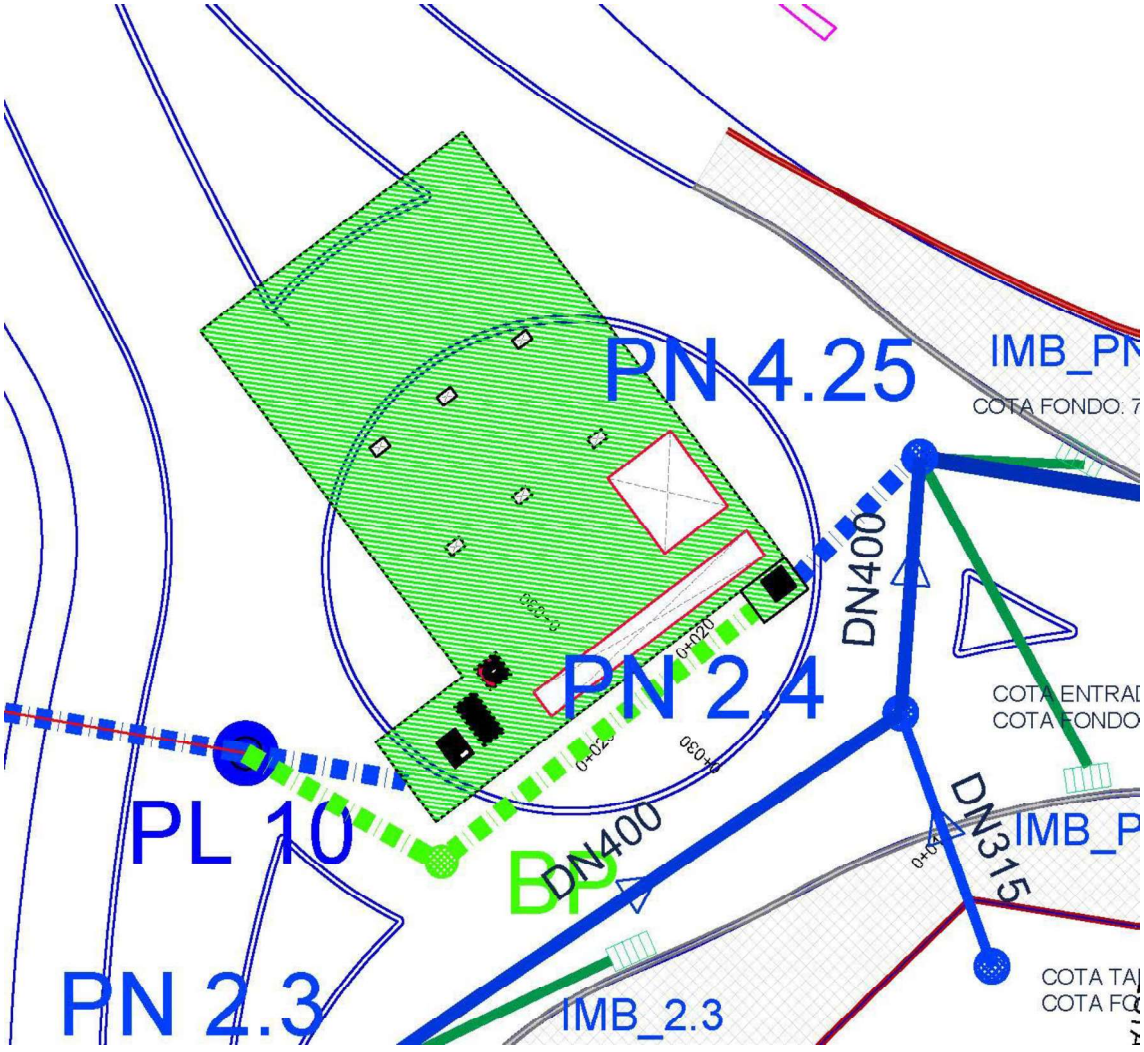
# 2 ANEJOS.

## *2.1 PROYECTO DE CONSTRUCCIÓN DE TANQUE DE TORMENTAS NORTE DE LA FRACCIÓN 3, DE LA UNIDAD DE EJECUCIÓN UE-VII.1. "SISTEMAS GENERALES P.E. + KODAK" DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).*

PROCAVER
SOLUCIONES URBANAS, S.L.

# PROYECTO DE CONSTRUCCIÓN DEL TANQUE DE TORMENTAS NORTE DE LA UNIDAD DE EJECUCIÓN UE-VII.1. "SISTEMAS GENERALES P.E. + KODAK" DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID)

(EXPDTE. DE CONFORMIDAD TÉCNICA CTS 1249)




PROPIEDAD:
J.C UE-VII.1. "SISTEMAS GENERALES P.E. + KODAK"
FEBRERO DEL 2024

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# DOCUMENTO I.- MEMORIA Y ANEJOS

# MEMORIA DESCRIPTIVA

## 1. Objeto

El objeto del presente proyecto es la definición de las obras e instalaciones necesarias a desarrollar para llevar a cabo la ejecución del **tanque de tormentas Norte, a desarrollar en interior de la Unidad de Ejecución UE-VII.1. de Las Rozas de Madrid (Madrid).**

El proyecto se compone de los siguientes documentos técnicos:

- Documento nº I Memoria Descriptiva y Anejos, donde se especifica y describe todo lo concerniente a las obras a realizar y características pertinentes, ya sea en la Memoria Descriptiva o en sus Anejos.

- Documento nº II Planos, donde se grafía la solución y el diseño propuesto para el tanque de tormentas, así como, estructura, equipos y detalles constructivos que permiten la adecuada ejecución.

- Documento nº III Pliego de Condiciones, se fijan las prescripciones técnicas respecto de los materiales y el procedimiento constructivo a desarrollar para la ejecución de las obras, así como, su medición y posterior abono.

- Documento nº IV Presupuesto, que incorpora los cuadros de precios con la medición y valoración de las diferentes unidades de obra recogidas en proyecto.

- Documento nº V Estudio de Seguridad y Salud.

El proyecto se adapta a la normativa vigente del Canal de Isabel II, a sus prescripciones y a sus determinaciones en cuanto a criterios de diseño, materiales y elementos a emplear en la ejecución de tanques de tormentas.

# 2. Introducción y Antecedentes administrativos

El presente proyecto del **tanque de tormentas Norte** cuenta con el **expediente de conformidad técnica CTS 1249**, correspondiente al Proyecto de los tanques de tormentas Norte y Sur de la Unidad de Ejecución UE-VII.1. de Las Rozas de Madrid (Madrid).

La red de alcantarillado incluida en el proyecto específico de saneamiento (excluyendo los tanques de tormentas y la Fracción 2) de la unidad de ejecución UE VII.1 de Las Rozas de Madrid, está siendo tramitada de forma separada en el expediente de conformidad técnica CTS 873.

El 31/3/2021 Canal emitió el Informe n. º 1 positivo a proyecto, sobre conformidad técnica a la red de alcantarillado incluida en el proyecto específico de saneamiento (excluyendo los laminadores y la fracción 2) de la Unidad de Ejecución UE-VII.1. de Las Rozas de Madrid, CTS 873. Cabe destacar, que:

"La puesta en servicio de red de saneamiento de aguas pluviales estará condicionada a obtener la conformidad técnica de Canal de los laminadores de aguas pluviales y a la puesta en servicio de dichos laminadores", tal y como se indicaba en el Informe n. º 1 del 31/3/2021 del CTS 873.

Respecto a los tanques de laminación el 3/3/2021 Canal indicó en un correo electrónico relativo al CTS 873 algunos criterios generales para tener en cuenta en el diseño de los tanques de laminación para la entrega futura correspondiente específicamente al expediente CTS 1249 de los tanques, ya que el proyecto de la red de saneamiento adelantaba planos de planta y sección de los laminadores y un predimensionamiento hidráulico.

La conformidad técnica a la red de alcantarillado incluida en el Proyecto de urbanización de la Unidad de Ejecución UE-VII.1. de Las Rozas de Madrid (Madrid) Sur", queda sujeta al cumplimiento de los condicionantes que se exponen a continuación:

La puesta en servicio de red de saneamiento de aguas pluviales estará condicionada a obtener la conformidad técnica de Canal de los laminadores de aguas pluviales y a la

puesta en servicio de dichos laminadores.», tal y como se indicaba en el Informe n. º 1 del 31/3/2021 del CTS 873.

El 4/11/2021 Canal emitió el Informe n. º 1 sobre conformidad técnica a los tanques de tormentas incluidos en el proyecto específico de saneamiento de la Unidad de Ejecución UE-VII.1. de Las Rozas de Madrid, donde se indica lo siguiente:

- Los posibles condicionantes que requiera la CHT, y en particular, los caudales que autorice para la salida de los tanques de vertido a cauce son base para el dimensionamiento de los tanques y condicionan el diseño que finalmente se disponga (tamaño, funcionamiento, elementos de los que se dote para accesibilidad, limpieza, etc.). Dado que se desconocen los posibles condicionantes que incluya la autorización emitida por la CHT, no es posible evaluar si los tanques se ajustan a lo exigido en la misma, por lo que para continuar con la tramitación del expediente incluyendo el análisis de su diseño (más allá de las indicaciones generales del correo enviado el 3/3/2021), es necesario remitir la autorización de la CHT para la ejecución de obras en dominio público hidráulico en relación con el vertido y las obras de tanques de tormentas y de urbanización y edificación. El promotor debe especificar si en la citada autorización se ha dado validez a los cálculos del Estudio Hidráulico complementario 2 remitido a Canal el 13/9/2021.

- Es necesario remitir el proyecto con el diseño de los tanques que finalmente se proponga y garantizar que se cumplen los posibles condicionantes de la CHT.

# 3. Situación y Emplazamiento

EL Tanque de Tormentas Norte, se localiza bajo el círculo interior de la glorieta situada en la intersección de las calles Ignacio Echavarría, Isla del Hierro y Formentera, dentro de la Fracción 3 que está integrada por el actual ámbito UE-VII.1. “Kodak”.

# 4. Propiedad

El Promotor del presente Proyecto de Urbanización es la JUNTA DE COMPENSACIÓN DE LA UNIDAD DE EJECUCIÓN UE-VII-1 "SISTEMAS GENERALES P.E. + KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID, que está desarrollando de forma íntegra el ámbito de la unidad de ejecución de referencia, con domicilio en Madrid, Calle Camino De La Zarzuela, 15 piso 3 (28023 Madrid), siendo a efectos legales este proyecto de iniciativa privada.

# 5. Autor del Encargo y Redacción del Proyecto

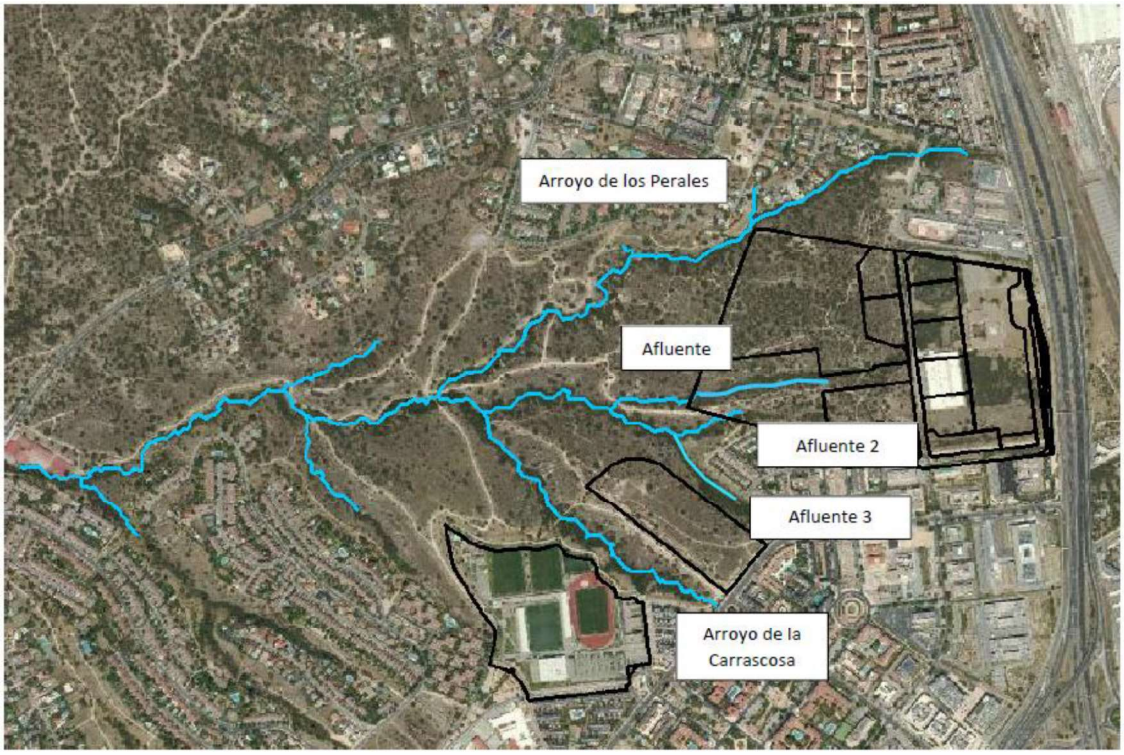
El presente documento se redacta por encargo de la JUNTA DE COMPENSACIÓN DE LA UNIDAD DE EJECUCIÓN UE-VII-1 "SISTEMAS GENERALES P.E. + KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID a la mercantil PROCAVER SOLUCIONES URBANAS, S.L.

El autor del proyecto es D. José Antonio Segura Sánchez, como de Ingeniero de Caminos, Canales y Puertos colegiado nº 14.718, en nombre y representación de la mercantil PROCAVER SOLUCIONES URBANAS, S.L.

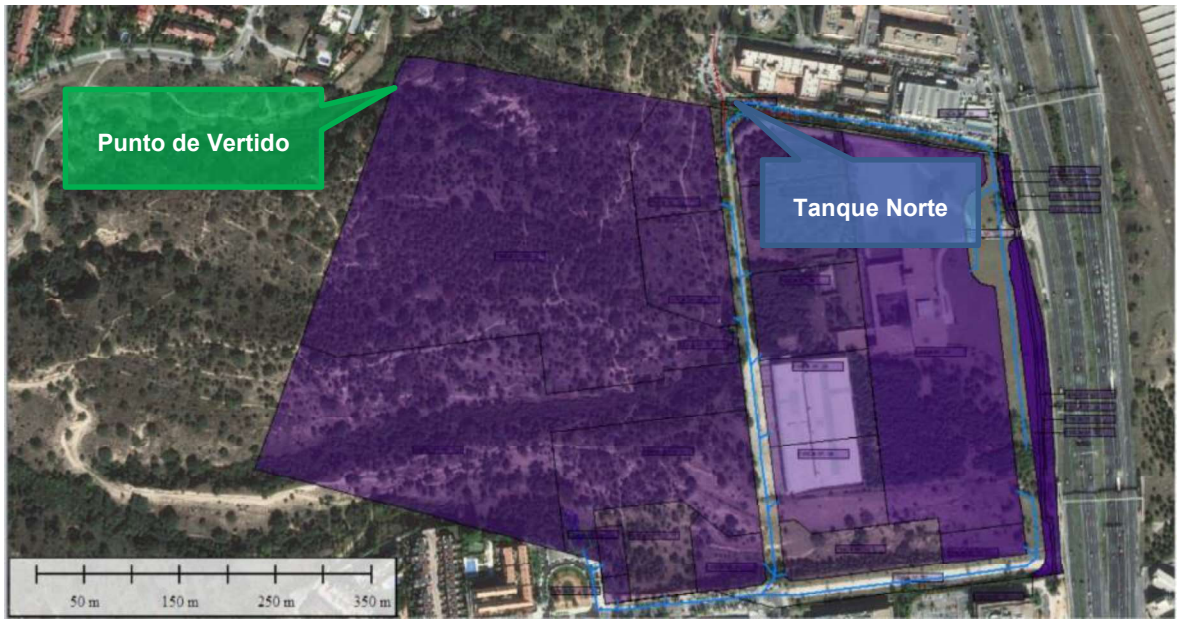
# 6. Criterios de diseño

Para facilitar la integración en la red de pluviales ejecutada según el proyecto de conformidad técnica de saneamiento, y de forma coherente con el sistema de drenaje actual, se propone la disposición del **tanque de tormentas Norte**.

En las siguientes imágenes se muestran tanto la red de drenaje actual como la ubicación aproximada del **tanque de tormentas Norte** y su punto de vertido:




*Red de drenaje actual*




*Ubicación de tanques de tormenta y puntos de vertido*

El **tanque de tormentas Norte** ha sido diseñado para garantizar un caudal de vertido máximo coincidente con el 10% del caudal en régimen natural (situación preoperacional) para un periodo de retorno de **10 años, de cada uno de los arroyos donde se produce el vertido.**

En el Estudio Hidrológico e Hidráulico, se calculan los citados caudales en régimen natural, para el periodo de retorno de 10 años, en cada uno de los arroyos, siendo los valores obtenidos los siguientes:

- Arroyo Perales, donde vierte el colector Norte. 1.425 l/s.

Con el criterio de garantizar un caudal máximo de vertido equivalente al 10% del caudal, los valores de vertido máximo son:

**- Zona Norte: 142,5 l/s.**

Por otra parte, el Estudio Hidrológico e Hidráulico recoge que los caudales resultantes de la red de saneamiento de aguas pluviales de la urbanización correspondientes a la zona Norte para los diferentes periodos de retorno son los siguientes:

| Caudal Máximo (l/s) (EHH-JUN22) | Periodo de Retorno | | | |
|---|---|---|---|---|
| Cuenca | 5 años | 10 años | 100 años | 500 años |
| Zona Norte (Arroyo Perales) | 0,565 | 0,668 | 1,031 | 1,315 |

Definido el caudal máximo de vertido, se calcula el volumen de laminación necesario para cada una de las zonas:

| Tanque | Caudal Vertido (l/s) |
|---|---|
| Norte | 142,5 |

# 7. Estudio hidrológico

Según se recoge en el Estudio Hidrológico e Hidráulico, realizado según la Norma 5.2.IC, se obtienen los caudales máximos estimados para cada período de retorno considerado. Para el análisis de la capacidad de laminación necesaria que garantice el criterio de máximos caudales de vertido a cauce público estos estudios deben completarse con la obtención de hidrogramas de diseño a partir de los que se pueda hacer un balance de volúmenes y obtener de esta forma las dimensiones mínimas necesarias para los tanques de laminación.

A continuación, se resume el desarrollo seguido para la obtención de hidrogramas de diseño que representen el comportamiento de la cuenca a partir de considerar el hietograma de precipitación correspondiente a 10 años de período de retorno mediante la aplicación de uso extendido HEC-HMS.

## 7.1. Caudales de diseño

Para la determinación de los caudales de avenida o de diseño de la red de drenaje se propone emplear el método racional ampliamente empleado y sancionado por la experiencia para este tipo de infraestructuras. En este caso el modelo utilizado está basado en la formulación propuesta en la actual Norma 5.2.-I.C. Drenaje Superficial de la Instrucción de Carreteras de 15 de febrero de 2016.

Este método considera el efecto de no uniformidad de las lluvias además de una adecuada estimación del coeficiente de escorrentía.

El caudal máximo Q, expresado en m3/s se obtiene a partir de la siguiente expresión:

$$Q = \frac{CIA}{3.6} K$$

obteniéndose los resultados que se reflejan en los siguientes cuadros que resumen el proceso seguido.

A partir del uso del suelo se determina el valor del coeficiente de escorrentía mediante la formulación incluida en la normativa española:

$$C = \frac{\left(\frac{P_d \cdot K_A}{P_0} - 1\right)\left(\frac{P_d \cdot K_A}{P_0} + 23\right)}{\left(\frac{P_d \cdot K_A}{P_0} + 11\right)^2}$$

Donde C es el coeficiente de escorrentía, Pd la precipitación diaria para el período de retorno considerado, P0 el umbral de escorrentía corregido para los distintos períodos de retorno y KA un coeficiente reductor por superficie obtenido según:

Si $A$ < 1 km$^2$ $\qquad K_A = 1$

Si $A \geq 1$ km$^2$ $\qquad K_A = 1 - \frac{\log_{10} A}{15}$

La determinación de la intensidad de cálculo se obtiene a partir de la siguiente expresión:

$$F_a = \left(\frac{I_1}{I_d}\right)^{3{,}5287 - 2{,}5287\, t^{0{,}1}}$$

El tiempo de concentración se obtiene según:

$$t_c = 0{,}3 \cdot L_c^{\,0{,}76} \cdot J_c^{\,-0{,}19}$$

Donde tc es el tiempo de concentración en horas, Lc la longitud del cauce principal en Km y Jc la pendiente media del cauce.

El coeficiente de uniformidad K, cuyo valor depende exclusivamente del tiempo de concentración Tc, responde a la siguiente expresión:

$$K = 1 + \frac{Tc^{1.25}}{Tc^{1.25} + 14}$$

En los siguientes cuadros se muestran los datos necesarios, así como el proceso seguido para la obtención de los caudales máximos para el sistema correspondiente al **arroyo Perales**:

| Cuenca | Superficie ($Km^2$) | Longitud cauce (Km) | Cota máxima (m) | Cota mínima (m) | Pendiente media (m/m) | Tiempo de concentración (h) | Coeficiente uniformidad | Coeficiente reductor |
|---|---|---|---|---|---|---|---|---|
| Tanque_Norte | 0.294 | 0.935 | 735.0 | 704.0 | 0.033 | 0.545 | 1.032 | 1.000 |
| Ayo_Perales2 | 0.475 | 1.060 | 735.0 | 701.0 | 0.032 | 0.603 | 1.037 | 1.000 |
| Ayo_Perales | 0.939 | 2.100 | 735.0 | 673.0 | 0.030 | 1.030 | 1.069 | 1.000 |

La precipitación máxima en 24 horas estimada para distintos períodos de retorno es:

**Precipitación máxima 24 horas**

| | Período de Retorno | | | |
|---|---|---|---|---|
| Cuenca | 5 años | 10 años | 100 años | 500 años |
| Cuenca completa | 52.33 | 61.83 | 95.46 | 121.73 |

Una vez aplicado el coeficiente reductor por área las precipitaciones de cálculo son:

**Precipitación areal por subcuencas**

| | Período de Retorno | | | |
|---|---|---|---|---|
| Cuenca | 5 años | 10 años | 100 años | 500 años |
| Tanque_Norte | 52.33 | 61.83 | 95.46 | 121.73 |
| Ayo_Perales2 | 52.33 | 61.83 | 95.46 | 121.73 |
| Ayo_Perales | 52.33 | 61.83 | 95.46 | 121.73 |

El umbral de escorrentía inicial y el corregido para el cálculo del caudal correspondiente a 10 años de período de retorno es:

**Umbral de escorrentía inicial**

| Cuenca | $P_0$ (mm) |
|---|---|
| Tanque_Norte | 11.43 |
| Ayo_Perales2 | 13.65 |
| Ayo_Perales | 16.25 |

**Umbral de escorrentía**

| Coef. Corrector Bm | 1.00 | | | |
|---|---|---|---|---|
| | 5 años | 10 años | 100 años | 500 años |
| Coef. Corrector Ft | 0.91 | 1.00 | 1.31 | 1.54 |

| Cuenca | 5 años | 10 años | 100 años | 500 años |
|---|---|---|---|---|
| Tanque_Norte | 10.40 | 11.43 | 14.97 | 17.60 |
| Ayo_Perales2 | 12.42 | 13.65 | 17.88 | 21.02 |
| Ayo_Perales | 14.79 | 16.25 | 21.29 | 25.03 |

El coeficiente de escorrentía e intensidad media son:

**Coeficiente de escorrentía C**

| | | Período de Retorno | | |
|---|---|---|---|---|
| Cuenca | 5 años | 10 años | 100 años | 500 años |
| Tanque_Norte | 0.44 | 0.47 | 0.52 | 0.55 |
| Ayo_Perales2 | 0.38 | 0.40 | 0.46 | 0.49 |
| Ayo_Perales | 0.32 | 0.34 | 0.40 | 0.43 |

**Intensidad media**

| | | Período de Retorno | | |
|---|---|---|---|---|
| Cuenca | 5 años | 10 años | 100 años | 500 años |
| Tanque_Norte | 30.74 | 36.32 | 56.07 | 71.50 |
| Ayo_Perales2 | 29.06 | 34.34 | 53.02 | 67.61 |
| Ayo_Perales | 21.44 | 25.33 | 39.10 | 49.87 |

Los caudales finalmente obtenidos para cada uno de los tramos considerados son:

**Caudal máximo Racional ($m^3/s$)**

| | | Período de Retorno | | |
|---|---|---|---|---|
| Cuenca | 5 años | 10 años | 100 años | 500 años |
| Tanque_Norte | 1.14 | 1.42 | 2.47 | 3.32 |
| Ayo_Perales2 | 1.50 | 1.89 | 3.34 | 4.52 |
| Ayo_Perales | 1.91 | 2.42 | 4.35 | 5.95 |

En los siguientes cuadros se muestran los datos necesarios, así como el proceso seguido para la obtención de los caudales máximos para el sistema correspondiente al denominado Cauce_1 y la Cuenca Total:

| Cuenca | Superficie ($Km^2$) | Longitud cauce (Km) | Cota máxima (m) | Cota mínima (m) | Pendiente media (m/m) | Tiempo de concentración (h) | Coeficiente uniformidad | Coeficiente reductor |
|---|---|---|---|---|---|---|---|---|
| Cauce_1 | 1.103 | 1.857 | 742.0 | 675.0 | 0.036 | 0.90 | 1.000 | 0.997 |
| Cuenca_Total | 3.907 | 3.417 | 735.0 | 651.0 | 0.025 | 1.54 | 1.109 | 0.961 |

La precipitación máxima en 24 horas estimada para distintos períodos de retorno es:

**Precipitación máxima 24 horas**

| | Período de Retorno | | | |
|---|---|---|---|---|
| Cuenca | 5 años | 10 años | 100 años | 500 años |
| Cuenca completa | 52.33 | 61.83 | 95.46 | 121.73 |

Una vez aplicado el coeficiente reductor por área las precipitaciones de cálculo son:

**Precipitación areal por subcuencas**

| | Período de Retorno | | | |
|---|---|---|---|---|
| Cuenca | 5 años | 10 años | 100 años | 500 años |
| Cauce_1 | 52.18 | 61.66 | 95.19 | 121.39 |
| Cuenca_Total | 50.27 | 59.39 | 91.69 | 116.93 |

El umbral de escorrentía inicial y el corregido para el cálculo del caudal correspondiente a 10 años de período de retorno es:

**Umbral de escorrentía inicial**

| Cuenca | $P_0$ (mm) |
|---|---|
| Cauce_1 | 12.87 |
| Cuenca_Total | 15.53 |

**Umbral de escorrentía**

| Coef. Corrector Bm | 1.00 | | | |
|---|---|---|---|---|
| | 5 años | 10 años | 100 años | 500 años |
| Coef. Corrector Ft | 0.91 | 1.00 | 1.31 | 1.54 |

| Cuenca | 5 años | 10 años | 100 años | 500 años |
|---|---|---|---|---|
| Cauce_1 | 11.71 | 12.87 | 16.86 | 19.82 |
| Cuenca_Total | 14.13 | 15.53 | 20.35 | 23.92 |

El coeficiente de escorrentía e intensidad media son:

**Coeficiente de escorrentía C**

| | Período de Retorno | | | |
|---|---|---|---|---|
| Cuenca | 5 años | 10 años | 100 años | 500 años |
| Cauce_1 | 0.40 | 0.42 | 0.48 | 0.51 |
| Cuenca_Total | 0.32 | 0.34 | 0.40 | 0.43 |

**Intensidad media**

| | Período de Retorno | | | |
|---|---|---|---|---|
| Cuenca | 5 años | 10 años | 100 años | 500 años |
| Cauce_1 | 23.07 | 27.26 | 42.09 | 53.67 |
| Cuenca_Total | 16.18 | 19.12 | 29.51 | 37.63 |

Los caudales finalmente obtenidos para el Cauce_1 y la Cuenca Total son:

**Caudal máximo Racional ($m^3/s$)**

| | Período de Retorno | | | |
|---|---|---|---|---|
| Cuenca | 5 años | 10 años | 100 años | 500 años |
| Cauce_1 | 2.81 | 3.53 | 6.19 | 8.37 |
| Cuenca_Total | 6.24 | 7.93 | 14.25 | 19.46 |

En base al estudio hidrológico y los caudales estimados, el caudal circulante para 10 años de período de retorno en la zona del **vertido del Laminador Norte es de 1,42 m3/s.**

## 7.2. Caudales de la red de saneamiento pluviales

El proyecto de la red de pluviales desarrolla el cálculo de caudales y la justificación hidráulica de la red propuesta. La siguiente tabla muestra los datos utilizados para la obtención de los caudales de diseño de esta red que considera la urbanización proyectada:

| Cuenca | Superficie ($Km^2$) | Longitud cauce (Km) | Tiempo de concentración (h) |
|---|---|---|---|
| Zona Norte | 0.06995 | 0.592 | 0.174 |

Los coeficientes de escorrentía estimados son:

**Coeficiente de escorrentía C**

| | Período de Retorno | | | |
|---|---|---|---|---|
| Cuenca | 5 años | 10 años | 100 años | 500 años |
| Zona Norte | 0.52 | 0.52 | 0.52 | 0.52 |

Y la intensidad media en cada caso resulta:

**Intensidad media**

| | Período de Retorno | | | |
|---|---|---|---|---|
| Cuenca | 5 años | 10 años | 100 años | 500 años |
| Zona Norte | 55.54 | 65.63 | 101.32 | 129.21 |

Siguiendo la misma formulación para la obtención de caudales, los resultados son:

**Caudal máximo Racional ($m^3/s$)**

| | Período de Retorno | | | |
|---|---|---|---|---|
| Cuenca | 5 años | 10 años | 100 años | 500 años |
| Zona Norte | 0.565 | 0.668 | 1.031 | 1.315 |

A partir de estos valores se obtienen los caudales máximos estimados para el período de retorno considerado:

**Caudal máximo Racional ($m^3/s$)**

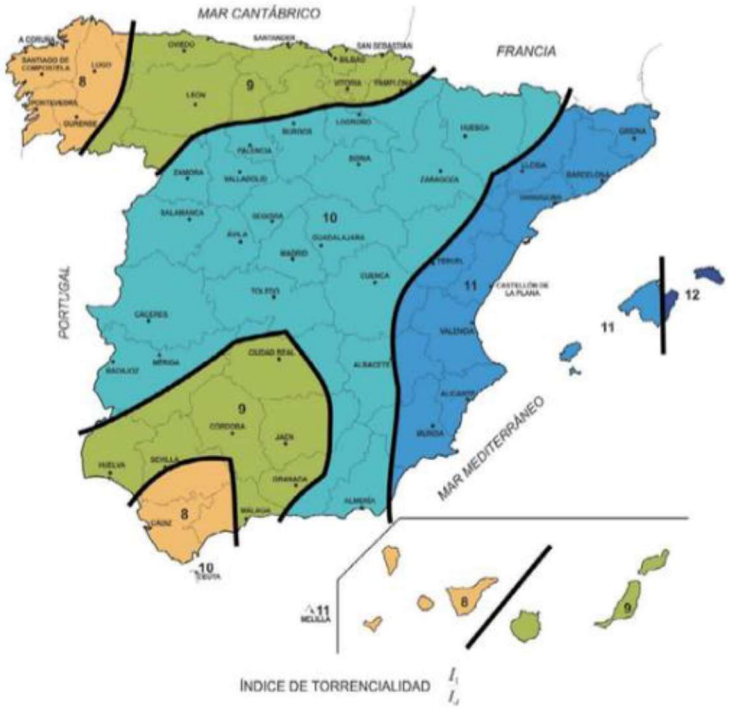
| Cuenca | 10 años |
|---|---|
| Zona Norte | 0.668 |

Como se puede comprobar, los caudales obtenidos para el **período de retorno de 10 años** en cada una de las zonas exceden de manera significativa el valor límite propuesto por la Confederación Hidrográfica del Tajo limitado en **142,5 l/s (0,142 m3/s) para la zona norte.**

## 7.3. Hidrograma de comprobación

Para estimar el volumen necesario de laminación correspondiente al evento de precipitación de **10 años de período de retorno** se transforma el caudal máximo en hidrograma considerando el hietograma correspondiente a 10 años de período de retorno.

A partir de la fórmula indicada a continuación se determina la intensidad en mm/h para las duraciones de tormenta estimadas, adoptando el valor I1/Id =10 indicado en la citada norma.

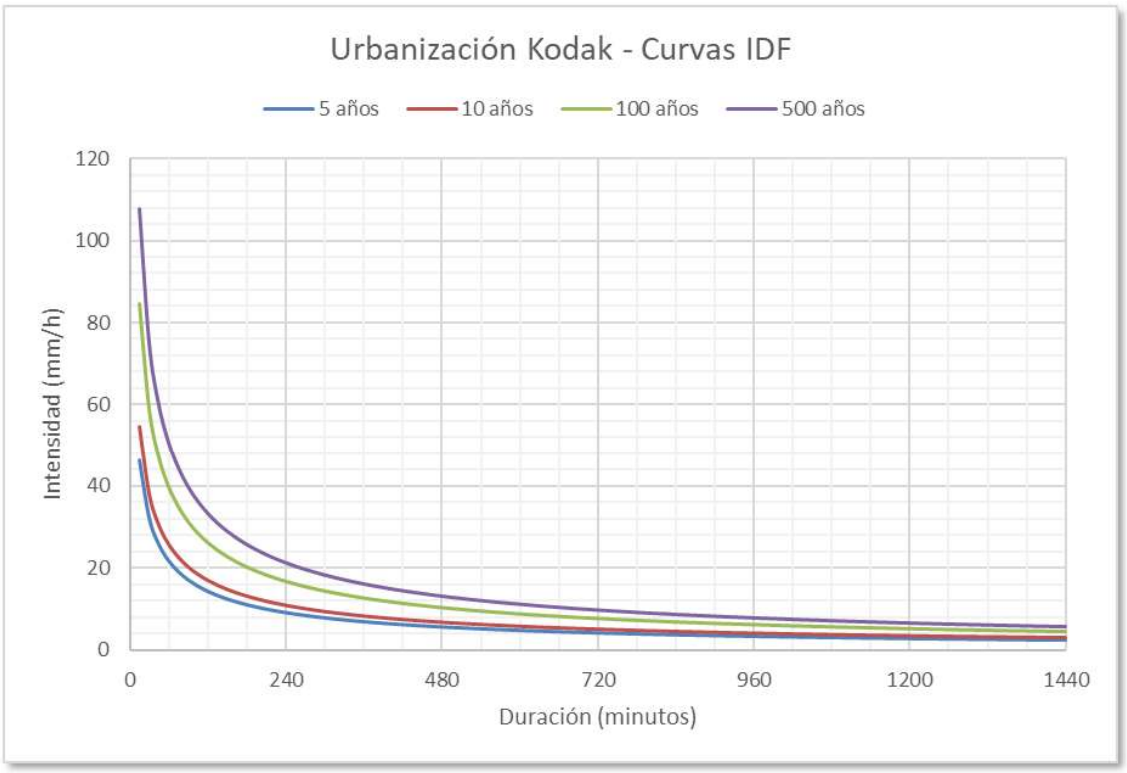



$$I(T,t) = I_d \cdot F_{\text{int}}$$

Donde Id es la intensidad media diaria para el período de retorno considerado y Fint un factor de intensidad determinado a partir de información de pluviógrafos existentes con registro continuo y una extensión suficiente de años, o bien a partir de la formulación indicada en la Norma que se muestra a continuación.

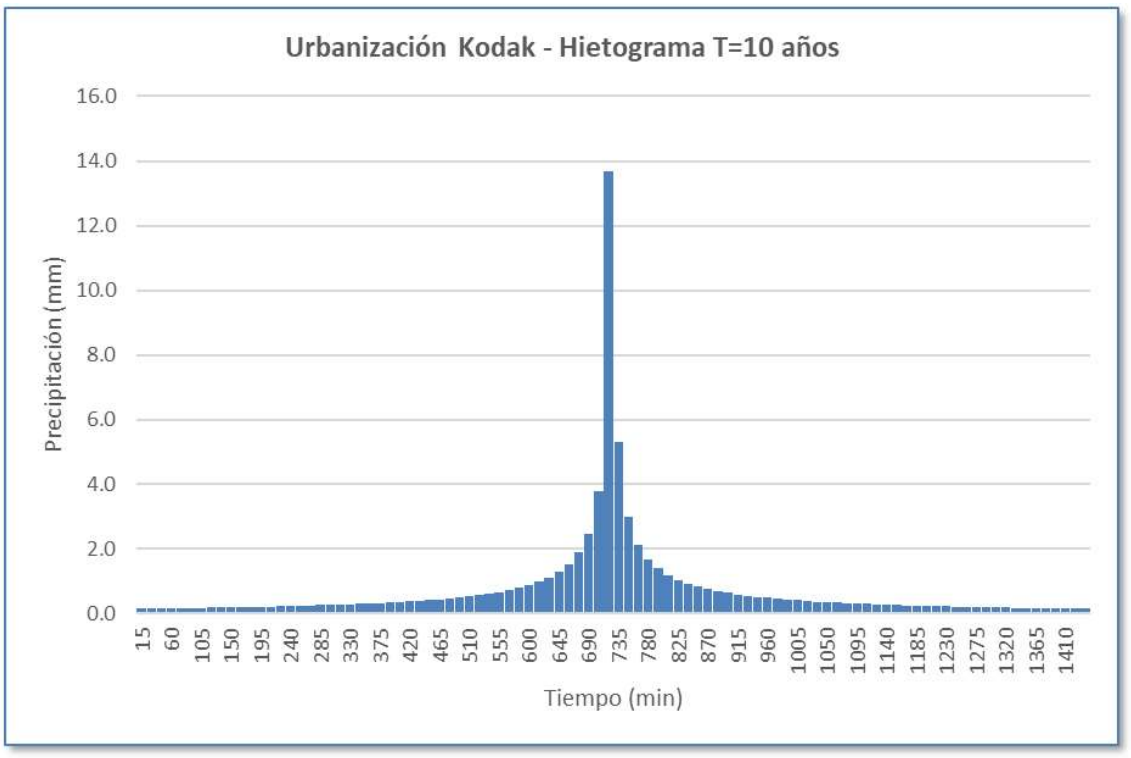
$$F_a = \left(\frac{I_1}{I_d}\right)^{3,5287 - 2,5287\, t^{0,1}}$$

Esta formulación facilita la elaboración de las curvas IDF (Intensidad-Duración-Frecuencia) que caracterizan los eventos de precipitación para los distintos períodos de retorno en las cuencas objeto de estudio.



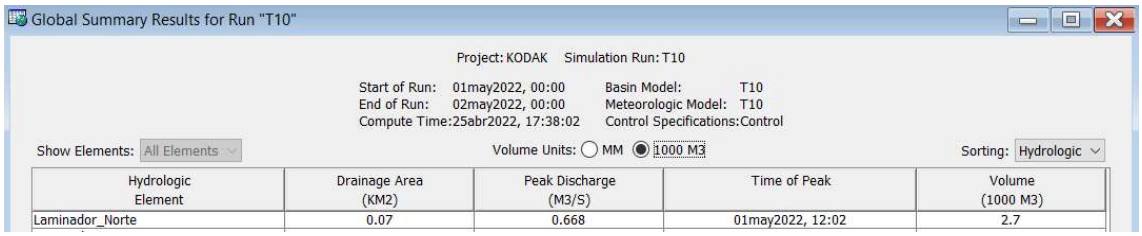

A partir de las curvas IDF se pueden desarrollar los hietogramas de diseño y/o comprobación para los distintos períodos de retorno.

Siguiendo la metodología de bloques alternos, con intervalos de tiempo de 15 minutos, y considerando el evento de precipitación de 24 horas de duración, se obtiene el hietograma correspondiente a **10 años de período de retorno**, hietograma que será el utilizado en la aplicación HEC-HMS para la obtención de los hidrogramas en cada una de las zonas:




A partir de estos valores se procede a desarrollar un modelo con la aplicación HEC-HMS siguiendo la metodología del número de curva, sin considerar pérdidas iniciales y calibrando el modelo para obtener el caudal máximo obtenido según la Norma española. Se comprueba que el número de curva es coherente con los usos estimados en el estudio inicial.

A continuación, se muestran resumen de resultados donde se comprueba la calibración de la cuenca al caudal inicialmente estimado:


Global Summary Results for Run "T10"

Project: KODAK Simulation Run: T10

Start of Run: 01may2022, 00:00 Basin Model: T10
End of Run: 02may2022, 00:00 Meteorologic Model: T10
Compute Time: 25abr2022, 17:38:02 Control Specifications: Control

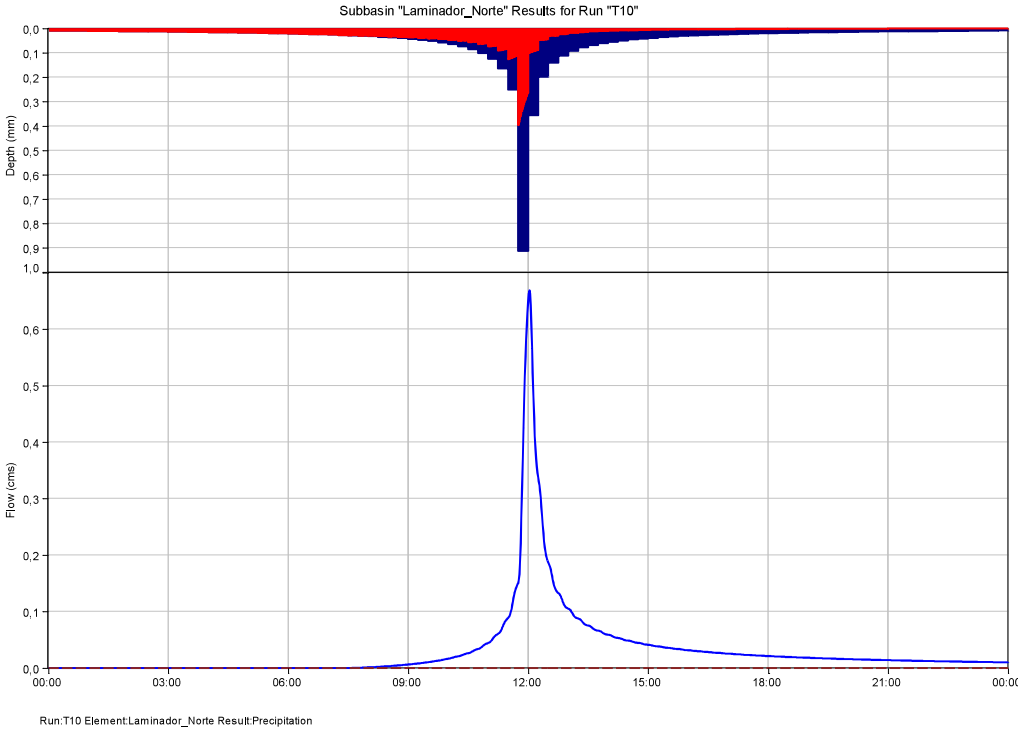
Show Elements: All Elements Volume Units: MM 1000 M3 Sorting: Hydrologic

| Hydrologic Element | Drainage Area (KM2) | Peak Discharge (M3/S) | Time of Peak | Volume (1000 M3) |
|---|---|---|---|---|
| Laminador_Norte | 0.07 | 0.668 | 01may2022, 12:02 | 2.7 |

Los números de curva obtenidos a partir de la calibración del modelo son 87 **para la zona norte**. Ambos valores son elevados y representa un grado de impermeabilización significativo coherente con los estudios anteriores.

El hidrograma obtenido en la zona norte es el siguiente:

## Laminador Norte:

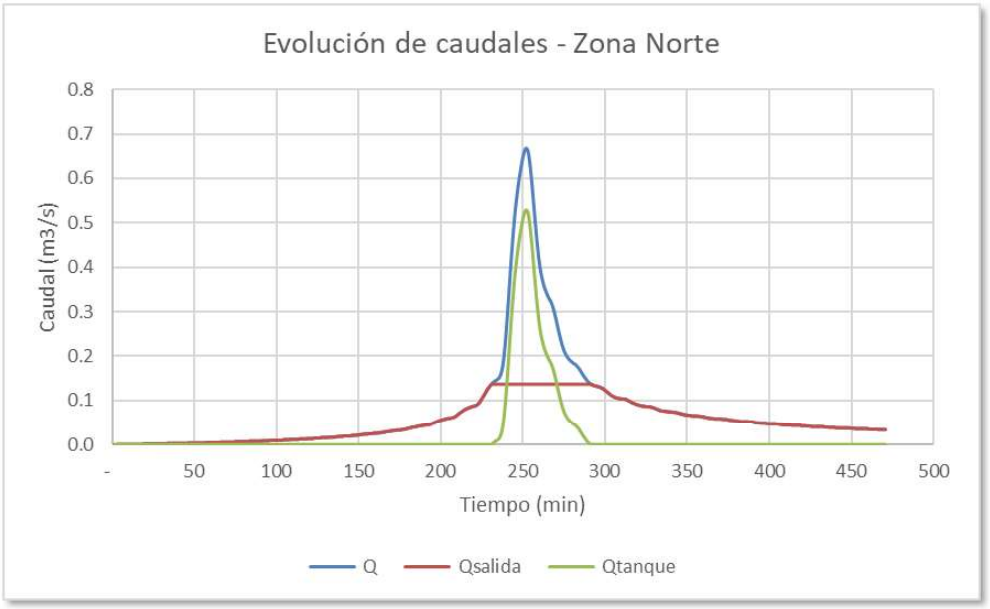


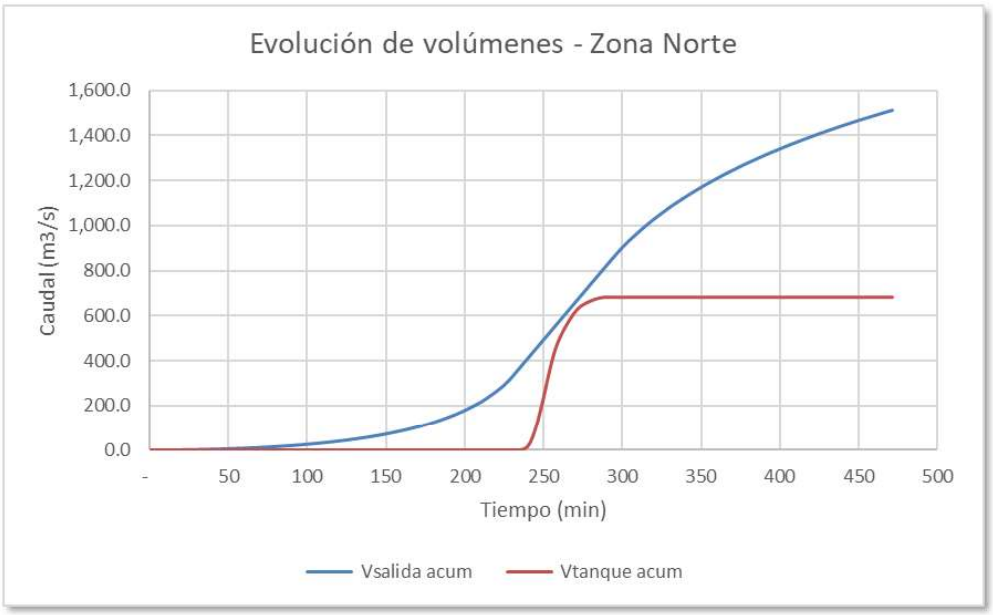
# 8. Dimensionamiento del tanque de tormentas

## 8.1. Volumen del tanque de tormentas

Una vez obtenidos los hidrogramas se procede a realizar un balance de volúmenes considerando la limitación del máximo caudal de vertido para cada uno de los casos.

En los siguientes gráficos se muestran los resultados obtenidos para el **laminador norte:**



Como se puede comprobar, **el volumen de laminación requerido para el laminador norte es de 667 m3.**

## 8.2. Implantación y Geometría del tanque de tormentas

El tanque de tormentas norte se sitúa en el punto bajo de la finalización del colector generale de aguas pluviales del saneamiento de la urbanización, de tal forma que las aguas pluviales se evacuarán hacia el arroyo de los Perales.

En el arroyo de los Perales, el vertido se hará mediante aliviadero de aguas pluviales proveniente del **Tanque de tormentas Norte**.

En el arroyo de la Carrascosa (afluente 2), el vertido se realizará mediante aliviadero de aguas pluviales proveniente del **Tanque de tormentas Sur**.

Por tanto, se proponen las siguientes dimensiones para los vasos de los tanques de tormentas:

**Tanque Norte (vertido al arroyo de los Perales):**

- Longitud: 14,80 m.

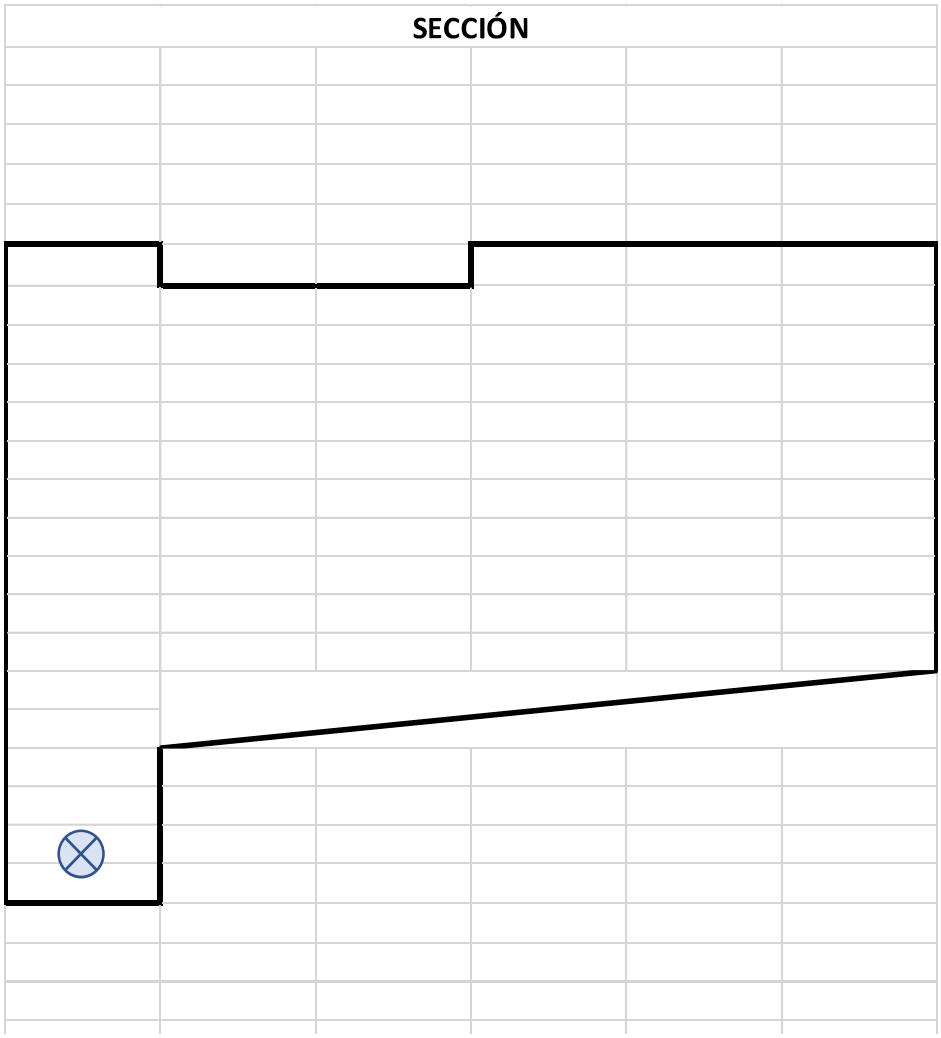
- Ancho: 9,50 m.

- Superficie: 140,60 m2.

- Calado: altura de calado útil de 4,75 m y 1,00 m de sobre calado, resultando una altura libre total de 5,75 m.

- Volumen total: **667,85 m3**, siendo superior a los 667,00 m3 del volumen estricto de cálculo obtenido.

A continuación, se muestra una sección tipo con las principales dimensiones para el tanque de tormentas norte:




| Tanque | S (m2) | H lámina (m) | H libre (m) |
|---|---|---|---|
| **Norte** | 140,60 | 4,75 | 5,75 |

## 8.3. Cumplimiento de la Normativa para Redes de Saneamiento del Canal de Isabel II. Versión 3. 2020 para tanques de retención

Atendiendo a la normativa vigente del Canal de Isabel II, los tanques objeto del presente proyecto se consideran de tipo **anti-inundación** y **fuera de línea**, de manera que se cumplen las siguientes características:

- **Tanques anti-inundación** (también llamados de regulación hidráulica o laminadores): su objetivo es suplir la falta de capacidad de un cierto colector mediante el almacenamiento en el tanque de los volúmenes de agua que dicho colector no es capaz de transportar porque la capacidad de éste sea inferior al caudal influente al tanque.

Estos tanques se instalarán donde sea necesario cumplir una función fundamentalmente laminadora, y especialmente en la entrada a las EDAR (estos tanques también son anti-DSU de manera indirecta).

En nuestro caso, la implantación del **tanque norte** tendrá lugar en el punto bajo y final del colector principal de saneamiento de aguas pluviales diseñados en la urbanización.

- **Tanques fuera de línea**: estos tanques tienen una flexibilidad y versatilidad de llenado que no poseen, los tanques en línea. En ellos mediante una cámara de derivación de caudales previa al tanque se segregan los caudales del hidrograma que pueden derivarse hacia el tanque para su llenado, los caudales que se trasvasan a la EDAR o los caudales que son directamente vertidos a cauce al superarse la dilución de vertido o cuando se cumplan estándares de vertido al disminuir los polutogramas asociados al hidrograma de la tormenta.

Elementos principales de tanques de retención:

En general los tanques deberán tener una serie de elementos que son necesarios para su funcionamiento hidráulico y correcta explotación.

En nuestro caso, el **tanque norte** diseñado, dispondrá de los siguientes elementos:

**- Elementos de regulación:**

Los elementos de regulación se podrán disponer aguas arriba del tanque o bien en su extremo de aguas abajo.

En nuestro caso, el **tanque norte** diseñado, dispondrá de elementos de regulación de caudales que permiten controlar los caudales hacia aguas abajo del tanque, mediante la instalación de Válvula vórtex.

Para su dimensionamiento se deberá aportar las curvas de gasto del fabricante de las válvulas vórtex y de las válvulas de seccionamiento por flotación y establecer la curva de gasto de las compuertas en función del grado de llenado aguas arriba y de su nivel de apertura.

**- Elementos de pretratamiento:**

La finalidad de los pretratamientos será la protección del cuerpo del tanque, así como conseguir hacer eficaz o viable el proceso de limpieza de las soleras del tanque. Los objetivos son:

- La retención de gruesos, gravas y arenas de tamaño medio con objeto de hacer factible una limpieza eficaz de las soleras del tanque cuando se proceda a su vaciado.

- La retención de sólidos flotantes previamente a los cuerpos de llenado del tanque.

Estos objetivos se pueden conseguir implementando las siguientes instalaciones previamente al cuerpo del tanque:

- La instalación de pozos de gruesos y desarenadores que retengan sólidos mayores de 5 mm.

- La instalación de rejas de desbaste de limpieza automatizada.

En nuestro caso, el **tanque norte** diseñado, dispondrá de una reja de desbaste de limpieza en la arqueta de llegada previa a la entrada al tanque de tormentas.

**- Elementos de limpieza:**

La limpieza de los sedimentos que se decantan sobre las soleras del cuerpo del tanque exige que éstas, en general, se doten de calles de limpieza que se configuran mediante la disposición de muretes de unos 0,30 m de altura aprovechando las alineaciones de las pilas y pilares que sustentan la cubierta del tanque.

De este modo se diseñan una serie de líneas o calles de limpieza cuyo objeto es servir de canales de pequeño calado sobre los que se descarga un volumen de agua que genera una onda superficial rápida que barre las soleras y consigue de este modo su limpieza. Los cajeros de estos canales son, precisamente, los muretes, anteriormente indicados, que se disponen en las alineaciones de pilas y pilares.

Las soleras de las calles deberán presentar un acabado fino, liso y regular con objeto de maximizar el arrastre de sólidos, debiendo incluirse en el proyecto el pulido del hormigón de las soleras.

Las calles no deberán superar un ancho de 8 m con objeto de que las clapetas de descarga rápida no tengan un ancho excesivo que provoque un peso de la clapeta demasiado alto que exija accionadores hidráulicos aparatosos. El ancho mínimo de las calles deberá ser de 5 m.

Las calles de limpieza deberán tener una pendiente mínima del 1% y finalizarán en un canal de recogida común a todas ellas, que deberá finalizar en una poceta de recogida de los volúmenes de agua y sedimentos generados por la limpieza de las soleras.

Los elementos de limpieza de las soleras del cuerpo del estanque podrán consistir en los siguientes sistemas:

- Cámaras de descarga rápida.

- Tanques basculantes.

- Sistema de impulsión para el vaciado del tanque por bombas.

En nuestro caso, el **tanque norte** diseñado, dispondrá de elementos de limpieza mediante la instalación de cámaras de descarga rápida o tanques basculantes.

**- Aliviadero de seguridad:**

El tanque deberá estar provisto de un aliviadero de seguridad que vierta aquellos volúmenes a cauce receptor que no son susceptibles de ser almacenados en el tanque al haberse agotado su volumen de retención de diseño.

Se deberá determinar el máximo nivel extraordinario de llenado del tanque (MNE) como la cota de la lámina de agua que deberá existir sobre el labio de vertido del aliviadero para conseguir aliviar el máximo caudal de diseño. El máximo nivel normal (MNN) quedará definido por la cota a la que se dispondrá el labio del vertedero del aliviadero.

El colector de alivio deberá disponer de unas clapetas anti-retorno en su extremo de vertido al cauce de tal modo que la posible crecida del río no origine un llenado no deseado del tanque por dicho colector.

Esta circunstancia deberá ser tenida en cuenta a la hora de establecer la cota MNE.

En nuestro caso, el **tanque norte** diseñado, dispondrá de aliviadero de seguridad.

**- Ventilación del tanque:**

El tanque deberá estar provisto de un sistema de ventilación natural o forzada que consiga que el aire contenido entre la lámina de agua y la cubierta del tanque se renueve al menos 7 veces a la hora.

En nuestro caso, el **tanque norte** diseñado, dispondrá de sistema mixto de ventilación natural y forzada, mediante las rejillas sobre las puertas de la caseta de control, los huecos de ventilación natural proyectados en la losa superior de la cámara de almacenamiento del depósito del tanque de tormentas, y la extracción forzada en la caseta y depósito de almacenamiento del tanque. También, se han proyectado rejillas de ventilación natural en todos los paramentos exteriores de la caseta de control, para

facilitar corrientes de ventilación cruzada continua que favorezcan la renovación de aire.

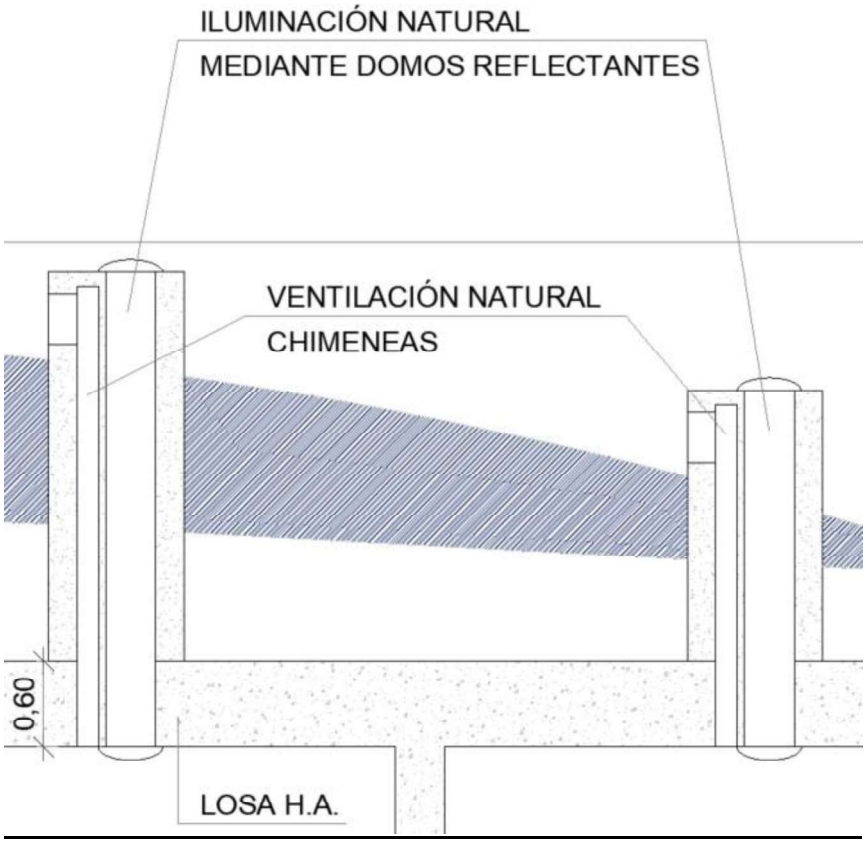
**- Iluminación**

Siempre que sea posible, el tanque deberá diseñarse para que en las horas centrales del día (11:00 a 16:00) el mismo pueda inspeccionarse sin necesidad de acudir a luz artificial. La iluminancia mínima sobre la solera del tanque y en dicho intervalo horario será de 30 lux en días soleados.

En cualquier caso, el tanque deberá disponer de luz artificial para poder efectuar tareas de inspección, mantenimiento o reparaciones, fuera de las horas anteriormente indicadas o cuando en ellas se precise una mayor iluminación adicional. La iluminancia mínima sobre la solera del tanque por la luz artificial deberá ser de 150 lux. Las luminarias tendrán un grado de protección IP68, es decir totalmente protegido contra el polvo y contra la inmersión continua en agua, según Norma UNE-EN 60529, y se dotará al tanque de tomas de corriente para conexión de focos portátiles.

En nuestro caso, el **tanque norte** diseñado, dispondrá de sistema mixto de luz natural y artificial, mediante las rejillas sobre las puertas de la caseta de control, y los huecos de iluminación natural proyectados en la losa superior de la cámara de almacenamiento del depósito del tanque de tormentas. También, se ha provisto de un sistema de iluminación artificial tanto la caseta de control, como el depósito de almacenamiento del tanque.

A continuación, se muestra imagen de la posición de las chimeneas mixtas de ventilación e iluminación natural proyectadas sobre en la losa superior de la cámara de almacenamiento del depósito del tanque de tormentas.




**- Sensores y metrología:**

El tanque dispondrá de una serie de sensores que permitirán su monitorización desde el centro de control del tanque si éste existiera o bien desde el centro de control general.

Los tanques deberán tener los siguientes sensores:

- Caudalímetros o limnímetros instalados en el colector influente al tanque y a una distancia suficiente que permita reaccionar los reguladores hidráulicos de ingreso de agua al tanque y ubicados en un punto tal que a la vez describa correctamente el flujo hidráulico: puntos con regímenes previsiblemente uniformes o próximos al uniforme.

- Sensores de monitorización del grado de apertura de compuertas.

- Sensores de nivel ultrasónicos para determinar el llenado de los compartimentos del tanque.

- Sensores de auscultación estructural.

- Caudalímetro o limnímetro instalado en el colector de alivio a cauce.

- Caudalímetro o limnímetro del efluente derivado hacia la depuradora tras el tanque.

- Caudalímetros en todos los colectores de impulsión de las bombas, en caso de vaciado del tanque por bombeo.

- Sondas multiparamétricas de calidad de las aguas retenidas en cada uno de los compartimentos del tanque.

En nuestro caso, el **tanque norte** diseñado, dispondrá de caudalímetro tipo radar en los colectores de entrada y salida y un sensor de llenado del tanque.

**- Sensores de gases:**

El tanque deberá tener sensores de detección de gases, entre ellos metano, sulfhídrico, amoniaco, oxígeno.

Los sensores se instalarán en:

- En los puntos centrales de los compartimentos se dispondrán, próximos a la cubierta para detectar los gases más ligeros, sensores de CH4 y NH3 y mediante un vástago vertical cilíndrico en acero inoxidable 316L anclado a la cubierta y con un sistema de deslizadera-flotador, se dispondrán sensores de H2S y oxígeno disuelto, de modo que se consiga monitorizar los gases pesados.

En nuestro caso, el **tanque norte** diseñado, no dispondrá de sensores de gases.

**- Autómata de control o PLC:**

Los tanques deberán tener un PLC (controlador lógico programable) procedente de los sensores instalados para la regulación o instrumentación del tanque, que centralice y

permita su tratamiento, para que en función de dichas variables el sistema de control ordene la realización de las consignas de regulación y funcionamiento del tanque.

Para ello, se deberá efectuar el estudio de reglas y consignas que habrá de tener para el gobierno de los elementos de regulación y desagüe del tanque.

El tanque deberá poseer un edificio o caseta de control donde se ubique dicho PLC.

Se deberá definir e instalar un sistema compatible de comunicación con el sistema implantado en Canal de Isabel II, capaz de enviar toda la información del estado de la instalación según sus señales digitales y analógicas, y siguiendo los estándares y protocolos que fije Canal de Isabel II para recibir dicha información en su Centro Principal de Control.

En nuestro caso, el **tanque norte** diseñado, dispondrá de un edificio o caseta de control donde se ubique un PLC (controlador lógico programable), según necesidades.

# 9. Instalaciones del tanque de tormentas

## 9.1. Pozo o Cámara de Gruesos

Previo al pretratamiento o reja de gruesos, el caudal de aguas pluviales proveniente de la red de saneamiento de la urbanización hará su entrada en una cámara de gruesos, en el interior del tanque de tormentas, de dimensiones 3,00 x 1, 95 m.

## 9.2. Pretratamiento (Reja de Gruesos)

Se instalará una reja automática de gruesos con las siguientes características:

Elementos de control del sistema:

- Reja de Cadena.

- Sensor de nivel.

- Controlador digital.

Con la activación de un selector de modo la reja podrá trabajar de las siguientes maneras:

- 0 reposo

- 1 Modo local “sin autómata”

- 2 Automático local por autómata

- 3 Remoto

**- Modo Manual:**

En el modo manual la se pondrá en marcha únicamente cuando se accionen los pulsadores Marcha-Paro ubicados en el frontal del armario:

• Si se activa el selector de “AVANCE” el equipo comenzará a funcionar en un movimiento de avance.

• La reja seguirá funcionando hasta que se desactive este selector, el cual detendrá el equipo.

• Si se acciona el pulsador de “RETROCESO” el equipo comenzará a funcionar en un movimiento de retroceso.

• La reja seguirá funcionando en sentido inverso durante 5 segundos salvo que se accione el pulsador de “PARO RETROCESO”, el cual detendrá el equipo.

• Si ambos selectores están activados la orden avance prevalecerá.

**- Modo Automático:**

En el modo automático entrarán en funcionamiento los programas del autómata (PLC) integrado en el cuadro eléctrico. El sistema tiene varios funcionamientos diferentes, siempre y cuando no haya ningún defecto o alarma:

- Dispositivo de nivel:

La reja dispondrá de un sensor de nivel programado para enviar una señal analógica al controlador digital, el cual enviará la señal digital al PLC.

Cuando el nivel de fluido ha sobrepasado un valor mínimo preestablecido durante un tiempo ininterrumpido determinado (este margen de tiempo se utiliza para evitar que el detector de señales como consecuencia de posibles oleajes en el canal), el controlador enviará una señal digital al autómata para que el equipo comience a funcionar. Cuando el nivel de fluido del canal baja por debajo de dicho nivel, el equipo se mantendrá en funcionamiento un tiempo establecido, transcurrido el cual se pararán.

Cuando el nivel de fluido sobrepasa un valor máximo preestablecido durante un tiempo ininterrumpido determinado, el controlador enviará una señal digital de alarma al autómata para que el equipo se pare. Cuando el nivel de fluido del canal baja por debajo de dicho nivel, el equipo se pondrá en funcionamiento hasta alcanzar el valor mínimo.

El funcionamiento mediante el dispositivo de nivel tendrá prioridad respecto a los otros dos modos.

- Ciclo marcha-paro (temporizador):

La reja se activará si el nivel alto está desactivado y empezará a trabajar por tiempos de Marcha-Paro a través de un temporizador interno del autómata. Este temporizador establecerá unos ciclos de funcionamiento para la reja cada cierto intervalo de tiempo establecido (siempre y cuando el equipo no esté funcionando debido a un nivel de agua alto), normalmente 2-3 minutos cada 24 horas.

- Funcionamiento en modo inverso:

El limitador de par estará ajustado para el consumo correspondiente al motor. Al superar el consumo indicado, el motor parará, se rearmará automáticamente y realizará una inversión de la dirección del movimiento. El equipo trabajará durante un tiempo establecido en modo inverso, y parará transcurrido dicho tiempo. Una vez parado el equipo volverá a ponerse en funcionamiento en modo avance de forma continua mientras las señales del detector de nivel o temporizador estén activadas. Si

el equipo se detiene debido a un exceso de consumo del motor un número determinado de veces seguidas dentro de un periodo de tiempo establecido, el equipo se detendrá definitivamente y será necesaria una inspección por parte del operario. Si en contramarcha el limitador de par actúa por sobreconsumo la reja se detendrá definitivamente.

La reja de cadenas seleccionada, de Quilton consta de un bastidor de acero inoxidable construido rígidamente por fuertes perfiles de sujeción y amarre. Sirve de apoyo y fija los barrotes que forman la reja y que marcan, con su separación, la luz o paso de la reja deseado.

El agua con sedimentos fluye a través de los barrotes de la reja, mientras que los sólidos quedan retenidos en estos. Estos residuos son recogidos en la parte inferior del canal y trasladados a la zona superior donde tiene lugar la descarga, la cual puede efectuarse en contenedores, tornillos o cintas transportadoras, compactadores, etc.

El sistema de limpieza de la reja está sostenido entre dos cadenas y cuenta con unas guías que conducen los peines de accionamiento automático para que los dientes de los mismos se introduzcan entre las barras de la reja, sin apoyarse en ellas, de forma que realicen una correcta extracción de los sólidos desbastados, asegurando así una limpieza óptima de la reja.

En cumplimiento con el apartado 7.1 del Anexo XI del **Real Decreto 665/2023, de 18 de julio**, por el que se modifica el Reglamento del Dominio Público Hidráulico, se exige la instalarán de sistemas de retención de residuos sólidos gruesos y flotantes en el sistema de saneamiento para reducir la degradación visual o superficial en el punto de vertido por desbordamiento de dicho sistema de saneamiento. **El Real Decreto limita el paso máximo de los sistemas de retención a una luz libre de 10 mm.**

El **modelo de reja de cadenas seleccionado** para su instalación en la cámara de pretratamiento **limita la luz de paso a 10 mm**, tal y como se muestra en la siguiente imagen de las características técnicas, y además también garantiza la continua limpieza de la misma, por lo que se garantiza que el equipo se mantendrá completamente operativo después de cada episodio de lluvia.

## REJA DE CADENAS

Reja de cadenas Quilton mod. QC100 (10x930x4800) en material AISI-316L



### CARACTERÍSTICAS GENERALES

| | |
|---|---|
| Mod. Reja de cadena | QC100 |
| Material | AISI-316L |
| Tipo (AxW1xH1) | 10x930x4800 |

### DIMENSIONES

| | |
|---|---|
| Luz de paso (A) (mm) | 10 |
| Anchura canal (W) (mm) | 950 |
| Anchura reja (W1) (mm) | 930 |
| Altura canal (H) (mm) | 3250 |
| Altura descarga (H1) (mm) | 4800 |
| Altura total (H2) (mm) | 5700 |
| Inclinación | 80° |
| Nº peines de limpieza | 7 |
| Longitud barrotes (mm) | 1700 |
| Sección barrotes (mm) | 40x10 |

### CADENA DE PANTALLA

| | |
|---|---|
| Modelo | EHP-100 |
| Dureza, roldanas, casquillos, bulones | 48-50HR |
| Resistencia a la tracción | >45.000 N |
| Elongación | 0,45 mm/m |
| Paso | 100 mm |

## 9.3. Elemento de Regulación y Vaciado del tanque (Válvula Vortex)

Se instalará un regulador de caudal tipo **vortex** para el control del vaciado, limitando el caudal a **142,5 l/s para el tanque Norte.**

Estos reguladores son usados para regular o limitar el caudal en redes de saneamiento. Hay soluciones para salidas de Aliviaderos, Tanques de tormenta, Industrias y soluciones para entradas a Separadores, Estaciones de Bombeo, EDARs y muchas otras situaciones. Aseguran una regulación sin partes móviles, sin aporte de energía y con una sección de paso máxima. La curva característica asegura óptimas condiciones de operación.

La **válvula vórtex** irá alojada en el interior de una cámara seca y con un baipás. Dicho baipás debe ser capaz de funcionar como elemento de regulación dotándolo de una

compuerta que en función de la máxima altura de agua en el tanque y el grado de apertura no supere el caudal máximo de incorporación autorizado.

El dimensionamiento se realiza según las especificaciones de HIDROSTANK, empresa especializada en este tipo de instalaciones, resumiendo a continuación los cálculos y comprobaciones realizados.

Se selecciona una válvula de regulación de caudal tipo vórtice, marca MOSBAEK-HIDROSTANK, modelo CY/DX 1000-PP300-C275-A30 / BCTWL, para regular un caudal de 142 l/s a una altura de lámina de agua de 4,7 metros.

Fabricados en Acero Inoxidable AISI 316 L garantizan máxima durabilidad bajo todas las condiciones de operación.

La principal característica de las válvulas vortex es que regulan caudales con gran sección de paso, minimizando el riesgo de atasco. La inexistencia de partes móviles, así como el no necesitar aporte de energía, reducen también su mantenimiento.

Su función es la de limitar el caudal de paso a la salida del aliviadero hacia el colector aguas abajo. Dispone de un tubo de bypass en caso de atasco de la válvula, para permitir el paso de agua alternativo

A continuación, se muestra Imagen de válvula Vortex en cámara seca y salida entubada:

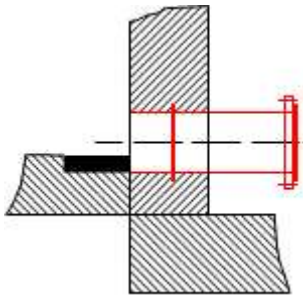


Instalación de Válvula Vortex en Cámara Seca:

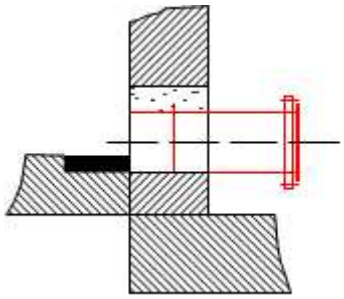
Se pueden distinguir tres partes: la instalación del vortex, el by-pass y los remates de obra civil.

El Vortex lleva asociado los siguientes elementos: un pasamuros, una válvula de guillotina y el propio Vortex. Existen tres formas comunes de instalar el pasamuros:

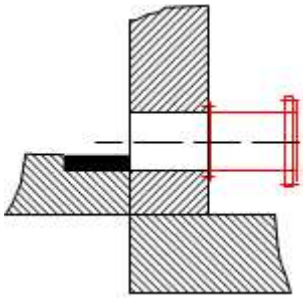
- Pasamuros embebido en el hormigón: El pasamuros se coloca al llevar a cabo el encofrado de los muros. Es necesario tener definido perfectamente el tipo de válvula a instalar.



- Pasamuros embebido en el hormigón, posterior al encofrado: Al realizar el muro se deja una ventana, en la cual se aloja el pasamuros y se rellena posteriormente de hormigón.



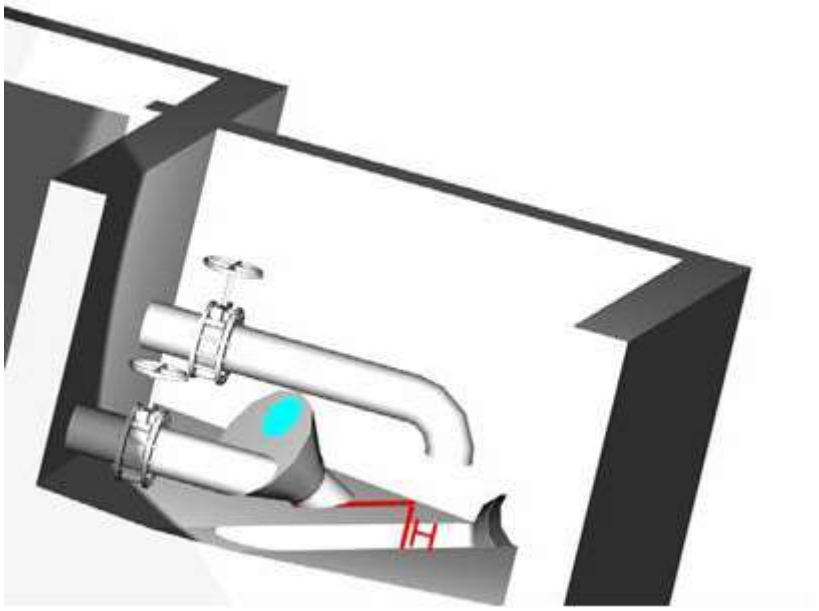
- Pasamuros anclado al muro:



El by-pass lleva asociado, a su vez, los siguientes elementos: pasamuros (se puede instalar de las tres formas mencionadas anteriormente), válvula de guillotina y codo.

Ejecutar una correcta obra civil es muy importante para optimizar el funcionamiento del aliviadero o tanque de tormenta en su conjunto, así como para facilitar el mantenimiento, así que a continuación se muestran las pautas que deben seguirse:

- La altura libre es la altura (H) a la que se encuentra la parte inferior del regulador respecto de la solera.




De este modo, para evitar inundar la cámara donde se encuentra el regulador se deberá respetar esta altura libre necesaria para la correcta descarga en la salida del regulador de caudal, según el siguiente cuadro:

| Caudal (l/s) | Altura libre (mm) |
|---|---|
| 0-60 | 200* |
| 60-90 | 250 |
| 90-180 | 300 |
| 180-300 | 350 |
| 300-500 | 400 |
| 500-800 | 500 |

- Se realizará una media caña con pendiente en la cámara central para reconducir el agua, así como unas cunas con inclinación que dirijan el fluido hacia la media caña. También se realizará en la media caña, justamente antes de la entrada al pasamuros conectado al Vortex, una rampa que facilite la entrada del agua por dicho pasamuros. Dicha rampa tendrá una elevada pendiente (aproximadamente 40%). El by-pass además tendrá una cota más alta que el vortex.



- Se conducirá el agua hasta la tubería de salida por medio de unas medias cañas de hormigón o plástico con pendiente, que vayan desde la salida del vortex hasta la tubería de salida. De manera similar, se debe conducir la salida del by- pass. Asimismo, se dimensionará la tubería de salida y la media caña del vortex de manera que sean capaces de evacuar de la cámara del vortex toda el agua que pasa a través del mismo, sin desbordar la media caña y, por tanto, sin inundar la cámara.



- Las dimensiones interiores en planta de la cámara donde se va a instalar el regulador vortex tiene dimensiones de 3.15 m x 3.45 m, dependiendo del caudal a regular, del tamaño y de la posición del regulador de caudal.

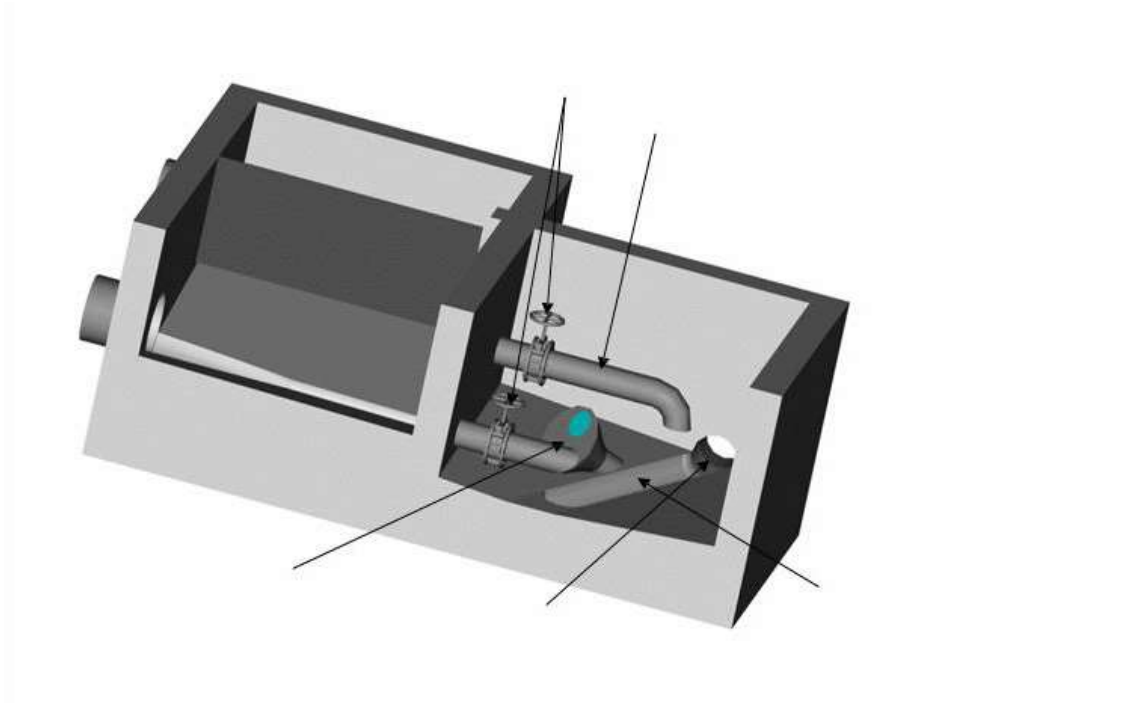
- Se colocará la tubería del by-pass a una distancia suficiente del regulador de caudal como para que una persona pueda introducirse entre los dos a la hora de realizar mantenimiento en el aliviadero.

- Se tendrá en cuenta el diámetro del volante de las válvulas de guillotina a la hora de diseñar los pasamuros, de manera que quede espacio suficiente para poder maniobrar el mismo correctamente.

- Se colocarán los pates de acceso a la cámara preferiblemente en el lado del by- pass, de manera que al abrir el mismo, se pueda salir de la cámara con la mayor celeridad posible en caso de inundación.

- Para facilitar el mantenimiento e inspección del Vortex se colocarán dos tapas de registro en la losa superior, una encima del canal central, que quede cerca del pasamuros del regulador, y la otra en la cámara de regulación.

En la siguiente puede observarse la instalación en cámara seca asociada a una válvula vortex:



La válvula vortex seleccionada para el control del caudal de vaciado del tanque norte presenta las siguientes características y curva de desagüe:

- COTA SALIDA: 727,43
- COTA ENTRADA CÁMARA VORTEX: 727.73
- PTO. BAJO SOLERA: 728.33
- PTO. ALTO SOLERA: 728.466 (Justo bajo los limpiadores)
- 2 LP-2814
- VT-2199

**Curva de desagüe característica:**

Los Vortex regulan el caudal en función de la altura del agua. En tiempo seco el flujo pasa sin dificultad a través del regulador. Si la altura de agua crece, el aire es atrapado en la parte superior de la cámara del regulador y se crea un torbellino.

En este momento, la curva característica se vuelve parabólica, reduciéndose el caudal. La energía potencial del agua se pierde en la rotación, la sección se reduce por el núcleo de aire, y de esta forma, se limita la descarga. Al disminuir el caudal de entrada al aliviadero, la altura del agua disminuye y la curva característica sigue con forma parabólica hasta que el aire se introduce en el regulador. Esta entrada de aire destruye el vórtice, y crea un repentino aumento de la descarga, que facilita la limpieza aguas arriba.

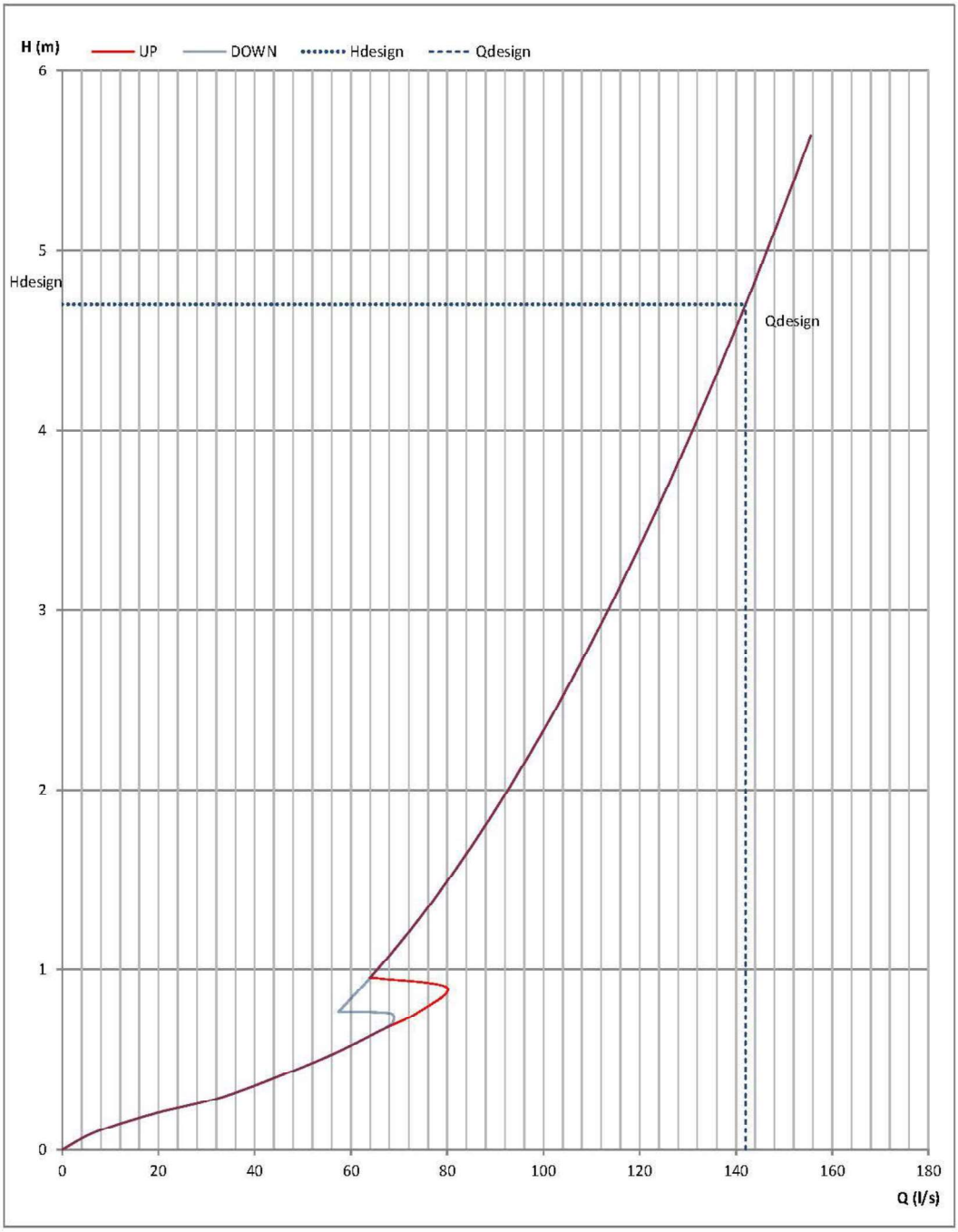
A continuación, se muestra la curva característica de la válvula vortex seleccionada:

**Tanque Norte:**

Mosbaek A/S

**Ref: 28209.1.1**
Date: 20-06-2023
**Design**: Q=142l/s
H=4,7m

**CYDX 1000 ø268**



## 9.4. Elemento de limpieza (Limpiadores autobasculantes)

Para la limpieza de los depósitos de finos decantados en el fondo del tanque, se instalarán dos **depósitos autobasculantes** separados en sendas calles.

Los limpiadores autobasculantes son equipos encargados de llevar a cabo la limpieza de los sólidos y sedimentos depositados en el fondo de los tanques de tormenta.

Su función es la limpieza de la solera del tanque de tormentas después de un evento lluvioso, para eliminar la sedimentación depositada en dicha solera al llenarse el tanque de tormentas. Consiste en una tolva suspendida de dos rodamientos, que al llenarse de agua y por su propia geometría, bascula produciendo la ola de limpieza. Su capacidad se calcula en función de la longitud a limpiar, la pendiente de la solera y la altura de instalación del propio equipo. En este caso, se ofertan 5 limpiadores en paralelo para cubrir toda la superficie de la solera.

Están diseñados en base a los mejores estándares de calidad para trabajar en ambientes corrosivos y oxidantes, fabricados en acero inoxidable, tanto AISI 304 como AISI 316. Además, están concebidos para no necesitar operaciones de mantenimiento y alcanzar una larga vida útil.

Las características de estos serán los siguientes:

Limpiadores autobasculante Hidrostank, referencia LP-2814:

• Volumen 200-2000 l/m.

• Longitud 4,6 m.

• Fabricados en acero inoxidable AISI 304L o AISI 316L.

• Sistema de llenado mediante tuberia tipo Filpress DN 42 mm en acero inoxidable 316 con accesorios roscados de 1,5 pulgadas, con llave de corte instalada en arqueta de PP de 58x58 interior y altura 60 cm con marco en acero galvanizado ajustable y tapa de composite de 636x636 clase B125. Electroválvula con cuerpo de latón y partes internas en acero inoxidable, con bobina IP65.

Los depósitos autobasculantes deberán ser probados en fábrica para garantizar su funcionamiento.

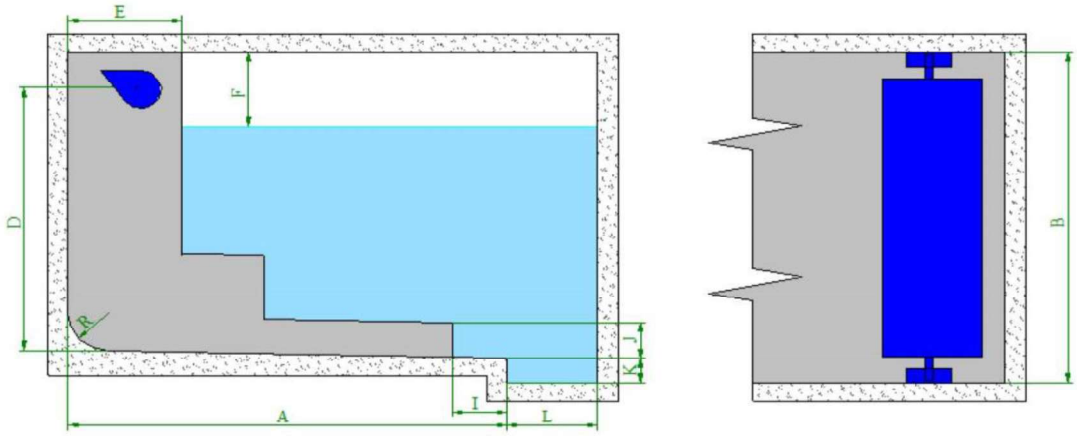
A continuación, se muestran los parámetros de diseño de los **limpiadores autobasculantes o volquetes**:

**Tanque Norte:**

Para conseguir una limpieza óptima, debe tenerse en cuenta que existe una relación directa entre la capacidad del limpiador (l/m), la altura de caída (h), la longitud a limpiar (L), y la pendiente de la solera.

| | | | | |
|---|---|---|---|---|
| **LIMPIADORES AUTOBASCULANTES HIDROSTANK.** | | | | Hidroflush version 3.5 |
| Cálculo de la capacidad del limpiador en función de la longitud, pendiente y altura de la cámara. | | | | |
| **Proyecto:** | SISTEMAS GENERALES P.E.+ KODAK" DEL P.G.O.U. DE LAS ROZAS DE MADRID | | | |
| **Número de proyecto:** | 4177 | | | |
| **Referencia limpiador:** | LP-2814 | | | |
| **Cliente:** | PROCAVER | | | |
| **Datos de entrada:** | | | | Datos del dibujo |
| Longitud a limpiar ..... | | 14.80 | m | A |
| Anchura de línea ..... | | 4.60 | m | B |
| Pendiente ..... | | 1.00 | % | C |
| Altura del eje ..... | | 4.79 | m | D |
| **Datos de salida:** | | | | |
| Volumen específico necesario ..... | | 200-2000 | l/m | |
| **Parámetros de diseño obra civil:** | | | | Datos del dibujo |
| Anchura del muro soporte mínima ..... | | 1.65 | m | E |
| Resguardo mínimo ..... | | 1.28 | m | F |
| Longitud primer tramo murete separador ..... | | 1 | m | G |
| Altura primer tramo murete separador ..... | | 0.5 | m | H |
| Paso libre recomendado entre carriles ..... | | 1,2-2 | m | I |
| Altura murete de separación ..... | | 0.3 | m | J |
| Profundidad canal de recogida ..... | | 0.7 | m | K |
| Anchura canal de recogida ..... | | 1 | m | L |

**Dibujo genérico mostrando dimensiones principales.**




**Cuadro resumen**

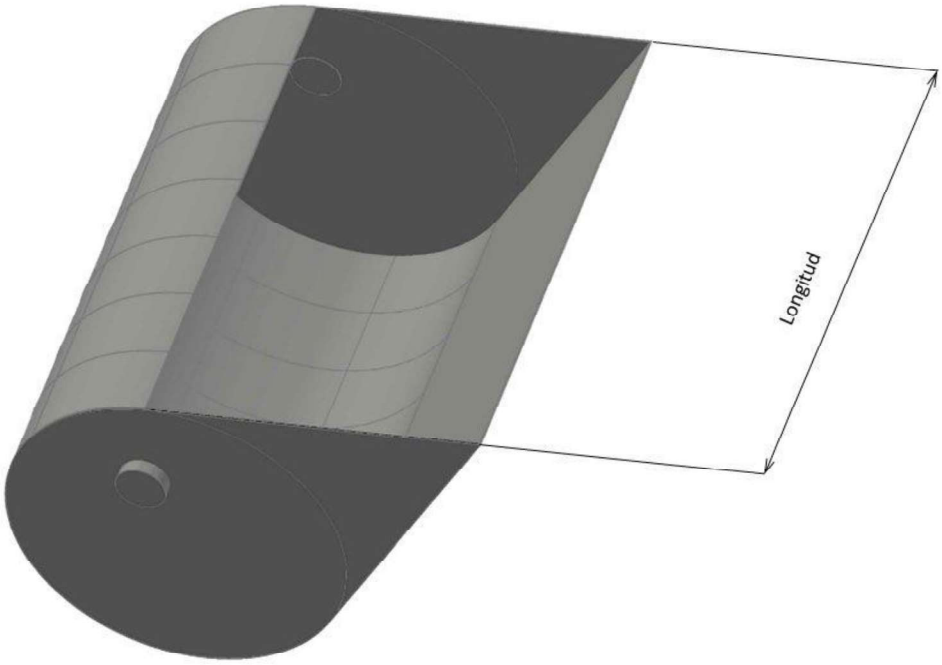
| | |
|---|---|
| **Referencia limpiador:** | LP-2814 |
| **Capacidad (*):** | 200-2000 l/m |
| **Longitud (incluyendo soportes):** | 4.60 m |

(*) Hidrostank garantiza la eficiencia en la limpieza con la capacidad escogida según los datos de entrada.
La oferta enviada se corresponderá con la capacidad necesaria, estando esta dentro del rango especificado.

A continuación, se muestran imágenes representativas del funcionamiento de limpiadores basculantes:







Longitud


hidro
metálica
hidro
metálica

Las principales características de los modelos seleccionados son las siguientes:

| Característica | Especificación de Hidrostank |
|---|---|
| Marca | Hidrostank |
| Referencia | LP-2814 |
| Anchura entre paredes | 4,6 |
| Diámetro del eje | 60 mm |
| Tipo de soportes | Soporte a pared lateral |
| Material del cuerpo | AISI 316L |
| Material de las lágrimas | AISI 316L |
| Material de los refuerzos | AISI 316L |
| Material de los soportes | AISI 316L |
| Material de los ejes | AISI 316L |
| Carcasa de los rodamientos | AISI 316 |
| Rodamientos | Acero cromado, doble hilera de rodillos esféricos |
| Capacidad de carga dinámica del rodamiento | 180 kN |
| Capacidad de carga estática del rodamiento | 220 kN |
| Tipo de anclajes | Anclaje hembra para hormigón INDEX HEA4 M16 |
| Material de los anclajes | Acero inoxidable A4. |
| Tornillos de sujeción | Tornillos DIN 933 de M16 en A4 |
| Acabado superficial | Chorreado con bolas de vidrio |
| Pruebas en fábrica | Prueba de volteo con agua, grabación en vídeo en nuestras instalaciones |

Y con relación al circuito de llenado para los limpiadores:

| Característica | Especificación de Hidrostank |
|---|---|
| Arquetas | Marca Hidrostank, de Polipropileno. Preparadas para la realización de la acometida de agua |
| Tubería hacia los limpiadores | Acero inoxidable AISI 316 tipo Filpress DN 42, con piezas roscadas de 1,5” en acero inoxidable AISI 316 |
| Llaves de bola | En acero inoxidable AISI 316, 1,5” de diámetro |
| Electroválvulas | Marca CEME serie 86 o similar, de 1,5” en latón |
| Enlace para las acometidas | En latón, de 1,5”, una acometida para cada arqueta |

El cometido del circuito de llenado es el de llenar los limpiadores con agua cuando sea necesario realizar una limpieza de la solera del tanque de tormentas. Comprende las arquetas de fontanería, las electroválvulas y la tubería que va desde estas hasta los limpiadores.

El circuito de llenado está formado por:

- Conducción de tuberías en polietileno, inoxidable o material específico.

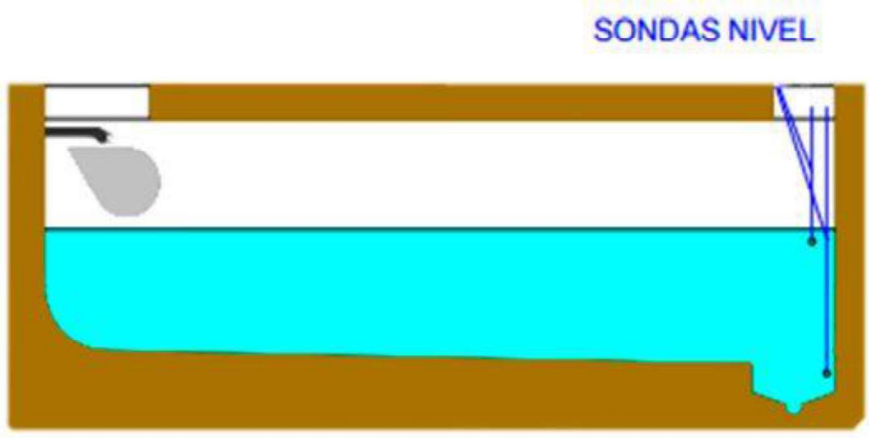
- Electroválvula de control, apertura y cierre.

- Circuito de control que mediante la instalación de boyas el nivel del tanque gestiona el llenado del limpiador.

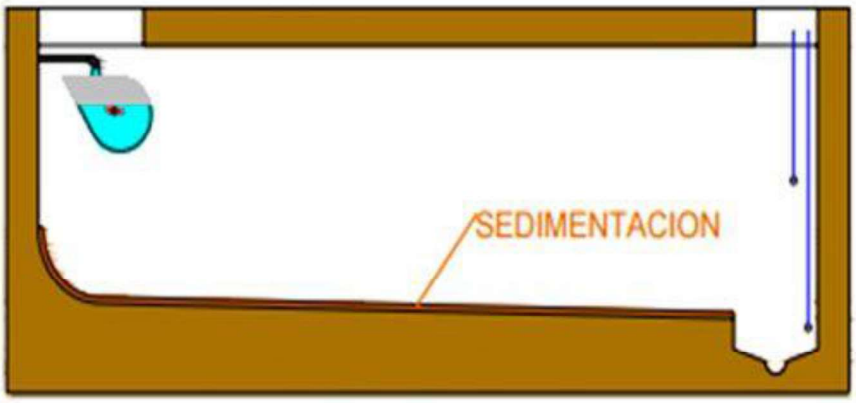


Los tanques de tormentas, una vez vaciados, alcanzan un gran nivel de suciedad depositada sobre su superficie generando malos olores. Además, estos residuos son difíciles de eliminar. Para facilitar y cumplir esta función de limpieza se instalan los limpiadores basculantes, cuyo funcionamiento cumple con la siguiente secuencia:

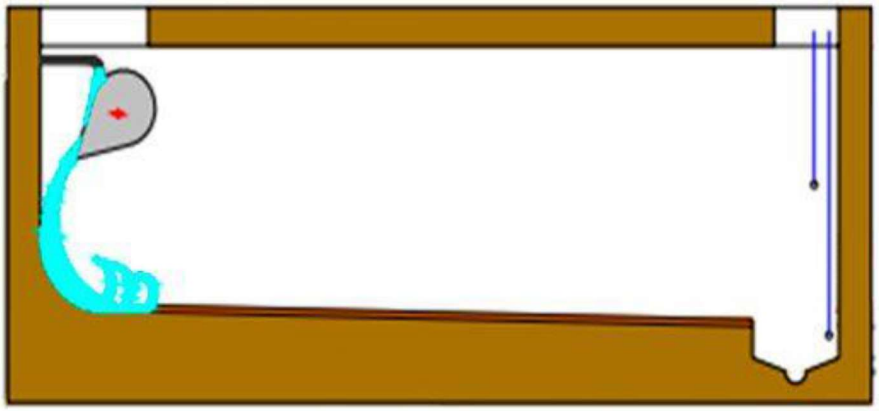
A. Una vez vaciado el tanque la sedimentación se acumula sobre la solera. Una sonda detecta esta situación y envía una señal que es recogida por el autómata, el cual abre la electro-válvula que permite el llenado del limpiador basculante.



B. El limpiador basculante está diseñado para cuando alcance su máxima capacidad de agua se produzca un desplazamiento de su centro de gravedad, haciendo que el equipo vuelque de forma inmediata y enérgica, consiguiendo que el agua contenida impacte contra la solera y produzca por tanto la limpieza de la misma.




C. Una vez vaciado el contenido del limpiador éste vuelve a su posición de reposo por su propio diseño, accionando un final de carrera que cierra la electroválvula.



## 9.5. Instalación de Fontanería

Se proyecta una acometida desde la red de abastecimiento del Canal de Isabel II para dotar de suministro de agua a los depósitos basculantes y la limpieza de PE DN50.

## 9.6. Instalación de Saneamiento interior para Aguas Pluviales

Se proyectan dos sumideros para la recogida de las aguas pluviales de la superficie interior de la rotonda, conectadas a la arqueta de entrada al tanque mediante tuberías de PVC de DN 110.

## 9.7. Instalación eléctrica

Se proyecta una acometida trifásica de sección 95 mm2 para la alimentación de los equipos, el alumbrado y las tomas de corriente.

La alimentación de las luminarias del interior del tanque se realizará con cables resistentes a la humedad.

Se instalarán bases tomas de corriente trifásicas de 32 A, monofásicas de 16 A y Schuko en los espacios con acceso al tanque. Y una base de tomas tipo Schuko en el cuarto eléctrico. Cada base de tomas tendrá una línea de alimentación independiente

En el cuarto eléctrico se instalará el cuadro general de baja tensión y un rack para la telegestión del depósito.

Los cálculos eléctricos se presentan en los anejos del presente proyecto.

## 9.8. Instalación de Control y Sistemas de Comunicación

El presente proyecto recoge las características de los materiales, los cálculos que justifican su empleo y la forma de ejecución de las obras a realizar, dando con ello cumplimiento a las siguientes disposiciones:

-Reglamento Electrotécnico para Baja Tensión e Instrucciones Técnicas Complementarias (Real Decreto 842/2002 de 2 de Agosto de 2002).

- Real Decreto 1955/2000 de 1 de Diciembre, por el que se regulan las Actividades de Transporte, Distribución, Comercialización, Suministro y Procedimientos de Autorización de Instalaciones de Energía Eléctrica.

- Ley 31/1995, de 8 de noviembre, de Prevención de Riesgos Laborales.

- Real Decreto 1627/1997 de 24 de octubre de 1.997, sobre Disposiciones mínimas de seguridad y salud en las obras.

- Real Decreto 486/1997 de 14 de abril de 1997, sobre Disposiciones mínimas de seguridad y salud en los lugares de trabajo.

- Real Decreto 485/1997 de 14 de abril de 1997, sobre Disposiciones mínimas en materia de señalización de seguridad y salud en el trabajo.

- Real Decreto 1215/1997 de 18 de julio de 1997, sobre Disposiciones mínimas de seguridad y salud para la utilización por los trabajadores de los equipos de trabajo.

- Real Decreto 773/1997 de 30 de mayo de 1997, sobre Disposiciones mínimas de seguridad y salud relativas a la utilización por los trabajadores de equipos de protección individual.

- REAL DECRETO 1890/2008, de 14 de noviembre, por el que se aprueba el Reglamento de eficiencia energética en instalaciones de alumbrado exterior y sus Instrucciones técnicas complementarias EA-01 a EA-07.

El tanque cuenta con **sensores tipo radar** que determinen los niveles de los colectores de entrada y salida del tanque, así como el nivel en el interior de éste y para detectar si se está produciendo un vertido por el aliviadero, con un **sistema compatible de comunicación** con el sistema implantado en Canal de Isabel II, capaz de enviar toda la información del estado de la instalación según sus señales digitales y analógicas, y siguiendo los estándares y protocolos que fija Canal de Isabel II para recibir dicha información en su Centro Principal de Control.

El cuadro eléctrico que se ubica junto a la zona elevada de la estructura del tanque de tormentas, donde van alojados los volquetes de limpieza, estará alojado en el interior de una caseta cerrada. Dicha caseta permite actuar en los cuadros desde el interior de

la misma, contará con iluminación propia de forma natural (mediante rejillas en la puerta de acceso y ventanas laterales) y artificial y también está ventilada de forma cruzada (ventanas laterales).

La iluminación del interior de los tanques, sensores de radar, sistema de comunicación PLC y las instalaciones necesarias para los sistemas de autolimpieza se resumen a continuación:

| Característica | Especificación de Hidrostank |
|---|---|
| Aparamenta y protecciones | Schneider Electric |
| Armario eléctrico | Schneider Electric, fabricado en PRFV. Grado de protección IP 65. Modelo Thalassa PLA 12124, 1250x1250x420 mm (alto x ancho x profundo) |
| Fuente de alimentación | Weidmüller o similar |
| PLC | Siemens S7-1500, CPU 1516-3 PNDP |
| Pantalla táctil | Siemens HMI MTP 1500 Unified Comfort panel |
| Sensores inductivos | Schneider Electric P30PA370D, 24 Vcc, con conector acodado M12 |
| Bobinas de las electroválvulas | CEME o similar, 24 Vcc |
| Sensores de radar | Vegapuls C11, medición de nivel en continuo con señal de 4-20 mA, programable mediante Bluetooth (4 unidades) |

El circuito de control se encarga del funcionamiento automático de los diferentes equipos (compuertas, limpiadores y guillotinas motorizadas), en función de lo que sucede en el tanque de tormentas y sus colectores de entrada y salida. Consiste en un cuadro eléctrico con el PLC, varios sensores de radar, sensores inductivos y la conexión eléctrica de todos los elementos en el cuadro de control.

Las luminarias serán conformes a los requisitos establecidos en las normas de la serie UNE-EN 60598 y en base a las especificaciones técnicas de alumbrado interior ETE-AIN.

Las partes metálicas accesibles de las luminarias que no sean de Clase II o Clase III, deberán tener un elemento de conexión para su puesta a tierra, que irá conectado de manera fiable y permanente al conductor de protección del circuito.

Los circuitos de alimentación estarán previstos para transportar la carga debida a los propios receptores, a sus elementos asociados y a sus corrientes armónicas y de

arranque. En el caso de distribuciones monofásicas, el conductor neutro tendrá la misma sección que los de fase. Será aceptable un coeficiente diferente para el cálculo de la sección de los conductores, siempre y cuando el factor de potencia de cada receptor sea mayor o igual a 0,9 y si se conoce la carga que supone cada uno de los elementos asociados a las lámparas y las corrientes de arranque, que tanto éstas como aquéllos puedan producir. En este caso, el coeficiente será el que resulte.

Las luminarias a instalar serán proyectores adosadas Led que cumplirán la prescripción de la ETE-AIN-006.

- Tipo: Carcasa y cierre en policarbonato. Clips de acero inoxidable.

- Difusor: Metacrilato, provisto de cierres articulados imperdibles con junta de neopreno, especialmente perfilada e incorporada ofreciendo una perfecta estanqueidad.

- Reflector: Metálico

- Driver: Incorporado

- Tasa de fallos del Driver ≤ 1% en 5.000h

- Protección: IP 65 IK 08

- Temperatura de funcionamiento -20°C a 45°C

- Factor de Potencia >0,90

- Apertura de haz: Según indicaciones de la dirección técnica

- Vida útil ≥ 60000 horas de vida útiles

- Instalación: Adosada

- Clase: 1

- Lámpara: LED

- Características Lámpara LED:

    o Temperatura de color ≥ 4000K

- o Índice de reproducción cromática ≥ 80%
- o Vida útil de la lámpara ≥ 50000 horas de vida útiles
- o Eficiencia Lm/W ≥ 130 Lm/W

## 9.9. Instalación de Alumbrado Interior

Se instalarán luminarias estancas de 54W en el interior de la edificación y de 16W en el exterior sobre las puertas accionadas por sensores de presencia.

Se instalarán 4 proyectores de 130W en el interior del tanque accionadas mediante un interruptor situado en el cuarto de acceso al tanque. El tanque también estará iluminado mediante iluminación natural mediante domos reflectantes.

Los cálculos luminotécnicos se presentan en los anejos del presente proyecto.

# 10. Colector de Vertido. Red de pluviales de salida

Se ha proyectado un colector de vertido de aguas pluviales con origen en el tanque de tormentas norte.

El colector Norte discurre desde el Tanque de Tormentas Norte hasta el Punto de Vertido Norte, con una longitud de 394 m, de los cuales los últimos 195m se ubican en la Zona de Policía del Arroyo Perales.

Las principales características del colector Norte son las que se muestran en la siguiente tabla:

| Coordenadas UTM ETRS89 HUSO 30 | | | Caracteristicas Colector | | | | | |
|---|---|---|---|---|---|---|---|---|
| Colectores | Coordenada X | Coordenada Y | Longitud Aprox TOTAL Colector (m) | Longitud del colector INTERIOR Zona de Policia (m) | Longitud del colector EXTERIOR Zona de Policia (m) | Tubería | Ø (mm) | Pendiente (%) |
| **Colector Norte (Parcialmente en Zona de Policia)** | | | | | | | | |
| Pozo de Salida Norte | 424.502,84 | 4.487.096,05 | 364 | 195 | 169 | PVC | 600 | 2% al 4% |
| Punto de interseccion Zona de Policia | 424.336,71 | 4.487.124,62 | | | | | | |
| Punto Vertido Norte (en Zona de Policia) | 424.142,60 | 4.487.122,32 | | | | | | |

Se ha comprobado la capacidad de todas las conducciones que forman el circuito considerando tubería de PVC en diámetros de 600 mm. Para mantener el funcionamiento en gravedad de todo el sistema se ha tenido que disponer de pendientes del orden del 2-4 % en algunos tramos de corta longitud garantizando en

todo momento la capacidad de la conducción dispuesta, aunque de forma puntual no se consigan alcanzar los criterios de pendiente o velocidad mínima habituales.

# 11. Caminos de Acceso a los tanques de tormentas

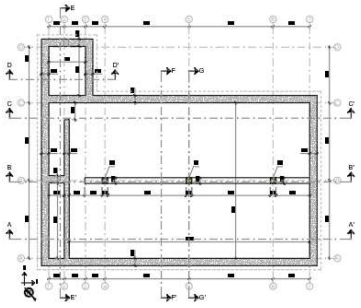
Se proponen los siguientes accesos a ambos tanques de tormentas:

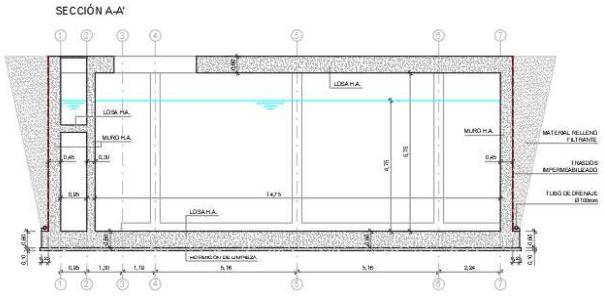
En el caso del **tanque norte,** se accederá mediante la red viaria al interior del círculo Interior de la glorieta situada en la intersección de las calles Ignacio Echeverría, Isla del Hierro y Formentera.

# 12. Características Estructurales

El Tanque Norte de laminación se encuentra ubicado dentro de la Fracción 3 que está integrada por el actual ámbito UE-VII.1. "Kodak" más la Parcela 7 original del Parque Empresarial de Las Rozas en Madrid. Concretamente, el planeamiento obliga a disponer el tanque bajo una rotonda en la intersección de la C/Formentera de forma que parte de la sección está sometida a las cargas de tráfico rodado.

El tanque presenta una planta sensiblemente rectangular y dimensiones aproximadas 16,70x10,30x6,95 m, según se muestra en las siguientes secciones:





El depósito se proyecta mediante una estructura monolítica de hormigón armado totalmente enterrada y ejecutada 'in situ', la cual está conformada por losas, pilares y muros. Las secciones propuestas son las siguientes:

- Losa superior e inferior e=0,60 m
- Muros exteriores e=0,45 m
- Muro interior e=0,30 m
- Pilares axb=0,35x0,35 m

Los materiales propuestos son los siguientes:

ARMADURAS PASIVAS:

| | |
|---|---|
| Tipo | B500 SD |
| Nivel de control | Normal |
| Resistencia característica $f_{yk}$ | 500 MPa |
| Coeficiente de minoración $\gamma_s$ (situac. Persistentes o transitorias) | 1,15 |
| Resistencia de cálculo $f_{yd}$ | 435 MPa |
| Módulo de Elasticidad $E_s$ | 200 000 MPa |

MALLAZOS:

| | |
|---|---|
| Tipo | B500 T |
| Nivel de control | Normal |
| Resistencia característica $f_{yk}$ | 500 MPa |
| Coeficiente de minoración $\gamma_s$ (situac. Persistentes o transitorias) | 1,15 |
| Resistencia de cálculo $f_{yd}$ | 435 MPa |
| Módulo de Elasticidad $E_s$ | 200 000 MPa |

HORMIGÓN ARMADO:

| | |
|---|---|
| Tipo | HA-30/B/20/XC2 |
| Nivel de control | Estadístico |
| Resistencia característica $f_{ck}$ | 30 MPa |
| Resistencia media $f_{cm}$ | 38 MPa |
| SITUACIONES PERSISTENTES O TRANSITORIAS | |
| Coeficiente de minoración $\gamma_c$ | 1,50 |
| Resistencia de cálculo $\alpha_{cc}f_{ck}/\gamma_c$ | 20 N/mm$^2$ |

| | |
|---|---|
| SITUACIONES ACCIDENTALES | |
| Coeficiente de minoración $\gamma_c$ | 1,30 |
| Resistencia de cálculo $\alpha_{cc}f_{ck}/\gamma_c$ | 23,07 N/mm$^2$ |
| MODULO DE ELASTICIDAD | |
| Módulo de Elasticidad inicial $E_{co}$ | 33 578 N/mm$^2$ |
| Módulo de Elasticidad secante $E_c$ | 28 577 N/mm$^2$ |
| Módulo de Poisson $\upsilon_c$ | 0,20 |

HORMIGÓN DE LIMPIEZA:

| | |
|---|---|
| Tipo | HL-150/B/20 |

## MODELO DE CÁLCULO:

Para el dimensionamiento del depósito se ha empleado un programa de cálculo el cual permite el análisis lineal y no lineal, en teoría de primer, segundo o tercer orden, de sistemas estructurales tridimensionales complejos modelizados con elementos finitos tipo barra, placa y sólidos, contemplando tanto el análisis estático como el dinámico.

Los modelos utilizados emplean el método de rigidez para la obtención de desplazamientos en los nudos, a partir de los cuales se obtienen los esfuerzos en placas y reacciones en apoyos. Los resultados se obtienen para cada hipótesis simple de carga y combinación, obtenidas éstas según la normativa correspondiente en cada caso.

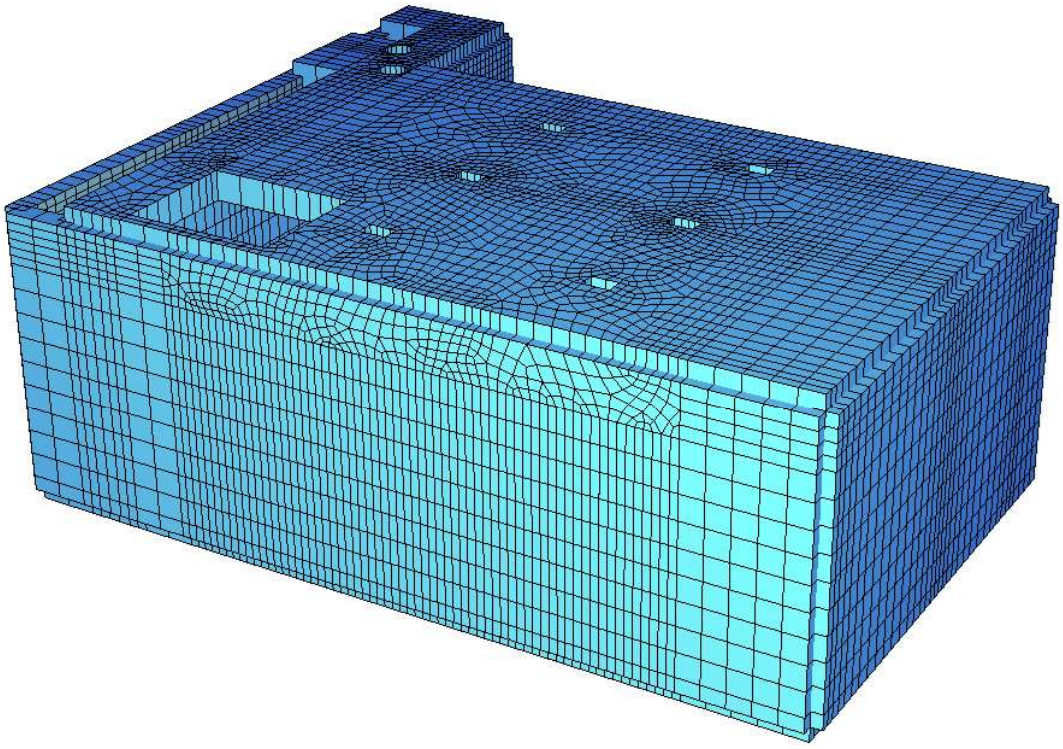
El programa realiza un cálculo lineal mecánico y geométrico de los materiales que forman la estructura.

Como criterio común a todos los cálculos realizados, según el estado límite objeto de comprobación, se han tenido en cuenta las siguientes consideraciones:

- Estados Límite Últimos: se ha considerado el nivel de agua correspondiente a la máxima cota de la lámina libre en al depósito (nivel de vertido), despreciándose la acción del empuje del terreno en caso de ser favorable.

- Estados Límite de Servicio (fisuración): se ha considerado el nivel de agua correspondiente a la máxima cota de la lámina libre en el depósito (nivel de vertido). Asimismo, dado que la fisuración resulta ser en estos casos limitante, se ha tenido en cuenta el efecto favorable del empuje del terreno.

Se muestra a continuación la geometría y discretización del modelo de elementos finitos tipo placa que han servido de base para el dimensionamiento del tanque:



SEGURA SANCHEZ JOSE ANTONIO - 07237123N

Firmado digitalmente por SEGURA SANCHEZ JOSE ANTONIO - 07237123N
Nombre de reconocimiento (DN): c=ES, serialNumber=IDCES-07237123N, givenName=JOSE ANTONIO, sn=SEGURA SANCHEZ, cn=SEGURA SANCHEZ JOSE ANTONIO - 07237123N
Fecha: 2024.04.05 22:39:10 +02'00'

REDACTOR DEL PROYECTO

D. José Antonio Segura Sánchez

Procaver Soluciones Urbanas, S.L.

# 13. ANEJOS

## 13.1. ANEJO 1. AUTORIZACIÓN DG PATRIMONIO PARA HINCA

Se aporta la autorización emitida por la DG de Patrimonio Histórico de la Comunidad de Madrid para llevar a cabo la ejecución de la hinca bajo el Canal del Guadarrama.

Comunidad de Madrid

**Subdirección General de Patrimonio Histórico**
Dirección General de Patrimonio Cultural
CONSEJERÍA DE CULTURA, TURISMO Y DEPORTE

| | |
|---|---|
| **Nº EXPTE.:** | RES/1059/2021 |
| **Nº REG.:** | 09/544346.9/23 |
| **TIPO:** | Resolución autorización |
| **ASUNTO:** | Obras de acometidas de saneamiento en la UE-VII-1 sobre el Real Canal del Guadarrama, en Las Rozas de Madrid |
| **INTERESADO:** | Joaquín Ros Felis (representante de la JUNTA DE COMPENSACIÓN DE LA UNIDAD DE EJECUCIÓN UE-VII-1 "SISTEMAS GENERALES P.E. + KODAK) y David Urquiaga Cela (arqueólogo) |
| **MUNICIPIO:** | Las Rozas de Madrid |

**David Urquiaga Cela**

**ASUNTO: RESOLUCIÓN**

Con esta fecha, la Directora General de Patrimonio Cultural ha dictado la siguiente **RESOLUCIÓN**:

*"Visto el informe emitido por el Técnico de este Área y una vez examinado el expediente relativo a la solicitud preceptiva de autorización en cumplimiento del artículo 61 de la Ley 8/2023, de 30 de marzo, de Patrimonio Cultural de la Comunidad de Madrid, hecha por Joaquín Ros Felis (JUNTA DE COMPENSACIÓN DE LA UNIDAD DE EJECUCIÓN UE-VII-1 "SISTEMAS GENERALES P.E. + KODAK) y David Urquiaga Cela (arqueólogo), para llevar a cabo una actuación consistente en un seguimiento arqueológico del proyecto de las Obras de acometidas de saneamiento en la UE-VII-1 sobre el Real Canal del Guadarrama, en el término municipal de Las Rozas de Madrid, se considera oportuno efectuar la siguiente propuesta la siguiente propuesta de RESOLUCIÓN:*

*AUTORIZAR seguimiento arqueológico del proyecto de obras de acometidas de saneamiento en la UE-VII-1 sobre el Real Canal del Guadarrama, en el término municipal de Las Rozas de Madrid, bajo la dirección de David Urquiaga Cela, de acuerdo a las siguientes prescripciones:*

***1ª**. Tendrá una duración de 12 meses a partir del día siguiente a su recepción, debiendo comunicar por escrito a este Área las fechas de comienzo y finalización de los trabajos, así como el horario en que se realizarán dichos trabajos.*

***2ª**. El ámbito de los trabajos será el indicado en la solicitud presentada ante la Dirección General de Patrimonio Cultural.*

***La actuación arqueológica consistirá en un control arqueológico de los movimientos de tierras de carácter intensivo durante la realización de las actuaciones que afecten al subsuelo, fundamentalmente en tramo donde se documenta el trazado del Canal del Guadarrama. En caso de afectar a restos o elementos relacionados con el Canal del Guadarrama, se comunicará de forma inmediata a la Dirección General de Patrimonio que marcará las directrices a seguir.***

***3ª**. Se comunicará al Área de Protección de la Dirección General de Patrimonio Cultural, inmediatamente la aparición de restos materiales singulares que aparezcan durante el curso de los trabajos, en aplicación del artículo 61.4 de la Ley 8/2023, de 30 de marzo, de Patrimonio Cultural de la Comunidad de Madrid.*

***4ª.** En el caso de que en el curso de los trabajos se descubran nuevos yacimientos*

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| **TIPO:** | Resolución autorización |
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| **MUNICIPIO:** | Las Rozas de Madrid |

*arqueológicos/paleontológicos o se modifique la información arqueológica preexistente, se deberán cumplimentar la/s fichas/s del Catálogo de Patrimonio Cultural de la Comunidad de Madrid, mediante la aplicación informática que será suministrada por la Dirección General de Patrimonio Cultural.*

***5ª.*** *En el plazo de diez días, a partir de la finalización de los trabajos, se presentará en soporte digital un Informe Preliminar. En caso de que la actuación proporcione resultados positivos se incluirá un resumen de los mismos, para su posterior difusión en las Actuaciones en Yacimientos Arqueológicos de la web www.comunidad.madrid.*

*Este documento, con una extensión máxima de 15 páginas, deberá presentase en formato doc., docm., .rtf. o cualquiera compatible con procesador de textos que permita su manipulación, e incluirá, como mínimo, un plano general junto a fotografías significativas, además de un texto que explique, de forma concisa y clara los principales hitos de la intervención.*

***6ª.*** *En los dos meses siguientes a la finalización de la actuación presentará la Memoria final, en papel y soporte digital, correspondiente con la documentación original que haya generado la investigación (planimetría, fotografías, diapositivas, negativos, fichas, diarios de campo...), además del inventario por duplicado de los materiales recuperados. Se podrá solicitar prórroga por causa motivada y justificada.*

*Para presentar los datos en formato digital se tendrán en cuenta las siguientes reglas:*

***6.1.*** *Será necesario aportar dos archivos digitales separados sobre el proyecto de referencia: por un lado, un polígono con la delimitación de la zona afectada, por otro, un archivo con la planimetría del proyecto.*

***6.2****. Será necesario que la planimetría esté correctamente georreferenciada, usando para ello ETRS 89 USO 30N.*

***6.3****. Para la delimitación de la zona afectada será posible la entrega de ficheros de coordenadas, siempre que estén tomados siguiendo la indicación del punto 7.2. La planimetría será entregada en formato CAD, o bien en archivos que sean compatibles con ARCGIS 10.3 o anterior.*

***7ª.*** *De conformidad con el artículo 66.2 de la Ley 8/2023, de 30 de marzo, de Patrimonio Cultural de la Comunidad de Madrid, los objetos obtenidos, debidamente inventariados y catalogados, serán depositados en el Museo Arqueológico y Paleontológico de la Comunidad de Madrid, junto con una copia de los informes y memorias preceptivos, así como de los inventarios de los materiales obtenidos, con identificación de la estratigrafía de la que proceden y la documentación gráfica generada en el transcurso de la intervención y toda la documentación generada susceptible de servir de contextualización a los materiales, como planos y fotografías.*

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| **MUNICIPIO:** | Las Rozas de Madrid |

*Una vez realizado este depósito, el titular de la autorización de cualquier actividad arqueológica y paleontológica, en el plazo máximo de cinco años a contar desde la finalización de la intervención autorizada, deberá presentar los resultados científicos definitivos en una memoria final que deberá incluir propuesta cronológica e interpretación cultural.* ***Si se cumpliesen los plazos sin hacer entrega de la memoria final, no se volverá a emitir una autorización de actividad arqueológica a nombre del titular*** *hasta que no se haya entregado toda la documentación al Museo Arqueológico y Paleontológico de la Comunidad de Madrid y a la Dirección General competente en materia de patrimonio cultural.*

***8ª.*** *Tal y como recoge el artículo 66.3. de la Ley 8/2023 de 30 de marzo de Patrimonio Cultural de la Comunidad de Madrid, la Consejería competente en materia de patrimonio cultural se reserva el derecho a publicar o difundir la memoria en los medios de comunicación científica que considere oportunos, previa conformidad de las personas autoras y sin perjuicio del derecho de propiedad intelectual que les asista.*

*Así mismo quedan cedidos a la Comunidad de Madrid todos los derechos de explotación referidos a dicho material y, en particular, los de reproducción, distribución, comunicación pública y transformación, para cualquier modalidad actualmente conocida con carácter exclusivo, ámbito mundial y hasta el paso de la obra para el dominio público.*

***9ª.*** *La presente resolución deberá estar disponible durante la actuación arqueológica por si fuera requerida por los Servicios de Seguridad del Estado, Ayuntamiento o Servicios Técnicos de la Comunidad de Madrid.*

***10ª.*** *En virtud de lo dispuesto en artículo 65.3 de la Ley 8/2023, de 30 de marzo, de Patrimonio Cultural de la Comunidad de Madrid, la Consejería competente en materia de patrimonio cultural, podrá revocar la autorización concedida por incumplimiento de las condiciones establecidas en la presente autorización, o de las demás obligaciones establecidas en la Ley y en sus normas de desarrollo. La revocación no exonera a la persona o entidad autorizada del deber de conservar el yacimiento o los vestigios encontrados y de la obligación de entregar los hallazgos y la documentación de toda índole generada por la actividad arqueológica y/o paleontológica.*

*Asimismo, la revocación de la autorización llevará aparejada la inmediata paralización de la actuación, prevista en el artículo 102 de la Ley 8/2023, de 30 de marzo, de Patrimonio Cultural de la Comunidad de Madrid y, en su caso, incurrirá en la infracción prevista los artículos 105 y siguientes, sancionadas según los artículos 109 y siguientes de la referida Ley, siendo responsables, según lo establecido en el artículo 108, los autores materiales de las actuaciones infractoras y aquellos que indujeran o colaborasen en su comisión, incluidos los técnicos o profesionales autores de proyectos o directores de obras o actuaciones que contribuyan dolosa o culposamente a la comisión de la infracción, en especial, en el supuesto de incumplimiento de las órdenes de*

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| **MUNICIPIO:** | Las Rozas de Madrid |

*paralización previstas en el artículo 102 de la presente Ley.*

*Todo ello entendido sin perjuicio del cumplimiento de la normativa técnica, urbanística y medioambiental vigente".*

Lo que se le comunica para su conocimiento y efectos, significándole que la presente resolución no pone fin a la vía administrativa y los interesados, que no sean Administración Pública, podrán interponer Recurso de Alzada ante esta Dirección General de Patrimonio Cultural o ante la Consejería de Cultura y Turismo en el plazo de un mes contado a partir del día siguiente a la recepción del presente escrito, de conformidad con lo dispuesto en los artículos 121 y 122 de la Ley 39/2015, de 1 de octubre, del Procedimiento Administrativo Común de las Administraciones Públicas.

En el caso de las Administraciones Públicas podrán interponer recurso contencioso-administrativo, en el plazo de dos meses, ante la Sala de lo Contencioso administrativo del Tribunal Superior de Justicia de Madrid, sin perjuicio de poder efectuar requerimiento previo ante la Dirección General de Patrimonio Cultural de la Comunidad de Madrid, en el plazo de dos meses desde la recepción del presente escrito, de conformidad con lo dispuesto en el artículo 44 de la Ley 29/1998, de 13 de julio, reguladora de la Jurisdicción Contencioso-administrativa.

En Madrid, a fecha de la firma,

LA JEFA DEL ÁREA DE PROTECCIÓN

Fdo.: Isabel Baquedano Beltrán

Se informa al interesado que en los sucesivos trámites debe hacer referencia al número de expediente.

El arqueólogo titular de este permiso deberá comunicar a SEPRONA de la Guardia Civil (Sector Escultores, 10 - 28760 Tres Cantos, Madrid, Fax: 91 8073901), con antelación suficiente, el inicio y finalización de las intervenciones arqueológicas y paleontológicas autorizadas por esta Dirección General de Patrimonio Cultural.

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## 13.2. ANEJO 2. AUTORIZACIÓN VERTIDO Y OBRAS EMITIDA POR LA CHT

**R E S O L U C I O N**

PROCEDIMIENTO: EJECUCIÓN DE OBRAS EN DPH
TRAMITADOR: ÁREA GESTIÓN DPH
N/REF: O-0407/2022

ASUNTO: RESOLUCIÓN DE OTORGAMIENTO

1S0003267342

**Antecedentes**

En esta Confederación Hidrográfica del Tajo se encuentra en tramitación el expediente identificado como sigue:

- Referencia expediente: O-0407/2022
- Fecha de solicitud: 10 de octubre de 2022
- Solicitante: Junta de Compensación UE VII-1 Kodak (V87637260)
- Tipo de solicitud: Autorización para ejecución de obras en dominio público hidráulico
- Descripción de la solicitud: Solicitud de autorización para obras de urbanización, edificación, tanques de tormentas y vertido
- Término municipal donde se localiza la actuación: Las Rozas de Madrid (Madrid).

Expediente relacionado de referencia **IPL-0086/2012 (122.266/12):** Mediante oficio de fecha 8 de abril de 2014, se emite por parte de este Organismo informe relativo a la modificación puntual del P.G.O.U. de Las Rozas de Madrid, en el ámbito de los Sistemas Generales y las Parcelas 2 y 7 del "Parque Empresarial" y de la U.E. VII-1 "Kodak" en el término municipal de Las Rozas de Madrid (Madrid).

Expediente relacionado de referencia **IPL-0116/2014:** Mediante oficio de fecha 30 de junio de 2016, se emite por parte de este Organismo informe relativo a la modificación puntual del P.G.O.U. de Las Rozas de Madrid, en distintos ámbitos y ordenación pormenorizada, en el T.M. de Las Rozas de Madrid (Madrid).

En la documentación aportada en el expediente IPL-0116/2014, se incluyó un Estudio Hidrológico-Hidráulico correspondiente al arroyo Perales, arroyo Carrascosa y sus dos afluentes innominados.

En el informe emitido por este Organismo se recogieron una serie de consideraciones que indicaban lo siguiente:

- *En el análisis de la documentación gráfica aportada, en concreto en el denominado plano 3 se aprecia que las vaguadas susceptibles de conducir aguas pluviales situadas en el interior de los diferentes ámbitos de actuación se sitúan en zonas verdes, como el caso del afluente del arroyo Perales de aproximadamente 200 metros, situado en el interior de la unidad UE-VII.1. Fracción 3.*
- *En el caso del cauce que discurre por la margen noreste de la unidad UE-VII.1 Fracción 2 y que en la cartografía oficial a escala 1:25.000 del ICN se denomina precisamente arroyo de la Carrascosa, se aprecia igualmente que la ordenación propuesta no afecta al trazado de dicho cauce ya que el mismo, en el tramo que discurre por el interior del ámbito, se sitúa en zona verde.*
- *Por su parte, en este nuevo estudio sí se incluye el cauce del denominado afluente 2 del arroyo de la Carrascosa en el modelo, y se analizan sus diferentes zonas inundables a partir del vertido de pluviales propuesto procedente del interior de la unidad UE-VII.1. Fracción 3.*
- *No obstante lo anterior, se reitera que parte de las actuaciones propuestas se encuentran en zona de policía de cauces, definida por 100 metros a partir del cauce y que por tanto para el desarrollo de las mismas será precisa la autorización de este Organismo.*

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- *En este sentido cabe destacar que la representación de la zona de policía es errónea, ya que en la representación de aquella aportada en el plano nº 7.1 se aprecia como la misma se limita a las zonas en las que no se encuentra ningún desarrollo previo, es decir, que la extensión de la zona de policía de cauces públicos reduce su extensión en los tramos de los arroyos que disponen de actuaciones ya ejecutadas, aunque este aspecto es irrelevante con respecto al objeto del presente informe.*
- *En el análisis del plano 7.1 "Afecciones a la red hidrográfica. Líneas D.P.H. y servidumbre" se detectan errores en la representación de la estimación previa del dominio público hidráulico ya que el mismo no se representa en la zona más baja de la vaguada existente, como en el caso del, denominado en el estudio, afluente 2A del arroyo Carrascosa, entre las secciones 200 y 100.*

Expediente relacionado de referencia **X-0390/2017**: Mediante oficio de fecha 3 de enero de 2018, se emite por parte de este Organismo informe relativo a la aprobación inicial del Proyecto de Urbanización de la unidad de ejecución, Sistemas Generales PE+KODAK, donde se solicita al peticionario presentar la documentación necesaria para la elaboración del informe correspondiente.

Expediente relacionado de referencia **IPL-0048/2018:** con fecha de 21 de febrero de 2019 este Organismo de cuenca emite informe relativo al Proyecto de urbanización UE VII.1 "KODAK", solicitado por el Ayuntamiento de Las Rozas de Madrid (Madrid), incorporando una serie de condicionantes y consideraciones.

En dicho informe se pone de manifiesto lo siguiente:

- *Se significa que en la documentación aportada no se ha incluido un Estudio Hidrológico-Hidráulico y planos en planta que incluyan una estimación de la delimitación del dominio público hidráulico, zona de servidumbre y zona de policía de los cauces afectados presentes en el ámbito de actuación, así como la delimitación de sus zonas inundables en régimen de avenidas extraordinarias para una situación preoperacional y posoperacional.*
- *Se significa que, al no presentarse en el presente expediente el estudio hidrológico-hidráulico, no es posible comprobar que las indicaciones realizadas en el informe contenido en el expediente IPL-0116/2014 hayan sido incluidas a dicho estudio hidrológico-hidráulico y, por consiguiente, no es posible realizar una valoración del mismo.*
- *El tramo a modelizar deberá ser siempre mayor que el tramo afectado por la actuación, debiendo prolongarse aguas abajo hasta la avenida de Atenas para tener en cuenta los efectos de las condiciones de contorno del modelo en los ámbitos aguas abajo del Sector. Así como incluir el estudio de forma conjunta de los cauces afectados y conectarlos hidráulicamente en el modelo (aunque se estimen los caudales circulantes por las distintas subcuencas de manera independiente) de tal forma que los diferentes calados del afluente supongan condiciones de contorno adicionales.*

Expediente relacionado de referencia **IPL-0101/2019:** con fecha 7 de noviembre de 2019 se emite informe sobre proyecto de urbanización UE VII-1, sistemas generales P.E. +KODAK, solicitado por el Ayuntamiento de Las Rozas de Madrid (Madrid).

El Ayuntamiento solicita la emisión de un nuevo informe sobre las actuaciones en la UE VII-1 Kodak, remitiendo un CD con la modelización hidráulica de los arroyos presentes en el ámbito de actuación de la UE VII.1 Kodak, con el objetivo de dar cumplimiento al informe emitido por este Organismo con fecha de 21 de febrero de 2019 relativo al expediente con referencia **IPL-0048/2018,** incorporando los condicionantes y consideraciones establecidos en dicho informe.

En el informe emitido se pone de manifiesto lo siguiente:

- *En relación a la modelización hidráulica, los resultados de las láminas de inundación en SIG se muestran en teselas que no mantienen la continuidad que no son representativas de la realidad, tanto para la situación preoperacional como para la posoperacional en las cabeceras del arroyo Perales y los Afluentes 1 ,2 y 3.*

- *Teniendo en cuenta lo anterior, la modelización hidráulica en HEC-RAS no se considera correcta, al obtener unos resultados que no son representativos de la realidad.*
- *En relación a la Zona de Flujo Preferente, se infiere que ésta no ha sido modelizada por lo que no se puede realizar una valoración sobre ello.*
- *En relación a las obras de drenaje transversal, se significa que existen dos obras de paso que no tienen capacidad hidráulica suficiente para desaguar la avenida extraordinaria de 500 años. En concreto, las ODT situadas en el arroyo Perales la sección 1610 y la sección 895 respectivamente.*
- *No se hace referencia a la introducción de sistemas de drenaje sostenible.*

  *Las nuevas urbanizaciones, polígonos industriales y desarrollos urbanísticos en general, deberán introducir sistemas de drenaje sostenible, tales como superficies y acabados permeables, de forma que el eventual incremento del riesgo de inundación se mitigue. A tal efecto, el expediente del desarrollo urbanístico deberá incluir un estudio hidrológico-hidráulico que lo justifique (art 126 ter.7).*
- *Se reitera que parte de las actuaciones propuestas se encuentran en zona de policía de cauces, definida por 100 metros a partir del cauce.*
- *Asimismo, se significa que las actuaciones que se prevean en las áreas de influencia de los cauces públicos, deberán situarse fuera del dominio público hidráulico y de la zona de servidumbre de paso del cauce correspondiente y siempre que se afecte a un cauce público o se desarrollen obras en su zona de policía es necesario obtener previamente la autorización de este Organismo, según se establece en los artículos 9, 78 y 126 del Reglamento del Dominio Público Hidráulico.*
- *Los caudales de aguas pluviales que se vierten en los puntos de vertido no han sido considerados en la modelización en HEC-RAS para la situación posoperacional, por lo que no es posible realizar una valoración sobre si producen un incremento significativo de la lámina de inundación.*

  *Así mismo, se infiere que los caudales de vertido de las aguas pluviales suponen un incremento muy significativo de los caudales circulantes por el arroyo Perales y los arroyos afluentes del Carrascosa lo que podría producir afecciones aguas abajo del ámbito de actuación.*

  *El estudio hidrológico e hidráulico deberá tener en cuenta que, en la situación posoperacional, se modificará la superficie impermeable en los terrenos y por tanto los caudales instantáneos de la escorrentía superficial generados por lluvias de período de retorno superior al contemplado en el diseño de la red de saneamiento. Por ello, se deberá analizar el destino de las aguas de escorrentía que se generen en el ámbito, así como, considerar las afecciones que podrían provocar las mismas en los cauces y en las zonas bajas donde desagua de forma natural el sector.*

Expediente relacionado de referencia **O-0431/2021:** mediante resolución emitida en fecha 23 de mayo de 2023 por esta Confederación Hidrográfica del Tajo se autorizan las obras de urbanización de la Calle Formentera desde la salida Norte de la Unidad de Ejecución **UE-VII.1. "SISTEMAS GENERALES P.E. + KODAK"**, por la ampliación de la Calle José Echegaray, hasta la calle Islas Pitiusas; correspondientes con las pavimentaciones y explanaciones en la mitad de la calle (la ahora no consolidada), el drenaje de estas pavimentaciones y el alumbrado público entre los puntos de coordenadas aproximadas UTM ETRS89 (HUSO 30): Punto 1: $X_1$: 424 543 $Y_1$: 4 487 359 y Punto 2: $X_2$: 424.501 $Y_2$: 4 487 115, generando afección al arroyo Los Perales, en el término municipal de Las Rozas de Madrid (Madrid).

Expediente relacionado de referencia **O-0006/2020**: mediante resolución emitida en fecha 10 de mayo de 2023 por esta Confederación Hidrográfica del Tajo se deniegan obras de urbanización y edificación en la unidad de ejecución UE-VII 1 Kodak, junto con la ejecución de tanques de tormentas y puntos de vertido a cauces, generando afección a la zona de policía y al dominio público hidráulico del arroyo de los Perales y del arroyo de la Carrascosa, en el término municipal de Las Rozas de Madrid (Madrid).

Las actuaciones solicitadas son las mismas que en el presente expediente. Se ha producido una modificación en los tanques de tormentas para reducir el caudal vertido e incorporando los métodos de drenaje sostenible que se indicaba en la resolución.



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Al expediente se ha incorporado el correspondiente informe propuesta emitido por el Servicio encargado de la tramitación, proponiendo las condiciones en las que podría ser otorgada la autorización.

**Consideraciones**

De acuerdo con lo establecido en el artículo 9 del Reglamento del Dominio Público Hidráulico, el tanque de tormentas denominado Tanque Norte y el trazado del colector proyectado que quedan ubicados fuera de la zona de policía del arroyo Perales, no precisarán de autorización administrativa de este Organismo, sin perjuicio de otras posibles autorizaciones que se deban solicitar ante los correspondientes órganos de la Administración General del Estado, Autonómica o Local.

La solución propuesta para las obras de vertido mediante la playa de bolos no deberá suponer una afección significativa a la zona de servidumbre del arroyo Perales ni a la del arroyo Afluente 2, sin modificar los perfiles naturales de los taludes de los cauces, y no se verá alterada la efectividad del uso en la zona de servidumbre de paso público peatonal y para el desarrollo servicios vigilancia, conservación y mantenimiento, sin llegar a producir una afección al dominio público hidráulico de los citados cauces.

Las actuaciones asociadas a la ejecución del tanque de tormenta denominado Tanque Sur se ubican fuera de la zona inundable, definida como los terrenos que puedan resultar inundados por los niveles teóricos que alcanzarían las aguas en las avenidas cuyo período estadístico de retorno sea de 500 años, no encontrándose sujetas a ninguna de las limitaciones establecidas a los usos del suelo recogidas en el artículo 14 bis del Reglamento del Dominio Público Hidráulico con el objeto de garantizar la seguridad de bienes y personas.

Dada la naturaleza del resto de actuaciones solicitadas (colectores subterráneos en zona de policía y obras en los puntos de vertido que no modifican la sección del cauce), puede concluirse que las mismas no suponen un obstáculo para el régimen de corrientes en avenidas ordinarias o extraordinarias del arroyo Perales y del arroyo Afluente 2, sin generar afecciones significativas sobre los mismos, cumpliendo con lo establecido en el artículo 9 y ss. del vigente Reglamento del Dominio Público Hidráulico.

Al comparar el caudal de vertido del punto de vertido propuesto del Tanque Norte, $Q_{VERTIDO_1}$ = 0,142 $m^3/s$, con el caudal circulante por el arroyo Perales en una situación de régimen natural para un periodo de retorno equivalente (10 años), $Q_{CAUCE,\ 10}$ = 1,425 $m^3/s$, se obtiene que el caudal aliviado supone un **10%** respecto al caudal circulante en régimen natural por el arroyo Perales.

Comparando el caudal de vertido del punto de vertido propuesto del Tanque Sur, $Q_{VERTIDO_2}$ = 0,065 $m^3/s$, con el caudal circulante por el afluente 2 del arroyo de la Carrascosa en una situación de régimen natural para un periodo de retorno equivalente (10 años), $Q_{CAUCE,\ 10}$ = 0,655 $m^3/s$, se obtiene que el caudal aliviado supone un **10%** respecto al caudal circulante en régimen natural por el afluente 2.

A este respecto, con el objetivo de proteger los cauces en su estado más natural posible y considerando lo establecido en el artículo 34.3 del vigente Plan Hidrológico de la parte española de la demarcación hidrográfica del Tajo, el caudal máximo que pudiera incorporarse al cauce en los puntos de desbordamiento, tanto en redes unitarias como de recogida de pluviales, no podrá superar nunca un valor equivalente al **10%** del caudal circulante por el cauce en régimen natural, para un periodo de retorno igual al de diseño de la red.

En el caso en estudio, al ser el caudal aliviado del 10% respecto al caudal circulante en régimen natural, tanto para el arroyo Perales como para el afluente 2 del arroyo de la Carrascosa, la cuantificación del vertido previsto como consecuencia de las actuaciones solicitadas se considera admisible para cumplir con los objetivos generales de protección de los cauces en su estado natural.

Las obras de urbanización de las parcelas de la Fracción 3 en las fincas Nº19, 30 y 31, con uso asociado a zonas verdes, para las fincas Nº3, 9, 10, 11 y 12 con uso asociado a viviendas, y la Nº17, con uso asociado a equipamiento, se ubican fuera de dominio público hidráulico y zona de servidumbre del arroyo Innominado (Afluente 2) del arroyo de la Carrascosa, así como tampoco se encuentran afectadas por las avenidas extraordinarias de 100 y 500 años de periodo de retorno para dicho arroyo.

Las obras del proceso de urbanización de las parcelas de la Fracción 3 en las fincas Nº19, 30 y 31, con uso asociado a zonas verdes, para las fincas Nº3, 9, 10, 11 y 12 con uso asociado a viviendas, y la Nº17, con uso asociado a equipamiento, son compatibles con la consecución de los objetivos y fines de la zona de servidumbre de cauces públicos, según lo establecido en el artículo 7 del vigente Reglamento del Dominio Público Hidráulico.

Las obras de edificación solicitadas en zona de policía de los cauces innominados afluentes del arroyo de la Carrascosa son objeto de autorizaciones independientes a solicitud de sus promotores.

**Resolución**

A la vista de lo expuesto, y en virtud de las competencias que tiene atribuidas, esta Confederación Hidrográfica del Tajo resuelve:

- **Autorizar a la JUNTA DE COMPENSACIÓN UE VII-1 KODAK con NIF.: V87637260** para ejecutar las actuaciones que se indican a continuación, debiendo respetar las condiciones siguientes.

**Descripción de la actuación**

Obras asociadas a los vertidos de aguas pluviales generadas en el sector de la Fracción 3 de la UE-VII 1 "Kodak" a los arroyos Perales y a uno Innominado afluente del arroyo de la Carrascosa, a través de dos puntos de vertido a los que les llega el caudal de aguas pluviales de dos tanques de tormentas, en el término municipal de Las Rozas de Madrid (Madrid).

*Las actuaciones a realizar en dominio público hidráulico del arroyo Perales son:*

- **Punto de vertido 1**: Obras de vertido de las aguas pluviales en las coordenadas aproximadas UTM ETRS89 (30N): Punto 1: $X_1$: 424 143 $Y_1$: 4 487 122. Para proteger las márgenes y reducir la afección del vertido se dispone en toda la zona de vertido situada a cielo abierto una playa de bolos de diámetro 300 mm en una superficie aproximada de 75 $m^2$, siempre cajeando el terreno natural, de manera que no se disminuya la capacidad hidráulica del cauce.

*Las actuaciones a realizar en dominio público hidráulico del arroyo Innominado afluente del arroyo de la Carrascosa son:*

- **Punto de vertido 2**: Obras de vertido de las aguas pluviales en las coordenadas aproximadas UTM ETRS89 (30N): Punto 2: $X_4$: 424 240 $Y_4$: 4 486 677. Para proteger las márgenes y reducir la afección del vertido se dispone en toda la zona de vertido situada a cielo abierto una playa de bolos de diámetro 300 mm con una superficie aproximada de 320 $m^2$, siempre cajeando el terreno natural, de manera que nunca se disminuya la capacidad hidráulica del cauce.

Obras asociadas a la urbanización y la instalación de tuberías enterradas de 600 mm de diámetro de PVC las cuales concluyen en los puntos de vertido y la ejecución del tanque de tormentas Sur, en zona de policía de los arroyos Perales y el afluente Innominado del arroyo de la Carrascosa, en el término municipal de Las Rozas de Madrid (Madrid).

*Las actuaciones a realizar en zona de policía del arroyo Perales son:*

- **Colector 1** de aguas pluviales de 600 mm de diámetro de PVC de 159 m de longitud entre las coordenadas aproximadas UTM ETRS89 (30N): $X_2$: 424 142 $Y_2$: 4 487 122 y $X_3$: 424 336: $Y_3$: 4 487 124.

*Las actuaciones a realizar en zona de policía del arroyo Innominado afluente del arroyo de la Carrascosa son:*

- **Tanque de tormentas Sur** en las coordenadas aproximadas UTM ETRS89 (30N): $X_{TS}$: 424 340 $Y_{TS}$: 4 486 651. Tiene unas dimensiones de 20,30 x 21,50 x 3,36 m, con una capacidad de laminación de 1470,00 $m^3$, sin provocar retorno a la red.
- **Colector 2** de aguas pluviales de 600 mm de diámetro de PVC de 86 m de longitud entre las coordenadas aproximadas UTM ETRS89 (30N): $X_5$: 424 239 $Y_5$: 4 486 677 y $X_6$: 424 325 $Y_6$:4 486 659.
- **Urbanización de las parcelas de la Fracción 3** en las fincas Nº19, 30 y 31, con uso asociado a zonas verdes, para las fincas Nº3, 9, 10, 11 y 12 con uso asociado a viviendas, y la Nº17, con uso asociado a equipamiento.

**Condiciones generales**

1. Las actuaciones se ejecutarán de acuerdo a la documentación técnica presentada y que obra en el expediente, en cuanto no resulte modificada por las presentes condiciones.

   La Confederación Hidrográfica del Tajo podrá autorizar pequeñas variaciones que tiendan al perfeccionamiento de las obras y que no impliquen modificaciones en la esencia de la autorización.

2. Esta autorización es única y exclusivamente para la ejecución de las actuaciones enumeradas y descritas, siendo necesario solicitar nueva autorización para efectuar cualquier tipo de captación de aguas públicas o vertido de efluentes.

3. Esta autorización se otorga en aplicación de la normativa en materia de aguas, según criterios y afecciones estrictamente hidráulicas, siendo independiente de aquellas que se deriven de la normativa sectorial aplicable, las cuales deberán ser otorgadas por la Administración competente.

4. Esta autorización se otorga sin perjuicio del dominio público ni de terceros, dejando a salvo el derecho de propiedad, no pudiendo ser invocada para excluir o disminuir la responsabilidad civil o penal en que pueda incurrir el titular por el funcionamiento normal o anormal de las actuaciones autorizadas.

5. Las servidumbres legales podrán ser decretadas por la autoridad competente. Deberán respetarse las servidumbres, establecidas en el artículo 6.a. del texto refundido de la Ley de Aguas, de 5 metros situadas a continuación del límite del dominio público hidráulico (terreno cubierto por las aguas en las máximas crecidas ordinarias), y sin perjuicio a sus funciones definidas en el artículo 7 del Reglamento del Dominio Público Hidráulico, no permitiéndose ningún tipo de construcción en esta zona que no haya sido expresamente considerada en la presente autorización.

6. Esta autorización no lleva aneja servidumbre de paso por caminos o fincas particulares, ni tampoco el derecho a depositar en ellas o sus caminos escombros o materiales de ninguna clase.

7. La Confederación Hidrográfica del Tajo no responde de cualquier afección que puedan sufrir las obras por causa de crecidas, tanto ordinarias como extraordinarias, que se produzcan en el cauce.

8. La reparación de los daños que pudieran ocasionarse con motivo o como consecuencia de las obras objeto de la presente autorización, será a cargo del titular. Este Organismo instará para que el titular de la autorización realice las subsanaciones necesarias, con la potestad de imponer multas coercitivas para hacer cumplir lo ordenado, sin menoscabo de las sanciones que puedan imponerse.

   En ningún caso la Confederación Hidrográfica del Tajo será responsable de los accidentes, desperfectos o cualquier clase de perjuicios que puedan acaecer por la existencia de la actuación que se autoriza.

9. Se prohíbe realizar vertidos de aguas residuales u otros productos al cauce sin la autorización de la Confederación Hidrográfica del Tajo.

10. No se podrán acumular residuos sólidos, escombros o sustancias de otra naturaleza que constituyan o puedan constituir un peligro de contaminación de las aguas o de degradación del dominio público hidráulico.

11. Se deberá respetar cualquier limitación ambiental impuesta sobre los espacios protegidos afectados, prestando especial atención a la época de cría y nidificación de las especies vulnerables o sensibles que se presenten en los hábitats fluviales.
12. Finalizados los trabajos, se deberán retirar todas las instalaciones y obras auxiliares que puedan ser susceptibles de ser arrastradas al cauce como consecuencia de las avenidas o de reducir su capacidad de desagüe, así como la restitución de los terrenos y de la vegetación de ribera autóctona afectados por la ejecución de los trabajos.
13. La inspección de las actuaciones podrá ser realizada por la Confederación Hidrográfica del Tajo, siendo de cuenta del titular las remuneraciones y gastos que por dicho concepto se originen, debiendo darse cuenta a dicho Organismo del inicio y del final de los trabajos.
14. El incumplimiento de las presentes condiciones, tanto generales como específicas, o la ejecución de trabajos no contemplados, podrán ser constitutivos de infracción según el artículo 116 del texto refundido de la Ley de Aguas, sin perjuicio de que pueda dar lugar a la caducidad, revocación o suspensión de la autorización.

**Condiciones específicas**

1. Las obras en los puntos de vertido se realizarán sin interferir en la franja de 5 metros correspondiente a la zona de servidumbre de uso público, debiendo **quedar enrasadas con el terreno en su estado primitivo**, de forma que permita el paso de las aguas, sin suponer un obstáculo a la libre circulación de las mismas, ni una afección a la funcionalidad de la zona de servidumbre.

   El titular será el responsable de los daños ocasionados aguas abajo del punto de vertido por el incorrecto funcionamiento de dichas obras e instalaciones.
2. Se concede la ocupación de los terrenos de dominio público necesarios para la ejecución de las obras.
3. El titular de la autorización está obligado a disponer las actuaciones necesarias para la protección del cauce con materiales apropiados para evitar la erosión en el tramo en que se incorporan los caudales desde el colector de aguas pluviales y para limitar la salida de sólidos al cauce receptor.
4. El titular será el responsable de implementar las técnicas de drenaje urbano sostenible necesarias para reducir la generación de escorrentías, así como las obras e instalaciones que permitan retener y evacuar adecuadamente al cauce las primeras aguas de escorrentía con elevadas concentraciones de contaminantes producidas en dichos episodios.
5. El titular queda obligado a conservar las obras en perfecto estado, así como el tramo de cauce afectado, siendo a su cargo la limpieza del mismo y mantenimiento de sus condiciones de circulación o evacuación hidráulica, debiendo retirar cualquier obstáculo que origine retenciones de los caudales circulantes o implique situaciones de peligro para las fincas colindantes.
6. Las obras deberán estar terminadas en el plazo de **DOS (2) AÑOS** a contar desde el día siguiente al de la notificación de la presente autorización.
7. El titular en ningún momento podrá llevar a cabo obras de movimientos de tierras que alteren la configuración de los terrenos afectados por las obras.

**Recursos**

Esta resolución pone fin a la vía administrativa, pudiendo presentar Recurso Potestativo de Reposición ante la Presidencia de este Organismo, en el plazo de **UN (1) MES**. Con carácter alternativo puede interponer Recurso Contencioso-Administrativo ante la Sala de lo Contencioso-Administrativo del Tribunal Superior de Justicia de Madrid, en el plazo de **DOS (2) MESES**, contados a partir del día siguiente de su notificación.

**Normativa aplicable**

Texto Refundido de la Ley de Aguas
Competencia para resolver: artículo 24.a)
Fin de la vía administrativa: artículo 22.2
Ley 39/2015 del Procedimiento Administrativo Común de las Administraciones Públicas
Recurso potestativo de reposición: artículos 123 y 124
Ley 29/1998 reguladora de la Jurisdicción Contenciosa Administrativa
Recurso contencioso-administrativo: artículos 14 y 46

# 13.3. ANEJO 3. ESTUDIO GEOTÉCNICO

CONTROL DE OBRAS PÚBLICAS
Y EDIFICACIÓN, S.L.
GEOTECNIA Y CONTROL DE CALIDAD



NORTE



SUR

**ESTUDIO GEOTÉCNICO DEL TERRENO**

**Localización: Tanques laminadores. Urb. Kodak**
**Las Rozas de Madrid. MADRID**

**Peticionario: Cnes. RICO, S.A.**

Serranillos del Valle, 27 de junio de 2023

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## ANEXOS

ANEXO 1.- CERTIFICADO DE ENSAYOS

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## 1.- INTRODUCCIÓN.-

### a) Antecedentes:

El día 11 de junio de 2021, **CONTROL DE OBRAS PUBLICAS Y EDIFICACION, S. L.**, realizó una oferta a Cnes. RICO, S.A., para realizar la investigación del terreno que ayudará a conocer los parámetros geotécnicos del terreno de cimentación de DOS LAMINADORES (NORTE Y SUR) en la urbanización de Kodak de las Rozas de Madrid.

Tipo de construcción según el CTE:

**C-0:** construcciones de menos de 4 plantas y superficie construida <300 $m^2$.
**C-1:** otras construcciones de menos de 4 plantas.
**C-2:** construcciones entre 4 y 10 plantas.

Tipologías o Grupos de Terrenos existentes según el CTE:

**T-1:** Terrenos favorables, definidos como aquellos con poca variabilidad y en los que la práctica habitual en la zona es de cimentación directa mediante elementos aislados.
**T-2:** Terrenos intermedios, los que presentan variabilidad o que en la zona no siempre se recurre a la misma solución de cimentación o que presentan rellenos no superiores a 3 m.
**T-3:** Terrenos desfavorables, los no clasificados en ninguno de los otros dos grupos (expansivos, colapsables, Kársticos, blandos…).

En función de estas determinaciones y atendiendo a las referencias determinadas por el trabajo de gabinete realizado, la construcción se puede considerar del tipo **C-0**, y los terrenos existentes en la parcela del tipo **T-1.**

El tanque norte tiene unas dimensiones de 14,8 m x 9,5 m x **5, 75 m.(Altura libre)**
El tanque sur tiene unas dimensiones de 20,3 m x 21,5 m x **4,4 m. (Altura libre)**

**b) Objetivos:**

La finalidad del reconocimiento es definir la disposición y características geomecánicas de los diferentes estratos del terreno en la profundidad indicada por la Propiedad, según la oferta.

En su realización, así como para la redacción del presente estudio, se ha tenido en cuenta las recomendaciones contenidas en las Normas contenidas en el Código Técnico de la Edificación aprobado por el Real decreto 314/2006 de 17 de marzo y el reciente CE.

El documento expreso que relaciona la adecuación de los estudios geotécnicos tras la aprobación del Real decreto está integrado dentro del CTE en el documento básico SE-C sobre Seguridad Estructural y Cimientos.

Adjuntamos notas prácticas con las nuevas denominaciones.

A los efectos de este Código, se definen como clases de exposición relativas al hormigón estructural las recogidas en la tabla 27.1.a.

Tabla 27.1.a Clases de exposición relativas al hormigón estructural

| Designación de la clase | Descripción del entorno | Ejemplos informativos donde pueden existir las clases de exposición |
|---|---|---|
| | 1. Sin riesgo de ataque por corrosión | |
| X0 | Para hormigón en masa: todas las exposiciones salvo donde haya ataque hielo/deshielo, abrasión o ataque químico.<br>Para hormigón con armaduras en un ambiente muy seco. | Elementos de hormigón en masa.<br>Elementos de hormigón en interiores de edificios con una humedad muy baja. (HR<45 %). |
| | 2. Corrosión inducida por carbonatación | |
| XC1 | Seco o permanentemente húmedo. | Elementos de hormigón armado o pretensado dentro de recintos cerrados (tales como edificios), con humedad del aire baja. (HR<65 %).<br>Elementos de hormigón armado o pretensado permanentemente sumergido en agua no agresiva. |
| XC2 | Húmedo, raramente seco. | Elementos de hormigón armado o pretensado permanentemente en contacto con agua o enterradas en suelos no agresivos (por ejemplo, cimentaciones). |
| XC3 | Humedad moderada. | Elementos de hormigón armado o pretensado dentro de recintos cerrados (tales como edificios), con humedad media o alta. (HR>65 %).<br>Elementos de hormigón armado o pretensado en el exterior, protegidos de la lluvia. |
| XC4 | Sequedad y humedad cíclicas. | Elementos de hormigón armado o pretensado en el exterior, expuestos al contacto con el agua, de forma no permanente (por ejemplo, la procedente de la lluvia). |
| | 3. Corrosión inducida por cloruros de origen no marino | |
| XD1 | Humedad moderada. | Elementos de hormigón armado o pretensado en el exterior, expuestas a aerosoles con iones cloruro con origen no marino. |
| XD2 | Húmedo, raramente seco. | Piscinas.<br>Elementos de hormigón armado o pretensado expuestos a aguas industriales que contienen cloruros. |
| XD3 | Ciclos humedad y secado. | Elementos de puentes expuestos a salpicaduras de aguas con cloruros, situados a menos de 10 metros de distancia horizontal o a menos de 5 metros de distancia vertical de una zona de rodadura donde se usen sales de deshielo.<br>Elementos enterrados a menos de 1 metro del borde de una zona de rodadura donde se usen sales de deshielo.<br>Losas en aparcamientos. |
| | 4. Corrosión inducida por cloruros de origen marino | |
| XS1 | Expuestos a aerosoles marinos, pero no en contacto directo con el agua del mar. | Elementos estructurales de hormigón armado o pretensado sometidos a los aerosoles marinos, ubicados en la costa o cerca de la costa. |
| XS2 | Permanentemente sumergida en agua de mar. | Elementos estructurales de hormigón armado o pretensado permanentemente sumergidos en agua marina. |
| XS3 | Zonas de carrera de mareas afectadas por el oleaje o salpicaduras. | Elementos estructurales de hormigón armado o pretensado situados en zona de carrera de mareas, afectados por el oleaje o salpicaduras. |
| | 5. Ataque hielo/deshielo | |
| XF1 | Saturación moderada, sin sales fundentes. | Elementos con superficies verticales expuestas a lluvia y helada (tales como fachadas y pilares) (1).<br>Elementos con superficies horizontales no saturados, pero expuestos a lluvia y helada (1). |
| XF2 | Saturación moderada, con sales fundentes. | Mismo tipo de elementos que en la clase XF1, pero expuestos a sales fundentes, bien directamente o bien a sus salpicaduras y/o escorrentía (por ejemplo dinteles, pilas, cargaderos, etc.) (1). |
| XF3 | Saturación alta, sin sales fundentes. | Elementos con superficies horizontales donde se pueda acumular el agua y estén expuestas a la helada (1). |
| XF4 | Saturación alta con sales fundentes o agua del mar. | Elementos con superficies horizontales donde se pueda acumular el agua y estén expuestas a la helada y sales fundentes, bien directamente o bien a sus salpicaduras (1). |
| | 6. Ataque químico | |
| XA1 | Ambiente de una débil agresividad química conforme a la tabla 27.1.b. | Terrenos naturales y aguas (subterráneas, industriales, residuales, etc.). |
| XA2 | Ambiente de una moderada agresividad química conforme a la tabla 27.1.b. | Terrenos naturales y aguas (subterráneas, industriales, residuales, etc.). |
| XA3 | Ambiente de una alta agresividad química conforme a la tabla 27.1.b. | Terrenos naturales y aguas (subterráneas, industriales, residuales, etc.). |
| | 7. Erosión | |
| XM1 | Elementos sometidos a erosión/abrasión moderada. | Losas sometidas al tráfico de vehículos. |
| XM2 | Elementos sometidos a erosión/abrasión intensa. | Losas en zonas industriales sometidas al tráfico de carretillas de horquillas con neumáticos. |
| XM3 | Elementos sometidos a erosión/abrasión extrema. | Losas en zonas industriales sometidas al tráfico de carretillas de horquillas con ruedas de acero o cadenas. |

ımbiental en invierno superior al 75 % de humedad relativa y tenga una probabilidad anual superior al 50 % de alcanzar al me-ıos una vez temperaturas por debajo de -5 °C. Asimismo, considerará que es probable el uso de sales fundentes cuando el ele-nento esté ubicado en zonas con más de 5 nevadas anuales o con un valor medio de la temperatura media en invierno inferior ı 0 °C.

En general, la clase XS1 se aplicará en estructuras marinas aéreas ubicadas a menos de 5 km de la costa. No obstante, el autor del proyecto podrá, bajo su responsabilidad, adoptar una clase diferente siempre que disponga de datos experimentales de estructuras próximas ya existentes y ubicadas en condiciones similares a las de la estructura proyectada, que así lo aconsejen.

Tabla 27.1.b Clasificación de la agresividad química

| Tipo de medio agresivo | Parámetros | Tipo de exposición | | |
|---|---|---|---|---|
| | | XA1 | XA2 | XA3 |
| | | Ataque débil | Ataque medio | Ataque fuerte |
| AGUA. | VALOR DEL pH, según UNE 83952. | 6,5 - 5,5 | 5,5 - 4,5 | < 4,5 |
| | $CO_2$ AGRESIVO (mg $CO_2$/ l), según UNE-EN 13577. | 15 - 40 | 40 - 100 | > 100 |
| | IÓN AMONIO (mg $NH_4^+$ / l), según UNE 83954. | 15 - 30 | 30 - 60 | > 60 |
| | IÓN MAGNESIO (mg $Mg^{2+}$ / l), según UNE 83955. | 300 - 1000 | 1000 - 3000 | > 3000 |
| | IÓN SULFATO (mg $SO_4^{2-}$ / l), según UNE 83956. | 200 - 600 | 600 - 3000 | > 3000 |
| | RESIDUO SECO (mg / l), según UNE 83957. | 75 - 150 | 50 - 75 | < 50 |
| SUELO. | GRADO DE ACIDEZ. BAUMANN-GULLY (ml/kg), según UNE-EN 16502. | > 200 | (*) | (*) |
| | IÓN SULFATO (mg $SO_4^{2-}$ / kg de suelo seco), según UNE 83963. | 2000 - 3000 | 3000 - 12000 | > 12000 |

*) Estas condiciones no se dan en la práctica.

La toma de muestras para la determinación del contenido de $CO_2$ agresivo requiere una preparación especial de los envases de recogida, según se recoge en la norma UNE-EN 13577. Para la determinación de ion amonio, la muestra se conservará refrigerada desde que finalice el muestreo hasta el inicio del ensayo.

Además, de las condiciones agresivas indicadas en las tablas 27.1.a y 27.1.b, se considerarán formas particulares de acción agresiva las siguientes:

– ataque químico específico derivado del uso del elemento estructural, en cuyo caso el proyecto establecerá las características del agente agresivo y la estrategia particular de durabilidad,

– ataque químico por reactividad álcali-árido, cuando concurran las circunstancias indicadas en el apartado 43.3.4.3, donde también se indica cómo actuar.

27.2 Exigencias específicas de las estructuras de hormigón.

Además de las exigencias generales indicadas en el Artículo 5, las aberturas características de fisura no serán superiores a las aberturas máximas de fisura, $w_{max}$ que figuran en la tabla 27.2.

Tabla 27.2 Abertura máxima de la fisura

| Clase de exposición | $w_{max}$ | |
|---|---|---|
| | Hormigón armado (para la combinación cuasipermanente de acciones) | Hormigón pretensado (para la combinación frecuente de acciones) |
| X0(2), XC1(2). | 0,4 | 0,2 |
| XC2, XC3, XF1, XF3, XC4. | 0,3 | 0,2 (1) |
| XS1, XS2, XD1, XD2, XD3, XF2, XF4, XA1(3). | 0,2 | Descompresión |
| XS3, XA2(3), XA3(3). | 0,1 | |

1) Adicionalmente deberá comprobarse que las armaduras activas se encuentran en la zona comprimida de la sección, bajo la :ombinación cuasi-permanente de acciones.

2) Para las clases de exposición X0 y XC1, la abertura de fisura no influye normalmente en la durabilidad. Los valores recogidos :n la tabla para estos casos se establecen para garantizar un aspecto aceptable.

3) La limitación relativa a las clases XA1, XA2 y XA3 solo será de aplicación en el caso de que el ataque químico pueda afectar a a armadura.

| Parámetro de dosificación | Tipo de hormigón | Clase de exposición | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | XO | XC 1 | XC 2 | XC 3 | XC 4 | XS 1 | X3 2 | XS 3 | XD 1 | XD 2 | XD 3 | XF 1 | XF 2 | XF 3 | XF 4 | XA 1 | XA 2 | XA 3 | XM 1 | XM 2 | XM 3 |
| Máxima relación agua/cemento. | Masa | 0,60 | – | – | – | – | – | – | – | – | – | – | 0,55 | 0,50 | 0,55 | 0,50 | 0,50 | 0,50 | 0,45 | 0,50 | 0,50 | 0,50 |
| | Armado | 0,60 | 0,60 | 0,60 | 0,55 | 0,55 | 0,50 | 0,50 | 0,45 | 0,50 | 0,50 | 0,50 | 0,55 | 0,50 | 0,55 | 0,50 | 0,50 | 0,50 | 0,45 | 0,50 | 0,50 | 0,50 |
| | Pretensado | 0,60 | 0,60 | 0,60 | 0,55 | 0,55 | 0,45 | 0,45 | 0,45 | 0,45 | 0,45 | 0,45 | 0,45 | 0,50 | 0,45 | 0,50 | 0,50 | 0,45 | 0,45 | 0,50 | 0,50 | 0,50 |
| Contenido mínimo de cemento (kg/m$^3$). | Masa | 200 | – | – | – | – | – | – | – | – | – | – | 275 | 300 | 275 | 300 | 275 | 300 | 325 | 300 | 300 | 300 |
| | Armado | 250 | 275 | 275 | 300 | 300 | 300 | 325 | 350 | 325 | 325 | 325 | 300 | 325 | 300 | 325 | 325 | 350 | 350 | 325 | 325 | 325 |
| | Pretensado | 275 | 300 | 300 | 300 | 300 | 300 | 325 | 350 | 325 | 325 | 325 | 300 | 325 | 300 | 325 | 325 | 350 | 350 | 325 | 325 | 325 |

Tabla 43.2.1.b Resistencia característica mínima esperada para el hormigón (*)

| Parámetro de dosificación | Tipo de hormigón | Clase de exposición | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | XO | XC 1 | XC 2 | XC 3 | XC 4 | XS 1 | XS 2 | XS 3 | XD 1 | XD 2 | XD 3 | XF 1 | XF 2 | XF 3 | XF 4 | XA 1 | XA 2 | XA 3 | XM 1 | XM 2 | XM 3 |
| Resistencia característica (N/mm$^3$). | Masa | 20 | – | – | – | – | – | – | – | – | – | – | 30 | 30 | 30 | 30 | 30 | 30 | 35 | 30 | 30 | 30 |
| | Armado | 25 | 25 | 25 | 30 | 30 | 30 | 30 | 35 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 35 | 30 | 30 | 30 |
| | Pretensado | 25 | 25 | 25 | 30 | 30 | 30 | 35 | 35 | 35 | 35 | 35 | 30 | 30 | 30 | 30 | 30 | 35 | 35 | 30 | 30 | 30 |

*) Resistencia característica mínima alcanzable para un hormigón fabricado con cemento de categoría resistente 32,5 R con un contenido mínimo de cemento y máxima relación agua/cemento, conformes a lo indicado en la tabla 43.2.1a.

Cuando el elemento estructural esté expuesto a más de una clase de exposición, a los efectos de aplicar la tabla 43.2.1.a, se procederá fijando para cada parámetro el criterio más exigente de entre los establecidos para cada clase.

Cuando la resistencia especificada en la tipificación del hormigón sea inferior a la resistencia mínima esperada (tabla 43.2.1.b asociada a la clase de exposición considerada, prevalecerá esta última en la prescripción del hormigón por ser los condicionantes de durabilidad más restrictivos que los de resistencia.

En el caso particular de que se utilicen adiciones en la fabricación del hormigón, se podrá tener en cuenta su empleo a los efectos del cálculo del contenido de cemento y de la relación agua/cemento. A tales efectos, en la tabla 43.2.1.a se sustituirá el contenido de cemento C (kg/m$^3$) por C+KF, así como la relación A/C por A/(C+KF) siendo F (kg/m$^3$) el contenido de adición y K el coeficiente de eficacia de la misma.

Cuando se usen cenizas volantes o humo de sílice como adición al hormigón, los contenidos de cemento no podrán ser inferiores a 200, 250 o 275 kg/m$^3$, según se trate de hormigón en masa, armado o pretensado, respectivamente.

En el caso de las cenizas volantes, se tomará un valor de K no superior a 0,20 si se emplea un cemento CEM I 32,5, ni superior a 0,40 en el caso de cementos CEM I con otras categorías resistentes superiores. Para el humo de sílice, se tomará un valor de K no superior a 2, excepto en el caso de hormigones con relación agua/cemento mayor que 0,45 que vayan a estar sometidos a cualesquiera de las clases de exposición XF en cuyo caso para K se tomará un valor igual a 1. La dirección facultativa podrá admitir, bajo su responsabilidad, valores superiores del coeficiente de eficacia, pero no mayores de 0,65 para el caso de las cenizas volantes siempre que ello se deduzca como una estimación centrada en la mediana del valor característicc real, definido como el cuantil del 5 % de la distribución de valores de K. La estimación referida procederá de un estudio experimental que no solo tenga en cuenta la resistencia sino también el mecanismo de daño asociado al ambiente en el que va a estar ubicada la estructura.

Se debe tener en cuenta que los requisitos de máxima relación agua/cemento y contenido mínimo de cemento, recogidos en la tabla 43.2.1.a, condicionan unas características mecánicas mínimas en el hormigón. En este sentido, en la tabla 43.2.1.b se muestra, para cada clase de exposición, la resistencia característica mínima esperable de un hormigón fabricado con un cemento CEM I o CEM II de categoría resistente 32,5 R y áridos de una calidad normal.

43.3 Medidas frente a agresividades específicas.

43.3.1 Protección de las armaduras frente a la corrosión.

43.3.1.1 Criterios generales.

En el caso de elementos estructurales sometidos a cualquiera de las clases XC, XS o XD, el autor del proyecto deberá incluir medidas específicas frente a la corrosión de las armaduras que consistirán en:

a) la adopción de los valores límites de dosificación del hormigón, de acuerdo con los criterios generales establecidos en el apartado 43.2.1,

## 2.- IDENTIFICACIÓN DEL ÁREA DE TRABAJO.-

De forma previa a la realización del trabajo de campo, el equipo técnico de Control de Obras Públicas y Edificación S. L., realizó un estudio previo de gabinete del área afectada por la edificación planteada dentro del contexto o marco geológico de la localidad en la cual se pretende encuadrar la correspondiente edificación.

Para ello, se plasma en papel, el ámbito geológico de la localidad, el cual servirá de sustrato o apoyo de las futuras cimentaciones proyectadas sobre la misma.

De este modo, se realiza una aproximación al terreno, mediante un análisis de la cartografía geológica estudiando los mapas geológicos de la serie MAGNA (nº 558) a escala 1:50.000 del terreno, obteniendo las siguientes apreciaciones macroscópicas sobre la **situación geográfica** de la localidad y su **contenido litoestratigráfico**.

**Situación geográfica:**

El municipio de Las Rozas es uno de los más extensos de la Comunidad de Madrid, ya que su superficie se encuentra entre 5.883 y 5.914 hectáreas. Se encuentra a una distancia de 18 km de Madrid, encajonada entre la carretera de La Coruña A-6 (que atraviesa la ciudad dividiéndola en dos zonas de tamaño desigual) y la carretera de El Escorial M-505, que tiene su kilómetro 0 en este municipio. Cuenta con 4 estaciones de ferrocarril: Las Rozas, Las Matas, Pinar y El Tejar.

El municipio limita con los de Torrelodones (al norte); Villanueva del Pardillo y Galapagar (al oeste); el Monte de El Pardo (Madrid) (al este) y Majadahonda (al sur) y es uno de los pueblos de la sierra de Madrid que incluyen parte de su territorio dentro del Parque Regional de la Cuenca Alta del Manzanares.

## 3.- TRABAJOS REALIZADOS.-

a) Trabajos de campo realizados:

Tras la realización del trabajo de gabinete y después de visitar el terreno se efectuaron, el día 18 de mayo de 2023, los trabajos de campo consistentes en la combinación de trabajos de carácter descriptivo del terreno y trabajos mediante maquinaria geotécnica (fundamentalmente sondeos mecánicos y/o penetraciones dinámicas).

Los puntos de reconocimiento realizados sobre la parcela quedan reflejados en la siguiente tabla y su situación dentro del ámbito estudiado se incluye más adelante en el estudio geotécnico:

| Tipo de reconocimiento | Nº de puntos |
|---|---|
| Muestras | 2 |
| Penetraciones dinámicas tipo Borro´s | 4 |

b) Trabajos de laboratorio realizados:

Tras la realización de los trabajos de campo mediante pruebas y toma de muestras “in situ”, se procedió al traslado de las muestras obtenidas al Laboratorio para su identificación y determinación de los parámetros geotécnicos correspondientes.

En el interior de este trabajo existe un apartado donde se expresan y comentan los resultados de los ensayos realizados producto de la campaña de campo.

## 4.- DESCRIPCIÓN DE LOS TRABAJOS DE CAMPO.-

A continuación, se detalla para cada tipo de prospección su metodología aplicada y de cálculo, así como los datos obtenidos:

### 1. Penetraciones dinámicas:

Metodología aplicada:

La prueba normal de penetración consiste en contabilizar el número de golpes necesarios para la penetración en el terreno de una cuchara normalizada según la norma UNE 103801-1994.

La energía de golpeo la proporciona una maza de 63,5 Kg de peso, en caída libre desde una altura variable de 50-76 cm (lo que determina el tipo de penetrómetro (Borro´s o Dpsh). En este caso, las penetraciones dinámicas que se realizaron fueron de tipo Borros. La máquina es automática.

El penetrómetro dinámico utiliza un cono. El golpeo es anotado cada 20 cm. para la hinca del cono del penetrómetro.

En el Anexo nº 2 se presentan los perfiles penetrométricos con los respectivos golpeos obtenidos en cada punto.

A continuación, la siguiente la tabla muestra la profundidad de rechazo de los penetros respecto a la boca de los penetros:

| **Penetrómetros dinámicos** | **Profundidad de rechazo respecto a la boca de los penetros** |
|---|---|
| Penetro 1 norte | 2,2 m. |
| Penetro 2 norte | 3,0 m. |
| Penetro 1 sur | 3,6 m |
| Penetro 2 sur | 3,6 m |

Metodología de cálculo:

Los reconocimientos se han efectuado desde la cota indicada anteriormente de los penetros hasta rechazo ($N_{20}$ > 100 golpes), pensando en una cimentación superficial, aunque sin descartar una cimentación profunda si fuese necesario.

Se puede estimar la carga admisible para una cimentación superficial en función de los ensayos de penetración dinámica. La fórmula utilizada es la **"holandesa",** según la cual resulta:

$q_{adm} = R_D \times \frac{K}{20}$ siendo:

$q_{adm}$ = Carga admisible en $Kp/cm^2$.

K = Coeficiente en función del tipo de suelo.

El valor de $R_D$ viene dado por la fórmula:

$$R_D = \frac{M^2 \times H}{A\,(e + e_1)\,(M + P)}$$

Donde:

$R_D$ = Resistencia dinámica en $Kp/cm^2$.

M = Masa de la maza.

H = Altura de caída.

A = Sección de la puntaza.

e = Penetración por golpe.

$e_1$ = Acortamiento elástico.

P = Peso del varillaje y puntaza.

Por otra parte, la relación entre el asiento diferencial máximo y el asiento máximo es, según GRANT ET AL (1974)

$$\frac{\vartheta_{máx.}}{H_{máx.}} = 0{,}6$$

Si se supone en el caso actual que el asiento diferencial máximo puede llegar a igualar el asiento máximo, la carga admisible obtenida debería multiplicarse por el factor 0,6.

Resultan finalmente los gráficos obtenidos en el anexo nº 2 en la zona baja de cada hoja. Los resultados ofrecidos aplican ya este factor.

## 5.- DESCRIPCIÓN DE LOS TRABAJOS DE LABORATORIO.-

Una vez realizados los trabajos de campo, se transportaron las muestras al Laboratorio para la realización de los ensayos correspondientes.

**Metodología de extracción de muestra inalterada del terreno:**

Para proceder a la analítica de laboratorio, previamente, se realizó un ensayo de campo que permita obtener una muestra inalterada a la cota de cimentación prevista. El procedimiento mediante el cual se obtuvo la muestra está basado en la introducción sobre el terreno de un tomamuestras de 96 mm hincada en el terreno mediante golpeo simple de la maza del penetrómetro dinámico hasta la cota deseada de cimentación en lapsos paulatinos y sucesivos.

El tomamuestras presenta una longitud aproximada de 60 cm + zapata, por lo tanto, se sucederán las extracciones del tomamuestras hasta alcanzar la cota de cimentación, en caso de no realizar el muestreo en sondeo. El agujero que se va generando es recubierto in situ mediante tubería de pvc de lámina delgada con el fin de evitar que terrenos poco cohesivos taponen el agujero.

Una vez que se ha llegado a la cota a la cual se pretende obtener la muestra inalterada, se cambia el dispositivo, empleando para ello, toma muestras de 86 mm y se procede del mismo modo a hincar la muestra en el terreno, obteniendo de este modo una muestra representativa a la cota deseada.

Este método es valido, obteniendo tras el proceso una muestra inalterada del terreno, la cual se procederá a analizar en el Laboratorio.

**Los materiales son analizados y clasificados en función de varios criterios:**

a) Clasificación granulométrica: Divide los materiales por tamaños estableciendo el criterio base para clasificar los suelos en gravas, arenas, limos o arcillas.

**Porcentaje de finos < 35%**

| Denominación | | % de arcilla y limo |
|---|---|---|
| Nombre principal | Grava o arena | - |
| Nombre secundario | Arenosa o con grava | - |
| Con indicios de | Limos o arcillas | 1-10 |
| Algo | Limosa o arcillosa | 10-20 |
| Bastante | Limosa o arcillosa | 25-35 |

**Porcentaje de finos > 35%**

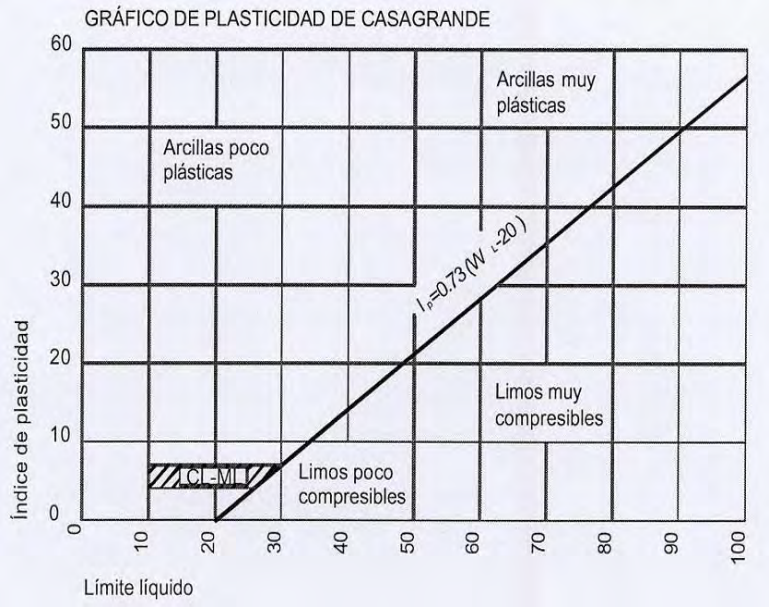
| Denominación | | % de arena y grava |
|---|---|---|
| Nombre principal | Arcilla o limo | < 35 |
| Nombre secundario | Arenosa/so o con grava | 35-65 |

b) Plasticidad: En función de las tablas de Casagrande, establece tipologías de terreno más o menos plásticas y que en cierta forma determinan la probabilidad de expansividad del terreno. Según **Jiménez Salas**, se establecen unos criterios de peligrosidad para arcillas en cuanto a su expansividad:

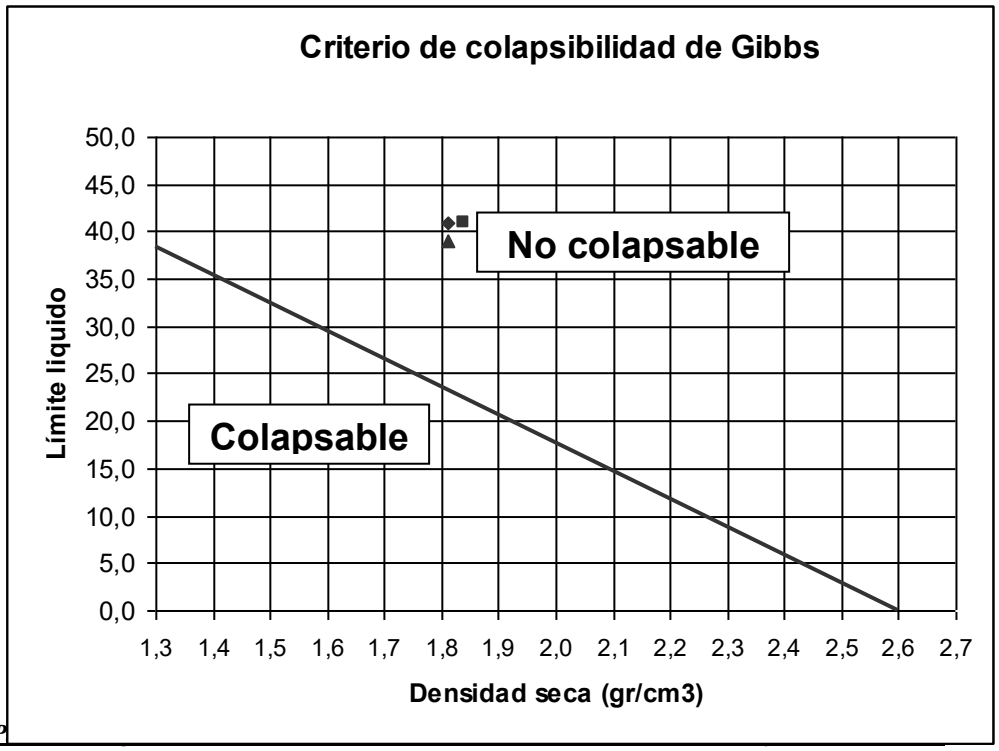
| Parámetro | Nula | Marginal | Crítica | Muy Crítica |
|---|---|---|---|---|
| LL | < 30 | 30-40 | 40-60 | >60 |
| IP | 0-15 | 10-35 | 20-55 | >45 |

**Tabla 43.1.**
**Criterios de expansividad**

| Criterio | Baja | Media | Alta | Muy alta |
|---|---|---|---|---|
| Límite de retracción LR (%) | <15 | 12 a 16 | 8 a 12 | <10 |
| Índice plástico IP (%) | <18 | 15 a 28 | 25 a 40 | >35 |
| Límite líquido LL (%) | <30 | 30 a 40 | 40 a 60 | >60 |
| Contenido de finos <# 200 (%) | <30 | 30 a 60 | 60 a 95 | >95 |
| Contenido de arcilla <0,002 mm (%) | <15 | 13 a 23 | 20 a 30 | >30 |
| Actividad | <0,5 | 0,5 a 0,7 | 0,7 a 1,0 | >1,0 |
| Índice PVC Lambe | <2 | 2 a 4 | 4 a 6 | >6 |
| Presión de hinchamiento (daN/mm$^2$) | <0,3 | 0,3 a 1,2 | 1,2 a 2,5 | >2,5 |
| Hinchamiento en superficie (cm) | <1 | 1 a 2 | 2 a 5 | >5 |
| Índice de desecación (fin del verano) | >1,0 | 1,0 a 0,8 | 0,8 a 0,6 | < 0,6 |
| Ensayo estándar SPT (golpes/30cm) | <10 | 10 a 20 | 20 a 30 | >30 |




c) Otros ensayos: Determinan parámetros específicos del suelo que sirven para integración de cálculos de tensiones de suelos (**corte directo** del terreno para obtención de ángulo de rozamiento y cohesión de suelos granulares y cohesivos; **presión de hinchamiento** de materiales para establecer criterios de expansividad; **resistencia a compresión simple** de rocas y suelos para determinar caracteres de resistencia de suelos….)



En el caso de arenas:

| Arenas | | | | | | | |
|---|---|---|---|---|---|---|---|
| **N** | **Compacidad relativa (%)** | **Densidad relativa** | **Φ (º)** | **E kg/cm2** | **Índice de densidad** | **Losa qa (kg/cm2)** | **Zapata qa (kg/cm2)** |
| 0 – 4 | 0 – 15 | Muy floja | 28 | 100 | 0 – 0.15 | Requiere compactación | Requiere compactación |
| 5 – 10 | 16 – 35 | Floja | 28 – 30 | 100 – 250 | 0.15 – 0.33 | Requiere compactación | Requiere compactación |
| 11 – 30 | 36 – 65 | Media | 30 – 36 | 250 – 500 | 0.33 – 0.67 | 0.7 – 2.5 | 0.35 – 1.25 |
| 31 – 50 | 66 – 85 | Densa | 36 – 41 | 500 – 1000 | 0.67 – 0.85 | 2.5 – 4.5 | 1.25 – 2.25 |
| >50 | 86 – 100 | Muy densa | >41 | >1000 | 0.85 – 1 | >4.5 | >2.25 |

| Arenas | | | | | |
|---|---|---|---|---|---|
| **N** | **4** | **10** | **30** | **50** | **>50** |
| **Cr (%)** | 15 | 35 | 65 | 85 | 86-100 |
| **Id** | 0.15 | 0.33 | 0.67 | 0.85 | 0.85-1 |
| **Qa kg/cm2** | | 0.7 | 2.5 | 4.5 | >4.5 |
| **Φ** | 28 | 30 | 36 | 41 | >41 |
| **E Kg/cm2** | 100 | 250 | 500 | 1000 | >1000 |
| **Compacidad** | Muy floja | Floja | Media | Densa | Muy densa |

Para el caso de arcillas:

**Arcillas**

| N | Qa (kg/cm2) | Φ (º) | E (kg/cm2) | E | K30 |
|---|---|---|---|---|---|
| <2 | <0.25 | 0 | 3 | <15 | <0.65 |
| 2 – 4 | 0.25 – 0.50 | 0 – 2 | 30 | 15 – 30 | 0.65 – 1.30 |
| 4 – 8 | 0.50 – 1 | 2 – 4 | 45 – 90 | 30 – 60 | 1.30 – 2.50 |
| 8 – 15 | 1 – 2 | 4 – 6 | 90 – 200 | 60 – 90 | 2.50 – 4 |
| 15 – 30 | 2 – 4 | 6 – 12 | >200 | 90 – 180 | 4 – 8 |
| >30 | >4 | >14 | >200 | 180 – 480 | 8 -21 |

d) Ensayos de Agresividad química de aguas y suelos, estableciendo diversas tipologías de ataques en función de la siguiente tabla:

| Tipo de Medio agresivo | Parámetros[1] | Tipo de exposición | | |
|---|---|---|---|---|
| | | $Q_a$ Ataque débil | $Q_b$ Ataque medio | $Q_c$ Ataque fuerte |
| Agua | Valor del pH | 6,5-5,5 | 5,5-4,5 | < 4,5 |
| | $CO_2$ agresivo (mg $CO_2$/l) | 15-40 | 40-100 | > 100 |
| | Ión amonio (mg $NH_4^+$/l) | 15-30 | 30-60 | > 60 |
| | Ión magnesio (mg $Mg^{2+}$/l) | 300-1000 | 1000-3000 | > 3000 |
| | Ión sulfato (mg $SO_4^{2-}$/l) | 200-600 | 600-3000 | > 3000 |
| | Residuo seco a 110º C (mg/l) | 75-150 | 50-75 | < 50 |
| Suelo | Grado de acidez Baumann-Gully | > 20 | -[1] | -[1] |
| | Ión Sulfato (mg $SO_4^{2-}$/kg de suelo seco) | 2000-3000 | 3000-12000 | > 12000 |

[1] Estas condiciones no se dan en la práctica

LAS NORMAS DEL CE, TIENEN LAS SIGUIENTES HOJAS COMO GUIA:

## Análisis de Laboratorio:

A continuación, se representa un resumen de los resultados de los distintos análisis del terreno realizados.

Esta representación de resultados permite definir el terreno de una forma similar:

**Presenta un cernido por el tamiz del 0,08 del 15% y resulta ser poco plásticas. Las muestras no presentan carbonatos en su composición ni sulfatos.**

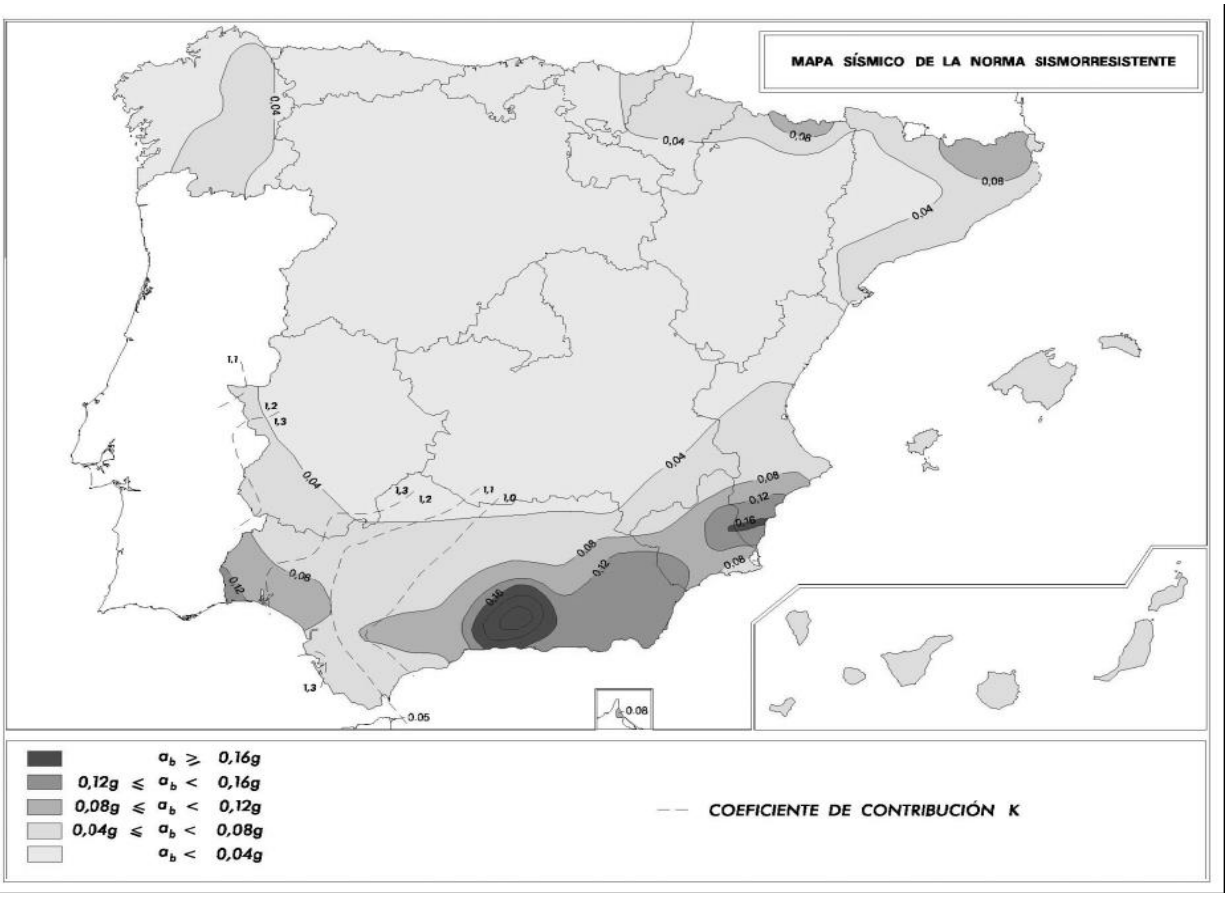
## 6.- COMPORTAMIENTO SÍSMICO DEL TERRENO, NSCE-02.-

La peligrosidad sísmica del territorio nacional se define por medio del mapa de peligrosidad sísmica. Dicho mapa suministra, expresada en relación al valor de la gravedad, g, la aceleración sísmica básica, $a_b$ -un valor característico de la aceleración horizontal de la superficie del terreno- y el coeficiente de contribución K, que tiene en cuenta la influencia de los distintos tipos de terremotos esperados en la peligrosidad sísmica de cada punto.

La aceleración sísmica de cálculo, $a_c$ se define como el producto:

$$a_c = S.\rho.a_b$$

- $a_b$: Aceleración sísmica básica.



- $\rho$: Coeficiente adimensional de riesgo, función de la probabilidad aceptable de que se exceda $a_c$ en el período de vida para el que se proyecta la construcción.

  Toma los siguientes valores:

  - construcciones de importancia normal $\rho$=1,0
  - construcciones de importancia especial $\rho$= 1,3

- S: Coeficiente de amplificación del terreno. Toma el valor:

$$\text{Para } \rho . a_b \leq 0{,}1 \text{ g} \qquad S = \frac{C}{1{,}25}$$

$$\text{Para } 0{,}1\text{g} < \rho . a_b < 0{,}4 \text{ g} \qquad S = \frac{C}{1{,}25} + 3{,}33 \left(\rho \cdot \frac{a_b}{g} - 0{,}1\right)\left(1 - \frac{C}{1{,}25}\right)$$

$$\text{Para } 0{,}4 \text{ g} \leq \rho . a_b \qquad S = 1{,}0$$

  - C: Coeficiente de terreno. Depende de las características geotécnicas del terreno de cimentación. En esta Norma, los terrenos se clasifican en los siguientes tipos:

- Terreno tipo I: Roca compacta, suelo cementado o granular muy denso. Velocidad de propagación de las ondas elásticas transversales o de cizalla, $v_s$ > 750 m/s.

- Terreno tipo II: Roca muy fracturada, suelos granulares densos o cohesivos duros. Velocidad de propagación de las ondas elásticas transversales o de cizalla, 750 m/s $\geq v_s$ > 400 m/s.

- Terreno tipo III: Suelo granular de compacidad media, o suelo cohesivo de consistencia firme a muy firme. Velocidad de propagación de las ondas elásticas transversales o de cizalla, 400 m/s $\geq v_s$ > 200 m/s.

- Terreno tipo IV: Suelo granular suelto, o suelo cohesivo blando. Velocidad de propagación de las ondas elásticas transversales o de cizalla, $v_s \leq$200 m/s.

A cada uno de estos tipos de terreno se le asigna el valor del coeficiente C;

| TIPO DE TERRENO | COEFICIENTE C |
|---|---|
| I | 1,0 |
| II | 1,3 |
| III | 1,6 |
| IV | 2,0 |

Para obtener el valor del coeficiente C de cálculo se determinarán los espesores de terrenos de cada tipo, existentes en los 30 primeros metros bajo la superficie. Según el Real Decreto 314/2006, por el que se aprueba el Código Técnico de la Edificación Actual, si no se ha explorado hasta 30 m de profundidad, se justificará el valor asignado a los estratos por debajo de la profundidad explorada.

Se adoptará como valor de C el valor medio obtenido al ponderar los coeficientes C, de cada estrato con su espesor $e_i$, en metros, mediante la expresión:

$$C = \Sigma C_i \cdot e_i / 30$$

En los edificios con sótanos bajo el nivel general de la superficie del terreno, los espesores de las distintas capas para clasificar las condiciones de cimentación deben, normalmente, medirse a partir de la rasante.

El coeficiente C no contempla el posible colapso del terreno bajo la estructura durante el terremoto debido a la inestabilidad del terreno como en el caso de arcillas sensibles, densificación de suelos, hundimiento de cavidades subterráneas, movimientos de ladera, etc. Especialmente habrá de analizarse la posibilidad de licuación (o licuefacción) de los suelos susceptibles a la misma.

**Datos del terreno analizado en la parcela para cálculo sismoresistente;**

- $a_b$ = 0,04g
- $\rho$ = 1
- C, Tipo de Terreno IV, C = 2
- $a_c$ = S. $\rho$. $a_b$ = 1,6 x 1 x 0,04 = 0,064g

## 7.- CALCULO DE PRESIONES ADMISIBLES DEL TERRENO.-

La Presión vertical admisible ($q_{adm}$, $q'_{adm}$) hace referencia al valor de cálculo de la resistencia del terreno ($R_d$). Puede expresarse en términos de presiones totales o efectivas, brutas o netas.

En el presente estudio geotécnico, se estima la presión admisible del terreno en función de diversas metodologías de cálculo en función de ensayos "in situ" del terreno y/o ensayos de laboratorio.

De este modo, en función de la tipología de prueba o ensayos se obtienen los siguientes resultados:

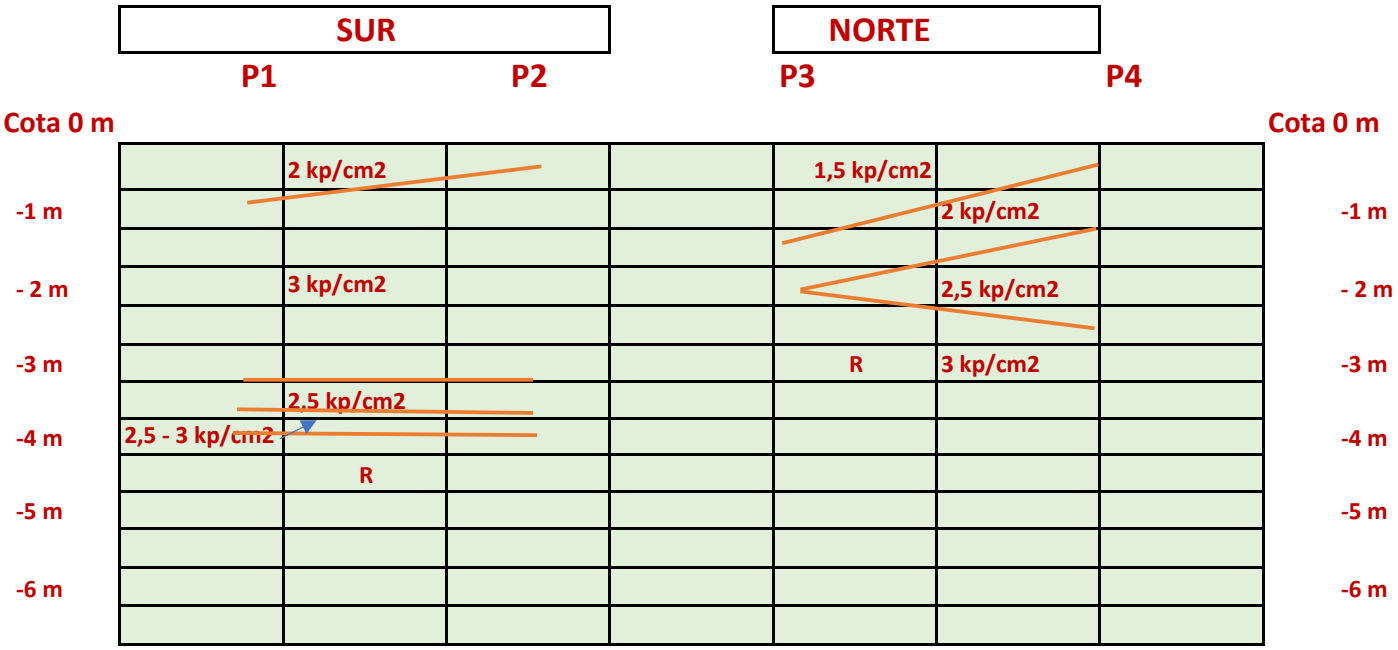
**Resultados obtenidos por penetraciones dinámicas realizadas (todas las cotas están referidas a la cota del penetrómetro:**

- NORTE: Valores de presión admisible entre **1,5 – 3,5 Kp/cm$^2$ hasta 2,5 m. El tanque llega hasta 5,75 m., por lo que es posible que se deba usar martillo rompedor.**

- SUR: Valores de presión admisible entre **2-3,5 Kp/cm$^2$ hasta 4 m. que coincide casi con el fondo del tanque.**

**Presiones admisibles de los penetrómetros.**

Tanques de tormentas. Obra Kodak. Las Rozas. Madrid




Estos materiales siguen en profundidad con la presión de 3 kp/cm2 según la geología.

Serranillos del Valle, 18 de mayo de 2023

Fdo.: Daniel Agúndez Agúndez

Director. Tm.: 609 00 92 02

CONTROL DE OBRAS PÚBLICAS Y EDIFICACIÓN, S.L.
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28979 SERRANILLOS DEL VALLE (Madrid)

## 8.- COEFICIENTE DE PERMEABILIDAD DEL TERRENO.-

La permeabilidad del terreno se puede estimar mediante tablas debidamente contrastadas recogidas en la bibliografía geotécnica.

La siguiente tabla muestra los valores medios de permeabilidad (k) que presentan algunos grupos de suelo:

| Tipo de suelo | Coeficiente de permeabilidad k (cm/s) |
|---|---|
| Grava mal graduada (GP) | >1 |
| Grava uniforme (GP) | 0,2 – 1 |
| Grava bien graduada (GW) | 0,05 – 0,3 |
| Arena uniforme (SP) | $5 \times 10^{-3}$ – 0,2 |
| Arena bien graduada (SW) | $10^{-3}$ – 0,1 |
| Arena limosa (SM) | $10^{-3}$ – $5 \times 10^{-3}$ |
| Arena arcillosa (SC) | $10^{-4}$ – $10^{-3}$ |
| Limo de baja plasticidad (ML) | $5 \times 10^{-5}$ – $10^{-4}$ |
| Arcillas de baja plasticidad (CL) | $10^{-5}$ – $10^{-8}$ |

Nota: para el caso de arcillas de consistencia dura y no meteorizadas, se pueden considerar prácticamente impermeables, al igual que para el caso de rocas sanas con pocas discontinuidades o que estén cerradas.

**Para el grupo de terreno según la tabla anterior, un coeficiente k de permeabilidad de entre $10^{-3}$ cm/s.**

## 9.- CALCULO DE ASIENTOS.-

Para proceder al cálculo de asientos se estima el método o procedimiento de cálculo en función de la tipología de terreno que se presenta en el interior de este estudio. Se trata de estimaciones realizadas en base a parámetros de carácter teórico.

**Calculo de asientos en suelo granular**:

Metodología empleada:

Para estimar el asiento de una cimentación directa en un terreno granular de estas características, podrían utilizarse correlaciones que permiten determinar el módulo de deformación del terreno en función de los resultados obtenidos en ensayos de penetración estática o dinámica realizados "in situ". En el presente DB se recomienda utilizar la expresión de Burland y Burbridge (1985), basada directamente en los resultados obtenidos en el ensayo SPT o deducidos de ensayos de penetración a través de correlaciones debidamente contrastadas.

El valor $N_B$ correspondiente al número de golpes del ensayo de penetración dinámica tipo Borro's se puede correlacionar con el valor N del ensayo SPT (valor necesario para poder calcular los asientos esperables) mediante la correlación propuesta por Dhalberg:

$$N = 25 * \log (N_B) - 15{,}16$$

Los asientos esperables más desfavorables según la expresión de **Burland-Burbridge** son:

Asiento medio al final de la construcción:
$\mathbf{s_i = fs\ \ fl\ \ q'_b\ B^{0,7}\ I_c,}$

Asiento diferido en el tiempo:
$\mathbf{s_t = ft\ s_i,}$

siendo:

$\mathbf{q'_b}$ presión efectiva bruta aplicada a la base de la cimentación (en $kN/m^2$).

**B** ancho de la zapata o losa (en m).

**$I_c$** Índice de compresibilidad, definido en función del valor medio de golpeo N del ensayo SPT, en una zona de influencia ($Z_I$) bajo la zapata o losa, cuya profundidad viene determinada en función del ancho de cimentación.

**fs** coeficiente dependiente de las dimensiones de la cimentación, supuesta ésta rectangular.

**fl** factor de corrección de la posible existencia de capas rígidas en la zona de influencia de la cimentación ($Z_I$).

**ft** factor función del tiempo.

El valor máximo admisible de asiento para el tipo de construcción planteada en el presente estudio no es superado para ninguno de los casos hipotéticos calculados, por lo que se recomienda cimentar sobre el terreno natural.

Las cotas de excavación serán muy similares a las definidas en el rechazo de los penetros.

## 11.- CONCLUSIONES Y RECOMENDACIONES.-

a) Descripción de las unidades geotécnicas:

Presenta un cernido por el tamiz del 0,08 del 15% y resulta ser poco plástica. La muestra no presenta carbonatos en su composición ni sulfatos. Son las típicas arenas de miga de la zona.

b) Cota de cimentación:

Se recomienda cimentar sobre el terreno natural (situado a cada cota de los tanques).

c) Presión admisible de cálculo:

La presión admisible del terreno puede ser de >3 kp/cm$^2$.

d) Recomendaciones de cimentación:

En el caso de aparecer zonas más arenosas se eliminarán.

e) Asientos:

El valor máximo admisible de asiento para el tipo de construcción planteada en el presente estudio no es superado para ninguno de los casos hipotéticos calculados, por lo que se recomienda cimentar sobre el terreno de excavación final.

f) Nivel freático o presencia de agua:

No se observa el nivel freático en las prospecciones realizadas

g) Permeabilidad del terreno:

Para el terreno, se considera un coeficiente k de permeabilidad de $10^{-3}$ cm/s.

h) Agresividad del terreno y agua:

El presente terreno NO contiene carbonatos, en concordancia con las litologías existentes sobre la zona estudiada.

Los materiales analizados muestran que el terreno donde se va a asentar la edificación NO presenta sulfatos por lo que NO es necesario tener que usar el empleo de cementos sulforresistentes para llevar a cabo la confección del hormigón de las cimentaciónes. (según CE).

(1) La Legislación vigente, estipula una cantidad de sulfatos igual o **> 3000 mg/Kg** en el suelo seco y de **600 mg/l** en el agua freática, para la cual se hace necesario el uso de cemento antisulfatos.

i) Acciones sísmicas sobre el terreno:

Según los cálculos realizados siguiendo la normativa sismorresitente vigente, el valor de la aceleración sísmica de cálculo ($a_c$) es 0,064g.

j) Ripabilidad de los materiales y métodos de excavación:

Para abordar las excavaciones de la obra bastará con el uso de maquinaria convencional incluso martillo rompedor.

k) Topografía de la Parcela:

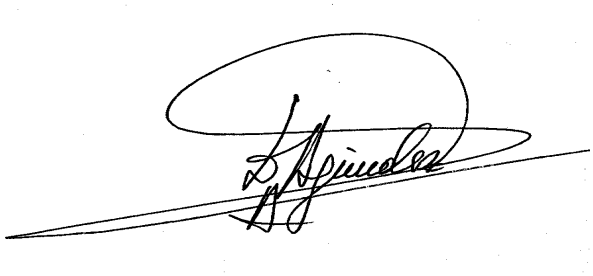
En el momento de la realización del estudio en obra no se observan taludes u otras formas geométricas asociadas con riesgo. Las acciones posteriores realizadas durante el transcurso de la obra respecto a la realización mediante maquinaria de nuevos taludes u otras formas geométricas, no están valoradas en este estudio geotécnico.

**Todas las consideraciones incluidas en este estudio se basan en los reconocimientos efectuados por lo que, dado el carácter puntual de los mismos, resulta interesante comprobar durante la ejecución de la cimentación que los resultados son generalizables al conjunto de los terrenos afectados por la construcción. CONTROL DE OBRAS PUBLICAS Y EDIFICACION, S. L. pone a disposición de la Dirección Facultativa de la obra las visitas necesarias a la excavación para comprobar lo anterior, sin coste añadido.**

Serranillos del Valle, 27de junio de 2023

CONTROL DE OBRAS PÚBLICAS
Y EDIFICACIÓN, S.L.
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Fdo.: Daniel Agúndez Agúndez
Director
Ingeniero Técnico en Cnes. civiles
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# ANEXO 1.- CERTIFICADO DE ENSAYOS

CONTROL DE OBRAS PÚBLICAS
Y EDIFICACIÓN, S.L.
LABORATORIO DE ENSAYOS

**Laboratorio con declaración responsable**
**C/ Tejo, 14. P. I. Cañariego**
**28979 - Serranillos del Valle. Madrid**

***MAD - L - 046***

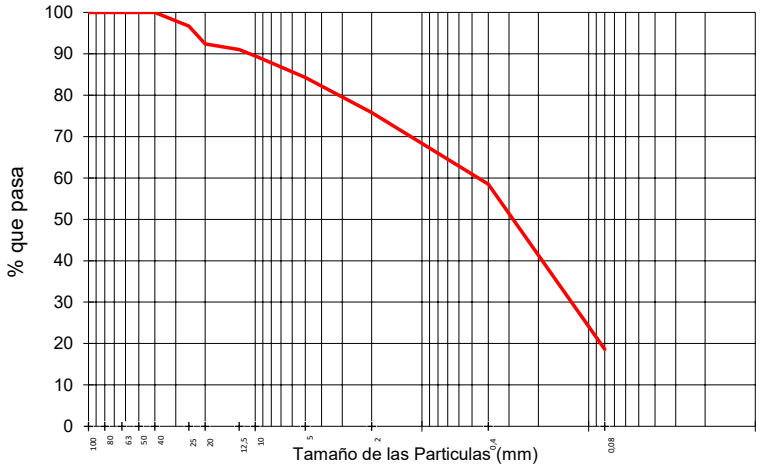
# ACTA RESUMEN DE RESULTADOS

**Fecha Acta:** 26/06/2023

ENSAYOS DE IDENTIFICACIÓN

**PETICIONARIO Y DIRECCIÓN:** CNES. RICO, S. A.
**OBRA :** TANQUES DE TORMENTAS NORTE Y SUR
**TRAMO:** URB. KODAK. LAS ROZAS — **FECHA TOMA:** 18-05-23
**PROCEDENCIA:** NORTE — **Nº MUESTRA:** SE-23-0226

**GRANULOMETRÍA DE SUELOS POR TAMIZADO.**
(UNE -103-101/95)




| TAMIZ UNE | %PASA |
|---|---|
| 100 | 100,0 |
| 80 | 100,0 |
| 63 | 100,0 |
| 50 | 100,0 |
| 40 | 100,0 |
| 25 | 96,7 |
| 20 | 92,4 |
| 12,5 | 91,0 |
| 10 | 89,5 |
| 5 | 84,3 |
| 2 | 75,8 |
| 0,4 | 58,5 |
| 0,08 | 18,6 |

| | |
|---|---|
| %Gruesos: | 24 |
| %Arenas Gruesas: | 17 |
| %Arenas Finas: | 40 |
| %Finos: | 19 |

**ENSAYO PROCTOR:**
(UNE -103.500/94,NORMAL) (UNE 103.501/94, MODIFICADO)

**HUMEDAD OPTIMA** ..... %
**DENSIDAD MÁXIMA** ..... g/cm³

**MATERIA ORGÁNICA:** 0,64 %
(UNE-103-204:1993 Y ERRATUM)

**CONTENIDO EN YESOS %**
( NLT 115 ) ..... %

**HUMEDAD DEL SUELO** 5,5 %
(UNE-103.300/93)

**ACIDEZ BAUMMAN** .....
(UNE-83962:2008)

**HINCHAMIENTO LIBRE**
( UNE 103601:1996 ) ..... %

**COLAPSO** ..... %
(NLT-254:99)

**COMPRESIÓN SIMPLE:**
(UNE -103400:1993)

**COMPRESIÓN SIMPLE** ..... Kg/cm²
**DEFORMACIÓN** ..... %

**CLASIFICACIÓN** .....

**LIMITES DE ATTERBERG**
(UNE -103.103/94,103-104/93)

**L.LÍQUIDO:** 28
**L,PLÁSTICO:** 17
**PLASTICIDAD:** 11

**C.B.R.:** **100%** .....
(UNE 103-502/95) **95%** .....
**HINCHAMIENTO:** **100%** ..... %
(UNE 103-502/95) **95%** ..... %

**SALES SOLUBLES**
( NLT 114 ) 0,34 %

**CUALITATIVO DE SULFATOS**
( UNE 103-202/95 ) NO

**CUANTITATIVO DE SULFATOS**
( UNE 103 201:1996 ) 0 %

**COHESION**
( UNE 103401:1998 ) ..... Kg/cm²

**ANGULO DE ROZAMIENTO INTERNO**
( UNE 103401:1998 ) ..... °

**DENSIDAD APARENTE DE UN SUELO**
( UNE 103301:1994 ) ..... g/cm³

**PRESIÓN DE HINCHAMIENTO**
( UNE 103602:1996 ) ..... Kg/cm²

**OBSERVACIONES:**

**DIRECTOR LABORATORIO**

CONTROL DE OBRAS PÚBLICAS
Y EDIFICACIÓN, S.L.
GEOTECNIA Y CONTROL DE CALIDAD
C/. Tejo, 14 - Pol. Ind. Cañariego - Telf: 91 810 30 10
28979 SERRANILLOS DEL VALLE (Madrid)

DANIEL AGÚNDEZ AGÚNDEZ

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Y EDIFICACIÓN, S.L.
LABORATORIO DE ENSAYOS

**Laboratorio con declaración responsable**
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**28979 - Serranillos del Valle. Madrid**

***MAD - L - 046***

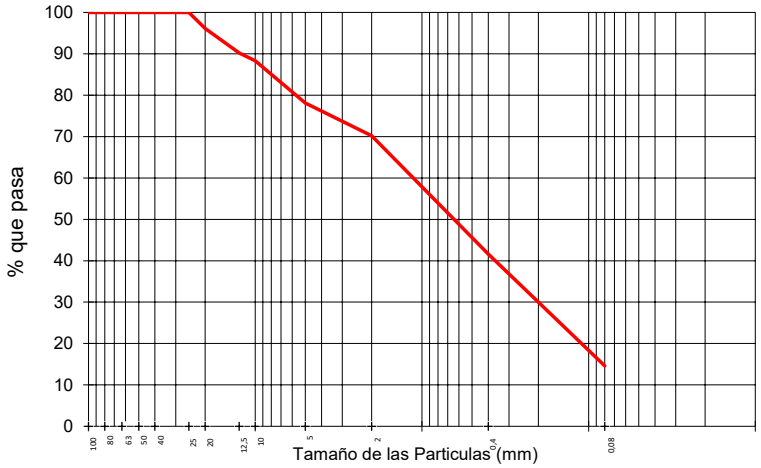
# ACTA RESUMEN DE RESULTADOS

**Fecha Acta:** 26/06/2023

ENSAYOS DE IDENTIFICACIÓN

**PETICIONARIO Y DIRECCIÓN:** CNES. RICO, S. A.
**OBRA :** TANQUES DE TORMENETAS NORTE Y SUR
**TRAMO:** URB. KODAK. LAS ROZAS — **FECHA TOMA:** 18-05-23
**PROCEDENCIA:** SUR — **Nº MUESTRA:** SE-23-0227

**GRANULOMETRÍA DE SUELOS POR TAMIZADO.**
(UNE -103-101/95)




| TAMIZ UNE | %PASA |
|---|---|
| 100 | 100,0 |
| 80 | 100,0 |
| 63 | 100,0 |
| 50 | 100,0 |
| 40 | 100,0 |
| 25 | 100,0 |
| 20 | 96,1 |
| 12,5 | 90,2 |
| 10 | 88,3 |
| 5 | 78,1 |
| 2 | 70,2 |
| 0,4 | 41,6 |
| 0,08 | 14,6 |

| | |
|---|---|
| %Gruesos: | 30 |
| %Arenas Gruesas: | 29 |
| %Arenas Finas: | 27 |
| %Finos: | 15 |

**ENSAYO PROCTOR:**
(UNE -103.500/94,NORMAL) (UNE 103.501/94, MODIFICADO)

**HUMEDAD OPTIMA** ..... %
**DENSIDAD MÁXIMA** ..... g/cm³

**MATERIA ORGÁNICA:** 0,36 %
(UNE-103-204:1993 Y ERRATUM)

**CONTENIDO EN YESOS %**
( NLT 115 ) ..... %

**HUMEDAD DEL SUELO** 3,4 %
(UNE-103.300/93)

**ACIDEZ BAUMMAN** .....
(UNE-83962:2008)

**HINCHAMIENTO LIBRE**
( UNE 103601:1996 ) ..... %

**COLAPSO** ..... %
(NLT-254:99)

**COMPRESIÓN SIMPLE:**
(UNE -103400:1993)

**COMPRESIÓN SIMPLE** ..... Kg/cm²
**DEFORMACIÓN** ..... %

**CLASIFICACIÓN** .....

**LIMITES DE ATTERBERG**
(UNE -103.103/94,103-104/93)

**L.LÍQUIDO:** 30
**L,PLÁSTICO:** 18
**PLASTICIDAD:** 12

**C.B.R.:** **100%** .....
(UNE 103-502/95) **95%** .....
**HINCHAMIENTO:** **100%** ..... %
(UNE 103-502/95) **95%** ..... %

**SALES SOLUBLES**
( NLT 114 ) 0,81 %

**CUALITATIVO DE SULFATOS**
( UNE 103-202/95 ) NO

**CUANTITATIVO DE SULFATOS**
( UNE 103 201:1996 ) 0 %

**COHESION**
( UNE 103401:1998 ) ..... Kg/cm²

**ANGULO DE ROZAMIENTO INTERNO**
( UNE 103401:1998 ) ..... °

**DENSIDAD APARENTE DE UN SUELO**
( UNE 103301:1994 ) ..... g/cm³

**PRESIÓN DE HINCHAMIENTO**
( UNE 103602:1996 ) ..... Kg/cm²

**OBSERVACIONES:**

**DIRECTOR LABORATORIO**

CONTROL DE OBRAS PÚBLICAS
Y EDIFICACIÓN, S.L.
GEOTECNIA Y CONTROL DE CALIDAD
C/. Tejo, 14 - Pol. Ind. Cañariego - Telf: 91 810 30 10
28979 SERRANILLOS DEL VALLE (Madrid)

DANIEL AGÚNDEZ AGÚNDEZ

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# ANEXO 2.- REGISTRO DE PENETRACIONES DINÁMICAS

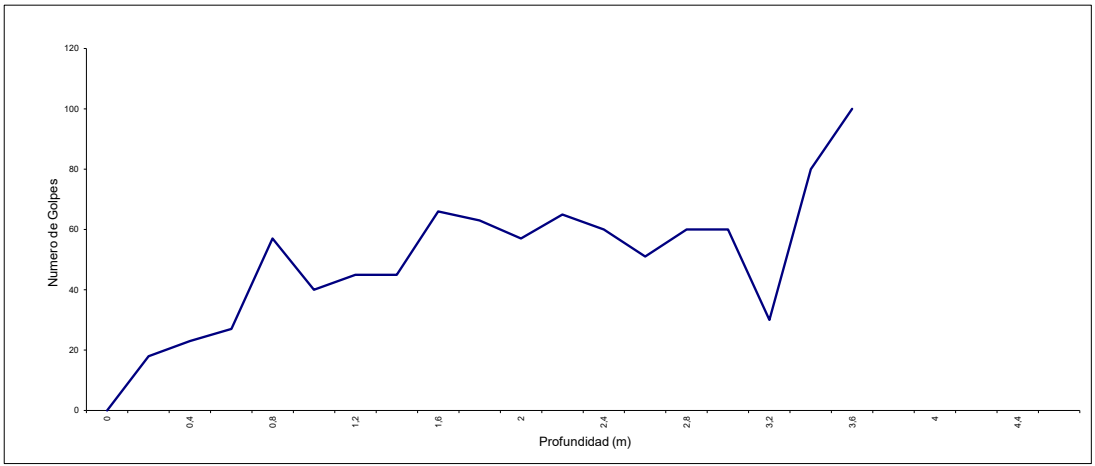
# ENSAYO DINAMICO DE PENETRACION BORRO. s/ UNE 103809:2010

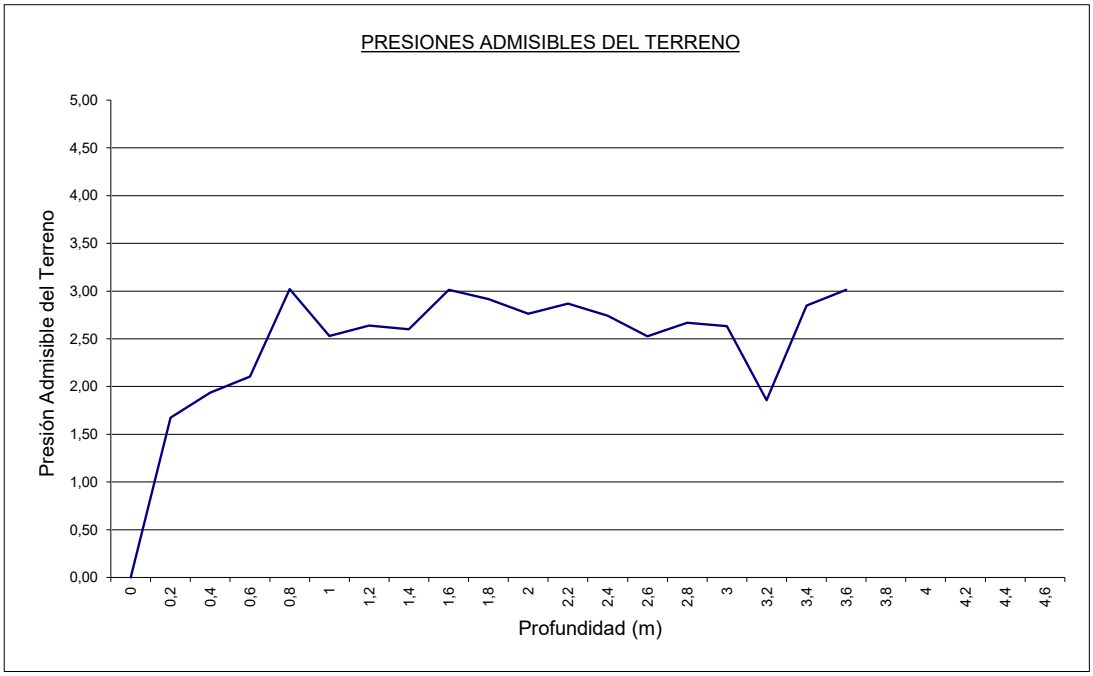
CONTROL DE OBRAS PÚBLICAS Y EDIFICACIÓN, S.L.
GEOTECNIA Y CONTROL DE CALIDAD

| Laboratorio Acreditado. MAD - L - 046 |
|---|
| C/ Tejo nº 4 ** P. I. Cañariego ** |
| 28979 - Serranillos del Valle. Madrid |

| | | | | |
|---|---|---|---|---|
| **Obra** | OBRA KODAK, ESTANQUE E TORMENTAS SUR | | | |
| **Localidad** | LAS ROZAS | | **Provincia** | MADRID |
| **Fecha de Realización** | 18/05/2023 | **N. Freático** | NO | |
| **Nº de Ensayo** | 1 | | | |

| Prof (m) | Nº Golpes |
|---|---|
| 0 | 0 |
| 0,2 | 18 |
| 0,4 | 23 |
| 0,6 | 27 |
| 0,8 | 57 |
| 1 | 40 |
| 1,2 | 45 |
| 1,4 | 45 |
| 1,6 | 66 |
| 1,8 | 63 |
| 2 | 57 |
| 2,2 | 65 |
| 2,4 | 60 |
| 2,6 | 51 |
| 2,8 | 60 |
| 3 | 60 |
| 3,2 | 30 |
| 3,4 | 80 |
| 3,6 | 100 |
| 3,8 | |
| 4 | |
| 4,2 | |
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CONTROL DE OBRAS PÚBLICAS Y EDIFICACIÓN, S.L.
GEOTECNIA Y CONTROL DE CALIDAD
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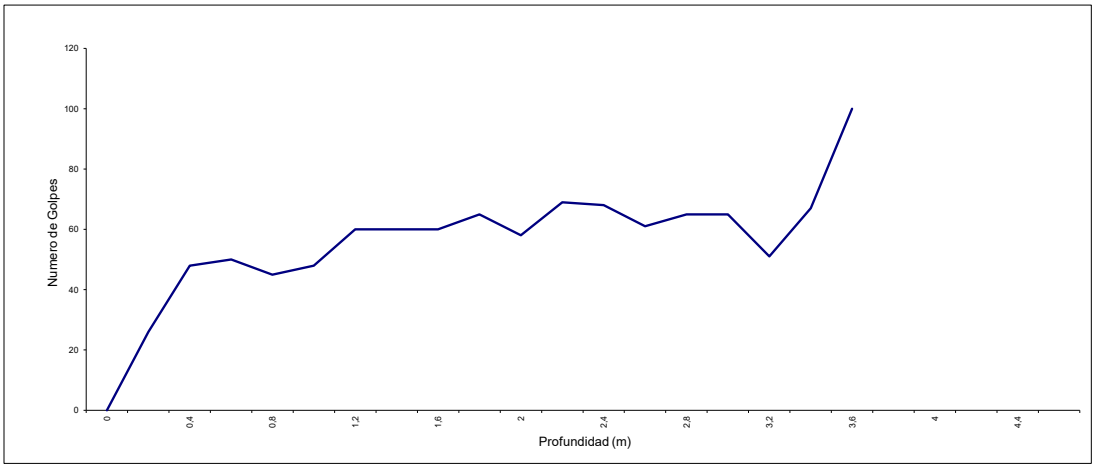
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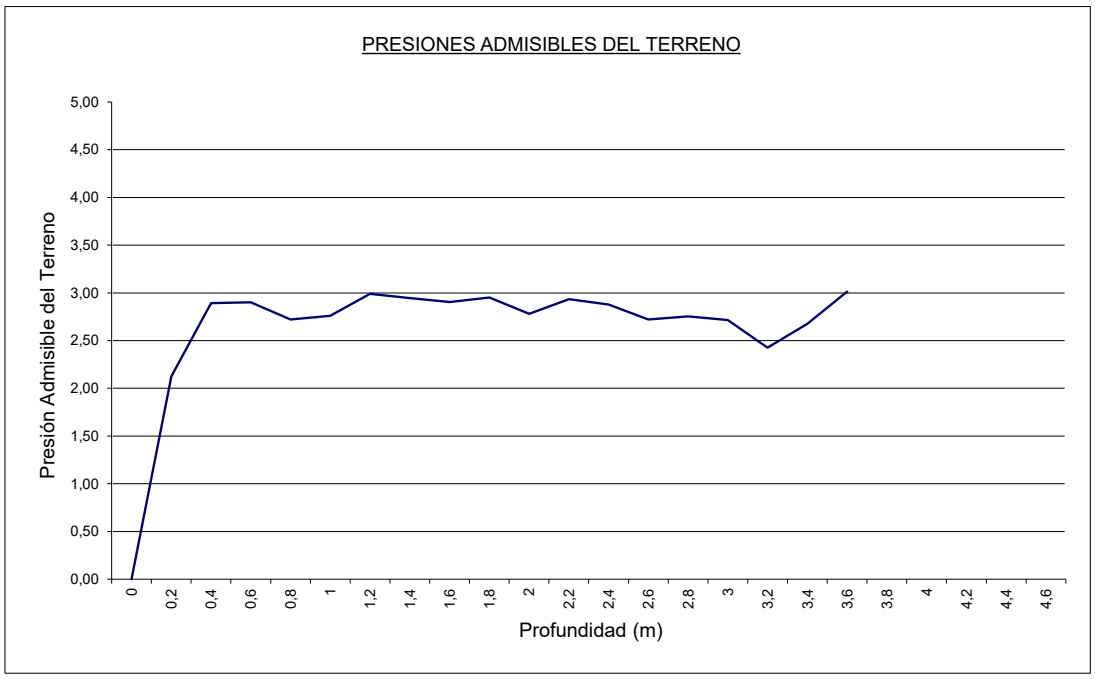
CONTROL DE OBRAS PÚBLICAS Y EDIFICACIÓN, S.L.
GEOTECNIA Y CONTROL DE CALIDAD

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|---|
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| 28979 - Serranillos del Valle. Madrid |

| | | | |
|---|---|---|---|
| **Obra** | OBRA KODAK, ESTANQUE E TORMENTAS SUR | | |
| **Localidad** | LAS ROZAS | **Provincia** | MADRID |
| **Fecha de Realización** | 18/05/2023 | **N. Freático** | NO |
| **Nº de Ensayo** | 2 | | |

| Prof (m) | Nº Golpes |
|---|---|
| 0 | 0 |
| 0,2 | 26 |
| 0,4 | 48 |
| 0,6 | 50 |
| 0,8 | 45 |
| 1 | 48 |
| 1,2 | 60 |
| 1,4 | 60 |
| 1,6 | 60 |
| 1,8 | 65 |
| 2 | 58 |
| 2,2 | 69 |
| 2,4 | 68 |
| 2,6 | 61 |
| 2,8 | 65 |
| 3 | 65 |
| 3,2 | 51 |
| 3,4 | 67 |
| 3,6 | 100 |
| 3,8 | |
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CONTROL DE OBRAS PÚBLICAS Y EDIFICACIÓN, S.L.
GEOTECNIA Y CONTROL DE CALIDAD
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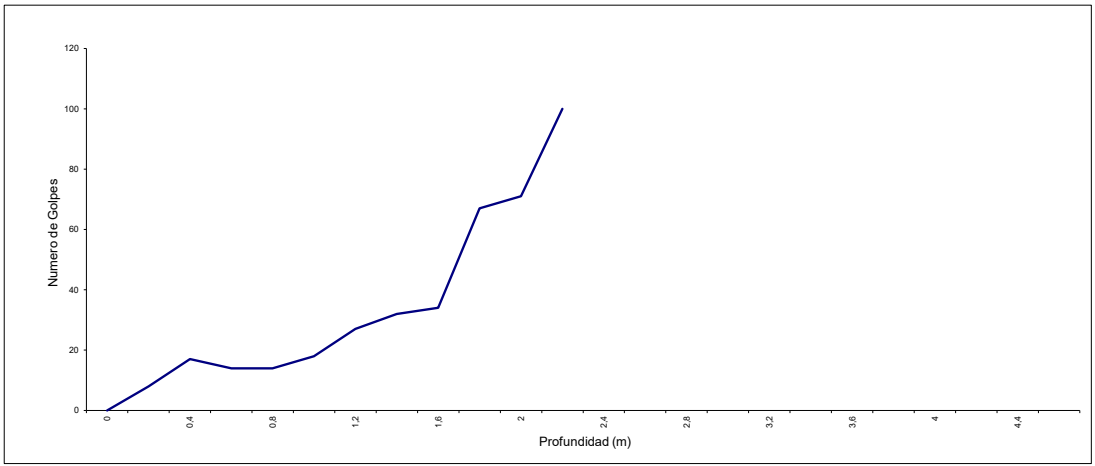
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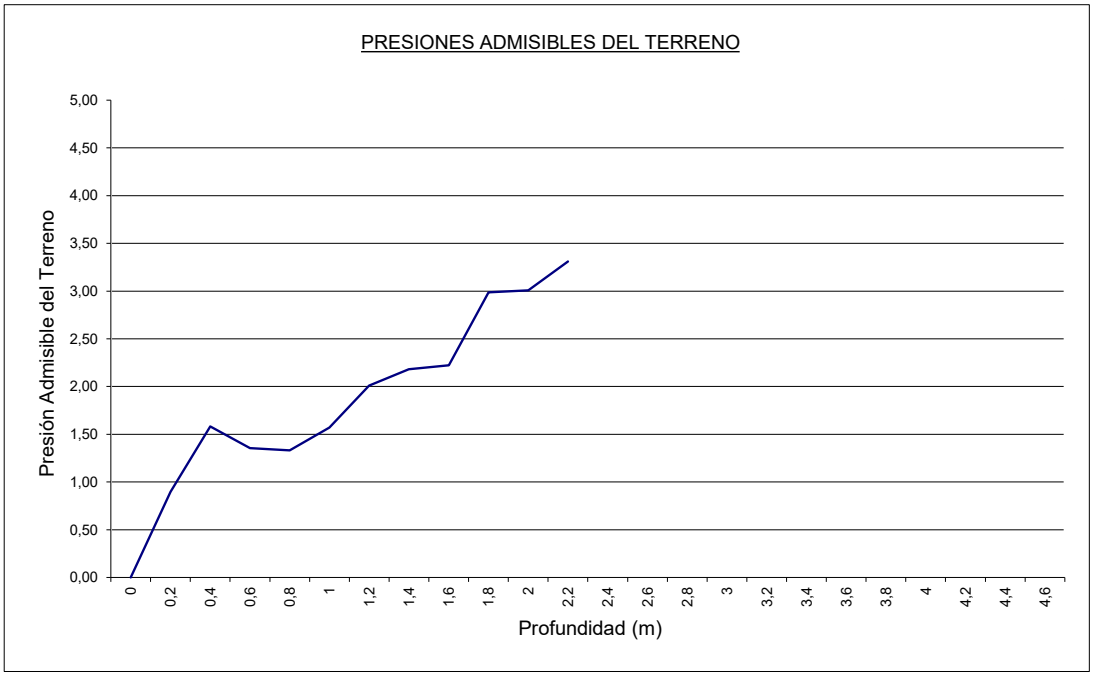
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GEOTECNIA Y CONTROL DE CALIDAD

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| 28979 - Serranillos del Valle. Madrid |

| | | | |
|---|---|---|---|
| **Obra** | OBRA KODAK, ESTANQUE E TORMENTAS NORTE | | |
| **Localidad** | LAS ROZAS | **Provincia** | MADRID |
| **Fecha de Realización** | 18/05/2023 | **N. Freático** | NO |
| **Nº de Ensayo** | 1 | | |

| Prof (m) | Nº Golpes |
|---|---|
| 0 | 0 |
| 0,2 | 8 |
| 0,4 | 17 |
| 0,6 | 14 |
| 0,8 | 14 |
| 1 | 18 |
| 1,2 | 27 |
| 1,4 | 32 |
| 1,6 | 34 |
| 1,8 | 67 |
| 2 | 71 |
| 2,2 | 100 |
| 2,4 | |
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CONTROL DE OBRAS PÚBLICAS Y EDIFICACIÓN, S.L.
GEOTECNIA Y CONTROL DE CALIDAD
C/. Tejo, 14 - Pol. Ind. Cañariego - Telf: 91 810 30 10
28979 SERRANILLOS DEL VALLE (Madrid)

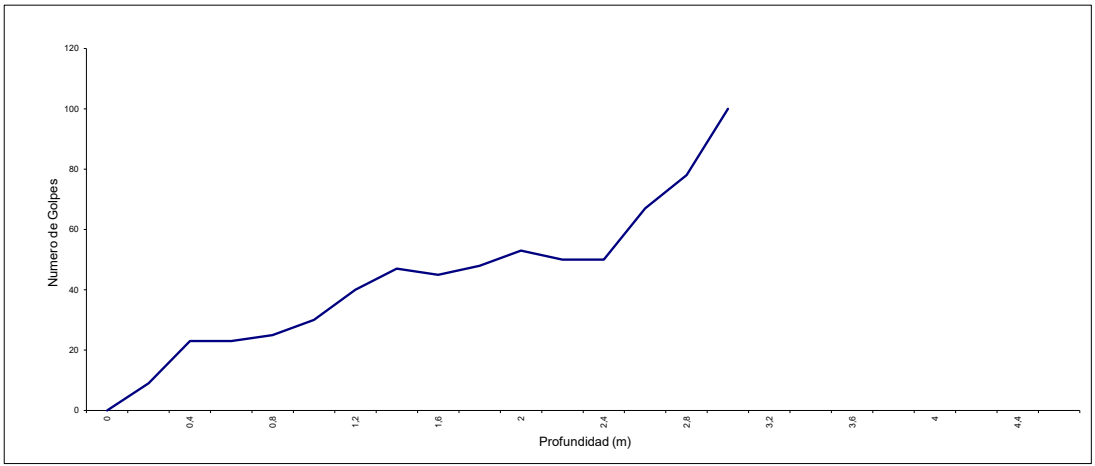
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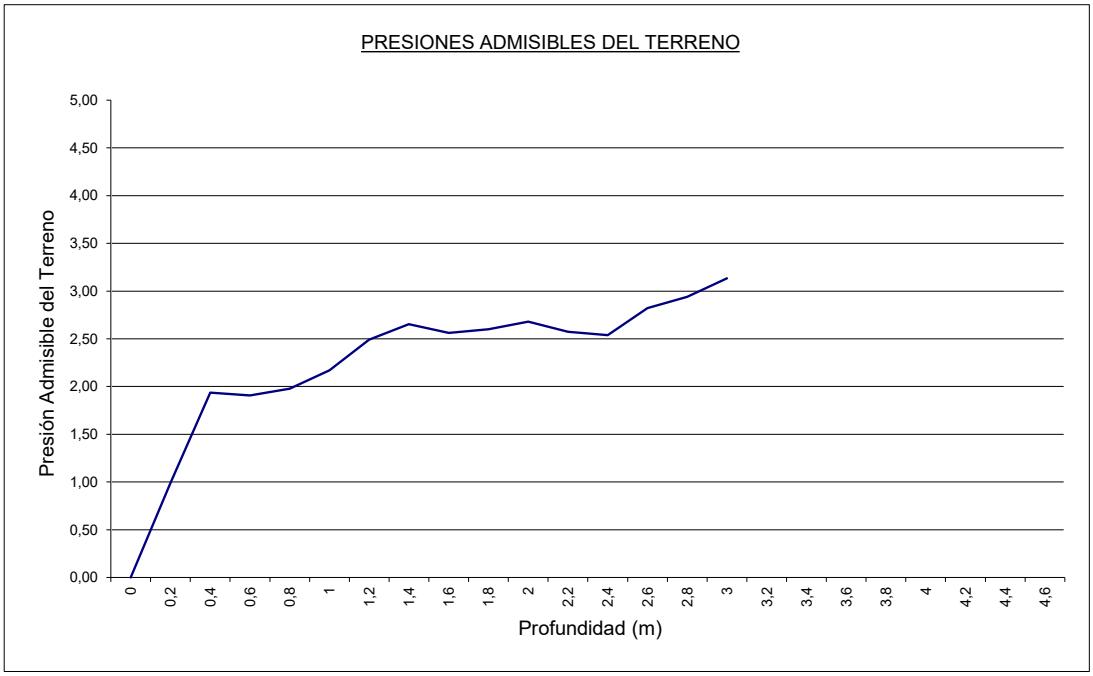
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GEOTECNIA Y CONTROL DE CALIDAD

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|---|
| C/ Tejo nº 4 ** P. I. Cañariego ** |
| 28979 - Serranillos del Valle. Madrid |

| | | | |
|---|---|---|---|
| **Obra** | OBRA KODAK, ESTANQUE E TORMENTAS NORTE | | |
| **Localidad** | LAS ROZAS | **Provincia** | MADRID |
| **Fecha de Realización** | 18/05/2023 | **N. Freático** | NO |
| **Nº de Ensayo** | 2 | | |

| Prof (m) | Nº Golpes |
|---|---|
| 0 | 0 |
| 0,2 | 9 |
| 0,4 | 23 |
| 0,6 | 23 |
| 0,8 | 25 |
| 1 | 30 |
| 1,2 | 40 |
| 1,4 | 47 |
| 1,6 | 45 |
| 1,8 | 48 |
| 2 | 53 |
| 2,2 | 50 |
| 2,4 | 50 |
| 2,6 | 67 |
| 2,8 | 78 |
| 3 | 100 |
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CONTROL DE OBRAS PÚBLICAS Y EDIFICACIÓN, S.L.
GEOTECNIA Y CONTROL DE CALIDAD
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28979 SERRANILLOS DEL VALLE (Madrid)

# ANEXO 3.- REGISTRO FOTOGRÁFICO

FOTOGRAFIAS DE LOS PENETROMETROS EN CADA TANQUE



Vista Norte




Vista Norte



Vista Norte



Vista Norte



Vista Sur



Vista Sur



P1



P1



P1




P1



P2



P2



P2



P2



P3



P3



P3



P4



P4



P4

## 13.4. ANEJO 4. CÁLCULO DE ESTRUCTURA

En el siguiente documento se refleja el proceso de cálculo y diseño de la estructura, así como las comprobaciones estructurales, resultados y esquemas de cálculo obtenidos de las distintas hipótesis de cargas.

PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

Documento:

# MEMORIA DE CÁLCULO

| | | |
|---|---|---|
| Documento Nº: | ING_MEMORIA_CALCULO_ESTRUCTURAL | Edición Nº: 01 |
| Objeto de edición: | Entrada en vigor | Fecha: 25/01/2024 |

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# ÍNDICE ANEXOS

ANEXO 0.- LISTADO DE RESULTADOS

## 1. OBJETO Y ALCANCE

La presente memoria tiene por objeto la descripción de los cálculos estructurales realizados para el dimensionamiento de la estructura correspondiente al “PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID)”.

El alcance del presente documento se extiende exclusivamente a:

- Estructura tanque de tormentas norte

Se ha realizado para ello los cálculos necesarios obteniendo dimensiones y armados, comprobando los coeficientes de seguridad frente a los distintos estados límite que, de manera justificada, se expone en los puntos siguientes.

## 2. DATOS DE PARTIDA.

En la redacción del presente documento se ha contado con la siguiente información de partida:

- Planos de arquitectura proporcionados por el peticionario.
- Estudio Geotécnico elaborado por CONTROL DE OBRAS PÚBLICAS Y EDIFICACIÓN, S.L. (GEOTECNIA Y CONTROL DE CALIDAD) y firmado por Daniel Agúndez Agúndez.

## 3. DESCRIPCIÓN DE LA ESTRUCTURA

El Tanque Norte de laminación se encuentra ubicado dentro de la Fracción 3 que está integrada por el actual ámbito UE-VII.1. “Kodak” más la Parcela 7 original del Parque Empresarial de Las Rozas en Madrid. Concretamente, el planeamiento obliga a disponer el tanque bajo una rotonda en la intersección de la C/Formentera de forma que parte de la sección está sometida a las cargas de tráfico rodado.




*Figura 1: Emplazamiento tanque norte.*

El tanque presenta una planta sensiblemente rectangular y dimensiones aproximadas 16,70x10,30x6,95 m.

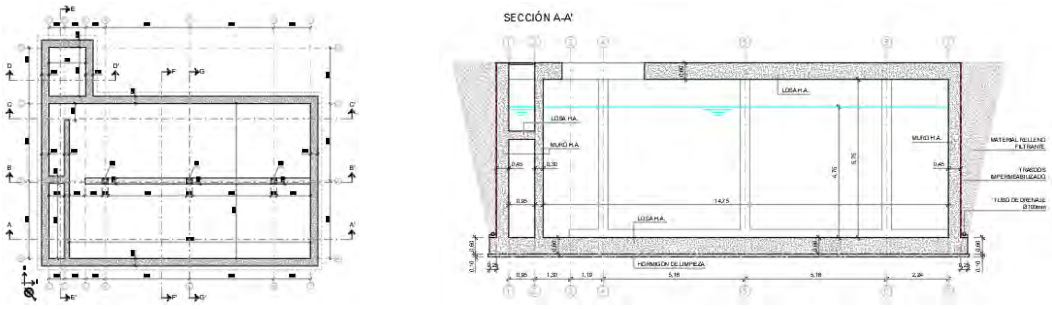



*Figura 2: Planta y sección del depósito.*

El depósito se proyecta mediante una estructura monolítica de hormigón armado totalmente enterrada y ejecutada 'in situ', la cual está conformada por losas, pilares y muros. Las secciones propuestas son las siguientes:

- Losa superior e inferior e=0,60 m
- Muros exteriores e=0,45 m
- Muro interior e=0,30 m
- Pilares axb=0,35x0,35 m

# 4. BASES DE CÁLCULO

## 4.1. NORMATIVA

Las principales normas utilizadas como referencia en las diferentes comprobaciones realizadas son:

- IAP-11. Instrucción sobre las acciones a considerar en el proyecto de puentes de carretera.
- EC-1. Eurocódigo 1: Acciones en estructuras. Cargas de tráfico en puentes, de 2 de octubre de 2004.
- CTE. Código técnico de la edificación.
- Real Decreto 470/2021, de 29 de junio, por el que se aprueba el Código Estructural.

- EC-2. Eurocódigo 2, "Proyecto de Estructuras de Hormigón".
- Guía de cimentaciones en obras de carretera.
- NCSE-02: Norma de Construcción Sismorresistente: Parte general y edificación

## 4.2. CARACTERÍSTICAS DE LOS MATERIALES

Los materiales propuestos son los siguientes:

### ARMADURAS PASIVAS

| | |
|---|---|
| Tipo | B500 SD |
| Nivel de control | Normal |
| Resistencia característica $f_{yk}$ | 500 MPa |
| Coeficiente de minoración $\gamma_s$ (situac. Persistentes o transitorias) | 1,15 |
| Resistencia de cálculo $f_{yd}$ | 435 MPa |
| Módulo de Elasticidad $E_s$ | 200 000 MPa |

### MALLAZOS

| | |
|---|---|
| Tipo | B500 T |
| Nivel de control | Normal |
| Resistencia característica $f_{yk}$ | 500 MPa |
| Coeficiente de minoración $\gamma_s$ (situac. Persistentes o transitorias) | 1,15 |
| Resistencia de cálculo $f_{yd}$ | 435 MPa |
| Módulo de Elasticidad $E_s$ | 200 000 MPa |

## HORMIGÓN ARMADO

| | |
|---|---|
| Tipo | HA-30/B/20/XC2 |
| Nivel de control | Estadístico |
| Resistencia característica $f_{ck}$ | 30 MPa |
| Resistencia media $f_{cm}$ | 38 MPa |
| SITUACIONES PERSISTENTES O TRANSITORIAS | |
| Coeficiente de minoración $\gamma_c$ | 1,50 |
| Resistencia de cálculo $\alpha_{cc}f_{ck}/\gamma_c$ | 20 N/mm² |
| SITUACIONES ACCIDENTALES | |
| Coeficiente de minoración $\gamma_c$ | 1,30 |
| Resistencia de cálculo $\alpha_{cc}f_{ck}/\gamma_c$ | 23,07 N/mm² |
| MODULO DE ELASTICIDAD | |
| Módulo de Elasticidad inicial $E_{co}$ | 33 578 N/mm² |
| Módulo de Elasticidad secante $E_c$ | 28 577 N/mm² |
| Módulo de Poisson $\upsilon_c$ | 0,20 |

## HORMIGÓN DE LIMPIEZA

| | |
|---|---|
| Tipo | HL-150/B/20 |

### 4.3. CARÁCTERÍSTICAS GEOTÉCNICAS

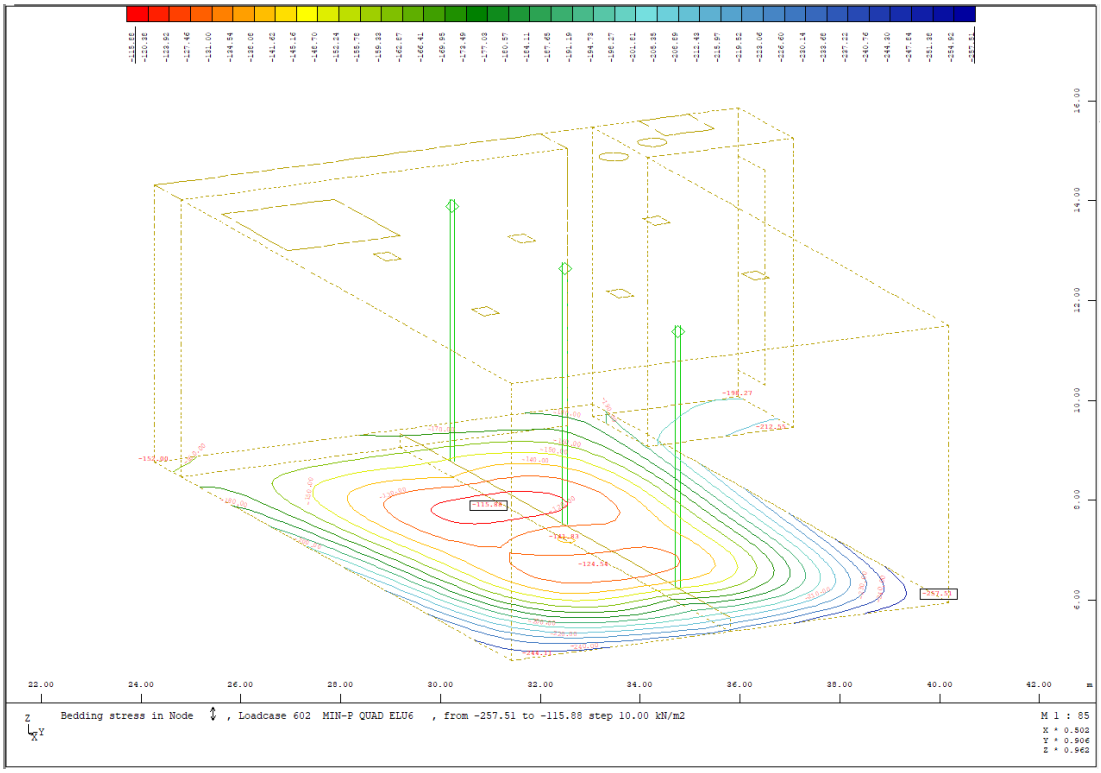
Del estudio geotécnico se extrae lo siguiente:

- La unidad geotécnica está compuesta por arenas de migas.
- No se observa el nivel freático en las prospecciones realizadas.
- El terreno no contiene carbonatos
- El terreno no presenta sulfatos.
- Presión admisible, $q_{adm}=0,30$ MPa

El coeficiente de balasto se estima en $k_{30x30}=22,00$ kg/cm$^3$ ("GEOTECNIA Y CIMIENTOS" por J.A. Jiménez Salas).

Se obtiene una tensión máxima inferior a la capacidad portante del terreno:

$\sigma=0,25$ MPa $\leq \sigma_{adm.}=0,30$ MPa




## 4.4. DURABILIDAD

Como consecuencia del tipo de ambiente definido, el hormigón armado para obra nueva debe cumplir las siguientes limitaciones:

AMBIENTE XC2

- Relación máxima agua / cemento de 0,60.
- Contenido mínimo en cemento de 275 kg/m$^3$.
- Recubrimiento:
  - Recubrimiento nominal en elementos en contacto con el terreno: 50,00 mm
  - Recubrimiento nominal resto de casos: 35,00 mm
- Máxima abertura de fisura de 0,30 mm.

- Resistencia mínima característica de 30 MPa.

Se ha considerado una vida útil de 100 años y un tipo de cemento acorde con el recubrimiento considerado según las tablas 44.2.1.1.a y 44.2.1.1.b del CE.

En piezas hormigonadas contra el terreno, el recubrimiento mínimo será de 70 mm, salvo que se haya preparado el terreno y dispuesto un hormigón de limpieza, s/CE.

Los valores de recubrimiento podrán ser superiores si el cumplimiento en materia de seguridad frente incendio así lo estableciera.

## 4.5. EJECUCIÓN

Se ha considerado un nivel de control de ejecución NORMAL para toda la obra.

## 4.6. ACCIONES

Se consideran las siguientes acciones solicitantes por planta y tipología de carga, acordes al CTE-DB-SE-AE:

### 4.6.1. ACCIONES PERMANENTES

Las cargas permanentes están constituidas por los pesos de los distintos elementos que forman parte de la estructura. Corresponden a acciones que actúan en todo momento y son constantes en posición y magnitud. Comprenden el peso propio y las cargas muertas. Sus valores se deducen de las dimensiones de los elementos especificadas en los planos y de sus pesos específicos correspondientes.

#### 4.6.1.1. PESO PROPIO

Corresponde al peso de los elementos estructurales, con su sección bruta, aplicándole el peso específico del material:

- Peso propio hormigón: 25,00 kN/m$^3$
- Peso propio pavimento: 23 kN/m$^3$
- Peso específico aparente de los rellenos: 20 kN/m$^3$

- Peso propio del agua: 10,00 kN/m$^3$

#### 4.6.1.2. CARGAS MUERTAS

Son las debidas a los elementos no estructurales que gravitan sobre la estructura, tales como: pavimentos, barreras, etc.

Se han considerado los siguientes valores:

- Terreno: 20,00·2,25=45,00 kN/m$^2$
- Pavimento (máx.):23,00·0,20=4,60 kN/m$^2$
- Rozamiento negativo=0,30·20,00·2,25·2,25·1/16,20≈1,60 kN/m$^2$

#### 4.6.1.3. ACCIONES PERMANENTES DE VALOR NO CONSTANTE

Acciones que actúan en todo momento pero cuya magnitud no es constante.

Se incluyen aquellas acciones cuya variación sea función del tiempo transcurrido y se produzca en un solo sentido, tendiendo hacia un determinado valor límite (acciones reológicas, pretensado, asientos del terreno bajo las cimentaciones), y aquellas otras acciones originadas por el terreno cuya magnitud varía en función de la interacción terreno-estructura.

##### 4.6.1.3.1. ACCIONES REOLÓGICAS

Las acciones reológicas se obtienen a partir de los valores característicos de las deformaciones provocadas por la retracción y la fluencia.

La deformación debida a la retracción del hormigón es función de la humedad relativa del ambiente, del espesor ficticio de la pieza, de la cuantía de armadura, de las condiciones de amasado del hormigón y del tiempo transcurrido desde su puesta en obra.

La deformación debida a la fluencia del hormigón bajo carga constante se considera proporcional a la deformación elástica instantánea.

Este tipo de acciones originan estados tensionales que son variables tanto en altura (geometría, condiciones de borde) como en planta (grado de soleamiento, etc.). Se ha

optado por tener en cuenta su efecto sobre la fisuración de la estructura, disponiendo la armadura necesaria.

#### 4.6.1.3.2. ACCIONES DEBIDAS AL TERRENO

El empuje del terreno sobre elementos verticales de la estructura se determinará en función de las características del terreno y de otras consideraciones geotécnicas. Cuando la actuación del empuje sea desfavorable para el elemento y efecto estudiado, su valor nunca será inferior al empuje hidrostático de un fluido de peso específico igual a 5 kN/m$^3$.

Los hastiales de la estructura se han considerado solicitados por el empuje al reposo.

- Coeficiente de empuje al reposo, $k_o$ (RELLENO): 0,50

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| θ | 30 | º | θ | 30 | º | θ | 30 | º |
| $k_o$ | 0,50 | | $k_o$ | 0,50 | | $k_o$ | 0,50 | |
| γ | 20,00 | kN/m$^3$ | γ | 20,00 | kN/m$^3$ | γ | 20,00 | kN/m$^3$ |
| z | 2,25 | m | z | 8,00 | m | z | 8,25 | m |
| $q_o$ | 22,50 | kN/m$^2$ | $q_f$ | 80,00 | kN/m$^2$ | $q_f$ | 82,50 | kN/m$^2$ |

### 4.6.2. ACCIONES VARIABLES

Son acciones externas a la estructura que pueden actuar o no sobre ella por razón de su uso. Las distintas acciones y valores considerados se desarrollan en lo puntos siguientes.

#### 4.6.2.1. TRÁFICO

La componente vertical de la sobrecarga de uso sobre tanque, la plataforma, de ancho w, se dividirá en n carriles virtuales, de anchura wi cada uno, con el criterio que se define en la tabla 4.1-a de la IAP-11.

TABLA 4.1-a **DEFINICIÓN DE LOS CARRILES VIRTUALES**

| ANCHURA DE LA PLATAFORMA ($w$) | NÚMERO DE CARRILES VIRTUALES ($n_l$) | ANCHURA DEL CARRIL VIRTUAL ($w_l$) | ANCHURA DEL ÁREA REMANENTE |
|---|---|---|---|
| $w < 5{,}4$ m | $n_l = 1$ | 3 m | $w - 3$ m |
| 5,4 m $\leq w < 6$ m | $n_l = 2$ | $\frac{w}{2}$ | 0 |
| $w \geq 6$ m | $n_l = ent\left(\frac{w}{3}\right)$ | 3 m | $w - 3n_l$ |

Se considerará la acción simultánea de las cargas siguientes:

- Uno o más vehículos pesados, según el número de carriles virtuales. Cada vehículo pesado estará constituido por dos ejes, siendo $Q_{ik}$ la carga de cada eje, indicada en la tabla 4.1-b., correspondiente al carril i.
- Una sobrecarga uniforme de valor $q_{ik}$, según la tabla 4.1-b.

TABLA 4.1-b **VALOR CARACTERÍSTICO DE LA SOBRECARGA DE USO**

| SITUACIÓN | VEHÍCULO PESADO $2Q_{ik}$ [kN] | SOBRECARGA UNIFORME $q_{ik}$ (ó $q_{rk}$) [kN/m$^2$] |
|---|---|---|
| Carril virtual 1 | 2 · 300 | 9,0 |
| Carril virtual 2 | 2 · 200 | 2,5 |
| Carril virtual 3 | 2 · 100 | 2,5 |
| Otros carriles virtuales | 0 | 2,5 |
| Área remanente ($q_{rk}$) | 0 | 2,5 |

### 4.6.2.2. SOBRECARGA EN TERRAPLENES

A efectos del cálculo de empujes del terreno sobre elementos de la estructura en contacto con él, se ha considerado una sobrecarga uniforme de 10 KN/m$^2$ actuando en la parte superior del terraplén en la zona por donde pueda discurrir el tráfico.

$q = 0{,}50 \cdot 10{,}00 = 5$ kN/m$^2$

#### 4.6.2.3. ACCIÓN DEL AGUA

En el cálculo del depósito, se tiene en cuenta las acciones debidas al agua en intradós, considerando simultáneamente los efectos del peso del agua y del empuje hidrostático en las paredes.

El empuje sobre los elementos estructurales se determinará de acuerdo con los conceptos de presión hidrostática, aplicando una distribución de presiones lineal, con valor nulo en la lámina libre y valor máximo en el fondo del depósito. Se considera una densidad del fluido de 10 KN/$m^3$.

Se considera una altura máxima de la lámina de agua de 4,75 m.

### 4.6.3. ACCIONES ACCIDENTALES

Se ha considerado una carga superficial de 20,00 kN/$m^2$, de posible acceso en toda la superficie.

## 4.1. COEFICIENTES DE SEGURIDAD E HIPÓTESIS DE CARGA

### 4.1.1. VALORES REPRESENTATIVOS.

De acuerdo con la Normativa vigente, los valores representativos de las acciones utilizados para la verificación de los estados límites se establecen en los siguientes apartados.

#### 4.1.1.1. PERMANENTES (G)

Para las acciones permanentes se considerará un único valor representativo, coincidente con el valor característico $G_k$,

#### 4.1.1.2. VARIABLES (Q)

Cada una de las acciones variables podrá considerarse con los siguientes valores representativos:

- Valor característico $Q_k$

Será el valor de la acción cuando actúe aisladamente.

- Valor de combinación $\psi_0 Q_k$:

Será el valor de la acción cuando actúe con alguna otra acción variable, para tener en cuenta la pequeña probabilidad de que actúen simultáneamente los valores más desfavorables de varias acciones independientes.

- Valor frecuente $\psi_1 Q_k$:

Será el valor de la acción que sea sobrepasado durante un período de corta duración respecto a la vida útil de la estructura.

- Valor casi permanente $\psi_2 Q_k$:

Será el valor de la acción que sea sobrepasado durante una gran parte de la vida útil de la estructura (el 50% o más del tiempo) o bien el valor medio.

#### 4.1.1.3. ACCIDENTALES (A)

Para las acciones accidentales se considerará un único valor representativo coincidente con el valor característico $A_k$.

### 4.1.2. VALORES DE CÁLCULO

Los valores de cálculo de las diferentes acciones serán los obtenidos aplicando el correspondiente coeficiente parcial de seguridad $\gamma_F$ a los valores representativos de las acciones definidas anteriormente.

Los coeficientes parciales de seguridad se indican en la siguiente tabla:

| COEFICIENTES DE SEGURIDAD $\gamma_f$ | | | | | | | |
|---|---|---|---|---|---|---|---|
| ESTADOS LIMITE | | ÚLTIMOS | | | | DE SERVICIO | |
| SITUACIONES | | PERSISTENTES Y TRANSITORIAS | | ACCIDENTALES | | PERSISTENTES Y TRANSITORIAS | |
| ACCIÓN | | Favorable | Desfavo-rable | Favorable | Desfavo-rable | Favorable | Desfavo-rable |
| PERMANENTE $\gamma_G$ | | 1,00 | 1,35 | 1,00 | 1,00 | 1,00 | 1,00 |
| PERMANENTE DE VALOR NO CONSTANTE $\gamma_{G^*}$ | Reológica | 1,00 | 1,35 | 1,00 | 1,00 | 1,00 | 1.00 |
| | Acción del terreno | 1,00 | 1,50 | 1,00 | 1,00 | 1,00 | 1.00 |
| VARIABLES | Tráfico | 0,00 | 1,35 | -- | -- | 0,00 | 1.00 |
| | Sobrecarga trasdós | 0,00 | 1,50 | 1,00 | 1,00 | 0,00 | 1.00 |
| | Empuje del agua | 0,00 | 1,50 | 1,00 | 1,00 | 0,00 | 1.00 |
| ACCIDENTAL $\gamma_A$ | | -- | -- | 1,00 | 1,00 | -- | -- |

### 4.1.3. COEFICIENTES DE SIMULTANEIDAD

Los coeficientes de simultaneidad empleados se definen en la Normativa vigente y son los siguientes:

| Tipo de carga | Coeficiente de simulatenidad | | |
|---|---|---|---|
| | $\Psi_0$ | $\Psi_1$ | $\Psi_2$ |
| Vehículo pesado | 0,75 | 0,75 | 0,00 |
| Sobrecarga uniforme | 0,40 | 0,40 | 0,00 |
| Sobrecarga trasdós | 0,60 | 0,60 | 0,20 |

### 4.1.4. HIPÓTESIS DE CARGA

Las hipótesis de carga a considerar se formarán combinando los valores de cálculo de las acciones cuya actuación pueda ser simultánea, según los criterios generales que se indican a continuación:

A) ESTADOS LÍMITE ÚLTIMOS

Para la comprobación de los Estados Límites Últimos se considerarán las situaciones persistentes y transitorias, y las accidentales con o sin sismo.

A1) Situaciones persistentes o transitorias.

Las combinaciones de las distintas acciones consideradas en estas situaciones, excepto en el ELU de fatiga, se realizan de acuerdo con el siguiente criterio:

$$\sum_{j\geq 1} \gamma_{G,j}\ G_{k,j} + \sum_{i\geq 1} \gamma_{G^*,i}\ G^{-}_{k,i} + \gamma_{Q,1}\ Q_{k,1} + \sum_{i>1} \gamma_{Q,i}\ \Psi_{0,i}\ Q_{k,i}$$

donde:

$G_{k,j}$ = Valor representativo de cada acción permanente.

$G^*_{k,i}$ = Valor representativo de cada acción permanente de valor no constante.

$Q_{k,1}$ = Valor representativo (valor característico) de la acción variable dominante.

$\psi_{0,i}\ Q_{k,i}$ = Valores representativos (valores de combinación) de las acciones variables concomitantes con la acción variable dominante.

En general, deberán realizarse tantas hipótesis o combinaciones como sea necesario, considerando, en cada una de ellas, una de las acciones variables como dominante y el resto como concomitantes.

A2) Situaciones accidentales.

De acuerdo con la Norma se distinguirán dos tipos de situaciones accidentales:

- Las provocadas por choques de vehículos, u otra acción de esta naturaleza, sobre los distintos elementos de la estructura.

- Las provocadas por la acción sísmica.

A2a) Situaciones accidentales sin sismo.

Las combinaciones de las distintas acciones consideradas en estas situaciones se realizarán de acuerdo con el siguiente criterio:

$$\sum_{j\geq 1} \gamma_{G,j}\ G_{k,j} + \sum_{i\geq 1} \gamma_{G^*,i}\ G^{-}_{k,i} + \gamma_{Q,1}\ \Psi_{1,1}\ Q_{k,1} + \sum_{i>1} \gamma_{Q,i}\ \Psi_{2,i}\ Q_{k,i} + \gamma_{A}\ A_{k}$$

donde:

$G_{k,j}$ = Valor representativo de cada acción permanente.

$G^*_{k,i}$ = Valor representativo de cada acción permanente de valor no constante.

$\psi_{1,1}\ Q_{k,1}$= Valor representativo frecuente de la acción variable dominante.

$\psi_{2,i}\ Q_{k,i}$ = Valores representativos casi-permanentes de las acciones variables concomitantes con la acción variable dominante y la acción accidental.

$A_k$ = Valor representativo característico de la acción accidental.

Para estas combinaciones serán de aplicación las observaciones indicadas en el planteamiento de las combinaciones A1).

A2b) Situaciones accidentales de sismo.

Las combinaciones de las distintas acciones consideradas en estas situaciones se realizarán de acuerdo con el siguiente criterio:

$$\sum_{j\geq 1} \gamma_{G,j}\ G_{k,j} + \sum_{i\geq 1} \gamma_{G^*,i}\ G^*_{k,i} + \gamma_{Q,1}\ \Psi_{2,1}\ Q_{k,1} + \gamma_A\ A_{E,k}$$

donde:

$G_{k,j}$ = Valor representativo de cada acción permanente.

$G^*_{k,i}$ = Valor representativo de cada acción permanente de valor no constante.

$\psi_{2,1}\ Q_{k,1}$ = Valor representativo casi-permanentes de la acción relativa a la sobrecarga de uso.

$A_{E,k}$ = Valor representativo característico de la acción sísmica.

B) ESTADOS LÍMITE DE SERVICIO.

Para las comprobaciones relativas a los Estados Límites de servicio se considerarán únicamente las situaciones persistentes y transitorias, excluyéndose las accidentales:

B1) Combinación Característica (poco probable o rara).

$$\sum_{j\geq 1} G_{k,j} + \sum_{i\geq 1} \gamma_{G^*,i}\ G^-_{k,i} + \gamma_{Q,1}\ Q_{k,1} + \sum_{i>1} \gamma_{Q,i}\ \Psi_{0,i}\ Q_{k,i}$$

B2) Combinación Frecuente.

$$\sum_{j\geq 1} G_{k,j} + \sum_{i\geq 1} \gamma_{G^*,i}\ G^-_{k,i} + \gamma_{Q,1}\ \Psi_{1,1}\ Q_{k,1} + \sum_{i>1} \gamma_{Q,i}\ \Psi_{2,i}\ Q_{k,i}$$

B3) Combinación Casi permanente.

$$\sum_{j\geq 1} G_{k,j} + \sum_{i\geq 1} \gamma_{G^*,j}\ G^{-}_{k,i} + \sum_{i\geq 1} \gamma_{Q,i}\ \Psi_{2,i}\ Q_{k,i}$$

## 5. MODELO DE CÁLCULO

Para el dimensionamiento del depósito se ha empleado un programa de cálculo el cual permite el análisis lineal y no lineal, en teoría de primer, segundo o tercer orden, de sistemas estructurales tridimensionales complejos modelizados con elementos finitos tipo barra, placa y sólidos, contemplando tanto el análisis estático como el dinámico.

Los modelos utilizados emplean el método de rigidez para la obtención de desplazamientos en los nudos, a partir de los cuales se obtienen los esfuerzos en placas y reacciones en apoyos. Los resultados se obtienen para cada hipótesis simple de carga y combinación, obtenidas éstas según la normativa correspondiente en cada caso.

El programa realiza un cálculo lineal mecánico y geométrico de los materiales que forman la estructura.

Como criterio común a todos los cálculos realizados, según el estado límite objeto de comprobación, se han tenido en cuenta las siguientes consideraciones:

- Estados Límite Últimos: se ha considerado el nivel de agua correspondiente a la máxima cota de la lámina libre en al depósito (nivel de vertido), despreciándose la acción del empuje del terreno en caso de ser favorable.

- Estados Límite de Servicio (fisuración): se ha considerado el nivel de agua correspondiente a la máxima cota de la lámina libre en el depósito (nivel de vertido). Asimismo, dado que la fisuración resulta ser en estos casos limitante, se ha tenido en cuenta el efecto favorable del empuje del terreno.

Se muestra a continuación la geometría y discretización del modelo de elementos finitos tipo placa que han servido de base para el dimensionamiento del tanque:

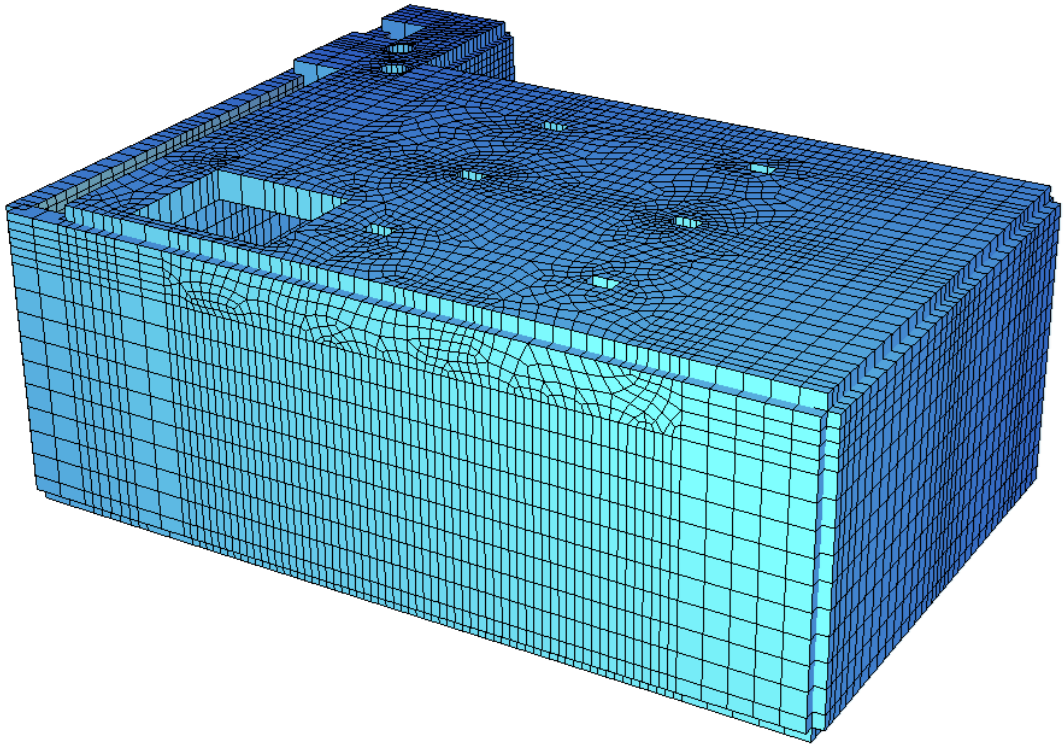


*Figura 3: Modelo de cálculo.*

## 6. CONCLUSIONES

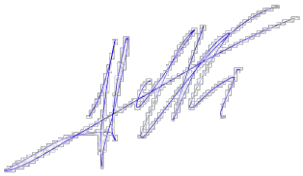
En el presente Documento se ha realizado el dimensionamiento, a nivel estructural, de la estructura correspondiente al "PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID)".

Se han realizado para ello los cálculos necesarios, obteniendo dimensiones y armados, comprobándose los coeficientes de seguridad frente a los distintos estados límite definidos en la normativa vigente, de una manera justificada que se ha expuesto en los puntos anteriores.

Se adjunta el desarrollo de los cálculos, así como Planos de definición, armado y detalles de la estructura dimensionada.

Alacuás, a 25/01/2024.

Firmado por el ingeniero calculista:



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Nº col.: 22.924
Dpto. Proyectos y Estructuras
SEG Ingeniería

Documento:

# ANEXO 0

# LISTADO DE RESULTADOS

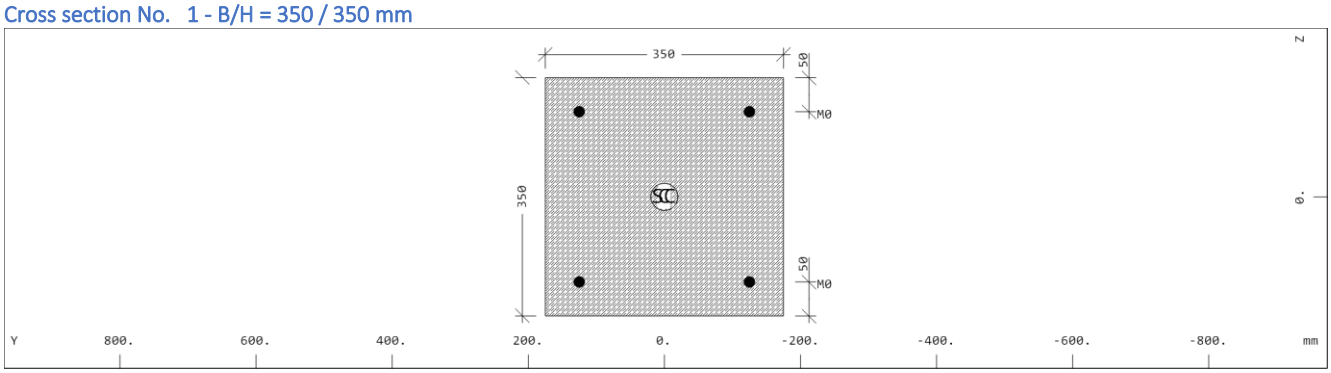
## AQUA - GENERAL CROSS SECTIONS

### Materials

| Mat | Classification |
|---|---|
| 1 | C 30/37 (EN 1992) |
| 2 | B 500 B (EN 1992) |
| 3 | S 275 (EN 1993) |

### Cross section No. 1 - B/H = 350 / 350 mm

### Cross section No. 1 - B/H = 350 / 350 mm




### Static properties of cross section

| SNo | Mat | A[m2] | Ay[m2] | Iy[m4] | yc[mm] | ysc[mm] | E[N/mm2] | g[kg/m] | I-1[m4] |
|---|---|---|---|---|---|---|---|---|---|
| | MRf | It[m4] | Az[m2] | Iz[m4] | zc[mm] | zsc[mm] | G[N/mm2] | | I-2[m4] |
| | | | Ayz[m2] | Iyz[m4] | | | | | α[°] |
| 1 | 1 | 1.2250E-01 | 1.021E-01 | 1.251E-03 | 0.0 | 0.0 | 32837 | 306.3 | |
| | 2[1] | 2.110E-03 | 1.021E-01 | 1.251E-03 | 0.0 | 0.0 | 13682 | (COMPR) | |
| 1 | = B/H = 350 / 350 mm | | | | | | | | |

[1] Reinforcements are not considered in the sectional values

| | | | |
|---|---|---|---|
| SNo | section number | Mat | material number |
| A[m2] | sectional area | Ay[m2],Az[m2],Ayz[m2] | transverse shear deformation area |
| Iy[m4],Iz[m4],Iyz[m4] | bending moment of inertia | yc[mm],zc[mm] | ordinate of elastic centroid |
| ysc[mm],zsc[mm] | ordinate of shear centre | E[N/mm2] | Young's modulus |
| g[kg/m] | mass per length | I-1[m4],I-2[m4],α[°] | principal moments of inertia and angle of the principal axes |
| MRf | reinforcement material number | It[m4] | torsional moment of inertia |
| G[N/mm2] | Shear modulus | | |

### Reinforcement global values

| Layer | Mref | Mat | As | As-min | As-max | D | yr | zr | L-tors | N-p | My-p | Mz-p |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | [cm2] | [cm2] | [cm2] | [mm] | [mm] | [mm] | [mm] | [kN] | [kNm] | [kNm] |
| M0 | 1 | 2 | 8.04 | 8.04 | | 16 | 0.0 | 0.0 | 1000.0 | | | |

| | | | |
|---|---|---|---|
| Layer | layer of reinforcement | Mref | embedding reference material |
| Mat | material number | As | reinforcement area |
| As-min | minimum reinforcement area | As-max | maximum reinforcement area |
| D | bar diameter | yr,zr | ordinate of elastic centroid |
| L-tors | torsional effective length | N-p | prestress normal force |
| My-p,Mz-p | prestress bending moment | | |

**SOFiMSHC - STRUCTURAL ELEMENTS AND GEOMETRY**

## Groups

| Grp | Number | Type | min-no | max-no | Designation |
|---|---|---|---|---|---|
| 1 | 33 | BEAM | 10001 | 10033 | |
| 1 | 3004 | QUAD | 10001 | 13004 | |
| 1 | 3037 | base | 10000 | 19999 | |
| 2 | 2391 | QUAD | 20001 | 22391 | |
| 3 | 3337 | QUAD | 30001 | 33337 | |
| 4 | 805 | QUAD | 40001 | 40805 | |
| 5 | 77 | QUAD | 50001 | 50077 | |
| 6 | 512 | QUAD | 60001 | 60512 | |

Grp primary group number
Number number of elements within group
Type element type
min-no,max-no minimum/maximum element number

## Summary of beam elements

### Groups

| Grp | TotLength | Max.Length | TotVolume | TotMass | Surface | Designation |
|---|---|---|---|---|---|---|
| | [m] | [m] | [m3] | [t] | [m2] | |
| 1 | 16.350 | 0.495 | 2.003 | 5.007 | 22.890 | |
| Sum | 16.350 | | 2.003 | 5.007 | 22.890 | |

Grp primary group number
Max.Length Maximum length in an element
TotMass Total mass
TotLength Total length
TotVolume Total volume
Surface Total surface

## Summary of quadrilateral elements

### Groups

| Grp | TotArea | TotVolume | TotMass | Material | Designation |
|---|---|---|---|---|---|
| | [m2] | [m3] | [t] | | |
| 1 | 166.562 | 99.938 | 249.844 | 1 | |
| 2 | 145.721 | 87.433 | 218.582 | 1 | |
| 3 | 299.625 | 134.831 | 337.078 | 1 | |
| 4 | 54.000 | 24.300 | 60.750 | 1 | |
| 5 | 4.515 | 1.580 | 3.951 | 1 | |
| 6 | 49.433 | 12.358 | 30.896 | 1 | |
| Sum | 719.857 | 360.440 | 901.101 | | |

Grp primary group number
TotVolume Total volume
Material Number of material
TotArea Total area
TotMass Total mass

## Summary of all elements

### Groups

| Grp | TotLength | TotArea | TotVolume | TotMass | Designation |
|---|---|---|---|---|---|
| | [m] | [m2] | [m3] | [t] | |
| 1 | 16.350 | 166.562 | 101.940 | 254.851 | |
| 2 | 0.000 | 145.721 | 87.433 | 218.582 | |
| 3 | 0.000 | 299.625 | 134.831 | 337.078 | |
| 4 | 0.000 | 54.000 | 24.300 | 60.750 | |
| 5 | 0.000 | 4.515 | 1.580 | 3.951 | |
| 6 | 0.000 | 49.433 | 12.358 | 30.896 | |
| Sum | 16.350 | 719.857 | 362.443 | 906.108 | |

Grp primary group number
TotArea Total area
TotMass Total mass
TotLength Total length
TotVolume Total volume

# ACCIONES

**SOFiLOAD - LOAD DEFINITIONS**

Actions

| type | part | sup | Designation | γ-u | γ-f | γ-a | $\psi_0$ | $\psi_1$ | $\psi_2$ | $\psi_1$inf |
|---|---|---|---|---|---|---|---|---|---|---|
| G | G | perm | dead load | 1.50 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Q | Q | cond | variable load | 1.60 | 0.00 | 1.00 | 0.70 | 0.60 | 0.30 | 1.00 |
| A | A | excl | accidental loading | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| | | | Reliability factor | Kfi | 1.000 | | | | | |
| | | | Reduction factor | xsi | 0.850 | | | | | |

type action part partition of the action
sup superposition type γ-u,γ-f,γ-a partial safety factors for unfavourable/favourable/accidental
$\psi_0,\psi_1,\psi_2,\psi_1$inf combination coefficients

Load Case 2 (G ) CM

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.500 |
| favourable partial safety factor | | 1.000 |
| Combination coefficient | $\psi_0$ | 1.000 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 1.000 (frequent) |
| Combination coefficient | $\psi_2$ | 1.000 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Area | SAR 270 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 265 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 260 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 261 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 266 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 271 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 272 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 267 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 262 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 123 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 122 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 223 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 222 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 273 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 269 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 268 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 264 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 263 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 124 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Area | SAR 125 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 126 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 257 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 258 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 259 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 130 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 131 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 132 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 133 | | | | | | PG | 51.20 [kN/m2] |
| | | | | activated | | | | 100.00 percent |

## Load Case 3 (Q ) AGUA 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_{1}$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

### Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Area | sar -mult- | | | 16.250 | 36.756 | 10.500 | PXX | 0.00 [kN/m2] |
| | | | | 16.250 | 36.756 | 5.750 | | 47.50 [kN/m2] |
| | | | | 16.250 | 27.006 | 5.750 | | 47.50 [kN/m2] |
| | | | | 16.250 | 27.006 | 10.500 | | 0.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | sar -mult- | | | 0.000 | 36.756 | 10.500 | PXX | 0.00 [kN/m2] |
| | | | | 0.000 | 36.756 | 5.750 | | -47.50 [kN/m2] |
| | | | | 0.000 | 27.006 | 5.750 | | -47.50 [kN/m2] |
| | | | | 0.000 | 27.006 | 10.500 | | 0.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | sar -mult- | | | 16.250 | 36.756 | 10.500 | PYY | 0.00 [kN/m2] |
| | | | | 16.250 | 36.756 | 5.750 | | 47.50 [kN/m2] |
| | | | | 0.000 | 36.756 | 5.750 | | 47.50 [kN/m2] |
| | | | | 0.000 | 36.756 | 10.500 | | 0.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | sar -mult- | | | 16.250 | 27.006 | 10.500 | PYY | 0.00 [kN/m2] |
| | | | | 16.250 | 27.006 | 5.750 | | -47.50 [kN/m2] |
| | | | | 0.000 | 27.006 | 5.750 | | -47.50 [kN/m2] |
| | | | | 0.000 | 27.006 | 10.500 | | 0.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | sar -mult- | | | 16.250 | 36.756 | 5.750 | PG | 47.50 [kN/m2] |
| | | | | 16.250 | 27.006 | 5.750 | | 47.50 [kN/m2] |
| | | | | 0.000 | 27.006 | 5.750 | | 47.50 [kN/m2] |
| | | | | 0.000 | 36.756 | 5.750 | | 47.50 [kN/m2] |
| | | | | activated | | | | 100.00 percent |

## Load Case 4 (Q ) AGUA 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |

| | | |
|---|---|---|
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Area | sar -mult- | | | 0.000 | 36.756 | 10.500 | PYY | 0.00 [kN/m2] |
| | | | | 0.000 | 36.756 | 5.500 | | -50.00 [kN/m2] |
| | | | | 2.500 | 36.756 | 5.500 | | -50.00 [kN/m2] |
| | | | | 2.500 | 36.756 | 10.500 | | 0.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | sar -mult- | | | 0.000 | 40.006 | 10.500 | PYY | 0.00 [kN/m2] |
| | | | | 0.000 | 40.006 | 5.500 | | 50.00 [kN/m2] |
| | | | | 2.500 | 40.006 | 5.500 | | 50.00 [kN/m2] |
| | | | | 2.500 | 40.006 | 10.500 | | 0.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | sar -mult- | | | 2.500 | 40.006 | 10.500 | PXX | 0.00 [kN/m2] |
| | | | | 2.500 | 40.006 | 5.500 | | 50.00 [kN/m2] |
| | | | | 2.500 | 36.756 | 5.500 | | 50.00 [kN/m2] |
| | | | | 2.500 | 36.756 | 10.500 | | 0.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | sar -mult- | | | 0.000 | 40.006 | 10.500 | PXX | 0.00 [kN/m2] |
| | | | | 0.000 | 40.006 | 5.500 | | -50.00 [kN/m2] |
| | | | | 0.000 | 36.756 | 5.500 | | -50.00 [kN/m2] |
| | | | | 0.000 | 36.756 | 10.500 | | 0.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | sar -mult- | | | 2.500 | 40.006 | 5.500 | PG | 50.00 [kN/m2] |
| | | | | 0.000 | 40.006 | 5.500 | | 50.00 [kN/m2] |
| | | | | 0.000 | 36.756 | 5.500 | | 50.00 [kN/m2] |
| | | | | 2.500 | 36.756 | 5.500 | | 50.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |

## Load Case 5 (G ) TIERRAS

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.500 |
| favourable partial safety factor | | 1.000 |
| Combination coefficient | $\psi_0$ | 1.000 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 1.000 (frequent) |
| Combination coefficient | $\psi_2$ | 1.000 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Area | sar -mult- | | | 0.000 | 27.006 | 11.500 | PYY | 22.50 [kN/m2] |
| | | | | 0.000 | 27.006 | 5.750 | | 80.00 [kN/m2] |
| | | | | 16.250 | 27.006 | 5.750 | | 80.00 [kN/m2] |
| | | | | 16.250 | 27.006 | 11.500 | | 22.50 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | sar -mult- | | | 16.250 | 36.756 | 11.500 | PYY | -22.50 [kN/m2] |
| | | | | 16.250 | 36.756 | 5.750 | | -80.00 [kN/m2] |
| | | | | 2.500 | 36.756 | 5.750 | | -80.00 [kN/m2] |
| | | | | 2.500 | 36.756 | 11.500 | | -22.50 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | sar -mult- | | | 16.250 | 27.006 | 11.500 | PXX | -22.50 [kN/m2] |
| | | | | 16.250 | 27.006 | 5.750 | | -80.00 [kN/m2] |
| | | | | 16.250 | 36.756 | 5.750 | | -80.00 [kN/m2] |
| | | | | 16.250 | 36.756 | 11.500 | | -22.50 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | sar -mult- | | | 0.000 | 27.006 | 11.500 | PXX | 22.50 [kN/m2] |
| | | | | 0.000 | 27.006 | 5.750 | | 80.00 [kN/m2] |
| | | | | 0.000 | 36.756 | 5.750 | | 80.00 [kN/m2] |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 0.000 | 36.756 | 11.500 | | 22.50 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | sar -mult- | | | 0.000 | 36.756 | 11.500 | PXX | 22.50 [kN/m2] |
| | | | | 0.000 | 36.756 | 5.500 | | 82.50 [kN/m2] |
| | | | | 0.000 | 40.006 | 5.500 | | 82.50 [kN/m2] |
| | | | | 0.000 | 40.006 | 11.500 | | 22.50 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | sar -mult- | | | 2.500 | 40.006 | 11.500 | PYY | -22.50 [kN/m2] |
| | | | | 2.500 | 40.006 | 5.500 | | -82.50 [kN/m2] |
| | | | | 0.000 | 40.006 | 5.500 | | -82.50 [kN/m2] |
| | | | | 0.000 | 40.006 | 11.500 | | -22.50 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | sar -mult- | | | 2.500 | 36.756 | 11.500 | PXX | -22.50 [kN/m2] |
| | | | | 2.500 | 36.756 | 5.500 | | -82.50 [kN/m2] |
| | | | | 2.500 | 40.006 | 5.500 | | -82.50 [kN/m2] |
| | | | | 2.500 | 40.006 | 11.500 | | -22.50 [kN/m2] |
| | | | | activated | | | | 100.00 percent |

## Load Case 6 (Q ) SCU TIERRAS

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

### Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Area | sar -mult- | | | 16.250 | 27.006 | 11.500 | PXX | -5.00 [kN/m2] |
| | | | | 16.250 | 27.006 | 5.750 | | -5.00 [kN/m2] |
| | | | | 16.250 | 36.756 | 5.750 | | -5.00 [kN/m2] |
| | | | | 16.250 | 36.756 | 11.500 | | -5.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | sar -mult- | | | 0.000 | 27.006 | 11.500 | PXX | 5.00 [kN/m2] |
| | | | | 0.000 | 27.006 | 5.750 | | 5.00 [kN/m2] |
| | | | | 0.000 | 36.756 | 5.750 | | 5.00 [kN/m2] |
| | | | | 0.000 | 36.756 | 11.500 | | 5.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | sar -mult- | | | 0.000 | 36.756 | 11.500 | PXX | 5.00 [kN/m2] |
| | | | | 0.000 | 36.756 | 5.500 | | 5.00 [kN/m2] |
| | | | | 0.000 | 40.006 | 5.500 | | 5.00 [kN/m2] |
| | | | | 0.000 | 40.006 | 11.500 | | 5.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | sar -mult- | | | 2.500 | 36.756 | 11.500 | PXX | -5.00 [kN/m2] |
| | | | | 2.500 | 36.756 | 5.500 | | -5.00 [kN/m2] |
| | | | | 2.500 | 40.006 | 5.500 | | -5.00 [kN/m2] |
| | | | | 2.500 | 40.006 | 11.500 | | -5.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | sar -mult- | | | 16.250 | 27.006 | 11.500 | PYY | 5.00 [kN/m2] |
| | | | | 16.250 | 27.006 | 5.750 | | 5.00 [kN/m2] |
| | | | | 0.000 | 27.006 | 5.750 | | 5.00 [kN/m2] |
| | | | | 0.000 | 27.006 | 11.500 | | 5.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | sar -mult- | | | 16.250 | 36.756 | 11.500 | PYY | -5.00 [kN/m2] |
| | | | | 16.250 | 36.756 | 5.750 | | -5.00 [kN/m2] |
| | | | | 2.500 | 36.756 | 5.750 | | -5.00 [kN/m2] |
| | | | | 2.500 | 36.756 | 11.500 | | -5.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | sar -mult- | | | 2.500 | 40.006 | 11.500 | PYY | -5.00 [kN/m2] |
| | | | | 2.500 | 40.006 | 5.500 | | -5.00 [kN/m2] |
| | | | | 0.000 | 40.006 | 5.500 | | -5.00 [kN/m2] |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 0.000 | 40.006 | 11.500 | | -5.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |

Load Case 7 (Q ) CV 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Area | SAR 270 | | | | | | PG | 9.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 265 | | | | | | PG | 9.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 260 | | | | | | PG | 9.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 124 | | | | | | PG | 9.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 125 | | | | | | PG | 9.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 126 | | | | | | PG | 9.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |

Load Case 8 (Q ) CV 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Area | SAR 271 | | | | | | PG | 2.50 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 266 | | | | | | PG | 2.50 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 261 | | | | | | PG | 2.50 [kN/m2] |
| | | | | activated | | | | 100.00 percent |

Load Case 9 (Q ) CV 3

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Area | SAR 272 | | | | | | PG | 2.50 [kN/m2] |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | activated | | | | | 100.00 percent |
| Area | SAR | 267 | | | | | PG | 2.50 | [kN/m2] |
| | | | | activated | | | | | 100.00 percent |
| Area | SAR | 262 | | | | | PG | 2.50 | [kN/m2] |
| | | | | activated | | | | | 100.00 percent |
| Area | SAR | 259 | | | | | PG | 2.50 | [kN/m2] |
| | | | | activated | | | | | 100.00 percent |
| Area | SAR | 258 | | | | | PG | 2.50 | [kN/m2] |
| | | | | activated | | | | | 100.00 percent |
| Area | SAR | 257 | | | | | PG | 2.50 | [kN/m2] |
| | | | | activated | | | | | 100.00 percent |

### Load Case 10 (Q ) AR

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Area | SAR 132 | | | | | | PG | 2.50 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 131 | | | | | | PG | 2.50 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 123 | | | | | | PG | 2.50 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 122 | | | | | | PG | 2.50 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 223 | | | | | | PG | 2.50 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 222 | | | | | | PG | 2.50 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 273 | | | | | | PG | 2.50 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 269 | | | | | | PG | 2.50 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 268 | | | | | | PG | 2.50 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 130 | | | | | | PG | 2.50 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 264 | | | | | | PG | 2.50 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 263 | | | | | | PG | 2.50 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 133 | | | | | | PG | 2.50 [kN/m2] |
| | | | | activated | | | | 100.00 percent |

### Load Case 11 (Q ) CARRO 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | Type | Load value |
|---|---|---|---|---|---|---|

| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
|---|---|---|---|---|---|---|---|---|
| Point | sar 260 | | | 15.250 | 28.206 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | 100.00 | percent |
| Point | sar 54 | | | 13.250 | 27.006 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | 100.00 | percent |
| Point | sar 57 | | | 15.250 | 27.006 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | 100.00 | percent |
| Point | sar 124 | | | 13.250 | 28.206 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | 100.00 | percent |

## Load Case 12 (Q ) CARRO 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

### Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 260 | | | 15.250 | 29.061 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | 100.00 | percent |
| Point | sar 124 | | | 13.250 | 27.861 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | 100.00 | percent |
| Point | sar 260 | | | 15.250 | 27.861 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | 100.00 | percent |
| Point | sar 124 | | | 13.250 | 29.061 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | 100.00 | percent |

## Load Case 13 (Q ) CARRO 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

### Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 260 | | | 15.250 | 29.916 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | 100.00 | percent |
| Point | sar 124 | | | 13.250 | 28.716 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | 100.00 | percent |
| Point | sar 260 | | | 15.250 | 28.716 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | 100.00 | percent |
| Point | sar 124 | | | 13.250 | 29.916 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | 100.00 | percent |

## Load Case 14 (Q ) CARRO 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 260 | | | 15.250 | 30.771 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | 100.00 | percent |
| Point | sar 124 | | | 13.250 | 29.571 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | 100.00 | percent |
| Point | sar 260 | | | 15.250 | 29.571 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | 100.00 | percent |
| Point | sar 124 | | | 13.250 | 30.771 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | 100.00 | percent |

## Load Case 15 (Q ) CARRO 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 260 | | | 15.250 | 31.626 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | 100.00 | percent |
| Point | sar 124 | | | 13.250 | 30.426 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | 100.00 | percent |
| Point | sar 260 | | | 15.250 | 30.426 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | 100.00 | percent |
| Point | sar 124 | | | 13.250 | 31.626 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | 100.00 | percent |

## Load Case 16 (Q ) CARRO 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 265 | | | 15.250 | 32.481 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | 100.00 | percent |
| Point | sar 124 | | | 13.250 | 31.281 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | 100.00 | percent |
| Point | sar 260 | | | 15.250 | 31.281 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | 100.00 | percent |
| Point | sar 125 | | | 13.250 | 32.481 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | 100.00 | percent |

## Load Case 17 (Q ) CARRO 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |

| | | |
|---|---|---|
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 265 | | | 15.250 | 33.336 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 125 | | | 13.250 | 32.136 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 265 | | | 15.250 | 32.136 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 125 | | | 13.250 | 33.336 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | | 100.00 percent |

## Load Case 18 (Q ) CARRO 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 265 | | | 15.250 | 34.191 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 125 | | | 13.250 | 32.991 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 265 | | | 15.250 | 32.991 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 125 | | | 13.250 | 34.191 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | | 100.00 percent |

## Load Case 19 (Q ) CARRO 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 265 | | | 15.250 | 35.046 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 125 | | | 13.250 | 33.846 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 265 | | | 15.250 | 33.846 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 125 | | | 13.250 | 35.046 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | | 100.00 percent |

## Load Case 20 (Q ) CARRO 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |

favourable partial safety factor 0.000
Combination coefficient $\psi_0$ 0.700 (rare)
Combination coefficient $\psi_1$inf 1.000 (infrequent)
Combination coefficient $\psi_1$ 0.600 (frequent)
Combination coefficient $\psi_2$ 0.300 (permanent)

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 270 | | | 15.250 | 35.901 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 125 | | | 13.250 | 34.701 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 265 | | | 15.250 | 34.701 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 126 | | | 13.250 | 35.901 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | | 100.00 percent |

## Load Case 21 (Q ) CARRO 1

Factor forces and moments 1.000
unfavourable partial safety factor 1.600
favourable partial safety factor 0.000
Combination coefficient $\psi_0$ 0.700 (rare)
Combination coefficient $\psi_1$inf 1.000 (infrequent)
Combination coefficient $\psi_1$ 0.600 (frequent)
Combination coefficient $\psi_2$ 0.300 (permanent)

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 66 | | | 15.250 | 36.756 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 125 | | | 13.250 | 35.556 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 265 | | | 15.250 | 35.556 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 67 | | | 13.250 | 36.756 | 11.500 | PG | 150.0 [kN] |
| | | | | activated | | | | 100.00 percent |

## Load Case 22 (Q ) CARRO 2

Factor forces and moments 1.000
unfavourable partial safety factor 1.600
favourable partial safety factor 0.000
Combination coefficient $\psi_0$ 0.700 (rare)
Combination coefficient $\psi_1$inf 1.000 (infrequent)
Combination coefficient $\psi_1$ 0.600 (frequent)
Combination coefficient $\psi_2$ 0.300 (permanent)

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 261 | | | 12.250 | 28.206 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 54 | | | 10.250 | 27.006 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 54 | | | 12.250 | 27.006 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 261 | | | 10.250 | 28.206 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |

## Load Case 23 (Q ) CARRO 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

### Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 261 | | | 12.250 | 29.061 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 261 | | | 10.250 | 27.861 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 261 | | | 12.250 | 27.861 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 261 | | | 10.250 | 29.061 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |

## Load Case 24 (Q ) CARRO 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

### Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 261 | | | 12.250 | 29.916 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 261 | | | 10.250 | 28.716 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 261 | | | 12.250 | 28.716 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 261 | | | 10.250 | 29.916 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |

## Load Case 25 (Q ) CARRO 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

### Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 261 | | | 12.250 | 30.771 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 261 | | | 10.250 | 29.571 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 261 | | | 12.250 | 29.571 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 261 | | | 10.250 | 30.771 | 11.500 | PG | 100.0 [kN] |

| | | | | | |
|---|---|---|---|---|---|
| | | | | activated | 100.00 percent |

### Load Case 26 (Q ) CARRO 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 261 | | | 12.250 | 31.626 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 261 | | | 10.250 | 30.426 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 261 | | | 12.250 | 30.426 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 261 | | | 10.250 | 31.626 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |

### Load Case 27 (Q ) CARRO 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 266 | | | 12.250 | 32.481 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 261 | | | 10.250 | 31.281 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 261 | | | 12.250 | 31.281 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 266 | | | 10.250 | 32.481 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |

### Load Case 28 (Q ) CARRO 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 266 | | | 12.250 | 33.336 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 266 | | | 10.250 | 32.136 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Point | sar 266 | | | 12.250 | 32.136 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 266 | | | 10.250 | 33.336 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |

### Load Case 29 (Q ) CARRO 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 266 | | | 12.250 | 34.191 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 266 | | | 10.250 | 32.991 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 266 | | | 12.250 | 32.991 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 266 | | | 10.250 | 34.191 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |

### Load Case 30 (Q ) CARRO 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 266 | | | 12.250 | 35.046 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 266 | | | 10.250 | 33.846 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 266 | | | 12.250 | 33.846 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 266 | | | 10.250 | 35.046 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |

### Load Case 31 (Q ) CARRO 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 271 | | | 12.250 | 35.901 | 11.500 | PG | 100.0 [kN] |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | activated | | | | 100.00 percent |
| Point | sar 266 | | | 10.250 | 34.701 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 266 | | | 12.250 | 34.701 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 271 | | | 10.250 | 35.901 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |

## Load Case 32 (Q ) CARRO 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

### Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 67 | | | 12.250 | 36.756 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 266 | | | 10.250 | 35.556 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 266 | | | 12.250 | 35.556 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 67 | | | 10.250 | 36.756 | 11.500 | PG | 100.0 [kN] |
| | | | | activated | | | | 100.00 percent |

## Load Case 33 (Q ) CARRO 3

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

### Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 257 | | | 9.250 | 28.206 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 15 | | | 7.250 | 27.006 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 54 | | | 9.250 | 27.006 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 262 | | | 7.250 | 28.206 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |

## Load Case 34 (Q ) CARRO 3

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 257 | | | 9.250 | 29.061 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 262 | | | 7.250 | 27.861 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 257 | | | 9.250 | 27.861 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 262 | | | 7.250 | 29.061 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |

## Load Case 35 (Q ) CARRO 3

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 257 | | | 9.250 | 29.916 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 262 | | | 7.250 | 28.716 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 257 | | | 9.250 | 28.716 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 262 | | | 7.250 | 29.916 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |

## Load Case 36 (Q ) CARRO 3

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 257 | | | 9.250 | 30.771 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 262 | | | 7.250 | 29.571 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 257 | | | 9.250 | 29.571 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 262 | | | 7.250 | 30.771 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |

## Load Case 37 (Q ) CARRO 3

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |

| | | |
|---|---|---|
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 257 | | | 9.250 | 31.626 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 262 | | | 7.250 | 30.426 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 257 | | | 9.250 | 30.426 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 262 | | | 7.250 | 31.626 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |

## Load Case 38 (Q ) CARRO 3

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 258 | | | 9.250 | 32.481 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 262 | | | 7.250 | 31.281 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 257 | | | 9.250 | 31.281 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 267 | | | 7.250 | 32.481 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |

## Load Case 39 (Q ) CARRO 3

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 258 | | | 9.250 | 33.336 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 267 | | | 7.250 | 32.136 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 258 | | | 9.250 | 32.136 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 267 | | | 7.250 | 33.336 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |

## Load Case 40 (Q ) CARRO 3

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |

| | | |
|---|---|---|
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 258 | | | 9.250 | 34.191 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 267 | | | 7.250 | 32.991 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 258 | | | 9.250 | 32.991 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 267 | | | 7.250 | 34.191 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |

## Load Case 41 (Q ) CARRO 3

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 258 | | | 9.250 | 35.046 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 267 | | | 7.250 | 33.846 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 258 | | | 9.250 | 33.846 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 267 | | | 7.250 | 35.046 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |

## Load Case 42 (Q ) CARRO 3

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 259 | | | 9.250 | 35.901 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 267 | | | 7.250 | 34.701 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 258 | | | 9.250 | 34.701 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 272 | | | 7.250 | 35.901 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |

## Load Case 43 (Q ) CARRO 3

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

### Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Point | sar 67 | | | 9.250 | 36.756 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 267 | | | 7.250 | 35.556 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 258 | | | 9.250 | 35.556 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |
| Point | sar 134 | | | 7.250 | 36.756 | 11.500 | PG | 50.0 [kN] |
| | | | | activated | | | | 100.00 percent |

## Load Case 44 (A ) BOMBEROS

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.000 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 1.000 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 1.000 (frequent) |
| Combination coefficient | $\psi_2$ | 0.000 (permanent) |

### Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Area | SAR 133 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 132 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 131 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 130 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 259 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 258 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 257 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 126 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 125 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 124 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 123 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 122 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 223 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 222 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 273 | | | | | | PG | 20.00 [kN/m2] |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | activated | | | | 100.00 percent |
| Area | SAR 272 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 271 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 270 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 269 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 268 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 267 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 266 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 265 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 264 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 263 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 262 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 261 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |
| Area | SAR 260 | | | | | | PG | 20.00 [kN/m2] |
| | | | | activated | | | | 100.00 percent |

### Load Case 45 (G ) RETRACCION

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.500 |
| favourable partial safety factor | | 1.000 |
| Combination coefficient | $\psi_0$ | 1.000 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 1.000 (frequent) |
| Combination coefficient | $\psi_2$ | 1.000 (permanent) |

### Loads

| Kind | Reference to | Projection | | Coordinates | | | Type | Load value |
|---|---|---|---|---|---|---|---|---|
| | | Designation | W[m] | X[m] | Y[m] | Z[m] | | |
| Area | qgrp ???? | | | | | | epsx | -0.200 [o/oo] |
| | | | | activated | | | | 100.00 percent |

**ASE - ADVANCED SOLUTION ENGINE**

Load Case 1 PP

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| Factor dead weight | DL-ZZ | -1.000 |

Load Case 2 (G ) CM

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.500 |
| favourable partial safety factor | | 1.000 |
| Combination coefficient | $\psi_0$ | 1.000 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 1.000 (frequent) |
| Combination coefficient | $\psi_2$ | 1.000 (permanent) |

Load Case 3 (Q ) AGUA 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 4 (Q ) AGUA 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 5 (G ) TIERRAS

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.500 |
| favourable partial safety factor | | 1.000 |
| Combination coefficient | $\psi_0$ | 1.000 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 1.000 (frequent) |
| Combination coefficient | $\psi_2$ | 1.000 (permanent) |

Load Case 6 (Q ) SCU TIERRAS

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 7 (Q ) CV 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 8 (Q ) CV 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 9 (Q ) CV 3

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 10 (Q ) AR

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 11 (Q ) CARRO 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 12 (Q ) CARRO 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 13 (Q ) CARRO 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 14 (Q ) CARRO 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |

| | | |
|---|---|---|
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 15 (Q ) CARRO 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 16 (Q ) CARRO 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 17 (Q ) CARRO 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 18 (Q ) CARRO 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 19 (Q ) CARRO 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 20 (Q ) CARRO 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 21 (Q ) CARRO 1

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |

| | | |
|---|---|---|
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 22 (Q ) CARRO 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 23 (Q ) CARRO 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 24 (Q ) CARRO 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 25 (Q ) CARRO 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 26 (Q ) CARRO 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 27 (Q ) CARRO 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 28 (Q ) CARRO 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |

| | | |
|---|---|---|
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 29 (Q ) CARRO 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 30 (Q ) CARRO 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 31 (Q ) CARRO 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 32 (Q ) CARRO 2

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 33 (Q ) CARRO 3

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 34 (Q ) CARRO 3

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 35 (Q ) CARRO 3

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 36 (Q ) CARRO 3

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 37 (Q ) CARRO 3

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 38 (Q ) CARRO 3

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 39 (Q ) CARRO 3

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 40 (Q ) CARRO 3

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

Load Case 41 (Q ) CARRO 3

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

### Load Case 42 (Q ) CARRO 3

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

### Load Case 43 (Q ) CARRO 3

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.600 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 0.700 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 0.600 (frequent) |
| Combination coefficient | $\psi_2$ | 0.300 (permanent) |

### Load Case 44 (A ) BOMBEROS

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.000 |
| favourable partial safety factor | | 0.000 |
| Combination coefficient | $\psi_0$ | 1.000 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 1.000 (frequent) |
| Combination coefficient | $\psi_2$ | 0.000 (permanent) |

### Load Case 45 (G ) RETRACCIÓN

| | | |
|---|---|---|
| Factor forces and moments | | 1.000 |
| unfavourable partial safety factor | | 1.500 |
| favourable partial safety factor | | 1.000 |
| Combination coefficient | $\psi_0$ | 1.000 (rare) |
| Combination coefficient | $\psi_1$inf | 1.000 (infrequent) |
| Combination coefficient | $\psi_1$ | 1.000 (frequent) |
| Combination coefficient | $\psi_2$ | 1.000 (permanent) |

### Sum of Loadings

| Loadcase | Σ(Loads) | | | Designation |
|---|---|---|---|---|
| | X[kN] | Y[kN] | Z[kN] | |
| 1 | 0.0 | 0.0 | -9061.1 | PP |
| 2 | 0.0 | 0.0 | -7460.9 | CM |
| 3 | 0.0 | 0.0 | -7525.8 | AGUA 1 |
| 4 | 0.0 | 0.0 | -406.2 | AGUA 2 |
| 5 | 0.0 | -50.8 | 0.0 | TIERRAS |
| 6 | 0.0 | -3.1 | 0.0 | SCU TIERRAS |
| 7 | 0.0 | 0.0 | -307.1 | CV 1 |
| 8 | 0.0 | 0.0 | -71.7 | CV 2 |
| 9 | 0.0 | 0.0 | -72.4 | CV 3 |
| 10 | 0.0 | 0.0 | -134.9 | AR |
| 11 | 0.0 | 0.0 | -600.0 | CARRO 1 |
| 12 | 0.0 | 0.0 | -600.0 | CARRO 1 |
| 13 | 0.0 | 0.0 | -600.0 | CARRO 1 |
| 14 | 0.0 | 0.0 | -600.0 | CARRO 1 |
| 15 | 0.0 | 0.0 | -600.0 | CARRO 1 |
| 16 | 0.0 | 0.0 | -600.0 | CARRO 1 |
| 17 | 0.0 | 0.0 | -600.0 | CARRO 1 |
| 18 | 0.0 | 0.0 | -600.0 | CARRO 1 |
| 19 | 0.0 | 0.0 | -600.0 | CARRO 1 |
| 20 | 0.0 | 0.0 | -600.0 | CARRO 1 |
| 21 | 0.0 | 0.0 | -600.0 | CARRO 1 |
| 22 | 0.0 | 0.0 | -400.0 | CARRO 2 |
| 23 | 0.0 | 0.0 | -400.0 | CARRO 2 |

| | | | | |
|---|---|---|---|---|
| 24 | 0.0 | 0.0 | -400.0 | CARRO 2 |
| 25 | 0.0 | 0.0 | -400.0 | CARRO 2 |
| 26 | 0.0 | 0.0 | -400.0 | CARRO 2 |
| 27 | 0.0 | 0.0 | -400.0 | CARRO 2 |
| 28 | 0.0 | 0.0 | -400.0 | CARRO 2 |
| 29 | 0.0 | 0.0 | -400.0 | CARRO 2 |
| 30 | 0.0 | 0.0 | -400.0 | CARRO 2 |
| 31 | 0.0 | 0.0 | -400.0 | CARRO 2 |
| 32 | 0.0 | 0.0 | -400.0 | CARRO 2 |
| 33 | 0.0 | 0.0 | -200.0 | CARRO 3 |
| 34 | 0.0 | 0.0 | -200.0 | CARRO 3 |
| 35 | 0.0 | 0.0 | -200.0 | CARRO 3 |
| 36 | 0.0 | 0.0 | -200.0 | CARRO 3 |
| 37 | 0.0 | 0.0 | -200.0 | CARRO 3 |
| 38 | 0.0 | 0.0 | -200.0 | CARRO 3 |
| 39 | 0.0 | 0.0 | -200.0 | CARRO 3 |
| 40 | 0.0 | 0.0 | -200.0 | CARRO 3 |
| 41 | 0.0 | 0.0 | -200.0 | CARRO 3 |
| 42 | 0.0 | 0.0 | -200.0 | CARRO 3 |
| 43 | 0.0 | 0.0 | -200.0 | CARRO 3 |
| 44 | 0.0 | 0.0 | -2914.4 | BOMBEROS |
| 45 | 0.0 | 0.0 | 0.0 | RETRACCIÓN |

# COMBOS

**MAXIMA - SUPERPOSITION OF LOAD CASES**

Combination rule Number 1

ELU PERSISTENTE (ESTANQUEIDAD)
Resulting Load Cases type Design combination

Load Case selection

| Number | Fact | Type | Designation |
|---|---|---|---|
| 1 | 1.00 | PERM | PP |
| 1 | 0.35 | COND | PP |
| 3 | 1.50 | COND | AGUA 1 |
| 4 | 1.50 | COND | AGUA 2 |
| 45 | 1.00 | PERM | RETRACCIÓN |
| 45 | 0.35 | COND | RETRACCIÓN |

Fact factor for load case
PERM permanent load grouped in actions
Type type of the load case
COND conditional load

Generated Load Cases

| Number | Combination | Designation |
|---|---|---|
| 101 | 1 | MAX-MXX QUAD ELU1 |
| 102 | 1 | MIN-MXX QUAD ELU1 |
| 103 | 1 | MAX-MYY QUAD ELU1 |
| 104 | 1 | MIN-MYY QUAD ELU1 |
| 105 | 1 | MAX-MXY QUAD ELU1 |
| 106 | 1 | MIN-MXY QUAD ELU1 |
| 107 | 1 | MAX-NXX QUAD ELU1 |
| 108 | 1 | MIN-NXX QUAD ELU1 |
| 109 | 1 | MAX-NYY QUAD ELU1 |
| 110 | 1 | MIN-NYY QUAD ELU1 |
| 111 | 1 | MAX-NXY QUAD ELU1 |
| 112 | 1 | MIN-NXY QUAD ELU1 |
| 113 | 1 | MAX-VX QUAD ELU1 |
| 114 | 1 | MIN-VX QUAD ELU1 |
| 115 | 1 | MAX-VY QUAD ELU1 |
| 116 | 1 | MIN-VY QUAD ELU1 |

**MAXIMA - SUPERPOSITION OF LOAD CASES**

Combination rule Number 2

ELU PERSISTENTE (VACIO)
Resulting Load Cases type Design combination

Load Case selection

| Number | Fact | Type | Designation |
|---|---|---|---|
| 1 | 1.00 | PERM | PP |
| 1 | 0.35 | COND | PP |
| 5 | 1.00 | PERM | TIERRAS |
| 5 | 0.50 | COND | TIERRAS |
| 6 | 1.50 | COND | SCU TIERRAS |
| 45 | 1.00 | PERM | RETRACCIÓN |
| 45 | 0.35 | COND | RETRACCIÓN |

Fact factor for load case — Type type of the load case
PERM permanent load grouped in actions — COND conditional load

Generated Load Cases

| Number | Combination | Designation |
|---|---|---|
| 201 | 2 | MAX-MXX QUAD ELU2 |
| 202 | 2 | MIN-MXX QUAD ELU2 |
| 203 | 2 | MAX-MYY QUAD ELU2 |
| 204 | 2 | MIN-MYY QUAD ELU2 |
| 205 | 2 | MAX-MXY QUAD ELU2 |
| 206 | 2 | MIN-MXY QUAD ELU2 |
| 207 | 2 | MAX-NXX QUAD ELU2 |
| 208 | 2 | MIN-NXX QUAD ELU2 |
| 209 | 2 | MAX-NYY QUAD ELU2 |
| 210 | 2 | MIN-NYY QUAD ELU2 |
| 211 | 2 | MAX-NXY QUAD ELU2 |
| 212 | 2 | MIN-NXY QUAD ELU2 |
| 213 | 2 | MAX-VX QUAD ELU2 |
| 214 | 2 | MIN-VX QUAD ELU2 |
| 215 | 2 | MAX-VY QUAD ELU2 |
| 216 | 2 | MIN-VY QUAD ELU2 |

**MAXIMA - SUPERPOSITION OF LOAD CASES**

Combination rule Number 3

ELU PERSISTENTE
Resulting Load Cases type Design combination

Load Case selection

| Number | Fact | Type | Designation |
|---|---|---|---|
| 1 | 1.00 | PERM | PP |
| 1 | 0.35 | COND | PP |
| 2 | 1.00 | PERM | CM |
| 2 | 0.35 | COND | CM |
| 3 | 1.50 | COND | AGUA 1 |
| 4 | 1.50 | COND | AGUA 2 |
| 5 | 1.00 | PERM | TIERRAS |
| 5 | 0.50 | COND | TIERRAS |
| 6 | 1.50 | COND | SCU TIERRAS |
| 7 | 1.35 | COND | CV 1 |
| 8 | 1.35 | COND | CV 2 |
| 9 | 1.35 | COND | CV 3 |
| 10 | 1.35 | COND | AR |
| 11 | 1.35 | A1 | CARRO 1 |
| 12 | 1.35 | A1 | CARRO 1 |
| 13 | 1.35 | A1 | CARRO 1 |
| 14 | 1.35 | A1 | CARRO 1 |
| 15 | 1.35 | A1 | CARRO 1 |
| 16 | 1.35 | A1 | CARRO 1 |
| 17 | 1.35 | A1 | CARRO 1 |
| 18 | 1.35 | A1 | CARRO 1 |
| 19 | 1.35 | A1 | CARRO 1 |
| 20 | 1.35 | A1 | CARRO 1 |
| 21 | 1.35 | A1 | CARRO 1 |
| 22 | 1.35 | A2 | CARRO 2 |
| 23 | 1.35 | A2 | CARRO 2 |
| 24 | 1.35 | A2 | CARRO 2 |
| 25 | 1.35 | A2 | CARRO 2 |
| 26 | 1.35 | A2 | CARRO 2 |
| 27 | 1.35 | A2 | CARRO 2 |
| 28 | 1.35 | A2 | CARRO 2 |
| 29 | 1.35 | A2 | CARRO 2 |
| 30 | 1.35 | A2 | CARRO 2 |
| 31 | 1.35 | A2 | CARRO 2 |
| 32 | 1.35 | A2 | CARRO 2 |
| 33 | 1.35 | A3 | CARRO 3 |
| 34 | 1.35 | A3 | CARRO 3 |
| 35 | 1.35 | A3 | CARRO 3 |
| 36 | 1.35 | A3 | CARRO 3 |
| 37 | 1.35 | A3 | CARRO 3 |
| 38 | 1.35 | A3 | CARRO 3 |
| 39 | 1.35 | A3 | CARRO 3 |
| 40 | 1.35 | A3 | CARRO 3 |
| 41 | 1.35 | A3 | CARRO 3 |
| 42 | 1.35 | A3 | CARRO 3 |
| 43 | 1.35 | A3 | CARRO 3 |
| 45 | 1.00 | PERM | RETRACCIÓN |
| 45 | 0.35 | COND | RETRACCIÓN |

Fact factor for load case — Type type of the load case
PERM permanent load grouped in actions — COND conditional load
A exclusive load

Generated Load Cases

| Number | Combination | Designation |
|---|---|---|
| 301 | 3 | MAX-MXX QUAD ELU3 |

| | | |
|---|---|---|
| 302 | 3 | MIN-MXX QUAD ELU3 |
| 303 | 3 | MAX-MYY QUAD ELU3 |
| 304 | 3 | MIN-MYY QUAD ELU3 |
| 305 | 3 | MAX-MXY QUAD ELU3 |
| 306 | 3 | MIN-MXY QUAD ELU3 |
| 307 | 3 | MAX-NXX QUAD ELU3 |
| 308 | 3 | MIN-NXX QUAD ELU3 |
| 309 | 3 | MAX-NYY QUAD ELU3 |
| 310 | 3 | MIN-NYY QUAD ELU3 |
| 311 | 3 | MAX-NXY QUAD ELU3 |
| 312 | 3 | MIN-NXY QUAD ELU3 |
| 313 | 3 | MAX-VX QUAD ELU3 |
| 314 | 3 | MIN-VX QUAD ELU3 |
| 315 | 3 | MAX-VY QUAD ELU3 |
| 316 | 3 | MIN-VY QUAD ELU3 |
| 321 | 3 | MAX-PX NODE ELU3 |
| 322 | 3 | MIN-PX NODE ELU3 |
| 323 | 3 | MAX-PY NODE ELU3 |
| 324 | 3 | MIN-PY NODE ELU3 |
| 325 | 3 | MAX-PZ NODE ELU3 |
| 326 | 3 | MIN-PZ NODE ELU3 |
| 331 | 3 | MAX-N BEAM ELU3 |
| 332 | 3 | MIN-N BEAM ELU3 |
| 333 | 3 | MAX-VY BEAM ELU3 |
| 334 | 3 | MIN-VY BEAM ELU3 |
| 335 | 3 | MAX-VZ BEAM ELU3 |
| 336 | 3 | MIN-VZ BEAM ELU3 |
| 337 | 3 | MAX-MT BEAM ELU3 |
| 338 | 3 | MIN-MT BEAM ELU3 |
| 339 | 3 | MAX-MY BEAM ELU3 |
| 340 | 3 | MIN-MY BEAM ELU3 |
| 341 | 3 | MAX-MZ BEAM ELU3 |
| 342 | 3 | MIN-MZ BEAM ELU3 |

**MAXIMA - SUPERPOSITION OF LOAD CASES**

Combination rule Number 4

ELU ACCIDENTAL
Resulting Load Cases type Design combination

Load Case selection

| Number | Fact | Type | Designation |
|---|---|---|---|
| 1 | 1.00 | PERM | PP |
| 2 | 1.00 | PERM | CM |
| 3 | 1.00 | COND | AGUA 1 |
| 4 | 1.00 | COND | AGUA 2 |
| 5 | 1.00 | PERM | TIERRAS |
| 6 | 0.60 | COND | SCU TIERRAS |
| 44 | 1.00 | PERM | BOMBEROS |
| 45 | 1.00 | PERM | RETRACCIÓN |

Fact factor for load case — Type type of the load case
PERM permanent load grouped in actions — COND conditional load

Generated Load Cases

| Number | Combination | Designation |
|---|---|---|
| 401 | 4 | MAX-MXX QUAD ELU4 |
| 402 | 4 | MIN-MXX QUAD ELU4 |
| 403 | 4 | MAX-MYY QUAD ELU4 |
| 404 | 4 | MIN-MYY QUAD ELU4 |
| 405 | 4 | MAX-MXY QUAD ELU4 |
| 406 | 4 | MIN-MXY QUAD ELU4 |
| 407 | 4 | MAX-NXX QUAD ELU4 |
| 408 | 4 | MIN-NXX QUAD ELU4 |
| 409 | 4 | MAX-NYY QUAD ELU4 |
| 410 | 4 | MIN-NYY QUAD ELU4 |
| 411 | 4 | MAX-NXY QUAD ELU4 |
| 412 | 4 | MIN-NXY QUAD ELU4 |
| 413 | 4 | MAX-VX QUAD ELU4 |
| 414 | 4 | MIN-VX QUAD ELU4 |
| 415 | 4 | MAX-VY QUAD ELU4 |
| 416 | 4 | MIN-VY QUAD ELU4 |
| 421 | 4 | MAX-PX NODE ELU4 |
| 422 | 4 | MIN-PX NODE ELU4 |
| 423 | 4 | MAX-PY NODE ELU4 |
| 424 | 4 | MIN-PY NODE ELU4 |
| 425 | 4 | MAX-PZ NODE ELU4 |
| 426 | 4 | MIN-PZ NODE ELU4 |
| 431 | 4 | MAX-N BEAM ELU4 |
| 432 | 4 | MIN-N BEAM ELU4 |
| 433 | 4 | MAX-VY BEAM ELU4 |
| 434 | 4 | MIN-VY BEAM ELU4 |
| 435 | 4 | MAX-VZ BEAM ELU4 |
| 436 | 4 | MIN-VZ BEAM ELU4 |
| 437 | 4 | MAX-MT BEAM ELU4 |
| 438 | 4 | MIN-MT BEAM ELU4 |
| 439 | 4 | MAX-MY BEAM ELU4 |
| 440 | 4 | MIN-MY BEAM ELU4 |
| 441 | 4 | MAX-MZ BEAM ELU4 |
| 442 | 4 | MIN-MZ BEAM ELU4 |

**MAXIMA - SUPERPOSITION OF LOAD CASES**

Combination rule Number 5

ELS CUASI-PERMANENTE
Resulting Load Cases type Design combination

Load Case selection

| Number | Fact | Type | Designation |
|---|---|---|---|
| 1 | 1.00 | PERM | PP |
| 2 | 1.00 | PERM | CM |
| 3 | 1.00 | COND | AGUA 1 |
| 4 | 1.00 | COND | AGUA 2 |
| 5 | 1.00 | PERM | TIERRAS |
| 6 | 0.20 | COND | SCU TIERRAS |
| 45 | 1.00 | PERM | RETRACCIÓN |

Fact factor for load case
PERM permanent load grouped in actions
Type type of the load case
COND conditional load

Generated Load Cases

| Number | Combination | Designation |
|---|---|---|
| 501 | 5 | MAX-MXX QUAD ELS1 |
| 502 | 5 | MIN-MXX QUAD ELS1 |
| 503 | 5 | MAX-MYY QUAD ELS1 |
| 504 | 5 | MIN-MYY QUAD ELS1 |
| 505 | 5 | MAX-MXY QUAD ELS1 |
| 506 | 5 | MIN-MXY QUAD ELS1 |
| 507 | 5 | MAX-NXX QUAD ELS1 |
| 508 | 5 | MIN-NXX QUAD ELS1 |
| 509 | 5 | MAX-NYY QUAD ELS1 |
| 510 | 5 | MIN-NYY QUAD ELS1 |
| 511 | 5 | MAX-NXY QUAD ELS1 |
| 512 | 5 | MIN-NXY QUAD ELS1 |
| 513 | 5 | MAX-VX QUAD ELS1 |
| 514 | 5 | MIN-VX QUAD ELS1 |
| 515 | 5 | MAX-VY QUAD ELS1 |
| 516 | 5 | MIN-VY QUAD ELS1 |

**MAXIMA - SUPERPOSITION OF LOAD CASES**

Combination rule Number 6

ELU HUNDIMIENTO
Resulting Load Cases type Design combination

Load Case selection

| Number | Fact | Type | Designation |
|---|---|---|---|
| 1 | 1.00 | PERM | PP |
| 2 | 1.00 | PERM | CM |
| 3 | 1.00 | COND | AGUA 1 |
| 4 | 1.00 | COND | AGUA 2 |
| 5 | 1.00 | PERM | TIERRAS |
| 6 | 0.60 | COND | SCU TIERRAS |
| 7 | 1.00 | COND | CV 1 |
| 8 | 1.00 | COND | CV 2 |
| 9 | 1.00 | COND | CV 3 |
| 10 | 1.00 | COND | AR |
| 11 | 1.00 | A1 | CARRO 1 |
| 12 | 1.00 | A1 | CARRO 1 |
| 13 | 1.00 | A1 | CARRO 1 |
| 14 | 1.00 | A1 | CARRO 1 |
| 15 | 1.00 | A1 | CARRO 1 |
| 16 | 1.00 | A1 | CARRO 1 |
| 17 | 1.00 | A1 | CARRO 1 |
| 18 | 1.00 | A1 | CARRO 1 |
| 19 | 1.00 | A1 | CARRO 1 |
| 20 | 1.00 | A1 | CARRO 1 |
| 21 | 1.00 | A1 | CARRO 1 |
| 22 | 1.00 | A2 | CARRO 2 |
| 23 | 1.00 | A2 | CARRO 2 |
| 24 | 1.00 | A2 | CARRO 2 |
| 25 | 1.00 | A2 | CARRO 2 |
| 26 | 1.00 | A2 | CARRO 2 |
| 27 | 1.00 | A2 | CARRO 2 |
| 28 | 1.00 | A2 | CARRO 2 |
| 29 | 1.00 | A2 | CARRO 2 |
| 30 | 1.00 | A2 | CARRO 2 |
| 31 | 1.00 | A2 | CARRO 2 |
| 32 | 1.00 | A2 | CARRO 2 |
| 33 | 1.00 | A3 | CARRO 3 |
| 34 | 1.00 | A3 | CARRO 3 |
| 35 | 1.00 | A3 | CARRO 3 |
| 36 | 1.00 | A3 | CARRO 3 |
| 37 | 1.00 | A3 | CARRO 3 |
| 38 | 1.00 | A3 | CARRO 3 |
| 39 | 1.00 | A3 | CARRO 3 |
| 40 | 1.00 | A3 | CARRO 3 |
| 41 | 1.00 | A3 | CARRO 3 |
| 42 | 1.00 | A3 | CARRO 3 |
| 43 | 1.00 | A3 | CARRO 3 |
| 45 | 1.00 | PERM | RETRACCIÓN |

| | | | |
|---|---|---|---|
| Fact | factor for load case | Type | type of the load case |
| PERM | permanent load grouped in actions | COND | conditional load |
| A | exclusive load | | |

Generated Load Cases

| Number | Combination | Designation |
|---|---|---|
| 601 | 6 | MAX-P QUAD ELU6 |
| 602 | 6 | MIN-P QUAD ELU6 |

# DIMENSIONAMIENTO

**BEMESS - DESIGN OF PLATES AND SHELLS**

Reinforcementparameter two layer reinforcement

| Selection | distance | | bar-diameter | | crackwidth | | steelstress | | min.reinf. | |
|---|---|---|---|---|---|---|---|---|---|---|
| Grp elem | d1-u | 2.lay | ds-u | 2.lay | wk-u | 2.lay | sigsu | 2.lay | asu | 2.lay |
| no. no. | d1-l | 2.lay | ds-l | 2.lay | wk-l | 2.lay | sigsl | 2.lay | asl | 2.lay |
| | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [MPa] | [MPa] | [cm2/m] | [cm2/m] |
| default | 50.0 | 66.0 | 16 | 16 | 0.30 | 0.30 | - | - | - | - |
| | 50.0 | 66.0 | 16 | 16 | 0.30 | 0.30 | - | - | - | - |

distance upper / lower distance center of bar to surface
crackwidth upper / lower required crack width
min.reinf. upper / lower minimum reinforcement
bar-diameter upper / lower bar diameter
steelstress upper / lower maximum steel stress in SLS check

The reinforcement directions relate to the local coordinate system of
the elements and have to be plotted graphically.
With the input of a steel stress sigsu... the 'crack design according tables'
uses this given stress sigsu for the corresponding layer. With this input, the check can
be done for bar distances instead of bar diameters, see legend SLS control parameters.

**BEMESS - DESIGN OF PLATES AND SHELLS**

Load Cases for the Design

| Loadcase | factor | Designation |
|---|---|---|
| 101 | 1.000 | MAX-MXX QUAD ELU1 |
| 102 | 1.000 | MIN-MXX QUAD ELU1 |
| 103 | 1.000 | MAX-MYY QUAD ELU1 |
| 104 | 1.000 | MIN-MYY QUAD ELU1 |
| 105 | 1.000 | MAX-MXY QUAD ELU1 |
| 106 | 1.000 | MIN-MXY QUAD ELU1 |
| 107 | 1.000 | MAX-NXX QUAD ELU1 |
| 108 | 1.000 | MIN-NXX QUAD ELU1 |
| 109 | 1.000 | MAX-NYY QUAD ELU1 |
| 110 | 1.000 | MIN-NYY QUAD ELU1 |
| 111 | 1.000 | MAX-NXY QUAD ELU1 |
| 112 | 1.000 | MIN-NXY QUAD ELU1 |
| 113 | 1.000 | MAX-VX QUAD ELU1 |
| 114 | 1.000 | MIN-VX QUAD ELU1 |
| 115 | 1.000 | MAX-VY QUAD ELU1 |
| 116 | 1.000 | MIN-VY QUAD ELU1 |
| 201 | 1.000 | MAX-MXX QUAD ELU2 |
| 202 | 1.000 | MIN-MXX QUAD ELU2 |
| 203 | 1.000 | MAX-MYY QUAD ELU2 |
| 204 | 1.000 | MIN-MYY QUAD ELU2 |
| 205 | 1.000 | MAX-MXY QUAD ELU2 |
| 206 | 1.000 | MIN-MXY QUAD ELU2 |
| 207 | 1.000 | MAX-NXX QUAD ELU2 |
| 208 | 1.000 | MIN-NXX QUAD ELU2 |
| 209 | 1.000 | MAX-NYY QUAD ELU2 |
| 210 | 1.000 | MIN-NYY QUAD ELU2 |
| 211 | 1.000 | MAX-NXY QUAD ELU2 |
| 212 | 1.000 | MIN-NXY QUAD ELU2 |
| 213 | 1.000 | MAX-VX QUAD ELU2 |
| 214 | 1.000 | MIN-VX QUAD ELU2 |
| 215 | 1.000 | MAX-VY QUAD ELU2 |
| 216 | 1.000 | MIN-VY QUAD ELU2 |
| 301 | 1.000 | MAX-MXX QUAD ELU3 |
| 302 | 1.000 | MIN-MXX QUAD ELU3 |
| 303 | 1.000 | MAX-MYY QUAD ELU3 |
| 304 | 1.000 | MIN-MYY QUAD ELU3 |
| 305 | 1.000 | MAX-MXY QUAD ELU3 |
| 306 | 1.000 | MIN-MXY QUAD ELU3 |
| 307 | 1.000 | MAX-NXX QUAD ELU3 |
| 308 | 1.000 | MIN-NXX QUAD ELU3 |
| 309 | 1.000 | MAX-NYY QUAD ELU3 |
| 310 | 1.000 | MIN-NYY QUAD ELU3 |
| 311 | 1.000 | MAX-NXY QUAD ELU3 |
| 312 | 1.000 | MIN-NXY QUAD ELU3 |
| 313 | 1.000 | MAX-VX QUAD ELU3 |
| 314 | 1.000 | MIN-VX QUAD ELU3 |
| 315 | 1.000 | MAX-VY QUAD ELU3 |
| 316 | 1.000 | MIN-VY QUAD ELU3 |
| 401 | 1.000 | MAX-MXX QUAD ELU4 |
| 402 | 1.000 | MIN-MXX QUAD ELU4 |
| 403 | 1.000 | MAX-MYY QUAD ELU4 |
| 404 | 1.000 | MIN-MYY QUAD ELU4 |
| 405 | 1.000 | MAX-MXY QUAD ELU4 |
| 406 | 1.000 | MIN-MXY QUAD ELU4 |
| 407 | 1.000 | MAX-NXX QUAD ELU4 |
| 408 | 1.000 | MIN-NXX QUAD ELU4 |
| 409 | 1.000 | MAX-NYY QUAD ELU4 |
| 410 | 1.000 | MIN-NYY QUAD ELU4 |
| 411 | 1.000 | MAX-NXY QUAD ELU4 |
| 412 | 1.000 | MIN-NXY QUAD ELU4 |
| 413 | 1.000 | MAX-VX QUAD ELU4 |
| 414 | 1.000 | MIN-VX QUAD ELU4 |

| | | |
|---|---|---|
| 415 | 1.000 | MAX-VY QUAD ELU4 |
| 416 | 1.000 | MIN-VY QUAD ELU4 |

Material (EuroNorm: EN 1992-1-1:2004 Design of concrete structures)

| MAT | fck | fc | fctm | fy | ft | eps,ud | minT | Type |
|---|---|---|---|---|---|---|---|---|
| | [MPa] | [MPa] | [MPa] | [MPa] | [MPa] | [o/oo] | | |
| 1 | 30.00 | 30.00 | 2.90 | | | | 0.00 | |
| 2 | | | | 500.00 | 536.00 | 45.0 | | |

MAT material number
fck nominal strength of the concrete
fc strength of the concrete
fctm tensile strength of the concrete
fy yield stress reinforcing steel
ft tensile stress reinforcing steel
eps,ud maximum strain - limited to max. 0.9*50 o/oo
minT minimum transverse reinforcement
Type character of the loading

Material-safety-factors:

| MAT | concr SC1 | SC2 | steel SS1 | SS2 |
|---|---|---|---|---|
| 1 | 1.50 | 1.50 | | |
| 2 | | | 1.15 | 1.15 |

MAT material number
concr SC1 material safety SC1/SC2 = bending/compression
steel SS1 material safety steel bending/compression

At direct supports the shear force is linear reduced from 1.0*d up to the face of the support to 70%.
The maximum shear capacity is checked at the face of the support without reduction.

For punching design, the longitudinal reinforcement will be increased up to 0.00%
to avoid shear reinforcement [input PUNC...RO_V].
Outside the punching area, the normal slab shear design may increase the
longitudinal reinforcement up to 0.00% [input CTRL...RO_V].

Reinforcementparameter two layer reinforcement

| Selection | distance | | bar-diameter | | crackwidth | | steelstress | | min.reinf. | |
|---|---|---|---|---|---|---|---|---|---|---|
| Grp elem | d1-u | 2.lay | ds-u | 2.lay | wk-u | 2.lay | sigsu | 2.lay | asu | 2.lay |
| no. no. | d1-l | 2.lay | ds-l | 2.lay | wk-l | 2.lay | sigsl | 2.lay | asl | 2.lay |
| | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [MPa] | [MPa] | [cm2/m] | [cm2/m] |
| default | 50.0 | 66.0 | 16 | 16 | - | - | - | - | - | - |
| | 50.0 | 66.0 | 16 | 16 | - | - | - | - | - | - |

distance upper / lower distance center of bar to surface
bar-diameter upper / lower bar diameter
crackwidth upper / lower required crack width
steelstress upper / lower maximum steel stress in SLS check
min.reinf. upper / lower minimum reinforcement

The reinforcement directions relate to the local coordinate system of
the elements and have to be plotted graphically.

The reinforcement is saved in the data base as reinforcement distribution number 1

Required Reinforcements acc. to EuroNorm: EN 1992-1-1:2004 Design of concrete structures

| Grp | Element | t | asu | asu2 | asu3 | asl | asl2 | asl3 | supp | shear | ass |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | [m] | [cm2/m] | [cm2/m] | [cm2/m] | [cm2/m] | [cm2/m] | [cm2/m] | [-] | [-] | [cm2/m2] |
| 2 | 20226 | 0.600 | 9.33 | 8.69 | | | | | | 2 | 58.74 |
| 3 | 32395 | 0.450 | 53.98 | 29.69 | | 27.97 | 15.84 | | 0.00 | 1 | |
| 4 | 40101 | 0.450 | 38.68 | 11.95 | | 37.61 | 14.41 | | 0.00 | 1 | |
| 6 | 60289 | 0.250 | 28.29 | 40.54 | | 27.41 | 39.62 | | 0.74 | 2m | 8.76 |

Grp primary group number
Element element number
t plate thickness
asu Principal reinforcements (1st layer) Top
asu2 Cross reinforcements (2nd layer) Top
asu3 Third reinforcements Top
asl Principal reinforcements (1st layer) Bottom
asl2 Cross reinforcements (2nd layer) Bottom
asl3 Third reinforcements Bottom
supp reduction factor for the shear force near supports, punc=point in punching zone -> punching shear design
shear shear zone: 1=Ok, punc=punching area, 1s=asu/l increased for shear, 1d=for punching, 2=required ass, 2m=minimum shear reinf., 3=
ass Shear reinforcement
Elements with maximum values are printed. You can select an element with ELEM.

Maximum reinforcement: reinforcement distribution number 1

| Grp | Element | asu | asu2 | asu3 | asl | asl2 | asl3 | ass |
|---|---|---|---|---|---|---|---|---|

| | | [cm2/m] | [cm2/m] | [cm2/m] | [cm2/m] | [cm2/m] | [cm2/m] | [cm2/m2] |
|---|---|---|---|---|---|---|---|---|
| 1 | 10001 | 5.25 | | | 14.55 | 0.32 | | |
| 1 | 10002 | 5.78 | | | 13.91 | 0.56 | | |
| 1 | 10003 | 6.39 | | | 12.42 | | | |
| 1 | 10004 | 6.35 | | | 10.80 | | | |
| 1 | 10005 | 5.97 | | | 9.13 | | | |
| 1 | 10006 | 5.39 | | | 7.54 | | | 8.76 |
| 1 | 10007 | 4.70 | | | 6.42 | | | 8.76 |
| 1 | 10008 | 3.98 | | | 5.55 | | | 8.76 |
| 1 | 10009 | 3.52 | | | 5.40 | | | 8.76 |
| 1 | 10010 | 3.11 | | | 5.41 | | | 8.76 |
| 1 | 10011 | 2.85 | | | 5.40 | | | 8.76 |
| 1 | 10012 | 2.62 | | | 5.34 | | | 8.76 |
| 1 | 10013 | 2.46 | | | 5.24 | | | |
| 1 | 10014 | 2.33 | | | 5.14 | | | |
| 1 | 10015 | 2.18 | | | 5.11 | | | |
| 1 | 10016 | 1.93 | | | 5.32 | | | |
| 1 | 10017 | 1.67 | | | 5.71 | | | |
| 1 | 10018 | 1.05 | | | 6.83 | | | |
| 1 | 10019 | 11.19 | | | 19.42 | 6.11 | | |
| 1 | 10020 | 10.89 | | | 13.83 | 5.14 | | 8.76 |
| 1 | 10021 | 12.35 | 1.42 | | 11.37 | 4.02 | | |
| 1 | 10022 | 11.86 | 2.32 | | 10.05 | 2.17 | | |
| 1 | 10023 | 11.46 | 2.25 | | 8.70 | | | |
| 1 | 10024 | 10.49 | 1.35 | | 6.02 | | | |
| 1 | 10025 | 8.02 | | | 4.14 | | | |
| 1 | 10026 | 5.87 | | | 2.86 | | | |
| 1 | 10027 | 4.61 | | | 2.04 | | | |
| 1 | 10028 | 3.71 | | | 1.49 | | | |
| 1 | 10029 | 3.02 | | | 1.11 | | | |
| 1 | 10030 | 2.52 | | | 0.92 | | | |
| 1 | 10031 | 2.20 | | | 0.91 | | | |
| 1 | 10032 | 1.99 | | | 1.00 | | | |
| 1 | 10033 | 1.80 | | | 1.17 | | | |
| 1 | 10034 | 1.62 | | | 1.39 | | | |
| 1 | 10035 | 1.41 | | | 1.48 | | | |
| 1 | 10036 | 1.28 | | | 0.99 | | | |
| 1 | 10037 | 13.67 | | | 19.20 | 6.36 | | |
| 1 | 10038 | 12.82 | 1.17 | | 14.69 | 6.47 | | 8.76 |
| 1 | 10039 | 12.31 | 2.67 | | 10.51 | 3.82 | | |
| 1 | 10040 | 10.98 | 4.07 | | 7.80 | 2.44 | | |
| 1 | 10041 | 10.27 | 4.81 | | 5.91 | 0.65 | | |
| 1 | 10042 | 9.67 | 4.71 | | 3.50 | | | |
| 1 | 10043 | 9.02 | 3.80 | | 1.68 | | | |
| 1 | 10044 | 8.11 | 2.41 | | 0.38 | | | |
| 1 | 10045 | 6.54 | 0.69 | | | | | |
| 1 | 10046 | 4.39 | | | | | | |
| 1 | 10047 | 2.86 | | | | | | |
| 1 | 10048 | 2.17 | | | | | | |
| 1 | 10049 | 1.74 | | | | | | |
| 1 | 10050 | 1.48 | | | | | | |
| 1 | 10051 | 1.31 | | | | | | |
| 1 | 10052 | 1.16 | | | | | | |
| 1 | 10053 | 1.02 | | | | | | |
| 1 | 10054 | 0.99 | | | | | | |
| 1 | 10055 | 14.33 | 0.47 | | 16.58 | 7.45 | | |
| 1 | 10056 | 12.92 | 2.14 | | 14.52 | 6.80 | | 8.76 |
| 1 | 10057 | 12.49 | 3.21 | | 11.66 | 4.90 | | |
| 1 | 10058 | 11.08 | 4.41 | | 7.63 | 2.23 | | |
| 1 | 10059 | 9.61 | 5.38 | | 4.11 | 0.29 | | |
| 1 | 10060 | 8.72 | 6.01 | | 1.60 | | | |
| 1 | 10061 | 7.99 | 5.89 | | 0.06 | | | |
| 1 | 10062 | 7.30 | 5.20 | | | | | |
| 1 | 10063 | 6.41 | 3.99 | | | | | |
| 1 | 10064 | 5.51 | 2.43 | | | | | |
| 1 | 10065 | 4.40 | 0.55 | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 10066 | 2.04 | | | | | | |
| 1 | 10067 | 1.15 | | | | | | |
| 1 | 10068 | 0.75 | | | | | | |
| 1 | 10069 | 0.49 | | | | | | |
| 1 | 10070 | 0.33 | | | | | | |
| 1 | 10071 | 0.12 | | | | | | |
| 1 | 10072 | | | | | | | |
| 1 | 10073 | 13.53 | 1.42 | | 14.21 | 8.24 | | |
| 1 | 10074 | 12.35 | 2.67 | | 13.85 | 7.31 | | 8.76 |
| 1 | 10075 | 11.89 | 3.58 | | 11.59 | 5.62 | | 8.76 |
| 1 | 10076 | 10.69 | 4.12 | | 8.44 | 3.32 | | 8.76 |
| 1 | 10077 | 9.55 | 5.41 | | 4.63 | 1.10 | | |
| 1 | 10078 | 8.10 | 6.45 | | 1.45 | | | |
| 1 | 10079 | 7.26 | 6.89 | | | | | |
| 1 | 10080 | 6.66 | 6.82 | | | | | |
| 1 | 10081 | 6.07 | 6.17 | | | | | |
| 1 | 10082 | 5.32 | 5.09 | | | | | |
| 1 | 10083 | 4.35 | 3.62 | | | | | |
| 1 | 10084 | 3.11 | 1.77 | | | | | |
| 1 | 10085 | 1.42 | | | | | | |
| 1 | 10086 | 0.18 | | | | | | |
| 1 | 10087 | | | | | | | |
| 1 | 10088 | | | | | | | 8.76 |
| 1 | 10089 | | | | 2.02 | | | 8.76 |
| 1 | 10090 | | | | 6.16 | 3.53 | | |
| 1 | 10091 | 1.07 | | | 6.83 | | | |
| 1 | 10092 | 1.72 | | | 5.64 | | | |
| 1 | 10093 | 2.00 | | | 5.26 | | | |
| 1 | 10094 | 2.20 | | | 5.11 | | | |
| 1 | 10095 | 2.33 | | | 5.16 | | | |
| 1 | 10096 | 2.46 | | | 5.28 | | | |
| 1 | 10097 | 2.64 | | | 5.36 | | | 8.76 |
| 1 | 10098 | 2.90 | | | 5.39 | | | 8.76 |
| 1 | 10099 | 3.31 | | | 5.35 | | | 8.76 |
| 1 | 10100 | 3.76 | | | 5.29 | | | 8.76 |
| 1 | 10101 | 4.22 | | | 5.39 | | | 8.76 |
| 1 | 10102 | 4.65 | | | 5.96 | | | 8.76 |
| 1 | 10103 | 5.05 | | | 6.59 | | | 8.76 |
| 1 | 10104 | 5.39 | | | 7.29 | | | 8.76 |
| 1 | 10105 | 1.29 | | | 1.01 | | | |
| 1 | 10106 | 1.42 | | | 1.46 | | | |
| 1 | 10107 | 1.64 | | | 1.33 | | | |
| 1 | 10108 | 1.83 | | | 1.09 | | | |
| 1 | 10109 | 2.03 | | | 0.80 | | | |
| 1 | 10110 | 2.28 | | | 0.68 | | | |
| 1 | 10111 | 2.65 | | | 0.81 | | | |
| 1 | 10112 | 3.23 | | | 1.01 | | | |
| 1 | 10113 | 3.98 | | | 1.38 | | | |
| 1 | 10114 | 4.86 | | | 1.90 | | | |
| 1 | 10115 | 5.82 | | | 2.54 | | | |
| 1 | 10116 | 7.45 | | | 3.32 | | | |
| 1 | 10117 | 9.18 | 0.75 | | 4.28 | | | |
| 1 | 10118 | 10.81 | 1.65 | | 5.48 | | | |
| 1 | 10119 | 0.99 | | | | | | |
| 1 | 10120 | 1.03 | | | | | | |
| 1 | 10121 | 1.17 | | | | | | |
| 1 | 10122 | 1.33 | | | | | | |
| 1 | 10123 | 1.51 | | | | | | |
| 1 | 10124 | 1.82 | | | | | | |
| 1 | 10125 | 2.31 | | | | | | |
| 1 | 10126 | 3.11 | | | | | | |
| 1 | 10127 | 5.11 | | | | | | |
| 1 | 10128 | 6.72 | 1.29 | | | | | |
| 1 | 10129 | 8.13 | 2.74 | | | | | |
| 1 | 10130 | 8.90 | 3.80 | | 0.77 | | | |
| 1 | 10131 | 9.31 | 4.54 | | 1.71 | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 10132 | 9.70 | 5.06 | | 2.84 | | | |
| 1 | 10133 | | | | | | | |
| 1 | 10134 | 0.14 | | | | | | |
| 1 | 10135 | 0.33 | | | | | | |
| 1 | 10136 | 0.50 | | | | | | |
| 1 | 10137 | 0.79 | | | | | | |
| 1 | 10138 | 1.26 | | | | | | |
| 1 | 10139 | 2.70 | | | | | | |
| 1 | 10140 | 4.65 | 1.27 | | | | | |
| 1 | 10141 | 5.75 | 3.14 | | | | | |
| 1 | 10142 | 6.59 | 4.59 | | | | | |
| 1 | 10143 | 7.34 | 5.60 | | | | | |
| 1 | 10144 | 7.85 | 6.18 | | | | | |
| 1 | 10145 | 8.27 | 6.41 | | | | | |
| 1 | 10146 | 8.75 | 6.38 | | 1.04 | | | |
| 1 | 10147 | | | | 5.86 | 3.21 | | |
| 1 | 10148 | | | | 1.57 | | | 8.76 |
| 1 | 10149 | | | | | | | 8.76 |
| 1 | 10150 | | | | | | | |
| 1 | 10151 | 0.26 | | | | | | |
| 1 | 10152 | 2.11 | 0.28 | | | | | |
| 1 | 10153 | 3.33 | 2.39 | | | | | |
| 1 | 10154 | 4.59 | 4.31 | | | | | |
| 1 | 10155 | 5.51 | 5.77 | | | | | |
| 1 | 10156 | 6.23 | 6.73 | | | | | |
| 1 | 10157 | 6.72 | 7.27 | | | | | |
| 1 | 10158 | 7.11 | 7.38 | | | | | |
| 1 | 10159 | 7.55 | 7.21 | | 0.01 | | | |
| 1 | 10160 | 8.11 | 6.84 | | 1.20 | | | |
| 1 | 10161 | 4.92 | | | 14.33 | 0.32 | | |
| 1 | 10162 | 10.96 | | | 17.64 | 5.70 | | |
| 1 | 10163 | 13.43 | | | 17.40 | 6.65 | | |
| 1 | 10164 | 13.94 | 0.96 | | 15.15 | 7.73 | | |
| 1 | 10165 | 13.08 | 1.78 | | 13.82 | 8.38 | | |
| 1 | 10166 | 6.36 | | | 12.46 | | | |
| 1 | 10167 | 12.39 | 1.33 | | 11.35 | 4.06 | | |
| 1 | 10168 | 12.86 | 2.48 | | 11.43 | 4.74 | | |
| 1 | 10169 | 12.87 | 3.13 | | 12.30 | 5.66 | | 8.76 |
| 1 | 10170 | 12.13 | 3.54 | | 12.02 | 6.09 | | 8.76 |
| 1 | 10171 | 6.31 | | | 10.41 | | | |
| 1 | 10172 | 11.91 | 2.68 | | 9.60 | 1.83 | | |
| 1 | 10173 | 11.04 | 4.37 | | 7.24 | 2.03 | | |
| 1 | 10174 | 11.18 | 4.45 | | 7.55 | 2.42 | | |
| 1 | 10175 | 10.69 | 4.50 | | 8.21 | 3.21 | | 8.76 |
| 1 | 10176 | 5.79 | | | 8.69 | | | |
| 1 | 10177 | 11.39 | 2.47 | | 7.56 | | | |
| 1 | 10178 | 10.22 | 5.15 | | 5.07 | 0.01 | | |
| 1 | 10179 | 9.50 | 5.85 | | 2.97 | | | |
| 1 | 10180 | 9.02 | 5.93 | | 4.01 | 0.44 | | |
| 1 | 10181 | 12.86 | 1.94 | | 13.24 | 8.47 | | |
| 1 | 10182 | 11.86 | 2.98 | | 13.08 | 7.39 | | 8.76 |
| 1 | 10183 | 11.32 | 3.76 | | 11.28 | 5.79 | | 8.76 |
| 1 | 10184 | 10.26 | 4.23 | | 8.49 | 3.71 | | 8.76 |
| 1 | 10185 | 9.22 | 5.77 | | 5.31 | 1.90 | | |
| 1 | 10186 | 7.81 | 6.59 | | 2.30 | 0.26 | | |
| 1 | 10187 | 6.91 | 7.28 | | 0.07 | | | |
| 1 | 10188 | 6.41 | 7.56 | | | | | |
| 1 | 10189 | 5.89 | 7.26 | | | | | |
| 1 | 10190 | 5.25 | 6.49 | | | | | |
| 1 | 10191 | 4.43 | 5.33 | | | | | |
| 1 | 10192 | 3.36 | 3.80 | | | | | |
| 1 | 10193 | 2.13 | 2.08 | | | | | |
| 1 | 10194 | 0.76 | 0.13 | | | | | |
| 1 | 10195 | | | | | | | 8.76 |
| 1 | 10196 | | | | | | | 8.76 |
| 1 | 10197 | | | | 3.15 | | | 8.92 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 10198 | 0.06 | | | 12.97 | 5.20 | | |
| 1 | 10199 | 12.41 | 2.13 | | 12.96 | 8.81 | | |
| 1 | 10200 | 11.50 | 3.10 | | 12.65 | 7.60 | | 8.76 |
| 1 | 10201 | 10.94 | 3.82 | | 10.99 | 5.80 | | 8.76 |
| 1 | 10202 | 9.98 | 4.26 | | 8.38 | 3.82 | | 8.76 |
| 1 | 10203 | 9.00 | 5.65 | | 5.49 | 2.22 | | |
| 1 | 10204 | 7.65 | 6.58 | | 2.78 | 0.62 | | |
| 1 | 10205 | 6.78 | 7.36 | | 0.35 | | | |
| 1 | 10206 | 6.29 | 7.78 | | | | | |
| 1 | 10207 | 5.81 | 7.63 | | | | | |
| 1 | 10208 | 5.25 | 7.01 | | | | | |
| 1 | 10209 | 4.53 | 5.99 | | | | | |
| 1 | 10210 | 3.60 | 4.61 | | | | | |
| 1 | 10211 | 2.56 | 3.03 | | | | | |
| 1 | 10212 | 1.41 | 1.21 | | | | | |
| 1 | 10213 | | | | | | | 8.76 |
| 1 | 10214 | | | | | | | 8.76 |
| 1 | 10215 | | | | 2.80 | 0.43 | | 8.76 |
| 1 | 10216 | | | | 8.60 | 6.59 | | |
| 1 | 10217 | 11.97 | 2.27 | | 12.59 | 8.97 | | |
| 1 | 10218 | 11.12 | 3.19 | | 12.31 | 7.53 | | 8.76 |
| 1 | 10219 | 10.55 | 3.87 | | 10.71 | 5.82 | | 8.76 |
| 1 | 10220 | 9.69 | 4.29 | | 8.39 | 3.92 | | 8.76 |
| 1 | 10221 | 8.77 | 5.53 | | 5.61 | 2.48 | | |
| 1 | 10222 | 7.49 | 6.56 | | 3.30 | 1.00 | | |
| 1 | 10223 | 6.67 | 7.47 | | 0.70 | | | |
| 1 | 10224 | 6.17 | 7.95 | | | | | |
| 1 | 10225 | 5.75 | 7.93 | | | | | |
| 1 | 10226 | 5.26 | 7.43 | | | | | |
| 1 | 10227 | 4.65 | 6.54 | | | | | |
| 1 | 10228 | 3.89 | 5.29 | | | | | |
| 1 | 10229 | 3.05 | 3.82 | | | | | |
| 1 | 10230 | 2.17 | 2.12 | | | | | |
| 1 | 10231 | 0.95 | | | | | | 8.76 |
| 1 | 10232 | | | | | | | 8.76 |
| 1 | 10233 | | | | 1.16 | 0.74 | | 8.76 |
| 1 | 10234 | | | | 1.23 | 5.46 | | |
| 1 | 10235 | 11.54 | 2.39 | | 12.20 | 9.11 | | |
| 1 | 10236 | 10.74 | 3.26 | | 11.94 | 7.59 | | 8.76 |
| 1 | 10237 | 10.14 | 3.90 | | 10.43 | 5.83 | | 8.76 |
| 1 | 10238 | 9.37 | 4.31 | | 8.24 | 3.99 | | 8.76 |
| 1 | 10239 | 8.53 | 5.40 | | 5.70 | 2.69 | | |
| 1 | 10240 | 7.78 | 6.52 | | 3.53 | 1.30 | | |
| 1 | 10241 | 6.55 | 7.52 | | 1.07 | | | |
| 1 | 10242 | 6.06 | 8.07 | | | | | |
| 1 | 10243 | 5.70 | 8.15 | | | | | |
| 1 | 10244 | 5.29 | 7.77 | | | | | |
| 1 | 10245 | 4.79 | 6.99 | | | | | |
| 1 | 10246 | 4.19 | 5.84 | | | | | |
| 1 | 10247 | 3.55 | 4.46 | | | | | |
| 1 | 10248 | 2.90 | 2.80 | | | | | |
| 1 | 10249 | 2.24 | 0.83 | | | | | 8.76 |
| 1 | 10250 | 0.35 | | | | | | 8.76 |
| 1 | 10251 | | | | | | | 8.76 |
| 1 | 10252 | | | | | 1.71 | | |
| 1 | 10253 | 11.13 | 2.49 | | 11.82 | 9.22 | | |
| 1 | 10254 | 10.37 | 3.32 | | 11.57 | 7.64 | | 8.76 |
| 1 | 10255 | 9.73 | 3.91 | | 10.13 | 5.81 | | 8.76 |
| 1 | 10256 | 9.05 | 4.33 | | 8.06 | 4.04 | | 8.76 |
| 1 | 10257 | 8.38 | 5.28 | | 5.77 | 2.86 | | |
| 1 | 10258 | 7.60 | 6.47 | | 3.71 | 1.54 | | |
| 1 | 10259 | 6.44 | 7.53 | | 1.46 | 0.25 | | |
| 1 | 10260 | 5.96 | 8.15 | | | | | |
| 1 | 10261 | 5.64 | 8.32 | | | | | |
| 1 | 10262 | 5.31 | 8.03 | | | | | |
| 1 | 10263 | 4.92 | 7.33 | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 10264 | 4.48 | 6.26 | | | | | |
| 1 | 10265 | 4.01 | 4.94 | | | | | |
| 1 | 10266 | 3.54 | 3.32 | | | | | |
| 1 | 10267 | 3.03 | 1.39 | | | | | |
| 1 | 10268 | 1.60 | | | | | | 8.76 |
| 1 | 10269 | 0.18 | | | | | | 8.76 |
| 1 | 10270 | | | | | | | |
| 1 | 10271 | 10.79 | 2.58 | | 11.47 | 9.32 | | |
| 1 | 10272 | 10.21 | 3.36 | | 11.26 | 7.66 | | 8.76 |
| 1 | 10273 | 9.49 | 3.92 | | 9.86 | 5.78 | | 8.76 |
| 1 | 10274 | 8.86 | 4.34 | | 7.86 | 4.06 | | 8.76 |
| 1 | 10275 | 8.14 | 5.14 | | 5.81 | 2.99 | | |
| 1 | 10276 | 7.42 | 6.40 | | 3.93 | 1.74 | | |
| 1 | 10277 | 6.32 | 7.52 | | 1.83 | 0.50 | | |
| 1 | 10278 | 5.85 | 8.18 | | | | | |
| 1 | 10279 | 5.59 | 8.43 | | | | | |
| 1 | 10280 | 5.32 | 8.21 | | | | | |
| 1 | 10281 | 5.04 | 7.59 | | | | | |
| 1 | 10282 | 4.73 | 6.59 | | | | | |
| 1 | 10283 | 4.41 | 5.31 | | | | | |
| 1 | 10284 | 4.07 | 3.75 | | | | | |
| 1 | 10285 | 3.62 | 1.92 | | | | | |
| 1 | 10286 | 2.74 | | | | | | |
| 1 | 10287 | 1.21 | | | | | | |
| 1 | 10288 | 0.74 | | | | | | |
| 1 | 10289 | 10.39 | 2.64 | | 11.10 | 9.41 | | |
| 1 | 10290 | 9.87 | 3.40 | | 10.87 | 7.67 | | 8.76 |
| 1 | 10291 | 9.01 | 3.92 | | 9.52 | 5.73 | | 8.76 |
| 1 | 10292 | 8.55 | 4.35 | | 7.64 | 4.05 | | 8.76 |
| 1 | 10293 | 7.89 | 4.99 | | 5.81 | 3.10 | | |
| 1 | 10294 | 7.22 | 6.31 | | 4.08 | 1.89 | | |
| 1 | 10295 | 6.19 | 7.49 | | 2.18 | 0.70 | | |
| 1 | 10296 | 5.76 | 8.22 | | 0.05 | | | |
| 1 | 10297 | 5.52 | 8.48 | | | | | |
| 1 | 10298 | 5.32 | 8.33 | | | | | |
| 1 | 10299 | 5.13 | 7.76 | | | | | |
| 1 | 10300 | 4.92 | 6.81 | | | | | |
| 1 | 10301 | 4.72 | 5.59 | | | | | |
| 1 | 10302 | 4.47 | 4.11 | | | | | |
| 1 | 10303 | 4.08 | 2.45 | | | | | |
| 1 | 10304 | 3.49 | 0.74 | | | | | |
| 1 | 10305 | 2.10 | | | | | | |
| 1 | 10306 | 1.78 | | | | | | |
| 1 | 10307 | 10.01 | 2.70 | | 10.75 | 9.49 | | |
| 1 | 10308 | 9.53 | 3.43 | | 10.48 | 7.65 | | 8.76 |
| 1 | 10309 | 8.59 | 3.92 | | 9.17 | 5.69 | | 8.76 |
| 1 | 10310 | 8.23 | 4.35 | | 7.40 | 4.04 | | 8.76 |
| 1 | 10311 | 7.64 | 4.84 | | 5.79 | 3.19 | | |
| 1 | 10312 | 7.03 | 6.22 | | 4.17 | 2.00 | | |
| 1 | 10313 | 6.02 | 7.44 | | 2.39 | 0.86 | | |
| 1 | 10314 | 5.65 | 8.22 | | 0.30 | | | |
| 1 | 10315 | 5.44 | 8.50 | | | | | |
| 1 | 10316 | 5.30 | 8.39 | | | | | |
| 1 | 10317 | 5.17 | 7.87 | | | | | |
| 1 | 10318 | 5.06 | 6.97 | | | | | |
| 1 | 10319 | 4.94 | 5.81 | | | | | |
| 1 | 10320 | 4.75 | 4.43 | | | | | |
| 1 | 10321 | 4.44 | 2.94 | | | | | |
| 1 | 10322 | 3.93 | 1.36 | | | | | |
| 1 | 10323 | 3.21 | 0.49 | | | | | |
| 1 | 10324 | 2.58 | 0.20 | | | | | |
| 1 | 10325 | 9.64 | 2.75 | | 10.38 | 9.56 | | |
| 1 | 10326 | 9.20 | 3.45 | | 10.09 | 7.63 | | 8.76 |
| 1 | 10327 | 8.33 | 3.91 | | 8.85 | 5.65 | | 8.76 |
| 1 | 10328 | 7.91 | 4.35 | | 7.16 | 4.05 | | 8.76 |
| 1 | 10329 | 7.38 | 4.70 | | 5.74 | 3.25 | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 10330 | 6.78 | 6.12 | | 4.22 | 2.09 | | |
| 1 | 10331 | 5.74 | 7.37 | | 2.50 | 1.01 | | |
| 1 | 10332 | 5.52 | 8.18 | | 0.57 | | | |
| 1 | 10333 | 5.33 | 8.48 | | | | | |
| 1 | 10334 | 5.24 | 8.40 | | | | | |
| 1 | 10335 | 5.18 | 7.92 | | | | | |
| 1 | 10336 | 5.13 | 7.06 | | | | | |
| 1 | 10337 | 5.07 | 5.97 | | | | | |
| 1 | 10338 | 4.95 | 4.70 | | | | | |
| 1 | 10339 | 4.67 | 3.23 | | | | | |
| 1 | 10340 | 4.29 | 2.02 | | | | | |
| 1 | 10341 | 3.81 | 1.17 | | | | | |
| 1 | 10342 | 3.30 | 0.79 | | | | | |
| 1 | 10343 | 9.29 | 2.79 | | 10.05 | 9.62 | | |
| 1 | 10344 | 8.88 | 3.46 | | 9.67 | 7.36 | | 8.76 |
| 1 | 10345 | 8.08 | 3.91 | | 8.52 | 5.62 | | 8.76 |
| 1 | 10346 | 7.53 | 4.35 | | 6.97 | 4.11 | | 8.76 |
| 1 | 10347 | 6.99 | 4.72 | | 5.68 | 3.30 | | |
| 1 | 10348 | 6.35 | 6.01 | | 4.25 | 2.15 | | |
| 1 | 10349 | 5.57 | 7.28 | | 2.58 | 1.11 | | |
| 1 | 10350 | 5.38 | 8.13 | | 0.81 | 0.02 | | |
| 1 | 10351 | 5.21 | 8.42 | | | | | |
| 1 | 10352 | 5.15 | 8.37 | | | | | |
| 1 | 10353 | 5.13 | 7.92 | | | | | |
| 1 | 10354 | 5.14 | 7.11 | | | | | |
| 1 | 10355 | 5.13 | 6.08 | | | | | |
| 1 | 10356 | 5.06 | 4.93 | | | | | |
| 1 | 10357 | 4.84 | 3.61 | | | | | |
| 1 | 10358 | 4.55 | 2.64 | | | | | |
| 1 | 10359 | 4.18 | 1.92 | | | | | |
| 1 | 10360 | 3.78 | 1.35 | | | | | |
| 1 | 10361 | 8.95 | 2.83 | | 9.74 | 9.65 | | |
| 1 | 10362 | 8.58 | 3.47 | | 9.32 | 7.35 | | 8.76 |
| 1 | 10363 | 7.84 | 3.90 | | 8.20 | 5.58 | | 8.76 |
| 1 | 10364 | 7.05 | 4.36 | | 6.79 | 4.15 | | 8.76 |
| 1 | 10365 | 6.57 | 4.75 | | 5.60 | 3.33 | | |
| 1 | 10366 | 6.14 | 5.91 | | 4.25 | 2.18 | | |
| 1 | 10367 | 5.39 | 7.18 | | 2.64 | 1.17 | | |
| 1 | 10368 | 5.21 | 8.05 | | 1.01 | 0.12 | | |
| 1 | 10369 | 5.09 | 8.40 | | | | | |
| 1 | 10370 | 5.03 | 8.31 | | | | | |
| 1 | 10371 | 5.04 | 7.89 | | | | | |
| 1 | 10372 | 5.08 | 7.11 | | | | | |
| 1 | 10373 | 5.12 | 6.15 | | | | | |
| 1 | 10374 | 5.07 | 5.02 | | | | | |
| 1 | 10375 | 4.93 | 3.92 | | | | | |
| 1 | 10376 | 4.73 | 3.22 | | | | | |
| 1 | 10377 | 4.44 | 2.54 | | | | | |
| 1 | 10378 | 4.13 | 2.08 | | | | | |
| 1 | 10379 | 8.63 | 2.86 | | 9.55 | 9.65 | | |
| 1 | 10380 | 8.29 | 3.41 | | 8.98 | 7.33 | | 8.76 |
| 1 | 10381 | 7.60 | 3.89 | | 7.88 | 5.52 | | 8.76 |
| 1 | 10382 | 6.80 | 4.36 | | 6.62 | 4.19 | | 8.76 |
| 1 | 10383 | 6.48 | 4.93 | | 5.51 | 3.35 | | |
| 1 | 10384 | 6.24 | 5.80 | | 4.24 | 2.20 | | |
| 1 | 10385 | 5.43 | 7.11 | | 2.68 | 1.22 | | |
| 1 | 10386 | 5.03 | 7.96 | | 1.18 | 0.19 | | |
| 1 | 10387 | 4.93 | 8.33 | | | | | |
| 1 | 10388 | 4.87 | 8.23 | | | | | |
| 1 | 10389 | 4.90 | 7.82 | | | | | |
| 1 | 10390 | 4.97 | 7.08 | | | | | |
| 1 | 10391 | 5.03 | 6.14 | | | | | |
| 1 | 10392 | 5.02 | 5.09 | | | | | |
| 1 | 10393 | 4.97 | 4.25 | | | | | |
| 1 | 10394 | 4.82 | 3.61 | | | | | |
| 1 | 10395 | 4.61 | 3.04 | | | | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 10396 | 4.38 | 2.67 | | | | | |
| 1 | 10397 | 8.34 | 2.89 | | 9.26 | 9.64 | | |
| 1 | 10398 | 8.01 | 3.42 | | 8.66 | 7.31 | | 8.76 |
| 1 | 10399 | 7.37 | 3.88 | | 7.58 | 5.46 | | 8.76 |
| 1 | 10400 | 6.82 | 4.54 | | 6.45 | 4.21 | | 8.76 |
| 1 | 10401 | 6.62 | 5.12 | | 5.41 | 3.36 | | |
| 1 | 10402 | 6.42 | 6.07 | | 4.22 | 2.32 | | |
| 1 | 10403 | 5.77 | 7.46 | | 2.72 | 1.24 | | |
| 1 | 10404 | 5.25 | 8.31 | | 1.31 | 0.24 | | |
| 1 | 10405 | 5.02 | 8.54 | | | | | |
| 1 | 10406 | 4.75 | 8.21 | | | | | |
| 1 | 10407 | 4.71 | 7.73 | | | | | |
| 1 | 10408 | 4.79 | 7.02 | | | | | |
| 1 | 10409 | 4.88 | 6.13 | | | | | |
| 1 | 10410 | 4.92 | 5.16 | | | | | |
| 1 | 10411 | 4.92 | 4.43 | | | | | |
| 1 | 10412 | 4.83 | 3.90 | | | | | |
| 1 | 10413 | 4.70 | 3.43 | | | | | |
| 1 | 10414 | 4.54 | 3.15 | | | | | |
| 1 | 10415 | 8.05 | 2.91 | | 8.99 | 9.60 | | |
| 1 | 10416 | 7.75 | 3.42 | | 8.44 | 7.27 | | 8.76 |
| 1 | 10417 | 7.16 | 4.04 | | 7.28 | 5.39 | | 8.76 |
| 1 | 10418 | 6.82 | 4.72 | | 6.28 | 4.23 | | 8.76 |
| 1 | 10419 | 6.72 | 5.31 | | 5.31 | 3.36 | | |
| 1 | 10420 | 6.56 | 6.35 | | 4.12 | 2.31 | | |
| 1 | 10421 | 5.96 | 7.77 | | 2.73 | 1.24 | | |
| 1 | 10422 | 5.46 | 8.65 | | 1.40 | 0.26 | | |
| 1 | 10423 | 5.26 | 8.92 | | 0.18 | | | |
| 1 | 10424 | 5.05 | 8.66 | | | | | |
| 1 | 10425 | 4.81 | 7.96 | | | | | |
| 1 | 10426 | 4.66 | 7.01 | | | | | |
| 1 | 10427 | 4.67 | 6.14 | | | | | |
| 1 | 10428 | 4.79 | 5.24 | | | | | |
| 1 | 10429 | 4.81 | 4.65 | | | | | |
| 1 | 10430 | 4.78 | 4.11 | | | | | |
| 1 | 10431 | 4.72 | 3.73 | | | | | |
| 1 | 10432 | 4.62 | 3.52 | | | | | |
| 1 | 10433 | 7.79 | 2.95 | | 8.80 | 9.56 | | |
| 1 | 10434 | 7.50 | 3.52 | | 8.29 | 7.22 | | 8.76 |
| 1 | 10435 | 7.05 | 4.21 | | 7.25 | 5.31 | | 8.76 |
| 1 | 10436 | 6.80 | 4.88 | | 6.12 | 4.24 | | 8.76 |
| 1 | 10437 | 6.91 | 5.68 | | 5.20 | 3.35 | | |
| 1 | 10438 | 6.95 | 7.16 | | 4.01 | 2.18 | | |
| 1 | 10439 | 6.57 | 8.44 | | 2.71 | 1.23 | | |
| 1 | 10440 | 6.23 | 9.36 | | 1.45 | 0.27 | | |
| 1 | 10441 | 5.46 | 9.27 | | 0.30 | | | |
| 1 | 10442 | 5.27 | 9.05 | | | | | |
| 1 | 10443 | 5.05 | 8.36 | | | | | |
| 1 | 10444 | 4.91 | 7.44 | | | | | |
| 1 | 10445 | 4.87 | 6.64 | | | | | |
| 1 | 10446 | 4.84 | 5.36 | | | | | |
| 1 | 10447 | 4.64 | 4.68 | | | | | |
| 1 | 10448 | 4.66 | 4.22 | | | | | |
| 1 | 10449 | 4.66 | 3.92 | | | | | |
| 1 | 10450 | 4.62 | 3.78 | | | | | |
| 1 | 10451 | 7.60 | 3.08 | | 8.59 | 9.51 | | |
| 1 | 10452 | 7.28 | 3.67 | | 8.00 | 7.17 | | 8.76 |
| 1 | 10453 | 6.99 | 4.35 | | 7.00 | 5.23 | | 8.76 |
| 1 | 10454 | 6.81 | 5.06 | | 5.96 | 4.25 | | 8.76 |
| 1 | 10455 | 6.98 | 5.84 | | 5.00 | 3.34 | | |
| 1 | 10456 | 7.03 | 7.29 | | 3.88 | 2.15 | | |
| 1 | 10457 | 6.68 | 8.72 | | 2.70 | 1.21 | | |
| 1 | 10458 | 6.38 | 9.69 | | 1.48 | 0.26 | | |
| 1 | 10459 | 6.01 | 10.01 | | 0.41 | | | |
| 1 | 10460 | 5.63 | 9.80 | | | | | |
| 1 | 10461 | 5.29 | 8.82 | | | | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 10462 | 5.16 | 7.83 | | | | | |
| 1 | 10463 | 5.05 | 6.81 | | | | | |
| 1 | 10464 | 5.00 | 5.73 | | | | | |
| 1 | 10465 | 4.75 | 4.98 | | | | | |
| 1 | 10466 | 4.63 | 4.30 | | | | | |
| 1 | 10467 | 4.54 | 4.02 | | | 0.05 | | |
| 1 | 10468 | 4.46 | 4.06 | | | 0.10 | | |
| 1 | 10469 | 7.46 | 3.19 | | 8.35 | 9.35 | | |
| 1 | 10470 | 7.13 | 3.80 | | 7.76 | 7.11 | | 8.76 |
| 1 | 10471 | 6.93 | 4.49 | | 6.68 | 5.23 | | 8.76 |
| 1 | 10472 | 6.81 | 5.20 | | 5.73 | 4.24 | | 8.76 |
| 1 | 10473 | 7.02 | 5.99 | | 4.80 | 3.32 | | |
| 1 | 10474 | 7.08 | 7.53 | | 3.76 | 2.11 | | |
| 1 | 10475 | 6.76 | 8.99 | | 2.68 | 1.18 | | |
| 1 | 10476 | 6.48 | 9.98 | | 1.48 | 0.24 | | |
| 1 | 10477 | 6.13 | 10.35 | | 0.41 | | | |
| 1 | 10478 | 5.78 | 10.18 | | | | | |
| 1 | 10479 | 5.45 | 9.58 | | | | | |
| 1 | 10480 | 5.30 | 8.26 | | | | | |
| 1 | 10481 | 5.25 | 7.16 | | | | | |
| 1 | 10482 | 5.16 | 6.00 | | | | | |
| 1 | 10483 | 5.01 | 5.23 | | | | | |
| 1 | 10484 | 4.65 | 4.53 | | | 0.15 | | |
| 1 | 10485 | 4.47 | 4.05 | | | 0.29 | | |
| 1 | 10486 | 4.38 | 4.17 | | | 0.37 | | |
| 1 | 10487 | 7.33 | 3.30 | | 8.04 | 9.27 | | |
| 1 | 10488 | 7.04 | 3.92 | | 7.34 | 6.89 | | 8.76 |
| 1 | 10489 | 6.87 | 4.60 | | 6.47 | 5.24 | | 8.76 |
| 1 | 10490 | 6.81 | 5.33 | | 5.48 | 4.24 | | 8.76 |
| 1 | 10491 | 7.02 | 6.11 | | 4.61 | 3.29 | | |
| 1 | 10492 | 7.10 | 7.74 | | 3.66 | 2.07 | | |
| 1 | 10493 | 6.79 | 9.22 | | 2.65 | 1.13 | | |
| 1 | 10494 | 6.53 | 10.25 | | 1.49 | 0.21 | | |
| 1 | 10495 | 6.20 | 10.65 | | 0.49 | | | |
| 1 | 10496 | 5.87 | 10.53 | | | | | |
| 1 | 10497 | 5.54 | 9.96 | | | | | |
| 1 | 10498 | 5.39 | 8.61 | | | | | |
| 1 | 10499 | 5.32 | 7.54 | | | | | |
| 1 | 10500 | 5.19 | 6.35 | | | | | |
| 1 | 10501 | 4.99 | 5.46 | | | 0.18 | | |
| 1 | 10502 | 4.60 | 4.66 | | | 0.40 | | |
| 1 | 10503 | 4.35 | 4.00 | | | 0.56 | | |
| 1 | 10504 | 4.23 | 4.18 | | | 0.65 | | |
| 1 | 10505 | 7.20 | 3.39 | | 7.84 | 9.19 | | |
| 1 | 10506 | 6.95 | 4.02 | | 7.06 | 6.75 | | 8.76 |
| 1 | 10507 | 6.79 | 4.70 | | 5.99 | 5.24 | | 8.76 |
| 1 | 10508 | 6.80 | 5.43 | | 5.25 | 4.23 | | 8.76 |
| 1 | 10509 | 7.01 | 6.22 | | 4.44 | 3.26 | | |
| 1 | 10510 | 7.09 | 7.93 | | 3.59 | 2.02 | | |
| 1 | 10511 | 6.79 | 9.43 | | 2.62 | 1.08 | | |
| 1 | 10512 | 6.53 | 10.49 | | 1.51 | 0.16 | | |
| 1 | 10513 | 6.21 | 10.93 | | 0.56 | | | |
| 1 | 10514 | 5.89 | 10.84 | | | | | |
| 1 | 10515 | 5.57 | 10.30 | | | | | |
| 1 | 10516 | 5.41 | 9.36 | | | | | |
| 1 | 10517 | 5.31 | 7.82 | | | | | |
| 1 | 10518 | 5.14 | 6.66 | | | 0.08 | | |
| 1 | 10519 | 4.90 | 5.45 | | | 0.41 | | |
| 1 | 10520 | 4.47 | 4.68 | | | 0.65 | | |
| 1 | 10521 | 4.14 | 3.99 | | | 0.82 | | |
| 1 | 10522 | 3.96 | 4.10 | | | 0.92 | | |
| 1 | 10523 | 7.08 | 3.46 | | 7.65 | 9.09 | | |
| 1 | 10524 | 6.86 | 4.11 | | 6.82 | 6.68 | | 8.76 |
| 1 | 10525 | 6.72 | 4.78 | | 6.17 | 4.69 | | 8.76 |
| 1 | 10526 | 6.78 | 5.53 | | 5.05 | 4.21 | | 8.76 |
| 1 | 10527 | 6.96 | 6.31 | | 4.33 | 3.22 | | |

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| 1 | 10528 | 7.04 | 8.09 | | 3.52 | 1.96 | | |
| 1 | 10529 | 6.74 | 9.61 | | 2.59 | 1.02 | | |
| 1 | 10530 | 6.49 | 10.70 | | 1.52 | 0.11 | | |
| 1 | 10531 | 6.17 | 11.18 | | 0.62 | | | |
| 1 | 10532 | 5.85 | 11.13 | | | | | |
| 1 | 10533 | 5.53 | 10.61 | | | | | |
| 1 | 10534 | 5.33 | 9.67 | | | | | |
| 1 | 10535 | 5.21 | 8.50 | | | | | |
| 1 | 10536 | 5.01 | 6.83 | | | 0.27 | | |
| 1 | 10537 | 4.72 | 5.45 | | | 0.63 | | |
| 1 | 10538 | 4.34 | 4.63 | | | 0.90 | | |
| 1 | 10539 | 3.83 | 4.12 | | | 1.09 | | |
| 1 | 10540 | 3.64 | 3.92 | | | 1.20 | | |
| 1 | 10541 | 6.96 | 3.53 | | 7.74 | 9.08 | | |
| 1 | 10542 | 6.77 | 4.18 | | 6.97 | 6.58 | | 8.76 |
| 1 | 10543 | 6.64 | 4.86 | | 5.99 | 4.61 | | 8.76 |
| 1 | 10544 | 6.72 | 5.60 | | 4.87 | 4.19 | | 8.76 |
| 1 | 10545 | 6.89 | 6.39 | | 4.22 | 3.18 | | |
| 1 | 10546 | 6.96 | 8.46 | | 3.45 | 1.90 | | |
| 1 | 10547 | 6.66 | 9.76 | | 2.50 | 0.96 | | |
| 1 | 10548 | 6.40 | 10.88 | | 1.54 | 0.06 | | |
| 1 | 10549 | 6.08 | 11.40 | | 0.68 | | | |
| 1 | 10550 | 5.74 | 11.38 | | | | | |
| 1 | 10551 | 5.41 | 10.89 | | | | | |
| 1 | 10552 | 5.17 | 9.95 | | | | | |
| 1 | 10553 | 5.03 | 8.74 | | | | | |
| 1 | 10554 | 4.80 | 6.95 | | | 0.46 | | |
| 1 | 10555 | 4.47 | 5.55 | | | 0.85 | | |
| 1 | 10556 | 4.02 | 4.48 | | | 1.16 | | |
| 1 | 10557 | 3.51 | 4.07 | | | 1.37 | | |
| 1 | 10558 | 3.23 | 3.78 | | | 1.49 | | |
| 1 | 10559 | 6.85 | 3.59 | | 7.59 | 9.12 | | |
| 1 | 10560 | 6.68 | 4.25 | | 6.79 | 6.49 | | 8.76 |
| 1 | 10561 | 6.56 | 4.92 | | 5.82 | 4.53 | | 8.76 |
| 1 | 10562 | 6.64 | 5.67 | | 4.71 | 3.43 | | 8.76 |
| 1 | 10563 | 6.80 | 6.45 | | 4.12 | 3.13 | | |
| 1 | 10564 | 6.86 | 8.59 | | 3.38 | 1.84 | | |
| 1 | 10565 | 6.54 | 9.89 | | 2.43 | 0.89 | | |
| 1 | 10566 | 6.27 | 11.03 | | 1.55 | | | |
| 1 | 10567 | 5.93 | 11.58 | | 0.74 | | | |
| 1 | 10568 | 5.57 | 11.60 | | 0.08 | | | |
| 1 | 10569 | 5.22 | 11.14 | | | | | |
| 1 | 10570 | 4.93 | 10.20 | | | | | |
| 1 | 10571 | 4.75 | 8.95 | | | 0.13 | | |
| 1 | 10572 | 4.49 | 7.50 | | | 0.63 | | |
| 1 | 10573 | 4.11 | 5.59 | | | 1.08 | | |
| 1 | 10574 | 3.60 | 4.48 | | | 1.42 | | |
| 1 | 10575 | 3.01 | 4.01 | | | 1.66 | | |
| 1 | 10576 | 2.70 | 3.68 | | | 1.79 | | |
| 1 | 10577 | 6.74 | 3.64 | | 7.45 | 9.15 | | |
| 1 | 10578 | 6.59 | 4.30 | | 6.63 | 6.48 | | 8.76 |
| 1 | 10579 | 6.47 | 4.96 | | 5.66 | 4.45 | | 8.76 |
| 1 | 10580 | 6.55 | 5.72 | | 4.58 | 3.41 | | 8.76 |
| 1 | 10581 | 6.67 | 6.50 | | 4.02 | 3.09 | | |
| 1 | 10582 | 6.73 | 8.68 | | 3.29 | 1.77 | | |
| 1 | 10583 | 6.39 | 9.98 | | 2.41 | 0.82 | | |
| 1 | 10584 | 6.10 | 11.14 | | 1.58 | | | |
| 1 | 10585 | 5.72 | 11.72 | | 0.81 | | | |
| 1 | 10586 | 5.34 | 11.78 | | 0.18 | | | |
| 1 | 10587 | 4.95 | 11.35 | | | | | |
| 1 | 10588 | 4.59 | 10.42 | | | | | |
| 1 | 10589 | 4.37 | 9.13 | | | 0.25 | | |
| 1 | 10590 | 4.09 | 7.58 | | | 0.81 | | |
| 1 | 10591 | 3.66 | 5.49 | | | 1.30 | | |
| 1 | 10592 | 3.09 | 4.44 | | | 1.69 | | |
| 1 | 10593 | 2.74 | 3.92 | | | 1.96 | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 10594 | 2.33 | 3.54 | | | 2.11 | | |
| 1 | 10595 | 6.64 | 3.68 | | 7.32 | 9.19 | | |
| 1 | 10596 | 6.50 | 4.34 | | 6.47 | 6.57 | | 8.76 |
| 1 | 10597 | 6.39 | 5.00 | | 5.52 | 4.41 | | 8.76 |
| 1 | 10598 | 6.44 | 5.75 | | 4.46 | 3.88 | | 8.76 |
| 1 | 10599 | 6.54 | 6.54 | | 3.93 | 3.03 | | |
| 1 | 10600 | 6.57 | 8.75 | | 3.14 | 1.70 | | |
| 1 | 10601 | 6.23 | 10.02 | | 2.39 | 0.75 | | |
| 1 | 10602 | 5.89 | 11.22 | | 1.61 | | | |
| 1 | 10603 | 5.48 | 11.83 | | 0.89 | | | |
| 1 | 10604 | 5.04 | 11.92 | | 0.29 | | | |
| 1 | 10605 | 4.57 | 11.45 | | | | | |
| 1 | 10606 | 4.19 | 10.52 | | | | | |
| 1 | 10607 | 3.90 | 9.22 | | | 0.36 | | |
| 1 | 10608 | 3.57 | 7.59 | | | 0.98 | | |
| 1 | 10609 | 3.10 | 5.82 | | | 1.54 | | |
| 1 | 10610 | 2.76 | 4.37 | | | 1.98 | | |
| 1 | 10611 | 2.00 | 3.77 | | | 2.29 | | |
| 1 | 10612 | 1.44 | 3.34 | | | 2.56 | | |
| 1 | 10613 | 6.55 | 3.71 | | 7.19 | 9.22 | | |
| 1 | 10614 | 6.41 | 4.38 | | 6.33 | 6.64 | | 8.76 |
| 1 | 10615 | 6.31 | 5.02 | | 5.38 | 4.40 | | 8.76 |
| 1 | 10616 | 6.32 | 5.78 | | 4.36 | 3.84 | | 8.76 |
| 1 | 10617 | 6.40 | 6.56 | | 3.76 | 2.54 | | |
| 1 | 10618 | 6.40 | 8.79 | | 3.10 | 1.63 | | |
| 1 | 10619 | 6.03 | 10.05 | | 2.39 | 0.67 | | |
| 1 | 10620 | 5.65 | 11.26 | | 1.64 | | | |
| 1 | 10621 | 5.19 | 11.89 | | 0.96 | | | |
| 1 | 10622 | 4.66 | 11.94 | | 0.36 | | | |
| 1 | 10623 | 4.15 | 11.55 | | | | | |
| 1 | 10624 | 3.71 | 10.67 | | | | | |
| 1 | 10625 | 3.29 | 9.06 | | | 0.47 | | |
| 1 | 10626 | 2.94 | 7.02 | | | 1.16 | | |
| 1 | 10627 | 2.38 | 5.06 | | | 2.34 | | 8.76 |
| 1 | 10628 | 1.79 | 4.25 | | | 3.12 | | |
| 1 | 10629 | 0.81 | 3.56 | | | 3.49 | | |
| 1 | 10630 | 0.42 | 3.06 | | | 3.70 | | |
| 1 | 10631 | 6.46 | 3.74 | | 7.08 | 9.24 | | |
| 1 | 10632 | 6.33 | 4.40 | | 6.19 | 6.38 | | 8.76 |
| 1 | 10633 | 6.23 | 5.04 | | 5.19 | 4.38 | | 8.76 |
| 1 | 10634 | 6.18 | 5.79 | | 4.28 | 3.79 | | 8.76 |
| 1 | 10635 | 6.27 | 6.62 | | 3.70 | 2.48 | | |
| 1 | 10636 | 6.21 | 8.80 | | 3.07 | 1.56 | | |
| 1 | 10637 | 5.81 | 10.04 | | 2.39 | 0.59 | | |
| 1 | 10638 | 5.38 | 11.26 | | 1.68 | | | |
| 1 | 10639 | 4.83 | 11.83 | | 1.05 | | | |
| 1 | 10640 | 4.26 | 11.94 | | 0.49 | | | |
| 1 | 10641 | 3.68 | 11.62 | | 0.04 | | | |
| 1 | 10642 | 3.13 | 10.43 | | 0.05 | | | |
| 1 | 10643 | 2.58 | 8.96 | | 0.06 | 0.69 | | |
| 1 | 10644 | 2.13 | 7.05 | | 0.66 | 1.45 | | 8.76 |
| 1 | 10645 | 1.77 | 5.03 | | 1.27 | 3.25 | | 8.76 |
| 1 | 10646 | 0.91 | 3.80 | | 0.71 | 4.77 | | 8.76 |
| 1 | 10647 | 0.44 | 3.27 | | | 5.52 | | 8.76 |
| 1 | 10648 | | 2.66 | | | 5.08 | | |
| 1 | 10649 | 6.37 | 3.75 | | 6.96 | 9.27 | | |
| 1 | 10650 | 6.26 | 4.41 | | 6.07 | 6.43 | | 8.76 |
| 1 | 10651 | 6.15 | 5.04 | | 5.13 | 4.66 | | 8.76 |
| 1 | 10652 | 6.04 | 5.79 | | 4.22 | 3.75 | | 8.76 |
| 1 | 10653 | 6.10 | 6.62 | | 3.66 | 2.51 | | |
| 1 | 10654 | 6.01 | 8.74 | | 3.04 | 1.48 | | |
| 1 | 10655 | 5.57 | 10.00 | | 2.39 | 0.50 | | |
| 1 | 10656 | 5.06 | 11.14 | | 1.72 | | | |
| 1 | 10657 | 4.48 | 11.79 | | 1.13 | | | |
| 1 | 10658 | 3.83 | 11.92 | | 0.61 | | | |
| 1 | 10659 | 3.15 | 11.63 | | 0.22 | | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 10660 | 2.47 | 10.40 | | 0.27 | | | |
| 1 | 10661 | 1.77 | 9.03 | | 1.03 | 0.75 | | |
| 1 | 10662 | 1.33 | 7.08 | | 2.22 | 1.64 | | 8.76 |
| 1 | 10663 | 0.99 | 4.53 | | 2.93 | 3.77 | | 8.76 |
| 1 | 10664 | 0.55 | 3.67 | | 2.61 | 5.73 | | 8.76 |
| 1 | 10665 | | 2.66 | | 1.71 | 7.40 | | 8.76 |
| 1 | 10666 | | 2.24 | | 0.03 | 7.56 | | |
| 1 | 10667 | 6.29 | 3.77 | | 6.85 | 9.27 | | |
| 1 | 10668 | 6.18 | 4.42 | | 6.08 | 6.49 | | |
| 1 | 10669 | 6.07 | 5.04 | | 5.16 | 5.04 | | 8.76 |
| 1 | 10670 | 5.91 | 5.79 | | 4.25 | 3.70 | | 8.76 |
| 1 | 10671 | 5.92 | 6.60 | | 3.62 | 2.44 | | |
| 1 | 10672 | 5.80 | 8.72 | | 3.03 | 1.40 | | |
| 1 | 10673 | 5.58 | 9.93 | | 2.40 | 0.42 | | |
| 1 | 10674 | 4.77 | 11.06 | | 1.76 | | | |
| 1 | 10675 | 4.11 | 11.71 | | 1.20 | | | |
| 1 | 10676 | 3.38 | 11.84 | | 0.73 | | | |
| 1 | 10677 | 2.46 | 11.19 | | 0.38 | | | |
| 1 | 10678 | 1.75 | 10.37 | | 0.48 | 0.02 | | |
| 1 | 10679 | 1.32 | 9.04 | | 1.75 | 0.86 | | 8.76 |
| 1 | 10680 | 0.96 | 6.57 | | 3.46 | 1.95 | | 8.76 |
| 1 | 10681 | 0.60 | 4.52 | | 4.85 | 4.47 | | 8.76 |
| 1 | 10682 | 0.13 | 3.36 | | 5.11 | 6.51 | | 8.76 |
| 1 | 10683 | | 2.25 | | 4.57 | 9.20 | | 8.76 |
| 1 | 10684 | | 1.77 | | 2.32 | 10.39 | | |
| 1 | 10685 | 6.22 | 3.77 | | 6.81 | 8.53 | | |
| 1 | 10686 | 6.11 | 4.42 | | 6.16 | 6.55 | | |
| 1 | 10687 | 5.99 | 5.03 | | 5.25 | 4.46 | | 8.76 |
| 1 | 10688 | 5.82 | 5.77 | | 4.28 | 3.44 | | 8.76 |
| 1 | 10689 | 5.74 | 6.56 | | 3.59 | 2.38 | | |
| 1 | 10690 | 5.59 | 8.64 | | 3.01 | 1.32 | | |
| 1 | 10691 | 5.22 | 10.28 | | 2.41 | 0.31 | | |
| 1 | 10692 | 4.47 | 10.93 | | 1.80 | | | |
| 1 | 10693 | 3.74 | 11.57 | | 1.27 | | | |
| 1 | 10694 | 2.89 | 11.63 | | 0.84 | | | |
| 1 | 10695 | 2.14 | 11.06 | | 0.51 | | | |
| 1 | 10696 | 1.47 | 10.25 | | 1.01 | | | |
| 1 | 10697 | 0.97 | 8.64 | | 2.20 | 0.87 | | 8.76 |
| 1 | 10698 | 0.53 | 5.68 | | 4.41 | 1.96 | | 8.76 |
| 1 | 10699 | 0.12 | 4.49 | | 6.49 | 4.54 | | 8.76 |
| 1 | 10700 | | 3.12 | | 7.61 | 7.03 | | 8.76 |
| 1 | 10701 | | 1.80 | | 8.32 | 10.78 | | 8.77 |
| 1 | 10702 | | 1.17 | | 5.93 | 13.79 | | |
| 1 | 10703 | 6.16 | 3.77 | | 6.87 | 8.60 | | |
| 1 | 10704 | 6.05 | 4.42 | | 6.24 | 6.60 | | |
| 1 | 10705 | 5.93 | 5.01 | | 5.38 | 4.44 | | 8.76 |
| 1 | 10706 | 5.74 | 5.74 | | 4.32 | 3.38 | | 8.76 |
| 1 | 10707 | 5.56 | 6.52 | | 3.57 | 2.31 | | |
| 1 | 10708 | 5.39 | 8.53 | | 3.01 | 1.24 | | |
| 1 | 10709 | 4.97 | 10.14 | | 2.42 | 0.23 | | |
| 1 | 10710 | 4.17 | 10.77 | | 1.83 | | | |
| 1 | 10711 | 3.37 | 11.38 | | 1.33 | | | |
| 1 | 10712 | 2.63 | 11.19 | | 0.92 | | | |
| 1 | 10713 | 1.91 | 10.85 | | 0.64 | | | |
| 1 | 10714 | 1.19 | 10.02 | | 1.36 | | | |
| 1 | 10715 | 0.61 | 8.16 | | 2.62 | 0.84 | | 8.76 |
| 1 | 10716 | 0.05 | 5.73 | | 5.09 | 1.92 | | 8.76 |
| 1 | 10717 | | 4.14 | | 7.79 | 4.36 | | 8.76 |
| 1 | 10718 | | 2.98 | | 9.68 | 7.10 | | 8.85 |
| 1 | 10719 | | 1.50 | | 12.48 | 11.59 | | 10.44 |
| 1 | 10720 | | 0.63 | | 12.11 | 17.99 | | |
| 1 | 10721 | 6.11 | 3.77 | | 6.92 | 8.64 | | |
| 1 | 10722 | 5.99 | 4.41 | | 6.31 | 6.65 | | |
| 1 | 10723 | 5.86 | 4.99 | | 5.52 | 4.40 | | 8.76 |
| 1 | 10724 | 5.66 | 5.70 | | 4.36 | 3.35 | | 8.76 |
| 1 | 10725 | 5.39 | 6.47 | | 3.55 | 2.25 | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 10726 | 5.20 | 8.39 | | 3.00 | 1.16 | | |
| 1 | 10727 | 4.73 | 9.97 | | 2.43 | 0.14 | | |
| 1 | 10728 | 3.90 | 10.57 | | 1.86 | | | |
| 1 | 10729 | 3.16 | 11.08 | | 1.37 | | | |
| 1 | 10730 | 2.45 | 10.94 | | 0.99 | | | |
| 1 | 10731 | 1.69 | 10.56 | | 0.73 | | | |
| 1 | 10732 | 0.92 | 9.32 | | 1.57 | 0.01 | | |
| 1 | 10733 | 0.25 | 7.67 | | 2.86 | 0.79 | | 8.76 |
| 1 | 10734 | | 5.39 | | 5.37 | 1.83 | | 8.76 |
| 1 | 10735 | | 4.34 | | 8.42 | 3.94 | | 8.76 |
| 1 | 10736 | | 2.91 | | 10.95 | 6.92 | | 9.61 |
| 1 | 10737 | | 1.43 | | 15.17 | 11.75 | | 12.00 |
| 1 | 10738 | | 0.57 | | 22.26 | 20.93 | | |
| 1 | 10739 | 6.06 | 3.76 | | 6.97 | 8.66 | | |
| 1 | 10740 | 5.94 | 4.39 | | 6.38 | 6.69 | | |
| 1 | 10741 | 5.81 | 4.96 | | 5.60 | 4.36 | | |
| 1 | 10742 | 5.58 | 5.66 | | 4.40 | 3.29 | | 8.76 |
| 1 | 10743 | 5.31 | 6.41 | | 3.54 | 2.19 | | |
| 1 | 10744 | 5.01 | 8.23 | | 3.00 | 1.08 | | |
| 1 | 10745 | 4.50 | 9.78 | | 2.43 | 0.05 | | |
| 1 | 10746 | 3.77 | 11.03 | | 1.87 | | | |
| 1 | 10747 | 3.02 | 10.80 | | 1.40 | | | |
| 1 | 10748 | 2.29 | 10.64 | | 1.03 | | | |
| 1 | 10749 | 1.50 | 10.20 | | 0.79 | | | |
| 1 | 10750 | 0.71 | 8.87 | | 1.68 | 0.13 | | |
| 1 | 10751 | | 7.41 | | 3.00 | 0.83 | | 8.76 |
| 1 | 10752 | | 5.22 | | 4.98 | 1.71 | | 8.76 |
| 1 | 10753 | | 4.24 | | 8.33 | 3.30 | | 8.76 |
| 1 | 10754 | | 2.95 | | 11.15 | 6.86 | | 10.00 |
| 1 | 10755 | | 1.47 | | 16.08 | 11.99 | | 12.65 |
| 1 | 10756 | | 0.52 | | 28.56 | 19.73 | | |
| 1 | 10757 | 0.04 | | | 12.93 | 5.18 | | |
| 1 | 10758 | | | | 2.83 | | | 8.85 |
| 1 | 10759 | | | | | | | 8.76 |
| 1 | 10760 | | | | | | | 8.76 |
| 1 | 10761 | 1.04 | 0.50 | | | | | |
| 1 | 10762 | 2.49 | 2.57 | | | | | |
| 1 | 10763 | 3.54 | 4.39 | | | | | |
| 1 | 10764 | 4.63 | 5.98 | | | | | |
| 1 | 10765 | 5.43 | 7.11 | | | | | |
| 1 | 10766 | 6.02 | 7.78 | | | | | |
| 1 | 10767 | 6.45 | 8.04 | | | | | |
| 1 | 10768 | 6.79 | 7.90 | | | | | |
| 1 | 10769 | 7.23 | 7.49 | | 0.60 | | | |
| 1 | 10770 | 7.80 | 6.99 | | 2.11 | 0.15 | | |
| 1 | 10771 | | | | 8.60 | 6.54 | | |
| 1 | 10772 | | | | 2.65 | 0.21 | | 8.76 |
| 1 | 10773 | | | | | | | 8.76 |
| 1 | 10774 | | | | | | | 8.76 |
| 1 | 10775 | 1.65 | 1.57 | | | | | |
| 1 | 10776 | 2.87 | 3.50 | | | | | |
| 1 | 10777 | 3.75 | 5.18 | | | | | |
| 1 | 10778 | 4.70 | 6.62 | | | | | |
| 1 | 10779 | 5.40 | 7.60 | | | | | |
| 1 | 10780 | 5.93 | 8.14 | | | | | |
| 1 | 10781 | 6.32 | 8.27 | | | | | |
| 1 | 10782 | 6.63 | 8.03 | | | | | |
| 1 | 10783 | 7.07 | 7.60 | | 0.94 | | | |
| 1 | 10784 | 7.63 | 6.99 | | 2.53 | 0.50 | | |
| 1 | 10785 | | | | 1.32 | 5.39 | | |
| 1 | 10786 | | | | 1.15 | 0.55 | | 8.76 |
| 1 | 10787 | | | | | | | 8.76 |
| 1 | 10788 | 1.20 | 0.26 | | | | | 8.76 |
| 1 | 10789 | 2.36 | 2.48 | | | | | |
| 1 | 10790 | 3.31 | 4.28 | | | | | |
| 1 | 10791 | 3.99 | 5.85 | | | | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 10792 | 4.79 | 7.15 | | | | | |
| 1 | 10793 | 5.39 | 8.01 | | | | | |
| 1 | 10794 | 5.85 | 8.42 | | | | | |
| 1 | 10795 | 6.20 | 8.45 | | | | | |
| 1 | 10796 | 6.48 | 8.12 | | | | | |
| 1 | 10797 | 6.90 | 7.64 | | 1.33 | | | |
| 1 | 10798 | 7.45 | 6.97 | | 2.95 | 0.85 | | |
| 1 | 10799 | | | | | 1.71 | | |
| 1 | 10800 | | | | | | | 8.76 |
| 1 | 10801 | 0.53 | | | | | | 8.76 |
| 1 | 10802 | 2.37 | 1.14 | | | | | 8.76 |
| 1 | 10803 | 3.05 | 3.17 | | | | | |
| 1 | 10804 | 3.76 | 4.92 | | | | | |
| 1 | 10805 | 4.25 | 6.40 | | | | | |
| 1 | 10806 | 4.88 | 7.59 | | | | | |
| 1 | 10807 | 5.38 | 8.34 | | | | | |
| 1 | 10808 | 5.77 | 8.64 | | | | | |
| 1 | 10809 | 6.08 | 8.57 | | | | | |
| 1 | 10810 | 6.33 | 8.17 | | 0.27 | | | |
| 1 | 10811 | 6.76 | 7.65 | | 1.70 | 0.27 | | |
| 1 | 10812 | 7.27 | 6.94 | | 3.33 | 1.13 | | |
| 1 | 10813 | | | | | | | |
| 1 | 10814 | 0.40 | | | | | | 8.76 |
| 1 | 10815 | 1.82 | | | | | | 8.76 |
| 1 | 10816 | 3.13 | 1.70 | | | | | |
| 1 | 10817 | 3.67 | 3.70 | | | | | |
| 1 | 10818 | 3.98 | 5.42 | | | | | |
| 1 | 10819 | 4.49 | 6.83 | | | | | |
| 1 | 10820 | 4.98 | 7.93 | | | | | |
| 1 | 10821 | 5.37 | 8.59 | | | | | |
| 1 | 10822 | 5.69 | 8.80 | | | | | |
| 1 | 10823 | 5.96 | 8.66 | | | | | |
| 1 | 10824 | 6.21 | 8.24 | | 0.60 | | | |
| 1 | 10825 | 6.59 | 7.65 | | 2.04 | 0.53 | | |
| 1 | 10826 | 7.58 | 6.88 | | 3.65 | 1.35 | | |
| 1 | 10827 | 0.77 | | | | | | |
| 1 | 10828 | 1.45 | | | | | | |
| 1 | 10829 | 3.02 | 0.10 | | | | | |
| 1 | 10830 | 3.72 | 2.21 | | | | | |
| 1 | 10831 | 4.17 | 4.12 | | | | | |
| 1 | 10832 | 4.34 | 5.80 | | | | | |
| 1 | 10833 | 4.71 | 7.15 | | | | | |
| 1 | 10834 | 5.06 | 8.18 | | | | | |
| 1 | 10835 | 5.36 | 8.77 | | | | | |
| 1 | 10836 | 5.62 | 8.91 | | | | | |
| 1 | 10837 | 5.83 | 8.70 | | | | | |
| 1 | 10838 | 6.07 | 8.26 | | 0.91 | | | |
| 1 | 10839 | 6.42 | 7.62 | | 2.35 | 0.73 | | |
| 1 | 10840 | 7.27 | 6.82 | | 3.84 | 1.52 | | |
| 1 | 10841 | 1.81 | | | | | | |
| 1 | 10842 | 2.42 | | | | | | |
| 1 | 10843 | 3.58 | 0.91 | | | | | |
| 1 | 10844 | 4.18 | 2.72 | | | | | |
| 1 | 10845 | 4.56 | 4.47 | | | | | |
| 1 | 10846 | 4.63 | 6.09 | | | | | |
| 1 | 10847 | 4.87 | 7.39 | | | | | |
| 1 | 10848 | 5.11 | 8.36 | | | | | |
| 1 | 10849 | 5.33 | 8.88 | | | | | |
| 1 | 10850 | 5.53 | 8.97 | | | | | |
| 1 | 10851 | 5.71 | 8.71 | | | | | |
| 1 | 10852 | 5.92 | 8.25 | | 1.21 | 0.13 | | |
| 1 | 10853 | 6.13 | 7.58 | | 2.61 | 0.92 | | |
| 1 | 10854 | 6.98 | 6.74 | | 3.94 | 1.65 | | |
| 1 | 10855 | 2.62 | 0.14 | | | | | |
| 1 | 10856 | 3.40 | 0.41 | | | | | |
| 1 | 10857 | 4.04 | 1.65 | | | | | |

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| 1 | 10858 | 4.53 | 3.19 | | | | | |
| 1 | 10859 | 4.83 | 4.78 | | | | | |
| 1 | 10860 | 4.84 | 6.31 | | | | | |
| 1 | 10861 | 4.99 | 7.55 | | | | | |
| 1 | 10862 | 5.14 | 8.47 | | | | | |
| 1 | 10863 | 5.28 | 8.95 | | | | | |
| 1 | 10864 | 5.43 | 8.99 | | | | | |
| 1 | 10865 | 5.60 | 8.74 | | 0.19 | | | |
| 1 | 10866 | 5.77 | 8.22 | | 1.46 | 0.28 | | |
| 1 | 10867 | 5.93 | 7.52 | | 2.82 | 1.05 | | |
| 1 | 10868 | 6.50 | 6.65 | | 4.01 | 1.75 | | |
| 1 | 10869 | 3.34 | 0.74 | | | | | |
| 1 | 10870 | 3.86 | 1.07 | | | | | |
| 1 | 10871 | 4.39 | 2.31 | | | | | |
| 1 | 10872 | 4.78 | 3.62 | | | | | |
| 1 | 10873 | 5.02 | 5.03 | | | | | |
| 1 | 10874 | 4.96 | 6.47 | | | | | |
| 1 | 10875 | 5.04 | 7.65 | | | | | |
| 1 | 10876 | 5.12 | 8.53 | | | | | |
| 1 | 10877 | 5.20 | 8.97 | | | | | |
| 1 | 10878 | 5.31 | 8.97 | | | | | |
| 1 | 10879 | 5.46 | 8.71 | | 0.44 | | | |
| 1 | 10880 | 5.60 | 8.17 | | 1.68 | 0.40 | | |
| 1 | 10881 | 5.74 | 7.44 | | 2.97 | 1.14 | | |
| 1 | 10882 | 6.20 | 6.55 | | 4.04 | 1.82 | | |
| 1 | 10883 | 3.81 | 1.26 | | | | | |
| 1 | 10884 | 4.23 | 1.80 | | | | | |
| 1 | 10885 | 4.61 | 2.71 | | | | | |
| 1 | 10886 | 4.94 | 3.99 | | | | | |
| 1 | 10887 | 5.12 | 5.24 | | | | | |
| 1 | 10888 | 5.01 | 6.58 | | | | | |
| 1 | 10889 | 5.04 | 7.70 | | | | | |
| 1 | 10890 | 5.06 | 8.54 | | | | | |
| 1 | 10891 | 5.10 | 8.95 | | | | | |
| 1 | 10892 | 5.19 | 8.95 | | | | | |
| 1 | 10893 | 5.30 | 8.67 | | 0.66 | | | |
| 1 | 10894 | 5.43 | 8.09 | | 1.86 | 0.48 | | |
| 1 | 10895 | 5.55 | 7.35 | | 3.08 | 1.20 | | |
| 1 | 10896 | 5.82 | 6.46 | | 4.05 | 1.86 | | |
| 1 | 10897 | 4.17 | 1.89 | | | | | |
| 1 | 10898 | 4.49 | 2.41 | | | | | |
| 1 | 10899 | 4.77 | 3.17 | | | | | |
| 1 | 10900 | 5.01 | 4.21 | | | | | |
| 1 | 10901 | 4.96 | 5.44 | | | | | |
| 1 | 10902 | 4.99 | 6.64 | | | | | |
| 1 | 10903 | 4.97 | 7.70 | | | | | |
| 1 | 10904 | 4.95 | 8.51 | | | | | |
| 1 | 10905 | 4.96 | 8.90 | | | | | |
| 1 | 10906 | 5.04 | 8.91 | | | | | |
| 1 | 10907 | 5.13 | 8.60 | | 0.85 | | | |
| 1 | 10908 | 5.24 | 8.01 | | 2.00 | 0.54 | | |
| 1 | 10909 | 5.48 | 7.25 | | 3.13 | 1.24 | | |
| 1 | 10910 | 6.02 | 6.35 | | 4.04 | 1.89 | | |
| 1 | 10911 | 4.42 | 2.49 | | | | | |
| 1 | 10912 | 4.66 | 2.91 | | | | | |
| 1 | 10913 | 4.86 | 3.65 | | | | | |
| 1 | 10914 | 5.01 | 4.43 | | | | | |
| 1 | 10915 | 4.92 | 5.57 | | | | | |
| 1 | 10916 | 4.90 | 6.67 | | | | | |
| 1 | 10917 | 4.85 | 7.67 | | | | | |
| 1 | 10918 | 4.80 | 8.45 | | | | | |
| 1 | 10919 | 4.79 | 8.82 | | | | | |
| 1 | 10920 | 4.86 | 8.85 | | 0.02 | | | |
| 1 | 10921 | 4.96 | 8.55 | | 1.00 | | | |
| 1 | 10922 | 5.22 | 7.95 | | 2.09 | 0.57 | | |
| 1 | 10923 | 5.70 | 7.14 | | 3.15 | 1.26 | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 10924 | 6.23 | 6.23 | | 4.02 | 1.89 | | |
| 1 | 10925 | 4.58 | 2.94 | | | | | |
| 1 | 10926 | 4.74 | 3.19 | | | | | |
| 1 | 10927 | 4.87 | 3.81 | | | | | |
| 1 | 10928 | 4.95 | 4.61 | | | | | |
| 1 | 10929 | 4.81 | 5.59 | | | | | |
| 1 | 10930 | 4.75 | 6.66 | | | | | |
| 1 | 10931 | 4.68 | 7.62 | | | | | |
| 1 | 10932 | 4.69 | 8.46 | | | | | |
| 1 | 10933 | 4.89 | 9.07 | | | | | |
| 1 | 10934 | 5.06 | 9.19 | | 0.19 | | | |
| 1 | 10935 | 5.19 | 8.92 | | 1.12 | | | |
| 1 | 10936 | 5.67 | 8.30 | | 2.15 | 0.58 | | |
| 1 | 10937 | 5.90 | 7.45 | | 3.13 | 1.26 | | |
| 1 | 10938 | 6.39 | 6.42 | | 3.98 | 1.88 | | |
| 1 | 10939 | 4.65 | 3.38 | | | | | |
| 1 | 10940 | 4.76 | 3.47 | | | | | |
| 1 | 10941 | 4.80 | 3.90 | | | | | |
| 1 | 10942 | 4.82 | 4.72 | | | | | |
| 1 | 10943 | 4.66 | 5.64 | | | | | |
| 1 | 10944 | 4.71 | 6.79 | | | | | |
| 1 | 10945 | 4.81 | 7.91 | | | | | |
| 1 | 10946 | 4.96 | 8.87 | | | | | |
| 1 | 10947 | 5.14 | 9.47 | | | | | |
| 1 | 10948 | 5.28 | 9.57 | | 0.32 | | | |
| 1 | 10949 | 5.38 | 9.27 | | 1.21 | | | |
| 1 | 10950 | 5.63 | 8.62 | | 2.17 | 0.57 | | |
| 1 | 10951 | 6.06 | 7.75 | | 3.08 | 1.24 | | |
| 1 | 10952 | 6.29 | 6.70 | | 3.91 | 1.86 | | |
| 1 | 10953 | 4.66 | 3.47 | | | | | |
| 1 | 10954 | 4.69 | 3.74 | | | | | |
| 1 | 10955 | 4.68 | 4.17 | | | | | |
| 1 | 10956 | 4.82 | 5.05 | | | | | |
| 1 | 10957 | 4.87 | 6.07 | | | | | |
| 1 | 10958 | 4.95 | 7.21 | | | | | |
| 1 | 10959 | 5.05 | 8.33 | | | | | |
| 1 | 10960 | 5.22 | 9.27 | | | | | |
| 1 | 10961 | 5.34 | 9.85 | | | | | |
| 1 | 10962 | 5.46 | 9.92 | | 0.34 | | | |
| 1 | 10963 | 5.54 | 9.59 | | 1.28 | | | |
| 1 | 10964 | 5.77 | 8.92 | | 2.17 | 0.55 | | |
| 1 | 10965 | 6.17 | 8.03 | | 3.01 | 1.21 | | |
| 1 | 10966 | 6.39 | 6.97 | | 3.78 | 1.83 | | |
| 1 | 10967 | 4.58 | 3.84 | | | 0.11 | | |
| 1 | 10968 | 4.57 | 3.87 | | | 0.07 | | |
| 1 | 10969 | 4.67 | 4.47 | | | | | |
| 1 | 10970 | 4.92 | 5.38 | | | | | |
| 1 | 10971 | 5.03 | 6.43 | | | | | |
| 1 | 10972 | 5.13 | 7.60 | | | | | |
| 1 | 10973 | 5.23 | 8.72 | | | | | |
| 1 | 10974 | 5.38 | 9.71 | | | | | |
| 1 | 10975 | 5.50 | 10.21 | | | | | |
| 1 | 10976 | 5.59 | 10.24 | | 0.43 | | | |
| 1 | 10977 | 5.65 | 9.89 | | 1.31 | | | |
| 1 | 10978 | 5.87 | 9.20 | | 2.15 | 0.52 | | |
| 1 | 10979 | 6.23 | 8.29 | | 2.93 | 1.17 | | |
| 1 | 10980 | 6.46 | 7.21 | | 3.64 | 1.79 | | |
| 1 | 10981 | 4.48 | 3.55 | | | 0.39 | | |
| 1 | 10982 | 4.47 | 3.72 | | | 0.34 | | |
| 1 | 10983 | 4.71 | 4.54 | | | 0.22 | | |
| 1 | 10984 | 4.95 | 5.63 | | | 0.05 | | |
| 1 | 10985 | 5.11 | 6.78 | | | | | |
| 1 | 10986 | 5.24 | 7.96 | | | | | |
| 1 | 10987 | 5.39 | 9.16 | | | | | |
| 1 | 10988 | 5.50 | 10.07 | | | | | |
| 1 | 10989 | 5.60 | 10.55 | | | | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 10990 | 5.68 | 10.55 | | 0.50 | | | |
| 1 | 10991 | 5.72 | 10.16 | | 1.33 | | | |
| 1 | 10992 | 5.93 | 9.45 | | 2.12 | 0.48 | | |
| 1 | 10993 | 6.27 | 8.54 | | 2.84 | 1.12 | | |
| 1 | 10994 | 6.51 | 7.44 | | 3.50 | 1.74 | | |
| 1 | 10995 | 4.28 | 3.60 | | | 0.66 | | |
| 1 | 10996 | 4.35 | 4.03 | | | 0.60 | | |
| 1 | 10997 | 4.63 | 4.62 | | | 0.47 | | |
| 1 | 10998 | 4.96 | 5.83 | | | 0.28 | | |
| 1 | 10999 | 5.19 | 7.10 | | | 0.01 | | |
| 1 | 11000 | 5.35 | 8.35 | | | | | |
| 1 | 11001 | 5.45 | 9.51 | | | | | |
| 1 | 11002 | 5.55 | 10.41 | | | | | |
| 1 | 11003 | 5.64 | 10.86 | | | | | |
| 1 | 11004 | 5.71 | 10.83 | | 0.55 | | | |
| 1 | 11005 | 5.75 | 10.42 | | 1.34 | | | |
| 1 | 11006 | 6.42 | 10.05 | | 2.08 | 0.42 | | |
| 1 | 11007 | 6.49 | 9.08 | | 2.76 | 1.07 | | |
| 1 | 11008 | 6.50 | 7.95 | | 3.37 | 1.69 | | |
| 1 | 11009 | 4.03 | 3.68 | | | 0.94 | | |
| 1 | 11010 | 4.14 | 4.10 | | | 0.87 | | |
| 1 | 11011 | 4.56 | 4.83 | | | 0.72 | | |
| 1 | 11012 | 4.87 | 6.00 | | | 0.50 | | |
| 1 | 11013 | 5.14 | 7.33 | | | 0.21 | | |
| 1 | 11014 | 5.31 | 8.64 | | | | | |
| 1 | 11015 | 5.44 | 9.83 | | | | | |
| 1 | 11016 | 5.55 | 10.73 | | | | | |
| 1 | 11017 | 5.64 | 11.15 | | | | | |
| 1 | 11018 | 6.10 | 11.50 | | 0.60 | | | |
| 1 | 11019 | 6.29 | 11.04 | | 1.34 | | | |
| 1 | 11020 | 6.40 | 10.27 | | 2.04 | 0.36 | | |
| 1 | 11021 | 6.47 | 9.28 | | 2.67 | 1.00 | | |
| 1 | 11022 | 6.47 | 8.13 | | 3.24 | 1.63 | | |
| 1 | 11023 | 3.72 | 3.71 | | | 1.21 | | |
| 1 | 11024 | 3.87 | 4.16 | | | 1.14 | | |
| 1 | 11025 | 4.36 | 4.97 | | | 0.97 | | |
| 1 | 11026 | 4.71 | 6.17 | | | 0.72 | | |
| 1 | 11027 | 5.02 | 7.51 | | | 0.39 | | |
| 1 | 11028 | 5.22 | 8.90 | | | | | |
| 1 | 11029 | 5.36 | 10.12 | | | | | |
| 1 | 11030 | 5.48 | 11.01 | | | | | |
| 1 | 11031 | 5.57 | 11.41 | | | | | |
| 1 | 11032 | 6.05 | 11.74 | | 0.64 | | | |
| 1 | 11033 | 6.24 | 11.25 | | 1.35 | | | |
| 1 | 11034 | 6.35 | 10.45 | | 2.00 | 0.29 | | |
| 1 | 11035 | 6.41 | 9.45 | | 2.59 | 0.91 | | |
| 1 | 11036 | 6.41 | 8.30 | | 3.13 | 1.56 | | |
| 1 | 11037 | 3.31 | 3.71 | | | 1.50 | | |
| 1 | 11038 | 3.49 | 4.19 | | | 1.41 | | |
| 1 | 11039 | 4.05 | 4.72 | | | 1.22 | | |
| 1 | 11040 | 4.46 | 6.19 | | | 0.94 | | |
| 1 | 11041 | 4.80 | 7.65 | | | 0.56 | | |
| 1 | 11042 | 5.04 | 9.13 | | | 0.12 | | |
| 1 | 11043 | 5.21 | 10.38 | | | | | |
| 1 | 11044 | 5.34 | 11.27 | | | | | |
| 1 | 11045 | 5.70 | 12.09 | | 0.07 | | | |
| 1 | 11046 | 5.94 | 11.95 | | 0.68 | | | |
| 1 | 11047 | 6.14 | 11.43 | | 1.35 | | | |
| 1 | 11048 | 6.25 | 10.61 | | 1.96 | 0.22 | | |
| 1 | 11049 | 6.32 | 9.59 | | 2.52 | 0.84 | | |
| 1 | 11050 | 6.32 | 8.44 | | 3.03 | 1.49 | | |
| 1 | 11051 | 2.77 | 3.31 | | | 1.80 | | |
| 1 | 11052 | 3.12 | 4.13 | | | 1.70 | | |
| 1 | 11053 | 3.63 | 4.63 | | | 1.48 | | |
| 1 | 11054 | 4.12 | 6.15 | | | 1.16 | | |
| 1 | 11055 | 4.52 | 7.76 | | | 0.73 | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 11056 | 4.79 | 9.33 | | | 0.24 | | |
| 1 | 11057 | 4.98 | 10.62 | | | | | |
| 1 | 11058 | 5.14 | 11.51 | | | | | |
| 1 | 11059 | 5.52 | 12.30 | | 0.14 | | | |
| 1 | 11060 | 5.78 | 12.12 | | 0.73 | | | |
| 1 | 11061 | 6.00 | 11.58 | | 1.36 | | | |
| 1 | 11062 | 6.12 | 10.74 | | 1.94 | 0.14 | | |
| 1 | 11063 | 6.20 | 9.71 | | 2.47 | 0.76 | | |
| 1 | 11064 | 6.21 | 8.55 | | 2.95 | 1.41 | | |
| 1 | 11065 | 2.36 | 3.62 | | | 2.12 | | |
| 1 | 11066 | 2.70 | 4.04 | | | 2.00 | | |
| 1 | 11067 | 3.12 | 4.61 | | | 1.75 | | |
| 1 | 11068 | 3.71 | 6.07 | | | 1.38 | | |
| 1 | 11069 | 4.15 | 7.84 | | | 0.90 | | |
| 1 | 11070 | 4.45 | 9.51 | | | 0.35 | | |
| 1 | 11071 | 4.67 | 10.83 | | | | | |
| 1 | 11072 | 4.86 | 11.71 | | | | | |
| 1 | 11073 | 5.29 | 12.48 | | 0.22 | | | |
| 1 | 11074 | 5.58 | 12.26 | | 0.78 | | | |
| 1 | 11075 | 5.81 | 11.69 | | 1.37 | | | |
| 1 | 11076 | 5.97 | 10.82 | | 1.92 | 0.06 | | |
| 1 | 11077 | 6.05 | 9.80 | | 2.42 | 0.68 | | |
| 1 | 11078 | 6.07 | 8.63 | | 2.87 | 1.33 | | |
| 1 | 11079 | 1.48 | 3.42 | | | 2.56 | | |
| 1 | 11080 | 2.04 | 3.89 | | | 2.33 | | |
| 1 | 11081 | 2.76 | 4.29 | | | 2.05 | | |
| 1 | 11082 | 3.17 | 5.94 | | | 1.62 | | |
| 1 | 11083 | 3.65 | 7.87 | | | 1.06 | | |
| 1 | 11084 | 3.99 | 9.63 | | | 0.45 | | |
| 1 | 11085 | 4.25 | 10.96 | | | | | |
| 1 | 11086 | 4.59 | 12.29 | | | | | |
| 1 | 11087 | 5.00 | 12.61 | | 0.31 | | | |
| 1 | 11088 | 5.33 | 12.36 | | 0.84 | | | |
| 1 | 11089 | 5.60 | 11.77 | | 1.39 | | | |
| 1 | 11090 | 5.78 | 10.89 | | 1.91 | | | |
| 1 | 11091 | 5.87 | 9.85 | | 2.39 | 0.60 | | |
| 1 | 11092 | 5.90 | 8.69 | | 2.82 | 1.25 | | |
| 1 | 11093 | 0.43 | 3.14 | | | 3.71 | | |
| 1 | 11094 | 0.95 | 3.68 | | | 3.48 | | |
| 1 | 11095 | 2.00 | 4.19 | | | 2.88 | | 8.76 |
| 1 | 11096 | 2.48 | 5.42 | | | 1.88 | | 8.76 |
| 1 | 11097 | 2.97 | 7.54 | | | 1.24 | | |
| 1 | 11098 | 3.33 | 9.44 | | | 0.56 | | |
| 1 | 11099 | 3.77 | 11.11 | | | | | |
| 1 | 11100 | 4.20 | 12.41 | | | | | |
| 1 | 11101 | 4.63 | 12.63 | | 0.36 | | | |
| 1 | 11102 | 5.01 | 12.35 | | 0.90 | | | |
| 1 | 11103 | 5.35 | 11.81 | | 1.42 | | | |
| 1 | 11104 | 5.56 | 10.92 | | 1.91 | | | |
| 1 | 11105 | 5.67 | 9.88 | | 2.36 | 0.51 | | |
| 1 | 11106 | 5.99 | 8.71 | | 2.77 | 1.14 | | |
| 1 | 11107 | | 2.72 | | | 5.11 | | |
| 1 | 11108 | 0.42 | 3.41 | | | 5.60 | | 8.76 |
| 1 | 11109 | 1.02 | 4.06 | | 0.71 | 4.90 | | 8.76 |
| 1 | 11110 | 1.72 | 5.27 | | 1.19 | 3.12 | | 8.76 |
| 1 | 11111 | 2.22 | 7.60 | | 0.48 | 1.45 | | 8.76 |
| 1 | 11112 | 2.64 | 9.56 | | | 0.67 | | |
| 1 | 11113 | 3.02 | 10.80 | | | | | |
| 1 | 11114 | 3.74 | 12.47 | | 0.04 | | | |
| 1 | 11115 | 4.25 | 12.66 | | 0.47 | | | |
| 1 | 11116 | 4.69 | 12.37 | | 0.97 | | | |
| 1 | 11117 | 5.04 | 11.74 | | 1.46 | | | |
| 1 | 11118 | 5.32 | 10.92 | | 1.92 | | | |
| 1 | 11119 | 5.46 | 9.88 | | 2.35 | 0.42 | | |
| 1 | 11120 | 5.68 | 9.13 | | 2.74 | 1.05 | | |
| 1 | 11121 | | 2.25 | | | 7.63 | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 11122 | | 2.84 | | 1.67 | 7.54 | | 8.76 |
| 1 | 11123 | 0.52 | 3.90 | | 2.59 | 5.80 | | 8.76 |
| 1 | 11124 | 0.93 | 5.20 | | 2.80 | 3.61 | | 8.76 |
| 1 | 11125 | 1.29 | 7.65 | | 1.65 | 1.78 | | 8.76 |
| 1 | 11126 | 1.81 | 9.63 | | 0.28 | 0.83 | | |
| 1 | 11127 | 2.34 | 10.85 | | 0.11 | 0.01 | | |
| 1 | 11128 | 3.23 | 12.48 | | 0.18 | | | |
| 1 | 11129 | 3.84 | 12.65 | | 0.58 | | | |
| 1 | 11130 | 4.35 | 12.34 | | 1.04 | | | |
| 1 | 11131 | 4.75 | 11.70 | | 1.50 | | | |
| 1 | 11132 | 5.03 | 10.81 | | 1.93 | | | |
| 1 | 11133 | 5.25 | 9.80 | | 2.34 | 0.32 | | |
| 1 | 11134 | 5.47 | 9.11 | | 2.71 | 0.97 | | |
| 1 | 11135 | | 1.78 | | 2.28 | 10.49 | | |
| 1 | 11136 | | 2.32 | | 4.53 | 9.09 | | 8.76 |
| 1 | 11137 | 0.11 | 3.54 | | 4.91 | 6.38 | | 8.76 |
| 1 | 11138 | 0.54 | 4.97 | | 4.55 | 3.59 | | 8.76 |
| 1 | 11139 | 0.87 | 7.60 | | 2.84 | 1.85 | | 8.76 |
| 1 | 11140 | 1.22 | 9.63 | | 0.93 | 0.94 | | 8.76 |
| 1 | 11141 | 1.63 | 10.70 | | 0.32 | 0.13 | | |
| 1 | 11142 | 2.62 | 12.03 | | 0.34 | | | |
| 1 | 11143 | 3.40 | 12.57 | | 0.68 | | | |
| 1 | 11144 | 3.99 | 12.26 | | 1.11 | | | |
| 1 | 11145 | 4.45 | 11.63 | | 1.54 | | | |
| 1 | 11146 | 4.77 | 10.73 | | 1.95 | | | |
| 1 | 11147 | 4.98 | 9.67 | | 2.34 | 0.22 | | |
| 1 | 11148 | 5.25 | 9.06 | | 2.70 | 0.88 | | |
| 1 | 11149 | | 1.20 | | 5.93 | 14.12 | | |
| 1 | 11150 | | 1.79 | | 8.17 | 10.85 | | 8.83 |
| 1 | 11151 | | 3.27 | | 7.23 | 6.82 | | 8.76 |
| 1 | 11152 | 0.06 | 4.79 | | 6.14 | 3.53 | | 8.76 |
| 1 | 11153 | 0.46 | 6.74 | | 3.70 | 1.87 | | 8.76 |
| 1 | 11154 | 0.89 | 9.24 | | 1.50 | 0.96 | | 8.76 |
| 1 | 11155 | 1.37 | 10.58 | | 0.49 | 0.14 | | |
| 1 | 11156 | 2.07 | 11.91 | | 0.47 | | | |
| 1 | 11157 | 2.79 | 12.11 | | 0.78 | | | |
| 1 | 11158 | 3.63 | 12.13 | | 1.17 | | | |
| 1 | 11159 | 4.14 | 11.51 | | 1.58 | | | |
| 1 | 11160 | 4.50 | 10.63 | | 1.97 | | | |
| 1 | 11161 | 4.91 | 9.55 | | 2.34 | 0.12 | | |
| 1 | 11162 | 4.99 | 8.91 | | 2.69 | 0.78 | | |
| 1 | 11163 | | 0.66 | | 11.97 | 18.24 | | |
| 1 | 11164 | | 1.53 | | 12.09 | 11.55 | | 10.43 |
| 1 | 11165 | | 3.13 | | 9.25 | 6.92 | | 8.85 |
| 1 | 11166 | | 4.51 | | 7.32 | 3.32 | | 8.76 |
| 1 | 11167 | | 6.24 | | 4.26 | 1.84 | | 8.76 |
| 1 | 11168 | 0.54 | 8.50 | | 1.81 | 0.94 | | 8.76 |
| 1 | 11169 | 1.10 | 10.34 | | 0.83 | 0.12 | | |
| 1 | 11170 | 1.72 | 12.14 | | 0.58 | | | |
| 1 | 11171 | 2.36 | 11.94 | | 0.86 | | | |
| 1 | 11172 | 3.00 | 11.69 | | 1.23 | | | |
| 1 | 11173 | 3.66 | 11.13 | | 1.61 | | | |
| 1 | 11174 | 4.10 | 10.32 | | 1.99 | | | |
| 1 | 11175 | 4.66 | 10.01 | | 2.35 | 0.02 | | |
| 1 | 11176 | 4.78 | 8.80 | | 2.68 | 0.68 | | |
| 1 | 11177 | | 0.59 | | 21.92 | 21.08 | | |
| 1 | 11178 | | 1.49 | | 14.67 | 11.67 | | 11.97 |
| 1 | 11179 | | 3.08 | | 10.46 | 6.52 | | 9.58 |
| 1 | 11180 | | 4.38 | | 7.90 | 2.92 | | 8.76 |
| 1 | 11181 | | 5.92 | | 4.38 | 1.77 | | 8.76 |
| 1 | 11182 | 0.22 | 8.14 | | 2.08 | 0.90 | | 8.76 |
| 1 | 11183 | 0.85 | 9.67 | | 1.09 | 0.14 | | |
| 1 | 11184 | 1.51 | 11.86 | | 0.67 | | | |
| 1 | 11185 | 2.17 | 12.08 | | 0.93 | | | |
| 1 | 11186 | 2.94 | 11.81 | | 1.27 | | | |
| 1 | 11187 | 3.57 | 11.24 | | 1.64 | | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 11188 | 3.99 | 10.41 | | 2.01 | | | |
| 1 | 11189 | 4.23 | 9.27 | | 2.36 | | | |
| 1 | 11190 | 4.48 | 8.63 | | 2.68 | 0.58 | | |
| 1 | 11191 | | 0.55 | | 28.13 | 19.54 | | |
| 1 | 11192 | | 1.32 | | 15.49 | 11.29 | | 12.60 |
| 1 | 11193 | | 3.07 | | 10.63 | 6.10 | | 9.97 |
| 1 | 11194 | | 4.33 | | 7.76 | 2.62 | | 8.76 |
| 1 | 11195 | | 6.22 | | 4.18 | 1.67 | | 8.76 |
| 1 | 11196 | | 8.20 | | 2.26 | 0.84 | | 8.76 |
| 1 | 11197 | 0.63 | 9.23 | | 1.24 | 0.11 | | |
| 1 | 11198 | 1.32 | 11.52 | | 0.73 | | | |
| 1 | 11199 | 2.00 | 11.79 | | 0.97 | | | |
| 1 | 11200 | 2.63 | 11.55 | | 1.30 | | | |
| 1 | 11201 | 3.30 | 11.02 | | 1.66 | | | |
| 1 | 11202 | 3.89 | 10.90 | | 2.02 | | | |
| 1 | 11203 | 4.19 | 9.82 | | 2.37 | | | |
| 1 | 11204 | 4.36 | 8.58 | | 2.69 | 0.47 | | |
| 1 | 11205 | 9.09 | 5.90 | | 4.73 | 1.37 | | |
| 1 | 11206 | 10.21 | 4.36 | | 8.22 | 3.57 | | 8.76 |
| 1 | 11207 | 11.46 | 3.75 | | 11.53 | 6.44 | | 8.76 |
| 1 | 11208 | 12.41 | 2.24 | | 12.73 | 8.62 | | |
| 1 | 11209 | 8.85 | 6.32 | | 4.97 | 1.82 | | |
| 1 | 11210 | 9.90 | 4.40 | | 8.08 | 3.61 | | 8.76 |
| 1 | 11211 | 11.02 | 3.83 | | 11.12 | 6.43 | | 8.76 |
| 1 | 11212 | 11.97 | 2.40 | | 12.39 | 8.92 | | |
| 1 | 11213 | 8.61 | 6.21 | | 5.14 | 2.18 | | |
| 1 | 11214 | 9.58 | 4.44 | | 7.90 | 3.69 | | 8.76 |
| 1 | 11215 | 10.56 | 3.88 | | 10.79 | 6.42 | | 8.76 |
| 1 | 11216 | 11.55 | 2.53 | | 12.22 | 9.06 | | |
| 1 | 11217 | 8.35 | 6.09 | | 5.25 | 2.38 | | |
| 1 | 11218 | 9.24 | 4.47 | | 7.88 | 3.74 | | 8.76 |
| 1 | 11219 | 10.10 | 3.91 | | 10.55 | 6.43 | | 8.76 |
| 1 | 11220 | 11.13 | 2.63 | | 11.82 | 9.17 | | |
| 1 | 11221 | 8.09 | 5.96 | | 5.32 | 2.54 | | |
| 1 | 11222 | 8.89 | 4.49 | | 7.69 | 3.77 | | 8.76 |
| 1 | 11223 | 9.47 | 3.93 | | 10.20 | 6.42 | | 8.76 |
| 1 | 11224 | 10.72 | 2.71 | | 11.42 | 9.27 | | |
| 1 | 11225 | 7.82 | 5.83 | | 5.36 | 2.67 | | |
| 1 | 11226 | 8.54 | 4.50 | | 7.47 | 3.77 | | 8.76 |
| 1 | 11227 | 9.05 | 3.93 | | 9.85 | 6.39 | | 8.76 |
| 1 | 11228 | 10.32 | 2.77 | | 11.02 | 9.35 | | |
| 1 | 11229 | 7.48 | 5.69 | | 5.36 | 2.77 | | 8.76 |
| 1 | 11230 | 8.11 | 4.51 | | 7.23 | 3.76 | | 8.76 |
| 1 | 11231 | 8.73 | 3.93 | | 9.49 | 6.34 | | 8.76 |
| 1 | 11232 | 9.93 | 2.85 | | 10.63 | 9.41 | | |
| 1 | 11233 | 7.12 | 5.55 | | 5.33 | 2.85 | | 8.76 |
| 1 | 11234 | 7.66 | 4.52 | | 6.98 | 3.82 | | 8.76 |
| 1 | 11235 | 8.42 | 3.93 | | 9.14 | 6.29 | | 8.76 |
| 1 | 11236 | 9.55 | 2.89 | | 10.25 | 9.46 | | |
| 1 | 11237 | 6.68 | 5.40 | | 5.29 | 2.90 | | 8.76 |
| 1 | 11238 | 7.16 | 4.52 | | 6.75 | 3.89 | | 8.76 |
| 1 | 11239 | 8.12 | 3.92 | | 8.77 | 6.23 | | 8.76 |
| 1 | 11240 | 9.19 | 2.92 | | 9.89 | 9.51 | | |
| 1 | 11241 | 6.34 | 5.25 | | 5.22 | 2.94 | | 8.76 |
| 1 | 11242 | 6.85 | 4.52 | | 6.58 | 3.94 | | 8.76 |
| 1 | 11243 | 7.83 | 3.90 | | 8.42 | 6.08 | | 8.76 |
| 1 | 11244 | 8.85 | 2.94 | | 9.54 | 9.48 | | |
| 1 | 11245 | 6.20 | 5.11 | | 5.14 | 2.96 | | 8.76 |
| 1 | 11246 | 6.56 | 4.52 | | 6.41 | 3.98 | | 8.76 |
| 1 | 11247 | 7.55 | 3.89 | | 8.07 | 6.02 | | 8.76 |
| 1 | 11248 | 8.52 | 2.96 | | 9.20 | 9.48 | | |
| 1 | 11249 | 6.36 | 4.98 | | 5.04 | 2.98 | | 8.76 |
| 1 | 11250 | 6.39 | 4.52 | | 6.23 | 4.01 | | 8.76 |
| 1 | 11251 | 7.30 | 3.87 | | 7.74 | 5.98 | | 8.76 |
| 1 | 11252 | 8.20 | 2.98 | | 8.88 | 9.46 | | |
| 1 | 11253 | 6.50 | 5.00 | | 4.94 | 2.82 | | 8.76 |

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|---|---|---|---|---|---|---|---|---|
| 1 | 11254 | 6.47 | 4.52 | | 6.05 | 4.04 | | 8.76 |
| 1 | 11255 | 7.07 | 3.86 | | 7.41 | 5.91 | | 8.76 |
| 1 | 11256 | 7.91 | 3.00 | | 8.57 | 9.43 | | |
| 1 | 11257 | 6.59 | 5.19 | | 4.83 | 2.68 | | 8.76 |
| 1 | 11258 | 6.53 | 4.53 | | 5.87 | 4.05 | | 8.76 |
| 1 | 11259 | 6.85 | 3.84 | | 7.09 | 5.85 | | 8.76 |
| 1 | 11260 | 7.63 | 3.02 | | 8.28 | 9.38 | | |
| 1 | 11261 | 6.66 | 5.36 | | 4.72 | 2.65 | | 8.76 |
| 1 | 11262 | 6.56 | 4.54 | | 5.69 | 4.06 | | 8.76 |
| 1 | 11263 | 6.64 | 3.83 | | 6.79 | 5.78 | | 8.76 |
| 1 | 11264 | 7.37 | 3.03 | | 8.00 | 9.32 | | |
| 1 | 11265 | 6.50 | 5.61 | | 4.54 | 2.62 | | 8.76 |
| 1 | 11266 | 6.58 | 4.60 | | 5.52 | 4.06 | | 8.76 |
| 1 | 11267 | 6.54 | 3.83 | | 6.50 | 5.65 | | 8.76 |
| 1 | 11268 | 7.13 | 3.05 | | 7.74 | 9.25 | | |
| 1 | 11269 | 6.52 | 5.84 | | 4.33 | 2.58 | | 8.76 |
| 1 | 11270 | 6.57 | 4.71 | | 5.31 | 4.06 | | 8.76 |
| 1 | 11271 | 6.46 | 3.84 | | 6.22 | 5.57 | | 8.76 |
| 1 | 11272 | 6.91 | 3.06 | | 7.49 | 9.17 | | |
| 1 | 11273 | 6.51 | 6.23 | | 4.14 | 2.53 | | 8.76 |
| 1 | 11274 | 6.40 | 4.95 | | 5.04 | 3.64 | | 8.76 |
| 1 | 11275 | 6.38 | 3.88 | | 5.96 | 5.51 | | 8.76 |
| 1 | 11276 | 6.71 | 3.08 | | 7.25 | 9.08 | | |
| 1 | 11277 | 6.44 | 6.42 | | 3.96 | 2.48 | | 8.76 |
| 1 | 11278 | 6.36 | 5.05 | | 4.81 | 3.61 | | 8.76 |
| 1 | 11279 | 6.29 | 3.97 | | 6.14 | 5.40 | | 8.76 |
| 1 | 11280 | 6.55 | 3.12 | | 7.03 | 8.99 | | |
| 1 | 11281 | 6.38 | 6.59 | | 3.81 | 2.42 | | 8.76 |
| 1 | 11282 | 6.30 | 5.13 | | 4.60 | 3.58 | | 8.76 |
| 1 | 11283 | 6.20 | 4.04 | | 5.94 | 5.31 | | 8.76 |
| 1 | 11284 | 6.42 | 3.18 | | 7.12 | 8.89 | | |
| 1 | 11285 | 6.30 | 6.74 | | 3.67 | 2.37 | | 8.76 |
| 1 | 11286 | 6.22 | 5.20 | | 4.41 | 3.54 | | 8.76 |
| 1 | 11287 | 6.10 | 4.10 | | 5.76 | 5.22 | | 8.76 |
| 1 | 11288 | 6.30 | 3.23 | | 6.95 | 8.78 | | |
| 1 | 11289 | 6.20 | 6.84 | | 3.55 | 2.31 | | 8.76 |
| 1 | 11290 | 6.12 | 5.25 | | 4.25 | 3.50 | | 8.76 |
| 1 | 11291 | 6.01 | 4.15 | | 5.58 | 5.13 | | 8.76 |
| 1 | 11292 | 6.18 | 3.28 | | 6.79 | 8.68 | | |
| 1 | 11293 | 6.07 | 6.93 | | 3.44 | 2.24 | | 8.76 |
| 1 | 11294 | 6.02 | 5.30 | | 4.12 | 3.46 | | 8.76 |
| 1 | 11295 | 5.91 | 4.18 | | 5.45 | 5.05 | | 8.76 |
| 1 | 11296 | 6.07 | 3.31 | | 6.65 | 8.57 | | |
| 1 | 11297 | 5.92 | 7.00 | | 3.36 | 2.17 | | 8.76 |
| 1 | 11298 | 5.90 | 5.32 | | 4.00 | 3.41 | | 8.76 |
| 1 | 11299 | 5.81 | 4.20 | | 5.30 | 4.85 | | 8.76 |
| 1 | 11300 | 5.95 | 3.34 | | 6.51 | 8.46 | | |
| 1 | 11301 | 5.81 | 7.03 | | 3.29 | 2.10 | | |
| 1 | 11302 | 5.77 | 5.34 | | 3.90 | 3.36 | | 8.76 |
| 1 | 11303 | 5.71 | 4.22 | | 5.17 | 4.82 | | 8.76 |
| 1 | 11304 | 5.85 | 3.36 | | 6.40 | 7.77 | | |
| 1 | 11305 | 5.63 | 7.05 | | 3.23 | 2.02 | | |
| 1 | 11306 | 5.63 | 5.35 | | 3.82 | 3.31 | | 8.76 |
| 1 | 11307 | 5.61 | 4.22 | | 5.04 | 4.78 | | 8.76 |
| 1 | 11308 | 5.74 | 3.37 | | 6.27 | 7.66 | | |
| 1 | 11309 | 5.45 | 7.04 | | 3.19 | 1.95 | | |
| 1 | 11310 | 5.48 | 5.35 | | 3.79 | 3.25 | | 8.76 |
| 1 | 11311 | 5.51 | 4.21 | | 4.93 | 4.74 | | 8.76 |
| 1 | 11312 | 5.64 | 3.38 | | 6.16 | 7.61 | | |
| 1 | 11313 | 5.26 | 7.01 | | 3.15 | 1.87 | | |
| 1 | 11314 | 5.33 | 5.34 | | 3.81 | 3.19 | | 8.76 |
| 1 | 11315 | 5.42 | 4.21 | | 4.98 | 4.69 | | 8.76 |
| 1 | 11316 | 5.59 | 3.39 | | 6.05 | 7.64 | | |
| 1 | 11317 | 5.07 | 6.95 | | 3.13 | 1.78 | | |
| 1 | 11318 | 5.17 | 5.31 | | 3.85 | 3.13 | | 8.76 |
| 1 | 11319 | 5.32 | 4.21 | | 5.07 | 4.65 | | 8.76 |

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|---|---|---|---|---|---|---|---|---|
| 1 | 11320 | 5.56 | 3.44 | | 6.10 | 7.61 | | |
| 1 | 11321 | 4.88 | 6.86 | | 3.11 | 1.70 | | |
| 1 | 11322 | 5.02 | 5.27 | | 3.89 | 3.06 | | 8.76 |
| 1 | 11323 | 5.24 | 4.19 | | 5.15 | 4.60 | | 8.76 |
| 1 | 11324 | 5.55 | 3.48 | | 6.15 | 7.63 | | |
| 1 | 11325 | 4.69 | 6.71 | | 3.11 | 1.61 | | |
| 1 | 11326 | 4.92 | 5.23 | | 3.93 | 2.98 | | 8.76 |
| 1 | 11327 | 5.26 | 4.22 | | 5.24 | 4.54 | | 8.76 |
| 1 | 11328 | 5.54 | 3.53 | | 6.21 | 7.69 | | |
| 1 | 11329 | 4.52 | 6.65 | | 3.10 | 1.52 | | |
| 1 | 11330 | 4.93 | 5.31 | | 3.96 | 2.91 | | 8.76 |
| 1 | 11331 | 5.28 | 4.27 | | 5.31 | 4.49 | | 8.76 |
| 1 | 11332 | 5.55 | 3.57 | | 6.27 | 7.71 | | |
| 1 | 11333 | 6.04 | 3.75 | | 7.03 | 8.70 | | |
| 1 | 11334 | 5.90 | 4.37 | | 6.45 | 6.75 | | |
| 1 | 11335 | 5.76 | 4.93 | | 5.65 | 4.33 | | |
| 1 | 11336 | 5.52 | 5.61 | | 4.44 | 3.22 | | 8.76 |
| 1 | 11337 | 5.24 | 6.34 | | 3.54 | 2.12 | | |
| 1 | 11338 | 4.84 | 8.04 | | 3.00 | 1.01 | | |
| 1 | 11339 | 4.31 | 9.55 | | 2.44 | | | |
| 1 | 11340 | 3.65 | 10.76 | | 1.88 | | | |
| 1 | 11341 | 2.89 | 10.50 | | 1.41 | | | |
| 1 | 11342 | 2.14 | 10.30 | | 1.05 | | | |
| 1 | 11343 | 1.34 | 9.69 | | 0.81 | | | |
| 1 | 11344 | 0.59 | 8.68 | | 1.72 | 0.21 | | |
| 1 | 11345 | | 7.30 | | 3.03 | 0.96 | | 8.76 |
| 1 | 11346 | | 4.70 | | 4.88 | 1.78 | | 8.76 |
| 1 | 11347 | | 4.20 | | 8.13 | 3.18 | | 8.76 |
| 1 | 11348 | | 2.93 | | 10.95 | 6.89 | | 9.95 |
| 1 | 11349 | | 1.46 | | 15.98 | 11.87 | | 12.59 |
| 1 | 11350 | | 0.53 | | 28.33 | 20.20 | | |
| 1 | 11351 | 6.07 | 3.73 | | 7.00 | 8.74 | | |
| 1 | 11352 | 5.91 | 4.35 | | 6.52 | 6.81 | | |
| 1 | 11353 | 5.71 | 4.90 | | 5.73 | 4.37 | | |
| 1 | 11354 | 5.47 | 5.56 | | 4.49 | 3.26 | | |
| 1 | 11355 | 5.18 | 6.27 | | 3.56 | 2.17 | | |
| 1 | 11356 | 4.77 | 7.84 | | 3.00 | 1.06 | | |
| 1 | 11357 | 4.22 | 9.31 | | 2.44 | 0.03 | | |
| 1 | 11358 | 3.55 | 10.40 | | 1.88 | | | |
| 1 | 11359 | 2.78 | 10.19 | | 1.40 | | | |
| 1 | 11360 | 2.04 | 9.93 | | 1.03 | | | |
| 1 | 11361 | 1.35 | 9.64 | | 0.80 | | | |
| 1 | 11362 | 0.71 | 8.69 | | 1.65 | 0.29 | | |
| 1 | 11363 | 0.14 | 7.33 | | 2.91 | 1.08 | | 8.76 |
| 1 | 11364 | | 5.19 | | 5.24 | 1.95 | | 8.76 |
| 1 | 11365 | | 4.24 | | 8.39 | 3.92 | | 8.76 |
| 1 | 11366 | | 2.96 | | 10.94 | 7.53 | | 9.44 |
| 1 | 11367 | | 1.39 | | 15.20 | 12.14 | | 11.80 |
| 1 | 11368 | | 0.61 | | 22.18 | 21.33 | | |
| 1 | 11369 | 6.11 | 3.72 | | 7.06 | 8.78 | | |
| 1 | 11370 | 5.96 | 4.32 | | 6.60 | 6.86 | | |
| 1 | 11371 | 5.76 | 4.86 | | 5.85 | 4.56 | | |
| 1 | 11372 | 5.50 | 5.50 | | 4.54 | 3.59 | | |
| 1 | 11373 | 5.13 | 6.19 | | 3.58 | 2.25 | | |
| 1 | 11374 | 4.70 | 7.63 | | 3.01 | 1.15 | | |
| 1 | 11375 | 4.16 | 9.06 | | 2.44 | 0.15 | | |
| 1 | 11376 | 3.53 | 10.09 | | 1.87 | | | |
| 1 | 11377 | 2.85 | 9.96 | | 1.38 | | | |
| 1 | 11378 | 2.21 | 10.05 | | 1.00 | | | |
| 1 | 11379 | 1.56 | 9.90 | | 0.75 | | | |
| 1 | 11380 | 1.00 | 8.95 | | 1.51 | 0.36 | | |
| 1 | 11381 | 0.45 | 7.24 | | 2.71 | 1.17 | | 8.76 |
| 1 | 11382 | | 5.44 | | 5.20 | 2.07 | | 8.76 |
| 1 | 11383 | | 4.39 | | 7.92 | 4.49 | | 8.76 |
| 1 | 11384 | | 3.03 | | 9.79 | 7.80 | | 8.76 |
| 1 | 11385 | | 1.48 | | 12.68 | 12.09 | | 10.16 |

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|---|---|---|---|---|---|---|---|---|
| 1 | 11386 | | 0.71 | | 12.30 | 18.49 | | |
| 1 | 11387 | 6.17 | 3.70 | | 7.13 | 8.83 | | |
| 1 | 11388 | 6.02 | 4.29 | | 6.67 | 6.93 | | |
| 1 | 11389 | 5.83 | 4.82 | | 5.94 | 4.63 | | |
| 1 | 11390 | 5.58 | 5.43 | | 4.70 | 3.67 | | |
| 1 | 11391 | 5.21 | 6.10 | | 3.66 | 2.34 | | |
| 1 | 11392 | 4.80 | 7.40 | | 3.01 | 1.25 | | |
| 1 | 11393 | 4.28 | 8.80 | | 2.43 | 0.26 | | |
| 1 | 11394 | 3.67 | 9.34 | | 1.85 | | | |
| 1 | 11395 | 3.01 | 10.07 | | 1.34 | | | |
| 1 | 11396 | 2.39 | 10.15 | | 0.94 | | | |
| 1 | 11397 | 1.78 | 10.03 | | 0.66 | | | |
| 1 | 11398 | 1.30 | 9.42 | | 1.26 | 0.41 | | |
| 1 | 11399 | 0.84 | 7.63 | | 2.37 | 1.24 | | 8.76 |
| 1 | 11400 | 0.43 | 5.74 | | 4.67 | 2.15 | | 8.76 |
| 1 | 11401 | 0.06 | 4.68 | | 6.92 | 4.79 | | 8.76 |
| 1 | 11402 | | 3.22 | | 7.98 | 7.79 | | 8.76 |
| 1 | 11403 | | 1.79 | | 8.72 | 11.40 | | 8.76 |
| 1 | 11404 | | 1.24 | | 6.38 | 14.61 | | |
| 1 | 11405 | 6.23 | 3.68 | | 7.19 | 8.90 | | |
| 1 | 11406 | 6.08 | 4.27 | | 6.68 | 6.99 | | |
| 1 | 11407 | 5.90 | 4.78 | | 6.02 | 5.10 | | |
| 1 | 11408 | 5.66 | 5.38 | | 4.78 | 3.95 | | |
| 1 | 11409 | 5.31 | 6.08 | | 3.69 | 2.43 | | |
| 1 | 11410 | 4.91 | 7.18 | | 3.03 | 1.36 | | |
| 1 | 11411 | 4.40 | 8.60 | | 2.43 | 0.37 | | |
| 1 | 11412 | 3.81 | 9.40 | | 1.83 | | | |
| 1 | 11413 | 3.17 | 10.13 | | 1.30 | | | |
| 1 | 11414 | 2.57 | 10.49 | | 0.86 | | | |
| 1 | 11415 | 2.16 | 10.08 | | 0.54 | | | |
| 1 | 11416 | 1.60 | 9.47 | | 0.91 | 0.44 | | |
| 1 | 11417 | 1.21 | 8.12 | | 2.16 | 1.28 | | |
| 1 | 11418 | 0.88 | 5.77 | | 3.89 | 2.18 | | 8.76 |
| 1 | 11419 | 0.56 | 4.88 | | 5.24 | 4.92 | | 8.76 |
| 1 | 11420 | 0.11 | 3.57 | | 5.67 | 7.45 | | 8.76 |
| 1 | 11421 | | 2.24 | | 5.17 | 9.93 | | 8.76 |
| 1 | 11422 | | 1.85 | | 2.90 | 11.29 | | |
| 1 | 11423 | 6.30 | 3.70 | | 7.26 | 8.95 | | |
| 1 | 11424 | 6.15 | 4.24 | | 6.76 | 7.05 | | |
| 1 | 11425 | 5.97 | 4.73 | | 6.11 | 5.17 | | |
| 1 | 11426 | 5.75 | 5.38 | | 4.88 | 4.03 | | |
| 1 | 11427 | 5.41 | 6.13 | | 3.72 | 2.60 | | |
| 1 | 11428 | 5.01 | 6.95 | | 3.05 | 1.46 | | |
| 1 | 11429 | 4.52 | 8.59 | | 2.43 | 0.48 | | |
| 1 | 11430 | 3.94 | 9.42 | | 1.80 | | | |
| 1 | 11431 | 3.32 | 10.16 | | 1.25 | | | |
| 1 | 11432 | 2.75 | 10.50 | | 0.77 | | | |
| 1 | 11433 | 2.40 | 10.06 | | 0.39 | | | |
| 1 | 11434 | 1.89 | 9.43 | | 0.49 | 0.44 | | |
| 1 | 11435 | 1.55 | 8.05 | | 1.67 | 1.28 | | |
| 1 | 11436 | 1.27 | 6.10 | | 2.78 | 2.15 | | 8.76 |
| 1 | 11437 | 0.96 | 4.91 | | 3.53 | 4.70 | | 8.76 |
| 1 | 11438 | 0.55 | 3.93 | | 3.29 | 6.78 | | 8.76 |
| 1 | 11439 | | 2.81 | | 2.45 | 8.24 | | 8.76 |
| 1 | 11440 | | 2.32 | | 0.71 | 8.81 | | |
| 1 | 11441 | 6.37 | 3.72 | | 7.27 | 9.01 | | |
| 1 | 11442 | 6.22 | 4.22 | | 6.85 | 7.12 | | |
| 1 | 11443 | 6.05 | 4.72 | | 6.20 | 5.23 | | |
| 1 | 11444 | 5.83 | 5.41 | | 5.01 | 4.10 | | |
| 1 | 11445 | 5.51 | 6.17 | | 3.76 | 2.96 | | |
| 1 | 11446 | 5.12 | 6.81 | | 3.07 | 1.57 | | |
| 1 | 11447 | 4.64 | 8.57 | | 2.44 | 0.59 | | |
| 1 | 11448 | 4.08 | 9.48 | | 1.78 | | | |
| 1 | 11449 | 3.47 | 10.13 | | 1.19 | | | |
| 1 | 11450 | 2.99 | 10.46 | | 0.68 | | | |
| 1 | 11451 | 2.63 | 10.35 | | 0.24 | | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 11452 | 2.18 | 9.32 | | 0.29 | 0.41 | | |
| 1 | 11453 | 1.85 | 7.93 | | 1.04 | 1.24 | | |
| 1 | 11454 | 1.60 | 6.03 | | 1.73 | 2.08 | | |
| 1 | 11455 | 1.30 | 4.97 | | 2.04 | 4.27 | | 8.76 |
| 1 | 11456 | 0.93 | 4.13 | | 1.49 | 5.92 | | 8.76 |
| 1 | 11457 | 0.48 | 3.24 | | 0.52 | 7.01 | | 8.76 |
| 1 | 11458 | 0.04 | 2.75 | | | 6.27 | | |
| 1 | 11459 | 6.46 | 3.74 | | 7.33 | 9.06 | | |
| 1 | 11460 | 6.30 | 4.24 | | 6.95 | 7.19 | | |
| 1 | 11461 | 6.13 | 4.74 | | 6.30 | 5.29 | | |
| 1 | 11462 | 5.92 | 5.42 | | 5.16 | 4.17 | | |
| 1 | 11463 | 5.61 | 6.19 | | 3.80 | 3.04 | | |
| 1 | 11464 | 5.22 | 6.75 | | 3.11 | 1.67 | | |
| 1 | 11465 | 4.75 | 8.53 | | 2.45 | 0.70 | | |
| 1 | 11466 | 4.20 | 9.43 | | 1.77 | | | |
| 1 | 11467 | 3.70 | 10.12 | | 1.14 | | | |
| 1 | 11468 | 3.35 | 10.37 | | 0.59 | | | |
| 1 | 11469 | 3.20 | 10.22 | | 0.10 | | | |
| 1 | 11470 | 2.87 | 9.61 | | 0.08 | 0.27 | | |
| 1 | 11471 | 2.36 | 7.78 | | 0.06 | 1.03 | | |
| 1 | 11472 | 2.09 | 5.97 | | 0.27 | 1.77 | | |
| 1 | 11473 | 1.83 | 5.03 | | 0.24 | 3.70 | | |
| 1 | 11474 | 1.25 | 4.31 | | | 4.71 | | |
| 1 | 11475 | 0.87 | 3.55 | | | 5.00 | | |
| 1 | 11476 | 0.49 | 3.15 | | | 4.79 | | |
| 1 | 11477 | 6.55 | 3.75 | | 7.40 | 9.12 | | |
| 1 | 11478 | 6.38 | 4.25 | | 7.06 | 7.26 | | |
| 1 | 11479 | 6.22 | 4.75 | | 6.41 | 5.35 | | |
| 1 | 11480 | 6.01 | 5.43 | | 5.35 | 4.24 | | |
| 1 | 11481 | 5.71 | 6.20 | | 3.87 | 3.12 | | |
| 1 | 11482 | 5.32 | 6.72 | | 3.16 | 1.77 | | |
| 1 | 11483 | 4.86 | 8.45 | | 2.47 | 0.80 | | |
| 1 | 11484 | 4.32 | 9.36 | | 1.76 | | | |
| 1 | 11485 | 3.99 | 10.09 | | 1.10 | | | |
| 1 | 11486 | 3.71 | 10.36 | | 0.51 | | | |
| 1 | 11487 | 3.59 | 10.06 | | 0.05 | | | |
| 1 | 11488 | 3.32 | 9.43 | | | 0.19 | | |
| 1 | 11489 | 3.05 | 8.39 | | | 0.89 | | |
| 1 | 11490 | 2.66 | 5.93 | | | 1.55 | | |
| 1 | 11491 | 2.25 | 5.08 | | | 2.35 | | |
| 1 | 11492 | 1.86 | 4.34 | | | 3.26 | | |
| 1 | 11493 | 1.18 | 3.79 | | | 3.76 | | |
| 1 | 11494 | 0.86 | 3.42 | | | 3.76 | | |
| 1 | 11495 | 6.65 | 3.76 | | 7.48 | 9.18 | | |
| 1 | 11496 | 6.47 | 4.25 | | 7.18 | 7.33 | | |
| 1 | 11497 | 6.30 | 4.76 | | 6.53 | 5.41 | | |
| 1 | 11498 | 6.10 | 5.43 | | 5.58 | 4.31 | | |
| 1 | 11499 | 5.80 | 6.12 | | 3.95 | 3.20 | | |
| 1 | 11500 | 5.42 | 6.72 | | 3.28 | 1.87 | | |
| 1 | 11501 | 4.96 | 8.35 | | 2.51 | 0.91 | | |
| 1 | 11502 | 4.46 | 9.25 | | 1.76 | 0.01 | | |
| 1 | 11503 | 4.22 | 9.96 | | 1.07 | | | |
| 1 | 11504 | 4.19 | 10.16 | | 0.45 | | | |
| 1 | 11505 | 3.95 | 9.97 | | | | | |
| 1 | 11506 | 3.72 | 9.31 | | | 0.16 | | |
| 1 | 11507 | 3.49 | 8.29 | | | 0.79 | | |
| 1 | 11508 | 3.19 | 6.97 | | | 1.39 | | |
| 1 | 11509 | 2.74 | 5.11 | | | 1.90 | | |
| 1 | 11510 | 2.51 | 4.45 | | | 2.28 | | |
| 1 | 11511 | 1.94 | 3.98 | | | 2.81 | | |
| 1 | 11512 | 1.28 | 3.65 | | | 2.88 | | |
| 1 | 11513 | 6.75 | 3.77 | | 7.56 | 9.24 | | |
| 1 | 11514 | 6.55 | 4.25 | | 7.30 | 7.41 | | |
| 1 | 11515 | 6.39 | 4.76 | | 6.66 | 5.46 | | |
| 1 | 11516 | 6.19 | 5.42 | | 5.80 | 4.37 | | |
| 1 | 11517 | 5.89 | 6.10 | | 4.06 | 2.91 | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 11518 | 5.51 | 6.71 | | 3.41 | 2.08 | | |
| 1 | 11519 | 5.05 | 8.23 | | 2.56 | 1.02 | | |
| 1 | 11520 | 4.62 | 9.11 | | 1.78 | 0.11 | | |
| 1 | 11521 | 4.42 | 9.79 | | 1.06 | | | |
| 1 | 11522 | 4.42 | 9.96 | | 0.48 | | | |
| 1 | 11523 | 4.21 | 9.74 | | | | | |
| 1 | 11524 | 4.00 | 9.09 | | | 0.13 | | |
| 1 | 11525 | 3.78 | 8.10 | | | 0.70 | | |
| 1 | 11526 | 3.50 | 6.89 | | | 1.25 | | |
| 1 | 11527 | 3.14 | 5.64 | | | 1.71 | | |
| 1 | 11528 | 2.98 | 4.66 | | | 2.06 | | |
| 1 | 11529 | 2.39 | 4.12 | | | 2.29 | | |
| 1 | 11530 | 1.91 | 4.02 | | | 2.41 | | |
| 1 | 11531 | 6.86 | 3.77 | | 7.66 | 9.45 | | |
| 1 | 11532 | 6.64 | 4.24 | | 7.39 | 7.22 | | |
| 1 | 11533 | 6.47 | 4.74 | | 6.80 | 5.51 | | |
| 1 | 11534 | 6.27 | 5.40 | | 5.93 | 4.27 | | |
| 1 | 11535 | 5.98 | 6.07 | | 4.29 | 3.36 | | |
| 1 | 11536 | 5.60 | 6.68 | | 3.50 | 2.31 | | |
| 1 | 11537 | 5.13 | 8.08 | | 2.63 | 1.12 | | |
| 1 | 11538 | 4.75 | 8.95 | | 1.81 | 0.21 | | |
| 1 | 11539 | 4.79 | 9.55 | | 1.07 | | | |
| 1 | 11540 | 4.58 | 9.73 | | 0.48 | | | |
| 1 | 11541 | 4.39 | 9.49 | | | | | |
| 1 | 11542 | 4.20 | 8.84 | | | 0.10 | | |
| 1 | 11543 | 3.99 | 7.90 | | | 0.62 | | |
| 1 | 11544 | 3.72 | 6.79 | | | 1.12 | | |
| 1 | 11545 | 3.42 | 5.67 | | | 1.54 | | |
| 1 | 11546 | 3.06 | 4.70 | | | 1.86 | | |
| 1 | 11547 | 2.63 | 4.38 | | | 2.07 | | |
| 1 | 11548 | 2.23 | 4.15 | | | 2.18 | | |
| 1 | 11549 | 6.97 | 3.76 | | 7.76 | 9.34 | | |
| 1 | 11550 | 6.73 | 4.21 | | 7.54 | 7.47 | | |
| 1 | 11551 | 6.56 | 4.72 | | 6.90 | 5.55 | | |
| 1 | 11552 | 6.35 | 5.37 | | 6.07 | 4.34 | | |
| 1 | 11553 | 6.06 | 6.03 | | 4.46 | 3.43 | | |
| 1 | 11554 | 5.67 | 6.64 | | 3.59 | 2.40 | | |
| 1 | 11555 | 5.20 | 7.93 | | 2.73 | 1.22 | | |
| 1 | 11556 | 4.85 | 8.77 | | 1.86 | 0.30 | | |
| 1 | 11557 | 4.90 | 9.33 | | 1.09 | | | |
| 1 | 11558 | 4.69 | 9.48 | | 0.50 | | | |
| 1 | 11559 | 4.50 | 9.22 | | | | | |
| 1 | 11560 | 4.32 | 8.57 | | | 0.07 | | |
| 1 | 11561 | 4.12 | 7.68 | | | 0.55 | | |
| 1 | 11562 | 3.87 | 6.66 | | | 1.00 | | |
| 1 | 11563 | 3.62 | 5.66 | | | 1.39 | | |
| 1 | 11564 | 3.30 | 4.79 | | | 1.67 | | |
| 1 | 11565 | 2.93 | 4.43 | | | 1.86 | | |
| 1 | 11566 | 2.47 | 4.23 | | | 1.97 | | |
| 1 | 11567 | 7.09 | 3.74 | | 7.88 | 9.37 | | |
| 1 | 11568 | 6.82 | 4.18 | | 7.70 | 7.53 | | |
| 1 | 11569 | 6.64 | 4.69 | | 7.07 | 5.67 | | |
| 1 | 11570 | 6.43 | 5.32 | | 6.18 | 4.41 | | |
| 1 | 11571 | 6.13 | 5.97 | | 4.60 | 3.51 | | |
| 1 | 11572 | 5.74 | 6.59 | | 3.68 | 2.48 | | |
| 1 | 11573 | 5.25 | 7.74 | | 2.80 | 1.31 | | |
| 1 | 11574 | 4.91 | 8.57 | | 1.92 | 0.41 | | |
| 1 | 11575 | 4.95 | 9.09 | | 1.12 | | | |
| 1 | 11576 | 4.75 | 9.21 | | 0.43 | | | |
| 1 | 11577 | 4.55 | 8.93 | | | | | |
| 1 | 11578 | 4.36 | 8.29 | | | | | |
| 1 | 11579 | 4.16 | 7.43 | | | 0.47 | | |
| 1 | 11580 | 3.95 | 6.49 | | | 0.89 | | |
| 1 | 11581 | 3.74 | 5.59 | | | 1.24 | | |
| 1 | 11582 | 3.46 | 4.78 | | | 1.50 | | |
| 1 | 11583 | 3.14 | 4.45 | | | 1.67 | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 11584 | 2.74 | 4.29 | | | 1.77 | | |
| 1 | 11585 | 7.21 | 3.72 | | 8.03 | 10.19 | | |
| 1 | 11586 | 6.92 | 4.14 | | 7.87 | 7.79 | | |
| 1 | 11587 | 6.71 | 4.65 | | 7.24 | 5.77 | | |
| 1 | 11588 | 6.50 | 5.27 | | 6.34 | 4.47 | | |
| 1 | 11589 | 6.20 | 5.91 | | 4.79 | 3.57 | | |
| 1 | 11590 | 5.79 | 6.51 | | 3.79 | 2.56 | | |
| 1 | 11591 | 5.29 | 7.54 | | 2.91 | 1.40 | | |
| 1 | 11592 | 5.18 | 8.29 | | 2.00 | 0.50 | | |
| 1 | 11593 | 4.96 | 8.83 | | 1.17 | | | |
| 1 | 11594 | 4.75 | 8.92 | | 0.39 | | | |
| 1 | 11595 | 4.54 | 8.62 | | | | | |
| 1 | 11596 | 4.34 | 7.98 | | | | | |
| 1 | 11597 | 4.14 | 7.16 | | | 0.39 | | |
| 1 | 11598 | 3.95 | 6.28 | | | 0.77 | | |
| 1 | 11599 | 3.78 | 5.42 | | | 1.09 | | |
| 1 | 11600 | 3.55 | 4.62 | | | 1.33 | | |
| 1 | 11601 | 3.29 | 4.40 | | | 1.49 | | |
| 1 | 11602 | 2.94 | 4.26 | | | 1.58 | | |
| 1 | 11603 | 7.34 | 3.69 | | 8.18 | 10.22 | | |
| 1 | 11604 | 7.01 | 4.11 | | 8.06 | 7.87 | | |
| 1 | 11605 | 6.79 | 4.59 | | 7.43 | 5.87 | | |
| 1 | 11606 | 6.56 | 5.19 | | 6.52 | 4.64 | | |
| 1 | 11607 | 6.25 | 5.83 | | 5.08 | 3.64 | | |
| 1 | 11608 | 5.83 | 6.43 | | 3.95 | 2.63 | | |
| 1 | 11609 | 5.32 | 7.32 | | 3.03 | 1.49 | | |
| 1 | 11610 | 5.16 | 8.05 | | 2.08 | 0.58 | | |
| 1 | 11611 | 4.93 | 8.56 | | 1.21 | | | |
| 1 | 11612 | 4.69 | 8.62 | | 0.36 | 0.03 | | |
| 1 | 11613 | 4.46 | 8.29 | | | | | |
| 1 | 11614 | 4.25 | 7.65 | | | | | |
| 1 | 11615 | 4.05 | 6.86 | | | 0.30 | | |
| 1 | 11616 | 3.89 | 5.98 | | | 0.65 | | |
| 1 | 11617 | 3.75 | 5.18 | | | 0.94 | | |
| 1 | 11618 | 3.57 | 4.51 | | | 1.17 | | |
| 1 | 11619 | 3.36 | 4.32 | | | 1.32 | | |
| 1 | 11620 | 3.06 | 4.20 | | | 1.41 | | |
| 1 | 11621 | 7.47 | 3.65 | | 8.34 | 10.24 | | |
| 1 | 11622 | 7.10 | 4.12 | | 8.25 | 7.94 | | |
| 1 | 11623 | 6.86 | 4.52 | | 7.63 | 6.00 | | |
| 1 | 11624 | 6.62 | 5.11 | | 6.70 | 4.68 | | |
| 1 | 11625 | 6.29 | 5.73 | | 5.41 | 3.70 | | |
| 1 | 11626 | 5.86 | 6.32 | | 4.13 | 2.70 | | |
| 1 | 11627 | 5.32 | 7.08 | | 3.16 | 1.57 | | |
| 1 | 11628 | 5.11 | 7.80 | | 2.15 | 0.66 | | |
| 1 | 11629 | 4.85 | 8.27 | | 1.24 | | | |
| 1 | 11630 | 4.58 | 8.30 | | 0.32 | 0.06 | | |
| 1 | 11631 | 4.33 | 7.95 | | | | | |
| 1 | 11632 | 4.09 | 7.30 | | | | | |
| 1 | 11633 | 3.89 | 6.52 | | | 0.21 | | |
| 1 | 11634 | 3.77 | 5.68 | | | 0.52 | | |
| 1 | 11635 | 3.66 | 4.80 | | | 0.80 | | |
| 1 | 11636 | 3.52 | 4.36 | | | 1.01 | | |
| 1 | 11637 | 3.36 | 4.19 | | | 1.15 | | |
| 1 | 11638 | 3.12 | 4.10 | | | 1.23 | | |
| 1 | 11639 | 7.60 | 3.60 | | 8.51 | 10.26 | | |
| 1 | 11640 | 7.19 | 4.13 | | 8.46 | 8.03 | | |
| 1 | 11641 | 6.92 | 4.51 | | 7.84 | 6.14 | | |
| 1 | 11642 | 6.66 | 5.01 | | 6.90 | 4.72 | | |
| 1 | 11643 | 6.33 | 5.63 | | 5.73 | 3.75 | | |
| 1 | 11644 | 5.87 | 6.20 | | 4.32 | 2.77 | | |
| 1 | 11645 | 5.48 | 6.78 | | 3.29 | 1.64 | | |
| 1 | 11646 | 5.02 | 7.53 | | 2.23 | 0.72 | | |
| 1 | 11647 | 4.72 | 7.97 | | 1.22 | 0.03 | | |
| 1 | 11648 | 4.42 | 7.96 | | 0.28 | 0.08 | | |
| 1 | 11649 | 4.13 | 7.59 | | | | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 11650 | 3.87 | 6.92 | | | | | |
| 1 | 11651 | 3.82 | 6.14 | | | 0.10 | | |
| 1 | 11652 | 3.58 | 5.33 | | | 0.39 | | |
| 1 | 11653 | 3.50 | 4.49 | | | 0.65 | | |
| 1 | 11654 | 3.41 | 4.17 | | | 0.84 | | |
| 1 | 11655 | 3.30 | 4.02 | | | 0.98 | | |
| 1 | 11656 | 3.10 | 3.95 | | | 1.06 | | |
| 1 | 11657 | 7.73 | 3.53 | | 8.70 | 10.26 | | |
| 1 | 11658 | 7.27 | 4.14 | | 8.68 | 8.41 | | |
| 1 | 11659 | 6.98 | 4.52 | | 8.06 | 6.25 | | |
| 1 | 11660 | 6.70 | 4.95 | | 7.10 | 4.75 | | |
| 1 | 11661 | 6.34 | 5.51 | | 5.91 | 3.79 | | |
| 1 | 11662 | 5.87 | 6.05 | | 4.41 | 2.82 | | |
| 1 | 11663 | 5.44 | 6.53 | | 3.36 | 1.70 | | |
| 1 | 11664 | 4.89 | 7.25 | | 2.24 | 0.78 | | |
| 1 | 11665 | 4.56 | 7.65 | | 1.19 | 0.05 | | |
| 1 | 11666 | 4.22 | 7.61 | | 0.21 | | | |
| 1 | 11667 | 3.89 | 7.21 | | | | | |
| 1 | 11668 | 3.60 | 6.51 | | | | | |
| 1 | 11669 | 3.56 | 5.73 | | | | | |
| 1 | 11670 | 3.32 | 4.93 | | | 0.25 | | |
| 1 | 11671 | 3.28 | 4.12 | | | 0.49 | | |
| 1 | 11672 | 3.24 | 3.88 | | | 0.68 | | |
| 1 | 11673 | 3.17 | 3.76 | | | 0.82 | | |
| 1 | 11674 | 3.02 | 3.75 | | | 0.90 | | |
| 1 | 11675 | 7.87 | 3.51 | | 8.89 | 10.25 | | |
| 1 | 11676 | 7.37 | 4.15 | | 8.91 | 8.47 | | |
| 1 | 11677 | 7.03 | 4.54 | | 8.29 | 6.36 | | |
| 1 | 11678 | 6.73 | 4.95 | | 7.31 | 4.80 | | |
| 1 | 11679 | 6.35 | 5.37 | | 6.09 | 3.83 | | |
| 1 | 11680 | 5.85 | 5.89 | | 4.48 | 2.87 | | |
| 1 | 11681 | 5.38 | 6.26 | | 3.39 | 1.75 | | |
| 1 | 11682 | 4.75 | 6.96 | | 2.23 | 0.81 | | |
| 1 | 11683 | 4.36 | 7.33 | | 1.16 | 0.05 | | |
| 1 | 11684 | 3.97 | 7.25 | | 0.17 | | | |
| 1 | 11685 | 3.60 | 6.81 | | | | | |
| 1 | 11686 | 3.26 | 6.09 | | | | | |
| 1 | 11687 | 3.23 | 5.28 | | | | | |
| 1 | 11688 | 3.01 | 4.47 | | | 0.10 | | |
| 1 | 11689 | 2.99 | 3.78 | | | 0.33 | | |
| 1 | 11690 | 2.99 | 3.58 | | | 0.52 | | |
| 1 | 11691 | 2.97 | 3.47 | | | 0.65 | | |
| 1 | 11692 | 2.87 | 3.06 | | | 0.73 | | |
| 1 | 11693 | 8.01 | 3.51 | | 9.10 | 10.22 | | |
| 1 | 11694 | 7.59 | 4.16 | | 9.15 | 8.53 | | |
| 1 | 11695 | 7.14 | 4.55 | | 8.52 | 6.46 | | |
| 1 | 11696 | 6.74 | 4.95 | | 7.53 | 4.93 | | |
| 1 | 11697 | 6.34 | 5.29 | | 6.27 | 3.86 | | |
| 1 | 11698 | 5.81 | 5.70 | | 4.55 | 2.91 | | |
| 1 | 11699 | 5.29 | 5.99 | | 3.41 | 1.79 | | |
| 1 | 11700 | 4.64 | 6.65 | | 2.21 | 0.84 | | |
| 1 | 11701 | 4.12 | 6.98 | | 1.12 | 0.03 | | |
| 1 | 11702 | 3.68 | 6.88 | | 0.07 | | | |
| 1 | 11703 | 3.26 | 6.42 | | | | | |
| 1 | 11704 | 2.88 | 5.64 | | | | | |
| 1 | 11705 | 2.85 | 4.80 | | | | | |
| 1 | 11706 | 2.62 | 4.01 | | | | | |
| 1 | 11707 | 2.63 | 3.42 | | | 0.16 | | |
| 1 | 11708 | 2.69 | 3.23 | | | 0.34 | | |
| 1 | 11709 | 2.70 | 3.14 | | | 0.48 | | |
| 1 | 11710 | 2.71 | 2.80 | | | 0.56 | | |
| 1 | 11711 | 8.15 | 3.51 | | 9.32 | 10.18 | | |
| 1 | 11712 | 7.83 | 4.17 | | 9.40 | 8.57 | | |
| 1 | 11713 | 7.34 | 4.57 | | 8.77 | 6.55 | | |
| 1 | 11714 | 6.74 | 4.95 | | 7.74 | 4.99 | | |
| 1 | 11715 | 6.31 | 5.25 | | 6.45 | 3.88 | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 11716 | 5.75 | 5.49 | | 4.67 | 2.93 | | |
| 1 | 11717 | 5.18 | 6.23 | | 3.42 | 1.81 | | |
| 1 | 11718 | 4.50 | 6.38 | | 2.18 | 0.84 | | |
| 1 | 11719 | 3.94 | 6.64 | | 1.05 | | | |
| 1 | 11720 | 3.43 | 6.50 | | | | | |
| 1 | 11721 | 2.94 | 5.98 | | | | | |
| 1 | 11722 | 2.76 | 5.27 | | | | | |
| 1 | 11723 | 2.72 | 4.35 | | | | | |
| 1 | 11724 | 2.45 | 3.48 | | | | | |
| 1 | 11725 | 2.27 | 3.02 | | | | | |
| 1 | 11726 | 2.26 | 2.83 | | | 0.16 | | |
| 1 | 11727 | 2.33 | 2.51 | | | 0.30 | | |
| 1 | 11728 | 2.38 | 2.50 | | | 0.39 | | |
| 1 | 11729 | 8.32 | 3.50 | | 9.55 | 10.22 | | |
| 1 | 11730 | 8.07 | 4.18 | | 9.65 | 8.60 | | |
| 1 | 11731 | 7.55 | 4.59 | | 9.01 | 6.64 | | |
| 1 | 11732 | 6.83 | 4.95 | | 7.96 | 5.05 | | |
| 1 | 11733 | 6.25 | 5.22 | | 6.63 | 3.89 | | |
| 1 | 11734 | 5.67 | 5.35 | | 4.95 | 2.95 | | |
| 1 | 11735 | 5.05 | 6.17 | | 3.42 | 1.82 | | |
| 1 | 11736 | 4.34 | 6.31 | | 2.14 | 0.82 | | |
| 1 | 11737 | 3.64 | 6.48 | | 0.91 | | | |
| 1 | 11738 | 3.11 | 6.33 | | | | | |
| 1 | 11739 | 2.84 | 5.89 | | | | | |
| 1 | 11740 | 2.60 | 5.12 | | | | | |
| 1 | 11741 | 2.58 | 4.24 | | | | | |
| 1 | 11742 | 2.25 | 3.24 | | | | | |
| 1 | 11743 | 2.04 | 2.57 | | | | | |
| 1 | 11744 | 1.79 | 2.24 | | | 0.01 | | |
| 1 | 11745 | 2.03 | 2.23 | | | 0.14 | | |
| 1 | 11746 | 2.15 | 2.27 | | | 0.24 | | |
| 1 | 11747 | 8.59 | 3.49 | | 9.75 | 10.15 | | |
| 1 | 11748 | 8.34 | 4.19 | | 9.92 | 8.61 | | |
| 1 | 11749 | 7.77 | 4.61 | | 9.26 | 6.70 | | |
| 1 | 11750 | 7.00 | 4.95 | | 8.17 | 5.09 | | |
| 1 | 11751 | 6.18 | 5.19 | | 6.80 | 3.89 | | |
| 1 | 11752 | 5.56 | 5.30 | | 5.20 | 2.94 | | |
| 1 | 11753 | 4.89 | 6.11 | | 3.40 | 1.81 | | |
| 1 | 11754 | 4.14 | 6.21 | | 2.07 | 0.78 | | |
| 1 | 11755 | 3.43 | 6.38 | | 0.72 | | | |
| 1 | 11756 | 3.01 | 6.21 | | | | | |
| 1 | 11757 | 2.70 | 5.76 | | | | | |
| 1 | 11758 | 2.42 | 5.00 | | | | | |
| 1 | 11759 | 2.37 | 4.10 | | | | | |
| 1 | 11760 | 1.99 | 3.01 | | | | | |
| 1 | 11761 | 1.73 | 2.28 | | | | | |
| 1 | 11762 | 1.49 | 1.96 | | | | | |
| 1 | 11763 | 1.50 | 1.79 | | | 0.03 | | |
| 1 | 11764 | 1.66 | 1.85 | | | 0.14 | | |
| 1 | 11765 | 8.87 | 3.48 | | 10.01 | 10.06 | | |
| 1 | 11766 | 8.61 | 4.19 | | 10.14 | 8.61 | | |
| 1 | 11767 | 7.99 | 4.63 | | 9.51 | 6.76 | | |
| 1 | 11768 | 7.17 | 4.95 | | 8.38 | 5.12 | | |
| 1 | 11769 | 6.24 | 5.16 | | 6.96 | 3.89 | | |
| 1 | 11770 | 5.47 | 5.25 | | 5.35 | 2.93 | | |
| 1 | 11771 | 4.76 | 6.03 | | 3.36 | 1.77 | | |
| 1 | 11772 | 3.93 | 6.10 | | 1.90 | 0.71 | | |
| 1 | 11773 | 3.36 | 6.24 | | 0.51 | | | |
| 1 | 11774 | 2.97 | 6.07 | | | | | |
| 1 | 11775 | 2.47 | 5.55 | | | | | |
| 1 | 11776 | 2.32 | 4.80 | | | | | |
| 1 | 11777 | 2.09 | 3.92 | | | | | |
| 1 | 11778 | 1.66 | 2.75 | | | | | |
| 1 | 11779 | 1.48 | 2.01 | | | | | |
| 1 | 11780 | 1.12 | 1.58 | | | | | |
| 1 | 11781 | 0.95 | 1.29 | | | | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 11782 | 1.03 | 1.37 | | | 0.06 | | |
| 1 | 11783 | 9.17 | 3.46 | | 10.27 | 9.95 | | |
| 1 | 11784 | 8.91 | 4.19 | | 10.55 | 8.59 | | |
| 1 | 11785 | 8.23 | 4.64 | | 9.75 | 6.80 | | |
| 1 | 11786 | 7.34 | 4.94 | | 8.58 | 5.14 | | |
| 1 | 11787 | 6.38 | 5.13 | | 7.11 | 3.91 | | |
| 1 | 11788 | 5.53 | 5.18 | | 5.45 | 2.89 | | |
| 1 | 11789 | 4.75 | 5.94 | | 3.38 | 1.70 | | |
| 1 | 11790 | 3.76 | 5.97 | | 1.69 | 0.59 | | |
| 1 | 11791 | 3.26 | 6.08 | | 0.27 | | | |
| 1 | 11792 | 2.81 | 5.88 | | | | | |
| 1 | 11793 | 2.25 | 5.37 | | | | | |
| 1 | 11794 | 2.03 | 4.61 | | | | | |
| 1 | 11795 | 1.73 | 3.71 | | | | | |
| 1 | 11796 | 1.22 | 2.42 | | | | | |
| 1 | 11797 | 1.16 | 1.67 | | | | | |
| 1 | 11798 | 0.92 | 1.15 | | | | | |
| 1 | 11799 | 0.67 | 0.73 | | | 0.07 | | |
| 1 | 11800 | 0.75 | 0.83 | | | 0.34 | | |
| 1 | 11801 | 9.49 | 3.43 | | 10.54 | 9.82 | | |
| 1 | 11802 | 9.21 | 4.19 | | 10.83 | 8.56 | | |
| 1 | 11803 | 8.47 | 4.65 | | 9.95 | 6.82 | | |
| 1 | 11804 | 7.54 | 4.93 | | 8.79 | 5.13 | | |
| 1 | 11805 | 6.50 | 5.08 | | 7.24 | 3.88 | | |
| 1 | 11806 | 5.58 | 5.11 | | 5.51 | 2.83 | | |
| 1 | 11807 | 4.75 | 5.83 | | 3.45 | 1.61 | | |
| 1 | 11808 | 3.70 | 5.81 | | 1.48 | 0.46 | | |
| 1 | 11809 | 3.15 | 5.88 | | | | | |
| 1 | 11810 | 2.64 | 5.59 | | | | | |
| 1 | 11811 | 1.99 | 5.13 | | | | | |
| 1 | 11812 | 1.70 | 4.36 | | | | | |
| 1 | 11813 | 1.41 | 3.44 | | | | | |
| 1 | 11814 | 1.18 | 2.11 | | | | | |
| 1 | 11815 | 0.96 | 1.32 | | | | | |
| 1 | 11816 | 0.68 | 0.68 | | | | | |
| 1 | 11817 | 0.32 | 0.09 | | | 0.53 | | |
| 1 | 11818 | 0.39 | 0.20 | | | 0.90 | | |
| 1 | 11819 | 9.81 | 3.40 | | 10.82 | 9.67 | | |
| 1 | 11820 | 9.52 | 4.17 | | 11.11 | 8.51 | | |
| 1 | 11821 | 8.73 | 4.65 | | 10.33 | 6.83 | | |
| 1 | 11822 | 7.72 | 4.91 | | 8.98 | 5.10 | | |
| 1 | 11823 | 6.63 | 5.04 | | 7.34 | 3.85 | | |
| 1 | 11824 | 5.63 | 5.04 | | 5.56 | 2.74 | | |
| 1 | 11825 | 4.74 | 5.71 | | 3.38 | 1.47 | | |
| 1 | 11826 | 3.69 | 5.62 | | 1.31 | 0.29 | | |
| 1 | 11827 | 3.02 | 5.64 | | | | | |
| 1 | 11828 | 2.44 | 5.33 | | | | | |
| 1 | 11829 | 1.97 | 4.83 | | | | | |
| 1 | 11830 | 1.59 | 4.05 | | | | | |
| 1 | 11831 | 1.27 | 3.11 | | | | | |
| 1 | 11832 | 1.00 | 1.76 | | | | | |
| 1 | 11833 | 0.75 | 0.96 | | | | | |
| 1 | 11834 | 0.44 | 0.20 | | | 0.12 | | |
| 1 | 11835 | | | | | 1.15 | | |
| 1 | 11836 | | | | | 1.72 | | |
| 1 | 11837 | 10.15 | 3.35 | | 11.10 | 9.51 | | |
| 1 | 11838 | 9.83 | 4.15 | | 11.38 | 8.43 | | |
| 1 | 11839 | 8.98 | 4.64 | | 10.56 | 6.81 | | |
| 1 | 11840 | 7.91 | 4.88 | | 9.15 | 5.06 | | |
| 1 | 11841 | 6.76 | 4.98 | | 7.39 | 3.85 | | |
| 1 | 11842 | 5.68 | 4.95 | | 5.57 | 2.62 | | |
| 1 | 11843 | 4.73 | 5.56 | | 3.35 | 1.30 | | |
| 1 | 11844 | 3.61 | 5.40 | | 1.10 | 0.07 | | |
| 1 | 11845 | 2.94 | 5.36 | | | | | |
| 1 | 11846 | 2.42 | 5.01 | | | | | |
| 1 | 11847 | 1.93 | 4.47 | | | | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 11848 | 1.50 | 3.65 | | | | | |
| 1 | 11849 | 1.12 | 2.68 | | | | | |
| 1 | 11850 | 0.79 | 1.24 | | | | | |
| 1 | 11851 | 0.49 | 0.58 | | | | | |
| 1 | 11852 | 0.02 | | | | 0.69 | | 8.76 |
| 1 | 11853 | | | | 0.05 | 2.45 | | 8.76 |
| 1 | 11854 | | | | | 3.25 | | |
| 1 | 11855 | 10.51 | 3.28 | | 11.38 | 9.33 | | |
| 1 | 11856 | 10.15 | 4.11 | | 11.64 | 8.34 | | |
| 1 | 11857 | 9.23 | 4.62 | | 10.78 | 6.77 | | |
| 1 | 11858 | 8.09 | 4.84 | | 9.31 | 5.00 | | |
| 1 | 11859 | 6.89 | 4.91 | | 7.46 | 3.77 | | |
| 1 | 11860 | 5.73 | 4.85 | | 5.55 | 2.46 | | |
| 1 | 11861 | 4.73 | 5.39 | | 3.28 | 1.08 | | |
| 1 | 11862 | 3.59 | 5.14 | | 0.83 | | | |
| 1 | 11863 | 2.96 | 4.99 | | | | | |
| 1 | 11864 | 2.40 | 4.64 | | | | | |
| 1 | 11865 | 1.90 | 4.03 | | | | | |
| 1 | 11866 | 1.41 | 3.16 | | | | | |
| 1 | 11867 | 0.97 | 1.92 | | | | | |
| 1 | 11868 | 0.55 | 0.81 | | | | | |
| 1 | 11869 | 0.18 | 0.13 | | | | | |
| 1 | 11870 | | | | 0.75 | 0.56 | | 8.76 |
| 1 | 11871 | | | | 2.00 | 2.54 | | 8.76 |
| 1 | 11872 | | | | 1.95 | 5.81 | | |
| 1 | 11873 | 10.90 | 3.19 | | 11.62 | 9.13 | | |
| 1 | 11874 | 10.48 | 4.07 | | 11.86 | 8.19 | | |
| 1 | 11875 | 9.48 | 4.58 | | 11.01 | 6.74 | | |
| 1 | 11876 | 8.26 | 4.79 | | 9.45 | 4.98 | | |
| 1 | 11877 | 7.02 | 4.83 | | 7.51 | 3.65 | | |
| 1 | 11878 | 5.82 | 4.74 | | 5.46 | 2.26 | | |
| 1 | 11879 | 4.73 | 5.19 | | 3.16 | 0.80 | | |
| 1 | 11880 | 3.64 | 4.85 | | 0.51 | | | |
| 1 | 11881 | 3.00 | 4.64 | | | | | |
| 1 | 11882 | 2.42 | 4.22 | | | | | |
| 1 | 11883 | 1.89 | 3.50 | | | | | |
| 1 | 11884 | 1.35 | 2.58 | | | | | |
| 1 | 11885 | 0.83 | 1.12 | | | | | |
| 1 | 11886 | 0.33 | 0.30 | | | | | |
| 1 | 11887 | | | | | | | |
| 1 | 11888 | | | | 1.38 | 0.17 | | 8.76 |
| 1 | 11889 | | | | 3.40 | 2.39 | | 8.76 |
| 1 | 11890 | | | | 7.63 | 6.93 | | |
| 1 | 11891 | 11.30 | 3.07 | | 11.80 | 8.75 | | |
| 1 | 11892 | 10.80 | 3.98 | | 12.17 | 8.07 | | |
| 1 | 11893 | 9.72 | 4.52 | | 11.24 | 6.69 | | |
| 1 | 11894 | 8.44 | 4.73 | | 9.58 | 4.94 | | |
| 1 | 11895 | 7.15 | 4.75 | | 7.53 | 3.50 | | |
| 1 | 11896 | 5.93 | 4.62 | | 5.36 | 2.03 | | |
| 1 | 11897 | 4.83 | 4.97 | | 3.00 | 0.45 | | |
| 1 | 11898 | 3.71 | 4.51 | | 0.15 | | | |
| 1 | 11899 | 3.06 | 4.24 | | | | | |
| 1 | 11900 | 2.46 | 3.73 | | | | | |
| 1 | 11901 | 1.90 | 2.93 | | | | | |
| 1 | 11902 | 1.31 | 1.69 | | | | | |
| 1 | 11903 | 0.73 | 0.43 | | | | | |
| 1 | 11904 | | | | | | | |
| 1 | 11905 | | | | | | | |
| 1 | 11906 | | | | 1.26 | | | 8.76 |
| 1 | 11907 | | | | 3.86 | 2.08 | | 8.76 |
| 1 | 11908 | | | | 11.01 | 5.93 | | |
| 1 | 11909 | | 0.58 | | 28.15 | 19.46 | | |
| 1 | 11910 | | 1.33 | | 15.51 | 11.10 | | 12.55 |
| 1 | 11911 | | 3.08 | | 10.55 | 5.95 | | 9.92 |
| 1 | 11912 | | 4.09 | | 7.63 | 2.55 | | 8.76 |
| 1 | 11913 | | 5.26 | | 4.17 | 1.63 | | 8.76 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 11914 | | 7.50 | | 2.32 | 0.81 | | 8.76 |
| 1 | 11915 | 0.53 | 8.99 | | 1.23 | 0.11 | | |
| 1 | 11916 | 1.16 | 11.12 | | 0.75 | | | |
| 1 | 11917 | 1.85 | 11.46 | | 0.99 | | | |
| 1 | 11918 | 2.45 | 11.27 | | 1.32 | | | |
| 1 | 11919 | 3.05 | 10.78 | | 1.68 | | | |
| 1 | 11920 | 3.66 | 10.68 | | 2.03 | | | |
| 1 | 11921 | 3.98 | 9.62 | | 2.38 | | | |
| 1 | 11922 | 4.18 | 8.41 | | 2.70 | 0.36 | | |
| 1 | 11923 | | 0.66 | | 22.06 | 20.67 | | |
| 1 | 11924 | | 1.53 | | 14.83 | 11.18 | | 11.81 |
| 1 | 11925 | | 2.95 | | 10.56 | 6.34 | | 9.44 |
| 1 | 11926 | | 4.15 | | 7.91 | 2.76 | | 8.76 |
| 1 | 11927 | | 5.64 | | 4.30 | 1.76 | | 8.76 |
| 1 | 11928 | 0.15 | 7.52 | | 2.24 | 0.91 | | 8.76 |
| 1 | 11929 | 0.72 | 8.99 | | 1.18 | 0.16 | | |
| 1 | 11930 | 1.33 | 10.98 | | 0.75 | | | |
| 1 | 11931 | 2.00 | 11.10 | | 1.00 | | | |
| 1 | 11932 | 2.60 | 10.98 | | 1.33 | | | |
| 1 | 11933 | 3.11 | 10.52 | | 1.69 | | | |
| 1 | 11934 | 3.59 | 10.44 | | 2.04 | | | |
| 1 | 11935 | 3.95 | 9.41 | | 2.39 | | | |
| 1 | 11936 | 4.27 | 8.21 | | 2.71 | 0.25 | | |
| 1 | 11937 | | 0.76 | | 12.28 | 17.88 | | |
| 1 | 11938 | | 1.59 | | 12.47 | 11.19 | | 10.21 |
| 1 | 11939 | | 3.00 | | 9.48 | 6.64 | | 8.76 |
| 1 | 11940 | | 4.51 | | 7.50 | 3.34 | | 8.76 |
| 1 | 11941 | | 5.83 | | 4.48 | 1.87 | | 8.76 |
| 1 | 11942 | 0.43 | 7.68 | | 2.02 | 0.98 | | 8.76 |
| 1 | 11943 | 0.93 | 9.64 | | 1.01 | 0.20 | | |
| 1 | 11944 | 1.55 | 11.21 | | 0.71 | | | |
| 1 | 11945 | 2.19 | 11.26 | | 0.98 | | | |
| 1 | 11946 | 2.76 | 10.87 | | 1.33 | | | |
| 1 | 11947 | 3.24 | 10.25 | | 1.69 | | | |
| 1 | 11948 | 3.71 | 10.18 | | 2.05 | | | |
| 1 | 11949 | 4.05 | 9.18 | | 2.40 | | | |
| 1 | 11950 | 4.36 | 8.01 | | 2.72 | 0.21 | | |
| 1 | 11951 | | 1.24 | | 6.41 | 14.09 | | |
| 1 | 11952 | | 1.87 | | 8.63 | 10.61 | | 8.76 |
| 1 | 11953 | | 3.32 | | 7.70 | 7.11 | | 8.76 |
| 1 | 11954 | 0.01 | 4.75 | | 6.49 | 3.71 | | 8.76 |
| 1 | 11955 | 0.34 | 6.18 | | 4.03 | 1.93 | | 8.76 |
| 1 | 11956 | 0.76 | 8.50 | | 1.78 | 1.03 | | 8.76 |
| 1 | 11957 | 1.16 | 10.26 | | 0.75 | 0.23 | | |
| 1 | 11958 | 1.78 | 11.37 | | 0.65 | | | |
| 1 | 11959 | 2.38 | 11.41 | | 0.95 | | | |
| 1 | 11960 | 2.92 | 11.01 | | 1.31 | | | |
| 1 | 11961 | 3.39 | 10.33 | | 1.69 | | | |
| 1 | 11962 | 3.84 | 9.45 | | 2.06 | | | |
| 1 | 11963 | 4.16 | 8.94 | | 2.41 | | | |
| 1 | 11964 | 4.46 | 7.80 | | 2.74 | 0.26 | | |
| 1 | 11965 | | 1.84 | | 2.85 | 10.60 | | |
| 1 | 11966 | | 2.37 | | 5.12 | 9.75 | | 8.76 |
| 1 | 11967 | 0.05 | 3.76 | | 5.47 | 6.80 | | 8.76 |
| 1 | 11968 | 0.46 | 5.23 | | 5.08 | 3.79 | | 8.76 |
| 1 | 11969 | 0.78 | 6.77 | | 3.27 | 1.95 | | 8.76 |
| 1 | 11970 | 1.10 | 9.24 | | 1.34 | 1.05 | | |
| 1 | 11971 | 1.49 | 10.48 | | 0.55 | 0.24 | | |
| 1 | 11972 | 2.01 | 11.46 | | 0.57 | | | |
| 1 | 11973 | 2.57 | 11.50 | | 0.90 | | | |
| 1 | 11974 | 3.08 | 11.10 | | 1.29 | | | |
| 1 | 11975 | 3.53 | 10.42 | | 1.68 | | | |
| 1 | 11976 | 3.97 | 9.53 | | 2.06 | | | |
| 1 | 11977 | 4.28 | 8.98 | | 2.42 | | | |
| 1 | 11978 | 4.55 | 7.72 | | 2.76 | 0.32 | | |
| 1 | 11979 | | 2.31 | | 0.52 | 8.18 | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 11980 | | 2.89 | | 2.37 | 8.01 | | 8.76 |
| 1 | 11981 | 0.47 | 4.15 | | 3.27 | 6.17 | | 8.76 |
| 1 | 11982 | 0.86 | 5.26 | | 3.41 | 3.87 | | 8.76 |
| 1 | 11983 | 1.16 | 7.39 | | 2.35 | 1.92 | | 8.76 |
| 1 | 11984 | 1.42 | 9.29 | | 0.77 | 1.04 | | |
| 1 | 11985 | 1.75 | 10.53 | | 0.39 | 0.23 | | |
| 1 | 11986 | 2.24 | 11.49 | | 0.48 | | | |
| 1 | 11987 | 2.75 | 11.54 | | 0.85 | | | |
| 1 | 11988 | 3.24 | 11.15 | | 1.27 | | | |
| 1 | 11989 | 3.67 | 10.48 | | 1.68 | | | |
| 1 | 11990 | 4.10 | 9.59 | | 2.07 | | | |
| 1 | 11991 | 4.40 | 9.03 | | 2.44 | | | |
| 1 | 11992 | 4.66 | 7.77 | | 2.79 | 0.37 | | |
| 1 | 11993 | 0.08 | 2.68 | | | 6.17 | | |
| 1 | 11994 | 0.40 | 3.45 | | 0.38 | 6.52 | | 8.76 |
| 1 | 11995 | 0.85 | 4.34 | | 1.36 | 5.42 | | 8.76 |
| 1 | 11996 | 1.20 | 5.31 | | 1.75 | 3.57 | | 8.76 |
| 1 | 11997 | 1.47 | 7.43 | | 1.16 | 1.77 | | 8.76 |
| 1 | 11998 | 1.70 | 9.30 | | 0.25 | 0.93 | | |
| 1 | 11999 | 1.99 | 10.54 | | 0.19 | 0.17 | | |
| 1 | 12000 | 2.56 | 11.46 | | 0.40 | | | |
| 1 | 12001 | 2.97 | 11.54 | | 0.80 | | | |
| 1 | 12002 | 3.40 | 11.17 | | 1.24 | | | |
| 1 | 12003 | 3.81 | 10.50 | | 1.68 | | | |
| 1 | 12004 | 4.23 | 9.63 | | 2.09 | | | |
| 1 | 12005 | 4.51 | 9.06 | | 2.47 | | | |
| 1 | 12006 | 4.76 | 7.79 | | 2.82 | 0.43 | | |
| 1 | 12007 | 0.52 | 2.97 | | | 4.55 | | |
| 1 | 12008 | 0.78 | 3.76 | | | 4.31 | | |
| 1 | 12009 | 1.16 | 4.50 | | | 3.97 | | |
| 1 | 12010 | 1.51 | 5.36 | | 0.37 | 2.64 | | 8.76 |
| 1 | 12011 | 1.94 | 7.36 | | | 1.54 | | |
| 1 | 12012 | 2.19 | 9.17 | | | 0.82 | | |
| 1 | 12013 | 2.48 | 10.43 | | | 0.18 | | |
| 1 | 12014 | 2.97 | 11.38 | | 0.33 | | | |
| 1 | 12015 | 3.31 | 11.49 | | 0.76 | | | |
| 1 | 12016 | 3.62 | 11.15 | | 1.23 | | | |
| 1 | 12017 | 3.94 | 10.50 | | 1.68 | | | |
| 1 | 12018 | 4.35 | 9.63 | | 2.11 | | | |
| 1 | 12019 | 4.63 | 8.58 | | 2.51 | | | |
| 1 | 12020 | 4.86 | 7.80 | | 2.87 | 0.48 | | |
| 1 | 12021 | 0.87 | 3.22 | | | 3.55 | | |
| 1 | 12022 | 1.09 | 4.00 | | | 3.07 | | |
| 1 | 12023 | 1.73 | 4.64 | | | 2.48 | | |
| 1 | 12024 | 2.11 | 5.40 | | | 1.99 | | |
| 1 | 12025 | 2.50 | 7.29 | | | 1.41 | | |
| 1 | 12026 | 2.71 | 9.02 | | | 0.77 | | |
| 1 | 12027 | 2.94 | 10.27 | | | 0.19 | | |
| 1 | 12028 | 3.20 | 11.01 | | 0.37 | | | |
| 1 | 12029 | 3.61 | 11.40 | | 0.73 | | | |
| 1 | 12030 | 3.87 | 11.09 | | 1.22 | | | |
| 1 | 12031 | 4.09 | 10.47 | | 1.69 | | | |
| 1 | 12032 | 4.47 | 9.62 | | 2.14 | | | |
| 1 | 12033 | 4.74 | 8.60 | | 2.55 | | | |
| 1 | 12034 | 4.96 | 7.79 | | 2.92 | 0.55 | | |
| 1 | 12035 | 1.15 | 3.86 | | | 2.71 | | |
| 1 | 12036 | 1.64 | 4.18 | | | 2.49 | | |
| 1 | 12037 | 2.34 | 4.75 | | | 2.22 | | |
| 1 | 12038 | 2.59 | 5.53 | | | 1.82 | | |
| 1 | 12039 | 2.94 | 7.28 | | | 1.30 | | |
| 1 | 12040 | 3.12 | 8.91 | | | 0.72 | | |
| 1 | 12041 | 3.31 | 10.09 | | | 0.20 | | |
| 1 | 12042 | 3.53 | 10.85 | | 0.32 | | | |
| 1 | 12043 | 3.86 | 11.28 | | 0.72 | | | |
| 1 | 12044 | 4.09 | 11.00 | | 1.23 | | | |
| 1 | 12045 | 4.28 | 10.41 | | 1.72 | | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 12046 | 4.59 | 9.58 | | 2.18 | | | |
| 1 | 12047 | 4.84 | 8.57 | | 2.61 | | | |
| 1 | 12048 | 5.05 | 7.77 | | 2.99 | 0.60 | | |
| 1 | 12049 | 1.68 | 4.04 | | | 2.39 | | |
| 1 | 12050 | 2.24 | 4.32 | | | 2.26 | | |
| 1 | 12051 | 2.50 | 4.83 | | | 2.02 | | |
| 1 | 12052 | 2.96 | 5.61 | | | 1.67 | | |
| 1 | 12053 | 3.27 | 7.20 | | | 1.20 | | |
| 1 | 12054 | 3.44 | 8.72 | | | 0.68 | | |
| 1 | 12055 | 3.61 | 9.93 | | | 0.21 | | |
| 1 | 12056 | 3.80 | 10.72 | | 0.22 | 0.03 | | |
| 1 | 12057 | 4.07 | 11.13 | | 0.73 | | | |
| 1 | 12058 | 4.27 | 10.89 | | 1.25 | | | |
| 1 | 12059 | 4.45 | 10.33 | | 1.76 | | | |
| 1 | 12060 | 4.74 | 9.52 | | 2.23 | | | |
| 1 | 12061 | 4.93 | 8.53 | | 2.68 | 0.05 | | |
| 1 | 12062 | 5.14 | 7.72 | | 3.08 | 0.64 | | |
| 1 | 12063 | 2.22 | 4.16 | | | 2.17 | | |
| 1 | 12064 | 2.62 | 4.40 | | | 2.05 | | |
| 1 | 12065 | 2.84 | 4.86 | | | 1.84 | | |
| 1 | 12066 | 3.24 | 5.76 | | | 1.53 | | |
| 1 | 12067 | 3.51 | 7.16 | | | 1.11 | | |
| 1 | 12068 | 3.66 | 8.53 | | | 0.64 | | |
| 1 | 12069 | 3.81 | 9.71 | | | 0.22 | | |
| 1 | 12070 | 3.99 | 10.50 | | 0.17 | 0.10 | | |
| 1 | 12071 | 4.22 | 10.96 | | 0.77 | | | |
| 1 | 12072 | 4.42 | 10.76 | | 1.29 | | | |
| 1 | 12073 | 4.58 | 10.22 | | 1.81 | | | |
| 1 | 12074 | 4.86 | 9.44 | | 2.30 | | | |
| 1 | 12075 | 5.04 | 8.47 | | 2.76 | 0.12 | | |
| 1 | 12076 | 5.22 | 7.66 | | 3.17 | 0.68 | | |
| 1 | 12077 | 2.31 | 4.24 | | | 1.96 | | |
| 1 | 12078 | 2.69 | 4.44 | | | 1.86 | | |
| 1 | 12079 | 3.10 | 4.87 | | | 1.67 | | |
| 1 | 12080 | 3.42 | 5.89 | | | 1.39 | | |
| 1 | 12081 | 3.66 | 7.07 | | | 1.02 | | |
| 1 | 12082 | 3.80 | 8.37 | | | 0.60 | | |
| 1 | 12083 | 3.93 | 9.46 | | | 0.23 | | |
| 1 | 12084 | 4.10 | 10.27 | | 0.12 | 0.17 | | |
| 1 | 12085 | 4.32 | 10.77 | | 0.81 | | | |
| 1 | 12086 | 4.52 | 10.60 | | 1.34 | | | |
| 1 | 12087 | 4.68 | 10.10 | | 1.88 | | | |
| 1 | 12088 | 5.02 | 9.34 | | 2.38 | | | |
| 1 | 12089 | 5.14 | 8.40 | | 2.85 | 0.17 | | |
| 1 | 12090 | 5.30 | 7.58 | | 3.28 | 0.72 | | |
| 1 | 12091 | 2.42 | 4.29 | | | 1.77 | | |
| 1 | 12092 | 2.93 | 4.46 | | | 1.68 | | |
| 1 | 12093 | 3.26 | 4.86 | | | 1.51 | | |
| 1 | 12094 | 3.52 | 5.86 | | | 1.26 | | |
| 1 | 12095 | 3.73 | 6.96 | | | 0.93 | | |
| 1 | 12096 | 3.85 | 8.17 | | | 0.55 | | |
| 1 | 12097 | 3.97 | 9.28 | | | 0.23 | | |
| 1 | 12098 | 4.15 | 10.03 | | 0.08 | 0.21 | | |
| 1 | 12099 | 4.37 | 10.56 | | 0.82 | | | |
| 1 | 12100 | 4.57 | 10.44 | | 1.40 | | | |
| 1 | 12101 | 4.74 | 9.97 | | 1.95 | | | |
| 1 | 12102 | 5.10 | 9.24 | | 2.48 | | | |
| 1 | 12103 | 5.22 | 8.31 | | 2.96 | 0.22 | | |
| 1 | 12104 | 5.37 | 7.48 | | 3.40 | 0.76 | | |
| 1 | 12105 | 2.59 | 4.27 | | | 1.59 | | |
| 1 | 12106 | 3.07 | 4.40 | | | 1.51 | | |
| 1 | 12107 | 3.34 | 4.76 | | | 1.36 | | |
| 1 | 12108 | 3.57 | 5.74 | | | 1.14 | | |
| 1 | 12109 | 3.66 | 6.86 | | | 0.84 | | |
| 1 | 12110 | 3.77 | 7.96 | | | 0.50 | | |
| 1 | 12111 | 3.93 | 9.01 | | | 0.22 | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 12112 | 4.14 | 9.81 | | 0.04 | 0.23 | | |
| 1 | 12113 | 4.37 | 10.34 | | 0.81 | 0.05 | | |
| 1 | 12114 | 4.59 | 10.25 | | 1.48 | | | |
| 1 | 12115 | 4.77 | 9.82 | | 2.04 | | | |
| 1 | 12116 | 5.12 | 9.12 | | 2.58 | | | |
| 1 | 12117 | 5.27 | 8.22 | | 3.08 | 0.26 | | |
| 1 | 12118 | 5.43 | 7.39 | | 3.54 | 0.79 | | |
| 1 | 12119 | 2.69 | 4.20 | | | 1.41 | | |
| 1 | 12120 | 2.55 | 4.30 | | | 1.34 | | |
| 1 | 12121 | 3.29 | 4.64 | | | 1.21 | | |
| 1 | 12122 | 3.46 | 5.60 | | | 1.01 | | |
| 1 | 12123 | 3.61 | 6.61 | | | 0.74 | | |
| 1 | 12124 | 3.68 | 7.72 | | | 0.44 | | |
| 1 | 12125 | 3.82 | 8.76 | | | 0.20 | | |
| 1 | 12126 | 4.07 | 9.57 | | | 0.25 | | |
| 1 | 12127 | 4.31 | 10.11 | | 0.79 | 0.11 | | |
| 1 | 12128 | 4.56 | 10.06 | | 1.55 | | | |
| 1 | 12129 | 4.77 | 9.67 | | 2.13 | | | |
| 1 | 12130 | 5.09 | 8.98 | | 2.69 | | | |
| 1 | 12131 | 5.30 | 8.11 | | 3.21 | 0.30 | | |
| 1 | 12132 | 5.48 | 7.29 | | 3.69 | 0.81 | | |
| 1 | 12133 | 2.72 | 4.10 | | | 1.24 | | |
| 1 | 12134 | 2.43 | 4.15 | | | 1.18 | | |
| 1 | 12135 | 3.23 | 4.46 | | | 1.06 | | |
| 1 | 12136 | 3.35 | 5.35 | | | 0.88 | | |
| 1 | 12137 | 3.21 | 6.32 | | | 0.63 | | |
| 1 | 12138 | 3.42 | 7.44 | | | 0.36 | | |
| 1 | 12139 | 3.65 | 8.44 | | | 0.16 | | |
| 1 | 12140 | 3.93 | 9.28 | | | 0.25 | | |
| 1 | 12141 | 4.21 | 9.86 | | 0.78 | 0.15 | | |
| 1 | 12142 | 4.49 | 9.86 | | 1.57 | | | |
| 1 | 12143 | 4.72 | 9.50 | | 2.22 | | | |
| 1 | 12144 | 5.08 | 8.84 | | 2.80 | | | |
| 1 | 12145 | 5.31 | 7.96 | | 3.35 | 0.34 | | |
| 1 | 12146 | 5.52 | 7.23 | | 3.84 | 0.94 | | |
| 1 | 12147 | 2.68 | 3.96 | | | 1.08 | | |
| 1 | 12148 | 1.86 | 3.76 | | | 1.02 | | |
| 1 | 12149 | 1.90 | 4.02 | | | 0.91 | | |
| 1 | 12150 | 2.78 | 5.08 | | | 0.75 | | |
| 1 | 12151 | 2.96 | 6.01 | | | 0.52 | | |
| 1 | 12152 | 3.16 | 7.09 | | | 0.28 | | |
| 1 | 12153 | 3.41 | 8.15 | | | 0.09 | | |
| 1 | 12154 | 3.72 | 9.02 | | | 0.24 | | |
| 1 | 12155 | 4.05 | 9.61 | | 0.75 | 0.18 | | |
| 1 | 12156 | 4.37 | 9.65 | | 1.57 | 0.03 | | |
| 1 | 12157 | 4.65 | 9.34 | | 2.31 | | | |
| 1 | 12158 | 5.03 | 8.71 | | 2.92 | | | |
| 1 | 12159 | 5.30 | 8.18 | | 3.48 | 0.43 | | |
| 1 | 12160 | 5.55 | 7.19 | | 4.01 | 0.94 | | |
| 1 | 12161 | 1.75 | 3.30 | | | 0.91 | | |
| 1 | 12162 | 1.73 | 3.60 | | | 0.86 | | |
| 1 | 12163 | 1.65 | 3.77 | | | 0.76 | | |
| 1 | 12164 | 2.50 | 4.71 | | | 0.61 | | |
| 1 | 12165 | 2.64 | 5.62 | | | 0.40 | | |
| 1 | 12166 | 2.85 | 6.71 | | | 0.18 | | |
| 1 | 12167 | 3.12 | 7.79 | | | 0.04 | | |
| 1 | 12168 | 3.47 | 8.71 | | | 0.21 | | |
| 1 | 12169 | 3.85 | 9.35 | | 0.72 | 0.19 | | |
| 1 | 12170 | 4.22 | 9.44 | | 1.56 | 0.06 | | |
| 1 | 12171 | 4.54 | 9.16 | | 2.34 | | | |
| 1 | 12172 | 4.96 | 8.57 | | 3.02 | | | |
| 1 | 12173 | 5.27 | 8.05 | | 3.62 | 0.44 | | |
| 1 | 12174 | 5.57 | 7.13 | | 4.17 | 0.93 | | |
| 1 | 12175 | 2.48 | 3.31 | | | 0.75 | | |
| 1 | 12176 | 2.51 | 3.40 | | | 0.70 | | |
| 1 | 12177 | 2.50 | 3.51 | | | 0.60 | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 12178 | 2.53 | 4.26 | | | 0.46 | | |
| 1 | 12179 | 2.59 | 5.18 | | | 0.26 | | |
| 1 | 12180 | 2.63 | 6.29 | | | 0.06 | | |
| 1 | 12181 | 2.80 | 7.45 | | | | | |
| 1 | 12182 | 3.17 | 8.38 | | | 0.15 | | |
| 1 | 12183 | 3.61 | 9.08 | | 0.68 | 0.19 | | |
| 1 | 12184 | 4.03 | 9.22 | | 1.54 | 0.08 | | |
| 1 | 12185 | 4.40 | 8.98 | | 2.34 | 0.01 | | |
| 1 | 12186 | 4.87 | 8.42 | | 3.06 | | | |
| 1 | 12187 | 5.21 | 7.92 | | 3.71 | 0.45 | | |
| 1 | 12188 | 5.58 | 7.07 | | 4.28 | 0.92 | | |
| 1 | 12189 | 2.25 | 3.03 | | | 0.58 | | |
| 1 | 12190 | 2.21 | 3.09 | | | 0.54 | | |
| 1 | 12191 | 2.34 | 3.30 | | | 0.44 | | |
| 1 | 12192 | 2.48 | 4.03 | | | 0.29 | | |
| 1 | 12193 | 2.56 | 4.96 | | | 0.11 | | |
| 1 | 12194 | 2.60 | 5.94 | | | | | |
| 1 | 12195 | 2.64 | 7.05 | | | | | |
| 1 | 12196 | 2.82 | 8.09 | | | 0.06 | | |
| 1 | 12197 | 3.32 | 8.80 | | 0.63 | 0.16 | | |
| 1 | 12198 | 3.81 | 8.99 | | 1.51 | 0.09 | | |
| 1 | 12199 | 4.22 | 8.80 | | 2.34 | 0.04 | | |
| 1 | 12200 | 4.76 | 8.27 | | 3.09 | 0.03 | | |
| 1 | 12201 | 5.17 | 7.79 | | 3.77 | 0.45 | | |
| 1 | 12202 | 5.58 | 7.01 | | 4.36 | 0.91 | | |
| 1 | 12203 | 1.90 | 2.63 | | | 0.41 | | |
| 1 | 12204 | 1.82 | 2.78 | | | 0.37 | | |
| 1 | 12205 | 2.09 | 3.04 | | | 0.27 | | |
| 1 | 12206 | 2.32 | 3.74 | | | 0.12 | | |
| 1 | 12207 | 2.45 | 4.77 | | | | | |
| 1 | 12208 | 2.51 | 5.87 | | | | | |
| 1 | 12209 | 2.57 | 6.80 | | | | | |
| 1 | 12210 | 2.67 | 7.74 | | | | | |
| 1 | 12211 | 3.00 | 8.51 | | 0.56 | 0.13 | | |
| 1 | 12212 | 3.54 | 8.76 | | 1.46 | 0.07 | | |
| 1 | 12213 | 4.07 | 8.61 | | 2.32 | 0.06 | | |
| 1 | 12214 | 4.66 | 8.13 | | 3.11 | 0.07 | | |
| 1 | 12215 | 5.11 | 7.67 | | 3.82 | 0.44 | | |
| 1 | 12216 | 5.57 | 6.94 | | 4.44 | 0.89 | | |
| 1 | 12217 | 1.54 | 2.35 | | | 0.26 | | |
| 1 | 12218 | 1.68 | 2.60 | | | 0.21 | | |
| 1 | 12219 | 1.82 | 2.73 | | | 0.09 | | |
| 1 | 12220 | 2.07 | 3.44 | | | | | |
| 1 | 12221 | 2.23 | 4.55 | | | | | |
| 1 | 12222 | 2.37 | 5.78 | | | | | |
| 1 | 12223 | 2.45 | 6.75 | | | | | |
| 1 | 12224 | 2.58 | 7.52 | | | | | |
| 1 | 12225 | 2.74 | 7.50 | | 0.51 | 0.07 | | |
| 1 | 12226 | 3.26 | 8.51 | | 1.39 | 0.03 | | |
| 1 | 12227 | 3.91 | 8.42 | | 2.29 | 0.06 | | |
| 1 | 12228 | 4.55 | 7.97 | | 3.11 | 0.10 | | |
| 1 | 12229 | 5.04 | 7.54 | | 3.85 | 0.42 | | |
| 1 | 12230 | 5.54 | 6.86 | | 4.51 | 0.87 | | |
| 1 | 12231 | 1.48 | 1.93 | | | 0.17 | | |
| 1 | 12232 | 1.41 | 2.24 | | | 0.11 | | |
| 1 | 12233 | 1.68 | 2.67 | | | 0.01 | | |
| 1 | 12234 | 2.01 | 3.19 | | | | | |
| 1 | 12235 | 2.00 | 4.36 | | | | | |
| 1 | 12236 | 2.12 | 5.58 | | | | | |
| 1 | 12237 | 2.28 | 6.68 | | | | | |
| 1 | 12238 | 2.45 | 7.48 | | | | | |
| 1 | 12239 | 2.65 | 7.43 | | 0.39 | | | |
| 1 | 12240 | 3.04 | 8.26 | | 1.30 | | | |
| 1 | 12241 | 3.73 | 8.22 | | 2.22 | 0.04 | | |
| 1 | 12242 | 4.40 | 7.82 | | 3.09 | 0.11 | | |
| 1 | 12243 | 4.95 | 7.42 | | 3.87 | 0.40 | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 12244 | 5.49 | 6.78 | | 4.57 | 0.83 | | |
| 1 | 12245 | 1.02 | 1.46 | | | 0.09 | | |
| 1 | 12246 | 1.36 | 1.82 | | | 0.04 | | |
| 1 | 12247 | 1.39 | 2.34 | | | | | |
| 1 | 12248 | 1.67 | 2.95 | | | | | |
| 1 | 12249 | 1.92 | 4.13 | | | | | |
| 1 | 12250 | 1.85 | 5.44 | | | | | |
| 1 | 12251 | 2.03 | 6.53 | | | | | |
| 1 | 12252 | 2.26 | 7.41 | | | | | |
| 1 | 12253 | 2.52 | 7.40 | | 0.15 | | | |
| 1 | 12254 | 2.78 | 7.98 | | 1.10 | | | |
| 1 | 12255 | 3.52 | 8.00 | | 2.13 | | | |
| 1 | 12256 | 4.23 | 7.71 | | 3.04 | 0.12 | | |
| 1 | 12257 | 4.85 | 7.34 | | 3.88 | 0.37 | | |
| 1 | 12258 | 5.43 | 6.70 | | 4.62 | 0.79 | | |
| 1 | 12259 | 0.73 | 0.90 | | | 0.32 | | |
| 1 | 12260 | 0.98 | 1.34 | | | 0.01 | | |
| 1 | 12261 | 1.22 | 1.96 | | | | | |
| 1 | 12262 | 1.40 | 2.68 | | | | | |
| 1 | 12263 | 1.54 | 3.93 | | | | | |
| 1 | 12264 | 1.61 | 5.27 | | | | | |
| 1 | 12265 | 1.75 | 6.41 | | | | | |
| 1 | 12266 | 2.06 | 7.25 | | | | | |
| 1 | 12267 | 2.37 | 7.35 | | | | | |
| 1 | 12268 | 2.67 | 7.94 | | 0.82 | | | |
| 1 | 12269 | 3.28 | 7.77 | | 2.00 | | | |
| 1 | 12270 | 4.03 | 7.49 | | 2.96 | 0.11 | | |
| 1 | 12271 | 4.71 | 7.22 | | 3.86 | 0.32 | | |
| 1 | 12272 | 5.35 | 6.62 | | 4.65 | 0.75 | | |
| 1 | 12273 | 0.33 | 0.24 | | | 0.83 | | |
| 1 | 12274 | 0.71 | 0.78 | | | 0.41 | | |
| 1 | 12275 | 1.03 | 1.55 | | | | | |
| 1 | 12276 | 1.24 | 2.38 | | | | | |
| 1 | 12277 | 1.37 | 3.70 | | | | | |
| 1 | 12278 | 1.52 | 5.18 | | | | | |
| 1 | 12279 | 1.67 | 6.24 | | | | | |
| 1 | 12280 | 1.84 | 7.14 | | | | | |
| 1 | 12281 | 2.20 | 7.27 | | | | | |
| 1 | 12282 | 2.54 | 7.91 | | 0.60 | | | |
| 1 | 12283 | 2.98 | 7.71 | | 1.74 | | | |
| 1 | 12284 | 3.79 | 7.30 | | 2.85 | 0.08 | | |
| 1 | 12285 | 4.54 | 7.16 | | 3.80 | 0.28 | | |
| 1 | 12286 | 5.25 | 6.55 | | 4.67 | 0.70 | | |
| 1 | 12287 | | | | | 1.61 | | |
| 1 | 12288 | 0.41 | 0.17 | | | 0.95 | | |
| 1 | 12289 | 0.84 | 1.14 | | | | | |
| 1 | 12290 | 1.08 | 2.09 | | | | | |
| 1 | 12291 | 1.25 | 3.41 | | | | | |
| 1 | 12292 | 1.42 | 4.93 | | | | | |
| 1 | 12293 | 1.62 | 6.19 | | | | | |
| 1 | 12294 | 1.86 | 7.14 | | | | | |
| 1 | 12295 | 2.26 | 7.66 | | | | | |
| 1 | 12296 | 2.66 | 7.88 | | 0.20 | | | |
| 1 | 12297 | 3.00 | 7.74 | | 1.40 | | | |
| 1 | 12298 | 3.50 | 7.31 | | 2.68 | 0.04 | | |
| 1 | 12299 | 4.33 | 7.21 | | 3.71 | 0.31 | | |
| 1 | 12300 | 5.11 | 6.49 | | 4.65 | 0.63 | | |
| 1 | 12301 | | | | | 3.03 | | |
| 1 | 12302 | | | | | 1.94 | | 8.76 |
| 1 | 12303 | 0.63 | 0.75 | | | | | 8.76 |
| 1 | 12304 | 0.88 | 1.78 | | | | | |
| 1 | 12305 | 1.10 | 2.96 | | | | | |
| 1 | 12306 | 1.34 | 4.15 | | | | | |
| 1 | 12307 | 1.57 | 5.68 | | | | | |
| 1 | 12308 | 1.83 | 6.94 | | | | | |
| 1 | 12309 | 2.11 | 7.54 | | | | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 12310 | 2.54 | 7.82 | | | | | |
| 1 | 12311 | 2.90 | 7.77 | | 0.99 | | | |
| 1 | 12312 | 3.24 | 7.38 | | 2.44 | | | |
| 1 | 12313 | 4.06 | 7.28 | | 3.55 | 0.34 | | |
| 1 | 12314 | 4.92 | 6.44 | | 4.69 | 0.61 | | |
| 1 | 12315 | | | | 1.78 | 5.53 | | |
| 1 | 12316 | | | | 1.60 | 1.97 | | 8.76 |
| 1 | 12317 | 0.33 | 0.37 | | 0.04 | 0.03 | | 8.76 |
| 1 | 12318 | 0.63 | 1.40 | | | | | 8.76 |
| 1 | 12319 | 0.29 | 1.87 | | | | | |
| 1 | 12320 | 0.59 | 3.35 | | | | | |
| 1 | 12321 | 1.58 | 5.24 | | | | | |
| 1 | 12322 | 1.85 | 6.49 | | | | | |
| 1 | 12323 | 2.10 | 7.38 | | | | | |
| 1 | 12324 | 2.40 | 7.76 | | | | | |
| 1 | 12325 | 2.80 | 7.81 | | 0.49 | | | |
| 1 | 12326 | 3.14 | 7.50 | | 2.06 | | | |
| 1 | 12327 | 3.78 | 7.45 | | 3.32 | 0.34 | | |
| 1 | 12328 | 4.68 | 6.55 | | 4.76 | 0.74 | | |
| 1 | 12329 | | | | 7.14 | 6.40 | | |
| 1 | 12330 | | | | 2.72 | 1.76 | | 8.76 |
| 1 | 12331 | | | | 0.25 | | | 8.76 |
| 1 | 12332 | | 0.23 | | | | | 8.76 |
| 1 | 12333 | 0.22 | 1.34 | | | | | |
| 1 | 12334 | 0.59 | 2.55 | | | | | |
| 1 | 12335 | 1.08 | 4.61 | | | | | |
| 1 | 12336 | 1.37 | 6.11 | | | | | |
| 1 | 12337 | 2.16 | 7.20 | | | | | |
| 1 | 12338 | 2.39 | 7.66 | | | | | |
| 1 | 12339 | 2.73 | 7.86 | | 0.08 | | | |
| 1 | 12340 | 3.06 | 7.65 | | 1.51 | | | |
| 1 | 12341 | 3.70 | 7.71 | | 2.98 | 0.32 | | |
| 1 | 12342 | 4.31 | 6.84 | | 4.68 | 0.85 | | |
| 1 | 12343 | | | | 10.26 | 5.39 | | |
| 1 | 12344 | | | | 3.01 | 1.36 | | 8.76 |
| 1 | 12345 | | | | 0.40 | | | 8.76 |
| 1 | 12346 | | | | | | | 8.76 |
| 1 | 12347 | 0.19 | 0.71 | | | | | |
| 1 | 12348 | 0.65 | 1.90 | | | | | |
| 1 | 12349 | 1.18 | 3.85 | | | | | |
| 1 | 12350 | 1.55 | 5.70 | | | | | |
| 1 | 12351 | 1.85 | 5.80 | | | | | |
| 1 | 12352 | 2.51 | 7.62 | | | | | |
| 1 | 12353 | 2.69 | 7.91 | | | | | |
| 1 | 12354 | 3.00 | 7.84 | | 0.82 | | | |
| 1 | 12355 | 3.61 | 8.04 | | 2.51 | 0.24 | | |
| 1 | 12356 | 3.87 | 7.23 | | 4.37 | 0.94 | | |
| 1 | 12357 | 4.56 | 6.50 | | 3.11 | 1.42 | | |
| 1 | 12358 | 4.97 | 5.38 | | 4.00 | 2.83 | | 8.76 |
| 1 | 12359 | 5.32 | 4.40 | | 5.39 | 4.42 | | 8.76 |
| 1 | 12360 | 5.57 | 3.61 | | 6.33 | 8.01 | | |
| 1 | 12361 | 4.63 | 6.34 | | 3.12 | 1.32 | | |
| 1 | 12362 | 5.03 | 5.45 | | 4.04 | 2.74 | | 8.76 |
| 1 | 12363 | 5.37 | 4.45 | | 5.46 | 4.36 | | 8.76 |
| 1 | 12364 | 5.60 | 3.66 | | 6.40 | 8.04 | | |
| 1 | 12365 | 4.71 | 6.37 | | 3.13 | 1.21 | | |
| 1 | 12366 | 5.10 | 5.51 | | 4.10 | 2.65 | | 8.76 |
| 1 | 12367 | 5.42 | 4.49 | | 5.53 | 4.29 | | 8.76 |
| 1 | 12368 | 5.64 | 3.70 | | 6.46 | 8.07 | | |
| 1 | 12369 | 4.80 | 6.45 | | 3.16 | 1.25 | | |
| 1 | 12370 | 5.17 | 5.57 | | 4.19 | 2.59 | | 8.76 |
| 1 | 12371 | 5.48 | 4.54 | | 5.60 | 4.22 | | 8.76 |
| 1 | 12372 | 5.69 | 3.74 | | 6.52 | 8.11 | | |
| 1 | 12373 | 4.89 | 6.51 | | 3.19 | 1.29 | | |
| 1 | 12374 | 5.25 | 5.61 | | 4.26 | 2.63 | | 8.76 |
| 1 | 12375 | 5.55 | 4.58 | | 5.68 | 4.19 | | 8.76 |

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|---|---|---|---|---|---|---|---|---|
| 1 | 12376 | 5.75 | 3.77 | | 6.59 | 8.14 | | |
| 1 | 12377 | 4.98 | 6.57 | | 3.22 | 1.33 | | |
| 1 | 12378 | 5.34 | 5.66 | | 4.32 | 2.66 | | 8.76 |
| 1 | 12379 | 5.62 | 4.61 | | 5.75 | 4.22 | | 8.76 |
| 1 | 12380 | 5.81 | 3.81 | | 6.66 | 8.17 | | |
| 1 | 12381 | 5.08 | 6.62 | | 3.27 | 1.36 | | |
| 1 | 12382 | 5.42 | 5.69 | | 4.39 | 2.68 | | 8.76 |
| 1 | 12383 | 5.70 | 4.65 | | 5.84 | 4.24 | | 8.76 |
| 1 | 12384 | 5.89 | 3.84 | | 6.74 | 8.19 | | |
| 1 | 12385 | 5.18 | 6.65 | | 3.33 | 1.40 | | |
| 1 | 12386 | 5.51 | 5.72 | | 4.46 | 2.69 | | 8.76 |
| 1 | 12387 | 5.78 | 4.68 | | 5.92 | 4.26 | | 8.76 |
| 1 | 12388 | 5.96 | 3.87 | | 6.82 | 8.22 | | |
| 1 | 12389 | 5.27 | 6.68 | | 3.40 | 1.43 | | |
| 1 | 12390 | 5.61 | 5.74 | | 4.53 | 2.70 | | 8.76 |
| 1 | 12391 | 5.86 | 4.70 | | 6.02 | 4.28 | | 8.76 |
| 1 | 12392 | 6.05 | 3.90 | | 6.90 | 8.25 | | |
| 1 | 12393 | 5.37 | 6.71 | | 3.49 | 1.46 | | |
| 1 | 12394 | 5.70 | 5.75 | | 4.62 | 2.70 | | 8.76 |
| 1 | 12395 | 5.95 | 4.73 | | 6.12 | 4.30 | | 8.76 |
| 1 | 12396 | 6.14 | 3.92 | | 7.00 | 8.26 | | |
| 1 | 12397 | 5.46 | 6.73 | | 3.59 | 1.49 | | |
| 1 | 12398 | 5.79 | 5.76 | | 4.86 | 2.69 | | 8.76 |
| 1 | 12399 | 6.04 | 4.75 | | 6.23 | 4.30 | | 8.76 |
| 1 | 12400 | 6.23 | 3.94 | | 6.94 | 8.27 | | |
| 1 | 12401 | 5.55 | 6.73 | | 3.70 | 1.51 | | |
| 1 | 12402 | 5.88 | 5.75 | | 4.96 | 2.68 | | 8.76 |
| 1 | 12403 | 6.13 | 4.77 | | 6.29 | 4.31 | | 8.76 |
| 1 | 12404 | 6.33 | 3.95 | | 7.06 | 8.27 | | |
| 1 | 12405 | 5.63 | 6.74 | | 3.83 | 1.53 | | |
| 1 | 12406 | 5.97 | 5.75 | | 5.16 | 2.66 | | 8.76 |
| 1 | 12407 | 6.23 | 4.79 | | 6.39 | 4.31 | | 8.76 |
| 1 | 12408 | 6.43 | 3.96 | | 7.17 | 8.12 | | |
| 1 | 12409 | 5.71 | 6.73 | | 3.97 | 1.54 | | |
| 1 | 12410 | 6.05 | 5.72 | | 5.29 | 2.64 | | 8.76 |
| 1 | 12411 | 6.32 | 4.80 | | 6.53 | 4.35 | | 8.76 |
| 1 | 12412 | 6.54 | 3.97 | | 7.30 | 8.08 | | |
| 1 | 12413 | 5.78 | 6.71 | | 4.13 | 1.55 | | |
| 1 | 12414 | 6.14 | 5.70 | | 5.63 | 2.90 | | 8.76 |
| 1 | 12415 | 6.41 | 4.80 | | 6.68 | 4.37 | | 8.76 |
| 1 | 12416 | 6.65 | 3.97 | | 7.43 | 8.65 | | |
| 1 | 12417 | 5.85 | 6.68 | | 4.30 | 1.72 | | |
| 1 | 12418 | 6.22 | 5.66 | | 5.79 | 2.84 | | 8.76 |
| 1 | 12419 | 6.50 | 4.80 | | 6.84 | 4.40 | | 8.76 |
| 1 | 12420 | 6.76 | 3.97 | | 7.58 | 8.61 | | |
| 1 | 12421 | 5.91 | 6.65 | | 4.49 | 1.70 | | |
| 1 | 12422 | 6.30 | 5.62 | | 5.95 | 2.77 | | 8.76 |
| 1 | 12423 | 6.59 | 4.79 | | 7.01 | 4.43 | | 8.76 |
| 1 | 12424 | 6.88 | 3.96 | | 7.73 | 8.56 | | |
| 1 | 12425 | 5.97 | 6.60 | | 4.68 | 1.67 | | |
| 1 | 12426 | 6.37 | 5.57 | | 6.12 | 2.70 | | 8.76 |
| 1 | 12427 | 6.69 | 4.78 | | 7.19 | 4.44 | | 8.76 |
| 1 | 12428 | 6.99 | 3.94 | | 7.88 | 8.50 | | |
| 1 | 12429 | 6.00 | 6.55 | | 4.84 | 1.64 | | |
| 1 | 12430 | 6.44 | 5.51 | | 6.29 | 2.62 | | 8.76 |
| 1 | 12431 | 6.78 | 4.76 | | 7.37 | 4.55 | | 8.76 |
| 1 | 12432 | 7.11 | 3.92 | | 8.05 | 8.42 | | |
| 1 | 12433 | 6.04 | 6.44 | | 4.96 | 1.60 | | |
| 1 | 12434 | 6.51 | 5.46 | | 6.48 | 2.53 | | 8.76 |
| 1 | 12435 | 6.87 | 4.73 | | 7.56 | 4.54 | | 8.76 |
| 1 | 12436 | 7.23 | 3.89 | | 8.22 | 8.32 | | |
| 1 | 12437 | 6.07 | 6.38 | | 5.10 | 1.56 | | |
| 1 | 12438 | 6.57 | 5.44 | | 6.67 | 2.44 | | 8.76 |
| 1 | 12439 | 6.96 | 4.70 | | 7.76 | 4.52 | | 8.76 |
| 1 | 12440 | 7.36 | 3.86 | | 8.40 | 8.20 | | |
| 1 | 12441 | 6.09 | 6.31 | | 5.26 | 1.51 | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 12442 | 6.63 | 5.41 | | 6.86 | 2.34 | | 8.76 |
| 1 | 12443 | 7.05 | 4.66 | | 7.97 | 4.60 | | 8.76 |
| 1 | 12444 | 7.48 | 3.82 | | 8.59 | 8.07 | | |
| 1 | 12445 | 6.11 | 6.23 | | 5.54 | 1.45 | | |
| 1 | 12446 | 6.69 | 5.38 | | 7.06 | 2.24 | | 8.76 |
| 1 | 12447 | 7.13 | 4.62 | | 8.18 | 4.56 | | 8.76 |
| 1 | 12448 | 7.61 | 3.77 | | 8.74 | 7.91 | | |
| 1 | 12449 | 6.11 | 6.15 | | 5.83 | 1.40 | | |
| 1 | 12450 | 6.74 | 5.36 | | 7.26 | 2.13 | | 8.76 |
| 1 | 12451 | 7.23 | 4.58 | | 8.40 | 4.50 | | 8.76 |
| 1 | 12452 | 7.74 | 3.71 | | 8.95 | 7.74 | | |
| 1 | 12453 | 6.11 | 6.08 | | 6.08 | 1.34 | | |
| 1 | 12454 | 6.79 | 5.34 | | 7.46 | 2.01 | | 8.76 |
| 1 | 12455 | 7.32 | 4.53 | | 8.58 | 4.45 | | 8.76 |
| 1 | 12456 | 7.87 | 3.65 | | 9.17 | 7.55 | | |
| 1 | 12457 | 6.09 | 6.01 | | 6.23 | 1.28 | | |
| 1 | 12458 | 6.85 | 5.32 | | 7.66 | 2.04 | | |
| 1 | 12459 | 7.42 | 4.49 | | 8.81 | 4.41 | | 8.76 |
| 1 | 12460 | 8.01 | 3.59 | | 9.39 | 7.36 | | |
| 1 | 12461 | 6.07 | 5.94 | | 6.36 | 1.22 | | |
| 1 | 12462 | 6.90 | 5.32 | | 7.87 | 2.11 | | |
| 1 | 12463 | 7.53 | 4.46 | | 9.06 | 4.31 | | 8.76 |
| 1 | 12464 | 8.15 | 3.53 | | 9.63 | 7.15 | | |
| 1 | 12465 | 6.03 | 5.93 | | 6.48 | 1.16 | | |
| 1 | 12466 | 6.96 | 5.34 | | 8.07 | 2.21 | | |
| 1 | 12467 | 7.64 | 4.44 | | 9.31 | 4.25 | | |
| 1 | 12468 | 8.31 | 3.47 | | 9.89 | 6.93 | | |
| 1 | 12469 | 5.97 | 5.98 | | 6.58 | 1.10 | | |
| 1 | 12470 | 7.02 | 5.38 | | 8.29 | 2.32 | | |
| 1 | 12471 | 7.77 | 4.45 | | 9.58 | 4.21 | | |
| 1 | 12472 | 8.48 | 3.43 | | 10.16 | 6.72 | | |
| 1 | 12473 | 5.88 | 6.08 | | 6.65 | 1.13 | | |
| 1 | 12474 | 7.11 | 5.49 | | 8.47 | 2.47 | | |
| 1 | 12475 | 7.91 | 4.48 | | 9.84 | 4.17 | | |
| 1 | 12476 | 8.69 | 3.44 | | 10.27 | 6.51 | | |
| 1 | 12477 | 5.77 | 6.31 | | 6.69 | 1.42 | | |
| 1 | 12478 | 7.23 | 5.61 | | 8.74 | 2.63 | | |
| 1 | 12479 | 8.05 | 4.59 | | 10.08 | 4.16 | | |
| 1 | 12480 | 8.95 | 3.48 | | 10.63 | 6.37 | | |
| 1 | 12481 | 5.41 | 6.55 | | 6.50 | 1.72 | | |
| 1 | 12482 | 7.64 | 6.23 | | 9.46 | 3.25 | | |
| 1 | 12483 | 8.08 | 4.27 | | 10.21 | 3.75 | | |
| 1 | 12484 | 9.25 | 3.89 | | 10.97 | 6.41 | | |
| 1 | 12485 | 15.36 | 17.36 | | 20.50 | 23.11 | | |
| 1 | 12486 | 5.67 | 10.73 | | 9.62 | 12.77 | | 8.76 |
| 1 | 12487 | 5.49 | 10.28 | | 4.75 | 5.12 | | 8.76 |
| 1 | 12488 | 5.14 | 10.33 | | 2.06 | 0.86 | | |
| 1 | 12489 | 10.26 | 3.50 | | 12.31 | 4.88 | | |
| 1 | 12490 | 10.09 | 7.43 | | 13.20 | 6.93 | | |
| 1 | 12491 | 6.44 | 7.70 | | 8.88 | 5.08 | | |
| 1 | 12492 | 4.16 | 7.23 | | 5.48 | 2.26 | | |
| 1 | 12493 | 6.13 | | | 0.70 | | | |
| 1 | 12494 | 9.64 | | | | | | |
| 1 | 12495 | 12.64 | 4.57 | | | | | |
| 1 | 12496 | 17.14 | 13.78 | | | | | 8.76 |
| 1 | 12497 | 7.43 | | | 2.79 | | | |
| 1 | 12498 | 12.46 | 1.48 | | 1.47 | | | |
| 1 | 12499 | 14.45 | 6.90 | | 0.73 | | | 8.76 |
| 1 | 12500 | 15.21 | 10.30 | | | | | 8.76 |
| 1 | 12501 | 9.79 | | | 7.36 | 1.44 | | |
| 1 | 12502 | 13.72 | 4.07 | | 6.19 | | | 8.76 |
| 1 | 12503 | 14.24 | 8.34 | | 4.16 | | | 8.76 |
| 1 | 12504 | 13.84 | 11.00 | | 1.22 | | | 8.76 |
| 1 | 12505 | 13.13 | 2.54 | | 10.73 | 5.73 | | |
| 1 | 12506 | 14.86 | 8.04 | | 9.91 | 4.02 | | 8.76 |
| 1 | 12507 | 13.49 | 11.30 | | 6.78 | 1.71 | | 8.76 |

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|---|---|---|---|---|---|---|---|---|
| 1 | 12508 | 11.88 | 12.16 | | 2.50 | | | 8.76 |
| 1 | 12509 | 15.98 | 8.35 | | 14.08 | 12.92 | | |
| 1 | 12510 | 15.54 | 14.32 | | 10.93 | 10.72 | | 8.76 |
| 1 | 12511 | 11.23 | 13.54 | | 5.64 | 5.02 | | 8.76 |
| 1 | 12512 | 9.84 | 12.78 | | 3.06 | 0.69 | | |
| 1 | 12513 | 20.95 | 24.32 | | 16.64 | 26.40 | | |
| 1 | 12514 | 10.99 | 17.48 | | 6.86 | 13.52 | | 8.76 |
| 1 | 12515 | 8.53 | 14.01 | | 3.37 | 5.85 | | 8.76 |
| 1 | 12516 | 7.77 | 12.72 | | 1.72 | 1.41 | | |
| 1 | 12517 | | | | 0.64 | | | |
| 1 | 12518 | | | | 0.52 | | | |
| 1 | 12519 | 0.36 | | | 1.25 | | | |
| 1 | 12520 | 0.60 | | | 2.44 | | | |
| 1 | 12521 | 3.22 | | | 0.11 | | | |
| 1 | 12522 | 4.67 | | | | | | |
| 1 | 12523 | 6.73 | | | | | | |
| 1 | 12524 | 8.64 | 0.02 | | | | | 8.76 |
| 1 | 12525 | 5.02 | 10.10 | | | | | |
| 1 | 12526 | 4.99 | 9.68 | | | | | |
| 1 | 12527 | 4.97 | 8.94 | | | | | |
| 1 | 12528 | 4.92 | 7.89 | | | | | |
| 1 | 12529 | 4.75 | 6.32 | | | | | |
| 1 | 12530 | 4.39 | 4.23 | | | | | |
| 1 | 12531 | 3.86 | 1.86 | | | | | |
| 1 | 12532 | 2.74 | 0.14 | | | | | |
| 1 | 12533 | 1.07 | | | | | | |
| 1 | 12534 | 0.38 | | | | | | |
| 1 | 12535 | 0.03 | | | | | | |
| 1 | 12536 | | | | | | | |
| 1 | 12537 | | | | | | | |
| 1 | 12538 | | | | | | | |
| 1 | 12539 | 3.81 | 8.49 | | 2.98 | 0.57 | | |
| 1 | 12540 | 3.27 | 8.27 | | 0.68 | | | |
| 1 | 12541 | 3.17 | 8.22 | | | | | |
| 1 | 12542 | 3.11 | 7.99 | | | | | |
| 1 | 12543 | 2.79 | 7.30 | | | | | |
| 1 | 12544 | 2.58 | 5.12 | | | | | |
| 1 | 12545 | 2.23 | 4.42 | | | | | |
| 1 | 12546 | 1.72 | 2.04 | | | | | |
| 1 | 12547 | 1.09 | 0.43 | | | | | |
| 1 | 12548 | 0.04 | | | | | | |
| 1 | 12549 | | | | | | | |
| 1 | 12550 | | | | | | | |
| 1 | 12551 | | | | 2.45 | 0.29 | | 8.76 |
| 1 | 12552 | | | | 4.91 | 4.03 | | |
| 1 | 12553 | 20.29 | 14.24 | | | | | |
| 1 | 12554 | 20.01 | 10.44 | | | | | |
| 1 | 12555 | 17.86 | 5.03 | | | | | |
| 1 | 12556 | 15.19 | 0.49 | | 0.07 | | | |
| 1 | 12557 | 9.66 | | | 1.10 | | | |
| 1 | 12558 | 6.14 | | | 1.31 | | | |
| 1 | 12559 | 4.16 | | | 1.79 | | | |
| 1 | 12560 | 2.90 | | | 1.91 | | | |
| 1 | 12561 | 2.20 | | | 1.52 | | | |
| 1 | 12562 | 1.78 | | | 1.20 | | | |
| 1 | 12563 | 1.54 | | | 0.92 | | | |
| 1 | 12564 | 1.42 | | | 0.74 | | | |
| 1 | 12565 | 1.38 | | | 0.66 | | | |
| 1 | 12566 | 1.30 | | | 1.03 | | | |
| 1 | 12567 | 15.66 | 12.07 | | | | | 8.76 |
| 1 | 12568 | 15.99 | 10.64 | | | | | |
| 1 | 12569 | 15.46 | 7.28 | | | | | |
| 1 | 12570 | 14.04 | 3.21 | | | | | |
| 1 | 12571 | 11.24 | | | | | | |
| 1 | 12572 | 7.06 | | | | | | |
| 1 | 12573 | 4.45 | | | | | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 12574 | 2.96 | | | 0.23 | | | |
| 1 | 12575 | 2.12 | | | 0.26 | | | |
| 1 | 12576 | 1.66 | | | 0.15 | | | |
| 1 | 12577 | 1.42 | | | | | | |
| 1 | 12578 | 1.25 | | | | | | |
| 1 | 12579 | 1.06 | | | | | | |
| 1 | 12580 | 0.69 | | | | | | |
| 1 | 12581 | 13.33 | 11.39 | | | | | |
| 1 | 12582 | 13.20 | 10.56 | | | | | |
| 1 | 12583 | 12.94 | 8.38 | | | | | |
| 1 | 12584 | 12.23 | 5.26 | | | | | |
| 1 | 12585 | 11.00 | 1.68 | | | | | |
| 1 | 12586 | 7.81 | | | | | | |
| 1 | 12587 | 4.84 | | | | | | |
| 1 | 12588 | 2.97 | | | | | | |
| 1 | 12589 | 2.00 | | | | | | |
| 1 | 12590 | 1.55 | | | | | | |
| 1 | 12591 | 1.27 | | | | | | |
| 1 | 12592 | 1.05 | | | | | | |
| 1 | 12593 | 0.85 | | | | | | |
| 1 | 12594 | 0.58 | | | | | | |
| 1 | 12595 | 11.15 | 11.71 | | 0.23 | | | |
| 1 | 12596 | 10.86 | 10.74 | | | | | |
| 1 | 12597 | 10.62 | 9.03 | | | | | |
| 1 | 12598 | 10.21 | 6.60 | | | | | |
| 1 | 12599 | 9.46 | 3.58 | | | | | |
| 1 | 12600 | 8.36 | 0.46 | | | | | |
| 1 | 12601 | 5.07 | | | | | | |
| 1 | 12602 | 3.11 | | | | | | |
| 1 | 12603 | 2.07 | | | | | | |
| 1 | 12604 | 1.49 | | | | | | |
| 1 | 12605 | 1.05 | | | | | | |
| 1 | 12606 | 0.84 | | | | | | |
| 1 | 12607 | 0.65 | | | | | | |
| 1 | 12608 | 0.46 | | | | | | |
| 1 | 12609 | 9.13 | 11.90 | | 0.31 | | | |
| 1 | 12610 | 8.89 | 10.85 | | | | | |
| 1 | 12611 | 8.71 | 9.34 | | | | | |
| 1 | 12612 | 8.45 | 7.31 | | | | | |
| 1 | 12613 | 7.98 | 4.75 | | | | | |
| 1 | 12614 | 7.20 | 1.85 | | | | | |
| 1 | 12615 | 5.22 | | | | | | |
| 1 | 12616 | 3.20 | | | | | | |
| 1 | 12617 | 1.70 | | | | | | |
| 1 | 12618 | 1.12 | | | | | | |
| 1 | 12619 | 0.82 | | | | | | |
| 1 | 12620 | 0.61 | | | | | | |
| 1 | 12621 | 0.45 | | | | | | |
| 1 | 12622 | 0.32 | | | | | | |
| 1 | 12623 | 7.34 | 11.66 | | | | | |
| 1 | 12624 | 7.22 | 10.66 | | | | | |
| 1 | 12625 | 7.14 | 9.34 | | | | | |
| 1 | 12626 | 6.99 | 7.62 | | | | | |
| 1 | 12627 | 6.69 | 5.44 | | | | | |
| 1 | 12628 | 6.13 | 2.88 | | | | | |
| 1 | 12629 | 5.30 | 0.33 | | | | | |
| 1 | 12630 | 2.80 | | | | | | |
| 1 | 12631 | 1.48 | | | | | | |
| 1 | 12632 | 0.86 | | | | | | |
| 1 | 12633 | 0.57 | | | | | | |
| 1 | 12634 | 0.38 | | | | | | |
| 1 | 12635 | 0.18 | | | | | | |
| 1 | 12636 | 0.16 | | | | | | |
| 1 | 12637 | 0.54 | | | 3.16 | | | |
| 1 | 12638 | 0.48 | | | 3.29 | | | 8.76 |
| 1 | 12639 | 0.70 | | | 3.70 | | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 12640 | 1.05 | | | 4.29 | | | |
| 1 | 12641 | 1.48 | | | 5.05 | | | |
| 1 | 12642 | 1.92 | | | 5.86 | | | |
| 1 | 12643 | 2.33 | | | 6.63 | | | |
| 1 | 12644 | 2.70 | | | 7.33 | | | |
| 1 | 12645 | 3.00 | | | 7.85 | | | |
| 1 | 12646 | 3.23 | | | 8.22 | | | |
| 1 | 12647 | 3.41 | | | 8.47 | | | |
| 1 | 12648 | 3.57 | | | 8.65 | | | |
| 1 | 12649 | 3.72 | | | 8.77 | | | |
| 1 | 12650 | 3.70 | | | 8.87 | | | |
| 1 | 12651 | 5.83 | | | | | | 8.76 |
| 1 | 12652 | 4.44 | | | | | | 8.76 |
| 1 | 12653 | 3.32 | | | | | | |
| 1 | 12654 | 2.63 | | | | | | |
| 1 | 12655 | 2.18 | | | 0.86 | | | |
| 1 | 12656 | 1.95 | | | 1.75 | | | |
| 1 | 12657 | 1.91 | | | 2.41 | | | |
| 1 | 12658 | 1.98 | | | 2.82 | | | |
| 1 | 12659 | 2.12 | | | 3.00 | | | |
| 1 | 12660 | 2.28 | | | 3.01 | | | |
| 1 | 12661 | 2.43 | | | 2.95 | | | |
| 1 | 12662 | 2.58 | | | 2.86 | | | |
| 1 | 12663 | 2.78 | | | 2.76 | | | |
| 1 | 12664 | 3.20 | | | 2.60 | | | |
| 1 | 12665 | | | | | | | |
| 1 | 12666 | | | | | | | |
| 1 | 12667 | | | | | | | |
| 1 | 12668 | | | | | | | |
| 1 | 12669 | 0.26 | | | | | | |
| 1 | 12670 | 0.55 | | | | | | |
| 1 | 12671 | 1.03 | | | | | | |
| 1 | 12672 | 1.80 | | | | | | |
| 1 | 12673 | 2.99 | | | | | | |
| 1 | 12674 | 3.78 | 0.99 | | | | | |
| 1 | 12675 | 4.49 | 1.83 | | | | | |
| 1 | 12676 | 5.65 | 2.66 | | 0.65 | | | |
| 1 | 12677 | 6.82 | 3.41 | | 2.82 | | | |
| 1 | 12678 | 8.00 | 3.82 | | 6.67 | 1.38 | | |
| 1 | 12679 | 9.30 | 3.97 | | 9.17 | 3.47 | | |
| 1 | 12680 | 10.65 | 3.82 | | 11.55 | 5.45 | | |
| 1 | 12681 | 11.82 | 3.15 | | 13.34 | 6.82 | | |
| 1 | 12682 | 12.46 | 1.73 | | 14.11 | 7.38 | | |
| 1 | 12683 | | | | 4.48 | 3.44 | | |
| 1 | 12684 | | | | 2.08 | | | 8.76 |
| 1 | 12685 | | | | 0.27 | | | |
| 1 | 12686 | | | | | | | |
| 1 | 12687 | | | | | | | |
| 1 | 12688 | 0.41 | | | | | | |
| 1 | 12689 | 1.28 | | | | | | |
| 1 | 12690 | 2.05 | 1.35 | | | | | |
| 1 | 12691 | 2.65 | 2.37 | | | | | |
| 1 | 12692 | 3.27 | 3.07 | | | | | |
| 1 | 12693 | 3.93 | 3.51 | | | | | |
| 1 | 12694 | 5.13 | 3.71 | | 1.85 | | | |
| 1 | 12695 | 6.20 | 4.23 | | 5.04 | 1.04 | | |
| 1 | 12696 | 7.43 | 4.45 | | 7.35 | 2.88 | | |
| 1 | 12697 | 8.76 | 4.49 | | 9.63 | 4.62 | | |
| 1 | 12698 | 10.11 | 4.29 | | 11.57 | 6.42 | | |
| 1 | 12699 | 11.27 | 3.69 | | 12.79 | 7.74 | | |
| 1 | 12700 | 11.82 | 2.61 | | 12.75 | 8.29 | | |
| 1 | 12701 | 1.16 | | | 0.92 | | | |
| 1 | 12702 | 1.23 | | | 0.80 | | | |
| 1 | 12703 | 1.15 | | | 0.95 | | | |
| 1 | 12704 | 1.11 | | | 1.07 | | | |
| 1 | 12705 | 1.12 | | | 1.38 | | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 12706 | 1.18 | | | 1.75 | | | |
| 1 | 12707 | 1.30 | | | 2.10 | | | |
| 1 | 12708 | 1.57 | | | 2.69 | | | |
| 1 | 12709 | 2.12 | | | 3.02 | | | |
| 1 | 12710 | 2.77 | | | 3.22 | | | |
| 1 | 12711 | 3.64 | | | 3.68 | | | |
| 1 | 12712 | 4.73 | | | 4.22 | | | |
| 1 | 12713 | 6.01 | | | 4.92 | | | |
| 1 | 12714 | 7.20 | | | 5.84 | | | |
| 1 | 12715 | 8.17 | | | 7.52 | | | |
| 1 | 12716 | 8.83 | | | 10.49 | | | |
| 1 | 12717 | 9.10 | | | 13.95 | 0.50 | | |
| 1 | 12718 | 6.32 | | | 13.60 | 2.17 | | |
| 1 | 12719 | 0.56 | | | | | | |
| 1 | 12720 | 0.89 | | | | | | |
| 1 | 12721 | 0.95 | | | | | | |
| 1 | 12722 | 0.97 | | | 0.08 | | | |
| 1 | 12723 | 0.98 | | | 0.31 | | | |
| 1 | 12724 | 1.03 | | | 0.58 | | | |
| 1 | 12725 | 1.24 | | | 0.89 | | | |
| 1 | 12726 | 1.60 | | | 1.22 | | | |
| 1 | 12727 | 2.12 | | | 1.45 | | | |
| 1 | 12728 | 2.83 | | | 1.78 | | | |
| 1 | 12729 | 3.87 | | | 2.38 | | | |
| 1 | 12730 | 5.24 | | | 3.09 | | | |
| 1 | 12731 | 6.69 | | | 4.07 | | | |
| 1 | 12732 | 8.12 | | | 5.10 | | | |
| 1 | 12733 | 9.44 | | | 7.34 | | | |
| 1 | 12734 | 10.50 | | | 10.87 | 0.27 | | |
| 1 | 12735 | 10.27 | | | 12.97 | 2.26 | | |
| 1 | 12736 | 7.83 | | | 14.35 | 3.89 | | |
| 1 | 12737 | 0.48 | | | | | | |
| 1 | 12738 | 0.64 | | | | | | |
| 1 | 12739 | 0.71 | | | | | | |
| 1 | 12740 | 0.78 | | | | | | |
| 1 | 12741 | 0.83 | | | | | | |
| 1 | 12742 | 0.91 | | | | | | |
| 1 | 12743 | 1.12 | | | 0.09 | | | |
| 1 | 12744 | 1.55 | | | 0.29 | | | |
| 1 | 12745 | 2.15 | | | 0.62 | | | |
| 1 | 12746 | 3.01 | | | 0.99 | | | |
| 1 | 12747 | 4.21 | | | 1.42 | | | |
| 1 | 12748 | 5.72 | | | 2.31 | | | |
| 1 | 12749 | 7.37 | | | 3.40 | | | |
| 1 | 12750 | 9.09 | 0.49 | | 4.55 | | | |
| 1 | 12751 | 10.73 | 0.85 | | 7.08 | | | |
| 1 | 12752 | 11.85 | 0.45 | | 10.03 | 1.24 | | |
| 1 | 12753 | 11.48 | 0.01 | | 12.35 | 3.04 | | |
| 1 | 12754 | 9.38 | | | 15.24 | 4.41 | | |
| 1 | 12755 | 0.38 | | | | | | |
| 1 | 12756 | 0.55 | | | | | | |
| 1 | 12757 | 0.63 | | | | | | |
| 1 | 12758 | 0.71 | | | | | | |
| 1 | 12759 | 0.79 | | | | | | |
| 1 | 12760 | 0.91 | | | | | | |
| 1 | 12761 | 1.18 | | | | | | |
| 1 | 12762 | 1.65 | | | | | | |
| 1 | 12763 | 2.33 | | | 0.03 | | | |
| 1 | 12764 | 3.28 | | | 0.34 | | | |
| 1 | 12765 | 4.69 | | | 0.77 | | | |
| 1 | 12766 | 6.24 | 0.17 | | 1.74 | | | |
| 1 | 12767 | 8.10 | 1.07 | | 2.78 | | | |
| 1 | 12768 | 9.35 | 1.73 | | 4.00 | | | |
| 1 | 12769 | 10.50 | 2.14 | | 6.62 | | | |
| 1 | 12770 | 11.53 | 2.04 | | 9.38 | 1.68 | | |
| 1 | 12771 | 12.23 | 1.05 | | 12.02 | 3.47 | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 12772 | 11.09 | | | 15.39 | 4.86 | | |
| 1 | 12773 | 0.36 | | | | | | |
| 1 | 12774 | 0.38 | | | | | | |
| 1 | 12775 | 0.43 | | | | | | |
| 1 | 12776 | 0.63 | | | | | | |
| 1 | 12777 | 0.72 | | | | | | |
| 1 | 12778 | 0.87 | | | | | | |
| 1 | 12779 | 1.17 | | | | | | |
| 1 | 12780 | 1.71 | | | | | | |
| 1 | 12781 | 2.49 | | | | | | |
| 1 | 12782 | 3.57 | | | | | | |
| 1 | 12783 | 5.08 | | | 0.29 | | | |
| 1 | 12784 | 6.69 | 1.13 | | 1.23 | | | |
| 1 | 12785 | 7.81 | 1.99 | | 2.32 | | | |
| 1 | 12786 | 8.91 | 2.60 | | 4.07 | | | |
| 1 | 12787 | 10.08 | 2.95 | | 7.72 | 1.16 | | |
| 1 | 12788 | 11.25 | 2.77 | | 10.40 | 3.12 | | |
| 1 | 12789 | 12.27 | 1.96 | | 12.93 | 4.91 | | |
| 1 | 12790 | 12.23 | 0.13 | | 15.03 | 5.49 | | |
| 1 | 12791 | 0.12 | | | | | | |
| 1 | 12792 | 0.16 | | | | | | |
| 1 | 12793 | 0.29 | | | | | | |
| 1 | 12794 | 0.37 | | | | | | |
| 1 | 12795 | 0.60 | | | | | | |
| 1 | 12796 | 0.78 | | | | | | |
| 1 | 12797 | 1.13 | | | | | | |
| 1 | 12798 | 1.72 | | | | | | |
| 1 | 12799 | 2.62 | | | | | | |
| 1 | 12800 | 3.88 | | | | | | |
| 1 | 12801 | 4.91 | 0.74 | | | | | |
| 1 | 12802 | 6.41 | 1.77 | | 0.89 | | | |
| 1 | 12803 | 7.42 | 2.63 | | 2.04 | | | |
| 1 | 12804 | 8.55 | 3.18 | | 5.30 | 0.12 | | |
| 1 | 12805 | 9.77 | 3.46 | | 8.39 | 2.13 | | |
| 1 | 12806 | 11.06 | 3.35 | | 11.00 | 4.24 | | |
| 1 | 12807 | 12.19 | 2.65 | | 13.29 | 5.81 | | |
| 1 | 12808 | 12.80 | 0.91 | | 14.67 | 6.32 | | |
| 1 | 12809 | 3.75 | | | 8.93 | | | |
| 1 | 12810 | 3.83 | | | 8.97 | | | |
| 1 | 12811 | 3.81 | | | 9.01 | | | |
| 1 | 12812 | 3.80 | | | 8.99 | | | |
| 1 | 12813 | 3.79 | | | 8.90 | | | |
| 1 | 12814 | 3.76 | | | 8.72 | | | |
| 1 | 12815 | 3.71 | | | 8.43 | | | |
| 1 | 12816 | 3.65 | | | 8.02 | | | |
| 1 | 12817 | 3.59 | | | 7.52 | | | |
| 1 | 12818 | 3.48 | | | 6.97 | | | |
| 1 | 12819 | 3.33 | | | 6.41 | | | |
| 1 | 12820 | 3.13 | | | 5.99 | | | |
| 1 | 12821 | 2.99 | | | 5.88 | | | |
| 1 | 12822 | 2.77 | | | 6.02 | | | |
| 1 | 12823 | 2.63 | | | 6.71 | | | |
| 1 | 12824 | 2.28 | | | 7.65 | | | |
| 1 | 12825 | 1.85 | | | 9.58 | | | |
| 1 | 12826 | 5.04 | | | 13.91 | | | |
| 1 | 12827 | 3.13 | | | 2.64 | | | |
| 1 | 12828 | 2.90 | | | 2.81 | | | |
| 1 | 12829 | 2.87 | | | 2.90 | | | |
| 1 | 12830 | 2.85 | | | 2.99 | | | |
| 1 | 12831 | 2.83 | | | 3.05 | | | |
| 1 | 12832 | 2.84 | | | 3.10 | | | |
| 1 | 12833 | 2.79 | | | 3.09 | | | |
| 1 | 12834 | 2.74 | | | 3.01 | | | |
| 1 | 12835 | 2.69 | | | 2.99 | | | |
| 1 | 12836 | 2.68 | | | 2.90 | | | |
| 1 | 12837 | 2.62 | | | 2.78 | | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 12838 | 2.61 | | | 2.69 | | | |
| 1 | 12839 | 2.51 | | | 2.67 | | | |
| 1 | 12840 | 2.34 | | | 2.96 | | | |
| 1 | 12841 | 2.12 | | | 3.86 | | | |
| 1 | 12842 | 2.09 | | | 6.05 | | | |
| 1 | 12843 | 2.95 | | | 11.57 | 1.08 | | |
| 1 | 12844 | 6.31 | | | 14.56 | 2.58 | | |
| 1 | 12845 | 10.27 | | | 15.72 | 3.44 | | |
| 1 | 12846 | 6.42 | | | 12.41 | 3.59 | | |
| 1 | 12847 | 2.50 | | | 7.94 | 2.91 | | |
| 1 | 12848 | 0.23 | | | 4.14 | 1.52 | | |
| 1 | 12849 | | | | 1.41 | | | |
| 1 | 12850 | | | | | | | |
| 1 | 12851 | | | | | | | |
| 1 | 12852 | | | | | | | |
| 1 | 12853 | | | | | | | |
| 1 | 12854 | | | | | | | |
| 1 | 12855 | | | | | | | |
| 1 | 12856 | | | | | | | |
| 1 | 12857 | | | | | | | |
| 1 | 12858 | | | | | | | |
| 1 | 12859 | | | | | | | |
| 1 | 12860 | | | | | | | |
| 1 | 12861 | | | | 0.63 | | | |
| 1 | 12862 | | | | 2.05 | | | |
| 1 | 12863 | 0.62 | | | 3.76 | | | |
| 1 | 12864 | 0.86 | | | 4.70 | | | |
| 1 | 12865 | 10.06 | | | 16.12 | 4.20 | | |
| 1 | 12866 | 5.95 | | | 11.69 | 3.32 | | |
| 1 | 12867 | 3.03 | | | 8.22 | 3.03 | | |
| 1 | 12868 | 1.14 | | | 5.08 | 2.28 | | |
| 1 | 12869 | | | | 2.91 | 0.93 | | |
| 1 | 12870 | | | | 0.96 | | | |
| 1 | 12871 | | | | | | | |
| 1 | 12872 | | | | | | | |
| 1 | 12873 | | | | | | | |
| 1 | 12874 | | | | | | | |
| 1 | 12875 | | | | | | | |
| 1 | 12876 | | | | | | | |
| 1 | 12877 | | | | | | | |
| 1 | 12878 | | | | | | | |
| 1 | 12879 | | | | | | | |
| 1 | 12880 | | | | | | | |
| 1 | 12881 | | | | 0.51 | | | |
| 1 | 12882 | 0.11 | | | 1.95 | | | |
| 1 | 12883 | 0.83 | | | 3.59 | | | |
| 1 | 12884 | 1.68 | | | 5.32 | 1.01 | | |
| 1 | 12885 | 9.59 | | | 16.01 | 3.96 | | |
| 1 | 12886 | 5.61 | | | 11.28 | 3.33 | | |
| 1 | 12887 | 3.10 | | | 7.98 | 2.92 | | |
| 1 | 12888 | 2.08 | | | 5.67 | 2.24 | | |
| 1 | 12889 | 1.15 | | | 4.04 | 1.01 | | |
| 1 | 12890 | 0.33 | | | 2.46 | | | |
| 1 | 12891 | | | | 0.66 | | | |
| 1 | 12892 | | | | | | | |
| 1 | 12893 | | | | | | | |
| 1 | 12894 | | | | | | | |
| 1 | 12895 | | | | | | | |
| 1 | 12896 | | | | | | | |
| 1 | 12897 | | | | | | | |
| 1 | 12898 | | | | | | | |
| 1 | 12899 | | | | | | | |
| 1 | 12900 | | | | | | | |
| 1 | 12901 | | | | | | | |
| 1 | 12902 | 0.17 | | | 1.35 | | | |
| 1 | 12903 | 1.23 | | | 3.85 | 1.06 | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 12904 | 2.81 | | | 6.14 | 2.28 | | |
| 1 | 12905 | 8.53 | | | 15.22 | 3.01 | | |
| 1 | 12906 | 4.99 | | | 10.24 | 2.60 | | |
| 1 | 12907 | 3.53 | | | 7.79 | 2.15 | | |
| 1 | 12908 | 2.82 | | | 6.55 | 1.06 | | |
| 1 | 12909 | 2.12 | | | 4.94 | | | |
| 1 | 12910 | 1.41 | | | 3.02 | | | |
| 1 | 12911 | 0.74 | | | 1.44 | | | |
| 1 | 12912 | 0.19 | | | 0.31 | | | |
| 1 | 12913 | | | | | | | |
| 1 | 12914 | | | | | | | |
| 1 | 12915 | | | | | | | |
| 1 | 12916 | | | | | | | |
| 1 | 12917 | | | | | | | |
| 1 | 12918 | | | | | | | |
| 1 | 12919 | | | | | | | |
| 1 | 12920 | | | | | | | |
| 1 | 12921 | | | | | | | |
| 1 | 12922 | 0.17 | | | 0.17 | | | |
| 1 | 12923 | 1.26 | | | 2.67 | 1.86 | | |
| 1 | 12924 | 3.97 | | | 6.18 | 3.32 | | |
| 1 | 12925 | 6.60 | | | 13.11 | 1.73 | | |
| 1 | 12926 | 4.44 | | | 9.44 | 1.05 | | |
| 1 | 12927 | 4.12 | | | 8.12 | | | |
| 1 | 12928 | 3.43 | | | 6.16 | | | |
| 1 | 12929 | 2.72 | | | 4.50 | | | |
| 1 | 12930 | 2.02 | | | 2.95 | | | |
| 1 | 12931 | 1.42 | | | 1.72 | | | |
| 1 | 12932 | 1.02 | | | 0.70 | | | |
| 1 | 12933 | 0.68 | | | | | | |
| 1 | 12934 | 0.42 | | | | | | |
| 1 | 12935 | 0.25 | | | | | | |
| 1 | 12936 | 0.17 | | | | | | |
| 1 | 12937 | 0.16 | | | | | | |
| 1 | 12938 | 0.23 | | | | | | |
| 1 | 12939 | 0.43 | | | | | | |
| 1 | 12940 | 0.73 | | | | | | |
| 1 | 12941 | 1.04 | | | | | | |
| 1 | 12942 | 1.41 | | | 1.28 | | | |
| 1 | 12943 | 1.19 | | | 3.02 | 2.06 | | |
| 1 | 12944 | 4.08 | | | 5.28 | 4.86 | | |
| 1 | 12945 | 3.53 | | | 8.28 | | | |
| 1 | 12946 | 3.96 | | | 7.26 | | | |
| 1 | 12947 | 3.71 | | | 6.03 | | | |
| 1 | 12948 | 3.45 | | | 4.99 | | | |
| 1 | 12949 | 3.12 | | | 3.96 | | | |
| 1 | 12950 | 2.79 | | | 2.92 | | | |
| 1 | 12951 | 2.46 | | | 2.05 | | | |
| 1 | 12952 | 2.15 | | | 1.29 | | | |
| 1 | 12953 | 1.89 | | | 0.63 | | | |
| 1 | 12954 | 1.64 | | | 0.11 | | | |
| 1 | 12955 | 1.50 | | | | | | |
| 1 | 12956 | 1.46 | | | | | | |
| 1 | 12957 | 1.52 | | | | | | |
| 1 | 12958 | 1.68 | | | | | | |
| 1 | 12959 | 1.94 | | | 0.04 | | | |
| 1 | 12960 | 2.29 | | | 0.44 | | | |
| 1 | 12961 | 2.79 | | | 1.13 | | | |
| 1 | 12962 | 3.16 | | | 2.22 | | | |
| 1 | 12963 | 3.57 | | | 4.51 | 0.13 | | |
| 1 | 12964 | 3.58 | | | 7.30 | 1.38 | | |
| 1 | 12965 | 5.47 | | | 10.98 | | | |
| 1 | 12966 | 4.69 | | | 9.10 | | | |
| 1 | 12967 | 3.95 | | | 7.18 | | | |
| 1 | 12968 | 3.14 | | | 5.45 | | | |
| 1 | 12969 | 2.31 | | | 3.93 | | | |

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|---|---|---|---|---|---|---|---|---|
| 1 | 12970 | 1.55 | | | 2.51 | | | |
| 1 | 12971 | 1.07 | | | 1.44 | | | |
| 1 | 12972 | 0.68 | | | 0.59 | | | |
| 1 | 12973 | 0.37 | | | | | | |
| 1 | 12974 | 0.13 | | | | | | |
| 1 | 12975 | | | | | | | |
| 1 | 12976 | | | | | | | |
| 1 | 12977 | | | | | | | |
| 1 | 12978 | | | | | | | |
| 1 | 12979 | | | | | | | |
| 1 | 12980 | | | | | | | |
| 1 | 12981 | | | | 0.28 | | | |
| 1 | 12982 | | | | 1.02 | | | |
| 1 | 12983 | | | | 2.01 | | | |
| 1 | 12984 | 0.13 | | | 3.31 | | | |
| 1 | 12985 | 10.34 | | | 16.28 | 4.45 | | |
| 1 | 12986 | 4.90 | | | 10.04 | 2.52 | | |
| 1 | 12987 | 1.81 | | | 6.57 | 1.43 | | |
| 1 | 12988 | 0.41 | | | 3.65 | | | |
| 1 | 12989 | | | | 1.02 | | | |
| 1 | 12990 | | | | | | | |
| 1 | 12991 | | | | | | | |
| 1 | 12992 | | | | | | | |
| 1 | 12993 | | | | | | | |
| 1 | 12994 | | | | | | | |
| 1 | 12995 | | | | | | | |
| 1 | 12996 | | | | | | | |
| 1 | 12997 | | | | | | | |
| 1 | 12998 | | | | | | | |
| 1 | 12999 | | | | | | | |
| 1 | 13000 | | | | | | | |
| 1 | 13001 | | | | 0.20 | | | |
| 1 | 13002 | | | | 1.32 | | | |
| 1 | 13003 | | | | 2.63 | | | |
| 1 | 13004 | 0.81 | | | 5.07 | | | |
| 2 | 20001 | | | | | | | |
| 2 | 20002 | | | | | | | |
| 2 | 20003 | | | | | | | |
| 2 | 20004 | | | | | | | |
| 2 | 20005 | 8.97 | | | 3.51 | | | |
| 2 | 20006 | 14.23 | 2.23 | | 7.02 | | | |
| 2 | 20007 | 10.32 | 1.88 | | 4.16 | | | |
| 2 | 20008 | 8.62 | | | 3.89 | | | |
| 2 | 20009 | 5.37 | 1.59 | | 4.75 | | | |
| 2 | 20010 | 3.12 | | | 3.96 | | | |
| 2 | 20011 | 6.52 | | | 7.27 | | | |
| 2 | 20012 | 8.71 | 4.80 | | 8.13 | | | |
| 2 | 20013 | 9.30 | 3.36 | | 3.95 | | | |
| 2 | 20014 | 14.83 | 5.13 | | 9.36 | 0.80 | | |
| 2 | 20015 | 8.19 | | | 6.31 | | | |
| 2 | 20016 | 4.72 | | | 4.48 | | | |
| 2 | 20017 | 16.35 | 2.93 | | 8.85 | | | |
| 2 | 20018 | 16.51 | 2.55 | | 9.54 | | | |
| 2 | 20019 | 8.83 | 0.67 | | 2.28 | | | |
| 2 | 20020 | 10.00 | 1.98 | | 3.51 | | | |
| 2 | 20021 | 11.67 | | | 6.21 | | | |
| 2 | 20022 | 5.96 | | | 5.33 | | | |
| 2 | 20023 | 2.94 | | | 3.28 | | | |
| 2 | 20024 | 3.09 | | | 2.51 | | | |
| 2 | 20025 | 18.27 | 4.38 | | 10.47 | | | |
| 2 | 20026 | 12.85 | 2.43 | | 5.06 | | | |
| 2 | 20027 | 8.29 | | | 2.61 | | | |
| 2 | 20028 | 16.62 | 2.70 | | 9.85 | | | |
| 2 | 20029 | 0.47 | | | | | | |
| 2 | 20030 | 0.61 | | | | | | |
| 2 | 20031 | 0.64 | | | | | | |

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|---|---|---|---|---|---|---|---|---|
| 2 | 20032 | 0.51 | | | | | | |
| 2 | 20033 | 7.27 | | | 3.04 | | | |
| 2 | 20034 | 8.75 | | | 2.76 | | | |
| 2 | 20035 | 5.36 | | | 0.99 | | | |
| 2 | 20036 | 5.73 | | | 2.04 | | | |
| 2 | 20037 | 0.17 | | | | | | |
| 2 | 20038 | | | | | | | |
| 2 | 20039 | | | | | | | |
| 2 | 20040 | | | | | | | |
| 2 | 20041 | | | | | | | |
| 2 | 20042 | | | | | | | |
| 2 | 20043 | | | | | | | |
| 2 | 20044 | | | | 0.25 | | | |
| 2 | 20045 | 3.39 | | | 0.77 | | | |
| 2 | 20046 | 5.27 | | | 3.83 | | | |
| 2 | 20047 | 2.60 | | | 1.48 | | | |
| 2 | 20048 | 2.05 | | | 0.39 | | | |
| 2 | 20049 | 0.60 | | | 0.55 | | | |
| 2 | 20050 | 2.57 | | | 1.25 | | | |
| 2 | 20051 | 7.34 | | | 4.30 | | | |
| 2 | 20052 | 4.77 | | | 1.67 | | | |
| 2 | 20053 | | | | | | | |
| 2 | 20054 | 0.31 | | | | | | |
| 2 | 20055 | 0.33 | | | | | | |
| 2 | 20056 | | | | | | | |
| 2 | 20057 | | | | | | | |
| 2 | 20058 | 0.05 | | | | | | |
| 2 | 20059 | | | | | | | |
| 2 | 20060 | | | | | | | |
| 2 | 20061 | | | | | | | |
| 2 | 20062 | 7.92 | | | 5.89 | | | |
| 2 | 20063 | 10.48 | | | 8.70 | | | |
| 2 | 20064 | 16.17 | | | 13.83 | | | |
| 2 | 20065 | | | | | | | |
| 2 | 20066 | 0.09 | | | | | | |
| 2 | 20067 | 0.45 | | | | | | |
| 2 | 20068 | | | | | | | |
| 2 | 20069 | | | | | | | |
| 2 | 20070 | | | | | | | |
| 2 | 20071 | | | | | | | |
| 2 | 20072 | | | | | | | |
| 2 | 20073 | 0.89 | | | 0.72 | | | |
| 2 | 20074 | | | | | | | |
| 2 | 20075 | 0.42 | | | 1.06 | | | |
| 2 | 20076 | 2.84 | | | 2.62 | | | |
| 2 | 20077 | 4.15 | | | 1.07 | | | |
| 2 | 20078 | 2.03 | | | | | | |
| 2 | 20079 | | | | | | | |
| 2 | 20080 | 2.63 | | | 0.20 | | | |
| 2 | 20081 | | | | | | | |
| 2 | 20082 | | | | | | | |
| 2 | 20083 | | | | | | | |
| 2 | 20084 | | | | | | | |
| 2 | 20085 | | | | | | | |
| 2 | 20086 | | | | | | | |
| 2 | 20087 | | | | | | | |
| 2 | 20088 | | | | | | | |
| 2 | 20089 | | | | | | | |
| 2 | 20090 | | | | | | | |
| 2 | 20091 | | | | | | | |
| 2 | 20092 | | | | | | | |
| 2 | 20093 | | | | | | | |
| 2 | 20094 | 2.41 | | | 1.38 | | | |
| 2 | 20095 | 9.56 | | | 7.87 | | | |
| 2 | 20096 | | | | | | | |
| 2 | 20097 | | | | | | | |

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|---|---|---|---|---|---|---|---|---|
| 2 | 20098 | | | | | | | |
| 2 | 20099 | | | | | | | |
| 2 | 20100 | | | | | | | |
| 2 | 20101 | 6.78 | 0.48 | | 0.81 | | | |
| 2 | 20102 | 2.57 | | | | | | |
| 2 | 20103 | | | | | | | |
| 2 | 20104 | 2.05 | | | | | | |
| 2 | 20105 | | | | | | | |
| 2 | 20106 | | | | | | | |
| 2 | 20107 | | | | | | | |
| 2 | 20108 | | | | | | | |
| 2 | 20109 | 20.57 | 10.25 | | 12.12 | 2.92 | | 8.76 |
| 2 | 20110 | 10.81 | | | 7.79 | | | |
| 2 | 20111 | 25.24 | 10.58 | | 18.83 | 6.42 | | 8.76 |
| 2 | 20112 | 14.98 | 5.74 | | 11.84 | 3.99 | | 8.76 |
| 2 | 20113 | 14.84 | 4.72 | | 10.73 | 0.92 | | |
| 2 | 20114 | 5.94 | | | 4.58 | | | |
| 2 | 20115 | 19.01 | 1.28 | | 15.66 | 0.60 | | 8.76 |
| 2 | 20116 | 10.97 | | | 9.22 | | | |
| 2 | 20117 | 5.28 | | | 0.98 | | | |
| 2 | 20118 | 8.35 | 0.96 | | 0.86 | | | |
| 2 | 20119 | 2.22 | | | | | | |
| 2 | 20120 | 3.11 | | | | | | |
| 2 | 20121 | 0.63 | | | | | | |
| 2 | 20122 | 1.60 | | | | | | |
| 2 | 20123 | | | | | | | |
| 2 | 20124 | 8.74 | | | 3.63 | | | |
| 2 | 20125 | 7.12 | | | 2.11 | | | |
| 2 | 20126 | 4.23 | | | 0.38 | | | |
| 2 | 20127 | 0.86 | | | | | | |
| 2 | 20128 | | | | | | | |
| 2 | 20129 | 2.93 | | | 4.92 | | | 8.76 |
| 2 | 20130 | 16.40 | 6.10 | | 9.35 | | | |
| 2 | 20131 | 11.81 | 6.48 | | 5.59 | | | |
| 2 | 20132 | 8.59 | 6.54 | | 4.00 | 0.38 | | |
| 2 | 20133 | 5.85 | 5.93 | | 1.95 | 1.62 | | |
| 2 | 20134 | 3.98 | 5.07 | | 0.79 | 2.76 | | |
| 2 | 20135 | | | | | | | |
| 2 | 20136 | | | | 3.05 | 0.63 | | 8.76 |
| 2 | 20137 | | | | 3.68 | 2.01 | | 8.76 |
| 2 | 20138 | | | | 4.34 | 3.48 | | 8.76 |
| 2 | 20139 | | | | 4.75 | 5.01 | | |
| 2 | 20140 | | | | 5.12 | 7.58 | | |
| 2 | 20141 | | | | 4.78 | 8.60 | | |
| 2 | 20142 | | | | 5.03 | 9.54 | | |
| 2 | 20143 | | | | 4.87 | 10.41 | | |
| 2 | 20144 | | | | 4.88 | 10.51 | | |
| 2 | 20145 | | | | 4.76 | 10.42 | | |
| 2 | 20146 | | 1.00 | | 4.60 | 10.02 | | |
| 2 | 20147 | 1.06 | 2.13 | | 4.52 | 8.68 | | |
| 2 | 20148 | 2.55 | 2.79 | | 5.18 | 7.31 | | 8.76 |
| 2 | 20149 | 4.86 | 4.31 | | 5.60 | 6.25 | | 8.76 |
| 2 | 20150 | 6.79 | 6.14 | | 6.38 | 3.60 | | 8.76 |
| 2 | 20151 | 8.13 | 8.12 | | 6.82 | 2.30 | | 8.76 |
| 2 | 20152 | 8.61 | 9.34 | | 6.97 | 2.38 | | 8.76 |
| 2 | 20153 | 7.87 | 10.12 | | 7.90 | 2.16 | | |
| 2 | 20154 | | | | 1.30 | | | 8.76 |
| 2 | 20155 | | | | 2.43 | 1.01 | | 8.76 |
| 2 | 20156 | | | | 3.21 | 2.38 | | 8.76 |
| 2 | 20157 | | | | 3.87 | 4.12 | | 8.76 |
| 2 | 20158 | | | | 4.45 | 6.64 | | |
| 2 | 20159 | | | | 4.26 | 8.18 | | |
| 2 | 20160 | | | | 4.66 | 8.91 | | |
| 2 | 20161 | | | | 4.79 | 10.46 | | |
| 2 | 20162 | | | | 4.90 | 10.38 | | |
| 2 | 20163 | | | | 5.24 | 10.16 | | |

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|---|---|---|---|---|---|---|---|---|
| 2 | 20164 | | 0.49 | | 5.08 | 10.12 | | |
| 2 | 20165 | 1.02 | 1.74 | | 5.00 | 8.44 | | |
| 2 | 20166 | 2.91 | 2.66 | | 5.35 | 7.14 | | 8.76 |
| 2 | 20167 | 5.29 | 4.26 | | 6.30 | 6.09 | | 8.76 |
| 2 | 20168 | 7.27 | 6.10 | | 6.64 | 4.07 | | 8.76 |
| 2 | 20169 | 8.72 | 8.12 | | 7.25 | 2.14 | | 8.76 |
| 2 | 20170 | 9.31 | 9.47 | | 7.33 | 2.24 | | 8.76 |
| 2 | 20171 | 8.54 | 10.30 | | 8.41 | 1.95 | | |
| 2 | 20172 | | | | | | | 8.77 |
| 2 | 20173 | | | | 0.32 | | | 8.76 |
| 2 | 20174 | | | | 1.54 | 1.12 | | 8.76 |
| 2 | 20175 | | | | 2.36 | 3.29 | | 8.76 |
| 2 | 20176 | | | | 3.46 | 5.80 | | 8.76 |
| 2 | 20177 | | | | 3.27 | 7.69 | | 8.76 |
| 2 | 20178 | | | | 3.93 | 8.60 | | |
| 2 | 20179 | | | | 4.53 | 9.98 | | |
| 2 | 20180 | | | | 4.96 | 10.12 | | |
| 2 | 20181 | | | | 5.23 | 10.00 | | |
| 2 | 20182 | | | | 5.58 | 9.94 | | |
| 2 | 20183 | 0.97 | 1.28 | | 5.71 | 8.63 | | 8.76 |
| 2 | 20184 | 3.01 | 2.46 | | 5.49 | 7.13 | | 8.76 |
| 2 | 20185 | 5.52 | 4.22 | | 6.30 | 6.16 | | 8.76 |
| 2 | 20186 | 7.64 | 6.06 | | 7.05 | 4.62 | | 8.76 |
| 2 | 20187 | 9.27 | 8.14 | | 7.84 | 1.97 | | 8.76 |
| 2 | 20188 | 10.05 | 9.35 | | 7.73 | 2.07 | | 8.76 |
| 2 | 20189 | 9.32 | 10.10 | | 8.88 | 1.81 | | |
| 2 | 20190 | | 0.89 | | | | | 13.97 |
| 2 | 20191 | | 0.45 | | | | | 12.92 |
| 2 | 20192 | | | | 0.10 | 0.47 | | 11.21 |
| 2 | 20193 | | | | 0.73 | 3.04 | | 8.76 |
| 2 | 20194 | | | | 1.11 | 4.92 | | 8.76 |
| 2 | 20195 | | | | 2.66 | 6.66 | | 8.76 |
| 2 | 20196 | | | | 3.32 | 7.77 | | |
| 2 | 20197 | | | | 3.51 | 8.99 | | |
| 2 | 20198 | | | | 4.49 | 9.39 | | |
| 2 | 20199 | | | | 5.00 | 9.34 | | |
| 2 | 20200 | | | | 5.06 | 9.38 | | |
| 2 | 20201 | 0.86 | 0.75 | | 5.88 | 8.58 | | 8.76 |
| 2 | 20202 | 2.80 | 2.12 | | 5.76 | 6.81 | | 8.76 |
| 2 | 20203 | 5.57 | 4.06 | | 6.57 | 6.61 | | 8.76 |
| 2 | 20204 | 7.70 | 5.97 | | 7.35 | 4.69 | | 8.76 |
| 2 | 20205 | 9.67 | 8.09 | | 8.24 | 1.78 | | 8.76 |
| 2 | 20206 | 10.62 | 9.24 | | 8.11 | 1.87 | | 8.76 |
| 2 | 20207 | 9.95 | 9.88 | | 9.40 | 1.61 | | |
| 2 | 20208 | 2.09 | 4.55 | | | | | 19.07 |
| 2 | 20209 | 2.33 | 2.30 | | | | | 16.52 |
| 2 | 20210 | | | | | | | 10.54 |
| 2 | 20211 | | | | | 0.25 | | 8.76 |
| 2 | 20212 | | | | | 2.24 | | 8.76 |
| 2 | 20213 | | | | 0.48 | 5.22 | | |
| 2 | 20214 | | | | 1.60 | 6.64 | | |
| 2 | 20215 | | | | 2.89 | 7.86 | | |
| 2 | 20216 | | | | 3.73 | 8.62 | | |
| 2 | 20217 | | | | 4.24 | 8.91 | | |
| 2 | 20218 | | | | 4.69 | 8.83 | | |
| 2 | 20219 | 0.49 | 0.28 | | 5.05 | 8.03 | | |
| 2 | 20220 | 2.72 | 1.77 | | 5.65 | 6.75 | | 8.76 |
| 2 | 20221 | 5.00 | 3.84 | | 6.95 | 6.33 | | 8.76 |
| 2 | 20222 | 8.05 | 5.84 | | 7.59 | 4.45 | | 8.76 |
| 2 | 20223 | 9.57 | 8.00 | | 8.98 | 1.58 | | 8.76 |
| 2 | 20224 | 10.40 | 9.12 | | 8.48 | 1.66 | | 8.76 |
| 2 | 20225 | 10.52 | 9.70 | | 9.93 | 1.36 | | |
| 2 | 20226 | 9.33 | 8.69 | | | | | 58.74 |
| 2 | 20227 | 5.69 | 1.44 | | | | | 18.09 |
| 2 | 20228 | 0.59 | | | | | | 10.80 |
| 2 | 20229 | | | | | | | 8.76 |

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|---|---|---|---|---|---|---|---|---|
| 2 | 20230 | | | | | | | 8.76 |
| 2 | 20231 | | | | | 3.16 | | |
| 2 | 20232 | | | | 0.65 | 5.55 | | |
| 2 | 20233 | | | | 2.17 | 6.96 | | |
| 2 | 20234 | | | | 3.10 | 7.75 | | |
| 2 | 20235 | | | | 3.79 | 8.36 | | |
| 2 | 20236 | | | | 4.51 | 8.36 | | |
| 2 | 20237 | | | | 4.75 | 7.82 | | |
| 2 | 20238 | 2.55 | 1.35 | | 5.48 | 6.66 | | |
| 2 | 20239 | 5.00 | 3.55 | | 6.98 | 5.50 | | 8.76 |
| 2 | 20240 | 7.67 | 5.76 | | 8.05 | 4.27 | | 8.76 |
| 2 | 20241 | 10.02 | 7.91 | | 9.05 | 1.39 | | 8.76 |
| 2 | 20242 | 11.06 | 9.09 | | 8.81 | 1.42 | | 8.76 |
| 2 | 20243 | 11.39 | 9.26 | | 10.37 | 1.08 | | |
| 2 | 20244 | 3.12 | 2.65 | | 5.57 | 7.57 | | 8.76 |
| 2 | 20245 | 2.00 | 2.18 | | 5.17 | 8.27 | | |
| 2 | 20246 | 0.89 | 1.61 | | 4.99 | 9.55 | | |
| 2 | 20247 | | 0.88 | | 5.24 | 10.45 | | |
| 2 | 20248 | | | | 5.23 | 10.67 | | |
| 2 | 20249 | | | | 5.12 | 10.78 | | |
| 2 | 20250 | | | | 5.22 | 10.87 | | |
| 2 | 20251 | | | | 5.16 | 10.01 | | |
| 2 | 20252 | | | | 5.13 | 9.14 | | |
| 2 | 20253 | | | | 5.05 | 7.68 | | |
| 2 | 20254 | | | | 4.90 | 5.71 | | |
| 2 | 20255 | | | | 4.48 | 4.06 | | 8.76 |
| 2 | 20256 | | | | 4.10 | 2.43 | | 8.76 |
| 2 | 20257 | | | | 3.61 | 1.02 | | 8.76 |
| 2 | 20258 | 3.20 | 2.53 | | 6.12 | 7.73 | | 8.76 |
| 2 | 20259 | 1.99 | 1.84 | | 5.43 | 7.99 | | 8.76 |
| 2 | 20260 | 0.78 | 1.22 | | 5.57 | 9.74 | | |
| 2 | 20261 | | 0.33 | | 6.05 | 10.57 | | |
| 2 | 20262 | | | | 5.77 | 10.85 | | |
| 2 | 20263 | | | | 5.37 | 10.52 | | |
| 2 | 20264 | | | | 5.33 | 10.84 | | |
| 2 | 20265 | | | | 4.98 | 9.50 | | |
| 2 | 20266 | | | | 4.38 | 8.61 | | |
| 2 | 20267 | | | | 4.56 | 7.43 | | |
| 2 | 20268 | | | | 4.09 | 4.72 | | 8.76 |
| 2 | 20269 | | | | 3.41 | 3.21 | | 8.76 |
| 2 | 20270 | | | | 3.20 | 1.80 | | 8.76 |
| 2 | 20271 | | | | 2.27 | | | 8.76 |
| 2 | 20272 | 3.26 | 2.34 | | 6.10 | 7.77 | | 8.76 |
| 2 | 20273 | 1.98 | 1.41 | | 6.02 | 8.14 | | 8.76 |
| 2 | 20274 | 0.69 | 0.75 | | 6.30 | 9.90 | | |
| 2 | 20275 | | | | 6.24 | 10.47 | | 8.76 |
| 2 | 20276 | | | | 5.67 | 10.55 | | |
| 2 | 20277 | | | | 5.58 | 10.40 | | |
| 2 | 20278 | | | | 5.10 | 10.49 | | |
| 2 | 20279 | | | | 4.43 | 8.84 | | |
| 2 | 20280 | | | | 3.79 | 8.02 | | |
| 2 | 20281 | | | | 3.65 | 6.21 | | 8.76 |
| 2 | 20282 | | | | 2.65 | 4.07 | | 8.76 |
| 2 | 20283 | | | | 1.75 | 1.96 | | 8.76 |
| 2 | 20284 | | | | 1.40 | 0.45 | | 8.76 |
| 2 | 20285 | | | | 0.15 | | | 8.79 |
| 2 | 20286 | 3.23 | 2.06 | | 6.11 | 7.26 | | 8.76 |
| 2 | 20287 | 1.89 | 0.92 | | 6.15 | 8.15 | | 8.76 |
| 2 | 20288 | 0.18 | 0.30 | | 6.16 | 9.59 | | 8.76 |
| 2 | 20289 | | | | 5.70 | 9.91 | | 8.76 |
| 2 | 20290 | | | | 5.26 | 9.74 | | |
| 2 | 20291 | | | | 5.03 | 9.82 | | |
| 2 | 20292 | | | | 4.23 | 9.66 | | |
| 2 | 20293 | | | | 3.35 | 8.05 | | |
| 2 | 20294 | | | | 2.97 | 7.18 | | 8.76 |
| 2 | 20295 | | | | 1.30 | 5.50 | | 8.76 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2 | 20296 | | | | 0.91 | 3.36 | | 8.76 |
| 2 | 20297 | | | | 0.29 | 0.84 | | 10.61 |
| 2 | 20298 | | | | | | | 12.64 |
| 2 | 20299 | | 0.66 | | | | | 14.03 |
| 2 | 20300 | 3.22 | 1.66 | | 6.00 | 7.07 | | 8.76 |
| 2 | 20301 | 1.71 | 0.47 | | 5.74 | 7.76 | | |
| 2 | 20302 | | | | 5.53 | 9.02 | | |
| 2 | 20303 | | | | 5.09 | 9.28 | | |
| 2 | 20304 | | | | 4.87 | 9.18 | | |
| 2 | 20305 | | | | 4.47 | 8.96 | | |
| 2 | 20306 | | | | 3.62 | 8.46 | | |
| 2 | 20307 | | | | 2.40 | 7.19 | | |
| 2 | 20308 | | | | 0.69 | 5.78 | | |
| 2 | 20309 | | | | | 2.81 | | 8.76 |
| 2 | 20310 | | | | | 0.70 | | 8.76 |
| 2 | 20311 | | | | | | | 10.21 |
| 2 | 20312 | 2.05 | 1.72 | | | | | 16.14 |
| 2 | 20313 | 1.26 | 4.19 | | | | | 18.95 |
| 2 | 20314 | 3.00 | 1.20 | | 5.85 | 6.98 | | |
| 2 | 20315 | 1.31 | | | 5.45 | 7.62 | | |
| 2 | 20316 | | | | 5.21 | 8.52 | | |
| 2 | 20317 | | | | 4.82 | 8.79 | | |
| 2 | 20318 | | | | 4.46 | 8.66 | | |
| 2 | 20319 | | | | 3.90 | 8.25 | | |
| 2 | 20320 | | | | 2.97 | 7.56 | | |
| 2 | 20321 | | | | 1.19 | 6.18 | | |
| 2 | 20322 | | | | | 4.13 | | |
| 2 | 20323 | | | | | | | 8.76 |
| 2 | 20324 | | | | | | | 8.76 |
| 2 | 20325 | 0.18 | | | | | | 10.32 |
| 2 | 20326 | 4.91 | 0.72 | | | | | 17.27 |
| 2 | 20327 | 8.96 | 8.30 | | | | | 56.57 |
| 2 | 20328 | 9.18 | 9.95 | | 7.91 | 2.27 | | |
| 2 | 20329 | 8.50 | 8.25 | | 7.61 | 2.36 | | 8.76 |
| 2 | 20330 | 6.90 | 5.84 | | 6.79 | 4.05 | | 8.76 |
| 2 | 20331 | 4.77 | 4.16 | | 6.12 | 6.30 | | 8.76 |
| 2 | 20332 | 9.68 | 9.83 | | 8.33 | 2.12 | | |
| 2 | 20333 | 9.25 | 8.29 | | 7.59 | 2.22 | | 8.76 |
| 2 | 20334 | 7.44 | 5.87 | | 7.01 | 4.47 | | 8.76 |
| 2 | 20335 | 5.21 | 4.14 | | 6.39 | 6.66 | | 8.76 |
| 2 | 20336 | 10.22 | 9.69 | | 8.78 | 1.94 | | |
| 2 | 20337 | 9.86 | 8.29 | | 8.18 | 2.05 | | 8.76 |
| 2 | 20338 | 7.83 | 5.85 | | 7.65 | 4.96 | | 8.76 |
| 2 | 20339 | 5.42 | 3.91 | | 6.85 | 6.75 | | 8.76 |
| 2 | 20340 | 10.86 | 9.56 | | 9.25 | 1.74 | | |
| 2 | 20341 | 10.23 | 8.26 | | 8.64 | 1.86 | | 8.76 |
| 2 | 20342 | 7.90 | 5.77 | | 7.70 | 5.08 | | 8.76 |
| 2 | 20343 | 5.44 | 3.79 | | 6.99 | 6.46 | | 8.76 |
| 2 | 20344 | 11.41 | 9.44 | | 9.74 | 1.52 | | |
| 2 | 20345 | 10.45 | 8.18 | | 9.56 | 1.66 | | 8.76 |
| 2 | 20346 | 7.85 | 5.69 | | 8.36 | 4.78 | | 8.76 |
| 2 | 20347 | 5.39 | 3.71 | | 7.19 | 6.86 | | 8.76 |
| 2 | 20348 | 11.83 | 9.14 | | 10.14 | 1.23 | | |
| 2 | 20349 | 10.93 | 8.13 | | 9.71 | 1.44 | | 8.76 |
| 2 | 20350 | 8.04 | 5.57 | | 8.39 | 4.59 | | 8.76 |
| 2 | 20351 | 5.36 | 3.44 | | 7.18 | 6.70 | | 8.76 |
| 2 | 20352 | | | | 6.63 | 8.51 | | |
| 2 | 20353 | | | | 7.68 | 9.17 | | |
| 2 | 20354 | | | | 7.27 | 11.87 | | |
| 2 | 20355 | | 0.15 | | 5.29 | 9.77 | | |
| 2 | 20356 | 1.46 | 2.35 | | 0.44 | 4.20 | | 8.76 |
| 2 | 20357 | 0.87 | 6.03 | | 2.07 | 4.93 | | 8.76 |
| 2 | 20358 | 1.23 | 5.88 | | 2.60 | 4.47 | | |
| 2 | 20359 | 0.71 | 4.22 | | 1.48 | 4.30 | | 8.76 |
| 2 | 20360 | 1.05 | 2.08 | | 0.60 | 4.10 | | 8.76 |
| 2 | 20361 | 1.11 | 3.32 | | 0.99 | 3.93 | | 8.76 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2 | 20362 | 1.13 | 2.61 | | 1.21 | 4.00 | | |
| 2 | 20363 | 1.22 | 2.00 | | 1.07 | 4.15 | | |
| 2 | 20364 | | 3.01 | | 4.24 | 5.38 | | |
| 2 | 20365 | | 2.71 | | 4.53 | 4.79 | | |
| 2 | 20366 | | 2.45 | | 4.07 | 4.98 | | |
| 2 | 20367 | | 3.11 | | 4.55 | 5.27 | | |
| 2 | 20368 | | 3.91 | | 5.31 | 6.26 | | |
| 2 | 20369 | | 6.20 | | 6.40 | 10.53 | | |
| 2 | 20370 | 0.29 | 6.08 | | 1.85 | 8.23 | | |
| 2 | 20371 | | 3.82 | | 3.74 | 6.43 | | |
| 2 | 20372 | | | | 2.57 | 9.00 | | |
| 2 | 20373 | | | | 1.71 | 9.03 | | |
| 2 | 20374 | | | | 2.57 | 9.04 | | |
| 2 | 20375 | | | | 2.37 | 8.39 | | |
| 2 | 20376 | | 0.20 | | 4.14 | 10.25 | | |
| 2 | 20377 | | | | 6.47 | 14.78 | | |
| 2 | 20378 | 0.05 | | | 1.88 | 11.21 | | |
| 2 | 20379 | | | | 2.64 | 10.25 | | |
| 2 | 20380 | | 0.36 | | 5.80 | 5.81 | | |
| 2 | 20381 | | 0.74 | | 5.05 | 4.48 | | |
| 2 | 20382 | | 0.74 | | 4.77 | 3.89 | | |
| 2 | 20383 | | 0.39 | | 5.60 | 4.66 | | |
| 2 | 20384 | | | | 6.72 | 6.91 | | |
| 2 | 20385 | 0.15 | 0.37 | | 6.56 | 5.14 | | |
| 2 | 20386 | 0.39 | 0.78 | | 7.19 | 5.07 | | |
| 2 | 20387 | 0.50 | 0.01 | | 7.52 | 6.66 | | |
| 2 | 20388 | 6.01 | 0.31 | | 5.98 | 0.44 | | |
| 2 | 20389 | 5.88 | 0.52 | | 6.00 | 0.76 | | |
| 2 | 20390 | 4.92 | 0.47 | | 3.90 | 0.48 | | |
| 2 | 20391 | 4.92 | 0.37 | | 4.13 | 0.75 | | |
| 2 | 20392 | 5.07 | 6.31 | | | | | 28.59 |
| 2 | 20393 | 2.94 | 1.85 | | | | | 11.79 |
| 2 | 20394 | 0.26 | 2.57 | | | | | 9.42 |
| 2 | 20395 | | 4.40 | | | | | 12.08 |
| 2 | 20396 | | 1.23 | | | | | 8.76 |
| 2 | 20397 | | 1.34 | | | | | 8.76 |
| 2 | 20398 | | 1.98 | | | | | 8.76 |
| 2 | 20399 | | 1.17 | | | | | 8.76 |
| 2 | 20400 | 8.24 | 8.09 | | 11.24 | 5.54 | | |
| 2 | 20401 | 6.03 | 1.79 | | 6.46 | 1.90 | | |
| 2 | 20402 | 5.46 | 3.68 | | 7.44 | 2.11 | | |
| 2 | 20403 | 4.23 | 7.47 | | 6.53 | 4.26 | | |
| 2 | 20404 | 1.10 | 1.53 | | 1.88 | 1.76 | | |
| 2 | 20405 | 1.75 | 2.16 | | 4.09 | 6.48 | | |
| 2 | 20406 | 0.88 | 2.55 | | 2.16 | 5.02 | | |
| 2 | 20407 | 0.72 | 2.85 | | 2.38 | 3.61 | | |
| 2 | 20408 | | 0.69 | | 3.65 | 7.04 | | |
| 2 | 20409 | | 0.31 | | 3.39 | 8.17 | | |
| 2 | 20410 | | 0.29 | | 2.51 | 8.19 | | |
| 2 | 20411 | | 0.67 | | 3.18 | 7.62 | | |
| 2 | 20412 | 0.04 | | | 0.73 | 9.83 | | |
| 2 | 20413 | 0.51 | 0.43 | | 0.49 | 8.38 | | |
| 2 | 20414 | 0.78 | 0.51 | | 1.27 | 8.39 | | |
| 2 | 20415 | | | | 1.37 | 9.53 | | |
| 2 | 20416 | 0.73 | 3.18 | | 1.57 | 3.45 | | |
| 2 | 20417 | 0.44 | 3.91 | | 1.53 | 3.77 | | |
| 2 | 20418 | 0.64 | 4.14 | | 2.19 | 3.97 | | |
| 2 | 20419 | 0.43 | 3.49 | | 1.63 | 3.38 | | |
| 2 | 20420 | 5.83 | 0.96 | | 5.76 | 0.63 | | |
| 2 | 20421 | 5.72 | 1.30 | | 5.61 | 0.76 | | |
| 2 | 20422 | 3.56 | 0.83 | | 3.42 | 0.67 | | |
| 2 | 20423 | 4.48 | 0.48 | | 3.08 | 0.53 | | |
| 2 | 20424 | | 2.00 | | 3.98 | 4.52 | | |
| 2 | 20425 | | 1.78 | | 3.96 | 4.45 | | |
| 2 | 20426 | | 1.33 | | 4.30 | 5.19 | | |
| 2 | 20427 | | 1.07 | | 4.07 | 4.02 | | |

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|---|---|---|---|---|---|---|---|---|
| 2 | 20428 | 2.50 | 10.46 | | 3.86 | 3.54 | | |
| 2 | 20429 | 2.10 | 8.07 | | 3.58 | 3.79 | | |
| 2 | 20430 | 2.11 | 7.73 | | 3.57 | 3.92 | | |
| 2 | 20431 | 2.63 | 10.24 | | 3.95 | 3.58 | | |
| 2 | 20432 | 4.97 | 1.51 | | 4.99 | 0.65 | | |
| 2 | 20433 | 4.09 | 1.05 | | 4.07 | 0.67 | | |
| 2 | 20434 | 5.60 | 1.92 | | 5.67 | 0.70 | | |
| 2 | 20435 | 5.42 | 2.57 | | 6.22 | 0.52 | | |
| 2 | 20436 | | | | 3.57 | 0.89 | | |
| 2 | 20437 | | 0.71 | | 5.80 | 4.58 | | |
| 2 | 20438 | | 2.10 | | 4.48 | 5.00 | | |
| 2 | 20439 | | 0.43 | | 3.81 | 2.47 | | |
| 2 | 20440 | 1.21 | 0.49 | | 6.65 | 1.16 | | |
| 2 | 20441 | 0.20 | 0.83 | | 5.45 | 2.48 | | |
| 2 | 20442 | | 0.50 | | 3.86 | 1.88 | | |
| 2 | 20443 | 1.60 | 0.42 | | 5.84 | 0.86 | | |
| 2 | 20444 | | | | | 1.27 | | |
| 2 | 20445 | | | | 0.90 | 2.03 | | |
| 2 | 20446 | | | | 0.33 | 2.04 | | |
| 2 | 20447 | | | | | 0.41 | | |
| 2 | 20448 | | 1.34 | | 2.96 | 1.94 | | |
| 2 | 20449 | | 1.41 | | 3.49 | 2.85 | | |
| 2 | 20450 | | 1.48 | | 3.50 | 3.30 | | |
| 2 | 20451 | | 1.38 | | 2.77 | 2.39 | | |
| 2 | 20452 | | 0.32 | | 3.15 | 3.09 | | |
| 2 | 20453 | | | | 3.67 | 6.31 | | |
| 2 | 20454 | | | | 3.11 | 7.85 | | |
| 2 | 20455 | | | | 5.18 | 8.34 | | 8.76 |
| 2 | 20456 | | 1.26 | | 1.21 | 0.16 | | |
| 2 | 20457 | | 1.29 | | 2.24 | 0.91 | | |
| 2 | 20458 | | 1.29 | | 1.88 | 1.19 | | |
| 2 | 20459 | | 1.29 | | 0.55 | | | |
| 2 | 20460 | 2.67 | | | 5.68 | 0.25 | | |
| 2 | 20461 | 2.03 | 0.17 | | 5.47 | 0.48 | | |
| 2 | 20462 | 0.11 | 0.21 | | 3.21 | 1.14 | | |
| 2 | 20463 | 2.02 | 1.48 | | 4.65 | 2.08 | | |
| 2 | 20464 | | 2.36 | | 4.61 | 4.88 | | |
| 2 | 20465 | | 2.04 | | 4.68 | 4.56 | | |
| 2 | 20466 | | 1.78 | | 4.71 | 4.67 | | |
| 2 | 20467 | | 2.11 | | 4.31 | 4.93 | | |
| 2 | 20468 | | 1.23 | | 3.35 | 2.30 | | |
| 2 | 20469 | | 1.00 | | 3.95 | 3.03 | | |
| 2 | 20470 | | 1.06 | | 4.42 | 3.55 | | |
| 2 | 20471 | | 1.29 | | 3.87 | 2.85 | | |
| 2 | 20472 | | | | | | | 8.76 |
| 2 | 20473 | | | | | | | |
| 2 | 20474 | | 0.02 | | | 0.85 | | |
| 2 | 20475 | | 0.27 | | | | | 8.76 |
| 2 | 20476 | 3.70 | 10.62 | | 5.04 | 3.87 | | |
| 2 | 20477 | 3.42 | 10.97 | | 4.75 | 3.52 | | |
| 2 | 20478 | 2.86 | 9.55 | | 4.75 | 5.14 | | |
| 2 | 20479 | 5.07 | 10.43 | | 7.48 | 6.20 | | 8.76 |
| 2 | 20480 | 0.07 | 0.90 | | 6.53 | 4.10 | | |
| 2 | 20481 | | 0.46 | | 5.88 | 4.34 | | |
| 2 | 20482 | | 0.65 | | 4.61 | 3.59 | | |
| 2 | 20483 | | 0.63 | | 5.26 | 3.50 | | |
| 2 | 20484 | | 0.77 | | 5.53 | 6.33 | | |
| 2 | 20485 | | 0.39 | | 5.95 | 7.25 | | |
| 2 | 20486 | | 0.26 | | 5.00 | 8.43 | | |
| 2 | 20487 | | 0.76 | | 4.92 | 6.69 | | |
| 2 | 20488 | | 1.84 | | 4.67 | 4.56 | | |
| 2 | 20489 | | 1.64 | | 4.46 | 4.04 | | |
| 2 | 20490 | | 1.58 | | 3.92 | 3.55 | | |
| 2 | 20491 | | 1.84 | | 4.40 | 3.99 | | |
| 2 | 20492 | 1.45 | 1.33 | | 2.81 | 7.63 | | |
| 2 | 20493 | 1.44 | 1.21 | | 1.88 | 7.33 | | |

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|---|---|---|---|---|---|---|---|---|
| 2 | 20494 | 1.41 | 1.76 | | 1.38 | 5.65 | | |
| 2 | 20495 | 1.20 | 2.01 | | 1.74 | 5.56 | | |
| 2 | 20496 | 2.81 | 10.25 | | 4.11 | 3.59 | | |
| 2 | 20497 | 2.14 | 7.66 | | 3.62 | 4.15 | | |
| 2 | 20498 | 2.23 | 8.06 | | 3.81 | 4.58 | | |
| 2 | 20499 | 3.05 | 10.46 | | 4.37 | 3.63 | | |
| 2 | 20500 | | 1.16 | | 2.67 | 1.77 | | |
| 2 | 20501 | | 1.10 | | 1.83 | 1.25 | | |
| 2 | 20502 | | 0.79 | | 1.87 | 2.17 | | |
| 2 | 20503 | | 0.94 | | 3.11 | 2.56 | | |
| 2 | 20504 | 1.64 | 6.23 | | 3.18 | 4.01 | | |
| 2 | 20505 | 1.16 | 4.59 | | 2.72 | 4.11 | | |
| 2 | 20506 | 0.85 | 4.56 | | 2.24 | 4.13 | | |
| 2 | 20507 | 1.49 | 5.82 | | 2.97 | 4.16 | | |
| 2 | 20508 | | 1.04 | | 3.59 | 6.61 | | |
| 2 | 20509 | | 1.28 | | 3.89 | 5.76 | | |
| 2 | 20510 | | 1.46 | | 3.94 | 4.89 | | |
| 2 | 20511 | | 1.07 | | 3.72 | 5.63 | | |
| 2 | 20512 | | 2.15 | | 4.45 | 4.42 | | |
| 2 | 20513 | | 2.50 | | 4.38 | 4.71 | | |
| 2 | 20514 | | 2.47 | | 4.38 | 5.60 | | |
| 2 | 20515 | | 2.07 | | 4.72 | 5.06 | | |
| 2 | 20516 | | | | 1.44 | 9.02 | | |
| 2 | 20517 | 0.86 | 0.54 | | 1.85 | 8.82 | | |
| 2 | 20518 | 1.25 | 0.73 | | 2.62 | 11.03 | | 8.76 |
| 2 | 20519 | | | | 2.84 | 11.36 | | 8.76 |
| 2 | 20520 | 0.04 | 0.31 | | 11.95 | 8.51 | | 8.76 |
| 2 | 20521 | 0.73 | 0.50 | | 8.74 | 7.44 | | |
| 2 | 20522 | 0.38 | 0.93 | | 9.11 | 4.92 | | |
| 2 | 20523 | 0.13 | 0.50 | | 8.17 | 2.17 | | 8.76 |
| 2 | 20524 | | 0.26 | | 2.53 | 2.46 | | |
| 2 | 20525 | | 0.50 | | 4.01 | 3.05 | | |
| 2 | 20526 | | 0.68 | | 3.35 | 3.03 | | |
| 2 | 20527 | | 0.47 | | 1.98 | 2.52 | | |
| 2 | 20528 | | 1.21 | | 4.90 | 4.65 | | |
| 2 | 20529 | | 0.90 | | 5.04 | 4.69 | | |
| 2 | 20530 | | 0.54 | | 5.97 | 5.96 | | |
| 2 | 20531 | | 0.96 | | 5.60 | 5.50 | | |
| 2 | 20532 | 0.56 | 0.44 | | 7.50 | 1.61 | | 8.76 |
| 2 | 20533 | 0.33 | 0.94 | | 8.14 | 3.72 | | |
| 2 | 20534 | 0.33 | 0.99 | | 7.22 | 3.22 | | |
| 2 | 20535 | 0.87 | 0.53 | | 7.33 | 1.35 | | |
| 2 | 20536 | 0.72 | 1.37 | | 0.27 | 3.97 | | 8.76 |
| 2 | 20537 | 1.35 | 1.77 | | 0.79 | 4.95 | | |
| 2 | 20538 | 1.23 | 1.31 | | 1.08 | 7.02 | | |
| 2 | 20539 | 0.59 | 1.07 | | 0.36 | 6.53 | | 8.76 |
| 2 | 20540 | | 1.71 | | 4.32 | 3.92 | | |
| 2 | 20541 | | 1.44 | | 4.10 | 3.46 | | |
| 2 | 20542 | | 1.21 | | 4.80 | 3.87 | | |
| 2 | 20543 | | 1.50 | | 4.74 | 4.05 | | |
| 2 | 20544 | | | | 2.58 | 7.62 | | |
| 2 | 20545 | | 0.07 | | 2.37 | 8.23 | | |
| 2 | 20546 | | 0.10 | | 2.70 | 8.69 | | |
| 2 | 20547 | | | | 2.37 | 8.06 | | |
| 2 | 20548 | | 1.53 | | 5.19 | 4.97 | | |
| 2 | 20549 | | 1.16 | | 5.30 | 5.48 | | |
| 2 | 20550 | | 1.14 | | 4.62 | 5.64 | | |
| 2 | 20551 | | 1.60 | | 4.60 | 4.95 | | |
| 2 | 20552 | | 1.02 | | 1.02 | 0.76 | | |
| 2 | 20553 | | 0.77 | | 0.06 | 0.17 | | 8.76 |
| 2 | 20554 | | 0.66 | | 0.74 | 1.62 | | |
| 2 | 20555 | | | | 0.44 | 1.66 | | |
| 2 | 20556 | | 0.25 | | 1.48 | 1.41 | | |
| 2 | 20557 | | | | 1.31 | 1.60 | | |
| 2 | 20558 | 0.65 | 7.19 | | 0.86 | 4.51 | | 10.58 |
| 2 | 20559 | 2.71 | 11.71 | | 4.39 | 9.05 | | 14.63 |

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|---|---|---|---|---|---|---|---|---|
| 2 | 20560 | 1.52 | 7.70 | | 3.01 | 6.28 | | 8.76 |
| 2 | 20561 | 0.97 | 4.43 | | 0.23 | 4.17 | | 9.20 |
| 2 | 20562 | 1.05 | 5.37 | | 1.19 | 5.08 | | 8.76 |
| 2 | 20563 | 0.88 | 2.24 | | 0.14 | 3.82 | | 8.76 |
| 2 | 20564 | 1.04 | 0.39 | | 2.85 | 7.34 | | |
| 2 | 20565 | 1.02 | 0.56 | | 3.01 | 7.09 | | |
| 2 | 20566 | 1.55 | 0.74 | | 2.95 | 5.73 | | |
| 2 | 20567 | 1.80 | 0.74 | | 3.00 | 5.78 | | |
| 2 | 20568 | 1.07 | 0.30 | | 2.98 | 7.24 | | |
| 2 | 20569 | 1.99 | 0.66 | | 3.10 | 5.77 | | |
| 2 | 20570 | 2.15 | 0.54 | | 3.33 | 5.72 | | |
| 2 | 20571 | 1.33 | 0.44 | | 3.02 | 6.86 | | |
| 2 | 20572 | | 4.02 | | 4.76 | 7.03 | | |
| 2 | 20573 | | 3.47 | | 4.20 | 7.36 | | |
| 2 | 20574 | | 6.04 | | 2.47 | 9.25 | | |
| 2 | 20575 | | 5.82 | | 6.55 | 11.74 | | |
| 2 | 20576 | | 3.27 | | 4.26 | 6.20 | | |
| 2 | 20577 | | 2.48 | | 4.15 | 5.51 | | |
| 2 | 20578 | | 2.19 | | 4.28 | 5.36 | | |
| 2 | 20579 | | 2.52 | | 4.21 | 5.95 | | |
| 2 | 20580 | | | | 2.71 | 8.36 | | |
| 2 | 20581 | | | | 2.60 | 8.46 | | |
| 2 | 20582 | | | | 2.53 | 8.54 | | |
| 2 | 20583 | | 0.21 | | 2.78 | 8.21 | | |
| 2 | 20584 | 0.37 | 0.21 | | 2.92 | 7.83 | | |
| 2 | 20585 | 0.76 | 0.41 | | 2.95 | 7.43 | | |
| 2 | 20586 | 0.27 | 0.24 | | 3.05 | 7.71 | | |
| 2 | 20587 | | | | 2.72 | 8.17 | | |
| 2 | 20588 | | 0.09 | | 2.95 | 8.09 | | |
| 2 | 20589 | | | | 2.73 | 8.36 | | |
| 2 | 20590 | | | | 2.62 | 8.36 | | |
| 2 | 20591 | | | | 2.96 | 8.34 | | |
| 2 | 20592 | | 0.26 | | 2.46 | 7.91 | | |
| 2 | 20593 | | 0.41 | | 2.06 | 7.82 | | |
| 2 | 20594 | | 0.32 | | 1.96 | 8.19 | | |
| 2 | 20595 | | 0.23 | | 2.12 | 8.21 | | |
| 2 | 20596 | 1.62 | 0.78 | | 3.41 | 3.90 | | |
| 2 | 20597 | 1.45 | 0.60 | | 2.91 | 4.57 | | |
| 2 | 20598 | 0.03 | 0.10 | | 4.26 | 6.33 | | |
| 2 | 20599 | 0.11 | 0.37 | | 2.33 | 2.38 | | |
| 2 | 20600 | 1.18 | 0.62 | | 2.95 | 5.29 | | |
| 2 | 20601 | 1.10 | 0.62 | | 2.84 | 5.66 | | |
| 2 | 20602 | 0.65 | 0.54 | | 2.90 | 7.26 | | |
| 2 | 20603 | | 0.07 | | 2.83 | 7.49 | | |
| 2 | 20604 | 0.68 | | | 4.03 | 6.71 | | |
| 2 | 20605 | | | | 3.85 | 7.02 | | |
| 2 | 20606 | 0.04 | | | 3.62 | 6.95 | | |
| 2 | 20607 | 1.14 | | | 3.81 | 6.40 | | |
| 2 | 20608 | | 0.02 | | 3.18 | 2.87 | | |
| 2 | 20609 | | 1.01 | | 5.46 | 9.34 | | |
| 2 | 20610 | | 0.53 | | 3.34 | 8.98 | | |
| 2 | 20611 | | 0.59 | | 4.22 | 6.52 | | |
| 2 | 20612 | 5.14 | 6.95 | | | | | 28.44 |
| 2 | 20613 | 0.73 | 4.55 | | | | | 11.54 |
| 2 | 20614 | 0.40 | 2.53 | | | | | 8.76 |
| 2 | 20615 | 3.99 | 1.92 | | | | | 11.86 |
| 2 | 20616 | | 0.35 | | 3.29 | 10.21 | | |
| 2 | 20617 | 0.23 | 0.22 | | 2.23 | 9.28 | | |
| 2 | 20618 | | | | 1.93 | 8.78 | | |
| 2 | 20619 | | 0.20 | | 2.24 | 9.09 | | |
| 2 | 20620 | | 0.33 | | 3.06 | 7.72 | | |
| 2 | 20621 | | 0.41 | | 2.82 | 8.41 | | |
| 2 | 20622 | | 0.39 | | 2.73 | 8.23 | | |
| 2 | 20623 | | 0.30 | | 2.76 | 8.44 | | |
| 2 | 20624 | | | | 3.24 | 1.13 | | |
| 2 | 20625 | | 0.39 | | 4.08 | 3.28 | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2 | 20626 | | 2.12 | | 4.77 | 6.25 | | |
| 2 | 20627 | | 0.90 | | 7.08 | 6.28 | | |
| 2 | 20628 | | 1.38 | | 3.53 | 5.70 | | |
| 2 | 20629 | | 1.25 | | 3.72 | 6.51 | | |
| 2 | 20630 | | 1.01 | | 3.47 | 7.21 | | |
| 2 | 20631 | | 1.18 | | 3.35 | 6.44 | | |
| 2 | 20632 | | | | 1.17 | 5.03 | | |
| 2 | 20633 | | | | 0.28 | 2.92 | | |
| 2 | 20634 | | | | | 1.09 | | |
| 2 | 20635 | | | | 0.80 | 4.13 | | |
| 2 | 20636 | 1.38 | 0.35 | | 3.16 | 6.79 | | |
| 2 | 20637 | 2.22 | 0.37 | | 3.45 | 5.64 | | |
| 2 | 20638 | 2.17 | 0.23 | | 3.67 | 6.38 | | |
| 2 | 20639 | 1.09 | 0.24 | | 3.30 | 6.98 | | |
| 2 | 20640 | 1.53 | | | 3.94 | 6.87 | | |
| 2 | 20641 | 0.29 | | | 3.48 | 7.03 | | |
| 2 | 20642 | 0.63 | | | 3.37 | 7.03 | | |
| 2 | 20643 | 2.00 | 0.09 | | 3.78 | 6.64 | | |
| 2 | 20644 | | | | 2.94 | 7.38 | | |
| 2 | 20645 | | | | 2.17 | 5.98 | | |
| 2 | 20646 | | 0.26 | | 2.84 | 5.99 | | |
| 2 | 20647 | | 0.03 | | 3.24 | 6.91 | | |
| 2 | 20648 | | | | 2.98 | 8.18 | | |
| 2 | 20649 | | | | 2.79 | 8.32 | | |
| 2 | 20650 | | | | 2.95 | 7.98 | | |
| 2 | 20651 | | | | 2.80 | 7.98 | | |
| 2 | 20652 | | | | 2.70 | 8.41 | | |
| 2 | 20653 | | | | 2.74 | 8.42 | | |
| 2 | 20654 | | | | 2.90 | 8.38 | | |
| 2 | 20655 | | | | 2.96 | 8.43 | | |
| 2 | 20656 | | 2.09 | | 4.17 | 5.27 | | |
| 2 | 20657 | | 1.83 | | 4.07 | 4.87 | | |
| 2 | 20658 | | 1.71 | | 4.08 | 4.45 | | |
| 2 | 20659 | | 1.93 | | 4.24 | 4.93 | | |
| 2 | 20660 | | 1.03 | | 3.42 | 5.38 | | |
| 2 | 20661 | | 1.30 | | 3.61 | 4.81 | | |
| 2 | 20662 | | 1.57 | | 3.82 | 5.09 | | |
| 2 | 20663 | | 1.32 | | 3.66 | 5.69 | | |
| 2 | 20664 | | 2.00 | | | | | 8.76 |
| 2 | 20665 | | 1.17 | | | | | 8.76 |
| 2 | 20666 | | 0.85 | | 1.15 | 0.75 | | |
| 2 | 20667 | | 0.67 | | | | | 8.76 |
| 2 | 20668 | 0.76 | 0.45 | | 3.03 | 12.80 | | 8.76 |
| 2 | 20669 | 0.21 | 0.69 | | 3.14 | 11.90 | | 8.76 |
| 2 | 20670 | 0.61 | 0.77 | | 2.89 | 8.46 | | |
| 2 | 20671 | 0.76 | 0.22 | | 2.79 | 9.16 | | |
| 2 | 20672 | | 0.92 | | 3.12 | 4.40 | | |
| 2 | 20673 | | 0.94 | | 2.57 | 2.87 | | |
| 2 | 20674 | | 1.25 | | 2.89 | 2.79 | | |
| 2 | 20675 | | 1.22 | | 3.33 | 4.06 | | |
| 2 | 20676 | | 1.58 | | 3.80 | 6.05 | | |
| 2 | 20677 | | 1.20 | | 3.17 | 6.47 | | |
| 2 | 20678 | | 0.84 | | 3.24 | 6.84 | | |
| 2 | 20679 | | 1.28 | | 3.78 | 6.19 | | |
| 2 | 20680 | | | | 2.59 | 6.96 | | |
| 2 | 20681 | | | | 2.68 | 7.54 | | |
| 2 | 20682 | | | | 3.02 | 7.54 | | |
| 2 | 20683 | | | | 2.93 | 7.29 | | |
| 2 | 20684 | 0.25 | | | | | | 8.76 |
| 2 | 20685 | | | | | | | 8.76 |
| 2 | 20686 | | | | 0.24 | 2.65 | | |
| 2 | 20687 | | | | | | | |
| 2 | 20688 | | 0.60 | | 2.62 | 7.41 | | |
| 2 | 20689 | | 0.92 | | 3.04 | 6.96 | | |
| 2 | 20690 | | 0.75 | | 3.15 | 7.83 | | |
| 2 | 20691 | | 0.52 | | 2.70 | 7.74 | | |

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|---|---|---|---|---|---|---|---|---|
| 2 | 20692 | | 0.10 | | 0.84 | 1.75 | | |
| 2 | 20693 | | 0.56 | | 2.01 | 2.70 | | |
| 2 | 20694 | | 0.42 | | 2.63 | 4.59 | | |
| 2 | 20695 | | | | 1.61 | 4.11 | | |
| 2 | 20696 | 0.69 | 0.39 | | 2.79 | 8.13 | | |
| 2 | 20697 | 0.46 | 0.32 | | 2.77 | 8.10 | | |
| 2 | 20698 | 0.01 | 0.33 | | 2.43 | 8.58 | | |
| 2 | 20699 | 0.46 | 0.56 | | 2.51 | 8.69 | | |
| 2 | 20700 | | 1.58 | | 3.84 | 4.56 | | |
| 2 | 20701 | | 1.40 | | 3.55 | 4.11 | | |
| 2 | 20702 | | 1.39 | | 3.23 | 3.12 | | |
| 2 | 20703 | | 1.50 | | 3.73 | 3.90 | | |
| 2 | 20704 | | 0.69 | | 3.84 | 6.15 | | |
| 2 | 20705 | | 0.99 | | 3.76 | 6.22 | | |
| 2 | 20706 | | 0.60 | | 3.29 | 7.22 | | |
| 2 | 20707 | | 0.36 | | 3.68 | 6.93 | | |
| 2 | 20708 | | 2.62 | | 3.99 | 5.74 | | |
| 2 | 20709 | | 2.66 | | 4.04 | 5.94 | | |
| 2 | 20710 | | 1.98 | | 3.69 | 5.89 | | |
| 2 | 20711 | | 2.21 | | 3.80 | 5.85 | | |
| 2 | 20712 | | 2.16 | | 3.99 | 5.52 | | |
| 2 | 20713 | | 1.99 | | 3.80 | 5.93 | | |
| 2 | 20714 | | 1.64 | | 3.75 | 5.82 | | |
| 2 | 20715 | | 1.85 | | 3.94 | 5.37 | | |
| 2 | 20716 | | 1.31 | | 4.13 | 5.68 | | |
| 2 | 20717 | | 1.54 | | 3.56 | 5.18 | | |
| 2 | 20718 | | 1.86 | | 4.06 | 5.52 | | |
| 2 | 20719 | | 1.06 | | 4.18 | 4.18 | | |
| 2 | 20720 | | | | 1.20 | 4.65 | | |
| 2 | 20721 | | | | 1.76 | 6.37 | | |
| 2 | 20722 | | | | 2.40 | 7.19 | | |
| 2 | 20723 | | | | 2.04 | 6.20 | | |
| 2 | 20724 | | | | 2.44 | 8.43 | | |
| 2 | 20725 | | | | 2.09 | 8.22 | | |
| 2 | 20726 | | 0.15 | | 1.78 | 8.36 | | |
| 2 | 20727 | | | | 2.03 | 8.50 | | |
| 2 | 20728 | | | | 2.97 | 7.96 | | |
| 2 | 20729 | | | | 3.12 | 7.59 | | |
| 2 | 20730 | | 0.15 | | 3.14 | 7.82 | | |
| 2 | 20731 | | | | 3.03 | 8.22 | | |
| 2 | 20732 | | | | 2.54 | 7.56 | | |
| 2 | 20733 | | | | 1.97 | 6.74 | | |
| 2 | 20734 | | | | 2.00 | 6.39 | | |
| 2 | 20735 | | | | 2.70 | 7.59 | | |
| 2 | 20736 | | 1.20 | | 0.92 | 0.15 | | |
| 2 | 20737 | | 1.25 | | 2.24 | 1.63 | | |
| 2 | 20738 | | 1.03 | | 1.99 | 1.52 | | |
| 2 | 20739 | | | | 3.64 | 7.30 | | |
| 2 | 20740 | | | | 3.23 | 7.43 | | |
| 2 | 20741 | | | | 3.22 | 7.30 | | |
| 2 | 20742 | | | | 3.06 | 7.57 | | |
| 2 | 20743 | | | | 3.09 | 7.48 | | |
| 2 | 20744 | | | | 2.88 | 7.82 | | |
| 2 | 20745 | | 1.63 | | 3.35 | 5.87 | | |
| 2 | 20746 | | 1.38 | | 3.08 | 6.17 | | |
| 2 | 20747 | | 1.74 | | 3.53 | 6.13 | | |
| 2 | 20748 | | 0.38 | | 2.78 | 8.68 | | |
| 2 | 20749 | | 0.45 | | 2.81 | 8.24 | | |
| 2 | 20750 | | 0.54 | | 3.08 | 8.49 | | |
| 2 | 20751 | 6.94 | 5.01 | | 8.05 | 5.41 | | |
| 2 | 20752 | 6.22 | 4.02 | | 6.46 | 5.45 | | |
| 2 | 20753 | 4.93 | 2.74 | | 4.58 | 5.64 | | |
| 2 | 20754 | 2.53 | 0.95 | | 4.22 | 6.05 | | |
| 2 | 20755 | 6.77 | 5.39 | | 7.77 | 5.08 | | |
| 2 | 20756 | 5.99 | 4.17 | | 6.30 | 5.20 | | |
| 2 | 20757 | 4.73 | 2.31 | | 4.69 | 5.11 | | |

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|---|---|---|---|---|---|---|---|---|
| 2 | 20758 | 2.91 | 0.82 | | 4.12 | 5.80 | | |
| 2 | 20759 | 6.55 | 5.42 | | 7.46 | 4.77 | | |
| 2 | 20760 | 5.79 | 4.25 | | 6.16 | 4.93 | | |
| 2 | 20761 | 4.60 | 2.30 | | 4.77 | 4.97 | | |
| 2 | 20762 | 3.14 | 0.78 | | 3.99 | 5.42 | | |
| 2 | 20763 | 6.36 | 5.57 | | 7.16 | 4.53 | | |
| 2 | 20764 | 5.63 | 4.36 | | 5.99 | 4.75 | | |
| 2 | 20765 | 4.53 | 2.33 | | 4.79 | 4.88 | | |
| 2 | 20766 | 3.27 | 0.88 | | 3.80 | 5.07 | | |
| 2 | 20767 | 6.16 | 5.88 | | 6.87 | 4.39 | | |
| 2 | 20768 | 5.40 | 4.52 | | 5.81 | 4.65 | | |
| 2 | 20769 | 4.42 | 2.43 | | 4.77 | 4.85 | | |
| 2 | 20770 | 3.29 | 0.95 | | 3.68 | 4.88 | | |
| 2 | 20771 | 5.88 | 6.21 | | 6.56 | 4.29 | | |
| 2 | 20772 | 5.13 | 4.68 | | 5.61 | 4.58 | | |
| 2 | 20773 | 4.23 | 2.47 | | 4.70 | 4.85 | | |
| 2 | 20774 | 3.22 | 1.05 | | 3.75 | 4.97 | | |
| 2 | 20775 | 5.56 | 6.57 | | 6.27 | 4.25 | | |
| 2 | 20776 | 4.84 | 4.74 | | 5.40 | 4.55 | | |
| 2 | 20777 | 3.99 | 2.71 | | 4.58 | 4.85 | | |
| 2 | 20778 | 3.07 | 0.98 | | 3.75 | 5.05 | | |
| 2 | 20779 | 5.25 | 6.88 | | 6.02 | 4.21 | | |
| 2 | 20780 | 4.55 | 4.86 | | 5.21 | 4.51 | | |
| 2 | 20781 | 3.73 | 2.69 | | 4.44 | 4.82 | | |
| 2 | 20782 | 2.85 | 1.08 | | 3.66 | 5.07 | | |
| 2 | 20783 | 5.00 | 7.13 | | 5.80 | 4.18 | | |
| 2 | 20784 | 4.30 | 4.95 | | 5.05 | 4.47 | | |
| 2 | 20785 | 3.46 | 2.67 | | 4.31 | 4.76 | | |
| 2 | 20786 | 2.62 | 1.17 | | 3.53 | 4.99 | | |
| 2 | 20787 | 4.80 | 7.26 | | 5.62 | 4.17 | | |
| 2 | 20788 | 4.06 | 4.83 | | 4.94 | 4.44 | | |
| 2 | 20789 | 3.22 | 2.52 | | 4.25 | 4.65 | | |
| 2 | 20790 | 2.28 | 1.19 | | 3.39 | 4.75 | | |
| 2 | 20791 | 4.65 | 7.34 | | 5.50 | 4.19 | | |
| 2 | 20792 | 3.90 | 4.73 | | 4.88 | 4.44 | | |
| 2 | 20793 | 3.08 | 2.54 | | 4.25 | 4.60 | | |
| 2 | 20794 | 2.19 | 1.24 | | 3.41 | 4.48 | | |
| 2 | 20795 | 4.53 | 7.50 | | 5.40 | 4.18 | | |
| 2 | 20796 | 3.80 | 4.72 | | 4.84 | 4.46 | | |
| 2 | 20797 | 3.02 | 2.52 | | 4.27 | 4.61 | | |
| 2 | 20798 | 2.19 | 1.27 | | 3.57 | 4.38 | | |
| 2 | 20799 | 4.42 | 7.55 | | 5.30 | 4.20 | | |
| 2 | 20800 | 3.69 | 4.74 | | 4.78 | 4.49 | | |
| 2 | 20801 | 2.98 | 2.47 | | 4.29 | 4.67 | | |
| 2 | 20802 | 2.23 | 1.37 | | 3.75 | 4.44 | | |
| 2 | 20803 | 4.31 | 7.63 | | 5.21 | 4.20 | | |
| 2 | 20804 | 3.59 | 4.69 | | 4.72 | 4.53 | | |
| 2 | 20805 | 2.93 | 2.60 | | 4.27 | 4.75 | | |
| 2 | 20806 | 2.32 | 1.40 | | 3.90 | 4.68 | | |
| 2 | 20807 | 10.54 | | | 10.23 | | | |
| 2 | 20808 | 4.90 | | | 5.33 | | | |
| 2 | 20809 | 0.84 | | | 0.81 | | | |
| 2 | 20810 | | | | | | | |
| 2 | 20811 | 0.03 | | | | | | |
| 2 | 20812 | 0.62 | | | | | | |
| 2 | 20813 | 13.94 | | | 11.52 | | | |
| 2 | 20814 | | | | | | | |
| 2 | 20815 | 1.41 | | | | | | |
| 2 | 20816 | 3.47 | | | 0.42 | | | |
| 2 | 20817 | 3.08 | | | 0.54 | | | |
| 2 | 20818 | 2.14 | | | 0.04 | | | |
| 2 | 20819 | 0.63 | | | 5.78 | 1.75 | | |
| 2 | 20820 | 5.85 | | | 10.50 | 3.18 | | |
| 2 | 20821 | 5.84 | | | 7.83 | 3.22 | | |
| 2 | 20822 | 1.51 | | | 4.16 | 3.03 | | |
| 2 | 20823 | | | | 0.21 | 2.31 | | |

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|---|---|---|---|---|---|---|---|---|
| 2 | 20824 | | | | | | | |
| 2 | 20825 | | | | 0.44 | | | |
| 2 | 20826 | | | | 0.17 | 1.96 | | |
| 2 | 20827 | 0.40 | | | 3.01 | 2.28 | | |
| 2 | 20828 | 3.53 | | | 7.59 | 5.09 | | |
| 2 | 20829 | 4.58 | 0.55 | | 5.18 | 3.92 | | |
| 2 | 20830 | | | | 0.01 | | | |
| 2 | 20831 | 9.43 | | | 15.61 | 8.25 | | |
| 2 | 20832 | 10.51 | | | 14.50 | 5.96 | | |
| 2 | 20833 | 18.38 | 4.59 | | 25.83 | 15.20 | | 8.76 |
| 2 | 20834 | 20.61 | 5.65 | | 25.77 | 10.94 | | 8.76 |
| 2 | 20835 | 15.89 | 2.55 | | 20.09 | 7.84 | | |
| 2 | 20836 | 15.15 | 3.46 | | 17.74 | 5.80 | | |
| 2 | 20837 | 6.85 | 1.54 | | 7.68 | 2.22 | | |
| 2 | 20838 | 18.11 | 7.51 | | 20.89 | 11.83 | | 8.76 |
| 2 | 20839 | 5.03 | | | 8.71 | 1.63 | | |
| 2 | 20840 | 5.55 | | | 9.00 | 1.65 | | |
| 2 | 20841 | 7.05 | | | 9.01 | 3.17 | | |
| 2 | 20842 | 6.52 | | | 10.69 | 2.30 | | |
| 2 | 20843 | 2.93 | 2.68 | | 8.42 | 12.90 | | |
| 2 | 20844 | 0.72 | 0.02 | | 6.34 | 13.33 | | |
| 2 | 20845 | 7.96 | 3.98 | | 17.00 | 17.52 | | 8.76 |
| 2 | 20846 | 7.33 | 4.03 | | 11.95 | 11.41 | | |
| 2 | 20847 | 10.31 | | | 14.88 | 3.30 | | |
| 2 | 20848 | 7.77 | | | 13.30 | 2.78 | | |
| 2 | 20849 | 2.38 | | | 9.29 | 3.56 | | |
| 2 | 20850 | 7.99 | | | 16.44 | 11.41 | | 8.76 |
| 2 | 20851 | | | | 0.33 | 2.55 | | |
| 2 | 20852 | 1.08 | | | 1.21 | 1.06 | | |
| 2 | 20853 | 6.41 | | | 5.85 | 3.15 | | |
| 2 | 20854 | 0.58 | | | | | | |
| 2 | 20855 | 0.52 | 3.01 | | | 2.65 | | |
| 2 | 20856 | | 3.07 | | | 4.62 | | |
| 2 | 20857 | 8.03 | 10.29 | | 9.22 | 14.67 | | 8.76 |
| 2 | 20858 | 0.17 | 1.66 | | 1.30 | 3.12 | | |
| 2 | 20859 | 1.79 | 0.57 | | 9.42 | 14.11 | | |
| 2 | 20860 | 6.72 | 1.42 | | 18.17 | 19.21 | | |
| 2 | 20861 | 2.21 | | | 9.19 | 12.21 | | |
| 2 | 20862 | 5.18 | 1.43 | | 14.56 | 13.23 | | |
| 2 | 20863 | 8.73 | | | 11.54 | 1.23 | | |
| 2 | 20864 | 6.68 | | | 9.17 | 1.06 | | |
| 2 | 20865 | 7.32 | | | 11.66 | 1.86 | | |
| 2 | 20866 | 6.95 | | | 7.93 | 0.70 | | |
| 2 | 20867 | 8.68 | | | 11.52 | 2.98 | | |
| 2 | 20868 | 7.21 | | | 12.08 | 5.07 | | |
| 2 | 20869 | 1.48 | | | | | | |
| 2 | 20870 | 1.74 | | | | | | |
| 2 | 20871 | 1.82 | | | | | | |
| 2 | 20872 | 5.60 | | | 9.20 | | | |
| 2 | 20873 | 1.21 | | | 2.21 | | | |
| 2 | 20874 | 3.09 | | | 4.24 | 0.33 | | |
| 2 | 20875 | 7.73 | 2.66 | | 5.65 | 4.00 | | |
| 2 | 20876 | 8.56 | 4.71 | | 5.25 | 5.51 | | |
| 2 | 20877 | 18.70 | 20.07 | | | | | ***** |
| 2 | 20878 | 13.84 | 10.06 | | | | | 22.06 |
| 2 | 20879 | 9.66 | 5.48 | | | 0.93 | | 13.94 |
| 2 | 20880 | 4.78 | 3.99 | | | 4.38 | | 9.20 |
| 2 | 20881 | 2.20 | 2.88 | | | 7.14 | | 8.76 |
| 2 | 20882 | 0.33 | 1.92 | | | 9.31 | | 8.76 |
| 2 | 20883 | | 1.14 | | | 10.75 | | |
| 2 | 20884 | | 0.72 | | | 11.68 | | |
| 2 | 20885 | | 0.61 | | 0.08 | 12.09 | | |
| 2 | 20886 | | 1.21 | | 0.74 | 11.64 | | |
| 2 | 20887 | | 1.86 | | 1.39 | 10.84 | | |
| 2 | 20888 | | 2.67 | | 1.63 | 8.81 | | |
| 2 | 20889 | 0.43 | 3.13 | | 1.55 | 6.66 | | |

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| 2 | 20890 | 0.82 | 3.60 | | 2.03 | 4.19 | | 8.76 |
| 2 | 20891 | 1.43 | 4.01 | | 2.40 | 4.09 | | 8.76 |
| 2 | 20892 | 1.84 | 5.55 | | 2.65 | 3.90 | | 8.76 |
| 2 | 20893 | 2.24 | 7.52 | | 2.89 | 3.72 | | |
| 2 | 20894 | 2.62 | 9.48 | | 3.09 | 3.56 | | |
| 2 | 20895 | 5.28 | 11.11 | | | | | 16.69 |
| 2 | 20896 | 7.36 | 9.77 | | | | | 17.87 |
| 2 | 20897 | 6.90 | 6.00 | | | 1.99 | | 12.86 |
| 2 | 20898 | 4.47 | 4.29 | | | 5.43 | | 8.83 |
| 2 | 20899 | 1.35 | 2.96 | | | 8.13 | | 8.76 |
| 2 | 20900 | | 1.93 | | | 10.28 | | 8.76 |
| 2 | 20901 | | 1.12 | | | 11.54 | | |
| 2 | 20902 | | 0.73 | | 0.39 | 12.94 | | |
| 2 | 20903 | | 0.69 | | 0.94 | 12.65 | | |
| 2 | 20904 | | 1.29 | | 1.58 | 12.18 | | |
| 2 | 20905 | | 2.00 | | 2.10 | 11.32 | | |
| 2 | 20906 | 0.10 | 2.75 | | 2.23 | 9.22 | | |
| 2 | 20907 | 0.58 | 3.18 | | 2.03 | 6.96 | | |
| 2 | 20908 | 1.00 | 3.62 | | 2.22 | 4.45 | | 8.76 |
| 2 | 20909 | 1.55 | 4.01 | | 2.57 | 4.17 | | 8.76 |
| 2 | 20910 | 1.98 | 5.59 | | 2.80 | 3.96 | | 8.76 |
| 2 | 20911 | 2.38 | 7.45 | | 3.00 | 3.77 | | 8.76 |
| 2 | 20912 | 2.76 | 9.51 | | 3.17 | 3.60 | | |
| 2 | 20913 | | 6.36 | | | | | 10.67 |
| 2 | 20914 | 1.50 | 6.49 | | | 1.09 | | 9.79 |
| 2 | 20915 | 2.14 | 5.25 | | | 3.37 | | 8.79 |
| 2 | 20916 | 1.86 | 4.19 | | | 6.66 | | 8.76 |
| 2 | 20917 | | 3.02 | | 0.19 | 9.32 | | 8.76 |
| 2 | 20918 | | 1.92 | | 0.58 | 11.45 | | 8.76 |
| 2 | 20919 | | 1.26 | | 1.35 | 12.52 | | |
| 2 | 20920 | | 0.74 | | 1.45 | 13.39 | | |
| 2 | 20921 | | 0.76 | | 2.21 | 13.02 | | |
| 2 | 20922 | | 1.38 | | 2.74 | 12.58 | | |
| 2 | 20923 | | 2.15 | | 2.71 | 11.72 | | |
| 2 | 20924 | 0.25 | 2.82 | | 2.75 | 9.40 | | |
| 2 | 20925 | 0.73 | 3.21 | | 2.47 | 7.24 | | 8.76 |
| 2 | 20926 | 1.19 | 3.64 | | 2.43 | 4.60 | | 8.76 |
| 2 | 20927 | 1.68 | 4.03 | | 2.75 | 4.23 | | 8.76 |
| 2 | 20928 | 2.14 | 5.68 | | 2.97 | 4.01 | | 8.76 |
| 2 | 20929 | 2.54 | 7.52 | | 3.15 | 3.80 | | 8.76 |
| 2 | 20930 | 2.89 | 9.58 | | 3.32 | 3.62 | | |
| 2 | 20931 | | 5.34 | | | 1.50 | | 8.76 |
| 2 | 20932 | | 5.11 | | 0.94 | 3.25 | | 8.76 |
| 2 | 20933 | | 4.61 | | 1.65 | 5.08 | | 8.76 |
| 2 | 20934 | | 3.85 | | 1.97 | 7.37 | | 8.76 |
| 2 | 20935 | | 2.92 | | 2.15 | 9.67 | | 8.76 |
| 2 | 20936 | | 1.94 | | 2.48 | 11.74 | | 8.76 |
| 2 | 20937 | | 1.26 | | 2.66 | 12.81 | | |
| 2 | 20938 | | 0.74 | | 2.74 | 13.40 | | |
| 2 | 20939 | | 0.79 | | 3.02 | 13.14 | | |
| 2 | 20940 | | 1.48 | | 3.13 | 12.69 | | |
| 2 | 20941 | | 2.33 | | 3.08 | 11.93 | | |
| 2 | 20942 | 0.43 | 2.88 | | 3.09 | 9.76 | | |
| 2 | 20943 | 0.92 | 3.25 | | 2.71 | 7.32 | | 8.76 |
| 2 | 20944 | 1.35 | 3.65 | | 2.64 | 4.64 | | 8.76 |
| 2 | 20945 | 1.82 | 4.11 | | 2.96 | 4.28 | | 8.76 |
| 2 | 20946 | 2.33 | 5.84 | | 3.15 | 4.03 | | 8.76 |
| 2 | 20947 | 2.72 | 7.59 | | 3.31 | 3.81 | | 8.76 |
| 2 | 20948 | 3.05 | 9.64 | | 3.50 | 3.65 | | |
| 2 | 20949 | 0.99 | 2.24 | | 2.11 | 7.44 | | |
| 2 | 20950 | 0.64 | 1.96 | | 1.85 | 8.61 | | |
| 2 | 20951 | 0.32 | 1.64 | | 1.90 | 10.19 | | |
| 2 | 20952 | | 1.01 | | 1.46 | 11.36 | | |
| 2 | 20953 | | 0.52 | | 0.90 | 12.23 | | |
| 2 | 20954 | | 0.12 | | 0.26 | 12.61 | | |
| 2 | 20955 | | 0.45 | | | 12.31 | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2 | 20956 | | 1.21 | | | 11.28 | | |
| 2 | 20957 | 0.74 | 2.19 | | | 9.45 | | 8.76 |
| 2 | 20958 | 3.20 | 3.66 | | | 6.44 | | 8.76 |
| 2 | 20959 | 6.86 | 5.17 | | | 2.90 | | 10.77 |
| 2 | 20960 | 10.42 | 6.67 | | | 0.14 | | 16.01 |
| 2 | 20961 | 15.20 | 12.67 | | | | | 25.86 |
| 2 | 20962 | 19.27 | 21.90 | | | | | ***** |
| 2 | 20963 | 1.08 | 2.38 | | 2.54 | 7.78 | | |
| 2 | 20964 | 0.70 | 2.10 | | 2.45 | 8.95 | | |
| 2 | 20965 | 0.30 | 1.80 | | 2.62 | 10.70 | | |
| 2 | 20966 | | 1.21 | | 2.27 | 11.86 | | |
| 2 | 20967 | | 0.65 | | 1.68 | 12.69 | | |
| 2 | 20968 | | 0.18 | | 0.98 | 13.34 | | |
| 2 | 20969 | | 0.48 | | 0.34 | 13.43 | | |
| 2 | 20970 | | 1.24 | | | 11.85 | | |
| 2 | 20971 | 0.19 | 2.36 | | | 10.07 | | 8.76 |
| 2 | 20972 | 2.90 | 4.02 | | | 6.95 | | 8.76 |
| 2 | 20973 | 6.10 | 5.69 | | | 3.95 | | 10.23 |
| 2 | 20974 | 7.00 | 7.88 | | | 0.94 | | 14.14 |
| 2 | 20975 | 7.30 | 11.32 | | | | | 19.06 |
| 2 | 20976 | 5.32 | 12.24 | | | | | 16.92 |
| 2 | 20977 | 1.23 | 2.49 | | 3.09 | 8.09 | | 8.76 |
| 2 | 20978 | 0.85 | 2.23 | | 3.04 | 9.11 | | |
| 2 | 20979 | 0.38 | 1.94 | | 3.11 | 10.97 | | |
| 2 | 20980 | | 1.44 | | 2.81 | 12.28 | | |
| 2 | 20981 | | 0.77 | | 2.89 | 13.15 | | |
| 2 | 20982 | | 0.24 | | 2.00 | 13.71 | | |
| 2 | 20983 | | 0.50 | | 1.04 | 14.07 | | |
| 2 | 20984 | | 1.28 | | 0.57 | 12.90 | | |
| 2 | 20985 | | 2.44 | | | 10.96 | | 8.76 |
| 2 | 20986 | 1.62 | 3.96 | | | 8.27 | | 8.76 |
| 2 | 20987 | 2.88 | 5.22 | | | 5.14 | | 8.76 |
| 2 | 20988 | 2.30 | 6.13 | | | 2.43 | | 9.94 |
| 2 | 20989 | 1.53 | 7.52 | | | 1.01 | | 10.02 |
| 2 | 20990 | 0.27 | 6.89 | | | | | 10.75 |
| 2 | 20991 | 1.41 | 2.59 | | 3.45 | 8.13 | | 8.76 |
| 2 | 20992 | 1.00 | 2.34 | | 3.40 | 9.23 | | |
| 2 | 20993 | 0.52 | 2.07 | | 3.41 | 11.11 | | |
| 2 | 20994 | | 1.70 | | 3.43 | 12.44 | | |
| 2 | 20995 | | 0.91 | | 2.98 | 13.28 | | |
| 2 | 20996 | | 0.29 | | 2.80 | 13.80 | | |
| 2 | 20997 | | 0.51 | | 2.38 | 14.07 | | |
| 2 | 20998 | | 1.28 | | 1.98 | 12.84 | | |
| 2 | 20999 | | 2.37 | | 1.65 | 11.44 | | 8.76 |
| 2 | 21000 | | 3.57 | | 1.23 | 9.29 | | 8.76 |
| 2 | 21001 | | 4.55 | | 0.92 | 6.73 | | 8.76 |
| 2 | 21002 | | 5.04 | | 0.51 | 4.85 | | 8.76 |
| 2 | 21003 | | 5.32 | | 0.08 | 3.05 | | 8.76 |
| 2 | 21004 | | 5.40 | | | 1.71 | | 8.76 |
| 2 | 21005 | 3.81 | 7.76 | | 4.01 | 3.77 | | |
| 2 | 21006 | 2.59 | 4.66 | | 3.56 | 4.06 | | 8.76 |
| 2 | 21007 | 2.12 | 3.30 | | 3.10 | 4.34 | | 8.76 |
| 2 | 21008 | 1.47 | 2.67 | | 2.59 | 5.57 | | 8.76 |
| 2 | 21009 | 3.96 | 7.87 | | 4.10 | 3.79 | | |
| 2 | 21010 | 2.73 | 4.78 | | 3.69 | 4.14 | | 8.76 |
| 2 | 21011 | 2.19 | 3.39 | | 3.27 | 4.42 | | 8.76 |
| 2 | 21012 | 1.57 | 2.77 | | 2.78 | 5.92 | | 8.76 |
| 2 | 21013 | 4.11 | 7.98 | | 4.25 | 3.83 | | |
| 2 | 21014 | 3.29 | 4.62 | | 3.84 | 4.19 | | 8.76 |
| 2 | 21015 | 2.29 | 3.45 | | 3.45 | 4.49 | | 8.76 |
| 2 | 21016 | 1.72 | 2.90 | | 3.13 | 6.18 | | 8.76 |
| 2 | 21017 | 4.26 | 8.04 | | 4.41 | 3.84 | | |
| 2 | 21018 | 3.45 | 4.79 | | 4.01 | 4.22 | | 8.76 |
| 2 | 21019 | 2.39 | 3.52 | | 3.63 | 4.54 | | 8.76 |
| 2 | 21020 | 1.87 | 3.00 | | 3.26 | 6.18 | | 8.76 |
| 2 | 21021 | 5.65 | 3.36 | | | | | 27.14 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2 | 21022 | 2.44 | | | | | | 12.98 |
| 2 | 21023 | 0.52 | | | | | | 8.76 |
| 2 | 21024 | | | | | | | 8.76 |
| 2 | 21025 | | | | | | | |
| 2 | 21026 | | | | | 0.02 | | |
| 2 | 21027 | | | | | 2.82 | | |
| 2 | 21028 | | | | 1.19 | 4.84 | | |
| 2 | 21029 | | | | 2.10 | 5.86 | | |
| 2 | 21030 | | | | 2.77 | 6.72 | | |
| 2 | 21031 | | | | 4.27 | 7.24 | | |
| 2 | 21032 | | | | 4.52 | 7.04 | | |
| 2 | 21033 | 1.92 | 0.09 | | 5.35 | 6.28 | | |
| 2 | 21034 | 4.80 | 2.60 | | 6.53 | 5.15 | | |
| 2 | 21035 | 8.25 | 5.29 | | 8.23 | 4.00 | | |
| 2 | 21036 | 10.60 | 7.50 | | 9.63 | 0.87 | | |
| 2 | 21037 | 12.32 | 8.86 | | 9.24 | 0.90 | | 8.76 |
| 2 | 21038 | 13.21 | 8.80 | | 11.13 | 0.51 | | |
| 2 | 21039 | | | | | | | |
| 2 | 21040 | | | | | | | |
| 2 | 21041 | | | | | | | |
| 2 | 21042 | | | | | | | |
| 2 | 21043 | | | | | | | |
| 2 | 21044 | | | | | | | |
| 2 | 21045 | | | | | | | |
| 2 | 21046 | | | | 1.09 | 1.06 | | |
| 2 | 21047 | | | | 2.06 | 2.47 | | |
| 2 | 21048 | | | | 3.12 | 4.06 | | |
| 2 | 21049 | | | | 3.99 | 5.25 | | |
| 2 | 21050 | 0.52 | | | 4.95 | 5.52 | | |
| 2 | 21051 | 2.53 | | | 5.77 | 5.46 | | |
| 2 | 21052 | 4.39 | 1.27 | | 6.81 | 4.87 | | |
| 2 | 21053 | 7.78 | 4.11 | | 8.53 | 3.58 | | |
| 2 | 21054 | 10.97 | 6.67 | | 10.16 | 1.30 | | |
| 2 | 21055 | 13.34 | 7.97 | | 10.19 | 0.09 | | 8.76 |
| 2 | 21056 | 15.81 | 8.00 | | 11.52 | | | |
| 2 | 21057 | | | | | | | |
| 2 | 21058 | | | | | | | |
| 2 | 21059 | | | | | | | |
| 2 | 21060 | | | | | | | |
| 2 | 21061 | | | | | | | |
| 2 | 21062 | | | | | | | |
| 2 | 21063 | | | | | | | |
| 2 | 21064 | | | | 0.21 | | | |
| 2 | 21065 | | | | 2.04 | | | |
| 2 | 21066 | | | | 3.29 | 0.18 | | |
| 2 | 21067 | 0.87 | | | 5.13 | 2.45 | | |
| 2 | 21068 | 2.40 | | | 6.65 | 3.57 | | |
| 2 | 21069 | 4.60 | | | 6.95 | 3.50 | | |
| 2 | 21070 | 6.26 | 1.56 | | 7.48 | 4.37 | | |
| 2 | 21071 | 7.94 | 3.10 | | 8.81 | 3.38 | | 8.76 |
| 2 | 21072 | 10.55 | 4.79 | | 10.13 | 1.12 | | |
| 2 | 21073 | 14.19 | 7.06 | | 10.28 | | | 8.76 |
| 2 | 21074 | 18.44 | 6.36 | | 11.54 | | | |
| 2 | 21075 | 0.75 | | | 0.56 | | | |
| 2 | 21076 | 0.77 | | | 0.53 | | | 8.76 |
| 2 | 21077 | 0.80 | | | 0.48 | | | 8.76 |
| 2 | 21078 | 0.88 | | | 0.43 | | | 8.76 |
| 2 | 21079 | 0.94 | | | 0.36 | | | 8.76 |
| 2 | 21080 | 0.97 | | | 0.33 | | | 8.76 |
| 2 | 21081 | 0.95 | | | 0.36 | | | 8.76 |
| 2 | 21082 | 0.91 | | | 0.48 | | | 8.76 |
| 2 | 21083 | 1.31 | | | 0.72 | | | 8.76 |
| 2 | 21084 | 2.02 | | | 1.02 | | | 8.76 |
| 2 | 21085 | 3.02 | | | 2.82 | | | 8.76 |
| 2 | 21086 | 4.55 | | | 5.77 | | | |
| 2 | 21087 | 6.60 | | | 7.74 | | | |

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|---|---|---|---|---|---|---|---|---|
| 2 | 21088 | 9.19 | 0.61 | | 9.19 | 1.46 | | |
| 2 | 21089 | 10.07 | 2.65 | | 10.14 | 1.86 | | |
| 2 | 21090 | 11.33 | 4.22 | | 10.78 | 0.38 | | |
| 2 | 21091 | 13.54 | 5.06 | | 9.05 | | | 8.76 |
| 2 | 21092 | 18.73 | 5.61 | | 10.26 | | | |
| 2 | 21093 | 4.89 | | | 2.12 | | | |
| 2 | 21094 | 4.94 | | | 2.10 | | | |
| 2 | 21095 | 4.94 | | | 2.05 | | | |
| 2 | 21096 | 5.00 | | | 1.99 | | | |
| 2 | 21097 | 5.21 | | | 1.91 | | | |
| 2 | 21098 | 5.25 | | | 1.83 | | | |
| 2 | 21099 | 5.20 | | | 1.76 | | | |
| 2 | 21100 | 5.34 | | | 1.77 | | | |
| 2 | 21101 | 5.20 | | | 1.94 | | | 8.76 |
| 2 | 21102 | 5.03 | | | 2.15 | | | 8.76 |
| 2 | 21103 | 4.97 | | | 2.44 | | | 8.76 |
| 2 | 21104 | 5.96 | | | 2.82 | | | |
| 2 | 21105 | 7.20 | | | 3.25 | | | |
| 2 | 21106 | 8.72 | | | 3.70 | | | |
| 2 | 21107 | 10.36 | | | 4.18 | | | |
| 2 | 21108 | 11.92 | | | 4.62 | | | |
| 2 | 21109 | 13.22 | 0.31 | | 4.87 | | | |
| 2 | 21110 | 13.63 | 0.02 | | 5.72 | | | |
| 2 | 21111 | | 0.41 | | 5.55 | 9.66 | | |
| 2 | 21112 | | 0.36 | | 5.40 | 10.47 | | |
| 2 | 21113 | | 0.27 | | 5.17 | 10.11 | | |
| 2 | 21114 | | 0.22 | | 5.15 | 9.33 | | |
| 2 | 21115 | 0.14 | 2.69 | | 3.67 | 11.70 | | |
| 2 | 21116 | 0.75 | 3.00 | | 3.62 | 9.28 | | |
| 2 | 21117 | 1.10 | 3.13 | | 4.20 | 8.53 | | 8.76 |
| 2 | 21118 | 0.77 | 2.92 | | 4.84 | 10.92 | | 8.76 |
| 2 | 21119 | | | | 5.05 | 8.94 | | |
| 2 | 21120 | | | | 5.88 | 9.83 | | |
| 2 | 21121 | | | | 5.78 | 8.98 | | |
| 2 | 21122 | | 0.02 | | 5.72 | 8.53 | | |
| 2 | 21123 | | | | 5.06 | 9.80 | | |
| 2 | 21124 | | | | 4.80 | 9.07 | | |
| 2 | 21125 | | 0.14 | | 4.84 | 9.72 | | |
| 2 | 21126 | | | | 4.36 | 9.68 | | |
| 2 | 21127 | | | | 5.06 | 4.15 | | |
| 2 | 21128 | | | | 4.94 | 4.47 | | 8.76 |
| 2 | 21129 | | | | 4.67 | 3.20 | | |
| 2 | 21130 | | | | 3.93 | 2.26 | | |
| 2 | 21131 | | 1.42 | | 3.68 | 12.61 | | |
| 2 | 21132 | | 0.68 | | 4.01 | 13.03 | | |
| 2 | 21133 | | 0.79 | | 3.67 | 13.44 | | |
| 2 | 21134 | | 1.55 | | 3.88 | 12.74 | | |
| 2 | 21135 | | 3.70 | | 3.70 | 11.38 | | |
| 2 | 21136 | | 3.53 | | 8.62 | 13.49 | | |
| 2 | 21137 | | 1.67 | | 6.17 | 8.46 | | |
| 2 | 21138 | | 1.05 | | 5.41 | 8.62 | | |
| 2 | 21139 | | 4.56 | | 2.05 | 3.46 | | 8.76 |
| 2 | 21140 | | 4.36 | | 3.03 | 4.96 | | 8.76 |
| 2 | 21141 | | 3.77 | | 4.28 | 6.66 | | 8.76 |
| 2 | 21142 | | 3.93 | | 3.51 | 4.60 | | 8.76 |
| 2 | 21143 | | | | 6.03 | 0.98 | | |
| 2 | 21144 | | 0.70 | | 11.73 | 8.61 | | |
| 2 | 21145 | | 0.95 | | 8.85 | 7.88 | | |
| 2 | 21146 | | | | 8.51 | 4.29 | | |
| 2 | 21147 | 0.79 | 2.94 | | 2.99 | 8.12 | | 8.76 |
| 2 | 21148 | 1.55 | 2.80 | | 3.83 | 6.57 | | 8.76 |
| 2 | 21149 | 1.90 | 3.10 | | 4.16 | 6.80 | | 8.76 |
| 2 | 21150 | 1.09 | 3.04 | | 3.88 | 8.64 | | 8.76 |
| 2 | 21151 | 2.57 | 4.14 | | 6.35 | 18.56 | | 8.76 |
| 2 | 21152 | | 1.62 | | 3.39 | 14.38 | | 8.76 |
| 2 | 21153 | 0.42 | 3.67 | | 2.42 | 10.03 | | 8.76 |

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|---|---|---|---|---|---|---|---|---|
| 2 | 21154 | 1.80 | 2.87 | | 4.74 | 11.73 | | 8.76 |
| 2 | 21155 | | 0.83 | | 6.00 | 7.05 | | |
| 2 | 21156 | | 0.33 | | 5.59 | 5.86 | | |
| 2 | 21157 | | 0.24 | | 5.45 | 5.32 | | |
| 2 | 21158 | | 0.58 | | 5.28 | 6.37 | | |
| 2 | 21159 | | 0.18 | | 4.41 | 11.09 | | |
| 2 | 21160 | | 0.40 | | 4.86 | 11.30 | | |
| 2 | 21161 | | 0.61 | | 4.94 | 11.86 | | |
| 2 | 21162 | | 0.36 | | 4.33 | 11.97 | | |
| 2 | 21163 | | | | 6.15 | 1.14 | | |
| 2 | 21164 | | | | 7.85 | 3.63 | | |
| 2 | 21165 | | 0.22 | | 8.13 | 7.08 | | |
| 2 | 21166 | | 0.20 | | 11.37 | 8.50 | | |
| 2 | 21167 | 3.26 | 9.62 | | 3.63 | 3.66 | | |
| 2 | 21168 | 3.43 | 9.53 | | 3.77 | 3.66 | | |
| 2 | 21169 | 2.94 | 6.94 | | 3.57 | 3.95 | | 8.76 |
| 2 | 21170 | 2.82 | 7.37 | | 3.44 | 3.85 | | 8.76 |
| 2 | 21171 | | 0.56 | | 4.36 | 10.43 | | |
| 2 | 21172 | | 0.38 | | 4.38 | 10.24 | | |
| 2 | 21173 | | 1.08 | | 4.79 | 11.05 | | |
| 2 | 21174 | 0.04 | 1.54 | | 4.69 | 10.61 | | |
| 2 | 21175 | | 5.34 | | 8.34 | 14.89 | | |
| 2 | 21176 | | 5.02 | | 2.82 | 11.30 | | |
| 2 | 21177 | | 2.82 | | 5.02 | 9.25 | | |
| 2 | 21178 | | 3.85 | | 6.37 | 9.18 | | |
| 2 | 21179 | | 0.86 | | 6.60 | 7.48 | | |
| 2 | 21180 | | 0.66 | | 6.66 | 7.88 | | |
| 2 | 21181 | | 0.25 | | 6.60 | 7.54 | | |
| 2 | 21182 | | 0.36 | | 6.12 | 6.59 | | |
| 2 | 21183 | 7.52 | 10.08 | | 7.28 | 2.40 | | |
| 2 | 21184 | 7.47 | 8.78 | | 6.28 | 2.51 | | 8.76 |
| 2 | 21185 | 6.49 | 8.29 | | 5.39 | 2.56 | | 8.76 |
| 2 | 21186 | 6.96 | 10.18 | | 6.70 | 2.52 | | |
| 2 | 21187 | | 0.56 | | 6.58 | 6.84 | | |
| 2 | 21188 | | 0.95 | | 6.84 | 8.17 | | |
| 2 | 21189 | | 0.75 | | 6.42 | 8.45 | | |
| 2 | 21190 | | 0.47 | | 6.00 | 7.28 | | |
| 2 | 21191 | | | | 5.61 | 5.63 | | |
| 2 | 21192 | | | | 6.03 | 6.81 | | |
| 2 | 21193 | | | | 5.34 | 5.69 | | |
| 2 | 21194 | | | | 5.08 | 4.55 | | |
| 2 | 21195 | | 0.56 | | 4.14 | 12.81 | | |
| 2 | 21196 | | 0.82 | | 4.45 | 12.38 | | |
| 2 | 21197 | | 1.01 | | 3.71 | 12.73 | | |
| 2 | 21198 | | 0.69 | | 3.85 | 13.06 | | |
| 2 | 21199 | | 0.49 | | 1.68 | 10.79 | | |
| 2 | 21200 | | 1.71 | | 3.02 | 12.48 | | |
| 2 | 21201 | 0.74 | 3.25 | | 4.49 | 13.49 | | |
| 2 | 21202 | | 0.54 | | 2.68 | 12.35 | | 8.76 |
| 2 | 21203 | | 1.29 | | 4.31 | 10.22 | | |
| 2 | 21204 | | 0.94 | | 4.16 | 10.21 | | |
| 2 | 21205 | 0.56 | 2.17 | | 4.32 | 10.21 | | |
| 2 | 21206 | 0.56 | 2.50 | | 4.09 | 9.77 | | 8.76 |
| 2 | 21207 | 1.30 | 3.60 | | 3.88 | 7.37 | | 8.76 |
| 2 | 21208 | 1.55 | 3.67 | | 3.52 | 6.29 | | 8.76 |
| 2 | 21209 | 2.37 | 4.21 | | 3.64 | 4.67 | | 8.76 |
| 2 | 21210 | 1.76 | 4.04 | | 3.46 | 5.98 | | 8.76 |
| 2 | 21211 | | 0.94 | | 6.46 | 9.46 | | |
| 2 | 21212 | | 1.37 | | 6.82 | 8.99 | | |
| 2 | 21213 | | 1.78 | | 6.34 | 9.18 | | |
| 2 | 21214 | | 1.29 | | 6.29 | 10.05 | | |
| 2 | 21215 | | | | 3.54 | 7.80 | | |
| 2 | 21216 | 1.06 | 1.58 | | 3.10 | 5.10 | | |
| 2 | 21217 | 1.16 | 2.09 | | 3.43 | 6.21 | | 8.76 |
| 2 | 21218 | 0.06 | 2.03 | | 2.91 | 8.19 | | 8.76 |
| 2 | 21219 | | | | 5.03 | 10.14 | | |

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|---|---|---|---|---|---|---|---|---|
| 2 | 21220 | | | | 5.28 | 9.84 | | |
| 2 | 21221 | | | | 5.70 | 10.47 | | |
| 2 | 21222 | | | | 5.01 | 10.32 | | |
| 2 | 21223 | | 3.97 | | 3.42 | 6.83 | | 8.76 |
| 2 | 21224 | | 3.37 | | 3.60 | 8.56 | | 8.76 |
| 2 | 21225 | | 2.87 | | 5.33 | 9.56 | | 8.76 |
| 2 | 21226 | | 3.41 | | 4.61 | 8.73 | | 8.76 |
| 2 | 21227 | 4.85 | 6.94 | | 4.70 | 3.11 | | 8.76 |
| 2 | 21228 | 5.91 | 10.44 | | 5.62 | 2.72 | | |
| 2 | 21229 | 6.37 | 10.33 | | 6.13 | 2.56 | | |
| 2 | 21230 | 5.47 | 7.84 | | 4.87 | 2.65 | | 8.76 |
| 2 | 21231 | | 2.09 | | 7.02 | 10.23 | | |
| 2 | 21232 | | 1.70 | | 6.22 | 6.45 | | |
| 2 | 21233 | | | | 4.92 | 4.15 | | |
| 2 | 21234 | 0.34 | 2.55 | | 9.17 | 9.06 | | 8.76 |
| 2 | 21235 | 3.84 | 6.97 | | 4.40 | 3.84 | | 8.76 |
| 2 | 21236 | 4.75 | 9.87 | | 5.02 | 3.35 | | |
| 2 | 21237 | 5.35 | 9.64 | | 5.35 | 3.05 | | |
| 2 | 21238 | 4.19 | 6.89 | | 4.62 | 3.49 | | 8.76 |
| 2 | 21239 | | 1.16 | | 5.65 | 10.02 | | |
| 2 | 21240 | | 0.46 | | 5.13 | 10.22 | | |
| 2 | 21241 | | 0.49 | | 5.04 | 9.66 | | |
| 2 | 21242 | | 1.17 | | 5.57 | 8.78 | | |
| 2 | 21243 | | 0.80 | | 4.97 | 10.38 | | |
| 2 | 21244 | | 0.24 | | 4.40 | 10.18 | | |
| 2 | 21245 | | 0.09 | | 4.41 | 9.74 | | |
| 2 | 21246 | | 0.35 | | 4.84 | 10.15 | | |
| 2 | 21247 | | | | 5.89 | 7.83 | | |
| 2 | 21248 | | 0.06 | | 6.36 | 7.64 | | |
| 2 | 21249 | | 0.40 | | 6.06 | 7.47 | | |
| 2 | 21250 | | 0.14 | | 5.97 | 7.75 | | |
| 2 | 21251 | | 0.48 | | 3.51 | 3.48 | | |
| 2 | 21252 | 2.07 | 3.48 | | 7.17 | 7.36 | | |
| 2 | 21253 | 1.83 | 4.00 | | 4.73 | 6.33 | | |
| 2 | 21254 | 2.03 | 2.83 | | 4.24 | 4.02 | | |
| 2 | 21255 | 3.74 | 4.29 | | 5.16 | 4.77 | | 8.76 |
| 2 | 21256 | 5.31 | 6.09 | | 5.56 | 2.63 | | 8.76 |
| 2 | 21257 | 6.57 | 6.80 | | 6.76 | 2.37 | | 8.76 |
| 2 | 21258 | 5.52 | 5.60 | | 6.05 | 3.99 | | 8.76 |
| 2 | 21259 | | 2.00 | | 7.21 | 8.88 | | |
| 2 | 21260 | | 2.61 | | 6.69 | 8.82 | | |
| 2 | 21261 | | 2.23 | | 6.33 | 8.82 | | |
| 2 | 21262 | | 1.70 | | 6.96 | 8.58 | | |
| 2 | 21263 | | 3.18 | | 6.07 | 8.08 | | |
| 2 | 21264 | | 3.17 | | 5.88 | 8.45 | | |
| 2 | 21265 | | 2.67 | | 6.00 | 8.72 | | |
| 2 | 21266 | | 2.97 | | 6.39 | 8.67 | | |
| 2 | 21267 | 1.18 | 3.35 | | 2.80 | 6.72 | | 8.76 |
| 2 | 21268 | 1.58 | 3.77 | | 2.89 | 4.56 | | 8.76 |
| 2 | 21269 | 1.98 | 4.04 | | 3.23 | 4.43 | | 8.76 |
| 2 | 21270 | 1.49 | 3.55 | | 3.39 | 6.07 | | 8.76 |
| 2 | 21271 | | 0.53 | | 6.47 | 7.42 | | |
| 2 | 21272 | | 0.36 | | 5.88 | 7.15 | | |
| 2 | 21273 | | 0.33 | | 5.92 | 7.71 | | |
| 2 | 21274 | | 0.58 | | 6.18 | 7.71 | | |
| 2 | 21275 | | 1.38 | | 4.94 | 12.18 | | |
| 2 | 21276 | | 2.16 | | 5.24 | 10.91 | | 8.76 |
| 2 | 21277 | | 2.58 | | 3.98 | 10.22 | | 8.76 |
| 2 | 21278 | | 1.71 | | 3.98 | 11.97 | | |
| 2 | 21279 | | | | 5.11 | 11.02 | | |
| 2 | 21280 | | | | 5.16 | 11.12 | | |
| 2 | 21281 | | | | 4.68 | 10.49 | | |
| 2 | 21282 | | | | 4.99 | 11.08 | | |
| 2 | 21283 | 3.19 | 7.05 | | 3.85 | 3.98 | | 8.76 |
| 2 | 21284 | 3.85 | 9.54 | | 4.34 | 3.60 | | |
| 2 | 21285 | 4.07 | 9.89 | | 4.67 | 3.53 | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2 | 21286 | 3.38 | 6.93 | | 4.14 | 4.00 | | 8.76 |
| 2 | 21287 | | 2.92 | | 7.94 | 10.59 | | |
| 2 | 21288 | | 3.79 | | 6.89 | 9.21 | | |
| 2 | 21289 | | 3.09 | | 6.75 | 8.92 | | |
| 2 | 21290 | | 2.33 | | 7.53 | 9.37 | | |
| 2 | 21291 | 2.93 | 3.69 | | 4.62 | 5.04 | | 8.76 |
| 2 | 21292 | 2.57 | 3.14 | | 4.43 | 4.47 | | 8.76 |
| 2 | 21293 | 3.67 | 4.67 | | 4.04 | 3.23 | | 8.76 |
| 2 | 21294 | 4.22 | 5.28 | | 4.89 | 2.97 | | 8.76 |
| 2 | 21295 | 2.38 | 3.88 | | 3.89 | 4.62 | | |
| 2 | 21296 | 3.09 | 4.16 | | 3.91 | 3.62 | | 8.76 |
| 2 | 21297 | 2.35 | 2.90 | | 3.74 | 3.88 | | 8.76 |
| 2 | 21298 | 2.17 | 3.07 | | 3.80 | 4.16 | | |
| 2 | 21299 | | | | 5.85 | 9.92 | | |
| 2 | 21300 | | | | 5.37 | 9.38 | | |
| 2 | 21301 | | | | 5.35 | 7.34 | | |
| 2 | 21302 | | | | 5.95 | 8.85 | | |
| 2 | 21303 | 1.65 | 2.96 | | 5.79 | 10.95 | | 8.76 |
| 2 | 21304 | 1.26 | 3.35 | | 4.38 | 9.05 | | 8.76 |
| 2 | 21305 | 1.30 | 4.00 | | 4.28 | 8.28 | | |
| 2 | 21306 | 1.81 | 3.85 | | 6.69 | 11.17 | | 8.76 |
| 2 | 21307 | | | | 4.36 | 10.11 | | |
| 2 | 21308 | | | | 4.41 | 10.63 | | |
| 2 | 21309 | | | | 4.98 | 11.04 | | |
| 2 | 21310 | | | | 4.98 | 10.56 | | |
| 2 | 21311 | | 1.40 | | 7.65 | 9.40 | | |
| 2 | 21312 | | 0.82 | | 7.02 | 8.18 | | |
| 2 | 21313 | | 1.02 | | 6.74 | 8.13 | | |
| 2 | 21314 | | 1.63 | | 6.75 | 8.47 | | |
| 2 | 21315 | | 0.70 | | 5.92 | 10.14 | | |
| 2 | 21316 | | 1.04 | | 5.89 | 10.59 | | |
| 2 | 21317 | | 0.81 | | 5.24 | 11.52 | | |
| 2 | 21318 | | 0.55 | | 5.56 | 10.92 | | |
| 2 | 21319 | 0.30 | 1.95 | | 4.14 | 9.63 | | |
| 2 | 21320 | 0.95 | 2.74 | | 4.34 | 9.40 | | 8.76 |
| 2 | 21321 | 1.76 | 2.99 | | 4.06 | 7.31 | | 8.76 |
| 2 | 21322 | 1.34 | 2.58 | | 4.36 | 8.64 | | |
| 2 | 21323 | | 0.44 | | 5.63 | 8.46 | | |
| 2 | 21324 | | 0.15 | | 5.04 | 8.32 | | |
| 2 | 21325 | | 0.22 | | 5.37 | 7.72 | | |
| 2 | 21326 | | 0.36 | | 5.38 | 7.31 | | |
| 2 | 21327 | | 0.87 | | 2.98 | 11.81 | | |
| 2 | 21328 | | 0.22 | | 2.55 | 10.41 | | |
| 2 | 21329 | | 0.09 | | 3.60 | 10.39 | | |
| 2 | 21330 | | 0.38 | | 3.77 | 11.98 | | |
| 2 | 21331 | | 2.85 | | 5.34 | 7.85 | | |
| 2 | 21332 | | 3.15 | | 5.96 | 7.86 | | |
| 2 | 21333 | | 3.21 | | 6.36 | 8.46 | | |
| 2 | 21334 | | 3.38 | | 6.37 | 8.59 | | |
| 2 | 21335 | | 1.10 | | 7.21 | 7.71 | | |
| 2 | 21336 | | 0.50 | | 7.32 | 6.76 | | |
| 2 | 21337 | | 0.26 | | 7.80 | 5.87 | | |
| 2 | 21338 | | 1.10 | | 7.92 | 7.96 | | |
| 2 | 21339 | | | | 6.75 | 4.70 | | |
| 2 | 21340 | | 0.25 | | 6.23 | 5.72 | | |
| 2 | 21341 | | 0.30 | | 5.64 | 5.94 | | |
| 2 | 21342 | | 0.26 | | 6.87 | 6.44 | | |
| 2 | 21343 | 0.84 | 3.00 | | 4.86 | 12.48 | | |
| 2 | 21344 | | 2.50 | | 4.21 | 12.77 | | |
| 2 | 21345 | | 2.44 | | 3.85 | 12.24 | | |
| 2 | 21346 | 0.67 | 2.88 | | 4.87 | 12.04 | | |
| 2 | 21347 | | 1.29 | | 5.17 | 11.51 | | |
| 2 | 21348 | | 1.41 | | 6.06 | 10.60 | | |
| 2 | 21349 | | 1.96 | | 6.15 | 9.75 | | |
| 2 | 21350 | | 2.01 | | 5.15 | 10.74 | | |
| 2 | 21351 | | | | 4.26 | 8.90 | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2 | 21352 | | 0.45 | | 4.21 | 6.63 | | |
| 2 | 21353 | | 0.10 | | 3.90 | 8.82 | | |
| 2 | 21354 | | | | 3.39 | 9.74 | | |
| 2 | 21355 | 1.40 | 2.96 | | 5.12 | 10.79 | | 8.76 |
| 2 | 21356 | 1.14 | 3.02 | | 4.80 | 10.55 | | 8.76 |
| 2 | 21357 | 1.31 | 3.19 | | 4.01 | 8.32 | | 8.76 |
| 2 | 21358 | 1.37 | 3.14 | | 4.18 | 8.90 | | 8.76 |
| 2 | 21359 | | 0.19 | | 5.11 | 10.53 | | |
| 2 | 21360 | | 0.28 | | 5.14 | 10.36 | | |
| 2 | 21361 | | 0.30 | | 5.23 | 10.80 | | |
| 2 | 21362 | | 2.91 | | 4.64 | 7.10 | | |
| 2 | 21363 | | 3.31 | | 4.28 | 5.83 | | |
| 2 | 21364 | | 3.14 | | 5.24 | 7.07 | | |
| 2 | 21365 | | 3.46 | | 5.34 | 7.43 | | |
| 2 | 21366 | | 3.25 | | 5.06 | 7.40 | | |
| 2 | 21367 | | 3.56 | | 4.42 | 5.98 | | 8.76 |
| 2 | 21368 | | 2.57 | | 5.10 | 9.70 | | |
| 2 | 21369 | | 2.50 | | 5.98 | 9.18 | | |
| 2 | 21370 | | 3.02 | | 5.11 | 9.28 | | |
| 2 | 21371 | 2.88 | 5.39 | | 7.44 | 19.78 | | 8.76 |
| 2 | 21372 | 0.63 | 1.71 | | 1.06 | 16.06 | | 8.76 |
| 2 | 21373 | 2.36 | 3.36 | | 5.98 | 13.55 | | 8.76 |
| 2 | 21374 | | | | 5.93 | 7.59 | | |
| 2 | 21375 | | | | 6.62 | 7.77 | | |
| 2 | 21376 | | | | 6.14 | 7.23 | | 8.76 |
| 2 | 21377 | 0.72 | 2.75 | | 7.58 | 13.45 | | 8.76 |
| 2 | 21378 | 0.84 | 1.79 | | 5.35 | 12.04 | | |
| 2 | 21379 | | 1.88 | | 5.74 | 12.12 | | |
| 2 | 21380 | | | | 4.56 | 10.00 | | |
| 2 | 21381 | | | | 5.00 | 10.35 | | |
| 2 | 21382 | | | | 5.49 | 10.09 | | |
| 2 | 21383 | 0.77 | 3.26 | | 3.07 | 9.26 | | |
| 2 | 21384 | 0.80 | 2.99 | | 3.67 | 9.57 | | |
| 2 | 21385 | 0.94 | 2.94 | | 3.98 | 10.21 | | |
| 2 | 21386 | 3.39 | 5.07 | | 4.22 | 3.87 | | 8.76 |
| 2 | 21387 | 2.49 | 4.20 | | 3.80 | 4.54 | | 8.76 |
| 2 | 21388 | 3.01 | 5.05 | | 4.07 | 4.30 | | 8.76 |
| 2 | 21389 | 2.53 | 6.06 | | 3.31 | 4.04 | | 8.76 |
| 2 | 21390 | 2.52 | 5.37 | | 3.39 | 4.16 | | 8.76 |
| 2 | 21391 | 2.01 | 4.35 | | 3.14 | 4.29 | | 8.76 |
| 2 | 21392 | 2.40 | 4.70 | | 3.57 | 4.34 | | 8.76 |
| 2 | 21393 | 2.55 | 4.81 | | 3.72 | 4.43 | | 8.76 |
| 2 | 21394 | 1.84 | 3.81 | | 3.42 | 5.11 | | 8.76 |
| 2 | 21395 | 4.20 | 4.19 | | 5.48 | 5.43 | | 8.76 |
| 2 | 21396 | 2.41 | 2.99 | | 4.82 | 7.00 | | 8.76 |
| 2 | 21397 | 2.82 | 3.44 | | 4.97 | 6.06 | | 8.76 |
| 2 | 21398 | 3.50 | 9.80 | | 3.89 | 3.59 | | |
| 2 | 21399 | 3.61 | 9.75 | | 4.11 | 3.62 | | |
| 2 | 21400 | 3.27 | 7.40 | | 3.80 | 3.88 | | 8.76 |
| 2 | 21401 | 0.14 | 3.02 | | 2.04 | 4.52 | | 8.76 |
| 2 | 21402 | 0.14 | 3.07 | | 2.01 | 4.49 | | 8.76 |
| 2 | 21403 | | 2.48 | | 1.60 | 5.00 | | |
| 2 | 21404 | | 2.28 | | 1.63 | 4.77 | | |
| 2 | 21405 | 0.26 | 2.81 | | 2.00 | 4.56 | | |
| 2 | 21406 | | 1.85 | | 1.86 | 4.95 | | |
| 2 | 21407 | | 0.78 | | 2.47 | 5.51 | | |
| 2 | 21408 | 0.49 | 2.31 | | 2.02 | 4.46 | | |
| 2 | 21409 | 0.23 | 0.44 | | 1.66 | 9.93 | | |
| 2 | 21410 | 0.56 | 0.91 | | 3.88 | 13.81 | | 8.76 |
| 2 | 21411 | 0.55 | 1.10 | | 2.70 | 10.97 | | 8.76 |
| 2 | 21412 | 0.27 | 1.38 | | 1.72 | 9.48 | | |
| 2 | 21413 | | 0.53 | | 1.04 | 9.58 | | |
| 2 | 21414 | | 1.37 | | 1.05 | 9.30 | | |
| 2 | 21415 | | 1.18 | | 0.62 | 9.45 | | |
| 2 | 21416 | | 0.63 | | 0.82 | 9.63 | | |
| 2 | 21417 | 21.46 | 22.13 | | | | | ***** |

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|---|---|---|---|---|---|---|---|---|
| 2 | 21418 | 9.13 | 14.49 | | | | | 20.55 |
| 2 | 21419 | 9.36 | 10.36 | | | | | 17.12 |
| 2 | 21420 | 14.85 | 10.31 | | | | | 22.22 |
| 2 | 21421 | 2.10 | 7.43 | | 2.91 | 3.67 | | |
| 2 | 21422 | 1.99 | 7.30 | | 2.90 | 3.64 | | |
| 2 | 21423 | 2.45 | 9.66 | | 3.10 | 3.48 | | |
| 2 | 21424 | 2.49 | 9.61 | | 3.08 | 3.51 | | |
| 2 | 21425 | | 2.27 | | 4.34 | 5.98 | | |
| 2 | 21426 | | 1.74 | | 5.96 | 6.24 | | |
| 2 | 21427 | | 0.03 | | 3.72 | 2.01 | | |
| 2 | 21428 | | 0.81 | | 5.00 | 4.42 | | |
| 2 | 21429 | 2.34 | 10.23 | | 3.75 | 3.50 | | |
| 2 | 21430 | 2.16 | 9.83 | | 3.61 | 3.55 | | |
| 2 | 21431 | 1.73 | 7.13 | | 3.33 | 3.87 | | |
| 2 | 21432 | 1.96 | 7.82 | | 3.50 | 3.79 | | |
| 2 | 21433 | 0.95 | 4.43 | | 2.62 | 4.10 | | 8.76 |
| 2 | 21434 | 1.18 | 5.37 | | 2.87 | 4.05 | | 8.76 |
| 2 | 21435 | 1.64 | 7.94 | | 3.08 | 3.68 | | |
| 2 | 21436 | 1.30 | 6.04 | | 2.84 | 3.86 | | |
| 2 | 21437 | | 2.50 | | 1.21 | 8.62 | | |
| 2 | 21438 | | 1.77 | | 0.86 | 10.21 | | |
| 2 | 21439 | | 1.70 | | 0.61 | 9.41 | | |
| 2 | 21440 | | 2.34 | | 0.88 | 8.18 | | |
| 2 | 21441 | | 0.57 | | 3.45 | 4.44 | | |
| 2 | 21442 | 0.20 | 1.29 | | 1.38 | 1.23 | | |
| 2 | 21443 | 0.75 | 2.54 | | 2.07 | 3.28 | | |
| 2 | 21444 | 0.85 | 1.98 | | 2.03 | 4.03 | | |
| 2 | 21445 | 9.27 | 5.97 | | | 1.03 | | 13.25 |
| 2 | 21446 | 7.26 | 6.60 | | | 1.50 | | 10.87 |
| 2 | 21447 | 5.02 | 5.34 | | | 4.18 | | 8.76 |
| 2 | 21448 | 5.14 | 4.67 | | | 3.89 | | 8.91 |
| 2 | 21449 | 0.03 | 7.47 | | 2.21 | 7.80 | | |
| 2 | 21450 | | 6.78 | | 5.18 | 9.85 | | |
| 2 | 21451 | | 5.18 | | 3.57 | 5.43 | | 8.76 |
| 2 | 21452 | | 5.09 | | 2.88 | 5.20 | | |
| 2 | 21453 | 0.40 | 3.37 | | 1.87 | 4.11 | | |
| 2 | 21454 | 0.04 | 2.90 | | 1.42 | 5.97 | | |
| 2 | 21455 | | 2.82 | | 1.58 | 5.37 | | |
| 2 | 21456 | 0.39 | 3.40 | | 2.03 | 4.19 | | 8.76 |
| 2 | 21457 | | | | 1.82 | 9.11 | | |
| 2 | 21458 | | 0.06 | | 2.23 | 9.11 | | |
| 2 | 21459 | | 0.04 | | 2.39 | 8.51 | | |
| 2 | 21460 | | | | 2.27 | 7.68 | | |
| 2 | 21461 | 0.66 | 2.14 | | | 8.81 | | 8.76 |
| 2 | 21462 | 2.50 | 3.25 | | | 6.08 | | 8.76 |
| 2 | 21463 | 2.32 | 3.73 | | | 6.09 | | 8.76 |
| 2 | 21464 | 0.60 | 2.52 | | | 8.43 | | 8.76 |
| 2 | 21465 | | 0.33 | | 2.52 | 9.51 | | |
| 2 | 21466 | | 0.65 | | 2.67 | 9.11 | | |
| 2 | 21467 | | 0.65 | | 2.96 | 8.56 | | |
| 2 | 21468 | | 0.30 | | 2.58 | 8.80 | | |
| 2 | 21469 | 0.67 | 3.54 | | 1.84 | 4.09 | | 8.76 |
| 2 | 21470 | 0.28 | 3.07 | | 1.30 | 6.47 | | |
| 2 | 21471 | 0.14 | 2.98 | | 1.29 | 6.31 | | |
| 2 | 21472 | 0.50 | 3.42 | | 1.84 | 4.27 | | |
| 2 | 21473 | 0.53 | 3.55 | | 2.36 | 4.37 | | |
| 2 | 21474 | 0.60 | 3.74 | | 2.44 | 4.31 | | |
| 2 | 21475 | 1.10 | 4.52 | | 2.86 | 4.18 | | 8.76 |
| 2 | 21476 | 0.94 | 4.10 | | 2.73 | 4.26 | | 8.76 |
| 2 | 21477 | | 0.44 | | 2.98 | 2.52 | | |
| 2 | 21478 | 0.35 | 0.70 | | 5.30 | 9.24 | | 8.76 |
| 2 | 21479 | | 0.01 | | 2.43 | 9.65 | | |
| 2 | 21480 | | 0.20 | | 3.38 | 6.45 | | |
| 2 | 21481 | | 1.35 | | 4.63 | 5.64 | | |
| 2 | 21482 | | 1.51 | | 4.44 | 6.50 | | |
| 2 | 21483 | | 1.95 | | 4.10 | 7.71 | | |

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|---|---|---|---|---|---|---|---|---|
| 2 | 21484 | | 2.23 | | 4.22 | 6.74 | | |
| 2 | 21485 | | 1.39 | | 3.69 | 6.86 | | |
| 2 | 21486 | | 1.08 | | 3.68 | 8.00 | | |
| 2 | 21487 | | 1.15 | | 3.17 | 8.88 | | |
| 2 | 21488 | | 1.60 | | 3.83 | 8.05 | | |
| 2 | 21489 | | 1.54 | | | 9.74 | | |
| 2 | 21490 | | 0.90 | | | 10.46 | | |
| 2 | 21491 | | 0.77 | | | 10.96 | | |
| 2 | 21492 | | 1.23 | | | 10.17 | | |
| 2 | 21493 | 3.71 | 9.73 | | | | | 12.96 |
| 2 | 21494 | 0.55 | 6.43 | | | | | 9.03 |
| 2 | 21495 | 0.43 | 6.03 | | | 0.75 | | 8.76 |
| 2 | 21496 | 4.06 | 7.85 | | | | | 10.59 |
| 2 | 21497 | | 0.40 | | 1.22 | 10.23 | | |
| 2 | 21498 | | 0.71 | | 1.38 | 10.30 | | |
| 2 | 21499 | | 0.68 | | 2.19 | 9.81 | | |
| 2 | 21500 | | 0.37 | | 2.06 | 10.01 | | |
| 2 | 21501 | | 0.09 | | 0.94 | 9.88 | | |
| 2 | 21502 | | 0.15 | | 1.10 | 10.03 | | |
| 2 | 21503 | | 0.12 | | 1.78 | 9.72 | | |
| 2 | 21504 | | | | 1.39 | 9.54 | | |
| 2 | 21505 | 0.43 | 3.02 | | 2.05 | 4.08 | | |
| 2 | 21506 | 0.40 | 3.37 | | 1.98 | 3.76 | | |
| 2 | 21507 | 0.63 | 4.03 | | 2.38 | 4.11 | | |
| 2 | 21508 | 0.34 | 3.55 | | 2.24 | 4.21 | | |
| 2 | 21509 | 1.71 | 5.47 | | 2.63 | 3.85 | | 8.76 |
| 2 | 21510 | 1.19 | 3.95 | | 2.31 | 4.03 | | 8.76 |
| 2 | 21511 | 1.00 | 3.85 | | 2.26 | 4.00 | | 8.76 |
| 2 | 21512 | 1.55 | 5.36 | | 2.62 | 3.82 | | 8.76 |
| 2 | 21513 | | 1.03 | | | 10.32 | | |
| 2 | 21514 | | 1.82 | | | 9.74 | | |
| 2 | 21515 | | 1.96 | | 0.56 | 10.10 | | |
| 2 | 21516 | | 1.18 | | 0.38 | 10.57 | | |
| 2 | 21517 | | 1.25 | | 1.63 | 10.16 | | |
| 2 | 21518 | | 1.94 | | 1.97 | 9.65 | | |
| 2 | 21519 | | 1.80 | | 3.44 | 9.37 | | |
| 2 | 21520 | | 1.22 | | 2.65 | 9.65 | | |
| 2 | 21521 | | 1.04 | | 2.84 | 7.55 | | 8.76 |
| 2 | 21522 | | 1.69 | | 2.06 | 5.82 | | |
| 2 | 21523 | | 1.95 | | 1.83 | 6.46 | | |
| 2 | 21524 | | 1.74 | | 1.68 | 8.47 | | |
| 2 | 21525 | 1.83 | 9.15 | | 3.33 | 3.61 | | |
| 2 | 21526 | 1.38 | 6.16 | | 3.05 | 3.98 | | 8.76 |
| 2 | 21527 | 1.56 | 6.69 | | 3.21 | 3.92 | | |
| 2 | 21528 | 1.98 | 9.59 | | 3.47 | 3.60 | | |
| 2 | 21529 | | 0.51 | | | 10.67 | | |
| 2 | 21530 | | 0.46 | | | 10.57 | | |
| 2 | 21531 | | 0.95 | | | 11.23 | | |
| 2 | 21532 | | 0.41 | | | 11.10 | | |
| 2 | 21533 | | 4.70 | | 2.06 | 3.59 | | |
| 2 | 21534 | | 4.98 | | 2.45 | 4.39 | | 8.76 |
| 2 | 21535 | | 5.18 | | 1.24 | 3.23 | | 8.76 |
| 2 | 21536 | | 4.91 | | 1.06 | 2.40 | | 8.76 |
| 2 | 21537 | | 0.69 | | 0.34 | 10.64 | | |
| 2 | 21538 | | 0.37 | | 0.45 | 10.44 | | |
| 2 | 21539 | | 0.30 | | 0.20 | 10.32 | | |
| 2 | 21540 | | 0.62 | | | 10.44 | | |
| 2 | 21541 | 0.02 | 2.76 | | | 8.25 | | 8.76 |
| 2 | 21542 | 1.06 | 3.79 | | | 7.01 | | 8.76 |
| 2 | 21543 | | 3.64 | | 1.01 | 7.94 | | 8.76 |
| 2 | 21544 | | 2.79 | | 0.64 | 8.97 | | |
| 2 | 21545 | | 2.23 | | 1.02 | 7.58 | | |
| 2 | 21546 | | 1.69 | | 0.87 | 8.90 | | |
| 2 | 21547 | | 1.70 | | 1.23 | 8.58 | | |
| 2 | 21548 | | 2.14 | | 1.31 | 6.99 | | |
| 2 | 21549 | | 2.65 | | 2.42 | 8.59 | | |

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|---|---|---|---|---|---|---|---|---|
| 2 | 21550 | | 3.38 | | 2.48 | 7.69 | | |
| 2 | 21551 | | 2.95 | | 3.45 | 7.21 | | |
| 2 | 21552 | | 2.35 | | 3.65 | 8.11 | | |
| 2 | 21553 | 0.83 | 3.86 | | 2.42 | 4.11 | | 8.76 |
| 2 | 21554 | 1.25 | 5.23 | | 2.68 | 3.91 | | 8.76 |
| 2 | 21555 | 1.33 | 5.20 | | 2.62 | 3.86 | | 8.76 |
| 2 | 21556 | 0.90 | 3.82 | | 2.31 | 4.06 | | 8.76 |
| 2 | 21557 | 3.54 | 6.12 | | | 2.26 | | 8.76 |
| 2 | 21558 | 0.07 | 5.37 | | 0.03 | 3.92 | | 8.76 |
| 2 | 21559 | | 4.52 | | 0.63 | 6.38 | | 8.76 |
| 2 | 21560 | 2.44 | 4.94 | | | 5.07 | | 8.76 |
| 2 | 21561 | 2.07 | 9.48 | | 3.22 | 3.53 | | |
| 2 | 21562 | 2.26 | 9.68 | | 3.14 | 3.46 | | |
| 2 | 21563 | 1.85 | 7.37 | | 2.93 | 3.66 | | |
| 2 | 21564 | 1.64 | 7.13 | | 2.93 | 3.72 | | 8.76 |
| 2 | 21565 | | 4.92 | | 1.47 | 4.73 | | 8.76 |
| 2 | 21566 | | 4.75 | | 2.60 | 5.52 | | |
| 2 | 21567 | | 3.86 | | 3.20 | 6.61 | | |
| 2 | 21568 | | 4.20 | | 2.15 | 6.45 | | 8.76 |
| 2 | 21569 | 1.54 | 5.92 | | 3.15 | 4.00 | | |
| 2 | 21570 | 1.30 | 5.09 | | 3.00 | 4.10 | | |
| 2 | 21571 | 0.79 | 4.03 | | 2.60 | 4.26 | | |
| 2 | 21572 | 1.11 | 4.39 | | 2.78 | 4.12 | | |
| 2 | 21573 | | 0.96 | | 0.28 | 9.86 | | |
| 2 | 21574 | | 0.49 | | 0.46 | 10.15 | | |
| 2 | 21575 | | 0.15 | | 0.54 | 10.23 | | |
| 2 | 21576 | | 0.49 | | 0.66 | 9.80 | | |
| 2 | 21577 | 0.74 | 3.77 | | 2.53 | 4.32 | | 8.76 |
| 2 | 21578 | 0.55 | 3.54 | | 2.25 | 4.23 | | 8.76 |
| 2 | 21579 | 0.09 | 2.99 | | 1.84 | 4.45 | | |
| 2 | 21580 | 0.34 | 3.32 | | 2.16 | 4.41 | | |
| 2 | 21581 | | 5.76 | | | 0.16 | | 8.76 |
| 2 | 21582 | | 5.22 | | 0.06 | 1.62 | | 8.76 |
| 2 | 21583 | | 5.49 | | | 1.86 | | 8.76 |
| 2 | 21584 | | 1.25 | | 0.52 | 10.02 | | |
| 2 | 21585 | | 1.25 | | 0.22 | 10.60 | | |
| 2 | 21586 | | 0.78 | | 0.18 | 10.44 | | |
| 2 | 21587 | | 5.02 | | 3.70 | 6.32 | | |
| 2 | 21588 | | 3.86 | | 3.93 | 6.61 | | |
| 2 | 21589 | | 3.56 | | 4.05 | 6.40 | | |
| 2 | 21590 | | | | | | | |
| 2 | 21591 | | | | | | | |
| 2 | 21592 | | | | | | | |
| 2 | 21593 | 0.10 | | | | | | |
| 2 | 21594 | 0.30 | | | | | | |
| 2 | 21595 | 0.66 | | | | | | |
| 2 | 21596 | 1.27 | | | 0.69 | | | |
| 2 | 21597 | 1.79 | | | 1.10 | | | |
| 2 | 21598 | 2.05 | | | 1.11 | | | |
| 2 | 21599 | | | | | | | 8.76 |
| 2 | 21600 | 4.24 | 4.68 | | | | | 18.63 |
| 2 | 21601 | 3.73 | 1.83 | | | | | 8.95 |
| 2 | 21602 | 2.47 | | | | | | 8.76 |
| 2 | 21603 | 0.71 | | | | | | |
| 2 | 21604 | | | | | | | |
| 2 | 21605 | | | | | | | |
| 2 | 21606 | | | | 0.43 | 0.69 | | |
| 2 | 21607 | | 0.14 | | 0.80 | 1.04 | | |
| 2 | 21608 | | 0.87 | | 1.12 | 1.15 | | |
| 2 | 21609 | 5.62 | 3.45 | | 7.13 | 3.70 | | |
| 2 | 21610 | | | | 0.37 | | | |
| 2 | 21611 | | | | 0.19 | | | |
| 2 | 21612 | | | | 0.51 | | | |
| 2 | 21613 | | | | 0.56 | | | |
| 2 | 21614 | | | | 0.31 | | | |
| 2 | 21615 | | | | 0.52 | | | |

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|---|---|---|---|---|---|---|---|---|
| 2 | 21616 | | | | 0.29 | | | |
| 2 | 21617 | | | | 0.09 | | | |
| 2 | 21618 | 8.34 | 6.76 | | 6.21 | 0.33 | | |
| 2 | 21619 | 8.43 | 5.73 | | 6.26 | 1.98 | | |
| 2 | 21620 | 7.13 | 5.39 | | 5.92 | 3.02 | | |
| 2 | 21621 | 6.16 | 5.84 | | 4.45 | 0.66 | | |
| 2 | 21622 | 7.88 | 5.47 | | 0.09 | | | |
| 2 | 21623 | 7.41 | 9.15 | | 2.79 | | | |
| 2 | 21624 | 8.75 | 5.66 | | 2.88 | | | |
| 2 | 21625 | 11.80 | 1.71 | | 1.92 | | | |
| 2 | 21626 | 0.07 | | | | | | |
| 2 | 21627 | 0.04 | | | | | | |
| 2 | 21628 | | | | 0.24 | | | |
| 2 | 21629 | | | | 0.18 | | | |
| 2 | 21630 | | | | 0.27 | | | |
| 2 | 21631 | | | | 0.08 | | | |
| 2 | 21632 | | | | 0.50 | | | |
| 2 | 21633 | | | | 0.50 | | | |
| 2 | 21634 | 0.18 | | | 0.06 | | | |
| 2 | 21635 | | | | 0.20 | | | |
| 2 | 21636 | | | | 0.24 | | | |
| 2 | 21637 | 0.09 | | | 0.04 | | | |
| 2 | 21638 | 1.99 | 1.63 | | 3.39 | | | |
| 2 | 21639 | 1.17 | 2.97 | | 1.08 | 1.06 | | 8.76 |
| 2 | 21640 | 1.08 | 0.25 | | 1.42 | | | 8.76 |
| 2 | 21641 | 2.46 | | | 4.76 | | | |
| 2 | 21642 | | | | 0.50 | | | |
| 2 | 21643 | | | | | | | 10.68 |
| 2 | 21644 | | | | | | | |
| 2 | 21645 | | | | | | | |
| 2 | 21646 | 8.26 | 7.00 | | 6.02 | | | |
| 2 | 21647 | 5.23 | 5.99 | | 3.52 | | | |
| 2 | 21648 | 6.32 | 6.26 | | 3.23 | | | |
| 2 | 21649 | 8.02 | 8.11 | | 4.79 | | | |
| 2 | 21650 | | | | 0.51 | | | |
| 2 | 21651 | | | | 0.56 | | | |
| 2 | 21652 | | | | 0.63 | | | |
| 2 | 21653 | | | | 0.63 | | | |
| 2 | 21654 | | | | | | | |
| 2 | 21655 | | | | | | | |
| 2 | 21656 | 0.12 | | | | | | |
| 2 | 21657 | | | | 0.15 | | | |
| 2 | 21658 | | | | 0.71 | | | |
| 2 | 21659 | 0.17 | | | 2.16 | | | |
| 2 | 21660 | 1.01 | | | 3.68 | | | |
| 2 | 21661 | 0.33 | | | 1.16 | | | |
| 2 | 21662 | | | | 0.53 | | | |
| 2 | 21663 | | | | 0.52 | | | |
| 2 | 21664 | | | | 0.14 | | | |
| 2 | 21665 | | | | 0.20 | | | |
| 2 | 21666 | 0.31 | | | 1.30 | | | |
| 2 | 21667 | 1.84 | | | 4.88 | | | |
| 2 | 21668 | 2.25 | | | 5.20 | | | |
| 2 | 21669 | 0.50 | | | 1.47 | | | 8.76 |
| 2 | 21670 | | | | 0.16 | | | |
| 2 | 21671 | 0.31 | | | 0.11 | | | |
| 2 | 21672 | 0.40 | | | 0.10 | | | |
| 2 | 21673 | | | | 0.04 | | | |
| 2 | 21674 | 3.84 | 4.59 | | 3.45 | 1.06 | | |
| 2 | 21675 | 4.09 | 6.52 | | 3.62 | 5.14 | | 9.47 |
| 2 | 21676 | 1.47 | 4.23 | | 0.38 | 2.29 | | 8.76 |
| 2 | 21677 | 2.03 | 3.52 | | 2.89 | 1.29 | | |
| 2 | 21678 | | | | | | | |
| 2 | 21679 | | | | | | | |
| 2 | 21680 | | | | | | | |
| 2 | 21681 | | | | | | | |

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|---|---|---|---|---|---|---|---|---|
| 2 | 21682 | 3.05 | | | 3.99 | | | |
| 2 | 21683 | 3.94 | | | 4.34 | | | |
| 2 | 21684 | 3.63 | | | 6.03 | | | |
| 2 | 21685 | 2.64 | | | 5.86 | | | |
| 2 | 21686 | 4.92 | | | 3.72 | | | |
| 2 | 21687 | 6.22 | | | 3.67 | | | |
| 2 | 21688 | 8.28 | 0.02 | | 4.55 | | | |
| 2 | 21689 | 5.09 | | | 5.29 | | | |
| 2 | 21690 | | | | 0.63 | | | |
| 2 | 21691 | | | | 0.47 | | | |
| 2 | 21692 | | | | 0.43 | | | |
| 2 | 21693 | | | | 0.54 | | | |
| 2 | 21694 | | | | 0.66 | | | |
| 2 | 21695 | | | | 0.57 | | | |
| 2 | 21696 | | | | 0.55 | | | |
| 2 | 21697 | | | | 0.66 | | | |
| 2 | 21698 | 0.91 | | | 1.09 | | | |
| 2 | 21699 | 2.03 | | | 2.85 | | | |
| 2 | 21700 | 1.75 | | | 4.19 | | | |
| 2 | 21701 | 0.29 | | | 1.82 | | | |
| 2 | 21702 | | | | | | | |
| 2 | 21703 | | | | | | | |
| 2 | 21704 | | | | | | | |
| 2 | 21705 | | | | | | | |
| 2 | 21706 | | | | | | | |
| 2 | 21707 | 0.53 | | | 0.10 | | | |
| 2 | 21708 | 0.43 | | | 0.08 | | | |
| 2 | 21709 | | | | | | | |
| 2 | 21710 | | | | | | | |
| 2 | 21711 | | | | | | | |
| 2 | 21712 | | | | | | | |
| 2 | 21713 | | | | | | | |
| 2 | 21714 | 4.33 | | | 5.02 | | | |
| 2 | 21715 | 6.13 | 2.74 | | 3.92 | | | |
| 2 | 21716 | 3.96 | 4.10 | | 3.37 | | | |
| 2 | 21717 | 3.31 | 1.79 | | 3.85 | | | |
| 2 | 21718 | | | | | | | |
| 2 | 21719 | | | | | | | |
| 2 | 21720 | 0.12 | | | 0.21 | | | |
| 2 | 21721 | | | | | | | |
| 2 | 21722 | | | | | | | |
| 2 | 21723 | | | | | | | |
| 2 | 21724 | | | | | | | |
| 2 | 21725 | | | | | | | |
| 2 | 21726 | | | | | | | |
| 2 | 21727 | | | | | | | |
| 2 | 21728 | | | | | | | |
| 2 | 21729 | 0.56 | | | 0.07 | | | |
| 2 | 21730 | 0.51 | | | 0.30 | | | |
| 2 | 21731 | 9.48 | | | 2.08 | | | |
| 2 | 21732 | 10.53 | 1.13 | | 3.33 | | | |
| 2 | 21733 | 7.37 | | | 2.81 | | | |
| 2 | 21734 | | | | 2.11 | | | |
| 2 | 21735 | | | | 1.87 | | | |
| 2 | 21736 | 1.13 | | | 3.93 | | | |
| 2 | 21737 | 2.14 | 0.02 | | 5.64 | 6.61 | | |
| 2 | 21738 | 0.47 | | | 5.30 | 7.05 | | |
| 2 | 21739 | | | | 4.93 | 7.52 | | |
| 2 | 21740 | | | | 4.52 | 7.71 | | |
| 2 | 21741 | | | | 4.00 | 7.31 | | |
| 2 | 21742 | | | | 2.78 | 6.49 | | |
| 2 | 21743 | | | | 1.98 | 5.51 | | |
| 2 | 21744 | | | | 0.70 | 3.78 | | |
| 2 | 21745 | | | | | 0.90 | | |
| 2 | 21746 | | | | | | | |
| 2 | 21747 | | | | | | | 8.76 |

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|---|---|---|---|---|---|---|---|---|
| 2 | 21748 | 0.35 | | | | | | 8.76 |
| 2 | 21749 | 2.49 | | | | | | 12.48 |
| 2 | 21750 | 5.74 | 2.94 | | | | | 26.76 |
| 2 | 21751 | 3.19 | 0.19 | | 6.01 | 5.78 | | |
| 2 | 21752 | 1.78 | | | 5.61 | 5.84 | | |
| 2 | 21753 | 0.61 | | | 4.77 | 5.84 | | |
| 2 | 21754 | | | | 4.44 | 5.74 | | |
| 2 | 21755 | | | | 3.84 | 4.85 | | |
| 2 | 21756 | | | | 2.93 | 3.48 | | |
| 2 | 21757 | | | | 2.13 | 2.19 | | |
| 2 | 21758 | | | | | | | |
| 2 | 21759 | | | | | | | |
| 2 | 21760 | | | | | | | |
| 2 | 21761 | | | | | | | |
| 2 | 21762 | | | | | | | |
| 2 | 21763 | | | | | | | |
| 2 | 21764 | | | | | | | |
| 2 | 21765 | 5.27 | 0.06 | | 7.27 | 4.04 | | |
| 2 | 21766 | 3.67 | | | 7.14 | 3.77 | | |
| 2 | 21767 | 2.43 | | | 6.87 | 3.88 | | |
| 2 | 21768 | 1.36 | | | 5.66 | 2.57 | | |
| 2 | 21769 | 0.45 | | | 4.72 | 1.23 | | |
| 2 | 21770 | | | | 3.56 | 0.05 | | |
| 2 | 21771 | | | | 1.36 | | | |
| 2 | 21772 | | | | | | | |
| 2 | 21773 | | | | | | | |
| 2 | 21774 | | | | | | | |
| 2 | 21775 | | | | | | | |
| 2 | 21776 | | | | | | | |
| 2 | 21777 | | | | | | | |
| 2 | 21778 | | | | | | | |
| 2 | 21779 | 7.11 | | | 8.21 | 0.40 | | |
| 2 | 21780 | 5.74 | | | 7.23 | 0.14 | | |
| 2 | 21781 | 4.51 | | | 5.94 | | | |
| 2 | 21782 | 3.44 | | | 3.29 | | | 8.76 |
| 2 | 21783 | 2.55 | | | 1.97 | | | 8.76 |
| 2 | 21784 | 1.79 | | | 0.96 | | | 8.76 |
| 2 | 21785 | 1.21 | | | 0.66 | | | 8.76 |
| 2 | 21786 | 1.11 | | | 0.48 | | | 8.76 |
| 2 | 21787 | 1.13 | | | 0.41 | | | 8.76 |
| 2 | 21788 | 1.09 | | | 0.42 | | | 8.76 |
| 2 | 21789 | 1.00 | | | 0.47 | | | |
| 2 | 21790 | 0.88 | | | 0.52 | | | 8.76 |
| 2 | 21791 | 0.82 | | | 0.55 | | | 8.76 |
| 2 | 21792 | 0.77 | | | 0.57 | | | |
| 2 | 21793 | 7.52 | | | 3.35 | | | |
| 2 | 21794 | 6.71 | | | 3.08 | | | |
| 2 | 21795 | 5.94 | | | 2.81 | | | 8.76 |
| 2 | 21796 | 5.21 | | | 2.57 | | | 8.76 |
| 2 | 21797 | 5.21 | | | 2.31 | | | 8.76 |
| 2 | 21798 | 5.34 | | | 2.09 | | | 8.76 |
| 2 | 21799 | 5.40 | | | 1.91 | | | 8.76 |
| 2 | 21800 | 5.36 | | | 1.84 | | | |
| 2 | 21801 | 5.38 | | | 1.88 | | | |
| 2 | 21802 | 5.33 | | | 1.95 | | | |
| 2 | 21803 | 5.06 | | | 2.02 | | | |
| 2 | 21804 | 5.00 | | | 2.08 | | | |
| 2 | 21805 | 4.98 | | | 2.12 | | | |
| 2 | 21806 | 4.92 | | | 2.13 | | | |
| 2 | 21807 | | | | 7.50 | 2.82 | | |
| 2 | 21808 | | 0.32 | | 13.05 | 10.28 | | |
| 2 | 21809 | | 1.79 | | 7.93 | 9.66 | | |
| 2 | 21810 | | 0.38 | | 8.64 | 7.70 | | |
| 2 | 21811 | | | | 6.92 | 4.01 | | |
| 2 | 21812 | | 0.22 | | 8.19 | 6.36 | | |
| 2 | 21813 | | 0.21 | | 11.09 | 6.35 | | |

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|---|---|---|---|---|---|---|---|---|
| 2 | 21814 | | | | 5.89 | 1.04 | | |
| 2 | 21815 | | | | 4.25 | 9.25 | | |
| 2 | 21816 | | | | 4.83 | 10.28 | | |
| 2 | 21817 | | 0.15 | | 4.96 | 9.99 | | |
| 2 | 21818 | | 0.41 | | 5.04 | 8.83 | | |
| 2 | 21819 | | | | 4.56 | 8.87 | | |
| 2 | 21820 | | 0.88 | | 5.61 | 7.19 | | |
| 2 | 21821 | 0.04 | 1.82 | | 8.55 | 6.11 | | |
| 2 | 21822 | | | | 5.17 | 8.38 | | |
| 2 | 21823 | | 1.09 | | 6.30 | 8.95 | | |
| 2 | 21824 | | 0.69 | | 6.22 | 7.90 | | |
| 2 | 21825 | | 0.47 | | 5.67 | 7.79 | | |
| 2 | 21826 | | 0.68 | | 5.91 | 8.65 | | |
| 2 | 21827 | | 1.24 | | 6.21 | 9.73 | | |
| 2 | 21828 | | 0.71 | | 5.87 | 9.42 | | |
| 2 | 21829 | | 0.57 | | 5.65 | 10.07 | | |
| 2 | 21830 | | 0.98 | | 5.97 | 10.38 | | |
| 2 | 21831 | 2.99 | 2.78 | | 5.35 | 7.46 | | 8.76 |
| 2 | 21832 | 2.75 | 2.87 | | 5.01 | 7.05 | | 8.76 |
| 2 | 21833 | 1.80 | 2.57 | | 5.18 | 9.00 | | 8.76 |
| 2 | 21834 | 1.90 | 2.42 | | 5.30 | 8.82 | | |
| 2 | 21835 | 1.90 | 3.41 | | 4.09 | 7.31 | | 8.76 |
| 2 | 21836 | 1.91 | 3.03 | | 4.36 | 7.77 | | 8.76 |
| 2 | 21837 | 1.60 | 2.56 | | 4.54 | 9.65 | | 8.76 |
| 2 | 21838 | 1.64 | 2.90 | | 5.58 | 9.64 | | |
| 2 | 21839 | | 0.73 | | 5.50 | 11.05 | | |
| 2 | 21840 | | 0.36 | | 5.37 | 10.68 | | |
| 2 | 21841 | | 0.12 | | 5.16 | 11.09 | | |
| 2 | 21842 | | 0.44 | | 5.34 | 11.65 | | |
| 2 | 21843 | | 1.17 | | 4.44 | 10.50 | | |
| 2 | 21844 | | | | 4.79 | 11.07 | | |
| 2 | 21845 | | | | 5.48 | 11.37 | | |
| 2 | 21846 | | 0.19 | | 4.97 | 10.65 | | |
| 2 | 21847 | | 4.06 | | 2.39 | 4.44 | | 8.76 |
| 2 | 21848 | | 4.16 | | 2.55 | 5.29 | | 8.76 |
| 2 | 21849 | | 4.62 | | 1.55 | 4.35 | | 8.76 |
| 2 | 21850 | | 4.65 | | 0.77 | 3.23 | | 8.76 |
| 2 | 21851 | 1.70 | 2.65 | | 4.86 | 8.82 | | 8.76 |
| 2 | 21852 | 2.59 | 2.86 | | 4.45 | 7.04 | | 8.76 |
| 2 | 21853 | 2.32 | 2.61 | | 4.44 | 6.99 | | 8.76 |
| 2 | 21854 | 1.46 | 2.66 | | 4.13 | 8.64 | | 8.76 |
| 2 | 21855 | | | | 4.57 | 2.78 | | |
| 2 | 21856 | | | | 4.91 | 3.82 | | |
| 2 | 21857 | | | | 5.90 | 5.45 | | |
| 2 | 21858 | | | | 5.51 | 4.08 | | |
| 2 | 21859 | | 5.09 | | 3.43 | 11.07 | | |
| 2 | 21860 | | 4.89 | | 7.68 | 13.16 | | |
| 2 | 21861 | | 3.40 | | 5.79 | 8.11 | | |
| 2 | 21862 | | 2.85 | | 4.86 | 8.77 | | |
| 2 | 21863 | | 0.09 | | 4.79 | 8.97 | | |
| 2 | 21864 | | 0.29 | | 5.20 | 9.66 | | |
| 2 | 21865 | | 0.42 | | 5.52 | 8.99 | | |
| 2 | 21866 | | 0.25 | | 5.10 | 8.33 | | |
| 2 | 21867 | 0.46 | 2.02 | | 3.82 | 14.34 | | 8.76 |
| 2 | 21868 | 1.93 | 3.08 | | 5.14 | 16.28 | | 8.76 |
| 2 | 21869 | 1.12 | 2.38 | | 3.95 | 10.52 | | |
| 2 | 21870 | 0.77 | 3.10 | | 3.48 | 10.25 | | 8.76 |
| 2 | 21871 | 2.08 | 3.73 | | 5.96 | 8.50 | | |
| 2 | 21872 | 2.12 | 2.74 | | 4.09 | 3.82 | | |
| 2 | 21873 | 2.69 | 3.38 | | 4.54 | 4.88 | | |
| 2 | 21874 | 2.27 | 3.67 | | 4.58 | 6.35 | | |
| 2 | 21875 | | 3.50 | | 3.28 | 11.58 | | |
| 2 | 21876 | | 1.03 | | 6.08 | 9.30 | | |
| 2 | 21877 | | 2.37 | | 7.44 | 9.25 | | |
| 2 | 21878 | | 4.37 | | 9.83 | 16.46 | | |
| 2 | 21879 | | 0.09 | | 4.01 | 9.19 | | 8.76 |

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|---|---|---|---|---|---|---|---|---|
| 2 | 21880 | 0.79 | 2.16 | | 3.53 | 8.98 | | 8.76 |
| 2 | 21881 | 1.88 | 1.98 | | 3.84 | 7.02 | | 8.76 |
| 2 | 21882 | 1.44 | 1.13 | | 4.00 | 6.41 | | |
| 2 | 21883 | 1.55 | 2.70 | | 3.74 | 8.18 | | 8.76 |
| 2 | 21884 | 1.18 | 2.43 | | 4.26 | 9.94 | | |
| 2 | 21885 | 1.35 | 2.54 | | 4.40 | 9.61 | | 8.76 |
| 2 | 21886 | 1.68 | 2.76 | | 4.09 | 8.07 | | 8.76 |
| 2 | 21887 | 0.07 | 1.93 | | 3.95 | 12.53 | | |
| 2 | 21888 | 0.31 | 2.10 | | 4.36 | 12.31 | | |
| 2 | 21889 | 0.97 | 2.31 | | 4.91 | 11.29 | | 8.76 |
| 2 | 21890 | 0.69 | 2.20 | | 4.02 | 11.38 | | |
| 2 | 21891 | | | | 5.32 | 9.11 | | |
| 2 | 21892 | | 0.18 | | 5.28 | 8.15 | | |
| 2 | 21893 | | 0.27 | | 6.14 | 8.28 | | |
| 2 | 21894 | | | | 6.15 | 8.82 | | |
| 2 | 21895 | | 0.40 | | 3.41 | 13.56 | | |
| 2 | 21896 | | 0.63 | | 3.97 | 13.25 | | |
| 2 | 21897 | | 1.38 | | 3.83 | 12.67 | | |
| 2 | 21898 | | 1.07 | | 3.84 | 12.80 | | |
| 2 | 21899 | | 1.18 | | 6.03 | 11.75 | | |
| 2 | 21900 | | 0.87 | | 5.11 | 12.32 | | |
| 2 | 21901 | | 1.49 | | 4.28 | 12.61 | | |
| 2 | 21902 | | 1.74 | | 5.21 | 11.70 | | |
| 2 | 21903 | | 4.39 | | 2.11 | 6.21 | | 8.76 |
| 2 | 21904 | | 3.98 | | 3.24 | 6.74 | | 8.76 |
| 2 | 21905 | | 3.54 | | 4.30 | 8.77 | | 8.76 |
| 2 | 21906 | | 3.97 | | 2.66 | 7.57 | | 8.76 |
| 2 | 21907 | | | | 4.36 | 10.22 | | |
| 2 | 21908 | | | | 4.53 | 10.09 | | |
| 2 | 21909 | | | | 4.44 | 9.71 | | |
| 2 | 21910 | | | | 4.84 | 10.18 | | |
| 2 | 21911 | | 0.53 | | 6.30 | 7.94 | | |
| 2 | 21912 | | 0.36 | | 5.35 | 7.30 | | |
| 2 | 21913 | | 0.40 | | 5.92 | 6.26 | | |
| 2 | 21914 | | 0.42 | | 6.24 | 6.52 | | |
| 2 | 21915 | | 3.65 | | 4.40 | 5.91 | | 8.76 |
| 2 | 21916 | | 3.35 | | 5.43 | 7.68 | | |
| 2 | 21917 | | 3.38 | | 5.84 | 8.15 | | |
| 2 | 21918 | | 3.80 | | 3.77 | 6.70 | | 8.76 |
| 2 | 21919 | | | | 4.75 | 11.14 | | |
| 2 | 21920 | | | | 3.48 | 10.74 | | |
| 2 | 21921 | | 0.04 | | 4.07 | 12.45 | | |
| 2 | 21922 | | 0.17 | | 4.43 | 12.09 | | |
| 2 | 21923 | | | | 6.09 | 7.29 | | |
| 2 | 21924 | | | | 5.50 | 7.48 | | |
| 2 | 21925 | | | | 5.57 | 9.22 | | |
| 2 | 21926 | | | | 6.15 | 8.40 | | |
| 2 | 21927 | | 2.22 | | 6.51 | 8.94 | | |
| 2 | 21928 | | 2.93 | | 6.20 | 8.99 | | |
| 2 | 21929 | | 3.14 | | 6.18 | 8.61 | | |
| 2 | 21930 | | 2.69 | | 6.39 | 9.10 | | |
| 2 | 21931 | | 1.34 | | 7.77 | 8.32 | | |
| 2 | 21932 | | 2.56 | | 6.83 | 9.10 | | |
| 2 | 21933 | | 3.53 | | 6.30 | 8.80 | | |
| 2 | 21934 | | 2.32 | | 7.79 | 10.61 | | |
| 2 | 21935 | | 2.07 | | 3.54 | 12.94 | | |
| 2 | 21936 | | 1.07 | | 3.41 | 16.23 | | 8.76 |
| 2 | 21937 | 1.97 | 3.59 | | 4.84 | 17.43 | | 8.76 |
| 2 | 21938 | 0.60 | 2.51 | | 4.41 | 13.12 | | |
| 2 | 21939 | | 2.98 | | 4.64 | 9.90 | | 8.76 |
| 2 | 21940 | | 2.35 | | 4.48 | 10.89 | | 8.76 |
| 2 | 21941 | | 2.36 | | 3.31 | 11.15 | | 8.76 |
| 2 | 21942 | | 3.28 | | 3.11 | 9.94 | | 8.76 |
| 2 | 21943 | | | | 5.16 | 11.26 | | |
| 2 | 21944 | | | | 5.42 | 10.52 | | |
| 2 | 21945 | | | | 5.45 | 10.38 | | |

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|---|---|---|---|---|---|---|---|---|
| 2 | 21946 | | | | 5.32 | 11.01 | | |
| 2 | 21947 | | 1.03 | | 7.41 | 8.07 | | |
| 2 | 21948 | | 0.88 | | 7.00 | 8.03 | | |
| 2 | 21949 | | 1.55 | | 6.81 | 8.78 | | |
| 2 | 21950 | | 1.83 | | 6.92 | 9.05 | | |
| 2 | 21951 | 0.98 | 1.97 | | 4.67 | 9.65 | | |
| 2 | 21952 | 1.01 | 2.24 | | 4.78 | 9.90 | | |
| 2 | 21953 | 0.50 | 1.92 | | 4.64 | 10.40 | | |
| 2 | 21954 | 0.13 | 1.42 | | 4.64 | 10.35 | | |
| 2 | 21955 | | 1.01 | | 3.44 | 12.92 | | |
| 2 | 21956 | | 0.51 | | 4.33 | 12.60 | | |
| 2 | 21957 | | 0.23 | | 4.27 | 13.34 | | |
| 2 | 21958 | | 0.45 | | 3.39 | 13.27 | | |
| 2 | 21959 | | 1.64 | | 6.33 | 12.02 | | |
| 2 | 21960 | | 1.24 | | 5.68 | 9.40 | | |
| 2 | 21961 | | 0.50 | | 4.99 | 10.53 | | |
| 2 | 21962 | | 0.37 | | 4.68 | 10.65 | | |
| 2 | 21963 | | 1.13 | | 6.58 | 8.23 | | |
| 2 | 21964 | | 0.52 | | 5.81 | 7.18 | | |
| 2 | 21965 | | 0.27 | | 5.61 | 5.70 | | |
| 2 | 21966 | | 0.65 | | 6.64 | 7.47 | | |
| 2 | 21967 | | 2.04 | | 4.27 | 12.80 | | |
| 2 | 21968 | | 1.71 | | 4.11 | 12.70 | | |
| 2 | 21969 | | 0.90 | | 3.88 | 12.59 | | |
| 2 | 21970 | | 1.38 | | 3.74 | 12.68 | | |
| 2 | 21971 | | 0.45 | | 6.73 | 7.97 | | |
| 2 | 21972 | | 0.04 | | 6.91 | 7.90 | | |
| 2 | 21973 | | | | 6.44 | 8.12 | | |
| 2 | 21974 | | 0.40 | | 6.40 | 7.93 | | |
| 2 | 21975 | | 1.55 | | 6.24 | 10.74 | | |
| 2 | 21976 | | 2.07 | | 6.00 | 10.68 | | |
| 2 | 21977 | | 2.54 | | 6.07 | 9.17 | | |
| 2 | 21978 | | 1.86 | | 6.40 | 9.40 | | |
| 2 | 21979 | | | | 6.04 | 10.45 | | |
| 2 | 21980 | | | | 5.93 | 10.31 | | |
| 2 | 21981 | | | | 5.36 | 9.96 | | |
| 2 | 21982 | | | | 6.24 | 9.89 | | |
| 2 | 21983 | | 0.90 | | 6.71 | 8.18 | | |
| 2 | 21984 | | 0.80 | | 6.61 | 8.15 | | |
| 2 | 21985 | | 0.95 | | 7.00 | 8.23 | | |
| 2 | 21986 | | 1.48 | | 6.89 | 8.61 | | |
| 2 | 21987 | | | | 5.04 | 10.55 | | |
| 2 | 21988 | | 0.15 | | 5.11 | 10.23 | | |
| 2 | 21989 | | 0.03 | | 4.75 | 9.73 | | |
| 2 | 21990 | | | | 4.86 | 10.27 | | |
| 2 | 21991 | 2.14 | 2.59 | | 6.70 | 12.78 | | 8.76 |
| 2 | 21992 | 1.30 | 2.44 | | 4.94 | 11.14 | | 8.76 |
| 2 | 21993 | 0.65 | 2.26 | | 4.97 | 12.46 | | |
| 2 | 21994 | 1.08 | 2.45 | | 5.09 | 12.56 | | |
| 2 | 21995 | | 0.46 | | 3.33 | 12.25 | | |
| 2 | 21996 | | | | 2.69 | 10.53 | | |
| 2 | 21997 | | | | 2.89 | 11.11 | | |
| 2 | 21998 | | 0.97 | | 3.11 | 12.39 | | |
| 2 | 21999 | 1.89 | 2.88 | | 4.09 | 7.62 | | 8.76 |
| 2 | 22000 | 1.80 | 2.83 | | 4.37 | 8.00 | | 8.76 |
| 2 | 22001 | 1.63 | 2.66 | | 4.44 | 8.74 | | 8.76 |
| 2 | 22002 | | 3.00 | | 4.72 | 6.89 | | |
| 2 | 22003 | | 3.29 | | 5.27 | 7.23 | | |
| 2 | 22004 | | 3.32 | | 4.37 | 5.90 | | |
| 2 | 22005 | | | | 4.95 | 5.22 | | |
| 2 | 22006 | 1.53 | 1.56 | | 3.97 | 2.87 | | |
| 2 | 22007 | 1.93 | 1.92 | | 6.71 | 4.96 | | |
| 2 | 22008 | 2.80 | 2.69 | | 3.70 | 4.24 | | |
| 2 | 22009 | 2.25 | 2.06 | | 3.58 | 4.97 | | |
| 2 | 22010 | 2.68 | 2.29 | | 4.06 | 5.57 | | |
| 2 | 22011 | | | | 5.37 | 6.21 | | |

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|---|---|---|---|---|---|---|---|---|
| 2 | 22012 | | | | 6.12 | 6.71 | | |
| 2 | 22013 | | | | 5.13 | 5.05 | | |
| 2 | 22014 | | 0.36 | | 6.56 | 6.92 | | |
| 2 | 22015 | | 0.11 | | 5.82 | 5.37 | | |
| 2 | 22016 | | 0.06 | | 6.39 | 6.60 | | |
| 2 | 22017 | 1.08 | 2.45 | | 4.76 | 9.83 | | 8.76 |
| 2 | 22018 | 1.04 | 2.64 | | 3.92 | 9.55 | | |
| 2 | 22019 | 0.74 | 2.25 | | 4.54 | 10.54 | | |
| 2 | 22020 | 0.52 | 1.49 | | 4.27 | 10.62 | | |
| 2 | 22021 | 0.72 | 1.47 | | 5.90 | 12.21 | | |
| 2 | 22022 | | 0.49 | | 4.54 | 10.42 | | |
| 2 | 22023 | | 0.43 | | 6.56 | 6.68 | | |
| 2 | 22024 | | 0.37 | | 7.55 | 6.65 | | |
| 2 | 22025 | | 0.23 | | 6.64 | 5.61 | | |
| 2 | 22026 | | | | 1.48 | 9.87 | | |
| 2 | 22027 | | | | 2.02 | 9.76 | | |
| 2 | 22028 | | 0.13 | | 1.68 | 10.52 | | |
| 2 | 22029 | | | | 1.26 | 10.41 | | |
| 2 | 22030 | | 5.15 | | | 3.14 | | 8.76 |
| 2 | 22031 | | 4.92 | | 0.82 | 3.70 | | 8.76 |
| 2 | 22032 | | 5.05 | | | 1.92 | | 8.76 |
| 2 | 22033 | | 5.61 | | | 0.30 | | 8.76 |
| 2 | 22034 | 2.58 | 5.66 | | | 1.80 | | 8.76 |
| 2 | 22035 | 1.27 | 6.33 | | | | | 9.18 |
| 2 | 22036 | 4.42 | 9.64 | | | | | 13.33 |
| 2 | 22037 | 5.86 | 7.85 | | | | | 11.24 |
| 2 | 22038 | | 0.38 | | | 11.34 | | |
| 2 | 22039 | | 0.18 | | | 11.80 | | |
| 2 | 22040 | | 0.28 | | 0.11 | 11.60 | | |
| 2 | 22041 | | | | | 11.23 | | |
| 2 | 22042 | | 0.42 | | 0.18 | 11.07 | | |
| 2 | 22043 | | 0.04 | | 0.35 | 11.05 | | |
| 2 | 22044 | | | | 0.87 | 10.94 | | |
| 2 | 22045 | | 0.28 | | 1.04 | 10.89 | | |
| 2 | 22046 | | 2.70 | | 3.82 | 6.82 | | |
| 2 | 22047 | | 3.32 | | 3.40 | 6.76 | | |
| 2 | 22048 | | 3.02 | | 2.95 | 7.79 | | |
| 2 | 22049 | | 2.41 | | 3.64 | 7.87 | | |
| 2 | 22050 | | 1.90 | | 4.07 | 7.60 | | |
| 2 | 22051 | | 1.48 | | 4.18 | 6.73 | | |
| 2 | 22052 | | 1.32 | | 4.48 | 5.29 | | |
| 2 | 22053 | | 2.03 | | 4.27 | 6.35 | | |
| 2 | 22054 | | 0.07 | | 3.98 | 1.81 | | |
| 2 | 22055 | | 1.60 | | 4.99 | 5.33 | | |
| 2 | 22056 | | 1.95 | | 4.63 | 5.25 | | |
| 2 | 22057 | | 0.79 | | 5.01 | 3.92 | | |
| 2 | 22058 | 0.42 | 0.38 | | 2.88 | 2.49 | | |
| 2 | 22059 | 0.96 | 0.50 | | 4.60 | 7.03 | | |
| 2 | 22060 | 1.17 | 1.10 | | 3.31 | 5.76 | | |
| 2 | 22061 | 1.62 | 0.96 | | 4.07 | 4.99 | | |
| 2 | 22062 | | | | 2.15 | 2.31 | | |
| 2 | 22063 | | | | 3.18 | 5.98 | | |
| 2 | 22064 | | | | 2.88 | 9.25 | | |
| 2 | 22065 | | | | 4.56 | 9.44 | | |
| 2 | 22066 | | | | 2.05 | 8.74 | | |
| 2 | 22067 | | | | 2.57 | 7.25 | | |
| 2 | 22068 | | 0.12 | | 2.61 | 8.51 | | |
| 2 | 22069 | | | | 2.36 | 9.01 | | |
| 2 | 22070 | | 4.49 | | 1.58 | 3.57 | | |
| 2 | 22071 | | 4.69 | | 1.06 | 2.65 | | 8.76 |
| 2 | 22072 | | 4.75 | | 1.71 | 3.77 | | 8.76 |
| 2 | 22073 | | 4.81 | | 2.54 | 4.71 | | 8.76 |
| 2 | 22074 | 22.01 | 22.45 | | | | | ***** |
| 2 | 22075 | 15.73 | 11.22 | | | | | 25.84 |
| 2 | 22076 | 10.50 | 10.33 | | | | | 18.45 |
| 2 | 22077 | 9.60 | 14.54 | | | | | 21.36 |

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|---|---|---|---|---|---|---|---|---|
| 2 | 22078 | 0.11 | 7.32 | | 1.98 | 7.38 | | |
| 2 | 22079 | | 4.98 | | 2.43 | 4.87 | | |
| 2 | 22080 | | 5.15 | | 3.30 | 5.62 | | |
| 2 | 22081 | | 6.75 | | 4.99 | 8.80 | | |
| 2 | 22082 | 1.00 | 2.09 | | 1.96 | 7.25 | | |
| 2 | 22083 | 0.95 | 1.93 | | 2.04 | 7.02 | | |
| 2 | 22084 | 0.47 | 1.37 | | 1.54 | 8.56 | | |
| 2 | 22085 | 0.59 | 1.74 | | 1.46 | 8.47 | | |
| 2 | 22086 | | 0.25 | | 2.59 | 9.65 | | |
| 2 | 22087 | | 0.32 | | 2.77 | 9.04 | | |
| 2 | 22088 | | 0.57 | | 3.25 | 8.93 | | |
| 2 | 22089 | | 0.56 | | 3.05 | 9.51 | | |
| 2 | 22090 | 0.68 | 0.62 | | 3.10 | 8.28 | | 8.76 |
| 2 | 22091 | 0.54 | 0.70 | | 2.48 | 8.25 | | |
| 2 | 22092 | 0.95 | 1.47 | | 2.60 | 6.10 | | |
| 2 | 22093 | 0.79 | 1.26 | | 2.86 | 5.71 | | |
| 2 | 22094 | | 3.22 | | 1.21 | 8.33 | | |
| 2 | 22095 | 0.83 | 3.96 | | | 6.50 | | 8.76 |
| 2 | 22096 | 0.80 | 3.19 | | | 7.31 | | 8.76 |
| 2 | 22097 | | 2.62 | | 0.36 | 8.66 | | |
| 2 | 22098 | | 0.54 | | 1.19 | 9.68 | | |
| 2 | 22099 | 0.02 | 0.32 | | 1.60 | 9.59 | | |
| 2 | 22100 | | 0.02 | | 1.24 | 10.58 | | |
| 2 | 22101 | | 0.15 | | 0.72 | 10.52 | | |
| 2 | 22102 | | 1.07 | | 3.22 | 9.33 | | |
| 2 | 22103 | | 1.00 | | 3.53 | 8.57 | | |
| 2 | 22104 | | 1.34 | | 3.68 | 7.34 | | |
| 2 | 22105 | | 1.57 | | 3.37 | 8.46 | | |
| 2 | 22106 | | | | 1.49 | 10.35 | | |
| 2 | 22107 | | | | 1.17 | 10.33 | | |
| 2 | 22108 | | 0.17 | | 2.06 | 10.57 | | |
| 2 | 22109 | | | | 2.21 | 11.24 | | |
| 2 | 22110 | | 0.86 | | 0.42 | 10.83 | | |
| 2 | 22111 | | 0.54 | | 1.36 | 10.98 | | |
| 2 | 22112 | | 0.87 | | 2.22 | 10.50 | | |
| 2 | 22113 | | 1.41 | | 1.18 | 10.81 | | |
| 2 | 22114 | | 3.81 | | 3.76 | 6.49 | | |
| 2 | 22115 | | 3.06 | | 3.94 | 6.10 | | |
| 2 | 22116 | | 3.83 | | 4.05 | 6.14 | | |
| 2 | 22117 | | 4.71 | | 3.56 | 5.98 | | |
| 2 | 22118 | 0.24 | 1.22 | | 1.20 | 9.93 | | |
| 2 | 22119 | 0.04 | 0.80 | | 0.99 | 9.83 | | |
| 2 | 22120 | | 0.36 | | 0.58 | 10.76 | | |
| 2 | 22121 | | 0.69 | | 0.75 | 11.06 | | |
| 2 | 22122 | 3.41 | 4.79 | | | 4.55 | | 8.76 |
| 2 | 22123 | 7.00 | 5.81 | | | 2.43 | | 10.49 |
| 2 | 22124 | 5.56 | 4.40 | | | 4.56 | | 9.36 |
| 2 | 22125 | 2.80 | 3.72 | | | 6.49 | | 8.76 |
| 2 | 22126 | | 1.66 | | | 9.94 | | 8.76 |
| 2 | 22127 | | 1.18 | | | 10.58 | | |
| 2 | 22128 | | 1.91 | | | 9.82 | | |
| 2 | 22129 | 0.38 | 2.40 | | | 8.22 | | 8.76 |
| 2 | 22130 | | 2.56 | | 2.33 | 8.96 | | |
| 2 | 22131 | | 1.98 | | 1.86 | 9.45 | | |
| 2 | 22132 | | 1.38 | | 2.90 | 9.86 | | |
| 2 | 22133 | | 1.96 | | 2.92 | 8.85 | | |
| 2 | 22134 | | 4.41 | | 0.77 | 5.67 | | 8.76 |
| 2 | 22135 | | 3.68 | | 1.95 | 7.09 | | |
| 2 | 22136 | | 3.94 | | 2.55 | 6.30 | | 8.76 |
| 2 | 22137 | | 4.51 | | 1.63 | 5.16 | | 8.76 |
| 2 | 22138 | 0.94 | 1.71 | | 2.21 | 6.79 | | |
| 2 | 22139 | 0.94 | 1.58 | | 2.41 | 6.50 | | |
| 2 | 22140 | 0.39 | 0.80 | | 1.96 | 8.28 | | |
| 2 | 22141 | 0.40 | 1.06 | | 1.70 | 8.41 | | |
| 2 | 22142 | 1.02 | 2.19 | | | 8.51 | | 8.76 |
| 2 | 22143 | 1.92 | 2.86 | | | 7.31 | | 8.76 |

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|---|---|---|---|---|---|---|---|---|
| 2 | 22144 | 3.10 | 3.21 | | | 6.54 | | 8.76 |
| 2 | 22145 | 10.88 | 5.96 | | | 0.04 | | 16.01 |
| 2 | 22146 | 7.37 | 4.77 | | | 2.67 | | 11.72 |
| 2 | 22147 | 9.03 | 6.14 | | | 0.87 | | 14.11 |
| 2 | 22148 | 0.04 | 0.40 | | 2.04 | 14.55 | | 8.76 |
| 2 | 22149 | 0.57 | 0.19 | | 2.81 | 9.67 | | |
| 2 | 22150 | 0.70 | 0.84 | | 3.68 | 13.45 | | 8.76 |
| 2 | 22151 | | 4.59 | | 3.06 | 5.46 | | 8.76 |
| 2 | 22152 | | 4.57 | | 2.34 | 5.11 | | 8.76 |
| 2 | 22153 | | 4.21 | | 2.99 | 6.07 | | 8.76 |
| 2 | 22154 | | 0.54 | | 2.24 | 10.08 | | |
| 2 | 22155 | | 0.34 | | 1.72 | 10.62 | | |
| 2 | 22156 | | 0.23 | | 2.37 | 10.15 | | |
| 2 | 22157 | | 1.16 | | | 10.94 | | |
| 2 | 22158 | | 0.48 | | | 11.82 | | |
| 2 | 22159 | | 0.76 | | | 11.21 | | |
| 2 | 22160 | | | | 5.29 | 9.12 | | |
| 2 | 22161 | | | | 5.04 | 8.60 | | |
| 2 | 22162 | | | | 5.04 | 7.75 | | |
| 2 | 22163 | | | | 5.01 | 6.52 | | |
| 2 | 22164 | | | | 4.72 | 4.89 | | |
| 2 | 22165 | | | | 4.16 | 2.81 | | |
| 2 | 22166 | | | | 3.07 | 0.88 | | |
| 2 | 22167 | | | | 0.97 | | | |
| 2 | 22168 | | | | | | | |
| 2 | 22169 | | | | | | | |
| 2 | 22170 | | | | | | | |
| 2 | 22171 | | | | | | | |
| 2 | 22172 | | | | | | | |
| 2 | 22173 | | | | | | | |
| 2 | 22174 | 0.13 | | | 4.63 | 7.27 | | |
| 2 | 22175 | | | | 4.09 | 7.43 | | |
| 2 | 22176 | | | | 3.73 | 7.49 | | |
| 2 | 22177 | | | | 3.62 | 7.18 | | |
| 2 | 22178 | | | | 3.32 | 6.54 | | |
| 2 | 22179 | | | | 2.60 | 5.34 | | |
| 2 | 22180 | | | | 1.97 | 3.79 | | |
| 2 | 22181 | | | | 0.99 | 1.91 | | |
| 2 | 22182 | | | | | 0.06 | | |
| 2 | 22183 | | | | | | | |
| 2 | 22184 | | | | | | | |
| 2 | 22185 | | | | | | | 8.76 |
| 2 | 22186 | 1.41 | | | | | | 9.62 |
| 2 | 22187 | 2.91 | 2.91 | | | | | 19.18 |
| 2 | 22188 | | | | 8.79 | 2.07 | | |
| 2 | 22189 | 3.41 | | | 9.64 | | | |
| 2 | 22190 | 1.83 | | | 6.23 | | | |
| 2 | 22191 | 1.89 | | | 4.80 | | | |
| 2 | 22192 | 1.80 | | | 3.38 | | | |
| 2 | 22193 | 1.62 | | | 2.21 | | | |
| 2 | 22194 | 1.29 | | | 1.27 | | | |
| 2 | 22195 | 0.91 | | | 0.70 | | | |
| 2 | 22196 | 0.56 | | | 0.40 | | | |
| 2 | 22197 | 0.36 | | | 0.21 | | | |
| 2 | 22198 | 0.24 | | | 0.10 | | | |
| 2 | 22199 | 0.19 | | | 0.06 | | | |
| 2 | 22200 | 0.15 | | | 0.03 | | | |
| 2 | 22201 | 0.14 | | | | | | |
| 2 | 22202 | | | | 5.75 | 5.93 | | |
| 2 | 22203 | 0.34 | | | 12.91 | 2.38 | | |
| 2 | 22204 | 1.07 | | | 11.11 | | | |
| 2 | 22205 | 0.57 | | | 8.17 | | | |
| 2 | 22206 | 0.71 | | | 5.71 | | | |
| 2 | 22207 | 0.75 | | | 3.71 | | | |
| 2 | 22208 | 0.62 | | | 2.25 | | | |
| 2 | 22209 | 0.39 | | | 1.20 | | | |

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| 2 | 22210 | 0.17 | | | 0.58 | | | |
| 2 | 22211 | | | | 0.25 | | | |
| 2 | 22212 | | | | 0.14 | | | |
| 2 | 22213 | | | | 0.10 | | | |
| 2 | 22214 | | | | 0.09 | | | |
| 2 | 22215 | | | | 0.14 | | | |
| 2 | 22216 | | | | 6.34 | 4.22 | | |
| 2 | 22217 | | | | 10.49 | 4.46 | | |
| 2 | 22218 | 0.06 | | | 12.31 | 2.25 | | |
| 2 | 22219 | | | | 10.39 | | | |
| 2 | 22220 | | | | 7.11 | | | |
| 2 | 22221 | 0.05 | | | 4.33 | | | |
| 2 | 22222 | 0.06 | | | 2.54 | | | |
| 2 | 22223 | | | | 1.38 | | | |
| 2 | 22224 | | | | 0.72 | | | |
| 2 | 22225 | | | | 0.40 | | | |
| 2 | 22226 | | | | 0.33 | | | |
| 2 | 22227 | | | | 0.31 | | | |
| 2 | 22228 | | | | 0.38 | | | |
| 2 | 22229 | | | | 0.45 | | | |
| 2 | 22230 | 1.79 | | | 8.47 | 6.75 | | |
| 2 | 22231 | 0.37 | | | 9.52 | 6.66 | | |
| 2 | 22232 | | | | 10.32 | 4.83 | | |
| 2 | 22233 | | | | 10.31 | 2.34 | | |
| 2 | 22234 | | | | 8.11 | 0.01 | | |
| 2 | 22235 | | | | 4.57 | | | |
| 2 | 22236 | | | | 2.75 | | | |
| 2 | 22237 | | | | 1.33 | | | |
| 2 | 22238 | | | | 0.63 | | | |
| 2 | 22239 | | | | 0.36 | | | |
| 2 | 22240 | | | | 0.33 | | | |
| 2 | 22241 | | | | 0.42 | | | |
| 2 | 22242 | | | | 0.46 | | | |
| 2 | 22243 | | | | 0.56 | | | |
| 2 | 22244 | 2.02 | 0.01 | | 8.35 | 10.83 | | |
| 2 | 22245 | 0.12 | | | 8.38 | 9.02 | | |
| 2 | 22246 | | | | 8.56 | 6.84 | | |
| 2 | 22247 | | | | 8.53 | 4.18 | | |
| 2 | 22248 | | | | 7.87 | 1.79 | | |
| 2 | 22249 | | | | 5.31 | | | |
| 2 | 22250 | | | | 2.88 | | | |
| 2 | 22251 | | | | 1.18 | | | |
| 2 | 22252 | | | | 0.41 | | | |
| 2 | 22253 | | | | 0.13 | | | |
| 2 | 22254 | | | | 0.19 | | | |
| 2 | 22255 | | | | 0.29 | | | |
| 2 | 22256 | | | | 0.36 | | | |
| 2 | 22257 | | | | 0.46 | | | |
| 2 | 22258 | | | | 6.75 | 11.58 | | |
| 2 | 22259 | | | | 6.80 | 9.88 | | |
| 2 | 22260 | | | | 7.02 | 7.91 | | |
| 2 | 22261 | | | | 7.03 | 5.62 | | |
| 2 | 22262 | | | | 6.67 | 3.11 | | |
| 2 | 22263 | | | | 5.40 | 1.00 | | |
| 2 | 22264 | | | | 3.06 | | | |
| 2 | 22265 | | | | 1.00 | | | |
| 2 | 22266 | | | | 0.07 | | | |
| 2 | 22267 | | | | | | | |
| 2 | 22268 | | | | | | | |
| 2 | 22269 | | | | | | | |
| 2 | 22270 | | | | 0.19 | | | |
| 2 | 22271 | | | | 0.10 | | | |
| 2 | 22272 | 13.02 | 8.89 | | 10.77 | 0.63 | | |
| 2 | 22273 | 11.60 | 7.85 | | 10.29 | 0.98 | | |
| 2 | 22274 | 8.21 | 5.09 | | 8.60 | 4.30 | | |
| 2 | 22275 | 4.94 | 2.54 | | 6.67 | 5.64 | | |

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|---|---|---|---|---|---|---|---|---|
| 2 | 22276 | 15.39 | 8.14 | | 11.22 | | | |
| 2 | 22277 | 12.00 | 6.97 | | 10.86 | 0.63 | | |
| 2 | 22278 | 7.94 | 3.98 | | 8.81 | 3.78 | | |
| 2 | 22279 | 4.62 | 1.29 | | 6.96 | 5.29 | | |
| 2 | 22280 | 17.55 | 6.69 | | 10.90 | | | |
| 2 | 22281 | 11.80 | 5.54 | | 10.97 | 0.57 | | |
| 2 | 22282 | 8.28 | 3.19 | | 9.12 | 3.85 | | 8.76 |
| 2 | 22283 | 6.46 | 1.53 | | 7.73 | 4.76 | | |
| 2 | 22284 | 17.61 | 5.39 | | 9.44 | | | |
| 2 | 22285 | 11.92 | 4.49 | | 10.92 | | | |
| 2 | 22286 | 10.32 | 2.75 | | 10.39 | 2.04 | | |
| 2 | 22287 | 9.38 | 0.52 | | 9.37 | 1.60 | | |
| 2 | 22288 | 13.81 | 0.15 | | 5.66 | | | |
| 2 | 22289 | 12.47 | | | 4.90 | | | |
| 2 | 22290 | 10.55 | | | 4.28 | | | |
| 2 | 22291 | 8.78 | | | 3.74 | | | |
| 2 | 22292 | 4.40 | 8.01 | | 4.54 | 3.85 | | |
| 2 | 22293 | 3.61 | 4.85 | | 4.16 | 4.19 | | 8.76 |
| 2 | 22294 | 2.67 | 3.57 | | 3.79 | 4.57 | | 8.76 |
| 2 | 22295 | 2.01 | 3.07 | | 3.53 | 6.16 | | 8.76 |
| 2 | 22296 | 4.60 | 8.34 | | 4.67 | 3.83 | | |
| 2 | 22297 | 3.71 | 4.97 | | 4.29 | 4.20 | | 8.76 |
| 2 | 22298 | 2.77 | 3.62 | | 3.91 | 4.60 | | 8.76 |
| 2 | 22299 | 2.10 | 3.13 | | 3.75 | 6.18 | | 8.76 |
| 2 | 22300 | 4.69 | 8.33 | | 4.83 | 3.83 | | |
| 2 | 22301 | 3.88 | 5.51 | | 4.44 | 4.20 | | 8.76 |
| 2 | 22302 | 2.93 | 3.68 | | 4.05 | 4.61 | | 8.76 |
| 2 | 22303 | 2.19 | 3.17 | | 4.30 | 6.33 | | 8.76 |
| 2 | 22304 | 4.96 | 8.56 | | 5.01 | 3.81 | | |
| 2 | 22305 | 4.08 | 5.69 | | 4.61 | 4.18 | | 8.76 |
| 2 | 22306 | 3.21 | 3.78 | | 4.20 | 4.63 | | 8.76 |
| 2 | 22307 | 2.43 | 3.26 | | 4.52 | 6.34 | | 8.76 |
| 2 | 22308 | 5.21 | 8.74 | | 5.24 | 3.77 | | |
| 2 | 22309 | 4.35 | 5.89 | | 4.81 | 4.14 | | 8.76 |
| 2 | 22310 | 3.43 | 3.69 | | 4.39 | 4.56 | | 8.76 |
| 2 | 22311 | 2.60 | 3.48 | | 3.96 | 5.55 | | 8.76 |
| 2 | 22312 | 5.18 | 8.89 | | 5.49 | 3.67 | | |
| 2 | 22313 | 4.71 | 6.05 | | 5.03 | 4.03 | | 8.76 |
| 2 | 22314 | 3.73 | 4.31 | | 4.61 | 4.44 | | 8.76 |
| 2 | 22315 | 2.86 | 3.73 | | 4.18 | 4.96 | | 8.76 |
| 2 | 22316 | 5.55 | 9.07 | | 5.73 | 3.53 | | |
| 2 | 22317 | 4.80 | 6.29 | | 5.22 | 3.86 | | 8.76 |
| 2 | 22318 | 4.05 | 4.89 | | 4.80 | 4.23 | | 8.76 |
| 2 | 22319 | 2.94 | 3.83 | | 4.39 | 4.56 | | 8.76 |
| 2 | 22320 | 5.89 | 9.21 | | 5.94 | 3.38 | | |
| 2 | 22321 | 5.17 | 7.38 | | 5.36 | 3.66 | | 8.76 |
| 2 | 22322 | 4.31 | 5.05 | | 4.90 | 3.95 | | 8.76 |
| 2 | 22323 | 3.23 | 3.67 | | 4.46 | 4.08 | | 8.76 |
| 2 | 22324 | 6.10 | 9.29 | | 6.14 | 3.20 | | |
| 2 | 22325 | 5.56 | 7.54 | | 5.29 | 3.37 | | 8.76 |
| 2 | 22326 | 4.54 | 5.11 | | 4.93 | 3.64 | | 8.76 |
| 2 | 22327 | 3.55 | 3.35 | | 4.07 | 3.50 | | 8.76 |
| 2 | 22328 | 6.69 | 10.37 | | 6.35 | 3.00 | | |
| 2 | 22329 | 5.93 | 7.53 | | 5.38 | 3.12 | | 8.76 |
| 2 | 22330 | 4.73 | 5.14 | | 4.71 | 3.30 | | 8.76 |
| 2 | 22331 | 3.52 | 3.23 | | 4.35 | 4.11 | | 8.76 |
| 2 | 22332 | 7.03 | 10.06 | | 6.52 | 2.75 | | |
| 2 | 22333 | 6.40 | 7.64 | | 5.46 | 2.85 | | 8.76 |
| 2 | 22334 | 5.02 | 5.24 | | 4.93 | 3.13 | | 8.76 |
| 2 | 22335 | 3.60 | 3.45 | | 5.04 | 4.96 | | 8.76 |
| 2 | 22336 | 7.68 | 10.19 | | 6.86 | 2.60 | | |
| 2 | 22337 | 6.90 | 7.81 | | 5.55 | 2.67 | | 8.76 |
| 2 | 22338 | 5.42 | 5.43 | | 5.59 | 3.01 | | 8.76 |
| 2 | 22339 | 3.78 | 3.76 | | 5.25 | 5.63 | | 8.76 |
| 2 | 22340 | 8.16 | 10.22 | | 7.28 | 2.49 | | |
| 2 | 22341 | 7.39 | 8.00 | | 6.64 | 2.60 | | 8.76 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2 | 22342 | 5.83 | 5.65 | | 6.00 | 3.59 | | 8.76 |
| 2 | 22343 | 4.16 | 3.99 | | 5.92 | 5.84 | | 8.76 |
| 2 | 22344 | 8.66 | 10.11 | | 7.70 | 2.39 | | |
| 2 | 22345 | 7.84 | 8.18 | | 7.22 | 2.49 | | 8.76 |
| 2 | 22346 | 6.28 | 5.77 | | 6.53 | 3.79 | | 8.76 |
| 2 | 22347 | 4.44 | 4.11 | | 5.80 | 5.99 | | 8.76 |
| 2 | 22348 | 4.16 | 7.53 | | 5.07 | 4.23 | | |
| 2 | 22349 | 3.43 | 4.60 | | 4.63 | 4.59 | | |
| 2 | 22350 | 2.84 | 2.55 | | 4.22 | 4.87 | | 8.76 |
| 2 | 22351 | 2.19 | 1.50 | | 3.82 | 4.99 | | |
| 2 | 22352 | 3.93 | 7.41 | | 4.91 | 4.25 | | |
| 2 | 22353 | 3.21 | 4.51 | | 4.48 | 4.63 | | 8.76 |
| 2 | 22354 | 2.61 | 2.47 | | 4.06 | 4.98 | | 8.76 |
| 2 | 22355 | 1.98 | 1.76 | | 3.67 | 5.30 | | 8.76 |
| 2 | 22356 | 3.64 | 7.66 | | 4.69 | 4.19 | | |
| 2 | 22357 | 2.96 | 4.41 | | 4.29 | 4.66 | | 8.76 |
| 2 | 22358 | 2.29 | 2.64 | | 3.85 | 4.99 | | 8.76 |
| 2 | 22359 | 1.57 | 1.94 | | 3.37 | 5.35 | | 8.76 |
| 2 | 22360 | 3.40 | 7.48 | | 4.47 | 4.14 | | |
| 2 | 22361 | 2.74 | 4.31 | | 4.08 | 4.58 | | 8.76 |
| 2 | 22362 | 2.11 | 2.77 | | 3.63 | 4.91 | | 8.76 |
| 2 | 22363 | 1.48 | 2.09 | | 3.12 | 5.20 | | |
| 2 | 22364 | 3.25 | 7.51 | | 4.30 | 4.06 | | |
| 2 | 22365 | 2.64 | 4.25 | | 3.90 | 4.47 | | 8.76 |
| 2 | 22366 | 2.05 | 2.88 | | 3.44 | 4.77 | | 8.76 |
| 2 | 22367 | 1.48 | 2.24 | | 2.94 | 5.01 | | |
| 2 | 22368 | 3.18 | 7.42 | | 4.17 | 3.98 | | |
| 2 | 22369 | 2.60 | 4.37 | | 3.76 | 4.36 | | 8.76 |
| 2 | 22370 | 2.04 | 2.98 | | 3.30 | 4.63 | | 8.76 |
| 2 | 22371 | 1.49 | 2.37 | | 2.77 | 4.84 | | |
| 2 | 22372 | 3.16 | 7.55 | | 4.10 | 3.92 | | |
| 2 | 22373 | 2.60 | 4.49 | | 3.67 | 4.26 | | 8.76 |
| 2 | 22374 | 2.05 | 3.13 | | 3.18 | 4.49 | | 8.76 |
| 2 | 22375 | 1.50 | 2.49 | | 2.63 | 5.05 | | |
| 2 | 22376 | 3.26 | 7.68 | | 4.05 | 3.84 | | |
| 2 | 22377 | 2.55 | 4.55 | | 3.61 | 4.17 | | 8.76 |
| 2 | 22378 | 2.07 | 3.21 | | 3.09 | 4.37 | | 8.76 |
| 2 | 22379 | 1.51 | 2.58 | | 2.51 | 5.29 | | 8.76 |
| 2 | 22380 | 10.79 | 11.86 | | 9.37 | 13.01 | | |
| 2 | 22381 | 2.74 | 6.02 | | 4.48 | 10.27 | | |
| 2 | 22382 | 2.57 | 2.28 | | 9.12 | 10.77 | | |
| 2 | 22383 | 0.85 | 0.68 | | 7.15 | 9.13 | | |
| 2 | 22384 | 8.44 | 4.64 | | 8.83 | 7.79 | | |
| 2 | 22385 | 6.73 | 5.43 | | 6.01 | 7.78 | | |
| 2 | 22386 | 3.58 | 3.00 | | 5.11 | 6.41 | | |
| 2 | 22387 | 1.58 | 0.99 | | 5.15 | 6.99 | | |
| 2 | 22388 | 8.38 | 3.64 | | 7.71 | 2.84 | | |
| 2 | 22389 | 7.02 | 0.65 | | 7.24 | 0.98 | | |
| 2 | 22390 | 7.85 | 2.88 | | 7.32 | 2.88 | | |
| 2 | 22391 | 5.04 | 0.25 | | 3.34 | 0.92 | | |
| 3 | 30001 | 6.23 | 12.24 | | 4.21 | 0.98 | | |
| 3 | 30002 | 6.27 | 12.28 | | 4.22 | 0.99 | | |
| 3 | 30003 | 6.32 | 12.33 | | 4.25 | 1.00 | | |
| 3 | 30004 | 6.37 | 12.38 | | 4.27 | 1.00 | | |
| 3 | 30005 | 6.48 | 12.43 | | 4.30 | 1.01 | | |
| 3 | 30006 | 6.57 | 12.48 | | 4.34 | 1.02 | | |
| 3 | 30007 | 6.65 | 12.53 | | 4.37 | 1.02 | | |
| 3 | 30008 | 6.73 | 12.58 | | 4.41 | 1.02 | | |
| 3 | 30009 | 6.82 | 12.63 | | 4.44 | 1.02 | | |
| 3 | 30010 | 6.92 | 12.67 | | 4.48 | 1.00 | | |
| 3 | 30011 | 7.02 | 12.73 | | 4.52 | 0.98 | | |
| 3 | 30012 | 7.12 | 12.78 | | 4.56 | 0.98 | | |
| 3 | 30013 | 7.24 | 12.83 | | 4.60 | 0.98 | | |
| 3 | 30014 | 7.36 | 12.86 | | 4.64 | 0.99 | | |
| 3 | 30015 | 7.48 | 12.90 | | 4.68 | 0.99 | | |
| 3 | 30016 | 7.60 | 12.93 | | 4.72 | 1.00 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 30017 | 7.73 | 12.96 | | 4.81 | 1.01 | | |
| 3 | 30018 | 7.86 | 12.97 | | 4.93 | 1.03 | | |
| 3 | 30019 | 8.00 | 12.97 | | 5.07 | 1.04 | | |
| 3 | 30020 | 8.14 | 12.95 | | 5.22 | 1.06 | | |
| 3 | 30021 | 8.28 | 12.92 | | 5.39 | 1.08 | | |
| 3 | 30022 | 9.03 | 12.86 | | 5.56 | 1.09 | | |
| 3 | 30023 | 8.73 | 12.72 | | 5.75 | 1.11 | | |
| 3 | 30024 | 8.87 | 14.22 | | 5.95 | 1.12 | | |
| 3 | 30025 | 9.01 | 14.05 | | 6.16 | 1.13 | | |
| 3 | 30026 | 9.16 | 13.86 | | 6.38 | 1.13 | | |
| 3 | 30027 | 9.31 | 13.64 | | 6.60 | 1.13 | | |
| 3 | 30028 | 9.47 | 13.39 | | 6.84 | 1.12 | | |
| 3 | 30029 | 9.63 | 13.11 | | 7.07 | 1.10 | | |
| 3 | 30030 | 9.80 | 12.80 | | 7.30 | 1.06 | | |
| 3 | 30031 | 10.06 | 12.46 | | 7.52 | 1.02 | | |
| 3 | 30032 | 10.34 | 12.14 | | 7.70 | 0.94 | | |
| 3 | 30033 | 5.41 | 6.21 | | 3.65 | | | 8.76 |
| 3 | 30034 | 5.34 | 2.93 | | 3.07 | | | |
| 3 | 30035 | 5.03 | 4.24 | | 2.62 | 3.58 | | |
| 3 | 30036 | 5.08 | 4.84 | | 3.00 | 6.00 | | |
| 3 | 30037 | 4.94 | 4.78 | | 2.88 | 7.38 | | |
| 3 | 30038 | 4.67 | 4.20 | | 2.65 | 7.45 | | |
| 3 | 30039 | 4.26 | 3.19 | | 2.29 | 6.38 | | |
| 3 | 30040 | 3.73 | 1.88 | | 2.20 | 4.33 | | |
| 3 | 30041 | 3.12 | 1.69 | | 2.35 | 1.54 | | |
| 3 | 30042 | 5.46 | 6.28 | | 3.66 | | | 8.76 |
| 3 | 30043 | 5.39 | 2.95 | | 3.07 | | | |
| 3 | 30044 | 5.01 | 4.22 | | 2.62 | 3.59 | | |
| 3 | 30045 | 5.07 | 4.83 | | 3.02 | 6.01 | | |
| 3 | 30046 | 4.94 | 4.77 | | 2.88 | 7.40 | | |
| 3 | 30047 | 4.68 | 4.20 | | 2.63 | 7.46 | | |
| 3 | 30048 | 4.27 | 3.20 | | 2.28 | 6.38 | | |
| 3 | 30049 | 3.74 | 1.90 | | 2.20 | 4.34 | | |
| 3 | 30050 | 3.12 | 1.72 | | 2.35 | 1.50 | | |
| 3 | 30051 | 5.51 | 6.35 | | 3.66 | | | 8.76 |
| 3 | 30052 | 5.45 | 2.96 | | 3.08 | | | |
| 3 | 30053 | 5.02 | 4.20 | | 2.71 | 3.61 | | |
| 3 | 30054 | 5.07 | 4.81 | | 3.04 | 6.03 | | |
| 3 | 30055 | 4.95 | 4.77 | | 2.89 | 7.42 | | |
| 3 | 30056 | 4.69 | 4.21 | | 2.62 | 7.48 | | |
| 3 | 30057 | 4.28 | 3.21 | | 2.25 | 6.38 | | |
| 3 | 30058 | 3.76 | 1.92 | | 2.19 | 4.36 | | |
| 3 | 30059 | 3.12 | 1.76 | | 2.35 | 1.24 | | |
| 3 | 30060 | 5.56 | 6.41 | | 3.67 | | | 8.76 |
| 3 | 30061 | 5.51 | 2.98 | | 3.08 | | | |
| 3 | 30062 | 5.07 | 4.21 | | 2.71 | 3.62 | | |
| 3 | 30063 | 5.08 | 4.80 | | 3.07 | 6.06 | | |
| 3 | 30064 | 4.96 | 4.77 | | 2.89 | 7.44 | | |
| 3 | 30065 | 4.70 | 4.21 | | 2.61 | 7.50 | | |
| 3 | 30066 | 4.29 | 3.23 | | 2.22 | 6.39 | | |
| 3 | 30067 | 3.78 | 1.94 | | 2.19 | 4.31 | | |
| 3 | 30068 | 3.14 | 1.76 | | 2.34 | 1.29 | | |
| 3 | 30069 | 5.62 | 6.48 | | 3.68 | | | 8.76 |
| 3 | 30070 | 5.58 | 3.00 | | 3.09 | | | |
| 3 | 30071 | 5.13 | 4.22 | | 2.70 | 3.64 | | |
| 3 | 30072 | 5.09 | 4.79 | | 3.10 | 6.08 | | |
| 3 | 30073 | 4.97 | 4.77 | | 2.90 | 7.48 | | |
| 3 | 30074 | 4.71 | 4.22 | | 2.60 | 7.53 | | |
| 3 | 30075 | 4.32 | 3.24 | | 2.20 | 6.40 | | |
| 3 | 30076 | 3.80 | 1.96 | | 2.18 | 4.31 | | |
| 3 | 30077 | 3.19 | 1.76 | | 2.31 | 1.37 | | |
| 3 | 30078 | 5.68 | 6.55 | | 3.70 | | | 8.76 |
| 3 | 30079 | 5.65 | 3.02 | | 3.09 | | | |
| 3 | 30080 | 5.19 | 4.23 | | 2.70 | 3.66 | | |
| 3 | 30081 | 5.03 | 4.80 | | 3.13 | 6.12 | | |
| 3 | 30082 | 4.99 | 4.77 | | 2.91 | 7.51 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 30083 | 4.73 | 4.23 | | 2.59 | 7.57 | | |
| 3 | 30084 | 4.34 | 3.26 | | 2.16 | 6.41 | | |
| 3 | 30085 | 3.82 | 1.99 | | 2.16 | 4.34 | | |
| 3 | 30086 | 3.23 | 1.76 | | 2.30 | 1.40 | | |
| 3 | 30087 | 5.75 | 6.62 | | 3.71 | | | 8.76 |
| 3 | 30088 | 5.72 | 3.04 | | 3.09 | | | |
| 3 | 30089 | 5.25 | 4.24 | | 2.73 | 3.68 | | |
| 3 | 30090 | 5.05 | 4.80 | | 2.95 | 6.15 | | |
| 3 | 30091 | 5.01 | 4.77 | | 2.93 | 7.55 | | |
| 3 | 30092 | 4.76 | 4.24 | | 2.59 | 7.62 | | |
| 3 | 30093 | 4.37 | 3.28 | | 2.12 | 6.43 | | |
| 3 | 30094 | 3.86 | 2.02 | | 2.14 | 4.44 | | |
| 3 | 30095 | 3.27 | 1.78 | | 2.29 | 1.41 | | |
| 3 | 30096 | 5.82 | 6.68 | | 3.73 | | | 8.76 |
| 3 | 30097 | 5.80 | 3.05 | | 3.09 | | | |
| 3 | 30098 | 5.31 | 4.25 | | 2.76 | 3.71 | | |
| 3 | 30099 | 5.07 | 4.80 | | 2.98 | 6.19 | | |
| 3 | 30100 | 5.04 | 4.77 | | 2.94 | 7.60 | | |
| 3 | 30101 | 4.79 | 4.25 | | 2.59 | 7.67 | | |
| 3 | 30102 | 4.40 | 3.31 | | 2.08 | 6.48 | | |
| 3 | 30103 | 3.90 | 2.06 | | 2.12 | 4.48 | | |
| 3 | 30104 | 3.30 | 1.80 | | 2.29 | 1.43 | | |
| 3 | 30105 | 5.89 | 6.74 | | 3.75 | | | 8.76 |
| 3 | 30106 | 5.88 | 3.09 | | 3.10 | | | |
| 3 | 30107 | 5.37 | 4.26 | | 2.80 | 3.74 | | |
| 3 | 30108 | 5.12 | 4.80 | | 3.01 | 6.23 | | |
| 3 | 30109 | 5.07 | 4.77 | | 2.96 | 7.65 | | |
| 3 | 30110 | 4.82 | 4.27 | | 2.59 | 7.73 | | |
| 3 | 30111 | 4.44 | 3.34 | | 2.03 | 6.54 | | |
| 3 | 30112 | 3.95 | 2.10 | | 2.10 | 4.52 | | |
| 3 | 30113 | 3.34 | 1.80 | | 2.28 | 1.51 | | |
| 3 | 30114 | 5.95 | 6.80 | | 3.77 | | | 8.76 |
| 3 | 30115 | 5.96 | 3.14 | | 3.10 | | | |
| 3 | 30116 | 5.43 | 4.27 | | 2.83 | 3.77 | | |
| 3 | 30117 | 5.16 | 4.80 | | 3.09 | 6.27 | | |
| 3 | 30118 | 5.10 | 4.77 | | 2.99 | 7.70 | | |
| 3 | 30119 | 4.86 | 4.28 | | 2.60 | 7.79 | | |
| 3 | 30120 | 4.49 | 3.36 | | 1.98 | 6.61 | | |
| 3 | 30121 | 3.99 | 2.14 | | 2.07 | 4.56 | | |
| 3 | 30122 | 3.41 | 1.78 | | 2.27 | 1.63 | | |
| 3 | 30123 | 6.07 | 6.86 | | 3.80 | | | 8.76 |
| 3 | 30124 | 6.04 | 3.18 | | 3.10 | | | |
| 3 | 30125 | 5.49 | 4.28 | | 2.87 | 3.80 | | |
| 3 | 30126 | 5.21 | 4.80 | | 3.14 | 6.31 | | |
| 3 | 30127 | 5.06 | 4.73 | | 3.02 | 7.75 | | |
| 3 | 30128 | 4.90 | 4.29 | | 2.61 | 7.86 | | |
| 3 | 30129 | 4.54 | 3.39 | | 1.95 | 6.70 | | |
| 3 | 30130 | 4.05 | 2.18 | | 2.04 | 4.62 | | |
| 3 | 30131 | 3.49 | 1.74 | | 2.26 | 1.93 | | |
| 3 | 30132 | 6.18 | 6.90 | | 3.83 | | | 8.76 |
| 3 | 30133 | 6.11 | 3.22 | | 3.10 | | | |
| 3 | 30134 | 5.54 | 4.29 | | 2.92 | 3.83 | | |
| 3 | 30135 | 5.26 | 4.79 | | 3.13 | 6.36 | | |
| 3 | 30136 | 5.09 | 4.68 | | 3.05 | 7.80 | | |
| 3 | 30137 | 4.95 | 4.30 | | 2.63 | 7.93 | | |
| 3 | 30138 | 4.59 | 3.42 | | 1.93 | 6.79 | | |
| 3 | 30139 | 4.12 | 2.24 | | 2.01 | 4.68 | | |
| 3 | 30140 | 3.55 | 1.70 | | 2.25 | 2.06 | | |
| 3 | 30141 | 6.29 | 7.71 | | 3.87 | | | 8.76 |
| 3 | 30142 | 6.19 | 3.26 | | 3.10 | | | |
| 3 | 30143 | 5.59 | 4.30 | | 2.98 | 3.86 | | |
| 3 | 30144 | 5.32 | 4.77 | | 3.18 | 6.40 | | |
| 3 | 30145 | 5.13 | 4.67 | | 3.09 | 7.86 | | |
| 3 | 30146 | 5.00 | 4.31 | | 2.66 | 8.00 | | |
| 3 | 30147 | 4.65 | 3.45 | | 1.92 | 6.89 | | |
| 3 | 30148 | 4.19 | 2.28 | | 1.94 | 4.74 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 30149 | 3.63 | 1.63 | | 2.26 | 2.16 | | |
| 3 | 30150 | 6.41 | 7.73 | | 3.91 | | | 8.76 |
| 3 | 30151 | 6.26 | 3.29 | | 3.11 | | | |
| 3 | 30152 | 5.63 | 4.31 | | 3.04 | 3.89 | | |
| 3 | 30153 | 5.37 | 4.75 | | 3.22 | 6.44 | | |
| 3 | 30154 | 5.17 | 4.66 | | 3.13 | 7.91 | | |
| 3 | 30155 | 5.05 | 4.32 | | 2.70 | 8.07 | | |
| 3 | 30156 | 4.71 | 3.48 | | 1.95 | 7.00 | | |
| 3 | 30157 | 4.27 | 2.34 | | 1.90 | 4.79 | | |
| 3 | 30158 | 3.71 | 1.55 | | 2.27 | 2.33 | | |
| 3 | 30159 | 6.53 | 7.75 | | 3.96 | | | 8.76 |
| 3 | 30160 | 6.33 | 3.32 | | 3.11 | | | |
| 3 | 30161 | 5.66 | 4.32 | | 3.10 | 3.92 | | |
| 3 | 30162 | 5.44 | 4.75 | | 3.27 | 6.48 | | |
| 3 | 30163 | 5.31 | 4.74 | | 3.17 | 7.95 | | |
| 3 | 30164 | 5.10 | 4.32 | | 2.74 | 8.13 | | |
| 3 | 30165 | 4.78 | 3.51 | | 1.99 | 7.10 | | |
| 3 | 30166 | 4.36 | 2.39 | | 1.86 | 4.88 | | |
| 3 | 30167 | 3.82 | 1.42 | | 2.29 | 2.52 | | |
| 3 | 30168 | 6.59 | 7.75 | | 4.02 | | | 8.76 |
| 3 | 30169 | 6.40 | 3.34 | | 3.12 | | | |
| 3 | 30170 | 5.73 | 4.33 | | 3.16 | 3.94 | | |
| 3 | 30171 | 5.50 | 4.74 | | 3.31 | 6.51 | | |
| 3 | 30172 | 5.35 | 4.73 | | 3.21 | 7.99 | | |
| 3 | 30173 | 5.16 | 4.32 | | 2.79 | 8.19 | | |
| 3 | 30174 | 4.86 | 3.53 | | 2.05 | 7.20 | | |
| 3 | 30175 | 4.45 | 2.46 | | 1.82 | 5.06 | | |
| 3 | 30176 | 3.94 | 1.26 | | 2.33 | 2.46 | | |
| 3 | 30177 | 6.71 | 7.74 | | 4.11 | | | 8.76 |
| 3 | 30178 | 6.46 | 3.36 | | 3.13 | | | |
| 3 | 30179 | 5.82 | 4.34 | | 3.28 | 3.97 | | |
| 3 | 30180 | 5.57 | 4.73 | | 3.59 | 6.54 | | |
| 3 | 30181 | 5.40 | 4.70 | | 3.25 | 8.02 | | |
| 3 | 30182 | 5.22 | 4.32 | | 2.84 | 8.24 | | |
| 3 | 30183 | 4.93 | 3.56 | | 2.13 | 7.30 | | |
| 3 | 30184 | 4.56 | 2.52 | | 1.99 | 5.25 | | |
| 3 | 30185 | 4.07 | 1.29 | | 2.38 | 2.57 | | |
| 3 | 30186 | 6.83 | 7.71 | | 4.22 | | | 8.76 |
| 3 | 30187 | 6.52 | 3.37 | | 3.16 | | | |
| 3 | 30188 | 5.91 | 4.35 | | 3.39 | 3.99 | | |
| 3 | 30189 | 5.63 | 4.71 | | 3.40 | 6.56 | | |
| 3 | 30190 | 5.45 | 4.67 | | 3.29 | 8.04 | | |
| 3 | 30191 | 5.28 | 4.30 | | 2.90 | 8.27 | | |
| 3 | 30192 | 5.01 | 3.57 | | 2.21 | 7.38 | | |
| 3 | 30193 | 4.66 | 2.57 | | 1.98 | 5.42 | | |
| 3 | 30194 | 4.21 | 1.40 | | 2.47 | 2.48 | | |
| 3 | 30195 | 6.97 | 7.67 | | 4.36 | | | 8.76 |
| 3 | 30196 | 6.58 | 3.38 | | 3.20 | | | |
| 3 | 30197 | 6.01 | 4.35 | | 3.45 | 4.01 | | |
| 3 | 30198 | 5.70 | 4.69 | | 3.43 | 6.58 | | |
| 3 | 30199 | 5.49 | 4.63 | | 3.32 | 8.04 | | |
| 3 | 30200 | 5.34 | 4.28 | | 2.95 | 8.29 | | |
| 3 | 30201 | 5.09 | 3.58 | | 2.31 | 7.44 | | |
| 3 | 30202 | 4.78 | 2.63 | | 2.00 | 5.58 | | |
| 3 | 30203 | 4.37 | 1.51 | | 2.60 | 2.64 | | |
| 3 | 30204 | 7.10 | 7.60 | | 4.51 | | | 8.76 |
| 3 | 30205 | 6.63 | 3.38 | | 3.25 | | | |
| 3 | 30206 | 6.10 | 4.35 | | 3.51 | 4.03 | | |
| 3 | 30207 | 5.78 | 4.66 | | 3.45 | 6.58 | | |
| 3 | 30208 | 5.53 | 4.58 | | 3.34 | 8.03 | | |
| 3 | 30209 | 5.39 | 4.25 | | 2.99 | 8.28 | | |
| 3 | 30210 | 5.17 | 3.58 | | 2.40 | 7.47 | | |
| 3 | 30211 | 4.89 | 2.68 | | 1.98 | 5.72 | | |
| 3 | 30212 | 4.54 | 1.62 | | 2.77 | 2.98 | | |
| 3 | 30213 | 7.22 | 7.52 | | 4.70 | | | 8.76 |
| 3 | 30214 | 6.67 | 3.39 | | 3.32 | | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 30215 | 6.21 | 4.35 | | 3.56 | 4.04 | | |
| 3 | 30216 | 5.85 | 4.62 | | 3.47 | 6.58 | | |
| 3 | 30217 | 5.57 | 4.52 | | 3.35 | 8.01 | | |
| 3 | 30218 | 5.45 | 4.20 | | 3.02 | 8.26 | | |
| 3 | 30219 | 5.25 | 3.57 | | 2.48 | 7.45 | | |
| 3 | 30220 | 5.01 | 2.76 | | 1.96 | 5.76 | | |
| 3 | 30221 | 4.72 | 1.73 | | 2.80 | 3.24 | | |
| 3 | 30222 | 7.35 | 7.42 | | 4.91 | | | 8.76 |
| 3 | 30223 | 6.72 | 3.43 | | 3.40 | | | |
| 3 | 30224 | 6.31 | 4.35 | | 3.60 | 4.05 | | |
| 3 | 30225 | 5.92 | 4.57 | | 3.47 | 6.56 | | |
| 3 | 30226 | 5.61 | 4.44 | | 3.34 | 7.96 | | |
| 3 | 30227 | 5.50 | 4.15 | | 3.04 | 8.20 | | |
| 3 | 30228 | 5.33 | 3.55 | | 2.55 | 7.43 | | |
| 3 | 30229 | 5.13 | 2.78 | | 1.94 | 5.82 | | |
| 3 | 30230 | 4.90 | 1.83 | | 2.86 | 3.44 | | |
| 3 | 30231 | 7.47 | 7.30 | | 5.15 | | | 8.76 |
| 3 | 30232 | 6.75 | 3.47 | | 3.49 | | | |
| 3 | 30233 | 6.41 | 4.33 | | 3.64 | 4.05 | | |
| 3 | 30234 | 5.99 | 4.51 | | 3.45 | 6.53 | | |
| 3 | 30235 | 5.64 | 4.34 | | 3.31 | 7.90 | | |
| 3 | 30236 | 5.54 | 4.08 | | 3.03 | 8.13 | | |
| 3 | 30237 | 5.40 | 3.52 | | 2.61 | 7.38 | | |
| 3 | 30238 | 5.25 | 2.79 | | 2.04 | 5.83 | | |
| 3 | 30239 | 5.09 | 1.94 | | 2.84 | 3.60 | | |
| 3 | 30240 | 7.65 | 7.15 | | 5.43 | | | 8.76 |
| 3 | 30241 | 6.87 | 3.51 | | 3.61 | | | |
| 3 | 30242 | 6.52 | 4.31 | | 3.66 | 4.05 | | |
| 3 | 30243 | 6.05 | 4.44 | | 3.41 | 6.49 | | |
| 3 | 30244 | 5.66 | 4.23 | | 3.26 | 7.82 | | |
| 3 | 30245 | 5.58 | 3.94 | | 3.00 | 8.02 | | |
| 3 | 30246 | 5.47 | 3.48 | | 2.63 | 7.29 | | |
| 3 | 30247 | 5.35 | 2.79 | | 2.16 | 5.79 | | |
| 3 | 30248 | 5.29 | 2.03 | | 2.81 | 3.70 | | |
| 3 | 30249 | 7.78 | 6.97 | | 5.73 | | | 8.76 |
| 3 | 30250 | 7.03 | 3.55 | | 3.76 | | | |
| 3 | 30251 | 6.63 | 4.28 | | 3.67 | 4.04 | | |
| 3 | 30252 | 6.12 | 4.35 | | 3.36 | 6.43 | | |
| 3 | 30253 | 5.68 | 4.04 | | 3.19 | 7.71 | | |
| 3 | 30254 | 5.61 | 3.80 | | 2.93 | 7.89 | | |
| 3 | 30255 | 5.53 | 3.41 | | 2.62 | 7.17 | | |
| 3 | 30256 | 5.45 | 2.78 | | 2.24 | 5.70 | | |
| 3 | 30257 | 5.46 | 2.09 | | 2.78 | 3.73 | | |
| 3 | 30258 | 7.91 | 6.79 | | 5.93 | 0.09 | | 8.76 |
| 3 | 30259 | 7.19 | 3.59 | | 3.93 | | | |
| 3 | 30260 | 6.73 | 4.24 | | 3.67 | 4.03 | | |
| 3 | 30261 | 6.18 | 4.25 | | 3.27 | 6.36 | | |
| 3 | 30262 | 5.69 | 3.86 | | 3.08 | 7.58 | | |
| 3 | 30263 | 5.51 | 3.68 | | 2.82 | 7.70 | | |
| 3 | 30264 | 5.58 | 3.29 | | 2.56 | 7.01 | | |
| 3 | 30265 | 5.54 | 2.76 | | 2.26 | 5.58 | | |
| 3 | 30266 | 5.61 | 2.13 | | 2.75 | 3.70 | | |
| 3 | 30267 | 8.05 | 6.58 | | 6.13 | 0.24 | | 8.76 |
| 3 | 30268 | 7.36 | 3.63 | | 4.14 | | | |
| 3 | 30269 | 6.84 | 4.19 | | 3.64 | 4.01 | | |
| 3 | 30270 | 6.23 | 4.12 | | 3.18 | 6.26 | | |
| 3 | 30271 | 5.56 | 3.69 | | 2.95 | 7.43 | | |
| 3 | 30272 | 5.51 | 3.53 | | 2.69 | 7.52 | | |
| 3 | 30273 | 5.61 | 3.16 | | 2.46 | 6.83 | | |
| 3 | 30274 | 5.62 | 2.72 | | 2.22 | 5.42 | | |
| 3 | 30275 | 5.74 | 2.17 | | 2.73 | 3.63 | | |
| 3 | 30276 | 8.20 | 6.35 | | 6.34 | 0.38 | | 8.76 |
| 3 | 30277 | 7.53 | 3.73 | | 4.38 | | | |
| 3 | 30278 | 6.94 | 4.12 | | 3.60 | 3.98 | | |
| 3 | 30279 | 6.27 | 3.97 | | 3.07 | 6.15 | | |
| 3 | 30280 | 5.54 | 3.49 | | 2.78 | 7.24 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 30281 | 5.51 | 3.35 | | 2.52 | 7.31 | | |
| 3 | 30282 | 5.48 | 3.03 | | 2.30 | 6.62 | | |
| 3 | 30283 | 5.68 | 2.67 | | 2.12 | 5.24 | | |
| 3 | 30284 | 5.85 | 2.17 | | 2.71 | 3.54 | | |
| 3 | 30285 | 8.34 | 6.10 | | 6.54 | 0.53 | | 8.76 |
| 3 | 30286 | 7.70 | 3.74 | | 4.65 | | | |
| 3 | 30287 | 7.03 | 4.03 | | 3.53 | 3.94 | | |
| 3 | 30288 | 6.30 | 3.79 | | 2.92 | 6.01 | | |
| 3 | 30289 | 5.51 | 3.25 | | 2.58 | 7.03 | | |
| 3 | 30290 | 5.49 | 3.14 | | 2.31 | 7.07 | | |
| 3 | 30291 | 5.49 | 2.88 | | 2.11 | 6.38 | | |
| 3 | 30292 | 5.73 | 2.60 | | 1.99 | 5.05 | | |
| 3 | 30293 | 5.93 | 2.16 | | 2.70 | 3.42 | | |
| 3 | 30294 | 8.63 | 6.06 | | 6.74 | 0.68 | | 8.76 |
| 3 | 30295 | 7.86 | 3.75 | | 4.97 | 0.10 | | |
| 3 | 30296 | 7.12 | 3.92 | | 3.43 | 3.89 | | |
| 3 | 30297 | 6.32 | 3.51 | | 2.73 | 5.84 | | |
| 3 | 30298 | 5.45 | 2.97 | | 2.34 | 6.79 | | |
| 3 | 30299 | 5.45 | 2.90 | | 2.07 | 6.81 | | |
| 3 | 30300 | 5.48 | 2.71 | | 1.91 | 6.13 | | |
| 3 | 30301 | 5.77 | 2.51 | | 1.91 | 4.84 | | |
| 3 | 30302 | 6.00 | 2.15 | | 2.70 | 3.29 | | |
| 3 | 30303 | 8.81 | 6.07 | | 6.92 | 0.83 | | 8.76 |
| 3 | 30304 | 8.02 | 3.75 | | 5.06 | 0.31 | | |
| 3 | 30305 | 7.20 | 3.80 | | 3.30 | 3.81 | | |
| 3 | 30306 | 6.30 | 3.26 | | 2.52 | 5.64 | | |
| 3 | 30307 | 5.38 | 2.67 | | 2.07 | 6.51 | | |
| 3 | 30308 | 5.39 | 2.63 | | 1.79 | 6.51 | | |
| 3 | 30309 | 5.45 | 2.50 | | 1.67 | 5.85 | | |
| 3 | 30310 | 5.80 | 2.41 | | 1.90 | 4.62 | | |
| 3 | 30311 | 6.05 | 2.12 | | 2.70 | 3.14 | | |
| 3 | 30312 | 9.17 | 6.07 | | 7.10 | 0.99 | | 8.76 |
| 3 | 30313 | 8.18 | 3.72 | | 5.13 | 0.52 | | |
| 3 | 30314 | 7.26 | 3.65 | | 3.14 | 3.71 | | |
| 3 | 30315 | 6.28 | 3.02 | | 2.26 | 5.40 | | |
| 3 | 30316 | 5.28 | 2.38 | | 1.80 | 6.19 | | |
| 3 | 30317 | 5.31 | 2.32 | | 1.58 | 6.19 | | |
| 3 | 30318 | 5.42 | 2.29 | | 1.40 | 5.56 | | |
| 3 | 30319 | 5.81 | 2.27 | | 1.86 | 4.41 | | |
| 3 | 30320 | 6.09 | 2.08 | | 2.71 | 2.98 | | |
| 3 | 30321 | 5.44 | 2.65 | | 3.65 | 1.41 | | |
| 3 | 30322 | 5.04 | 2.93 | | 3.55 | 1.24 | | |
| 3 | 30323 | 4.64 | 4.20 | | 3.66 | 1.22 | | 8.76 |
| 3 | 30324 | 5.28 | 3.63 | | 3.78 | 1.36 | | |
| 3 | 30325 | 5.45 | 1.98 | | 3.47 | 1.73 | | |
| 3 | 30326 | 5.35 | 1.61 | | 3.29 | 2.17 | | |
| 3 | 30327 | 5.08 | 1.65 | | 3.31 | 2.00 | | |
| 3 | 30328 | 5.15 | 2.17 | | 3.46 | 1.51 | | |
| 3 | 30329 | 2.95 | 14.68 | | 3.01 | 3.19 | | |
| 3 | 30330 | 3.23 | 14.86 | | 3.10 | 3.13 | | |
| 3 | 30331 | 3.64 | 10.59 | | 2.82 | 1.89 | | 8.76 |
| 3 | 30332 | 3.38 | 10.46 | | 2.78 | 1.99 | | |
| 3 | 30333 | 3.14 | 10.46 | | 2.74 | 2.15 | | |
| 3 | 30334 | 2.91 | 10.60 | | 2.73 | 2.32 | | |
| 3 | 30335 | 2.59 | 14.37 | | 2.81 | 3.28 | | |
| 3 | 30336 | 2.76 | 14.37 | | 2.89 | 3.25 | | |
| 3 | 30337 | 3.98 | 2.63 | | 3.13 | 0.53 | | 8.76 |
| 3 | 30338 | 3.84 | 5.43 | | 3.21 | 1.04 | | 8.76 |
| 3 | 30339 | 3.95 | 4.38 | | 3.44 | 1.07 | | 8.76 |
| 3 | 30340 | 4.23 | 2.50 | | 3.23 | 0.62 | | 8.76 |
| 3 | 30341 | 6.34 | 1.89 | | 3.54 | 2.11 | | |
| 3 | 30342 | 6.31 | 1.87 | | 3.50 | 2.12 | | |
| 3 | 30343 | 6.63 | 1.69 | | 4.02 | 2.10 | | |
| 3 | 30344 | 6.55 | 1.77 | | 4.00 | 2.21 | | |
| 3 | 30345 | 2.79 | 13.31 | | 2.52 | 3.26 | | |
| 3 | 30346 | 2.67 | 13.30 | | 2.53 | 3.20 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 30347 | 2.40 | 9.41 | | 2.60 | 2.17 | | |
| 3 | 30348 | 2.37 | 9.75 | | 2.60 | 2.24 | | |
| 3 | 30349 | 3.62 | 2.84 | | 2.87 | 0.45 | | 8.76 |
| 3 | 30350 | 3.79 | 6.10 | | 2.85 | 1.05 | | 8.76 |
| 3 | 30351 | 3.88 | 6.03 | | 3.00 | 1.05 | | 8.76 |
| 3 | 30352 | 3.77 | 2.76 | | 3.01 | 0.49 | | 8.76 |
| 3 | 30353 | 7.41 | 0.68 | | 4.62 | 0.90 | | |
| 3 | 30354 | 7.39 | 1.19 | | 4.88 | 1.84 | | |
| 3 | 30355 | 7.21 | 1.38 | | 4.63 | 1.90 | | |
| 3 | 30356 | 7.18 | 0.72 | | 4.41 | 0.96 | | |
| 3 | 30357 | 3.48 | 15.51 | | 3.20 | 3.09 | | |
| 3 | 30358 | 4.18 | 16.52 | | 3.34 | 3.03 | | |
| 3 | 30359 | 4.25 | 11.54 | | 2.98 | 1.78 | | 8.76 |
| 3 | 30360 | 3.89 | 11.03 | | 2.88 | 1.83 | | 8.76 |
| 3 | 30361 | 2.77 | 3.82 | | 2.57 | 0.51 | | |
| 3 | 30362 | 2.81 | 6.75 | | 2.61 | 1.42 | | |
| 3 | 30363 | 2.65 | 6.32 | | 2.57 | 1.28 | | |
| 3 | 30364 | 2.81 | 3.67 | | 2.55 | 0.44 | | |
| 3 | 30365 | 3.48 | 2.93 | | 2.76 | 0.50 | | 8.76 |
| 3 | 30366 | 3.41 | 2.90 | | 2.66 | 0.46 | | |
| 3 | 30367 | 3.41 | 6.39 | | 2.62 | 1.13 | | 8.76 |
| 3 | 30368 | 3.64 | 6.29 | | 2.73 | 1.09 | | 8.76 |
| 3 | 30369 | 3.15 | 5.18 | | 2.47 | 0.95 | | |
| 3 | 30370 | 3.07 | 7.60 | | 2.58 | 1.56 | | |
| 3 | 30371 | 3.28 | 6.94 | | 2.56 | 1.29 | | 8.76 |
| 3 | 30372 | 3.09 | 3.74 | | 2.53 | 0.61 | | |
| 3 | 30373 | 4.99 | 4.70 | | 3.79 | 1.14 | | |
| 3 | 30374 | 4.67 | 6.55 | | 3.68 | 1.18 | | 8.76 |
| 3 | 30375 | 5.25 | 11.31 | | 3.42 | 1.72 | | |
| 3 | 30376 | 4.60 | 5.28 | | 3.32 | 0.83 | | |
| 3 | 30377 | 2.91 | 3.54 | | 2.50 | 0.44 | | |
| 3 | 30378 | 2.60 | 6.18 | | 2.56 | 1.24 | | |
| 3 | 30379 | 2.69 | 6.30 | | 2.55 | 1.28 | | |
| 3 | 30380 | 2.95 | 3.52 | | 2.47 | 0.46 | | |
| 3 | 30381 | 4.76 | 2.01 | | 3.32 | 1.70 | | |
| 3 | 30382 | 4.48 | 2.34 | | 3.30 | 0.82 | | |
| 3 | 30383 | 4.40 | 3.78 | | 3.53 | 1.00 | | 8.76 |
| 3 | 30384 | 4.79 | 2.66 | | 3.49 | 1.05 | | |
| 3 | 30385 | 6.74 | 1.11 | | 3.90 | 1.07 | | |
| 3 | 30386 | 7.03 | 0.86 | | 4.20 | 1.05 | | |
| 3 | 30387 | 7.01 | 1.59 | | 4.40 | 1.76 | | |
| 3 | 30388 | 6.80 | 1.95 | | 4.25 | 1.51 | | |
| 3 | 30389 | 2.36 | 13.73 | | 2.62 | 3.26 | | |
| 3 | 30390 | 2.32 | 14.06 | | 2.71 | 3.29 | | |
| 3 | 30391 | 2.70 | 10.49 | | 2.66 | 2.37 | | |
| 3 | 30392 | 2.61 | 9.91 | | 2.64 | 2.25 | | |
| 3 | 30393 | 3.04 | 4.58 | | 2.50 | 0.76 | | |
| 3 | 30394 | 3.20 | 3.16 | | 2.45 | 0.33 | | |
| 3 | 30395 | 3.08 | 3.33 | | 2.45 | 0.41 | | |
| 3 | 30396 | 2.86 | 5.73 | | 2.56 | 1.12 | | |
| 3 | 30397 | 5.89 | 2.89 | | 3.87 | 1.46 | | |
| 3 | 30398 | 6.30 | 2.31 | | 3.95 | 1.60 | | |
| 3 | 30399 | 6.11 | 2.00 | | 3.73 | 1.67 | | |
| 3 | 30400 | 5.83 | 2.33 | | 3.70 | 1.55 | | |
| 3 | 30401 | 2.59 | 13.29 | | 2.53 | 3.19 | | |
| 3 | 30402 | 2.53 | 13.73 | | 2.59 | 3.21 | | |
| 3 | 30403 | 2.52 | 9.60 | | 2.62 | 2.18 | | |
| 3 | 30404 | 2.44 | 9.45 | | 2.60 | 2.14 | | |
| 3 | 30405 | 4.58 | 9.10 | | 3.33 | 1.23 | | 8.76 |
| 3 | 30406 | 4.39 | 11.23 | | 3.00 | 1.47 | | 8.76 |
| 3 | 30407 | 5.13 | 17.31 | | 3.43 | 2.85 | | |
| 3 | 30408 | 6.41 | 16.39 | | 3.44 | 2.43 | | |
| 3 | 30409 | 6.28 | 1.76 | | 3.76 | 1.78 | | |
| 3 | 30410 | 6.56 | 1.94 | | 4.05 | 1.76 | | |
| 3 | 30411 | 6.69 | 1.63 | | 4.13 | 1.91 | | |
| 3 | 30412 | 6.38 | 1.70 | | 3.75 | 1.87 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 30413 | 6.45 | 2.44 | | 4.06 | 1.29 | | |
| 3 | 30414 | 5.87 | 3.25 | | 3.88 | 1.17 | | |
| 3 | 30415 | 5.77 | 2.90 | | 3.47 | 0.44 | | |
| 3 | 30416 | 6.34 | 1.54 | | 3.67 | 0.84 | | |
| 3 | 30417 | 6.19 | 1.78 | | 3.51 | 1.97 | | |
| 3 | 30418 | 6.05 | 1.86 | | 3.31 | 2.38 | | |
| 3 | 30419 | 5.92 | 1.83 | | 3.27 | 2.40 | | |
| 3 | 30420 | 6.08 | 1.74 | | 3.49 | 1.92 | | |
| 3 | 30421 | 5.57 | 1.71 | | 3.28 | 2.28 | | |
| 3 | 30422 | 5.72 | 1.86 | | 3.48 | 1.65 | | |
| 3 | 30423 | 5.91 | 1.69 | | 3.48 | 1.81 | | |
| 3 | 30424 | 5.76 | 1.78 | | 3.27 | 2.35 | | |
| 3 | 30425 | 6.17 | 1.86 | | 3.39 | 2.30 | | |
| 3 | 30426 | 6.33 | 1.77 | | 3.63 | 1.90 | | |
| 3 | 30427 | 6.52 | 1.70 | | 3.88 | 2.01 | | |
| 3 | 30428 | 6.25 | 1.86 | | 3.45 | 2.19 | | |
| 3 | 30429 | 2.89 | 3.45 | | 2.57 | 0.37 | | |
| 3 | 30430 | 2.92 | 5.47 | | 2.61 | 1.00 | | |
| 3 | 30431 | 2.92 | 3.44 | | 2.55 | 0.38 | | |
| 3 | 30432 | 2.98 | 5.93 | | 2.51 | 1.15 | | |
| 3 | 30433 | 2.82 | 7.49 | | 2.59 | 1.56 | | |
| 3 | 30434 | 2.89 | 8.10 | | 2.59 | 1.68 | | |
| 3 | 30435 | 3.29 | 2.88 | | 2.43 | 0.23 | | |
| 3 | 30436 | 3.16 | 3.70 | | 2.45 | 0.48 | | |
| 3 | 30437 | 3.33 | 2.93 | | 2.37 | 0.19 | | |
| 3 | 30438 | 6.77 | 1.64 | | 4.34 | 2.13 | | |
| 3 | 30439 | 6.85 | 1.53 | | 4.36 | 2.13 | | |
| 3 | 30440 | 7.10 | 1.45 | | 4.68 | 2.08 | | |
| 3 | 30441 | 3.24 | 3.12 | | 2.57 | 0.44 | | |
| 3 | 30442 | 3.32 | 5.67 | | 2.59 | 1.01 | | 8.76 |
| 3 | 30443 | 3.36 | 2.96 | | 2.59 | 0.41 | | |
| 3 | 30444 | 3.29 | 2.81 | | 2.48 | 0.33 | | |
| 3 | 30445 | 3.20 | 2.85 | | 2.40 | 0.20 | | |
| 3 | 30446 | 3.16 | 3.62 | | 2.45 | 0.54 | | |
| 3 | 30447 | 11.98 | 11.96 | | 8.68 | | | |
| 3 | 30448 | 11.58 | 12.02 | | 8.57 | | | |
| 3 | 30449 | 11.19 | 12.12 | | 8.38 | | | |
| 3 | 30450 | 10.82 | 12.28 | | 8.15 | | | |
| 3 | 30451 | 10.46 | 12.53 | | 7.85 | 0.05 | | |
| 3 | 30452 | 10.12 | 12.75 | | 7.55 | 0.12 | | |
| 3 | 30453 | 9.79 | 12.94 | | 7.25 | 0.18 | | |
| 3 | 30454 | 9.48 | 13.10 | | 6.97 | 0.23 | | |
| 3 | 30455 | 9.18 | 13.24 | | 6.70 | 0.26 | | |
| 3 | 30456 | 8.97 | 13.35 | | 6.44 | 0.29 | | |
| 3 | 30457 | 8.75 | 12.93 | | 6.19 | 0.32 | | |
| 3 | 30458 | 8.47 | 11.88 | | 5.96 | 0.33 | | |
| 3 | 30459 | 8.20 | 11.90 | | 5.74 | 0.35 | | |
| 3 | 30460 | 7.87 | 11.92 | | 5.54 | 0.37 | | |
| 3 | 30461 | 7.68 | 11.82 | | 5.35 | 0.38 | | |
| 3 | 30462 | 7.47 | 11.81 | | 5.18 | 0.40 | | |
| 3 | 30463 | 7.27 | 11.78 | | 5.03 | 0.42 | | |
| 3 | 30464 | 7.15 | 11.74 | | 4.89 | 0.44 | | |
| 3 | 30465 | 6.96 | 11.78 | | 4.76 | 0.46 | | |
| 3 | 30466 | 6.77 | 11.82 | | 4.65 | 0.48 | | |
| 3 | 30467 | 6.51 | 11.85 | | 4.56 | 0.51 | | |
| 3 | 30468 | 6.34 | 11.88 | | 4.47 | 0.54 | | |
| 3 | 30469 | 6.18 | 11.91 | | 4.40 | 0.57 | | |
| 3 | 30470 | 6.02 | 11.94 | | 4.34 | 0.61 | | |
| 3 | 30471 | 5.89 | 11.97 | | 4.32 | 0.68 | | |
| 3 | 30472 | 6.16 | 12.00 | | 4.29 | 0.74 | | |
| 3 | 30473 | 6.15 | 12.03 | | 4.27 | 0.80 | | |
| 3 | 30474 | 6.14 | 12.06 | | 4.24 | 0.85 | | |
| 3 | 30475 | 6.14 | 12.09 | | 4.22 | 0.89 | | |
| 3 | 30476 | 6.15 | 12.12 | | 4.20 | 0.92 | | |
| 3 | 30477 | 6.17 | 12.16 | | 4.18 | 0.95 | | |
| 3 | 30478 | 6.20 | 12.20 | | 4.19 | 0.97 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 30479 | 10.58 | 7.10 | | 8.05 | 0.54 | | 8.76 |
| 3 | 30480 | 7.82 | 3.41 | | 5.46 | 2.05 | | |
| 3 | 30481 | 6.13 | 2.90 | | 2.71 | 5.31 | | |
| 3 | 30482 | 4.44 | 1.99 | | 0.69 | 6.39 | | |
| 3 | 30483 | 3.64 | 1.40 | | | 6.57 | | |
| 3 | 30484 | 3.39 | 1.16 | | | 6.38 | | |
| 3 | 30485 | 3.52 | 1.00 | | 0.52 | 5.79 | | |
| 3 | 30486 | 4.30 | 1.02 | | 1.97 | 4.93 | | |
| 3 | 30487 | 5.20 | 1.56 | | 4.20 | 3.51 | | |
| 3 | 30488 | 10.35 | 7.11 | | 7.85 | 0.44 | | 8.76 |
| 3 | 30489 | 7.83 | 3.53 | | 5.33 | 1.99 | | |
| 3 | 30490 | 6.20 | 3.18 | | 2.73 | 5.49 | | |
| 3 | 30491 | 4.65 | 2.36 | | 1.00 | 6.76 | | |
| 3 | 30492 | 3.88 | 1.80 | | 0.14 | 7.17 | | |
| 3 | 30493 | 3.62 | 1.52 | | 0.04 | 6.82 | | |
| 3 | 30494 | 3.72 | 1.34 | | 0.72 | 6.38 | | |
| 3 | 30495 | 4.40 | 1.22 | | 2.06 | 5.23 | | |
| 3 | 30496 | 5.20 | 1.60 | | 4.24 | 3.38 | | |
| 3 | 30497 | 10.13 | 7.00 | | 7.64 | 0.32 | | 8.76 |
| 3 | 30498 | 7.81 | 3.61 | | 5.03 | 1.89 | | |
| 3 | 30499 | 6.24 | 3.43 | | 2.84 | 5.60 | | |
| 3 | 30500 | 4.82 | 2.69 | | 1.27 | 7.03 | | |
| 3 | 30501 | 4.08 | 2.09 | | 0.41 | 7.52 | | |
| 3 | 30502 | 3.82 | 1.91 | | 0.20 | 7.17 | | |
| 3 | 30503 | 3.89 | 1.60 | | 0.95 | 6.72 | | |
| 3 | 30504 | 4.48 | 1.40 | | 2.13 | 5.43 | | |
| 3 | 30505 | 5.26 | 1.52 | | 4.24 | 3.22 | | |
| 3 | 30506 | 9.89 | 6.90 | | 7.40 | 0.21 | | 8.76 |
| 3 | 30507 | 7.77 | 3.68 | | 4.99 | 1.77 | | |
| 3 | 30508 | 6.27 | 3.66 | | 2.94 | 5.66 | | |
| 3 | 30509 | 4.96 | 3.00 | | 1.49 | 7.23 | | |
| 3 | 30510 | 4.26 | 2.45 | | 0.66 | 7.79 | | |
| 3 | 30511 | 4.00 | 2.15 | | 0.41 | 7.48 | | |
| 3 | 30512 | 4.17 | 1.83 | | 1.15 | 6.96 | | |
| 3 | 30513 | 4.53 | 1.53 | | 2.20 | 5.59 | | |
| 3 | 30514 | 5.22 | 1.45 | | 4.19 | 3.01 | | |
| 3 | 30515 | 9.65 | 6.81 | | 7.16 | 0.08 | | 8.76 |
| 3 | 30516 | 7.71 | 3.72 | | 4.88 | 1.31 | | |
| 3 | 30517 | 6.27 | 3.85 | | 3.02 | 5.67 | | |
| 3 | 30518 | 5.21 | 3.31 | | 1.69 | 7.36 | | |
| 3 | 30519 | 4.40 | 2.78 | | 0.89 | 7.99 | | |
| 3 | 30520 | 4.14 | 2.46 | | 0.63 | 7.69 | | |
| 3 | 30521 | 4.32 | 2.03 | | 1.32 | 7.15 | | |
| 3 | 30522 | 4.56 | 1.64 | | 2.25 | 5.67 | | |
| 3 | 30523 | 5.27 | 1.45 | | 4.13 | 3.02 | | |
| 3 | 30524 | 9.16 | 6.71 | | 6.91 | | | 8.76 |
| 3 | 30525 | 7.63 | 3.75 | | 4.80 | 1.13 | | |
| 3 | 30526 | 6.26 | 4.01 | | 3.07 | 5.64 | | |
| 3 | 30527 | 5.36 | 3.58 | | 1.85 | 7.43 | | |
| 3 | 30528 | 4.52 | 3.08 | | 1.14 | 8.13 | | |
| 3 | 30529 | 4.26 | 2.74 | | 0.83 | 7.85 | | |
| 3 | 30530 | 4.40 | 2.22 | | 1.46 | 7.28 | | |
| 3 | 30531 | 4.57 | 1.73 | | 2.28 | 5.72 | | |
| 3 | 30532 | 5.29 | 1.61 | | 4.08 | 2.95 | | |
| 3 | 30533 | 8.93 | 6.61 | | 6.59 | | | 8.76 |
| 3 | 30534 | 7.54 | 3.76 | | 4.71 | 0.94 | | |
| 3 | 30535 | 6.24 | 4.14 | | 3.11 | 5.59 | | |
| 3 | 30536 | 5.43 | 3.85 | | 2.01 | 7.47 | | |
| 3 | 30537 | 4.61 | 3.36 | | 1.37 | 8.23 | | |
| 3 | 30538 | 4.37 | 2.98 | | 1.01 | 7.97 | | |
| 3 | 30539 | 4.47 | 2.45 | | 1.52 | 7.35 | | |
| 3 | 30540 | 4.57 | 1.80 | | 2.32 | 5.73 | | |
| 3 | 30541 | 5.25 | 1.71 | | 3.99 | 2.92 | | |
| 3 | 30542 | 8.70 | 6.57 | | 6.23 | | | 8.76 |
| 3 | 30543 | 7.44 | 3.76 | | 4.61 | 0.75 | | |
| 3 | 30544 | 6.21 | 4.25 | | 3.14 | 5.52 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 30545 | 5.51 | 4.19 | | 2.17 | 7.46 | | |
| 3 | 30546 | 4.69 | 3.60 | | 1.58 | 8.28 | | |
| 3 | 30547 | 4.44 | 3.19 | | 1.19 | 8.04 | | |
| 3 | 30548 | 4.51 | 2.60 | | 1.59 | 7.39 | | |
| 3 | 30549 | 4.56 | 1.87 | | 2.35 | 5.70 | | |
| 3 | 30550 | 5.20 | 1.82 | | 3.89 | 2.88 | | |
| 3 | 30551 | 8.47 | 6.57 | | 5.90 | | | 8.76 |
| 3 | 30552 | 7.33 | 3.76 | | 4.50 | 0.56 | | |
| 3 | 30553 | 6.20 | 4.34 | | 3.15 | 5.42 | | |
| 3 | 30554 | 5.55 | 4.35 | | 2.30 | 7.43 | | |
| 3 | 30555 | 4.78 | 3.80 | | 1.77 | 8.30 | | |
| 3 | 30556 | 4.50 | 3.36 | | 1.39 | 8.08 | | |
| 3 | 30557 | 4.53 | 2.77 | | 1.69 | 7.40 | | |
| 3 | 30558 | 4.53 | 1.93 | | 2.41 | 5.65 | | |
| 3 | 30559 | 5.18 | 1.65 | | 3.83 | 2.80 | | |
| 3 | 30560 | 8.20 | 6.57 | | 5.59 | | | 8.76 |
| 3 | 30561 | 7.21 | 3.74 | | 4.33 | 0.36 | | |
| 3 | 30562 | 6.17 | 4.41 | | 3.16 | 5.32 | | |
| 3 | 30563 | 5.57 | 4.49 | | 2.42 | 7.38 | | |
| 3 | 30564 | 4.86 | 3.97 | | 1.94 | 8.29 | | |
| 3 | 30565 | 4.54 | 3.50 | | 1.58 | 8.09 | | |
| 3 | 30566 | 4.54 | 2.87 | | 1.83 | 7.38 | | |
| 3 | 30567 | 4.50 | 1.98 | | 2.43 | 5.59 | | |
| 3 | 30568 | 5.09 | 1.65 | | 3.77 | 2.69 | | |
| 3 | 30569 | 7.92 | 6.57 | | 5.30 | | | 8.76 |
| 3 | 30570 | 7.08 | 3.72 | | 4.05 | 0.18 | | |
| 3 | 30571 | 6.12 | 4.47 | | 3.16 | 5.21 | | |
| 3 | 30572 | 5.58 | 4.60 | | 2.51 | 7.31 | | |
| 3 | 30573 | 4.92 | 4.11 | | 2.08 | 8.27 | | |
| 3 | 30574 | 4.57 | 3.61 | | 1.74 | 8.08 | | |
| 3 | 30575 | 4.54 | 2.94 | | 1.95 | 7.35 | | |
| 3 | 30576 | 4.46 | 2.01 | | 2.45 | 5.52 | | |
| 3 | 30577 | 4.83 | 1.74 | | 3.70 | 2.52 | | |
| 3 | 30578 | 7.70 | 6.58 | | 5.05 | | | 8.76 |
| 3 | 30579 | 6.94 | 3.70 | | 3.82 | | | |
| 3 | 30580 | 6.07 | 4.51 | | 3.15 | 5.09 | | |
| 3 | 30581 | 5.58 | 4.70 | | 2.59 | 7.23 | | |
| 3 | 30582 | 5.11 | 4.22 | | 2.21 | 8.23 | | |
| 3 | 30583 | 4.64 | 3.71 | | 1.89 | 8.06 | | |
| 3 | 30584 | 4.53 | 3.00 | | 2.05 | 7.30 | | |
| 3 | 30585 | 4.41 | 1.99 | | 2.47 | 5.43 | | |
| 3 | 30586 | 4.74 | 1.78 | | 3.61 | 2.39 | | |
| 3 | 30587 | 7.49 | 6.58 | | 4.83 | | | 8.76 |
| 3 | 30588 | 6.80 | 3.67 | | 3.62 | | | |
| 3 | 30589 | 6.00 | 4.54 | | 3.11 | 4.97 | | |
| 3 | 30590 | 5.57 | 4.78 | | 2.65 | 7.14 | | |
| 3 | 30591 | 5.16 | 4.47 | | 2.33 | 8.18 | | |
| 3 | 30592 | 4.76 | 3.89 | | 2.02 | 8.02 | | |
| 3 | 30593 | 4.51 | 3.05 | | 2.14 | 7.24 | | |
| 3 | 30594 | 4.36 | 1.99 | | 2.48 | 5.33 | | |
| 3 | 30595 | 4.64 | 1.81 | | 3.51 | 2.32 | | |
| 3 | 30596 | 7.28 | 6.59 | | 4.63 | | | 8.76 |
| 3 | 30597 | 6.65 | 3.64 | | 3.46 | | | |
| 3 | 30598 | 5.92 | 4.56 | | 2.93 | 4.84 | | |
| 3 | 30599 | 5.56 | 4.84 | | 2.71 | 7.05 | | |
| 3 | 30600 | 5.17 | 4.59 | | 2.43 | 8.12 | | |
| 3 | 30601 | 4.79 | 3.97 | | 2.13 | 7.99 | | |
| 3 | 30602 | 4.48 | 3.08 | | 2.21 | 7.18 | | |
| 3 | 30603 | 4.30 | 1.99 | | 2.49 | 5.22 | | |
| 3 | 30604 | 4.57 | 1.87 | | 3.43 | 2.22 | | |
| 3 | 30605 | 7.12 | 6.59 | | 4.46 | | | 8.76 |
| 3 | 30606 | 6.50 | 3.61 | | 3.33 | | | |
| 3 | 30607 | 5.87 | 4.57 | | 2.90 | 4.72 | | |
| 3 | 30608 | 5.54 | 4.89 | | 2.74 | 6.95 | | |
| 3 | 30609 | 5.18 | 4.66 | | 2.51 | 8.07 | | |
| 3 | 30610 | 4.81 | 4.03 | | 2.24 | 7.96 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 30611 | 4.46 | 3.14 | | 2.27 | 7.11 | | |
| 3 | 30612 | 4.25 | 1.98 | | 2.32 | 5.13 | | |
| 3 | 30613 | 4.46 | 1.92 | | 3.37 | 2.07 | | |
| 3 | 30614 | 7.10 | 6.59 | | 4.32 | | | 8.76 |
| 3 | 30615 | 6.36 | 3.57 | | 3.23 | | | |
| 3 | 30616 | 5.84 | 4.57 | | 2.88 | 4.60 | | |
| 3 | 30617 | 5.52 | 4.92 | | 2.77 | 6.86 | | |
| 3 | 30618 | 5.19 | 4.71 | | 2.59 | 8.01 | | |
| 3 | 30619 | 4.83 | 4.08 | | 2.33 | 7.93 | | |
| 3 | 30620 | 4.46 | 3.17 | | 2.31 | 7.04 | | |
| 3 | 30621 | 4.19 | 1.96 | | 2.31 | 5.04 | | |
| 3 | 30622 | 4.34 | 1.92 | | 3.29 | 1.72 | | |
| 3 | 30623 | 6.92 | 6.59 | | 4.19 | | | 8.76 |
| 3 | 30624 | 6.21 | 3.53 | | 3.14 | | | |
| 3 | 30625 | 5.77 | 4.57 | | 2.86 | 4.48 | | |
| 3 | 30626 | 5.49 | 4.95 | | 2.80 | 6.76 | | |
| 3 | 30627 | 5.18 | 4.75 | | 2.65 | 7.95 | | |
| 3 | 30628 | 4.83 | 4.12 | | 2.41 | 7.89 | | |
| 3 | 30629 | 4.46 | 3.20 | | 2.35 | 6.97 | | |
| 3 | 30630 | 4.12 | 1.95 | | 2.31 | 4.93 | | |
| 3 | 30631 | 4.19 | 1.90 | | 3.21 | 1.73 | | |
| 3 | 30632 | 6.75 | 6.74 | | 4.09 | | | 8.76 |
| 3 | 30633 | 6.10 | 3.49 | | 3.08 | | | |
| 3 | 30634 | 5.70 | 4.57 | | 2.83 | 4.37 | | |
| 3 | 30635 | 5.46 | 4.97 | | 2.81 | 6.67 | | |
| 3 | 30636 | 5.17 | 4.78 | | 2.70 | 7.88 | | |
| 3 | 30637 | 4.83 | 4.14 | | 2.47 | 7.84 | | |
| 3 | 30638 | 4.45 | 3.22 | | 2.38 | 6.90 | | |
| 3 | 30639 | 4.06 | 1.94 | | 2.24 | 4.83 | | |
| 3 | 30640 | 4.10 | 1.92 | | 3.14 | 1.48 | | |
| 3 | 30641 | 6.61 | 6.76 | | 4.00 | | | 8.76 |
| 3 | 30642 | 5.92 | 3.45 | | 3.04 | | | |
| 3 | 30643 | 5.62 | 4.55 | | 2.81 | 4.26 | | |
| 3 | 30644 | 5.43 | 4.98 | | 2.82 | 6.58 | | |
| 3 | 30645 | 5.16 | 4.81 | | 2.74 | 7.82 | | |
| 3 | 30646 | 4.83 | 4.16 | | 2.53 | 7.80 | | |
| 3 | 30647 | 4.44 | 3.23 | | 2.40 | 6.83 | | |
| 3 | 30648 | 4.02 | 1.94 | | 2.23 | 4.75 | | |
| 3 | 30649 | 4.00 | 1.94 | | 3.09 | 1.42 | | |
| 3 | 30650 | 6.32 | 6.78 | | 3.93 | | | 8.76 |
| 3 | 30651 | 5.89 | 3.41 | | 3.02 | | | |
| 3 | 30652 | 5.55 | 4.54 | | 2.78 | 4.16 | | |
| 3 | 30653 | 5.40 | 4.98 | | 2.82 | 6.49 | | |
| 3 | 30654 | 5.15 | 4.82 | | 2.77 | 7.76 | | |
| 3 | 30655 | 4.82 | 4.18 | | 2.58 | 7.75 | | |
| 3 | 30656 | 4.42 | 3.23 | | 2.41 | 6.76 | | |
| 3 | 30657 | 3.99 | 1.93 | | 2.21 | 4.66 | | |
| 3 | 30658 | 3.88 | 1.93 | | 3.02 | 1.42 | | |
| 3 | 30659 | 6.16 | 6.80 | | 3.87 | | | 8.76 |
| 3 | 30660 | 5.67 | 3.37 | | 3.02 | | | |
| 3 | 30661 | 5.49 | 4.52 | | 2.75 | 4.06 | | |
| 3 | 30662 | 5.37 | 4.98 | | 2.82 | 6.41 | | |
| 3 | 30663 | 5.13 | 4.83 | | 2.80 | 7.70 | | |
| 3 | 30664 | 4.80 | 4.20 | | 2.61 | 7.71 | | |
| 3 | 30665 | 4.41 | 3.23 | | 2.42 | 6.70 | | |
| 3 | 30666 | 3.95 | 1.91 | | 2.18 | 4.57 | | |
| 3 | 30667 | 3.75 | 1.91 | | 2.95 | 1.44 | | |
| 3 | 30668 | 6.00 | 6.82 | | 3.82 | | | 8.76 |
| 3 | 30669 | 5.54 | 3.33 | | 3.01 | | | |
| 3 | 30670 | 5.44 | 4.50 | | 2.72 | 3.97 | | |
| 3 | 30671 | 5.33 | 4.97 | | 2.81 | 6.33 | | |
| 3 | 30672 | 5.11 | 4.84 | | 2.82 | 7.64 | | |
| 3 | 30673 | 4.79 | 4.20 | | 2.64 | 7.67 | | |
| 3 | 30674 | 4.39 | 3.23 | | 2.42 | 6.64 | | |
| 3 | 30675 | 3.92 | 1.90 | | 2.15 | 4.49 | | |
| 3 | 30676 | 3.65 | 1.90 | | 2.87 | 1.44 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 30677 | 5.84 | 6.84 | | 3.78 | | | 8.76 |
| 3 | 30678 | 5.67 | 3.29 | | 3.01 | | | |
| 3 | 30679 | 5.38 | 4.48 | | 2.69 | 3.89 | | |
| 3 | 30680 | 5.30 | 4.97 | | 2.80 | 6.26 | | |
| 3 | 30681 | 5.09 | 4.84 | | 2.83 | 7.58 | | |
| 3 | 30682 | 4.77 | 4.21 | | 2.66 | 7.63 | | |
| 3 | 30683 | 4.37 | 3.22 | | 2.41 | 6.58 | | |
| 3 | 30684 | 3.88 | 1.89 | | 2.12 | 4.36 | | |
| 3 | 30685 | 3.55 | 1.90 | | 2.74 | 1.42 | | |
| 3 | 30686 | 5.69 | 5.84 | | 3.74 | | | 8.76 |
| 3 | 30687 | 5.54 | 3.25 | | 3.01 | | | |
| 3 | 30688 | 5.33 | 4.46 | | 2.66 | 3.81 | | |
| 3 | 30689 | 5.27 | 4.96 | | 2.79 | 6.19 | | |
| 3 | 30690 | 5.06 | 4.83 | | 2.83 | 7.53 | | |
| 3 | 30691 | 4.76 | 4.21 | | 2.68 | 7.59 | | |
| 3 | 30692 | 4.35 | 3.22 | | 2.40 | 6.53 | | |
| 3 | 30693 | 3.85 | 1.88 | | 2.11 | 4.36 | | |
| 3 | 30694 | 3.40 | 1.83 | | 2.65 | 1.39 | | |
| 3 | 30695 | 5.54 | 5.87 | | 3.72 | | | 8.76 |
| 3 | 30696 | 5.40 | 3.21 | | 3.02 | | | |
| 3 | 30697 | 5.29 | 4.43 | | 2.64 | 3.73 | | |
| 3 | 30698 | 5.23 | 4.94 | | 2.78 | 6.12 | | |
| 3 | 30699 | 5.04 | 4.83 | | 2.83 | 7.47 | | |
| 3 | 30700 | 4.74 | 4.21 | | 2.69 | 7.56 | | |
| 3 | 30701 | 4.33 | 3.21 | | 2.38 | 6.39 | | |
| 3 | 30702 | 3.82 | 1.87 | | 2.13 | 4.34 | | |
| 3 | 30703 | 3.30 | 1.82 | | 2.58 | 1.37 | | |
| 3 | 30704 | 5.39 | 5.87 | | 3.70 | | | 8.76 |
| 3 | 30705 | 5.27 | 3.17 | | 3.02 | | | |
| 3 | 30706 | 5.24 | 4.41 | | 2.65 | 3.66 | | |
| 3 | 30707 | 5.21 | 4.93 | | 2.77 | 6.06 | | |
| 3 | 30708 | 5.02 | 4.82 | | 2.83 | 7.43 | | |
| 3 | 30709 | 4.73 | 4.21 | | 2.69 | 7.52 | | |
| 3 | 30710 | 4.31 | 3.20 | | 2.38 | 6.38 | | |
| 3 | 30711 | 3.80 | 1.86 | | 2.14 | 4.33 | | |
| 3 | 30712 | 3.21 | 1.82 | | 2.53 | 1.34 | | |
| 3 | 30713 | 5.25 | 6.87 | | 3.68 | | | 8.76 |
| 3 | 30714 | 5.14 | 3.13 | | 3.03 | | | |
| 3 | 30715 | 5.20 | 4.38 | | 2.66 | 3.60 | | |
| 3 | 30716 | 5.18 | 4.91 | | 2.76 | 6.00 | | |
| 3 | 30717 | 5.00 | 4.82 | | 2.83 | 7.39 | | |
| 3 | 30718 | 4.71 | 4.21 | | 2.69 | 7.50 | | |
| 3 | 30719 | 4.29 | 3.20 | | 2.37 | 6.37 | | |
| 3 | 30720 | 3.77 | 1.86 | | 2.16 | 4.32 | | |
| 3 | 30721 | 3.16 | 1.81 | | 2.49 | 1.31 | | |
| 3 | 30722 | 5.12 | 6.90 | | 3.67 | | | 8.76 |
| 3 | 30723 | 5.01 | 3.10 | | 3.04 | | | |
| 3 | 30724 | 5.16 | 4.36 | | 2.67 | 3.57 | | |
| 3 | 30725 | 5.15 | 4.90 | | 2.75 | 5.98 | | |
| 3 | 30726 | 4.99 | 4.81 | | 2.84 | 7.38 | | |
| 3 | 30727 | 4.70 | 4.20 | | 2.69 | 7.48 | | |
| 3 | 30728 | 4.28 | 3.19 | | 2.37 | 6.43 | | |
| 3 | 30729 | 3.76 | 1.86 | | 2.17 | 4.31 | | |
| 3 | 30730 | 3.13 | 1.79 | | 2.46 | 1.31 | | |
| 3 | 30731 | 5.29 | 5.98 | | 3.66 | | | 8.76 |
| 3 | 30732 | 4.96 | 3.06 | | 3.04 | | | |
| 3 | 30733 | 5.13 | 4.33 | | 2.68 | 3.57 | | |
| 3 | 30734 | 5.13 | 4.88 | | 2.76 | 5.98 | | |
| 3 | 30735 | 4.97 | 4.80 | | 2.85 | 7.37 | | |
| 3 | 30736 | 4.69 | 4.20 | | 2.69 | 7.46 | | |
| 3 | 30737 | 4.27 | 3.19 | | 2.36 | 6.42 | | |
| 3 | 30738 | 3.74 | 1.86 | | 2.18 | 4.30 | | |
| 3 | 30739 | 3.12 | 1.82 | | 2.43 | 1.31 | | |
| 3 | 30740 | 5.31 | 6.03 | | 3.65 | | | 8.76 |
| 3 | 30741 | 5.21 | 3.02 | | 3.05 | | | |
| 3 | 30742 | 5.09 | 4.31 | | 2.69 | 3.57 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 30743 | 5.11 | 4.87 | | 2.78 | 5.98 | | |
| 3 | 30744 | 4.96 | 4.80 | | 2.86 | 7.36 | | |
| 3 | 30745 | 4.68 | 4.20 | | 2.68 | 7.45 | | |
| 3 | 30746 | 4.26 | 3.19 | | 2.34 | 6.40 | | |
| 3 | 30747 | 3.73 | 1.86 | | 2.19 | 4.29 | | |
| 3 | 30748 | 3.11 | 1.79 | | 2.41 | 1.49 | | |
| 3 | 30749 | 5.34 | 6.09 | | 3.65 | | | 8.76 |
| 3 | 30750 | 5.25 | 2.99 | | 3.06 | | | |
| 3 | 30751 | 5.07 | 4.28 | | 2.70 | 3.57 | | |
| 3 | 30752 | 5.10 | 4.86 | | 2.80 | 5.98 | | |
| 3 | 30753 | 4.95 | 4.79 | | 2.87 | 7.37 | | |
| 3 | 30754 | 4.67 | 4.20 | | 2.67 | 7.44 | | |
| 3 | 30755 | 4.26 | 3.19 | | 2.32 | 6.39 | | |
| 3 | 30756 | 3.73 | 1.87 | | 2.20 | 4.34 | | |
| 3 | 30757 | 3.10 | 1.76 | | 2.39 | 1.49 | | |
| 3 | 30758 | 5.37 | 6.15 | | 3.65 | | | 8.76 |
| 3 | 30759 | 5.29 | 2.96 | | 3.06 | | | |
| 3 | 30760 | 5.04 | 4.26 | | 2.61 | 3.57 | | |
| 3 | 30761 | 5.08 | 4.85 | | 2.98 | 5.99 | | |
| 3 | 30762 | 4.95 | 4.78 | | 2.87 | 7.37 | | |
| 3 | 30763 | 4.67 | 4.20 | | 2.66 | 7.44 | | |
| 3 | 30764 | 4.26 | 3.19 | | 2.31 | 6.38 | | |
| 3 | 30765 | 3.73 | 1.87 | | 2.20 | 4.33 | | |
| 3 | 30766 | 3.10 | 1.72 | | 2.37 | 1.53 | | |
| 3 | 30767 | 4.26 | 13.10 | | 3.25 | 2.78 | | |
| 3 | 30768 | 3.84 | 13.36 | | 2.98 | 3.02 | | |
| 3 | 30769 | 3.39 | 9.41 | | 3.17 | 2.17 | | |
| 3 | 30770 | 3.63 | 8.68 | | 3.38 | 2.09 | | |
| 3 | 30771 | 6.86 | 4.88 | | 5.77 | 3.11 | | |
| 3 | 30772 | 6.60 | 5.45 | | 5.61 | 2.92 | | |
| 3 | 30773 | 6.06 | 3.83 | | 4.97 | 2.81 | | |
| 3 | 30774 | 6.23 | 3.66 | | 5.06 | 2.99 | | |
| 3 | 30775 | 7.32 | 7.24 | | 6.10 | 2.89 | | |
| 3 | 30776 | 7.49 | 7.23 | | 6.41 | 3.07 | | |
| 3 | 30777 | 8.41 | 9.59 | | 6.95 | 2.80 | | |
| 3 | 30778 | 8.05 | 9.04 | | 6.62 | 2.73 | | |
| 3 | 30779 | 3.20 | 3.79 | | 3.02 | 0.85 | | |
| 3 | 30780 | 3.13 | 6.24 | | 3.06 | 1.45 | | |
| 3 | 30781 | 2.98 | 5.75 | | 2.97 | 1.28 | | |
| 3 | 30782 | 3.09 | 3.75 | | 2.96 | 0.77 | | |
| 3 | 30783 | 3.49 | 3.63 | | 3.19 | 0.99 | | |
| 3 | 30784 | 3.43 | 5.80 | | 3.29 | 1.53 | | |
| 3 | 30785 | 3.29 | 6.31 | | 3.17 | 1.54 | | |
| 3 | 30786 | 3.34 | 3.75 | | 3.10 | 0.93 | | |
| 3 | 30787 | 3.00 | 13.84 | | 2.48 | 3.45 | | |
| 3 | 30788 | 2.75 | 13.55 | | 2.47 | 3.36 | | |
| 3 | 30789 | 2.33 | 10.27 | | 2.57 | 2.40 | | |
| 3 | 30790 | 2.55 | 11.03 | | 2.56 | 2.60 | | |
| 3 | 30791 | 9.79 | 12.68 | | 7.47 | 1.38 | | |
| 3 | 30792 | 9.43 | 10.74 | | 7.60 | 2.31 | | |
| 3 | 30793 | 9.51 | 9.29 | | 7.89 | 2.52 | | |
| 3 | 30794 | 10.38 | 12.18 | | 7.82 | 1.23 | | |
| 3 | 30795 | 7.03 | 4.80 | | 6.07 | 3.57 | | |
| 3 | 30796 | 8.28 | 6.93 | | 7.16 | 3.21 | | |
| 3 | 30797 | 8.44 | 8.22 | | 7.20 | 2.96 | | |
| 3 | 30798 | 7.39 | 6.29 | | 6.45 | 3.29 | | |
| 3 | 30799 | 2.77 | 3.59 | | 2.64 | 0.44 | | |
| 3 | 30800 | 2.70 | 5.21 | | 2.67 | 0.98 | | |
| 3 | 30801 | 2.63 | 6.29 | | 2.65 | 1.27 | | |
| 3 | 30802 | 2.76 | 3.79 | | 2.61 | 0.50 | | |
| 3 | 30803 | 4.35 | 3.52 | | 3.57 | 1.39 | | |
| 3 | 30804 | 4.11 | 5.79 | | 3.76 | 1.82 | | |
| 3 | 30805 | 3.83 | 5.70 | | 3.52 | 1.66 | | |
| 3 | 30806 | 4.20 | 3.53 | | 3.45 | 1.26 | | |
| 3 | 30807 | 5.94 | 3.96 | | 4.78 | 2.61 | | |
| 3 | 30808 | 5.99 | 5.78 | | 5.24 | 2.71 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 30809 | 5.51 | 5.69 | | 4.81 | 2.48 | | |
| 3 | 30810 | 5.78 | 3.80 | | 4.56 | 2.40 | | |
| 3 | 30811 | 2.78 | 3.43 | | 2.67 | 0.43 | | |
| 3 | 30812 | 2.79 | 3.35 | | 2.70 | 0.44 | | |
| 3 | 30813 | 2.71 | 4.94 | | 2.72 | 0.95 | | |
| 3 | 30814 | 2.72 | 4.89 | | 2.69 | 0.91 | | |
| 3 | 30815 | 5.00 | 3.34 | | 4.07 | 1.92 | | |
| 3 | 30816 | 4.80 | 5.77 | | 4.36 | 2.23 | | |
| 3 | 30817 | 4.48 | 5.79 | | 4.06 | 2.03 | | |
| 3 | 30818 | 4.83 | 3.35 | | 3.94 | 1.76 | | |
| 3 | 30819 | 9.15 | 13.39 | | 7.08 | 1.51 | | |
| 3 | 30820 | 8.92 | 12.34 | | 6.68 | 1.72 | | |
| 3 | 30821 | 8.63 | 10.84 | | 6.86 | 2.36 | | |
| 3 | 30822 | 9.04 | 11.82 | | 7.25 | 2.31 | | |
| 3 | 30823 | 6.93 | 12.98 | | 5.54 | 2.42 | | |
| 3 | 30824 | 7.11 | 9.46 | | 5.92 | 2.74 | | |
| 3 | 30825 | 7.67 | 10.52 | | 6.32 | 2.59 | | |
| 3 | 30826 | 7.31 | 12.89 | | 5.83 | 2.24 | | |
| 3 | 30827 | 3.25 | 14.08 | | 2.61 | 3.52 | | |
| 3 | 30828 | 3.18 | 14.04 | | 2.55 | 3.50 | | |
| 3 | 30829 | 2.72 | 11.46 | | 2.60 | 2.71 | | |
| 3 | 30830 | 2.88 | 11.69 | | 2.64 | 2.74 | | |
| 3 | 30831 | 4.07 | 13.97 | | 2.79 | 3.35 | | |
| 3 | 30832 | 3.61 | 11.64 | | 2.85 | 2.57 | | |
| 3 | 30833 | 3.35 | 10.24 | | 3.04 | 2.33 | | |
| 3 | 30834 | 3.68 | 13.44 | | 2.92 | 3.19 | | |
| 3 | 30835 | 4.92 | 13.11 | | 3.73 | 2.66 | | |
| 3 | 30836 | 4.55 | 8.77 | | 4.04 | 2.31 | | |
| 3 | 30837 | 4.83 | 8.98 | | 4.44 | 2.46 | | |
| 3 | 30838 | 5.55 | 13.21 | | 4.17 | 2.63 | | |
| 3 | 30839 | 2.75 | 5.14 | | 2.80 | 1.06 | | |
| 3 | 30840 | 2.85 | 3.41 | | 2.81 | 0.56 | | |
| 3 | 30841 | 2.89 | 3.55 | | 2.88 | 0.66 | | |
| 3 | 30842 | 2.84 | 5.40 | | 2.88 | 1.16 | | |
| 3 | 30843 | 3.06 | 11.86 | | 2.70 | 2.78 | | |
| 3 | 30844 | 3.26 | 12.11 | | 2.75 | 2.80 | | |
| 3 | 30845 | 3.50 | 14.38 | | 2.78 | 3.48 | | |
| 3 | 30846 | 3.48 | 14.10 | | 2.75 | 3.50 | | |
| 3 | 30847 | 6.09 | 13.09 | | 4.65 | 2.62 | | |
| 3 | 30848 | 5.76 | 8.88 | | 4.90 | 2.59 | | |
| 3 | 30849 | 6.42 | 8.94 | | 5.41 | 2.70 | | |
| 3 | 30850 | 6.50 | 12.93 | | 5.12 | 2.54 | | |
| 3 | 30851 | 2.64 | 9.30 | | 2.73 | 2.08 | | |
| 3 | 30852 | 2.57 | 9.03 | | 2.67 | 2.01 | | |
| 3 | 30853 | 2.57 | 6.81 | | 2.68 | 1.45 | | |
| 3 | 30854 | 2.61 | 7.02 | | 2.74 | 1.49 | | |
| 3 | 30855 | 2.69 | 7.21 | | 2.80 | 1.59 | | |
| 3 | 30856 | 2.83 | 7.48 | | 2.87 | 1.67 | | |
| 3 | 30857 | 3.14 | 9.82 | | 2.84 | 2.19 | | |
| 3 | 30858 | 2.78 | 9.54 | | 2.78 | 2.15 | | |
| 3 | 30859 | 7.48 | 12.82 | | 6.03 | 2.00 | | |
| 3 | 30860 | 8.27 | 11.52 | | 6.51 | 2.33 | | |
| 3 | 30861 | 7.96 | 12.54 | | 6.26 | 1.84 | | |
| 3 | 30862 | 6.65 | 4.02 | | 5.79 | 3.85 | | |
| 3 | 30863 | 7.76 | 5.81 | | 6.72 | 3.47 | | |
| 3 | 30864 | 6.74 | 4.10 | | 5.72 | 3.76 | | |
| 3 | 30865 | 6.43 | 3.98 | | 5.43 | 3.56 | | |
| 3 | 30866 | 6.79 | 4.85 | | 5.86 | 3.40 | | |
| 3 | 30867 | 6.20 | 3.56 | | 5.28 | 3.45 | | |
| 3 | 30868 | 3.20 | 8.31 | | 3.06 | 1.90 | | |
| 3 | 30869 | 3.22 | 9.66 | | 2.94 | 2.18 | | |
| 3 | 30870 | 2.98 | 7.56 | | 2.95 | 1.70 | | |
| 3 | 30871 | 2.85 | 3.29 | | 2.79 | 0.48 | | |
| 3 | 30872 | 2.79 | 4.58 | | 2.79 | 0.86 | | |
| 3 | 30873 | 2.83 | 3.30 | | 2.75 | 0.44 | | |
| 3 | 30874 | 2.59 | 8.91 | | 2.64 | 2.00 | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 3 | 30875 | 2.64 | 8.13 | | 2.59 | 1.76 | | |
| 3 | 30876 | 2.56 | 6.87 | | 2.66 | 1.45 | | |
| 3 | 30877 | 6.21 | 3.61 | | 5.24 | 3.31 | | |
| 3 | 30878 | 6.69 | 4.39 | | 5.65 | 3.27 | | |
| 3 | 30879 | 6.26 | 3.42 | | 5.13 | 3.16 | | |
| 3 | 30880 | 5.39 | 3.59 | | 4.40 | 2.22 | | |
| 3 | 30881 | 5.27 | 4.93 | | 4.52 | 2.29 | | |
| 3 | 30882 | 5.17 | 3.49 | | 4.24 | 2.07 | | |
| 3 | 30883 | 4.75 | 3.30 | | 3.82 | 1.61 | | |
| 3 | 30884 | 4.34 | 5.05 | | 3.89 | 1.82 | | |
| 3 | 30885 | 4.54 | 3.37 | | 3.70 | 1.49 | | |
| 3 | 30886 | 4.27 | 8.45 | | 3.76 | 2.14 | | |
| 3 | 30887 | 4.49 | 12.02 | | 3.54 | 2.56 | | |
| 3 | 30888 | 3.88 | 8.20 | | 3.56 | 2.10 | | |
| 3 | 30889 | 3.60 | 3.51 | | 3.37 | 1.11 | | |
| 3 | 30890 | 3.66 | 4.99 | | 3.39 | 1.41 | | |
| 3 | 30891 | 3.47 | 3.51 | | 3.29 | 1.03 | | |
| 3 | 30892 | 6.47 | 6.06 | | 7.16 | | | |
| 3 | 30893 | 17.52 | 8.80 | | 7.76 | | | |
| 3 | 30894 | 16.41 | 10.05 | | 8.46 | | | |
| 3 | 30895 | 14.65 | 10.87 | | 9.06 | | | |
| 3 | 30896 | 12.86 | 11.45 | | 8.85 | | | |
| 3 | 30897 | 1.81 | | | 7.99 | | | |
| 3 | 30898 | 0.90 | | | 8.92 | | | 8.76 |
| 3 | 30899 | 1.64 | | | 8.52 | | | |
| 3 | 30900 | 2.60 | | | 7.91 | | | |
| 3 | 30901 | 3.23 | | | 7.25 | | | |
| 3 | 30902 | 3.32 | | | 6.58 | | | |
| 3 | 30903 | 2.88 | | | 6.01 | | | |
| 3 | 30904 | 2.05 | | | 5.71 | | | |
| 3 | 30905 | 1.20 | | | 6.40 | | | |
| 3 | 30906 | 8.88 | 1.02 | | 5.41 | | | 8.76 |
| 3 | 30907 | 2.04 | | | 3.09 | | | 8.76 |
| 3 | 30908 | | | | 3.42 | | | 8.76 |
| 3 | 30909 | | | | 3.63 | | | |
| 3 | 30910 | | | | 3.52 | | | |
| 3 | 30911 | | | | 3.21 | | | |
| 3 | 30912 | | | | 2.79 | | | |
| 3 | 30913 | 0.12 | | | 2.32 | | | |
| 3 | 30914 | 1.18 | | | 2.09 | | | |
| 3 | 30915 | 11.16 | 4.86 | | 7.99 | 0.22 | | 8.76 |
| 3 | 30916 | 5.96 | 0.16 | | 4.16 | 0.48 | | |
| 3 | 30917 | 2.45 | | | 1.52 | 0.63 | | |
| 3 | 30918 | 0.73 | | | 1.08 | 0.36 | | |
| 3 | 30919 | | | | 1.04 | | | |
| 3 | 30920 | | | | 0.94 | | | |
| 3 | 30921 | | | | 0.82 | | | |
| 3 | 30922 | 0.59 | | | 1.28 | 0.26 | | |
| 3 | 30923 | 2.62 | | | 2.30 | 1.32 | | |
| 3 | 30924 | 11.38 | 6.49 | | 8.52 | 0.68 | | |
| 3 | 30925 | 7.60 | 2.03 | | 5.03 | 1.73 | | |
| 3 | 30926 | 4.80 | 0.54 | | 2.19 | 2.67 | | |
| 3 | 30927 | 2.51 | | | 0.09 | 2.81 | | |
| 3 | 30928 | 1.63 | | | | 2.85 | | |
| 3 | 30929 | 1.36 | | | | 2.71 | | |
| 3 | 30930 | 1.49 | | | 0.21 | 2.53 | | |
| 3 | 30931 | 2.41 | | | 1.40 | 2.01 | | |
| 3 | 30932 | 4.26 | 0.71 | | 3.33 | 3.25 | | |
| 3 | 30933 | 10.99 | 7.05 | | 8.33 | 0.66 | | 8.76 |
| 3 | 30934 | 7.82 | 3.02 | | 5.43 | 1.96 | | |
| 3 | 30935 | 5.81 | 2.11 | | 2.63 | 4.60 | | |
| 3 | 30936 | 3.86 | 1.03 | | 0.25 | 4.97 | | |
| 3 | 30937 | 2.92 | 0.41 | | | 5.25 | | |
| 3 | 30938 | 2.75 | 0.26 | | | 5.13 | | |
| 3 | 30939 | 2.89 | 0.22 | | 0.39 | 4.56 | | |
| 3 | 30940 | 3.90 | 0.39 | | 1.76 | 3.72 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 30941 | 5.12 | 1.39 | | 4.00 | 3.78 | | |
| 3 | 30942 | 0.88 | | | 7.36 | | | 8.76 |
| 3 | 30943 | 1.26 | | | 7.45 | | | 8.76 |
| 3 | 30944 | 2.77 | | | 6.74 | | | |
| 3 | 30945 | 6.57 | 6.80 | | 6.53 | | | |
| 3 | 30946 | 3.20 | | | 2.33 | | | 8.76 |
| 3 | 30947 | 6.01 | | | 3.22 | | | 8.76 |
| 3 | 30948 | 10.97 | 3.26 | | 5.41 | | | 8.76 |
| 3 | 30949 | 17.51 | 8.83 | | 7.15 | | | |
| 3 | 30950 | 6.57 | 1.17 | | 3.93 | 2.40 | | |
| 3 | 30951 | 9.36 | 3.26 | | 5.83 | 2.24 | | |
| 3 | 30952 | 12.58 | 6.00 | | 8.11 | 0.89 | | |
| 3 | 30953 | 16.00 | 9.53 | | 7.80 | | | |
| 3 | 30954 | 7.17 | 3.20 | | 5.33 | 3.52 | | |
| 3 | 30955 | 9.39 | 5.18 | | 7.01 | 3.11 | | |
| 3 | 30956 | 11.67 | 7.25 | | 8.47 | 1.70 | | |
| 3 | 30957 | 14.02 | 10.70 | | 8.55 | | | |
| 3 | 30958 | 6.79 | 3.92 | | 5.86 | 3.73 | | |
| 3 | 30959 | 8.57 | 5.77 | | 7.14 | 3.39 | | |
| 3 | 30960 | 10.35 | 8.20 | | 8.22 | 2.36 | | |
| 3 | 30961 | 11.72 | 11.49 | | 8.45 | 0.61 | | |
| 3 | 30962 | 12.54 | 11.50 | | 8.74 | | | |
| 3 | 30963 | 14.41 | 10.90 | | 8.96 | | | |
| 3 | 30964 | 16.27 | 10.14 | | 8.47 | | | |
| 3 | 30965 | 17.18 | 8.77 | | 7.73 | | | |
| 3 | 30966 | 6.34 | 6.27 | | 7.11 | | | |
| 3 | 30967 | 5.35 | 11.91 | | 3.96 | 0.79 | | |
| 3 | 30968 | 5.35 | 11.91 | | 3.95 | 0.76 | | |
| 3 | 30969 | 5.16 | 11.91 | | 3.95 | 0.72 | | |
| 3 | 30970 | 5.36 | 11.91 | | 3.95 | 0.69 | | |
| 3 | 30971 | 5.37 | 11.91 | | 3.96 | 0.65 | | |
| 3 | 30972 | 5.40 | 11.90 | | 3.98 | 0.61 | | |
| 3 | 30973 | 5.43 | 11.90 | | 4.01 | 0.57 | | |
| 3 | 30974 | 5.54 | 11.89 | | 4.05 | 0.54 | | |
| 3 | 30975 | 5.69 | 11.88 | | 4.10 | 0.50 | | |
| 3 | 30976 | 5.85 | 11.95 | | 4.16 | 0.47 | | |
| 3 | 30977 | 6.01 | 12.03 | | 4.24 | 0.44 | | |
| 3 | 30978 | 6.18 | 12.10 | | 4.32 | 0.41 | | |
| 3 | 30979 | 6.35 | 12.16 | | 4.42 | 0.38 | | |
| 3 | 30980 | 6.53 | 12.22 | | 4.54 | 0.36 | | |
| 3 | 30981 | 6.72 | 12.26 | | 4.67 | 0.34 | | |
| 3 | 30982 | 6.92 | 12.29 | | 4.81 | 0.32 | | |
| 3 | 30983 | 7.12 | 12.30 | | 4.97 | 0.31 | | |
| 3 | 30984 | 7.33 | 12.30 | | 5.14 | 0.29 | | |
| 3 | 30985 | 7.55 | 12.28 | | 5.33 | 0.28 | | |
| 3 | 30986 | 7.85 | 12.24 | | 5.54 | 0.27 | | |
| 3 | 30987 | 7.73 | 12.19 | | 5.76 | 0.25 | | |
| 3 | 30988 | 8.03 | 12.11 | | 6.00 | 0.24 | | |
| 3 | 30989 | 8.31 | 12.12 | | 6.25 | 0.22 | | |
| 3 | 30990 | 8.66 | 12.08 | | 6.52 | 0.19 | | |
| 3 | 30991 | 8.97 | 12.03 | | 6.80 | 0.16 | | |
| 3 | 30992 | 9.28 | 12.37 | | 7.09 | 0.12 | | |
| 3 | 30993 | 9.60 | 13.11 | | 7.39 | 0.06 | | |
| 3 | 30994 | 10.07 | 12.88 | | 7.70 | | | |
| 3 | 30995 | 10.44 | 12.62 | | 7.99 | | | |
| 3 | 30996 | 10.82 | 12.32 | | 8.21 | | | |
| 3 | 30997 | 11.22 | 12.16 | | 8.40 | | | |
| 3 | 30998 | 11.64 | 12.14 | | 8.53 | | | |
| 3 | 30999 | 8.64 | 7.29 | | 5.89 | | | |
| 3 | 31000 | 8.42 | 7.71 | | 5.69 | | | |
| 3 | 31001 | 8.26 | 8.11 | | 5.53 | | | |
| 3 | 31002 | 8.11 | 8.39 | | 5.43 | | | |
| 3 | 31003 | 7.97 | 8.93 | | 5.37 | | | |
| 3 | 31004 | 7.75 | 8.27 | | 5.37 | | | |
| 3 | 31005 | 7.37 | 8.63 | | 5.31 | 0.14 | | |
| 3 | 31006 | 7.46 | 9.01 | | 5.24 | 0.27 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 31007 | 7.32 | 9.36 | | 5.17 | 0.38 | | |
| 3 | 31008 | 7.21 | 9.69 | | 5.10 | 0.48 | | |
| 3 | 31009 | 7.08 | 9.99 | | 5.04 | 0.57 | | |
| 3 | 31010 | 6.95 | 10.26 | | 4.97 | 0.65 | | |
| 3 | 31011 | 6.82 | 10.51 | | 4.91 | 0.71 | | |
| 3 | 31012 | 6.69 | 10.74 | | 4.85 | 0.77 | | |
| 3 | 31013 | 6.56 | 10.94 | | 4.79 | 0.82 | | |
| 3 | 31014 | 6.49 | 11.12 | | 4.73 | 0.86 | | |
| 3 | 31015 | 6.40 | 11.27 | | 4.67 | 0.89 | | |
| 3 | 31016 | 6.33 | 11.40 | | 4.61 | 0.92 | | |
| 3 | 31017 | 6.25 | 11.51 | | 4.55 | 0.94 | | |
| 3 | 31018 | 6.18 | 11.60 | | 4.49 | 0.96 | | |
| 3 | 31019 | 6.12 | 11.67 | | 4.43 | 0.97 | | |
| 3 | 31020 | 6.05 | 11.72 | | 4.38 | 0.97 | | |
| 3 | 31021 | 5.99 | 11.77 | | 4.33 | 0.98 | | |
| 3 | 31022 | 5.67 | 11.80 | | 4.28 | 0.97 | | |
| 3 | 31023 | 5.63 | 11.82 | | 4.23 | 0.97 | | |
| 3 | 31024 | 5.60 | 11.86 | | 4.18 | 0.96 | | |
| 3 | 31025 | 5.54 | 11.87 | | 4.14 | 0.94 | | |
| 3 | 31026 | 5.51 | 11.87 | | 4.10 | 0.93 | | |
| 3 | 31027 | 5.48 | 11.87 | | 4.06 | 0.91 | | |
| 3 | 31028 | 5.43 | 11.87 | | 4.03 | 0.88 | | |
| 3 | 31029 | 5.39 | 11.87 | | 4.00 | 0.85 | | |
| 3 | 31030 | 5.37 | 11.91 | | 3.98 | 0.83 | | |
| 3 | 31031 | 18.22 | 5.91 | | 2.51 | | | |
| 3 | 31032 | 9.36 | 6.33 | | 6.18 | | | |
| 3 | 31033 | 10.75 | 7.15 | | 8.27 | 0.66 | | |
| 3 | 31034 | 7.55 | 2.87 | | 5.44 | 1.86 | | |
| 3 | 31035 | 5.52 | 1.97 | | 2.74 | 4.56 | | |
| 3 | 31036 | 3.81 | 0.89 | | 0.53 | 5.02 | | |
| 3 | 31037 | 3.32 | 0.65 | | | 5.18 | | |
| 3 | 31038 | 3.14 | 0.54 | | | 5.05 | | |
| 3 | 31039 | 3.34 | 0.48 | | 0.31 | 4.47 | | |
| 3 | 31040 | 4.33 | 0.62 | | 1.69 | 3.55 | | |
| 3 | 31041 | 5.51 | 1.11 | | 3.98 | 3.75 | | |
| 3 | 31042 | 11.17 | 6.58 | | 8.48 | 0.71 | | |
| 3 | 31043 | 7.32 | 1.88 | | 5.11 | 1.56 | | |
| 3 | 31044 | 4.45 | 0.41 | | 2.42 | 2.49 | | |
| 3 | 31045 | 2.46 | | | 0.24 | 2.62 | | |
| 3 | 31046 | 1.73 | | | | 2.71 | | |
| 3 | 31047 | 1.57 | | | | 2.67 | | |
| 3 | 31048 | 1.78 | | | 0.19 | 2.57 | | |
| 3 | 31049 | 2.53 | | | 1.30 | 2.09 | | |
| 3 | 31050 | 4.67 | 0.47 | | 3.28 | 3.18 | | |
| 3 | 31051 | 10.94 | 4.94 | | 8.01 | 0.21 | | 8.76 |
| 3 | 31052 | 5.67 | 0.23 | | 4.30 | 0.44 | | |
| 3 | 31053 | 2.33 | | | 1.69 | 0.30 | | |
| 3 | 31054 | 0.70 | | | 1.15 | 0.11 | | |
| 3 | 31055 | 0.01 | | | 1.08 | | | |
| 3 | 31056 | | | | 0.94 | | | |
| 3 | 31057 | 0.08 | | | 0.79 | | | |
| 3 | 31058 | 0.80 | | | 1.14 | 0.39 | | |
| 3 | 31059 | 2.82 | | | 2.20 | 1.26 | | |
| 3 | 31060 | 8.75 | 1.06 | | 5.60 | | | 8.76 |
| 3 | 31061 | 1.93 | | | 3.19 | | | 8.76 |
| 3 | 31062 | | | | 3.37 | | | 8.76 |
| 3 | 31063 | | | | 3.58 | | | |
| 3 | 31064 | | | | 3.50 | | | |
| 3 | 31065 | | | | 3.23 | | | |
| 3 | 31066 | | | | 2.85 | | | |
| 3 | 31067 | 0.06 | | | 2.41 | | | |
| 3 | 31068 | 1.13 | | | 2.17 | | | |
| 3 | 31069 | 1.75 | | | 7.87 | | | |
| 3 | 31070 | 0.83 | | | 8.76 | | | 8.76 |
| 3 | 31071 | 1.57 | | | 8.41 | | | |
| 3 | 31072 | 2.53 | | | 7.85 | | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 31073 | 3.16 | | | 7.23 | | | |
| 3 | 31074 | 3.26 | | | 6.60 | | | |
| 3 | 31075 | 2.84 | | | 6.07 | | | |
| 3 | 31076 | 2.03 | | | 5.82 | | | |
| 3 | 31077 | 1.21 | | | 6.57 | | | |
| 3 | 31078 | 4.94 | 5.54 | | 3.36 | | | 8.76 |
| 3 | 31079 | 4.70 | 3.21 | | 2.89 | | | |
| 3 | 31080 | 4.93 | 4.44 | | 3.05 | 3.02 | | |
| 3 | 31081 | 4.99 | 4.88 | | 3.47 | 5.36 | | |
| 3 | 31082 | 4.98 | 4.74 | | 3.65 | 6.59 | | |
| 3 | 31083 | 4.74 | 4.05 | | 3.69 | 6.79 | | |
| 3 | 31084 | 4.38 | 2.96 | | 3.58 | 6.04 | | |
| 3 | 31085 | 3.95 | 1.52 | | 3.31 | 4.32 | | |
| 3 | 31086 | 3.43 | 1.24 | | 2.91 | 1.53 | | |
| 3 | 31087 | 4.89 | 5.53 | | 3.36 | | | 8.76 |
| 3 | 31088 | 4.80 | 3.19 | | 2.88 | | | |
| 3 | 31089 | 4.92 | 4.44 | | 2.99 | 3.05 | | |
| 3 | 31090 | 4.98 | 4.89 | | 3.54 | 5.40 | | |
| 3 | 31091 | 4.92 | 4.71 | | 3.61 | 6.66 | | |
| 3 | 31092 | 4.74 | 4.06 | | 3.52 | 6.75 | | |
| 3 | 31093 | 4.39 | 2.98 | | 3.52 | 6.07 | | |
| 3 | 31094 | 3.97 | 1.55 | | 3.26 | 4.34 | | |
| 3 | 31095 | 3.44 | 1.29 | | 2.90 | 1.47 | | |
| 3 | 31096 | 5.15 | 5.51 | | 3.37 | | | 8.76 |
| 3 | 31097 | 4.76 | 3.18 | | 2.87 | | | |
| 3 | 31098 | 4.92 | 4.44 | | 2.94 | 3.09 | | |
| 3 | 31099 | 4.98 | 4.89 | | 3.37 | 5.45 | | |
| 3 | 31100 | 4.92 | 4.73 | | 3.56 | 6.72 | | |
| 3 | 31101 | 4.74 | 4.07 | | 3.38 | 6.78 | | |
| 3 | 31102 | 4.41 | 2.99 | | 3.46 | 6.10 | | |
| 3 | 31103 | 4.01 | 1.57 | | 3.21 | 4.36 | | |
| 3 | 31104 | 3.45 | 1.71 | | 2.89 | 1.42 | | |
| 3 | 31105 | 5.10 | 5.51 | | 3.38 | | | 8.76 |
| 3 | 31106 | 4.75 | 3.17 | | 2.87 | | | |
| 3 | 31107 | 4.92 | 4.44 | | 2.90 | 3.13 | | |
| 3 | 31108 | 4.99 | 4.90 | | 3.33 | 5.51 | | |
| 3 | 31109 | 4.93 | 4.74 | | 3.52 | 6.79 | | |
| 3 | 31110 | 4.75 | 4.09 | | 3.25 | 6.82 | | |
| 3 | 31111 | 4.44 | 3.01 | | 3.40 | 6.14 | | |
| 3 | 31112 | 4.04 | 1.59 | | 3.16 | 4.37 | | |
| 3 | 31113 | 3.50 | 1.72 | | 2.88 | 1.44 | | |
| 3 | 31114 | 5.10 | 5.50 | | 3.39 | | | 8.76 |
| 3 | 31115 | 4.81 | 3.17 | | 2.86 | | | |
| 3 | 31116 | 4.93 | 4.44 | | 2.87 | 3.19 | | |
| 3 | 31117 | 5.09 | 4.92 | | 3.30 | 5.57 | | |
| 3 | 31118 | 4.95 | 4.75 | | 3.48 | 6.86 | | |
| 3 | 31119 | 4.76 | 4.10 | | 3.19 | 6.85 | | |
| 3 | 31120 | 4.46 | 3.03 | | 3.35 | 6.18 | | |
| 3 | 31121 | 4.07 | 1.61 | | 3.10 | 4.78 | | |
| 3 | 31122 | 3.59 | 1.74 | | 2.87 | 1.49 | | |
| 3 | 31123 | 5.11 | 5.49 | | 3.41 | | | 8.76 |
| 3 | 31124 | 4.81 | 3.17 | | 2.85 | | | |
| 3 | 31125 | 4.94 | 4.44 | | 2.84 | 3.24 | | |
| 3 | 31126 | 5.10 | 4.92 | | 3.26 | 5.63 | | |
| 3 | 31127 | 4.96 | 4.76 | | 3.44 | 6.93 | | |
| 3 | 31128 | 4.78 | 4.11 | | 3.13 | 6.88 | | |
| 3 | 31129 | 4.49 | 3.05 | | 3.30 | 6.21 | | |
| 3 | 31130 | 4.11 | 1.64 | | 3.07 | 4.81 | | |
| 3 | 31131 | 3.68 | 1.77 | | 2.87 | 1.49 | | |
| 3 | 31132 | 5.14 | 5.48 | | 3.43 | | | 8.76 |
| 3 | 31133 | 4.85 | 3.20 | | 2.85 | | | |
| 3 | 31134 | 4.96 | 4.45 | | 2.82 | 3.31 | | |
| 3 | 31135 | 5.11 | 4.93 | | 3.23 | 5.70 | | |
| 3 | 31136 | 5.02 | 4.79 | | 3.26 | 6.82 | | |
| 3 | 31137 | 4.80 | 4.13 | | 3.07 | 6.92 | | |
| 3 | 31138 | 4.52 | 3.05 | | 3.25 | 6.26 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 31139 | 4.16 | 1.67 | | 3.04 | 4.85 | | |
| 3 | 31140 | 3.76 | 1.82 | | 2.88 | 1.47 | | |
| 3 | 31141 | 5.28 | 5.46 | | 3.45 | | | 8.76 |
| 3 | 31142 | 4.98 | 3.23 | | 2.84 | | | |
| 3 | 31143 | 4.98 | 4.45 | | 2.81 | 3.38 | | |
| 3 | 31144 | 5.05 | 4.93 | | 3.20 | 5.77 | | |
| 3 | 31145 | 5.03 | 4.80 | | 3.22 | 6.87 | | |
| 3 | 31146 | 4.83 | 4.14 | | 3.16 | 6.96 | | |
| 3 | 31147 | 4.55 | 3.07 | | 3.20 | 6.30 | | |
| 3 | 31148 | 4.20 | 1.70 | | 3.01 | 4.88 | | |
| 3 | 31149 | 3.88 | 1.84 | | 2.90 | 1.51 | | |
| 3 | 31150 | 5.43 | 5.45 | | 3.49 | | | 8.76 |
| 3 | 31151 | 5.11 | 3.26 | | 2.84 | | | |
| 3 | 31152 | 5.01 | 4.45 | | 2.80 | 3.45 | | |
| 3 | 31153 | 5.07 | 4.94 | | 3.18 | 5.85 | | |
| 3 | 31154 | 5.03 | 4.80 | | 3.18 | 6.93 | | |
| 3 | 31155 | 4.85 | 4.16 | | 3.11 | 7.02 | | |
| 3 | 31156 | 4.58 | 3.10 | | 3.15 | 6.35 | | |
| 3 | 31157 | 4.25 | 1.73 | | 2.98 | 4.92 | | |
| 3 | 31158 | 3.99 | 1.86 | | 2.92 | 1.56 | | |
| 3 | 31159 | 5.59 | 5.43 | | 3.53 | | | 8.76 |
| 3 | 31160 | 5.24 | 3.29 | | 2.84 | | | |
| 3 | 31161 | 5.04 | 4.46 | | 2.81 | 3.54 | | |
| 3 | 31162 | 5.10 | 4.95 | | 3.15 | 5.93 | | |
| 3 | 31163 | 5.07 | 4.81 | | 3.14 | 6.99 | | |
| 3 | 31164 | 4.88 | 4.17 | | 3.17 | 7.26 | | |
| 3 | 31165 | 4.62 | 3.13 | | 3.10 | 6.41 | | |
| 3 | 31166 | 4.30 | 1.76 | | 2.95 | 4.97 | | |
| 3 | 31167 | 4.14 | 1.96 | | 2.96 | 1.59 | | |
| 3 | 31168 | 5.74 | 5.43 | | 3.57 | | | 8.76 |
| 3 | 31169 | 5.37 | 3.32 | | 2.85 | | | |
| 3 | 31170 | 5.07 | 4.46 | | 2.81 | 3.63 | | |
| 3 | 31171 | 5.14 | 4.96 | | 2.96 | 5.72 | | |
| 3 | 31172 | 5.09 | 4.82 | | 3.23 | 7.31 | | |
| 3 | 31173 | 4.91 | 4.18 | | 3.11 | 7.33 | | |
| 3 | 31174 | 4.66 | 3.15 | | 3.05 | 6.46 | | |
| 3 | 31175 | 4.35 | 1.79 | | 2.93 | 4.52 | | |
| 3 | 31176 | 4.31 | 2.07 | | 3.03 | 1.63 | | |
| 3 | 31177 | 5.90 | 5.48 | | 3.63 | | | 8.76 |
| 3 | 31178 | 5.50 | 3.35 | | 2.86 | | | |
| 3 | 31179 | 5.11 | 4.47 | | 2.82 | 3.72 | | |
| 3 | 31180 | 5.17 | 4.96 | | 2.94 | 5.78 | | |
| 3 | 31181 | 5.12 | 4.83 | | 3.18 | 7.39 | | |
| 3 | 31182 | 4.94 | 4.19 | | 3.05 | 7.40 | | |
| 3 | 31183 | 4.69 | 3.18 | | 3.00 | 6.52 | | |
| 3 | 31184 | 4.41 | 1.83 | | 2.91 | 4.58 | | |
| 3 | 31185 | 4.43 | 2.10 | | 3.12 | 1.67 | | |
| 3 | 31186 | 6.07 | 5.53 | | 3.70 | | | 8.76 |
| 3 | 31187 | 5.62 | 3.38 | | 2.87 | | | |
| 3 | 31188 | 5.15 | 4.47 | | 2.84 | 3.83 | | |
| 3 | 31189 | 5.20 | 4.97 | | 2.92 | 5.85 | | |
| 3 | 31190 | 5.14 | 4.83 | | 3.13 | 7.47 | | |
| 3 | 31191 | 4.96 | 4.20 | | 2.99 | 7.46 | | |
| 3 | 31192 | 4.73 | 3.20 | | 2.94 | 6.58 | | |
| 3 | 31193 | 4.46 | 1.87 | | 2.89 | 4.64 | | |
| 3 | 31194 | 4.56 | 1.80 | | 3.25 | 1.71 | | |
| 3 | 31195 | 6.23 | 5.58 | | 3.78 | | | 8.76 |
| 3 | 31196 | 5.75 | 3.41 | | 2.89 | | | |
| 3 | 31197 | 5.23 | 4.47 | | 2.85 | 3.94 | | |
| 3 | 31198 | 5.24 | 4.96 | | 3.06 | 6.31 | | |
| 3 | 31199 | 5.16 | 4.83 | | 3.08 | 7.55 | | |
| 3 | 31200 | 4.99 | 4.21 | | 2.92 | 7.53 | | |
| 3 | 31201 | 4.77 | 3.22 | | 2.89 | 6.65 | | |
| 3 | 31202 | 4.52 | 1.91 | | 2.92 | 4.74 | | |
| 3 | 31203 | 4.69 | 1.83 | | 3.31 | 1.79 | | |
| 3 | 31204 | 6.40 | 6.03 | | 3.87 | | | 8.76 |

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|---|---|---|---|---|---|---|---|---|
| 3 | 31205 | 5.87 | 3.43 | | 2.91 | | | |
| 3 | 31206 | 5.45 | 4.47 | | 2.87 | 4.05 | | |
| 3 | 31207 | 5.28 | 4.96 | | 3.03 | 6.41 | | |
| 3 | 31208 | 5.19 | 4.82 | | 3.01 | 7.64 | | |
| 3 | 31209 | 5.02 | 4.21 | | 2.84 | 7.59 | | |
| 3 | 31210 | 4.80 | 3.23 | | 2.82 | 6.71 | | |
| 3 | 31211 | 4.57 | 1.95 | | 2.90 | 4.82 | | |
| 3 | 31212 | 4.79 | 1.85 | | 3.36 | 1.83 | | |
| 3 | 31213 | 6.57 | 6.08 | | 3.99 | | | 8.76 |
| 3 | 31214 | 5.98 | 3.46 | | 2.95 | | | |
| 3 | 31215 | 5.47 | 4.46 | | 2.89 | 4.17 | | |
| 3 | 31216 | 5.31 | 4.94 | | 3.00 | 6.52 | | |
| 3 | 31217 | 5.21 | 4.81 | | 2.94 | 7.72 | | |
| 3 | 31218 | 5.04 | 4.20 | | 2.75 | 7.65 | | |
| 3 | 31219 | 4.84 | 3.24 | | 2.75 | 6.77 | | |
| 3 | 31220 | 4.63 | 1.99 | | 2.71 | 4.89 | | |
| 3 | 31221 | 4.92 | 2.18 | | 3.42 | 1.94 | | |
| 3 | 31222 | 6.74 | 6.14 | | 4.12 | | | 8.76 |
| 3 | 31223 | 6.07 | 3.49 | | 3.00 | | | |
| 3 | 31224 | 5.50 | 4.46 | | 2.91 | 4.30 | | |
| 3 | 31225 | 5.34 | 4.92 | | 2.96 | 6.63 | | |
| 3 | 31226 | 5.23 | 4.79 | | 2.87 | 7.80 | | |
| 3 | 31227 | 5.06 | 4.19 | | 2.65 | 7.71 | | |
| 3 | 31228 | 4.87 | 3.24 | | 2.67 | 6.83 | | |
| 3 | 31229 | 4.69 | 2.02 | | 2.69 | 4.98 | | |
| 3 | 31230 | 5.02 | 1.87 | | 3.48 | 2.00 | | |
| 3 | 31231 | 6.85 | 6.20 | | 4.27 | | | 8.76 |
| 3 | 31232 | 6.21 | 3.52 | | 3.06 | | | |
| 3 | 31233 | 5.62 | 4.44 | | 2.92 | 3.59 | | |
| 3 | 31234 | 5.37 | 4.89 | | 2.92 | 6.74 | | |
| 3 | 31235 | 5.25 | 4.75 | | 2.78 | 7.88 | | |
| 3 | 31236 | 5.08 | 4.16 | | 2.54 | 7.75 | | |
| 3 | 31237 | 4.90 | 3.24 | | 2.59 | 6.89 | | |
| 3 | 31238 | 4.75 | 2.05 | | 2.66 | 5.06 | | |
| 3 | 31239 | 5.15 | 2.18 | | 3.54 | 2.11 | | |
| 3 | 31240 | 7.06 | 6.26 | | 4.45 | | | 8.76 |
| 3 | 31241 | 6.36 | 3.54 | | 3.14 | | | |
| 3 | 31242 | 5.68 | 4.42 | | 2.94 | 4.56 | | |
| 3 | 31243 | 5.40 | 4.85 | | 2.87 | 6.84 | | |
| 3 | 31244 | 5.26 | 4.71 | | 2.68 | 7.95 | | |
| 3 | 31245 | 5.09 | 4.13 | | 2.42 | 7.79 | | |
| 3 | 31246 | 4.93 | 3.22 | | 2.50 | 6.94 | | |
| 3 | 31247 | 4.80 | 2.07 | | 2.63 | 5.14 | | |
| 3 | 31248 | 5.33 | 2.00 | | 3.60 | 2.24 | | |
| 3 | 31249 | 7.28 | 6.32 | | 4.65 | | | 8.76 |
| 3 | 31250 | 6.51 | 3.56 | | 3.24 | | | |
| 3 | 31251 | 5.76 | 4.39 | | 2.95 | 4.70 | | |
| 3 | 31252 | 5.44 | 4.79 | | 2.81 | 6.95 | | |
| 3 | 31253 | 5.27 | 4.61 | | 2.58 | 8.02 | | |
| 3 | 31254 | 5.10 | 3.98 | | 2.28 | 7.82 | | |
| 3 | 31255 | 4.95 | 3.20 | | 2.39 | 6.99 | | |
| 3 | 31256 | 4.85 | 2.09 | | 2.59 | 5.23 | | |
| 3 | 31257 | 5.41 | 2.13 | | 3.66 | 2.34 | | |
| 3 | 31258 | 7.50 | 6.39 | | 4.88 | | | 8.76 |
| 3 | 31259 | 6.65 | 3.58 | | 3.36 | 0.14 | | |
| 3 | 31260 | 5.83 | 4.36 | | 2.96 | 4.83 | | |
| 3 | 31261 | 5.45 | 4.72 | | 2.74 | 7.05 | | |
| 3 | 31262 | 5.27 | 4.39 | | 2.45 | 8.09 | | |
| 3 | 31263 | 4.96 | 3.89 | | 2.13 | 7.85 | | |
| 3 | 31264 | 4.96 | 3.16 | | 2.27 | 7.04 | | |
| 3 | 31265 | 4.89 | 2.10 | | 2.55 | 5.31 | | |
| 3 | 31266 | 5.50 | 2.09 | | 3.73 | 2.43 | | |
| 3 | 31267 | 7.72 | 6.46 | | 5.14 | | | 8.76 |
| 3 | 31268 | 6.79 | 3.60 | | 3.50 | 0.32 | | |
| 3 | 31269 | 5.88 | 4.31 | | 2.97 | 4.96 | | |
| 3 | 31270 | 5.45 | 4.63 | | 2.66 | 7.15 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 31271 | 5.11 | 4.30 | | 2.32 | 8.14 | | |
| 3 | 31272 | 4.94 | 3.81 | | 1.97 | 7.88 | | |
| 3 | 31273 | 4.97 | 3.11 | | 2.14 | 7.08 | | |
| 3 | 31274 | 4.93 | 2.10 | | 2.49 | 5.38 | | |
| 3 | 31275 | 5.57 | 2.04 | | 3.81 | 2.53 | | |
| 3 | 31276 | 7.94 | 6.54 | | 5.42 | | | 8.76 |
| 3 | 31277 | 6.92 | 3.62 | | 3.68 | 0.51 | | |
| 3 | 31278 | 5.92 | 4.24 | | 3.00 | 5.09 | | |
| 3 | 31279 | 5.44 | 4.51 | | 2.56 | 7.23 | | |
| 3 | 31280 | 5.09 | 4.19 | | 2.17 | 8.18 | | |
| 3 | 31281 | 4.91 | 3.71 | | 1.79 | 7.89 | | |
| 3 | 31282 | 4.96 | 3.05 | | 1.99 | 7.11 | | |
| 3 | 31283 | 4.97 | 2.12 | | 2.45 | 5.45 | | |
| 3 | 31284 | 5.64 | 1.98 | | 3.88 | 2.62 | | |
| 3 | 31285 | 8.17 | 6.62 | | 5.74 | | | 8.76 |
| 3 | 31286 | 7.04 | 3.62 | | 3.88 | 0.69 | | |
| 3 | 31287 | 5.95 | 4.16 | | 3.01 | 5.21 | | |
| 3 | 31288 | 5.42 | 4.37 | | 2.45 | 7.30 | | |
| 3 | 31289 | 5.05 | 4.05 | | 2.00 | 8.20 | | |
| 3 | 31290 | 4.87 | 3.57 | | 1.60 | 7.89 | | |
| 3 | 31291 | 4.95 | 2.92 | | 1.82 | 7.12 | | |
| 3 | 31292 | 4.99 | 2.08 | | 2.45 | 5.50 | | |
| 3 | 31293 | 5.68 | 1.90 | | 3.96 | 2.71 | | |
| 3 | 31294 | 8.40 | 6.71 | | 6.08 | | | 8.76 |
| 3 | 31295 | 7.15 | 3.62 | | 4.11 | 0.88 | | |
| 3 | 31296 | 5.95 | 4.06 | | 3.01 | 5.32 | | |
| 3 | 31297 | 5.39 | 4.20 | | 2.31 | 7.35 | | |
| 3 | 31298 | 5.00 | 3.88 | | 1.81 | 8.19 | | |
| 3 | 31299 | 4.81 | 3.41 | | 1.40 | 7.87 | | |
| 3 | 31300 | 4.91 | 2.76 | | 1.73 | 7.10 | | |
| 3 | 31301 | 5.01 | 2.03 | | 2.48 | 5.54 | | |
| 3 | 31302 | 5.72 | 1.82 | | 4.04 | 2.77 | | |
| 3 | 31303 | 8.63 | 6.80 | | 6.44 | | | 8.76 |
| 3 | 31304 | 7.26 | 3.61 | | 4.38 | 0.73 | | |
| 3 | 31305 | 5.97 | 3.99 | | 3.00 | 5.41 | | |
| 3 | 31306 | 5.35 | 3.91 | | 2.16 | 7.37 | | |
| 3 | 31307 | 4.93 | 3.68 | | 1.60 | 8.16 | | |
| 3 | 31308 | 4.73 | 3.22 | | 1.23 | 7.81 | | |
| 3 | 31309 | 4.70 | 2.62 | | 1.64 | 7.06 | | |
| 3 | 31310 | 5.02 | 1.97 | | 2.48 | 5.55 | | |
| 3 | 31311 | 5.75 | 1.70 | | 4.11 | 2.84 | | |
| 3 | 31312 | 8.86 | 6.89 | | 6.81 | | | 8.76 |
| 3 | 31313 | 7.35 | 3.59 | | 4.68 | 0.93 | | |
| 3 | 31314 | 5.94 | 3.86 | | 2.98 | 5.47 | | |
| 3 | 31315 | 5.28 | 3.67 | | 1.97 | 7.35 | | |
| 3 | 31316 | 4.83 | 3.44 | | 1.37 | 8.08 | | |
| 3 | 31317 | 4.63 | 2.99 | | 1.05 | 7.72 | | |
| 3 | 31318 | 4.63 | 2.44 | | 1.54 | 6.98 | | |
| 3 | 31319 | 5.02 | 1.89 | | 2.44 | 5.53 | | |
| 3 | 31320 | 5.75 | 1.59 | | 4.17 | 2.89 | | |
| 3 | 31321 | 9.37 | 6.97 | | 7.06 | 0.05 | | 8.76 |
| 3 | 31322 | 7.43 | 3.56 | | 5.01 | 1.13 | | |
| 3 | 31323 | 5.96 | 3.69 | | 2.95 | 5.51 | | |
| 3 | 31324 | 5.23 | 3.40 | | 1.75 | 7.29 | | |
| 3 | 31325 | 4.72 | 3.15 | | 1.11 | 7.95 | | |
| 3 | 31326 | 4.50 | 2.72 | | 0.85 | 7.58 | | |
| 3 | 31327 | 4.53 | 2.23 | | 1.40 | 6.85 | | |
| 3 | 31328 | 5.00 | 1.79 | | 2.39 | 5.48 | | |
| 3 | 31329 | 5.73 | 1.45 | | 4.22 | 3.08 | | |
| 3 | 31330 | 9.62 | 7.05 | | 7.31 | 0.18 | | 8.76 |
| 3 | 31331 | 7.49 | 3.51 | | 5.24 | 1.32 | | |
| 3 | 31332 | 5.95 | 3.49 | | 2.90 | 5.52 | | |
| 3 | 31333 | 5.12 | 3.07 | | 1.57 | 7.18 | | |
| 3 | 31334 | 4.57 | 2.81 | | 0.88 | 7.77 | | |
| 3 | 31335 | 4.35 | 2.41 | | 0.64 | 7.40 | | |
| 3 | 31336 | 4.41 | 2.02 | | 1.26 | 6.66 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 31337 | 4.96 | 1.69 | | 2.20 | 5.39 | | |
| 3 | 31338 | 5.70 | 1.31 | | 4.27 | 3.28 | | |
| 3 | 31339 | 9.86 | 7.13 | | 7.55 | 0.30 | | 8.76 |
| 3 | 31340 | 7.53 | 3.45 | | 5.32 | 1.74 | | |
| 3 | 31341 | 5.94 | 3.25 | | 2.94 | 5.48 | | |
| 3 | 31342 | 4.98 | 2.69 | | 1.38 | 7.00 | | |
| 3 | 31343 | 4.40 | 2.43 | | 0.66 | 7.52 | | |
| 3 | 31344 | 4.18 | 2.12 | | 0.44 | 7.15 | | |
| 3 | 31345 | 4.27 | 1.80 | | 1.10 | 6.40 | | |
| 3 | 31346 | 4.91 | 1.57 | | 2.13 | 5.23 | | |
| 3 | 31347 | 5.74 | 1.27 | | 4.29 | 3.46 | | |
| 3 | 31348 | 10.10 | 7.20 | | 7.77 | 0.42 | | 8.76 |
| 3 | 31349 | 7.56 | 3.35 | | 5.39 | 1.83 | | |
| 3 | 31350 | 5.90 | 3.00 | | 2.88 | 5.39 | | |
| 3 | 31351 | 4.81 | 2.26 | | 1.16 | 6.74 | | |
| 3 | 31352 | 4.20 | 2.03 | | 0.42 | 7.19 | | |
| 3 | 31353 | 3.98 | 1.80 | | 0.26 | 6.75 | | |
| 3 | 31354 | 4.10 | 1.54 | | 0.94 | 6.05 | | |
| 3 | 31355 | 4.82 | 1.41 | | 2.04 | 5.01 | | |
| 3 | 31356 | 5.66 | 1.22 | | 4.26 | 3.60 | | |
| 3 | 31357 | 10.33 | 7.28 | | 7.98 | 0.53 | | 8.76 |
| 3 | 31358 | 7.57 | 3.28 | | 5.43 | 1.91 | | |
| 3 | 31359 | 5.83 | 2.72 | | 2.81 | 5.23 | | |
| 3 | 31360 | 4.41 | 1.85 | | 0.90 | 6.39 | | |
| 3 | 31361 | 3.96 | 1.63 | | 0.17 | 6.69 | | |
| 3 | 31362 | 3.75 | 1.44 | | 0.08 | 6.28 | | |
| 3 | 31363 | 3.89 | 1.24 | | 0.74 | 5.56 | | |
| 3 | 31364 | 4.72 | 1.21 | | 1.93 | 4.70 | | |
| 3 | 31365 | 5.62 | 1.23 | | 4.21 | 3.72 | | |
| 3 | 31366 | 8.01 | 5.56 | | 4.63 | | | |
| 3 | 31367 | 7.90 | 4.81 | | 3.28 | | | |
| 3 | 31368 | 7.91 | 4.75 | | 1.97 | 1.30 | | |
| 3 | 31369 | 7.31 | 3.85 | | 1.26 | 2.02 | | |
| 3 | 31370 | 6.47 | 2.79 | | 1.01 | 2.07 | | |
| 3 | 31371 | 6.69 | 2.70 | | 1.25 | 2.52 | | |
| 3 | 31372 | 6.97 | 3.12 | | 2.00 | 2.46 | | |
| 3 | 31373 | 6.92 | 3.15 | | 3.04 | 2.06 | | |
| 3 | 31374 | 6.41 | 3.14 | | 4.12 | 1.46 | | |
| 3 | 31375 | 7.71 | 5.47 | | 4.52 | | | |
| 3 | 31376 | 7.59 | 4.61 | | 3.64 | 0.09 | | |
| 3 | 31377 | 7.63 | 4.81 | | 2.62 | 1.72 | | |
| 3 | 31378 | 7.21 | 4.11 | | 1.59 | 2.49 | | |
| 3 | 31379 | 6.46 | 3.11 | | 1.28 | 2.47 | | |
| 3 | 31380 | 6.64 | 2.90 | | 1.26 | 2.95 | | |
| 3 | 31381 | 6.81 | 3.18 | | 2.02 | 3.02 | | |
| 3 | 31382 | 6.63 | 3.00 | | 3.07 | 2.47 | | |
| 3 | 31383 | 6.07 | 2.93 | | 4.17 | 1.80 | | |
| 3 | 31384 | 7.56 | 5.43 | | 4.42 | | | |
| 3 | 31385 | 7.35 | 4.40 | | 4.39 | 0.28 | | |
| 3 | 31386 | 7.41 | 4.82 | | 3.38 | 2.03 | | |
| 3 | 31387 | 7.08 | 4.31 | | 2.39 | 2.85 | | |
| 3 | 31388 | 6.42 | 3.49 | | 1.84 | 2.83 | | |
| 3 | 31389 | 6.54 | 3.14 | | 1.81 | 3.29 | | |
| 3 | 31390 | 6.63 | 3.15 | | 2.33 | 3.40 | | |
| 3 | 31391 | 6.37 | 2.84 | | 3.05 | 3.01 | | |
| 3 | 31392 | 5.79 | 2.57 | | 4.16 | 2.23 | | |
| 3 | 31393 | 7.44 | 5.45 | | 4.32 | | | |
| 3 | 31394 | 7.14 | 4.32 | | 4.75 | 0.40 | | |
| 3 | 31395 | 7.20 | 4.82 | | 3.98 | 2.30 | | |
| 3 | 31396 | 6.97 | 4.46 | | 3.09 | 3.18 | | |
| 3 | 31397 | 6.35 | 3.71 | | 2.33 | 3.18 | | |
| 3 | 31398 | 6.43 | 3.28 | | 2.51 | 3.35 | | |
| 3 | 31399 | 6.45 | 3.15 | | 3.03 | 3.43 | | |
| 3 | 31400 | 6.15 | 2.67 | | 3.63 | 3.33 | | |
| 3 | 31401 | 5.60 | 2.20 | | 4.21 | 2.46 | | |
| 3 | 31402 | 7.34 | 5.49 | | 4.23 | | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 31403 | 6.96 | 4.24 | | 4.99 | 0.46 | | |
| 3 | 31404 | 7.01 | 4.80 | | 4.45 | 2.53 | | |
| 3 | 31405 | 6.85 | 4.58 | | 3.67 | 3.48 | | |
| 3 | 31406 | 6.26 | 3.90 | | 2.85 | 3.23 | | |
| 3 | 31407 | 6.30 | 3.39 | | 3.10 | 3.67 | | |
| 3 | 31408 | 6.27 | 3.14 | | 3.63 | 3.77 | | |
| 3 | 31409 | 5.95 | 2.51 | | 4.14 | 3.38 | | |
| 3 | 31410 | 5.46 | 1.91 | | 4.56 | 2.63 | | |
| 3 | 31411 | 7.24 | 5.53 | | 4.14 | | | |
| 3 | 31412 | 6.80 | 4.17 | | 5.13 | 0.46 | | |
| 3 | 31413 | 6.84 | 4.78 | | 4.80 | 2.71 | | |
| 3 | 31414 | 6.72 | 4.67 | | 4.14 | 3.76 | | |
| 3 | 31415 | 6.17 | 4.06 | | 3.34 | 3.54 | | |
| 3 | 31416 | 6.17 | 3.48 | | 3.60 | 3.98 | | |
| 3 | 31417 | 6.10 | 3.11 | | 4.11 | 4.10 | | |
| 3 | 31418 | 5.78 | 2.36 | | 4.54 | 3.66 | | |
| 3 | 31419 | 5.33 | 1.62 | | 4.81 | 2.74 | | |
| 3 | 31420 | 7.15 | 5.58 | | 4.07 | | | |
| 3 | 31421 | 6.66 | 4.11 | | 5.19 | 0.43 | | |
| 3 | 31422 | 6.69 | 4.75 | | 5.05 | 2.86 | | |
| 3 | 31423 | 6.51 | 4.74 | | 4.51 | 3.72 | | |
| 3 | 31424 | 6.08 | 4.18 | | 3.77 | 3.83 | | |
| 3 | 31425 | 6.05 | 3.55 | | 4.08 | 4.10 | | |
| 3 | 31426 | 5.95 | 3.08 | | 4.55 | 4.16 | | |
| 3 | 31427 | 5.63 | 2.23 | | 4.84 | 3.89 | | |
| 3 | 31428 | 5.21 | 1.35 | | 4.98 | 2.84 | | |
| 3 | 31429 | 7.06 | 5.30 | | 4.00 | | | |
| 3 | 31430 | 6.52 | 4.06 | | 5.19 | 0.37 | | |
| 3 | 31431 | 6.55 | 4.72 | | 5.22 | 2.97 | | |
| 3 | 31432 | 6.38 | 4.79 | | 4.79 | 3.97 | | |
| 3 | 31433 | 6.00 | 4.30 | | 4.11 | 3.92 | | |
| 3 | 31434 | 5.93 | 3.61 | | 4.16 | 4.33 | | |
| 3 | 31435 | 5.81 | 3.04 | | 4.57 | 4.37 | | |
| 3 | 31436 | 5.49 | 2.12 | | 5.07 | 3.90 | | |
| 3 | 31437 | 5.10 | 1.10 | | 5.06 | 2.88 | | |
| 3 | 31438 | 6.93 | 5.32 | | 3.94 | | | |
| 3 | 31439 | 6.39 | 4.01 | | 5.14 | 0.31 | | |
| 3 | 31440 | 6.41 | 4.69 | | 5.32 | 3.06 | | |
| 3 | 31441 | 6.26 | 4.83 | | 5.00 | 4.19 | | |
| 3 | 31442 | 5.91 | 4.40 | | 4.18 | 4.14 | | |
| 3 | 31443 | 5.81 | 3.65 | | 4.39 | 4.54 | | |
| 3 | 31444 | 5.68 | 3.01 | | 4.78 | 4.55 | | |
| 3 | 31445 | 5.38 | 2.02 | | 4.97 | 3.95 | | |
| 3 | 31446 | 5.00 | 1.10 | | 5.08 | 2.88 | | |
| 3 | 31447 | 6.85 | 5.35 | | 3.89 | | | |
| 3 | 31448 | 6.26 | 3.96 | | 5.05 | 0.23 | | |
| 3 | 31449 | 6.29 | 4.66 | | 5.36 | 3.12 | | |
| 3 | 31450 | 6.15 | 4.85 | | 5.15 | 4.39 | | |
| 3 | 31451 | 5.83 | 4.47 | | 4.36 | 4.34 | | |
| 3 | 31452 | 5.70 | 3.72 | | 4.57 | 4.74 | | |
| 3 | 31453 | 5.56 | 2.98 | | 4.93 | 4.71 | | |
| 3 | 31454 | 5.26 | 1.93 | | 5.06 | 4.06 | | |
| 3 | 31455 | 4.92 | 1.07 | | 5.09 | 2.89 | | |
| 3 | 31456 | 6.77 | 5.38 | | 3.84 | | | |
| 3 | 31457 | 6.14 | 3.91 | | 4.93 | 0.12 | | |
| 3 | 31458 | 6.18 | 4.65 | | 5.36 | 3.07 | | |
| 3 | 31459 | 6.05 | 4.87 | | 5.24 | 4.32 | | |
| 3 | 31460 | 5.75 | 4.53 | | 4.49 | 4.53 | | |
| 3 | 31461 | 5.60 | 3.79 | | 4.69 | 4.93 | | |
| 3 | 31462 | 5.45 | 2.95 | | 5.03 | 4.86 | | |
| 3 | 31463 | 5.16 | 1.85 | | 5.09 | 4.14 | | |
| 3 | 31464 | 4.84 | 1.01 | | 5.07 | 2.89 | | |
| 3 | 31465 | 6.49 | 5.41 | | 3.80 | | | |
| 3 | 31466 | 6.02 | 3.87 | | 4.80 | 0.01 | | |
| 3 | 31467 | 6.07 | 4.65 | | 5.32 | 3.12 | | |
| 3 | 31468 | 5.96 | 4.88 | | 5.33 | 4.30 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 31469 | 5.68 | 4.57 | | 4.57 | 4.70 | | |
| 3 | 31470 | 5.51 | 3.84 | | 4.78 | 5.10 | | |
| 3 | 31471 | 5.35 | 2.93 | | 5.08 | 4.99 | | |
| 3 | 31472 | 5.07 | 1.79 | | 5.10 | 4.21 | | |
| 3 | 31473 | 4.76 | 1.06 | | 4.99 | 2.83 | | |
| 3 | 31474 | 6.39 | 5.44 | | 3.77 | | | 8.76 |
| 3 | 31475 | 5.95 | 3.83 | | 4.55 | | | |
| 3 | 31476 | 5.97 | 4.65 | | 5.25 | 3.14 | | |
| 3 | 31477 | 5.87 | 4.89 | | 5.02 | 4.40 | | |
| 3 | 31478 | 5.61 | 4.60 | | 4.62 | 4.86 | | |
| 3 | 31479 | 5.42 | 3.88 | | 4.83 | 5.26 | | |
| 3 | 31480 | 5.25 | 2.91 | | 5.10 | 5.11 | | |
| 3 | 31481 | 4.98 | 1.74 | | 5.07 | 4.26 | | |
| 3 | 31482 | 4.66 | 1.12 | | 4.86 | 2.74 | | |
| 3 | 31483 | 6.30 | 5.60 | | 3.73 | | | 8.76 |
| 3 | 31484 | 5.89 | 3.79 | | 4.28 | | | |
| 3 | 31485 | 5.88 | 4.65 | | 5.16 | 3.15 | | |
| 3 | 31486 | 5.79 | 4.89 | | 4.99 | 4.49 | | |
| 3 | 31487 | 5.55 | 4.63 | | 4.63 | 5.01 | | |
| 3 | 31488 | 5.33 | 3.90 | | 4.84 | 5.40 | | |
| 3 | 31489 | 5.16 | 2.88 | | 5.09 | 5.22 | | |
| 3 | 31490 | 4.89 | 1.69 | | 5.02 | 4.29 | | |
| 3 | 31491 | 4.58 | 1.19 | | 4.76 | 2.67 | | |
| 3 | 31492 | 6.20 | 5.77 | | 3.70 | | | 8.76 |
| 3 | 31493 | 5.84 | 3.75 | | 4.02 | | | |
| 3 | 31494 | 5.79 | 4.64 | | 5.06 | 3.16 | | |
| 3 | 31495 | 5.71 | 4.88 | | 4.94 | 4.57 | | |
| 3 | 31496 | 5.49 | 4.64 | | 4.63 | 5.15 | | |
| 3 | 31497 | 5.26 | 3.92 | | 4.84 | 5.54 | | |
| 3 | 31498 | 5.08 | 2.87 | | 5.06 | 5.31 | | |
| 3 | 31499 | 4.81 | 1.65 | | 4.95 | 4.32 | | |
| 3 | 31500 | 4.49 | 1.22 | | 4.61 | 2.59 | | |
| 3 | 31501 | 6.10 | 5.48 | | 3.67 | | | 8.76 |
| 3 | 31502 | 5.78 | 3.71 | | 3.77 | | | |
| 3 | 31503 | 5.71 | 4.64 | | 4.94 | 3.15 | | |
| 3 | 31504 | 5.64 | 4.87 | | 4.88 | 4.64 | | |
| 3 | 31505 | 5.43 | 4.65 | | 4.63 | 5.27 | | |
| 3 | 31506 | 5.18 | 3.94 | | 4.82 | 5.66 | | |
| 3 | 31507 | 5.00 | 2.85 | | 5.00 | 5.39 | | |
| 3 | 31508 | 4.73 | 1.61 | | 4.86 | 4.32 | | |
| 3 | 31509 | 4.41 | 1.29 | | 4.49 | 2.53 | | |
| 3 | 31510 | 6.06 | 5.50 | | 3.64 | | | 8.76 |
| 3 | 31511 | 5.73 | 3.67 | | 3.54 | | | |
| 3 | 31512 | 5.63 | 4.63 | | 4.81 | 3.14 | | |
| 3 | 31513 | 5.57 | 4.86 | | 4.80 | 4.71 | | |
| 3 | 31514 | 5.37 | 4.65 | | 4.61 | 5.40 | | |
| 3 | 31515 | 5.12 | 3.95 | | 4.79 | 5.77 | | |
| 3 | 31516 | 4.93 | 2.84 | | 4.94 | 5.47 | | |
| 3 | 31517 | 4.65 | 1.58 | | 4.75 | 4.32 | | |
| 3 | 31518 | 4.33 | 1.29 | | 4.37 | 2.46 | | |
| 3 | 31519 | 5.96 | 5.52 | | 3.61 | | | 8.76 |
| 3 | 31520 | 5.67 | 3.63 | | 3.32 | | | |
| 3 | 31521 | 5.56 | 4.62 | | 4.67 | 3.12 | | |
| 3 | 31522 | 5.51 | 4.87 | | 4.71 | 4.76 | | |
| 3 | 31523 | 5.32 | 4.65 | | 4.57 | 5.51 | | |
| 3 | 31524 | 5.05 | 3.95 | | 4.74 | 5.87 | | |
| 3 | 31525 | 4.86 | 2.90 | | 4.86 | 5.53 | | |
| 3 | 31526 | 4.58 | 1.56 | | 4.64 | 4.32 | | |
| 3 | 31527 | 4.25 | 1.06 | | 4.21 | 2.36 | | |
| 3 | 31528 | 5.86 | 5.54 | | 3.58 | | | 8.76 |
| 3 | 31529 | 5.61 | 3.59 | | 3.12 | | | |
| 3 | 31530 | 5.48 | 4.60 | | 4.54 | 3.10 | | |
| 3 | 31531 | 5.45 | 4.88 | | 4.61 | 4.81 | | |
| 3 | 31532 | 5.27 | 4.65 | | 4.52 | 5.61 | | |
| 3 | 31533 | 4.99 | 3.95 | | 4.69 | 5.96 | | |
| 3 | 31534 | 4.80 | 2.88 | | 4.77 | 5.59 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 31535 | 4.51 | 1.54 | | 4.53 | 4.32 | | |
| 3 | 31536 | 4.15 | 1.10 | | 4.03 | 2.24 | | |
| 3 | 31537 | 5.77 | 5.56 | | 3.56 | | | 8.76 |
| 3 | 31538 | 5.55 | 3.56 | | 3.01 | | | |
| 3 | 31539 | 5.42 | 4.59 | | 4.40 | 3.08 | | |
| 3 | 31540 | 5.39 | 4.89 | | 4.51 | 4.86 | | |
| 3 | 31541 | 5.22 | 4.64 | | 4.47 | 5.70 | | |
| 3 | 31542 | 4.94 | 3.95 | | 4.63 | 6.05 | | |
| 3 | 31543 | 4.73 | 2.86 | | 4.68 | 5.64 | | |
| 3 | 31544 | 4.44 | 1.52 | | 4.41 | 4.30 | | |
| 3 | 31545 | 4.07 | 1.07 | | 3.89 | 2.15 | | |
| 3 | 31546 | 5.67 | 5.57 | | 3.53 | | | 8.76 |
| 3 | 31547 | 5.36 | 3.52 | | 3.00 | | | |
| 3 | 31548 | 5.36 | 4.58 | | 4.26 | 3.05 | | |
| 3 | 31549 | 5.34 | 4.91 | | 4.40 | 4.91 | | |
| 3 | 31550 | 5.18 | 4.64 | | 4.40 | 5.79 | | |
| 3 | 31551 | 4.88 | 3.95 | | 4.56 | 6.13 | | |
| 3 | 31552 | 4.68 | 2.85 | | 4.58 | 5.69 | | |
| 3 | 31553 | 4.37 | 1.51 | | 4.29 | 4.29 | | |
| 3 | 31554 | 3.99 | 1.04 | | 3.76 | 2.08 | | |
| 3 | 31555 | 5.57 | 5.58 | | 3.51 | | | 8.76 |
| 3 | 31556 | 5.28 | 3.49 | | 2.99 | | | |
| 3 | 31557 | 5.30 | 4.56 | | 4.13 | 3.03 | | |
| 3 | 31558 | 5.29 | 4.92 | | 4.30 | 4.95 | | |
| 3 | 31559 | 5.14 | 4.63 | | 4.34 | 5.87 | | |
| 3 | 31560 | 4.85 | 3.95 | | 4.49 | 6.21 | | |
| 3 | 31561 | 4.62 | 2.84 | | 4.49 | 5.73 | | |
| 3 | 31562 | 4.31 | 1.49 | | 4.18 | 4.27 | | |
| 3 | 31563 | 3.89 | 1.06 | | 3.63 | 2.01 | | |
| 3 | 31564 | 5.61 | 5.60 | | 3.48 | | | 8.76 |
| 3 | 31565 | 5.21 | 3.46 | | 2.98 | | | |
| 3 | 31566 | 5.24 | 4.55 | | 4.00 | 3.01 | | |
| 3 | 31567 | 5.25 | 4.92 | | 4.21 | 4.99 | | |
| 3 | 31568 | 5.10 | 4.64 | | 4.27 | 5.95 | | |
| 3 | 31569 | 4.81 | 3.94 | | 4.41 | 6.28 | | |
| 3 | 31570 | 4.57 | 2.84 | | 4.39 | 5.77 | | |
| 3 | 31571 | 4.25 | 1.48 | | 4.05 | 4.27 | | |
| 3 | 31572 | 3.80 | 1.08 | | 3.51 | 1.94 | | |
| 3 | 31573 | 5.52 | 5.50 | | 3.46 | | | 8.76 |
| 3 | 31574 | 5.13 | 3.43 | | 2.97 | | | |
| 3 | 31575 | 5.19 | 4.53 | | 3.87 | 3.00 | | |
| 3 | 31576 | 5.21 | 4.93 | | 4.11 | 5.03 | | |
| 3 | 31577 | 5.06 | 4.66 | | 4.20 | 6.02 | | |
| 3 | 31578 | 4.78 | 3.94 | | 4.34 | 6.34 | | |
| 3 | 31579 | 4.52 | 2.84 | | 4.30 | 5.80 | | |
| 3 | 31580 | 4.20 | 1.46 | | 3.95 | 4.24 | | |
| 3 | 31581 | 3.73 | 1.09 | | 3.41 | 1.90 | | |
| 3 | 31582 | 5.43 | 5.52 | | 3.44 | | | 8.76 |
| 3 | 31583 | 5.05 | 3.40 | | 2.96 | | | |
| 3 | 31584 | 5.15 | 4.52 | | 3.75 | 2.98 | | |
| 3 | 31585 | 5.17 | 4.93 | | 4.02 | 5.07 | | |
| 3 | 31586 | 5.03 | 4.67 | | 4.13 | 6.09 | | |
| 3 | 31587 | 4.76 | 3.94 | | 4.26 | 6.40 | | |
| 3 | 31588 | 4.48 | 2.84 | | 4.21 | 5.83 | | |
| 3 | 31589 | 4.14 | 1.45 | | 3.84 | 4.23 | | |
| 3 | 31590 | 3.66 | 1.11 | | 3.30 | 1.85 | | |
| 3 | 31591 | 5.34 | 5.54 | | 3.42 | | | 8.76 |
| 3 | 31592 | 4.98 | 3.37 | | 2.95 | | | |
| 3 | 31593 | 5.10 | 4.51 | | 3.64 | 2.97 | | |
| 3 | 31594 | 5.13 | 4.93 | | 3.94 | 5.10 | | |
| 3 | 31595 | 5.00 | 4.69 | | 4.06 | 6.16 | | |
| 3 | 31596 | 4.74 | 3.93 | | 4.18 | 6.46 | | |
| 3 | 31597 | 4.44 | 2.79 | | 4.12 | 5.86 | | |
| 3 | 31598 | 4.10 | 1.43 | | 4.02 | 4.22 | | |
| 3 | 31599 | 3.59 | 1.13 | | 3.16 | 1.76 | | |
| 3 | 31600 | 5.32 | 5.55 | | 3.41 | | | 8.76 |

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|---|---|---|---|---|---|---|---|---|
| 3 | 31601 | 4.92 | 3.34 | | 2.94 | | | |
| 3 | 31602 | 5.07 | 4.49 | | 3.53 | 2.96 | | |
| 3 | 31603 | 5.10 | 4.93 | | 3.86 | 5.13 | | |
| 3 | 31604 | 4.98 | 4.70 | | 3.99 | 6.22 | | |
| 3 | 31605 | 4.73 | 3.93 | | 4.11 | 6.51 | | |
| 3 | 31606 | 4.40 | 2.79 | | 4.03 | 5.89 | | |
| 3 | 31607 | 4.05 | 1.44 | | 3.93 | 4.22 | | |
| 3 | 31608 | 3.52 | 1.16 | | 3.08 | 1.68 | | |
| 3 | 31609 | 5.24 | 5.56 | | 3.39 | | | 8.76 |
| 3 | 31610 | 4.87 | 3.31 | | 2.93 | | | |
| 3 | 31611 | 5.03 | 4.48 | | 3.43 | 2.96 | | |
| 3 | 31612 | 5.07 | 4.93 | | 3.78 | 5.17 | | |
| 3 | 31613 | 4.96 | 4.71 | | 3.93 | 6.28 | | |
| 3 | 31614 | 4.72 | 3.93 | | 4.03 | 6.56 | | |
| 3 | 31615 | 4.37 | 2.80 | | 3.95 | 5.92 | | |
| 3 | 31616 | 4.01 | 1.45 | | 3.67 | 4.21 | | |
| 3 | 31617 | 3.48 | 1.16 | | 3.04 | 1.65 | | |
| 3 | 31618 | 5.17 | 5.56 | | 3.38 | | | 8.76 |
| 3 | 31619 | 4.83 | 3.29 | | 2.92 | | | |
| 3 | 31620 | 5.00 | 4.47 | | 3.34 | 2.96 | | |
| 3 | 31621 | 5.05 | 4.93 | | 3.71 | 5.20 | | |
| 3 | 31622 | 4.94 | 4.71 | | 3.87 | 6.35 | | |
| 3 | 31623 | 4.71 | 3.93 | | 3.96 | 6.61 | | |
| 3 | 31624 | 4.35 | 2.82 | | 3.87 | 5.94 | | |
| 3 | 31625 | 3.97 | 1.45 | | 3.79 | 4.21 | | |
| 3 | 31626 | 3.45 | 1.23 | | 3.01 | 1.62 | | |
| 3 | 31627 | 5.10 | 5.56 | | 3.37 | | | 8.76 |
| 3 | 31628 | 4.78 | 3.27 | | 2.91 | | | |
| 3 | 31629 | 4.98 | 4.46 | | 3.26 | 2.97 | | |
| 3 | 31630 | 5.03 | 4.93 | | 3.64 | 5.23 | | |
| 3 | 31631 | 4.93 | 4.72 | | 3.81 | 6.41 | | |
| 3 | 31632 | 4.70 | 3.94 | | 3.89 | 6.66 | | |
| 3 | 31633 | 4.35 | 2.84 | | 3.79 | 5.96 | | |
| 3 | 31634 | 3.94 | 1.47 | | 3.70 | 4.22 | | |
| 3 | 31635 | 3.42 | 1.23 | | 2.98 | 1.56 | | |
| 3 | 31636 | 5.03 | 5.55 | | 3.37 | | | 8.76 |
| 3 | 31637 | 4.75 | 3.24 | | 2.91 | | | |
| 3 | 31638 | 4.96 | 4.45 | | 3.18 | 2.98 | | |
| 3 | 31639 | 5.01 | 4.92 | | 3.58 | 5.27 | | |
| 3 | 31640 | 4.92 | 4.73 | | 3.76 | 6.47 | | |
| 3 | 31641 | 4.70 | 3.95 | | 3.82 | 6.70 | | |
| 3 | 31642 | 4.36 | 2.86 | | 3.72 | 5.99 | | |
| 3 | 31643 | 3.91 | 1.49 | | 3.61 | 4.31 | | |
| 3 | 31644 | 3.41 | 1.23 | | 2.96 | 1.54 | | |
| 3 | 31645 | 4.97 | 5.55 | | 3.36 | | | 8.76 |
| 3 | 31646 | 4.73 | 3.23 | | 2.90 | | | |
| 3 | 31647 | 4.94 | 4.45 | | 3.11 | 3.00 | | |
| 3 | 31648 | 5.00 | 4.88 | | 3.52 | 5.31 | | |
| 3 | 31649 | 4.92 | 4.73 | | 3.70 | 6.53 | | |
| 3 | 31650 | 4.74 | 4.04 | | 3.75 | 6.75 | | |
| 3 | 31651 | 4.37 | 2.94 | | 3.65 | 6.01 | | |
| 3 | 31652 | 3.93 | 1.51 | | 3.38 | 4.31 | | |
| 3 | 31653 | 3.41 | 1.22 | | 2.93 | 1.55 | | |
| 3 | 31654 | 14.06 | 5.18 | | 1.32 | | | |
| 3 | 31655 | 13.13 | 5.24 | | 2.48 | | | 8.76 |
| 3 | 31656 | 12.20 | 4.91 | | 3.36 | | | |
| 3 | 31657 | 11.09 | 4.39 | | 3.53 | 0.02 | | |
| 3 | 31658 | 9.83 | 3.59 | | 3.12 | 0.39 | | |
| 3 | 31659 | 9.66 | 2.87 | | 2.57 | 0.35 | | |
| 3 | 31660 | 9.55 | 3.62 | | 2.12 | | | |
| 3 | 31661 | 10.28 | 4.19 | | 1.77 | | | |
| 3 | 31662 | 10.75 | 4.37 | | 0.94 | | | |
| 3 | 31663 | 9.73 | 5.74 | | 4.56 | | | |
| 3 | 31664 | 9.00 | 4.98 | | 2.83 | | | |
| 3 | 31665 | 8.26 | 4.07 | | 1.91 | | | |
| 3 | 31666 | 7.24 | 2.95 | | 1.66 | 0.82 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 31667 | 6.16 | 1.92 | | 1.41 | 1.30 | | |
| 3 | 31668 | 6.47 | 2.11 | | 1.48 | 1.40 | | |
| 3 | 31669 | 7.08 | 2.69 | | 1.99 | 0.99 | | |
| 3 | 31670 | 7.57 | 3.19 | | 2.66 | 0.43 | | |
| 3 | 31671 | 7.64 | 3.65 | | 3.29 | 0.13 | | |
| 3 | 31672 | 7.26 | 3.73 | | 5.92 | 3.89 | | |
| 3 | 31673 | 8.82 | 5.55 | | 7.26 | 3.41 | | |
| 3 | 31674 | 10.57 | 8.06 | | 8.33 | 2.38 | | |
| 3 | 31675 | 12.05 | 11.31 | | 8.57 | 0.67 | | |
| 3 | 31676 | 7.19 | 2.96 | | 5.33 | 3.39 | | |
| 3 | 31677 | 9.47 | 5.00 | | 7.04 | 3.02 | | |
| 3 | 31678 | 11.85 | 7.08 | | 8.57 | 1.52 | | |
| 3 | 31679 | 14.25 | 10.61 | | 8.62 | | | |
| 3 | 31680 | 6.52 | 0.97 | | 3.88 | 2.35 | | |
| 3 | 31681 | 9.36 | 3.06 | | 5.80 | 2.27 | | |
| 3 | 31682 | 12.63 | 6.02 | | 8.10 | 0.89 | | |
| 3 | 31683 | 16.24 | 9.52 | | 7.99 | | | |
| 3 | 31684 | 3.20 | | | 2.35 | | | 8.76 |
| 3 | 31685 | 5.99 | | | 3.23 | | | 8.76 |
| 3 | 31686 | 10.92 | 3.34 | | 5.24 | | | 8.76 |
| 3 | 31687 | 17.42 | 8.76 | | 7.01 | | | |
| 3 | 31688 | 0.91 | | | 7.51 | | | 8.76 |
| 3 | 31689 | 1.29 | | | 7.54 | | | 8.76 |
| 3 | 31690 | 2.87 | | | 6.79 | | | |
| 3 | 31691 | 6.44 | 6.96 | | 6.49 | | | |
| 3 | 31692 | 3.99 | 12.29 | | 3.35 | 3.46 | | |
| 3 | 31693 | 4.19 | 12.55 | | 3.46 | 3.51 | | |
| 3 | 31694 | 3.62 | 8.89 | | 3.39 | 2.38 | | |
| 3 | 31695 | 3.39 | 8.37 | | 3.34 | 2.29 | | |
| 3 | 31696 | 4.25 | 6.47 | | 3.70 | 1.90 | | |
| 3 | 31697 | 4.22 | 8.73 | | 3.77 | 2.31 | | |
| 3 | 31698 | 4.50 | 8.49 | | 3.94 | 2.35 | | |
| 3 | 31699 | 4.30 | 6.28 | | 3.84 | 1.91 | | |
| 3 | 31700 | 4.42 | 4.40 | | 3.71 | 1.49 | | |
| 3 | 31701 | 4.30 | 3.12 | | 3.53 | 1.05 | | |
| 3 | 31702 | 4.15 | 3.15 | | 3.47 | 1.01 | | |
| 3 | 31703 | 4.22 | 4.63 | | 3.60 | 1.45 | | |
| 3 | 31704 | 3.21 | 8.32 | | 3.32 | 2.44 | | |
| 3 | 31705 | 3.06 | 8.64 | | 3.34 | 2.59 | | |
| 3 | 31706 | 3.68 | 12.11 | | 3.30 | 3.59 | | |
| 3 | 31707 | 3.83 | 12.12 | | 3.28 | 3.48 | | |
| 3 | 31708 | 5.06 | 13.64 | | 3.91 | 3.48 | | |
| 3 | 31709 | 5.31 | 13.55 | | 4.01 | 3.37 | | |
| 3 | 31710 | 4.72 | 11.01 | | 3.91 | 2.69 | | |
| 3 | 31711 | 4.80 | 11.18 | | 3.73 | 2.75 | | |
| 3 | 31712 | 10.78 | 12.06 | | 7.98 | 1.30 | | |
| 3 | 31713 | 9.88 | 8.95 | | 7.96 | 2.63 | | |
| 3 | 31714 | 9.71 | 10.19 | | 7.70 | 2.53 | | |
| 3 | 31715 | 10.17 | 12.44 | | 7.66 | 1.55 | | |
| 3 | 31716 | 6.17 | 3.77 | | 4.61 | 2.32 | | |
| 3 | 31717 | 6.03 | 3.84 | | 4.48 | 2.17 | | |
| 3 | 31718 | 6.04 | 5.37 | | 4.79 | 2.40 | | |
| 3 | 31719 | 6.12 | 5.54 | | 4.94 | 2.50 | | |
| 3 | 31720 | 5.99 | 12.92 | | 4.38 | 2.83 | | |
| 3 | 31721 | 6.27 | 12.67 | | 4.67 | 2.77 | | |
| 3 | 31722 | 5.67 | 8.71 | | 4.86 | 2.59 | | |
| 3 | 31723 | 5.75 | 9.07 | | 4.59 | 2.55 | | |
| 3 | 31724 | 4.49 | 11.87 | | 3.56 | 3.11 | | |
| 3 | 31725 | 4.18 | 9.65 | | 3.63 | 2.47 | | |
| 3 | 31726 | 3.98 | 7.29 | | 3.58 | 1.96 | | |
| 3 | 31727 | 3.84 | 8.40 | | 3.52 | 2.25 | | |
| 3 | 31728 | 6.29 | 3.70 | | 4.76 | 2.49 | | |
| 3 | 31729 | 6.34 | 5.29 | | 5.14 | 2.64 | | |
| 3 | 31730 | 6.61 | 5.10 | | 5.36 | 2.80 | | |
| 3 | 31731 | 6.42 | 3.63 | | 4.92 | 2.67 | | |
| 3 | 31732 | 4.72 | 7.80 | | 4.12 | 2.29 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 31733 | 4.96 | 6.73 | | 4.26 | 2.17 | | |
| 3 | 31734 | 4.73 | 3.94 | | 4.00 | 1.68 | | |
| 3 | 31735 | 4.55 | 5.59 | | 3.97 | 1.86 | | |
| 3 | 31736 | 7.14 | 3.90 | | 5.96 | 3.83 | | |
| 3 | 31737 | 6.98 | 3.82 | | 5.76 | 3.75 | | |
| 3 | 31738 | 7.74 | 5.09 | | 6.35 | 3.55 | | |
| 3 | 31739 | 8.21 | 5.80 | | 6.96 | 3.49 | | |
| 3 | 31740 | 3.01 | 3.04 | | 3.20 | 0.82 | | |
| 3 | 31741 | 2.99 | 5.77 | | 3.30 | 1.72 | | |
| 3 | 31742 | 3.10 | 5.36 | | 3.27 | 1.45 | | |
| 3 | 31743 | 3.06 | 2.94 | | 3.20 | 0.77 | | |
| 3 | 31744 | 3.35 | 2.98 | | 3.22 | 0.80 | | |
| 3 | 31745 | 3.31 | 5.39 | | 3.30 | 1.56 | | |
| 3 | 31746 | 3.50 | 5.66 | | 3.35 | 1.66 | | |
| 3 | 31747 | 3.46 | 3.01 | | 3.25 | 0.84 | | |
| 3 | 31748 | 5.86 | 3.86 | | 4.35 | 2.02 | | |
| 3 | 31749 | 5.65 | 3.81 | | 4.19 | 1.87 | | |
| 3 | 31750 | 5.15 | 5.78 | | 4.46 | 2.21 | | |
| 3 | 31751 | 5.40 | 5.67 | | 4.62 | 2.31 | | |
| 3 | 31752 | 7.82 | 6.26 | | 6.55 | 3.28 | | |
| 3 | 31753 | 7.72 | 6.48 | | 6.38 | 3.17 | | |
| 3 | 31754 | 8.26 | 8.75 | | 6.77 | 2.97 | | |
| 3 | 31755 | 8.65 | 8.41 | | 7.07 | 3.01 | | |
| 3 | 31756 | 3.63 | 5.42 | | 3.46 | 1.62 | | |
| 3 | 31757 | 3.99 | 5.01 | | 3.52 | 1.51 | | |
| 3 | 31758 | 4.00 | 3.16 | | 3.41 | 0.96 | | |
| 3 | 31759 | 3.65 | 3.13 | | 3.35 | 0.91 | | |
| 3 | 31760 | 7.28 | 4.79 | | 6.01 | 3.39 | | |
| 3 | 31761 | 6.71 | 3.52 | | 5.39 | 3.34 | | |
| 3 | 31762 | 6.68 | 3.60 | | 5.32 | 3.19 | | |
| 3 | 31763 | 7.23 | 4.98 | | 5.89 | 3.25 | | |
| 3 | 31764 | 5.59 | 13.33 | | 4.06 | 3.08 | | |
| 3 | 31765 | 5.74 | 13.13 | | 4.15 | 2.90 | | |
| 3 | 31766 | 5.16 | 9.61 | | 4.37 | 2.59 | | |
| 3 | 31767 | 4.98 | 10.55 | | 4.15 | 2.63 | | |
| 3 | 31768 | 6.52 | 3.56 | | 5.06 | 2.85 | | |
| 3 | 31769 | 6.99 | 5.01 | | 5.56 | 2.96 | | |
| 3 | 31770 | 7.13 | 4.95 | | 5.73 | 3.11 | | |
| 3 | 31771 | 6.63 | 3.58 | | 5.21 | 3.03 | | |
| 3 | 31772 | 8.90 | 11.30 | | 7.03 | 2.62 | | |
| 3 | 31773 | 9.43 | 13.55 | | 6.93 | 1.93 | | |
| 3 | 31774 | 9.76 | 13.06 | | 7.31 | 1.73 | | |
| 3 | 31775 | 9.37 | 10.99 | | 7.38 | 2.56 | | |
| 3 | 31776 | 6.71 | 7.21 | | 5.68 | 2.84 | | |
| 3 | 31777 | 6.43 | 6.51 | | 5.43 | 2.72 | | |
| 3 | 31778 | 6.77 | 8.69 | | 5.60 | 2.75 | | |
| 3 | 31779 | 7.10 | 8.48 | | 5.89 | 2.82 | | |
| 3 | 31780 | 7.91 | 12.70 | | 5.86 | 2.41 | | |
| 3 | 31781 | 7.27 | 10.76 | | 5.99 | 2.72 | | |
| 3 | 31782 | 6.98 | 10.99 | | 5.66 | 2.73 | | |
| 3 | 31783 | 7.68 | 13.05 | | 5.51 | 2.53 | | |
| 3 | 31784 | 8.16 | 10.54 | | 6.33 | 2.70 | | |
| 3 | 31785 | 8.22 | 12.43 | | 6.21 | 2.27 | | |
| 3 | 31786 | 9.00 | 13.81 | | 6.57 | 2.11 | | |
| 3 | 31787 | 8.22 | 11.70 | | 6.67 | 2.67 | | |
| 3 | 31788 | 7.43 | 8.24 | | 6.18 | 2.87 | | |
| 3 | 31789 | 7.99 | 9.15 | | 6.47 | 2.92 | | |
| 3 | 31790 | 7.44 | 6.67 | | 6.17 | 3.06 | | |
| 3 | 31791 | 7.28 | 6.94 | | 5.95 | 2.96 | | |
| 3 | 31792 | 6.47 | 11.77 | | 5.04 | 2.69 | | |
| 3 | 31793 | 6.65 | 9.51 | | 5.34 | 2.66 | | |
| 3 | 31794 | 6.32 | 7.28 | | 5.19 | 2.62 | | |
| 3 | 31795 | 5.85 | 8.06 | | 5.00 | 2.62 | | |
| 3 | 31796 | 3.10 | 2.79 | | 3.24 | 0.70 | | |
| 3 | 31797 | 3.24 | 4.49 | | 3.31 | 1.29 | | |
| 3 | 31798 | 3.27 | 2.90 | | 3.23 | 0.73 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 31799 | 6.74 | 3.45 | | 5.44 | 3.48 | | |
| 3 | 31800 | 7.31 | 4.40 | | 5.89 | 3.50 | | |
| 3 | 31801 | 6.88 | 3.57 | | 5.55 | 3.65 | | |
| 3 | 31802 | 8.91 | 8.00 | | 7.37 | 3.04 | | |
| 3 | 31803 | 8.91 | 7.21 | | 7.40 | 3.12 | | |
| 3 | 31804 | 8.04 | 6.33 | | 6.81 | 3.36 | | |
| 3 | 31805 | 4.42 | 12.83 | | 3.54 | 3.46 | | |
| 3 | 31806 | 3.78 | 9.91 | | 3.44 | 2.62 | | |
| 3 | 31807 | 4.30 | 12.88 | | 3.50 | 3.57 | | |
| 3 | 31808 | 3.37 | 2.97 | | 3.32 | 0.85 | | |
| 3 | 31809 | 3.69 | 5.08 | | 3.42 | 1.49 | | |
| 3 | 31810 | 3.76 | 3.03 | | 3.32 | 0.85 | | |
| 3 | 31811 | 4.91 | 13.89 | | 3.83 | 3.63 | | |
| 3 | 31812 | 4.67 | 11.68 | | 3.59 | 2.92 | | |
| 3 | 31813 | 4.74 | 13.53 | | 3.72 | 3.57 | | |
| 3 | 31814 | 4.28 | 3.08 | | 3.61 | 1.08 | | |
| 3 | 31815 | 4.50 | 3.84 | | 3.75 | 1.40 | | |
| 3 | 31816 | 4.81 | 2.82 | | 3.66 | 1.16 | | |
| 3 | 31817 | 4.92 | 2.99 | | 3.68 | 1.23 | | |
| 3 | 31818 | 4.69 | 3.91 | | 3.83 | 1.53 | | |
| 3 | 31819 | 5.04 | 2.99 | | 3.80 | 1.42 | | |
| 3 | 31820 | 5.38 | 3.43 | | 4.00 | 1.62 | | |
| 3 | 31821 | 4.94 | 5.24 | | 4.25 | 2.02 | | |
| 3 | 31822 | 5.53 | 3.39 | | 4.09 | 1.71 | | |
| 3 | 31823 | 7.08 | 13.56 | | 5.14 | 2.61 | | |
| 3 | 31824 | 6.85 | 11.51 | | 5.34 | 2.72 | | |
| 3 | 31825 | 6.95 | 13.48 | | 4.94 | 2.66 | | |
| 3 | 31826 | 4.44 | 9.54 | | 4.67 | 3.81 | | |
| 3 | 31827 | 4.10 | 6.11 | | 4.43 | 2.53 | | |
| 3 | 31828 | 4.17 | 5.67 | | 4.59 | 2.42 | | |
| 3 | 31829 | 4.22 | 8.86 | | 4.88 | 3.80 | | |
| 3 | 31830 | 3.60 | 12.21 | | 3.34 | 3.71 | | |
| 3 | 31831 | 3.03 | 9.18 | | 3.39 | 2.78 | | |
| 3 | 31832 | 3.21 | 9.95 | | 3.42 | 3.04 | | |
| 3 | 31833 | 3.38 | 12.29 | | 3.38 | 3.81 | | |
| 3 | 31834 | 4.09 | 5.42 | | 4.78 | 2.40 | | |
| 3 | 31835 | 4.22 | 5.24 | | 5.00 | 2.45 | | |
| 3 | 31836 | 4.52 | 7.37 | | 5.35 | 3.88 | | |
| 3 | 31837 | 4.37 | 8.17 | | 5.11 | 3.83 | | |
| 3 | 31838 | 3.86 | 5.97 | | 4.11 | 2.30 | | |
| 3 | 31839 | 3.72 | 4.40 | | 4.01 | 1.60 | | |
| 3 | 31840 | 3.89 | 2.98 | | 4.01 | 0.92 | | |
| 3 | 31841 | 3.85 | 4.73 | | 4.18 | 1.81 | | |
| 3 | 31842 | 4.26 | 2.36 | | 4.52 | 1.20 | | |
| 3 | 31843 | 4.36 | 2.43 | | 4.64 | 1.35 | | |
| 3 | 31844 | 4.12 | 3.83 | | 4.37 | 1.34 | | |
| 3 | 31845 | 3.98 | 3.97 | | 4.29 | 1.45 | | |
| 3 | 31846 | 5.03 | 5.09 | | 6.63 | 4.82 | | |
| 3 | 31847 | 4.91 | 5.50 | | 6.33 | 4.43 | | |
| 3 | 31848 | 5.26 | 4.76 | | 5.78 | 2.65 | | |
| 3 | 31849 | 5.46 | 4.74 | | 6.21 | 3.23 | | |
| 3 | 31850 | 3.17 | 2.72 | | 3.36 | 0.74 | | |
| 3 | 31851 | 3.17 | 5.10 | | 3.41 | 1.63 | | |
| 3 | 31852 | 3.05 | 4.93 | | 3.33 | 1.55 | | |
| 3 | 31853 | 3.16 | 2.65 | | 3.24 | 0.70 | | |
| 3 | 31854 | 2.99 | 2.83 | | 3.24 | 0.73 | | |
| 3 | 31855 | 2.95 | 4.19 | | 3.31 | 1.27 | | |
| 3 | 31856 | 2.95 | 5.38 | | 3.32 | 1.62 | | |
| 3 | 31857 | 3.00 | 2.93 | | 3.21 | 0.79 | | |
| 3 | 31858 | 4.81 | 5.95 | | 6.00 | 4.18 | | |
| 3 | 31859 | 4.67 | 6.56 | | 5.66 | 3.98 | | |
| 3 | 31860 | 4.44 | 5.05 | | 5.22 | 2.45 | | |
| 3 | 31861 | 4.85 | 4.85 | | 5.45 | 2.41 | | |
| 3 | 31862 | 5.80 | 3.95 | | 4.71 | 1.03 | | |
| 3 | 31863 | 5.95 | 4.05 | | 4.92 | 0.98 | | |
| 3 | 31864 | 5.48 | 4.10 | | 4.82 | 1.21 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 31865 | 5.53 | 3.68 | | 4.64 | 1.41 | | |
| 3 | 31866 | 4.74 | 2.73 | | 4.85 | 1.73 | | |
| 3 | 31867 | 4.37 | 3.90 | | 4.67 | 1.29 | | |
| 3 | 31868 | 4.29 | 3.77 | | 4.51 | 1.24 | | |
| 3 | 31869 | 4.64 | 2.74 | | 4.86 | 1.71 | | |
| 3 | 31870 | 3.79 | 2.19 | | 3.81 | 0.59 | | |
| 3 | 31871 | 3.61 | 3.56 | | 3.87 | 1.25 | | |
| 3 | 31872 | 3.52 | 3.62 | | 3.77 | 1.27 | | |
| 3 | 31873 | 3.71 | 2.17 | | 3.75 | 0.60 | | |
| 3 | 31874 | 4.94 | 2.85 | | 4.82 | 1.76 | | |
| 3 | 31875 | 5.14 | 3.29 | | 4.71 | 1.77 | | |
| 3 | 31876 | 4.88 | 4.42 | | 4.67 | 1.17 | | |
| 3 | 31877 | 4.49 | 4.14 | | 4.80 | 1.29 | | |
| 3 | 31878 | 3.24 | 4.65 | | 3.46 | 1.53 | | |
| 3 | 31879 | 3.22 | 2.67 | | 3.42 | 0.74 | | |
| 3 | 31880 | 3.31 | 2.56 | | 3.48 | 0.68 | | |
| 3 | 31881 | 3.29 | 4.09 | | 3.52 | 1.36 | | |
| 3 | 31882 | 3.54 | 9.71 | | 3.92 | 3.34 | | |
| 3 | 31883 | 3.66 | 9.66 | | 4.01 | 3.38 | | |
| 3 | 31884 | 3.75 | 11.73 | | 4.20 | 3.99 | | |
| 3 | 31885 | 3.71 | 11.93 | | 4.13 | 4.02 | | |
| 3 | 31886 | 3.77 | 11.59 | | 4.27 | 4.04 | | |
| 3 | 31887 | 3.77 | 9.61 | | 4.11 | 3.41 | | |
| 3 | 31888 | 3.87 | 9.21 | | 4.17 | 3.31 | | |
| 3 | 31889 | 3.85 | 11.32 | | 4.37 | 4.03 | | |
| 3 | 31890 | 3.40 | 10.51 | | 3.81 | 3.44 | | |
| 3 | 31891 | 3.28 | 7.18 | | 3.57 | 2.40 | | |
| 3 | 31892 | 3.39 | 6.26 | | 3.60 | 2.13 | | |
| 3 | 31893 | 3.44 | 8.31 | | 3.76 | 2.83 | | |
| 3 | 31894 | 3.19 | 11.42 | | 3.67 | 3.71 | | |
| 3 | 31895 | 3.12 | 11.69 | | 3.58 | 3.77 | | |
| 3 | 31896 | 3.11 | 7.94 | | 3.49 | 2.55 | | |
| 3 | 31897 | 3.19 | 7.75 | | 3.54 | 2.56 | | |
| 3 | 31898 | 3.41 | 3.61 | | 3.65 | 1.23 | | |
| 3 | 31899 | 3.37 | 3.71 | | 3.59 | 1.27 | | |
| 3 | 31900 | 3.39 | 2.34 | | 3.53 | 0.64 | | |
| 3 | 31901 | 3.49 | 2.19 | | 3.59 | 0.60 | | |
| 3 | 31902 | 3.02 | 2.61 | | 3.22 | 0.66 | | |
| 3 | 31903 | 3.09 | 2.54 | | 3.19 | 0.63 | | |
| 3 | 31904 | 2.99 | 4.40 | | 3.30 | 1.37 | | |
| 3 | 31905 | 2.97 | 4.01 | | 3.30 | 1.21 | | |
| 3 | 31906 | 3.52 | 12.18 | | 3.37 | 3.82 | | |
| 3 | 31907 | 3.15 | 9.76 | | 3.40 | 3.00 | | |
| 3 | 31908 | 3.01 | 8.43 | | 3.43 | 2.65 | | |
| 3 | 31909 | 3.11 | 11.86 | | 3.49 | 3.78 | | |
| 3 | 31910 | 3.63 | 5.31 | | 3.83 | 1.95 | | |
| 3 | 31911 | 3.72 | 5.12 | | 3.94 | 1.92 | | |
| 3 | 31912 | 3.83 | 7.12 | | 4.03 | 2.63 | | |
| 3 | 31913 | 3.73 | 7.55 | | 3.92 | 2.69 | | |
| 3 | 31914 | 3.90 | 10.87 | | 4.39 | 3.97 | | |
| 3 | 31915 | 3.95 | 8.29 | | 4.19 | 3.09 | | |
| 3 | 31916 | 4.02 | 6.97 | | 4.29 | 2.74 | | |
| 3 | 31917 | 4.09 | 10.23 | | 4.54 | 3.90 | | |
| 3 | 31918 | 3.61 | 7.55 | | 3.83 | 2.66 | | |
| 3 | 31919 | 3.49 | 7.51 | | 3.74 | 2.60 | | |
| 3 | 31920 | 3.44 | 5.41 | | 3.64 | 1.91 | | |
| 3 | 31921 | 3.53 | 5.34 | | 3.73 | 1.93 | | |
| 3 | 31922 | 3.03 | 6.38 | | 3.40 | 2.00 | | |
| 3 | 31923 | 3.18 | 8.12 | | 3.42 | 2.47 | | |
| 3 | 31924 | 3.10 | 7.06 | | 3.37 | 2.18 | | |
| 3 | 31925 | 2.96 | 5.43 | | 3.33 | 1.67 | | |
| 3 | 31926 | 3.97 | 2.24 | | 4.04 | 0.79 | | |
| 3 | 31927 | 3.73 | 3.16 | | 3.93 | 1.06 | | |
| 3 | 31928 | 3.89 | 2.18 | | 3.87 | 0.74 | | |
| 3 | 31929 | 3.43 | 12.15 | | 3.87 | 4.01 | | |
| 3 | 31930 | 3.41 | 10.18 | | 3.85 | 3.38 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 31931 | 3.50 | 12.32 | | 3.97 | 4.12 | | |
| 3 | 31932 | 3.63 | 2.10 | | 3.70 | 0.57 | | |
| 3 | 31933 | 3.49 | 3.20 | | 3.71 | 1.09 | | |
| 3 | 31934 | 3.54 | 2.10 | | 3.65 | 0.56 | | |
| 3 | 31935 | 3.11 | 2.57 | | 3.29 | 0.65 | | |
| 3 | 31936 | 3.05 | 4.16 | | 3.33 | 1.28 | | |
| 3 | 31937 | 3.10 | 2.45 | | 3.20 | 0.59 | | |
| 3 | 31938 | 4.16 | 2.29 | | 4.35 | 1.09 | | |
| 3 | 31939 | 3.92 | 3.66 | | 4.18 | 1.28 | | |
| 3 | 31940 | 4.05 | 2.35 | | 4.15 | 0.83 | | |
| 3 | 31941 | 4.45 | 2.46 | | 4.71 | 1.53 | | |
| 3 | 31942 | 4.54 | 2.52 | | 4.78 | 1.67 | | |
| 3 | 31943 | 4.25 | 3.39 | | 4.48 | 1.08 | | |
| 3 | 31944 | 5.37 | 3.38 | | 4.56 | 1.60 | | |
| 3 | 31945 | 5.09 | 4.19 | | 4.65 | 1.32 | | |
| 3 | 31946 | 5.21 | 3.41 | | 4.53 | 1.73 | | |
| 3 | 31947 | 6.03 | 4.49 | | 5.04 | 0.99 | | |
| 3 | 31948 | 5.92 | 5.02 | | 5.76 | 1.89 | | |
| 3 | 31949 | 5.51 | 4.56 | | 5.35 | 1.42 | | |
| 3 | 31950 | 11.04 | 4.27 | | 0.35 | | | 8.76 |
| 3 | 31951 | 11.73 | 4.06 | | 0.33 | | | 8.76 |
| 3 | 31952 | 12.33 | 3.65 | | 0.24 | | | 8.76 |
| 3 | 31953 | 12.87 | 2.88 | | 0.54 | | | 8.76 |
| 3 | 31954 | 13.03 | 3.13 | | 2.53 | 0.99 | | |
| 3 | 31955 | 12.87 | 2.76 | | 5.23 | 7.08 | | |
| 3 | 31956 | 7.35 | 4.17 | | 3.66 | | | |
| 3 | 31957 | 7.07 | 4.23 | | 4.07 | | | |
| 3 | 31958 | 7.23 | 4.19 | | 4.58 | 0.18 | | |
| 3 | 31959 | 7.10 | 4.31 | | 5.12 | 1.13 | | 8.76 |
| 3 | 31960 | 6.75 | 4.45 | | 6.39 | 3.26 | | |
| 3 | 31961 | 5.83 | 4.54 | | 7.32 | 5.64 | | |
| 3 | 31962 | 32.08 | 17.80 | | 33.32 | 9.83 | | |
| 3 | 31963 | 31.98 | 18.18 | | 32.79 | 9.26 | | |
| 3 | 31964 | 31.64 | 18.45 | | 32.14 | 8.64 | | |
| 3 | 31965 | 31.09 | 18.63 | | 31.40 | 7.98 | | |
| 3 | 31966 | 30.30 | 18.64 | | 30.51 | 7.26 | | |
| 3 | 31967 | 29.31 | 18.48 | | 29.50 | 6.48 | | |
| 3 | 31968 | 28.24 | 18.05 | | 28.42 | 5.67 | | |
| 3 | 31969 | 27.20 | 17.38 | | 27.27 | 4.83 | | |
| 3 | 31970 | 26.17 | 16.58 | | 26.20 | 4.04 | | |
| 3 | 31971 | 25.17 | 15.68 | | 25.22 | 3.29 | | |
| 3 | 31972 | 24.15 | 14.83 | | 24.34 | 2.60 | | |
| 3 | 31973 | 23.40 | 14.17 | | 23.59 | 1.99 | | |
| 3 | 31974 | 23.00 | 13.61 | | 22.97 | 1.42 | | |
| 3 | 31975 | 24.44 | 15.77 | | 22.85 | 1.63 | | |
| 3 | 31976 | 24.39 | 13.88 | | 27.10 | 9.71 | | |
| 3 | 31977 | 15.68 | 9.00 | | 19.20 | 8.18 | | |
| 3 | 31978 | 9.59 | 4.12 | | 13.27 | 5.53 | | |
| 3 | 31979 | 5.36 | 1.68 | | 9.39 | 3.73 | | |
| 3 | 31980 | 3.13 | 0.31 | | 7.08 | 2.25 | | |
| 3 | 31981 | 1.38 | | | 6.47 | 1.94 | | |
| 3 | 31982 | 2.75 | | | 8.45 | 2.98 | | |
| 3 | 31983 | 7.51 | 3.11 | | 11.37 | 5.40 | | |
| 3 | 31984 | 12.97 | 7.43 | | 15.96 | 8.77 | | |
| 3 | 31985 | 24.99 | 14.16 | | 27.15 | 10.10 | | |
| 3 | 31986 | 16.74 | 9.64 | | 19.69 | 8.47 | | |
| 3 | 31987 | 10.82 | 5.20 | | 13.76 | 6.97 | | |
| 3 | 31988 | 6.79 | 3.22 | | 9.79 | 5.65 | | |
| 3 | 31989 | 4.43 | 1.59 | | 7.41 | 4.32 | | |
| 3 | 31990 | 2.74 | 0.45 | | 6.41 | 3.96 | | |
| 3 | 31991 | 4.04 | 1.07 | | 8.66 | 4.93 | | |
| 3 | 31992 | 8.48 | 4.10 | | 11.91 | 6.44 | | |
| 3 | 31993 | 14.14 | 8.29 | | 16.69 | 9.49 | | |
| 3 | 31994 | 25.32 | 14.21 | | 26.95 | 8.63 | | |
| 3 | 31995 | 17.61 | 9.94 | | 20.07 | 8.51 | | |
| 3 | 31996 | 12.07 | 6.36 | | 14.25 | 8.23 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 31997 | 8.29 | 4.63 | | 10.25 | 7.46 | | |
| 3 | 31998 | 5.80 | 2.99 | | 7.82 | 6.32 | | |
| 3 | 31999 | 4.03 | 1.49 | | 6.63 | 5.94 | | |
| 3 | 32000 | 5.78 | 2.31 | | 9.00 | 6.81 | | |
| 3 | 32001 | 9.48 | 4.78 | | 12.47 | 7.57 | | |
| 3 | 32002 | 15.26 | 8.80 | | 17.34 | 9.95 | | |
| 3 | 32003 | 25.38 | 14.05 | | 26.77 | 8.49 | | 8.76 |
| 3 | 32004 | 18.34 | 9.91 | | 20.30 | 8.36 | | |
| 3 | 32005 | 13.36 | 7.31 | | 14.69 | 9.23 | | |
| 3 | 32006 | 9.75 | 5.87 | | 10.70 | 9.00 | | |
| 3 | 32007 | 7.19 | 4.33 | | 8.14 | 8.17 | | |
| 3 | 32008 | 5.38 | 2.78 | | 7.06 | 7.79 | | |
| 3 | 32009 | 7.22 | 3.48 | | 9.43 | 8.57 | | |
| 3 | 32010 | 10.84 | 5.31 | | 13.02 | 8.86 | | |
| 3 | 32011 | 16.09 | 8.96 | | 17.86 | 10.13 | | |
| 3 | 32012 | 25.14 | 13.65 | | 26.36 | 7.96 | | |
| 3 | 32013 | 18.94 | 9.53 | | 20.37 | 8.17 | | |
| 3 | 32014 | 14.53 | 8.03 | | 15.05 | 9.92 | | |
| 3 | 32015 | 11.11 | 6.92 | | 11.15 | 10.29 | | |
| 3 | 32016 | 8.59 | 5.59 | | 8.87 | 9.88 | | |
| 3 | 32017 | 6.78 | 3.75 | | 8.00 | 9.46 | | |
| 3 | 32018 | 8.64 | 4.59 | | 9.88 | 9.96 | | |
| 3 | 32019 | 11.99 | 5.91 | | 13.52 | 9.88 | | |
| 3 | 32020 | 16.66 | 8.73 | | 18.23 | 10.02 | | 8.76 |
| 3 | 32021 | 24.64 | 13.03 | | 25.74 | 6.99 | | |
| 3 | 32022 | 19.42 | 8.83 | | 20.32 | 7.71 | | 8.76 |
| 3 | 32023 | 15.54 | 8.58 | | 15.34 | 10.29 | | |
| 3 | 32024 | 12.35 | 7.75 | | 11.78 | 11.28 | | |
| 3 | 32025 | 9.94 | 6.59 | | 9.60 | 11.19 | | |
| 3 | 32026 | 8.23 | 5.01 | | 9.10 | 10.98 | | |
| 3 | 32027 | 9.96 | 5.52 | | 10.79 | 11.15 | | |
| 3 | 32028 | 13.13 | 6.25 | | 13.93 | 10.59 | | |
| 3 | 32029 | 17.10 | 8.28 | | 18.42 | 9.64 | | |
| 3 | 32030 | 23.89 | 12.21 | | 24.96 | 5.94 | | 8.76 |
| 3 | 32031 | 19.72 | 8.48 | | 20.05 | 7.01 | | |
| 3 | 32032 | 16.24 | 8.79 | | 15.47 | 10.32 | | |
| 3 | 32033 | 13.34 | 8.36 | | 12.36 | 11.87 | | |
| 3 | 32034 | 11.12 | 7.35 | | 10.35 | 12.17 | | |
| 3 | 32035 | 9.65 | 5.86 | | 10.12 | 12.01 | | |
| 3 | 32036 | 11.09 | 6.18 | | 11.66 | 11.95 | | |
| 3 | 32037 | 13.81 | 6.32 | | 14.21 | 10.95 | | |
| 3 | 32038 | 17.40 | 7.60 | | 18.40 | 9.03 | | |
| 3 | 32039 | 23.16 | 11.38 | | 24.05 | 4.85 | | 8.76 |
| 3 | 32040 | 19.76 | 8.13 | | 19.59 | 6.12 | | |
| 3 | 32041 | 16.69 | 8.78 | | 15.45 | 10.06 | | |
| 3 | 32042 | 14.09 | 8.67 | | 13.08 | 12.14 | | |
| 3 | 32043 | 12.11 | 7.88 | | 11.31 | 12.87 | | |
| 3 | 32044 | 10.90 | 6.57 | | 11.04 | 12.83 | | |
| 3 | 32045 | 11.99 | 6.63 | | 12.43 | 12.44 | | |
| 3 | 32046 | 14.44 | 6.37 | | 14.56 | 11.02 | | |
| 3 | 32047 | 17.60 | 6.83 | | 18.19 | 8.39 | | |
| 3 | 32048 | 22.66 | 10.66 | | 23.13 | 3.85 | | 8.76 |
| 3 | 32049 | 19.61 | 7.69 | | 19.04 | 5.20 | | 8.76 |
| 3 | 32050 | 16.86 | 8.65 | | 15.54 | 9.64 | | |
| 3 | 32051 | 14.55 | 8.78 | | 13.52 | 12.17 | | |
| 3 | 32052 | 12.80 | 8.20 | | 11.98 | 13.27 | | |
| 3 | 32053 | 11.83 | 7.07 | | 11.80 | 13.35 | | |
| 3 | 32054 | 12.72 | 6.86 | | 13.02 | 12.63 | | |
| 3 | 32055 | 14.66 | 6.29 | | 14.84 | 10.87 | | |
| 3 | 32056 | 17.19 | 6.31 | | 17.75 | 7.81 | | |
| 3 | 32057 | 22.10 | 9.99 | | 22.25 | 2.95 | | 8.76 |
| 3 | 32058 | 19.31 | 7.21 | | 18.44 | 4.29 | | 8.76 |
| 3 | 32059 | 16.84 | 8.42 | | 15.42 | 9.16 | | |
| 3 | 32060 | 14.78 | 8.75 | | 13.72 | 12.05 | | |
| 3 | 32061 | 13.24 | 8.35 | | 12.41 | 13.23 | | |
| 3 | 32062 | 12.48 | 7.41 | | 12.33 | 13.43 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 32063 | 13.18 | 6.95 | | 13.38 | 12.65 | | |
| 3 | 32064 | 14.74 | 6.12 | | 14.93 | 10.60 | | |
| 3 | 32065 | 17.10 | 5.40 | | 17.32 | 7.20 | | |
| 3 | 32066 | 21.53 | 9.52 | | 21.46 | 2.18 | | 8.76 |
| 3 | 32067 | 18.95 | 6.75 | | 17.87 | 3.46 | | 8.76 |
| 3 | 32068 | 16.71 | 8.16 | | 15.17 | 8.70 | | |
| 3 | 32069 | 14.86 | 8.66 | | 13.77 | 11.88 | | |
| 3 | 32070 | 13.50 | 8.41 | | 12.67 | 13.29 | | |
| 3 | 32071 | 12.91 | 7.70 | | 12.66 | 13.55 | | |
| 3 | 32072 | 13.46 | 7.09 | | 13.55 | 12.59 | | |
| 3 | 32073 | 14.80 | 5.91 | | 14.89 | 10.30 | | |
| 3 | 32074 | 16.87 | 4.83 | | 16.88 | 6.64 | | |
| 3 | 32075 | 20.95 | 9.29 | | 20.80 | 1.53 | | 8.76 |
| 3 | 32076 | 18.56 | 6.34 | | 17.34 | 2.79 | | 8.76 |
| 3 | 32077 | 16.51 | 7.89 | | 14.88 | 8.29 | | |
| 3 | 32078 | 14.82 | 8.53 | | 13.70 | 11.71 | | |
| 3 | 32079 | 13.61 | 8.40 | | 12.79 | 13.28 | | |
| 3 | 32080 | 13.17 | 7.81 | | 12.84 | 13.60 | | |
| 3 | 32081 | 13.56 | 7.04 | | 13.59 | 12.47 | | |
| 3 | 32082 | 14.77 | 5.82 | | 14.74 | 10.00 | | |
| 3 | 32083 | 16.68 | 4.48 | | 16.43 | 6.13 | | |
| 3 | 32084 | 20.27 | 9.40 | | 20.28 | 1.02 | | 8.76 |
| 3 | 32085 | 18.20 | 5.93 | | 16.82 | 2.14 | | 8.76 |
| 3 | 32086 | 16.28 | 7.63 | | 14.58 | 7.97 | | |
| 3 | 32087 | 14.73 | 8.37 | | 13.59 | 11.54 | | |
| 3 | 32088 | 13.64 | 8.35 | | 12.86 | 13.29 | | |
| 3 | 32089 | 13.32 | 7.87 | | 12.92 | 13.60 | | |
| 3 | 32090 | 13.60 | 6.97 | | 13.55 | 12.36 | | |
| 3 | 32091 | 14.64 | 5.61 | | 14.54 | 9.71 | | |
| 3 | 32092 | 16.48 | 4.19 | | 15.98 | 5.69 | | |
| 3 | 32093 | 20.90 | 8.71 | | 19.97 | 0.36 | | 8.76 |
| 3 | 32094 | 17.70 | 5.35 | | 16.18 | 2.04 | | 8.76 |
| 3 | 32095 | 16.06 | 7.39 | | 14.34 | 7.70 | | |
| 3 | 32096 | 14.64 | 8.26 | | 13.53 | 11.46 | | |
| 3 | 32097 | 13.71 | 8.38 | | 12.98 | 13.32 | | |
| 3 | 32098 | 13.38 | 7.90 | | 12.95 | 13.59 | | |
| 3 | 32099 | 13.55 | 6.88 | | 13.44 | 12.22 | | |
| 3 | 32100 | 14.49 | 5.40 | | 14.32 | 9.45 | | |
| 3 | 32101 | 16.02 | 3.53 | | 15.59 | 5.30 | | |
| 3 | 32102 | 18.04 | 10.85 | | 20.73 | 11.16 | | |
| 3 | 32103 | 22.60 | 12.99 | | 24.83 | 12.12 | | |
| 3 | 32104 | 27.52 | 14.90 | | 29.19 | 12.18 | | |
| 3 | 32105 | 32.16 | 17.12 | | 33.14 | 10.85 | | |
| 3 | 32106 | 19.15 | 11.44 | | 21.37 | 11.42 | | |
| 3 | 32107 | 23.38 | 13.36 | | 25.17 | 12.04 | | |
| 3 | 32108 | 27.89 | 15.14 | | 29.10 | 11.86 | | |
| 3 | 32109 | 32.00 | 17.67 | | 32.59 | 10.49 | | |
| 3 | 32110 | 20.08 | 11.71 | | 21.84 | 11.45 | | |
| 3 | 32111 | 23.87 | 13.48 | | 25.34 | 11.80 | | |
| 3 | 32112 | 27.98 | 15.43 | | 28.87 | 11.45 | | |
| 3 | 32113 | 31.62 | 17.90 | | 31.94 | 10.09 | | |
| 3 | 32114 | 20.69 | 11.70 | | 22.14 | 11.26 | | |
| 3 | 32115 | 24.09 | 13.51 | | 25.33 | 11.41 | | |
| 3 | 32116 | 27.82 | 15.50 | | 28.50 | 10.95 | | |
| 3 | 32117 | 31.02 | 17.99 | | 31.20 | 9.67 | | |
| 3 | 32118 | 20.98 | 11.43 | | 22.23 | 10.85 | | |
| 3 | 32119 | 24.00 | 13.44 | | 25.12 | 10.85 | | |
| 3 | 32120 | 27.36 | 15.40 | | 27.95 | 10.35 | | 8.76 |
| 3 | 32121 | 30.27 | 17.96 | | 30.34 | 9.19 | | |
| 3 | 32122 | 21.08 | 11.01 | | 22.12 | 10.23 | | |
| 3 | 32123 | 23.74 | 13.00 | | 24.74 | 10.15 | | |
| 3 | 32124 | 26.66 | 14.86 | | 27.25 | 9.66 | | |
| 3 | 32125 | 29.54 | 17.72 | | 29.38 | 8.67 | | |
| 3 | 32126 | 20.93 | 10.46 | | 21.80 | 9.45 | | |
| 3 | 32127 | 23.37 | 12.38 | | 24.17 | 9.34 | | |
| 3 | 32128 | 26.05 | 14.60 | | 26.43 | 8.91 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 32129 | 28.80 | 17.59 | | 28.36 | 8.12 | | |
| 3 | 32130 | 20.41 | 9.65 | | 21.30 | 8.56 | | |
| 3 | 32131 | 22.68 | 11.52 | | 23.44 | 8.45 | | |
| 3 | 32132 | 25.26 | 13.94 | | 25.50 | 8.11 | | |
| 3 | 32133 | 27.82 | 17.00 | | 27.30 | 7.52 | | |
| 3 | 32134 | 19.78 | 8.73 | | 20.71 | 7.60 | | |
| 3 | 32135 | 21.91 | 10.69 | | 22.69 | 7.60 | | |
| 3 | 32136 | 24.42 | 13.26 | | 24.60 | 7.35 | | 8.76 |
| 3 | 32137 | 26.87 | 16.31 | | 26.33 | 6.95 | | |
| 3 | 32138 | 19.29 | 7.93 | | 20.07 | 6.78 | | |
| 3 | 32139 | 21.27 | 9.92 | | 21.92 | 6.79 | | 8.76 |
| 3 | 32140 | 23.65 | 12.67 | | 23.74 | 6.64 | | 8.76 |
| 3 | 32141 | 26.01 | 15.69 | | 25.45 | 6.44 | | |
| 3 | 32142 | 18.97 | 7.20 | | 19.44 | 6.04 | | 8.76 |
| 3 | 32143 | 20.57 | 9.22 | | 21.22 | 6.06 | | 8.76 |
| 3 | 32144 | 22.88 | 11.96 | | 22.98 | 6.01 | | 8.76 |
| 3 | 32145 | 25.18 | 14.94 | | 24.69 | 5.95 | | |
| 3 | 32146 | 18.67 | 6.47 | | 18.84 | 5.37 | | |
| 3 | 32147 | 20.11 | 8.59 | | 20.56 | 5.41 | | 8.76 |
| 3 | 32148 | 22.17 | 11.33 | | 22.30 | 5.42 | | |
| 3 | 32149 | 24.46 | 14.29 | | 24.02 | 5.45 | | |
| 3 | 32150 | 18.39 | 6.00 | | 18.26 | 4.76 | | |
| 3 | 32151 | 19.76 | 8.23 | | 19.95 | 4.80 | | 8.76 |
| 3 | 32152 | 21.61 | 10.86 | | 21.67 | 4.85 | | |
| 3 | 32153 | 23.89 | 13.81 | | 23.42 | 4.94 | | |
| 3 | 32154 | 17.75 | 5.65 | | 17.71 | 4.19 | | |
| 3 | 32155 | 19.30 | 7.70 | | 19.38 | 4.23 | | 8.76 |
| 3 | 32156 | 21.07 | 10.34 | | 21.10 | 4.30 | | |
| 3 | 32157 | 23.46 | 13.25 | | 22.87 | 4.44 | | |
| 3 | 32158 | 22.99 | 12.66 | | 33.32 | 10.71 | | |
| 3 | 32159 | 27.83 | 14.41 | | 35.15 | 12.01 | | |
| 3 | 32160 | 30.62 | 16.07 | | 34.65 | 11.51 | | |
| 3 | 32161 | 31.81 | 17.06 | | 33.96 | 10.56 | | |
| 3 | 32162 | 5.53 | | | 20.39 | 2.30 | | |
| 3 | 32163 | 2.21 | | | 13.35 | | | |
| 3 | 32164 | 2.65 | | | 10.93 | | | |
| 3 | 32165 | 3.59 | | | 9.69 | | | |
| 3 | 32166 | 4.24 | | | 8.80 | | | |
| 3 | 32167 | 4.34 | | | 8.09 | | | |
| 3 | 32168 | 3.90 | | | 7.63 | | | |
| 3 | 32169 | 3.09 | | | 7.70 | | | |
| 3 | 32170 | 2.40 | | | 9.79 | | | |
| 3 | 32171 | 15.43 | 7.02 | | 24.04 | 8.95 | | |
| 3 | 32172 | 5.94 | | | 15.61 | 2.13 | | |
| 3 | 32173 | 2.21 | | | 10.57 | | | |
| 3 | 32174 | 1.59 | | | 8.50 | | | |
| 3 | 32175 | 1.62 | | | 7.61 | | | |
| 3 | 32176 | 1.76 | | | 7.15 | | | |
| 3 | 32177 | 1.93 | | | 7.08 | | | |
| 3 | 32178 | 2.35 | | | 7.89 | | | |
| 3 | 32179 | 4.48 | | | 11.91 | 0.48 | | |
| 3 | 32180 | 20.09 | 10.80 | | 26.06 | 10.41 | | |
| 3 | 32181 | 10.71 | 4.20 | | 17.02 | 5.73 | | |
| 3 | 32182 | 4.78 | | | 12.10 | 1.17 | | |
| 3 | 32183 | 0.87 | | | 8.25 | | | |
| 3 | 32184 | | | | 6.77 | | | |
| 3 | 32185 | 0.04 | | | 6.47 | | | |
| 3 | 32186 | 0.95 | | | 7.09 | | | |
| 3 | 32187 | 3.75 | | | 9.87 | 0.72 | | |
| 3 | 32188 | 8.76 | 2.36 | | 13.46 | 4.47 | | |
| 3 | 32189 | 23.00 | 12.99 | | 26.84 | 10.86 | | |
| 3 | 32190 | 13.82 | 7.43 | | 18.35 | 7.67 | | |
| 3 | 32191 | 7.75 | 2.31 | | 12.67 | 3.66 | | |
| 3 | 32192 | 2.78 | | | 9.24 | 0.85 | | |
| 3 | 32193 | 0.63 | | | 6.49 | | | |
| 3 | 32194 | 0.02 | | | 6.16 | | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 32195 | 1.23 | | | 8.31 | 0.75 | | |
| 3 | 32196 | 6.21 | 1.27 | | 10.71 | 3.59 | | |
| 3 | 32197 | 11.07 | 5.60 | | 14.86 | 7.26 | | |
| 3 | 32198 | 2.42 | | | 13.40 | | | |
| 3 | 32199 | 3.83 | | | 18.13 | 0.86 | | |
| 3 | 32200 | 9.70 | 2.51 | | 22.06 | 4.74 | | |
| 3 | 32201 | 24.01 | 13.64 | | 33.71 | 10.78 | | |
| 3 | 32202 | 8.93 | 1.47 | | 16.23 | 4.00 | | |
| 3 | 32203 | 12.51 | 5.17 | | 20.23 | 7.38 | | |
| 3 | 32204 | 19.38 | 10.15 | | 27.22 | 11.33 | | |
| 3 | 32205 | 28.49 | 14.33 | | 35.23 | 12.05 | | |
| 3 | 32206 | 13.00 | 6.31 | | 18.01 | 8.14 | | |
| 3 | 32207 | 17.74 | 9.66 | | 22.82 | 10.77 | | |
| 3 | 32208 | 23.90 | 12.72 | | 28.77 | 12.34 | | |
| 3 | 32209 | 30.97 | 15.83 | | 34.50 | 11.73 | | |
| 3 | 32210 | 16.15 | 9.25 | | 19.64 | 10.31 | | |
| 3 | 32211 | 20.96 | 11.90 | | 24.10 | 11.86 | | |
| 3 | 32212 | 26.44 | 14.27 | | 29.07 | 12.43 | | |
| 3 | 32213 | 31.98 | 16.53 | | 33.80 | 11.30 | | |
| 3 | 32214 | 3.64 | | | 5.07 | 3.70 | | |
| 3 | 32215 | 3.46 | | | 5.80 | 4.77 | | |
| 3 | 32216 | 3.27 | | | 6.47 | 5.45 | | |
| 3 | 32217 | 3.28 | | | 8.38 | 7.09 | | |
| 3 | 32218 | 3.58 | | | 10.72 | 9.35 | | |
| 3 | 32219 | 4.77 | | | 7.51 | 10.75 | | |
| 3 | 32220 | 6.79 | 5.87 | | 4.76 | | | |
| 3 | 32221 | 6.63 | 5.32 | | 5.20 | | | |
| 3 | 32222 | 6.77 | 4.07 | | 6.00 | | | |
| 3 | 32223 | 7.55 | 3.69 | | 6.77 | | | |
| 3 | 32224 | 9.48 | 3.59 | | 6.78 | | | |
| 3 | 32225 | 13.77 | 3.36 | | 5.31 | | | |
| 3 | 32226 | 6.30 | 4.06 | | 6.28 | | | |
| 3 | 32227 | 6.05 | 2.32 | | 6.21 | 0.57 | | |
| 3 | 32228 | 5.38 | 1.90 | | 5.87 | 0.73 | | |
| 3 | 32229 | 4.68 | 1.54 | | 5.59 | 0.44 | | |
| 3 | 32230 | 3.99 | 1.27 | | 5.06 | 0.36 | | |
| 3 | 32231 | 3.41 | 0.90 | | 4.27 | 0.04 | | |
| 3 | 32232 | 3.04 | 1.83 | | 3.41 | | | |
| 3 | 32233 | 2.60 | 2.72 | | 3.52 | | | |
| 3 | 32234 | 2.49 | 2.92 | | 4.86 | 1.00 | | |
| 3 | 32235 | 6.30 | 3.91 | | 5.97 | | | |
| 3 | 32236 | 6.42 | 2.55 | | 5.60 | 0.10 | | |
| 3 | 32237 | 5.82 | 2.12 | | 4.99 | 0.28 | | |
| 3 | 32238 | 5.19 | 1.73 | | 4.69 | 0.22 | | |
| 3 | 32239 | 4.58 | 1.44 | | 4.24 | 0.12 | | |
| 3 | 32240 | 4.10 | 1.08 | | 3.51 | 0.02 | | |
| 3 | 32241 | 3.81 | 1.99 | | 2.88 | | | |
| 3 | 32242 | 3.34 | 2.87 | | 2.96 | | | |
| 3 | 32243 | 2.99 | 3.17 | | 4.55 | 0.37 | | |
| 3 | 32244 | 6.57 | 3.85 | | 5.84 | | | |
| 3 | 32245 | 6.86 | 2.68 | | 4.72 | | | |
| 3 | 32246 | 6.28 | 2.28 | | 4.17 | | | |
| 3 | 32247 | 5.66 | 1.86 | | 3.87 | 0.12 | | |
| 3 | 32248 | 5.15 | 1.65 | | 3.46 | 0.29 | | |
| 3 | 32249 | 4.82 | 1.34 | | 2.83 | 0.20 | | |
| 3 | 32250 | 4.62 | 2.07 | | 2.31 | | | |
| 3 | 32251 | 4.22 | 2.93 | | 2.33 | | | |
| 3 | 32252 | 3.89 | 3.41 | | 3.51 | | | |
| 3 | 32253 | 7.44 | 3.37 | | 5.14 | | | |
| 3 | 32254 | 7.51 | 2.63 | | 3.79 | | | |
| 3 | 32255 | 6.70 | 2.28 | | 3.40 | | | |
| 3 | 32256 | 6.07 | 1.96 | | 3.16 | 0.22 | | |
| 3 | 32257 | 5.75 | 1.81 | | 2.76 | 0.55 | | |
| 3 | 32258 | 5.60 | 1.51 | | 2.20 | 0.48 | | |
| 3 | 32259 | 5.53 | 2.07 | | 1.73 | 0.06 | | |
| 3 | 32260 | 5.34 | 2.83 | | 1.58 | | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 32261 | 5.52 | 3.48 | | 2.32 | | | |
| 3 | 32262 | 9.08 | 3.30 | | 3.94 | | | |
| 3 | 32263 | 8.23 | 2.35 | | 2.95 | | | |
| 3 | 32264 | 7.30 | 1.71 | | 2.86 | | | |
| 3 | 32265 | 6.65 | 1.91 | | 2.64 | 0.40 | | |
| 3 | 32266 | 6.29 | 1.98 | | 2.24 | 0.83 | | |
| 3 | 32267 | 6.24 | 1.74 | | 1.79 | 0.78 | | |
| 3 | 32268 | 6.40 | 2.07 | | 1.33 | 0.28 | | |
| 3 | 32269 | 6.61 | 2.55 | | 1.04 | | | |
| 3 | 32270 | 7.23 | 3.27 | | 1.15 | | | |
| 3 | 32271 | 11.39 | 3.08 | | 2.07 | | | |
| 3 | 32272 | 9.08 | 1.77 | | 2.76 | | | |
| 3 | 32273 | 7.77 | 1.53 | | 3.05 | | | |
| 3 | 32274 | 7.03 | 2.11 | | 2.83 | 0.68 | | |
| 3 | 32275 | 6.78 | 2.17 | | 2.39 | 1.18 | | |
| 3 | 32276 | 6.80 | 2.00 | | 1.84 | 1.12 | | |
| 3 | 32277 | 7.23 | 1.96 | | 1.31 | 0.57 | | |
| 3 | 32278 | 7.99 | 2.15 | | 0.78 | | | |
| 3 | 32279 | 8.67 | 2.72 | | 0.30 | | | |
| 3 | 32280 | 6.21 | 1.54 | | 6.75 | 5.42 | | |
| 3 | 32281 | 5.99 | 0.51 | | 8.29 | 6.78 | | |
| 3 | 32282 | 4.81 | | | 10.84 | 8.36 | | |
| 3 | 32283 | 4.35 | | | 12.12 | 9.33 | | |
| 3 | 32284 | 6.32 | | | 11.15 | 9.48 | | |
| 3 | 32285 | 12.12 | | | 7.72 | 9.78 | | |
| 3 | 32286 | 5.10 | 0.99 | | 7.01 | 5.14 | | |
| 3 | 32287 | 4.35 | 0.10 | | 8.49 | 6.11 | | |
| 3 | 32288 | 3.50 | | | 10.13 | 6.60 | | |
| 3 | 32289 | 4.23 | | | 10.83 | 6.05 | | 8.76 |
| 3 | 32290 | 7.32 | 0.53 | | 9.20 | 4.63 | | |
| 3 | 32291 | 13.32 | 2.54 | | 5.04 | 2.73 | | |
| 3 | 32292 | 4.24 | 1.14 | | 7.08 | 4.37 | | |
| 3 | 32293 | 3.81 | 0.72 | | 8.05 | 4.69 | | |
| 3 | 32294 | 3.34 | 0.74 | | 8.94 | 4.45 | | |
| 3 | 32295 | 4.76 | 1.52 | | 8.77 | 3.20 | | 8.76 |
| 3 | 32296 | 7.84 | 2.84 | | 6.83 | 1.29 | | 8.76 |
| 3 | 32297 | 13.20 | 3.93 | | 2.66 | | | |
| 3 | 32298 | 3.68 | 1.56 | | 6.81 | 3.40 | | |
| 3 | 32299 | 3.43 | 1.52 | | 7.38 | 3.27 | | |
| 3 | 32300 | 3.39 | 1.87 | | 7.63 | 2.59 | | |
| 3 | 32301 | 5.10 | 2.77 | | 6.94 | 1.12 | | 8.76 |
| 3 | 32302 | 8.14 | 3.71 | | 4.52 | | | 8.76 |
| 3 | 32303 | 12.54 | 4.04 | | 0.88 | | | |
| 3 | 32304 | 3.27 | 2.04 | | 6.36 | 2.44 | | |
| 3 | 32305 | 3.16 | 2.22 | | 6.59 | 2.11 | | |
| 3 | 32306 | 3.57 | 2.70 | | 6.42 | 1.26 | | |
| 3 | 32307 | 5.43 | 3.47 | | 5.39 | | | 8.76 |
| 3 | 32308 | 8.18 | 3.99 | | 2.76 | | | 8.76 |
| 3 | 32309 | 11.42 | 3.75 | | 0.34 | | | |
| 3 | 32310 | 2.99 | 2.48 | | 5.84 | 1.66 | | |
| 3 | 32311 | 3.06 | 2.75 | | 5.81 | 1.08 | | |
| 3 | 32312 | 3.77 | 3.22 | | 5.36 | 0.36 | | |
| 3 | 32313 | 5.62 | 3.74 | | 3.73 | | | |
| 3 | 32314 | 8.01 | 3.84 | | 1.80 | | | 8.76 |
| 3 | 32315 | 10.37 | 3.36 | | 0.13 | | | |
| 3 | 32316 | 3.28 | 0.38 | | 3.93 | | | |
| 3 | 32317 | 5.89 | 0.42 | | 6.51 | 2.23 | | |
| 3 | 32318 | 4.81 | 5.85 | | 5.38 | | | |
| 3 | 32319 | 7.53 | 7.30 | | 4.68 | | | |
| 3 | 32320 | 4.01 | 1.62 | | 9.27 | 0.38 | | |
| 3 | 32321 | 3.16 | 0.34 | | 10.43 | 1.67 | | |
| 3 | 32322 | 2.26 | 0.10 | | 10.37 | 2.20 | | |
| 3 | 32323 | 1.52 | 0.02 | | 9.78 | 2.26 | | |
| 3 | 32324 | 0.92 | | | 8.74 | 2.18 | | |
| 3 | 32325 | 0.43 | | | 7.69 | 1.87 | | |
| 3 | 32326 | | | | 6.47 | 1.38 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 32327 | 0.36 | 0.97 | | 5.02 | 0.81 | | |
| 3 | 32328 | 1.64 | 1.83 | | 5.12 | 2.09 | | |
| 3 | 32329 | 6.02 | 3.35 | | 6.60 | 0.44 | | |
| 3 | 32330 | 5.29 | 1.55 | | 7.91 | 1.62 | | |
| 3 | 32331 | 4.28 | 0.95 | | 7.62 | 1.22 | | |
| 3 | 32332 | 3.38 | 0.82 | | 7.12 | 1.21 | | |
| 3 | 32333 | 2.55 | 0.26 | | 6.47 | 1.00 | | |
| 3 | 32334 | 1.85 | 0.44 | | 5.69 | 0.63 | | |
| 3 | 32335 | 1.36 | 0.99 | | 4.75 | 0.20 | | |
| 3 | 32336 | 1.03 | 2.12 | | 4.34 | 0.41 | | |
| 3 | 32337 | 2.19 | 2.44 | | 5.08 | 1.82 | | |
| 3 | 32338 | 2.76 | 2.21 | | 5.23 | 3.50 | | |
| 3 | 32339 | 3.38 | 2.23 | | 5.30 | 3.91 | | |
| 3 | 32340 | 3.85 | 2.05 | | 5.25 | 3.98 | | |
| 3 | 32341 | 4.13 | 1.87 | | 5.56 | 3.59 | | |
| 3 | 32342 | 4.24 | 1.89 | | 5.53 | 2.81 | | |
| 3 | 32343 | 4.45 | 2.64 | | 5.14 | 1.50 | | |
| 3 | 32344 | 3.02 | 2.19 | | 5.59 | 2.52 | | |
| 3 | 32345 | 3.43 | 1.90 | | 5.77 | 2.83 | | |
| 3 | 32346 | 3.84 | 1.65 | | 5.85 | 3.11 | | |
| 3 | 32347 | 4.27 | 1.55 | | 5.80 | 3.45 | | |
| 3 | 32348 | 4.78 | 1.77 | | 5.59 | 3.73 | | |
| 3 | 32349 | 5.59 | 2.70 | | 5.17 | 3.97 | | |
| 3 | 32350 | 19.37 | 10.12 | | 18.63 | | | |
| 3 | 32351 | 18.45 | 8.46 | | 19.29 | | | |
| 3 | 32352 | 17.40 | 7.15 | | 21.09 | 0.21 | | |
| 3 | 32353 | 15.81 | 6.08 | | 21.62 | 1.19 | | |
| 3 | 32354 | 18.21 | 7.30 | | 18.03 | | | |
| 3 | 32355 | 16.52 | 4.90 | | 15.70 | 0.38 | | 8.76 |
| 3 | 32356 | 14.63 | 3.29 | | 13.17 | 3.32 | | 8.76 |
| 3 | 32357 | 12.65 | 2.15 | | 12.44 | 5.09 | | 8.76 |
| 3 | 32358 | 10.86 | 1.68 | | 12.26 | 5.82 | | 8.76 |
| 3 | 32359 | 8.95 | 1.94 | | 12.03 | 5.92 | | 8.76 |
| 3 | 32360 | 8.62 | 2.10 | | 11.85 | 5.65 | | 8.76 |
| 3 | 32361 | 10.64 | 2.12 | | 11.74 | 5.29 | | 8.76 |
| 3 | 32362 | 13.93 | 1.84 | | 11.75 | 4.98 | | |
| 3 | 32363 | 17.48 | 6.34 | | 19.32 | 0.26 | | |
| 3 | 32364 | 16.24 | 4.54 | | 16.97 | 0.30 | | 8.76 |
| 3 | 32365 | 14.80 | 3.37 | | 14.66 | 2.48 | | 8.76 |
| 3 | 32366 | 13.11 | 2.53 | | 13.49 | 3.72 | | 8.76 |
| 3 | 32367 | 11.82 | 1.32 | | 13.27 | 4.30 | | 8.76 |
| 3 | 32368 | 10.15 | 1.36 | | 12.99 | 4.32 | | 8.76 |
| 3 | 32369 | 10.35 | 1.74 | | 12.70 | 4.59 | | 8.76 |
| 3 | 32370 | 12.96 | 2.02 | | 12.49 | 5.36 | | 8.76 |
| 3 | 32371 | 16.38 | 2.77 | | 12.54 | 5.89 | | |
| 3 | 32372 | 16.22 | 5.25 | | 19.93 | 1.19 | | 8.76 |
| 3 | 32373 | 15.65 | 3.98 | | 18.35 | 1.09 | | 8.76 |
| 3 | 32374 | 14.94 | 3.32 | | 16.32 | 1.33 | | 8.76 |
| 3 | 32375 | 13.98 | 2.66 | | 14.83 | 2.22 | | 8.76 |
| 3 | 32376 | 12.79 | 1.73 | | 14.49 | 2.76 | | 8.76 |
| 3 | 32377 | 11.34 | 0.74 | | 14.04 | 3.85 | | 8.76 |
| 3 | 32378 | 12.36 | 1.24 | | 13.55 | 4.73 | | 8.76 |
| 3 | 32379 | 12.91 | 2.61 | | 13.10 | 5.46 | | |
| 3 | 32380 | 16.78 | 4.94 | | 12.98 | 6.01 | | |
| 3 | 32381 | 13.96 | 3.76 | | 20.96 | 2.01 | | |
| 3 | 32382 | 14.83 | 3.33 | | 20.57 | 2.13 | | |
| 3 | 32383 | 15.06 | 3.06 | | 18.38 | 1.74 | | |
| 3 | 32384 | 14.80 | 2.49 | | 16.33 | 1.88 | | |
| 3 | 32385 | 13.91 | 2.01 | | 15.64 | 3.01 | | |
| 3 | 32386 | 13.27 | 1.34 | | 14.92 | 3.92 | | |
| 3 | 32387 | 13.52 | 1.98 | | 14.20 | 4.61 | | |
| 3 | 32388 | 15.61 | 3.74 | | 13.72 | 5.13 | | |
| 3 | 32389 | 16.34 | 5.30 | | 13.35 | 5.38 | | |
| 3 | 32390 | 16.83 | 1.37 | | 11.67 | 4.72 | | 8.76 |
| 3 | 32391 | 18.94 | 1.17 | | 11.59 | 4.40 | | 8.76 |
| 3 | 32392 | 20.94 | 0.83 | | 11.24 | 3.95 | | 8.76 |

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|---|---|---|---|---|---|---|---|---|
| 3 | 32393 | 23.71 | 2.14 | | 10.67 | 3.48 | | 9.88 |
| 3 | 32394 | 24.11 | 4.92 | | 10.41 | 4.77 | | 14.36 |
| 3 | 32395 | 53.98 | 29.69 | | 27.97 | 15.84 | | |
| 3 | 32396 | 19.17 | 4.18 | | 12.65 | 5.98 | | |
| 3 | 32397 | 20.91 | 5.32 | | 12.72 | 5.78 | | 8.76 |
| 3 | 32398 | 22.81 | 6.78 | | 12.84 | 5.38 | | 8.76 |
| 3 | 32399 | 24.32 | 8.52 | | 12.75 | 4.50 | | 9.42 |
| 3 | 32400 | 27.81 | 9.77 | | 18.70 | 7.02 | | 12.50 |
| 3 | 32401 | 37.19 | 12.73 | | 25.91 | 6.91 | | |
| 3 | 32402 | 18.70 | 6.61 | | 13.10 | 6.08 | | |
| 3 | 32403 | 19.94 | 7.66 | | 13.48 | 5.88 | | |
| 3 | 32404 | 21.28 | 8.67 | | 14.10 | 5.31 | | 8.76 |
| 3 | 32405 | 23.28 | 9.27 | | 15.26 | 4.11 | | 8.76 |
| 3 | 32406 | 25.09 | 8.41 | | 18.15 | 3.04 | | 8.76 |
| 3 | 32407 | 27.87 | 6.31 | | 22.37 | 2.33 | | |
| 3 | 32408 | 16.80 | 6.44 | | 13.47 | 5.35 | | |
| 3 | 32409 | 17.64 | 7.13 | | 14.08 | 5.18 | | |
| 3 | 32410 | 18.28 | 7.44 | | 15.16 | 4.75 | | |
| 3 | 32411 | 19.46 | 7.39 | | 16.83 | 4.05 | | |
| 3 | 32412 | 21.21 | 6.78 | | 18.97 | 3.03 | | |
| 3 | 32413 | 23.87 | 5.51 | | 21.44 | 1.61 | | |
| 3 | 32414 | 24.37 | 22.79 | | 24.26 | 4.41 | | |
| 3 | 32415 | 23.99 | 22.25 | | 23.97 | 4.16 | | |
| 3 | 32416 | 23.53 | 21.58 | | 23.66 | 3.85 | | |
| 3 | 32417 | 22.98 | 20.82 | | 23.28 | 3.46 | | |
| 3 | 32418 | 22.55 | 19.88 | | 22.79 | 2.93 | | |
| 3 | 32419 | 22.22 | 19.23 | | 22.16 | 2.24 | | |
| 3 | 32420 | 21.98 | 18.64 | | 21.37 | 1.32 | | |
| 3 | 32421 | 22.06 | 17.83 | | 20.40 | 0.26 | | |
| 3 | 32422 | 21.98 | 16.88 | | 19.89 | | | |
| 3 | 32423 | 21.79 | 15.83 | | 19.35 | | | |
| 3 | 32424 | 21.50 | 14.80 | | 18.89 | | | |
| 3 | 32425 | 21.09 | 13.56 | | 18.57 | | | |
| 3 | 32426 | 20.49 | 12.44 | | 18.35 | | | |
| 3 | 32427 | 19.84 | 11.18 | | 18.17 | | | |
| 3 | 32428 | 21.16 | 14.64 | | 20.88 | 2.29 | | 8.76 |
| 3 | 32429 | 18.70 | 6.55 | | 17.01 | 0.76 | | 8.76 |
| 3 | 32430 | 16.36 | 6.37 | | 16.58 | 1.34 | | |
| 3 | 32431 | 14.08 | 6.47 | | 16.18 | 5.34 | | |
| 3 | 32432 | 11.82 | 5.88 | | 15.35 | 7.42 | | |
| 3 | 32433 | 9.63 | 4.82 | | 14.56 | 8.19 | | |
| 3 | 32434 | 7.51 | 3.57 | | 13.72 | 7.86 | | |
| 3 | 32435 | 5.46 | 2.28 | | 12.94 | 6.89 | | |
| 3 | 32436 | 3.36 | 1.16 | | 12.29 | 5.55 | | |
| 3 | 32437 | 21.07 | 14.11 | | 20.70 | 2.05 | | 8.76 |
| 3 | 32438 | 18.77 | 6.51 | | 16.80 | 0.44 | | 8.76 |
| 3 | 32439 | 16.54 | 6.41 | | 16.84 | 1.58 | | |
| 3 | 32440 | 14.34 | 6.51 | | 16.51 | 5.62 | | |
| 3 | 32441 | 12.12 | 5.93 | | 15.81 | 7.92 | | |
| 3 | 32442 | 9.93 | 4.90 | | 14.91 | 8.52 | | |
| 3 | 32443 | 7.79 | 3.63 | | 14.04 | 8.21 | | |
| 3 | 32444 | 5.70 | 2.36 | | 13.21 | 7.25 | | |
| 3 | 32445 | 3.51 | 1.20 | | 12.49 | 5.90 | | |
| 3 | 32446 | 21.01 | 13.47 | | 20.36 | 1.68 | | 8.76 |
| 3 | 32447 | 18.93 | 5.91 | | 16.54 | 0.09 | | 8.76 |
| 3 | 32448 | 16.77 | 6.44 | | 17.10 | 1.87 | | |
| 3 | 32449 | 14.59 | 6.54 | | 16.83 | 5.94 | | |
| 3 | 32450 | 12.41 | 5.97 | | 16.12 | 8.24 | | |
| 3 | 32451 | 10.23 | 4.94 | | 15.22 | 8.85 | | |
| 3 | 32452 | 8.07 | 3.68 | | 14.31 | 8.56 | | |
| 3 | 32453 | 5.94 | 2.41 | | 13.41 | 7.61 | | |
| 3 | 32454 | 3.69 | 1.27 | | 12.66 | 6.28 | | |
| 3 | 32455 | 21.04 | 12.87 | | 19.97 | 1.29 | | 8.76 |
| 3 | 32456 | 19.00 | 5.55 | | 16.05 | | | 8.76 |
| 3 | 32457 | 16.94 | 6.47 | | 17.34 | 2.21 | | |
| 3 | 32458 | 14.83 | 6.56 | | 17.11 | 6.29 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 32459 | 12.68 | 5.98 | | 16.69 | 8.56 | | |
| 3 | 32460 | 10.51 | 4.96 | | 15.46 | 9.19 | | |
| 3 | 32461 | 8.33 | 3.71 | | 14.49 | 8.90 | | |
| 3 | 32462 | 6.15 | 2.44 | | 13.52 | 7.96 | | |
| 3 | 32463 | 3.86 | 1.33 | | 12.64 | 6.62 | | |
| 3 | 32464 | 20.95 | 12.67 | | 19.47 | 0.81 | | 8.76 |
| 3 | 32465 | 19.04 | 5.78 | | 15.73 | | | 8.76 |
| 3 | 32466 | 17.09 | 6.48 | | 17.54 | 2.63 | | |
| 3 | 32467 | 15.04 | 6.54 | | 17.33 | 6.67 | | |
| 3 | 32468 | 12.92 | 5.95 | | 16.89 | 8.96 | | |
| 3 | 32469 | 10.75 | 4.92 | | 15.59 | 9.51 | | |
| 3 | 32470 | 8.55 | 3.68 | | 14.53 | 9.21 | | |
| 3 | 32471 | 6.32 | 2.42 | | 13.45 | 8.27 | | |
| 3 | 32472 | 3.99 | 1.35 | | 12.41 | 6.94 | | |
| 3 | 32473 | 20.80 | 12.68 | | 18.81 | 0.20 | | 8.76 |
| 3 | 32474 | 19.05 | 6.04 | | 15.95 | | | 8.76 |
| 3 | 32475 | 17.19 | 6.44 | | 17.66 | 3.09 | | |
| 3 | 32476 | 15.19 | 6.46 | | 17.44 | 7.06 | | |
| 3 | 32477 | 13.08 | 5.85 | | 16.94 | 9.34 | | |
| 3 | 32478 | 10.93 | 4.83 | | 15.55 | 9.78 | | |
| 3 | 32479 | 8.71 | 3.59 | | 14.38 | 9.47 | | |
| 3 | 32480 | 6.42 | 2.34 | | 13.13 | 8.50 | | |
| 3 | 32481 | 4.08 | 1.33 | | 11.90 | 7.18 | | |
| 3 | 32482 | 20.59 | 12.50 | | 17.87 | | | 8.76 |
| 3 | 32483 | 18.99 | 6.18 | | 16.16 | | | 8.76 |
| 3 | 32484 | 17.20 | 6.31 | | 17.66 | 3.56 | | |
| 3 | 32485 | 15.22 | 6.27 | | 17.39 | 7.41 | | |
| 3 | 32486 | 13.13 | 5.65 | | 16.78 | 9.58 | | |
| 3 | 32487 | 10.96 | 4.65 | | 15.28 | 9.97 | | |
| 3 | 32488 | 8.75 | 3.44 | | 13.95 | 9.60 | | |
| 3 | 32489 | 6.43 | 2.20 | | 12.49 | 8.59 | | |
| 3 | 32490 | 4.00 | 1.22 | | 11.02 | 7.26 | | |
| 3 | 32491 | 20.27 | 12.04 | | 17.36 | | | 8.76 |
| 3 | 32492 | 18.82 | 6.12 | | 15.96 | | | 8.76 |
| 3 | 32493 | 17.05 | 6.02 | | 17.49 | 3.99 | | |
| 3 | 32494 | 15.07 | 5.92 | | 17.11 | 7.65 | | |
| 3 | 32495 | 12.97 | 5.32 | | 16.34 | 9.68 | | |
| 3 | 32496 | 10.84 | 4.38 | | 15.30 | 9.99 | | |
| 3 | 32497 | 8.65 | 3.22 | | 13.20 | 9.59 | | |
| 3 | 32498 | 6.35 | 2.02 | | 11.47 | 8.51 | | |
| 3 | 32499 | 3.83 | 1.00 | | 9.63 | 7.10 | | |
| 3 | 32500 | 19.84 | 11.41 | | 17.03 | | | 8.76 |
| 3 | 32501 | 18.49 | 6.03 | | 15.94 | | | |
| 3 | 32502 | 16.71 | 5.57 | | 17.14 | 4.27 | | |
| 3 | 32503 | 14.69 | 5.44 | | 16.62 | 7.72 | | |
| 3 | 32504 | 12.60 | 4.90 | | 15.66 | 9.59 | | |
| 3 | 32505 | 10.52 | 4.07 | | 14.33 | 10.24 | | |
| 3 | 32506 | 8.44 | 3.00 | | 12.79 | 9.43 | | |
| 3 | 32507 | 6.21 | 1.83 | | 10.20 | 8.27 | | |
| 3 | 32508 | 4.25 | 0.74 | | 8.46 | 7.42 | | |
| 3 | 32509 | 19.10 | 10.66 | | 16.81 | | | 8.76 |
| 3 | 32510 | 17.97 | 5.78 | | 15.75 | | | |
| 3 | 32511 | 16.13 | 4.95 | | 16.61 | 4.41 | | |
| 3 | 32512 | 14.06 | 4.83 | | 15.91 | 7.61 | | |
| 3 | 32513 | 11.99 | 4.40 | | 14.74 | 9.29 | | |
| 3 | 32514 | 9.99 | 3.72 | | 13.18 | 9.84 | | |
| 3 | 32515 | 8.06 | 2.80 | | 11.32 | 9.52 | | |
| 3 | 32516 | 6.03 | 1.69 | | 9.10 | 8.50 | | |
| 3 | 32517 | 6.68 | 0.52 | | 6.21 | 6.91 | | |
| 3 | 32518 | 19.09 | 9.93 | | 16.71 | | | 8.76 |
| 3 | 32519 | 17.27 | 5.60 | | 15.47 | | | 8.76 |
| 3 | 32520 | 15.35 | 4.24 | | 15.96 | 4.40 | | 8.76 |
| 3 | 32521 | 13.25 | 4.16 | | 15.07 | 7.35 | | 8.76 |
| 3 | 32522 | 11.21 | 3.86 | | 13.67 | 8.88 | | |
| 3 | 32523 | 9.32 | 3.38 | | 11.88 | 9.29 | | |
| 3 | 32524 | 7.57 | 2.66 | | 9.76 | 8.95 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 32525 | 6.07 | 1.63 | | 8.10 | 7.93 | | |
| 3 | 32526 | 7.87 | 0.43 | | 6.63 | 5.79 | | |
| 3 | 32527 | 18.98 | 9.26 | | 16.76 | | | |
| 3 | 32528 | 16.48 | 5.43 | | 15.39 | 0.18 | | 8.76 |
| 3 | 32529 | 14.42 | 3.48 | | 15.22 | 4.28 | | 8.76 |
| 3 | 32530 | 12.30 | 3.47 | | 14.13 | 6.97 | | 8.76 |
| 3 | 32531 | 10.30 | 3.34 | | 12.51 | 8.35 | | |
| 3 | 32532 | 8.53 | 3.04 | | 10.53 | 8.63 | | |
| 3 | 32533 | 6.99 | 2.55 | | 9.73 | 8.29 | | |
| 3 | 32534 | 7.09 | 1.72 | | 9.23 | 7.36 | | |
| 3 | 32535 | 8.90 | 0.53 | | 8.19 | 5.18 | | 8.76 |
| 3 | 32536 | 18.80 | 8.59 | | 16.95 | | | |
| 3 | 32537 | 16.59 | 5.27 | | 14.80 | 0.31 | | 8.76 |
| 3 | 32538 | 14.16 | 3.15 | | 14.41 | 4.07 | | 8.76 |
| 3 | 32539 | 11.86 | 2.80 | | 13.10 | 6.49 | | 8.76 |
| 3 | 32540 | 9.42 | 2.82 | | 11.29 | 7.61 | | 8.76 |
| 3 | 32541 | 7.69 | 2.71 | | 10.73 | 7.96 | | |
| 3 | 32542 | 6.97 | 2.44 | | 10.47 | 7.64 | | |
| 3 | 32543 | 7.98 | 1.87 | | 10.19 | 6.80 | | 8.76 |
| 3 | 32544 | 9.96 | 0.78 | | 9.60 | 4.89 | | 8.76 |
| 3 | 32545 | 18.63 | 8.04 | | 17.33 | | | |
| 3 | 32546 | 16.60 | 5.11 | | 14.75 | 0.38 | | 8.76 |
| 3 | 32547 | 14.38 | 3.29 | | 13.55 | 3.80 | | 8.76 |
| 3 | 32548 | 12.19 | 2.23 | | 12.03 | 5.95 | | 8.76 |
| 3 | 32549 | 10.12 | 2.33 | | 11.53 | 6.90 | | 8.76 |
| 3 | 32550 | 8.00 | 2.39 | | 11.29 | 7.09 | | 8.76 |
| 3 | 32551 | 7.60 | 2.31 | | 11.10 | 6.79 | | 8.76 |
| 3 | 32552 | 8.94 | 2.02 | | 10.95 | 6.07 | | 8.76 |
| 3 | 32553 | 11.20 | 1.27 | | 10.71 | 4.64 | | 8.76 |
| 3 | 32554 | 2.15 | 0.71 | | 12.17 | 4.62 | | |
| 3 | 32555 | 1.57 | 0.56 | | 12.08 | 4.08 | | |
| 3 | 32556 | 1.06 | 0.43 | | 11.97 | 3.50 | | |
| 3 | 32557 | 0.55 | 0.30 | | 11.78 | 2.86 | | |
| 3 | 32558 | 0.04 | 0.12 | | 11.47 | 2.08 | | |
| 3 | 32559 | | 0.01 | | 10.51 | 0.93 | | |
| 3 | 32560 | 2.11 | 0.64 | | 12.31 | 4.99 | | |
| 3 | 32561 | 1.57 | 0.44 | | 12.21 | 4.46 | | |
| 3 | 32562 | 1.03 | 0.33 | | 12.08 | 3.88 | | |
| 3 | 32563 | 0.50 | 0.24 | | 11.90 | 3.24 | | |
| 3 | 32564 | | 0.07 | | 11.47 | 2.42 | | |
| 3 | 32565 | | 0.01 | | 10.47 | 1.08 | | |
| 3 | 32566 | 2.21 | 0.71 | | 12.35 | 5.36 | | |
| 3 | 32567 | 1.65 | 0.50 | | 12.22 | 4.84 | | |
| 3 | 32568 | 1.09 | 0.33 | | 12.07 | 4.28 | | |
| 3 | 32569 | 0.53 | 0.20 | | 11.85 | 3.64 | | |
| 3 | 32570 | | 0.06 | | 11.49 | 2.77 | | |
| 3 | 32571 | | 0.01 | | 10.20 | 1.28 | | 8.76 |
| 3 | 32572 | 2.33 | 0.76 | | 12.24 | 5.73 | | |
| 3 | 32573 | 1.71 | 0.55 | | 12.09 | 5.23 | | |
| 3 | 32574 | 1.12 | 0.38 | | 11.91 | 4.69 | | |
| 3 | 32575 | 0.55 | 0.25 | | 11.65 | 4.05 | | |
| 3 | 32576 | | 0.10 | | 11.18 | 3.15 | | |
| 3 | 32577 | | 0.01 | | 9.68 | 1.44 | | 8.76 |
| 3 | 32578 | 2.32 | 0.78 | | 11.89 | 6.06 | | |
| 3 | 32579 | 1.71 | 0.58 | | 11.71 | 5.59 | | |
| 3 | 32580 | 1.10 | 0.41 | | 11.50 | 5.08 | | |
| 3 | 32581 | 0.52 | 0.28 | | 11.18 | 4.46 | | |
| 3 | 32582 | | 0.22 | | 10.60 | 3.53 | | |
| 3 | 32583 | | 0.08 | | 8.94 | 1.66 | | 8.76 |
| 3 | 32584 | 2.39 | 0.76 | | 11.21 | 6.30 | | |
| 3 | 32585 | 1.64 | 0.56 | | 10.96 | 5.88 | | |
| 3 | 32586 | 1.01 | 0.40 | | 10.71 | 5.42 | | |
| 3 | 32587 | 0.42 | 0.45 | | 10.32 | 4.83 | | |
| 3 | 32588 | | 0.59 | | 9.60 | 3.89 | | |
| 3 | 32589 | | 0.16 | | 7.73 | 1.85 | | 9.27 |
| 3 | 32590 | 2.27 | 0.66 | | 10.06 | 6.38 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 32591 | 1.46 | 0.57 | | 9.63 | 6.00 | | |
| 3 | 32592 | 0.80 | 1.01 | | 9.31 | 5.61 | | |
| 3 | 32593 | 0.20 | 1.30 | | 8.85 | 5.10 | | |
| 3 | 32594 | | 1.19 | | 8.09 | 4.20 | | 8.76 |
| 3 | 32595 | | 0.33 | | 6.07 | 2.04 | | 10.59 |
| 3 | 32596 | 2.04 | 2.00 | | 8.24 | 6.17 | | |
| 3 | 32597 | 1.14 | 2.74 | | 7.69 | 5.85 | | |
| 3 | 32598 | 0.42 | 2.98 | | 7.19 | 5.56 | | |
| 3 | 32599 | | 2.93 | | 6.66 | 5.18 | | |
| 3 | 32600 | | 2.27 | | 5.76 | 4.39 | | 8.76 |
| 3 | 32601 | | 0.53 | | 3.45 | 2.24 | | 12.10 |
| 3 | 32602 | 3.56 | 2.13 | | 6.14 | 5.67 | | |
| 3 | 32603 | 3.14 | 3.07 | | 5.27 | 5.32 | | |
| 3 | 32604 | 2.44 | 3.94 | | 4.53 | 5.12 | | |
| 3 | 32605 | 1.50 | 4.55 | | 3.84 | 4.93 | | |
| 3 | 32606 | 0.04 | 4.42 | | 2.88 | 4.34 | | 8.76 |
| 3 | 32607 | | 1.02 | | 0.56 | 2.24 | | 13.64 |
| 3 | 32608 | 6.80 | 1.79 | | 3.98 | 4.84 | | |
| 3 | 32609 | 6.61 | 2.92 | | 2.51 | 4.34 | | |
| 3 | 32610 | 5.97 | 4.11 | | 1.15 | 4.19 | | |
| 3 | 32611 | 4.77 | 4.99 | | 0.17 | 4.13 | | 8.76 |
| 3 | 32612 | 3.24 | 4.92 | | | 3.07 | | 8.76 |
| 3 | 32613 | 0.23 | 2.50 | | | 0.88 | | 15.09 |
| 3 | 32614 | 9.90 | 0.81 | | 5.00 | 3.96 | | 8.76 |
| 3 | 32615 | 10.25 | 2.11 | | 3.41 | 2.62 | | 8.76 |
| 3 | 32616 | 10.03 | 3.63 | | 1.99 | 1.30 | | 8.76 |
| 3 | 32617 | 8.77 | 5.16 | | 0.89 | 0.95 | | 8.76 |
| 3 | 32618 | 6.46 | 5.49 | | | 0.87 | | 8.76 |
| 3 | 32619 | 2.68 | 2.94 | | | 0.36 | | 16.68 |
| 3 | 32620 | 11.35 | | | 6.90 | 2.53 | | 8.76 |
| 3 | 32621 | 13.37 | 0.42 | | 5.43 | 1.46 | | 8.76 |
| 3 | 32622 | 14.30 | 2.01 | | 3.87 | | | 8.76 |
| 3 | 32623 | 14.12 | 4.13 | | 2.38 | | | 8.76 |
| 3 | 32624 | 11.02 | 6.16 | | 1.01 | 0.49 | | 10.19 |
| 3 | 32625 | 5.10 | 3.85 | | | 0.02 | | 17.22 |
| 3 | 32626 | 12.22 | | | 8.78 | 2.70 | | 8.76 |
| 3 | 32627 | 14.03 | | | 8.00 | 1.46 | | 8.76 |
| 3 | 32628 | 16.35 | | | 6.23 | | | 8.76 |
| 3 | 32629 | 19.66 | 1.14 | | 4.71 | | | 9.59 |
| 3 | 32630 | 19.24 | 4.59 | | 3.15 | | | 13.08 |
| 3 | 32631 | 6.85 | 4.24 | | | | | 16.24 |
| 3 | 32632 | 13.39 | 0.36 | | 10.31 | 3.09 | | 8.76 |
| 3 | 32633 | 15.01 | | | 9.87 | 2.34 | | 8.76 |
| 3 | 32634 | 17.29 | | | 9.18 | 1.61 | | 8.76 |
| 3 | 32635 | 20.01 | | | 7.05 | 0.69 | | 10.14 |
| 3 | 32636 | 26.30 | 1.10 | | 6.74 | | | 14.94 |
| 3 | 32637 | 12.68 | 14.19 | | | 2.96 | | |
| 3 | 32638 | 23.46 | 10.48 | | 30.46 | 8.78 | | |
| 3 | 32639 | 26.59 | 12.62 | | 32.53 | 10.30 | | |
| 3 | 32640 | 28.75 | 14.70 | | 32.40 | 10.67 | | |
| 3 | 32641 | 29.88 | 16.31 | | 31.77 | 10.30 | | |
| 3 | 32642 | 30.20 | 17.55 | | 31.02 | 9.80 | | |
| 3 | 32643 | 30.03 | 18.67 | | 30.20 | 9.26 | | |
| 3 | 32644 | 29.54 | 19.72 | | 29.38 | 8.71 | | |
| 3 | 32645 | 28.98 | 21.13 | | 28.59 | 8.18 | | |
| 3 | 32646 | 28.74 | 22.29 | | 27.93 | 7.71 | | |
| 3 | 32647 | 28.26 | 23.19 | | 27.23 | 6.75 | | |
| 3 | 32648 | 27.75 | 24.02 | | 26.72 | 6.33 | | |
| 3 | 32649 | 27.24 | 24.34 | | 26.24 | 5.92 | | |
| 3 | 32650 | 26.75 | 24.49 | | 25.84 | 5.65 | | |
| 3 | 32651 | 26.27 | 24.44 | | 25.49 | 5.44 | | |
| 3 | 32652 | 25.84 | 24.26 | | 25.17 | 5.23 | | |
| 3 | 32653 | 25.44 | 23.97 | | 24.89 | 5.03 | | |
| 3 | 32654 | 25.07 | 23.62 | | 24.63 | 4.83 | | |
| 3 | 32655 | 24.71 | 23.23 | | 24.41 | 4.64 | | |
| 3 | 32656 | 5.91 | | | 13.28 | | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 32657 | 3.15 | | | 6.91 | | | |
| 3 | 32658 | 4.47 | | | 5.87 | | | |
| 3 | 32659 | 6.45 | | | 6.21 | | | |
| 3 | 32660 | 8.40 | | | 6.80 | | | |
| 3 | 32661 | 10.24 | | | 7.29 | | | |
| 3 | 32662 | 12.07 | | | 7.76 | | | |
| 3 | 32663 | 13.90 | 1.00 | | 8.45 | | | |
| 3 | 32664 | 14.50 | 2.77 | | 9.90 | | | |
| 3 | 32665 | 13.28 | 5.92 | | 17.49 | 5.23 | | |
| 3 | 32666 | 6.61 | 0.48 | | 7.24 | | | |
| 3 | 32667 | 5.58 | | | 5.28 | | | |
| 3 | 32668 | 6.42 | | | 5.46 | | | |
| 3 | 32669 | 7.81 | | | 6.11 | | | |
| 3 | 32670 | 9.36 | | | 6.79 | | | |
| 3 | 32671 | 11.08 | 0.54 | | 7.54 | | | |
| 3 | 32672 | 11.84 | 1.93 | | 8.74 | | | |
| 3 | 32673 | 12.28 | 3.44 | | 10.82 | 1.17 | | |
| 3 | 32674 | 17.62 | 10.57 | | 20.12 | 8.05 | | |
| 3 | 32675 | 10.03 | 4.63 | | 10.18 | 1.59 | | |
| 3 | 32676 | 7.24 | 1.43 | | 5.09 | | | |
| 3 | 32677 | 7.07 | 0.29 | | 4.82 | | | |
| 3 | 32678 | 7.55 | 0.24 | | 5.48 | | | |
| 3 | 32679 | 8.24 | 0.55 | | 6.36 | | | |
| 3 | 32680 | 8.75 | 1.27 | | 7.48 | | | |
| 3 | 32681 | 9.15 | 2.25 | | 9.15 | 0.80 | | |
| 3 | 32682 | 9.36 | 3.32 | | 10.62 | 1.78 | | 8.76 |
| 3 | 32683 | 20.81 | 13.73 | | 21.94 | 9.40 | | |
| 3 | 32684 | 12.58 | 8.58 | | 11.98 | 4.23 | | |
| 3 | 32685 | 8.26 | 4.12 | | 6.25 | | | |
| 3 | 32686 | 6.52 | 2.06 | | 4.33 | | | |
| 3 | 32687 | 6.26 | 1.38 | | 4.89 | | | |
| 3 | 32688 | 6.29 | 1.21 | | 5.99 | | | |
| 3 | 32689 | 6.37 | 1.55 | | 7.61 | 0.44 | | |
| 3 | 32690 | 6.43 | 2.21 | | 8.65 | 1.35 | | 8.76 |
| 3 | 32691 | 6.49 | 2.89 | | 10.01 | 2.29 | | 8.76 |
| 3 | 32692 | 22.91 | 15.73 | | 23.07 | 9.66 | | |
| 3 | 32693 | 14.83 | 11.32 | | 13.78 | 6.00 | | |
| 3 | 32694 | 9.54 | 6.92 | | 7.86 | 1.58 | | |
| 3 | 32695 | 6.56 | 3.66 | | 4.26 | 1.42 | | |
| 3 | 32696 | 5.08 | 2.16 | | 4.33 | 1.47 | | |
| 3 | 32697 | 4.48 | 1.70 | | 5.70 | 1.34 | | |
| 3 | 32698 | 4.10 | 1.65 | | 6.93 | 1.54 | | |
| 3 | 32699 | 3.84 | 1.96 | | 7.95 | 2.18 | | |
| 3 | 32700 | 3.79 | 2.34 | | 9.10 | 2.92 | | |
| 3 | 32701 | 24.17 | 16.98 | | 23.72 | 9.41 | | 8.76 |
| 3 | 32702 | 16.60 | 13.09 | | 15.30 | 6.75 | | |
| 3 | 32703 | 10.88 | 8.92 | | 9.14 | 3.18 | | |
| 3 | 32704 | 6.76 | 5.26 | | 5.32 | 2.82 | | |
| 3 | 32705 | 4.26 | 2.94 | | 4.13 | 3.19 | | |
| 3 | 32706 | 2.92 | 2.01 | | 5.18 | 3.37 | | |
| 3 | 32707 | 2.07 | 1.62 | | 6.15 | 3.47 | | |
| 3 | 32708 | 1.50 | 1.62 | | 7.09 | 3.56 | | |
| 3 | 32709 | 1.33 | 1.80 | | 7.99 | 3.74 | | |
| 3 | 32710 | 24.70 | 17.68 | | 23.98 | 8.82 | | |
| 3 | 32711 | 17.79 | 13.93 | | 16.50 | 6.84 | | |
| 3 | 32712 | 11.80 | 9.93 | | 10.40 | 3.97 | | |
| 3 | 32713 | 7.27 | 6.49 | | 6.17 | 4.06 | | |
| 3 | 32714 | 3.80 | 3.65 | | 5.51 | 4.65 | | |
| 3 | 32715 | 1.61 | 2.08 | | 5.45 | 4.99 | | |
| 3 | 32716 | 0.92 | 1.68 | | 5.72 | 5.03 | | |
| 3 | 32717 | 0.41 | 1.43 | | 6.30 | 4.92 | | |
| 3 | 32718 | | 0.95 | | 6.88 | 4.97 | | |
| 3 | 32719 | 24.74 | 18.03 | | 23.98 | 8.08 | | |
| 3 | 32720 | 18.43 | 14.12 | | 17.35 | 6.48 | | 8.76 |
| 3 | 32721 | 12.42 | 10.22 | | 11.52 | 4.29 | | |
| 3 | 32722 | 7.41 | 6.73 | | 7.63 | 4.60 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 32723 | 3.59 | 4.35 | | 7.88 | 6.31 | | |
| 3 | 32724 | 2.73 | 3.08 | | 8.30 | 6.94 | | |
| 3 | 32725 | 2.09 | 2.77 | | 7.46 | 6.24 | | |
| 3 | 32726 | 1.52 | 2.34 | | 7.88 | 6.08 | | |
| 3 | 32727 | 1.02 | 1.86 | | 8.37 | 5.62 | | |
| 3 | 32728 | 24.44 | 18.11 | | 23.82 | 7.34 | | |
| 3 | 32729 | 18.57 | 13.81 | | 17.84 | 5.90 | | |
| 3 | 32730 | 12.67 | 9.87 | | 12.35 | 4.22 | | |
| 3 | 32731 | 7.43 | 6.43 | | 8.90 | 4.57 | | |
| 3 | 32732 | 4.71 | 4.30 | | 9.24 | 6.67 | | |
| 3 | 32733 | 3.89 | 3.81 | | 9.64 | 7.69 | | |
| 3 | 32734 | 3.19 | 3.45 | | 8.87 | 6.95 | | |
| 3 | 32735 | 2.53 | 2.91 | | 9.34 | 6.66 | | |
| 3 | 32736 | 1.88 | 2.27 | | 9.76 | 5.96 | | |
| 3 | 32737 | 23.96 | 18.06 | | 23.57 | 6.63 | | 8.76 |
| 3 | 32738 | 18.39 | 13.24 | | 18.08 | 5.23 | | |
| 3 | 32739 | 12.64 | 9.15 | | 12.92 | 3.98 | | |
| 3 | 32740 | 8.38 | 5.92 | | 9.88 | 4.29 | | |
| 3 | 32741 | 5.82 | 4.25 | | 10.25 | 6.65 | | |
| 3 | 32742 | 4.87 | 4.20 | | 9.65 | 7.09 | | |
| 3 | 32743 | 4.08 | 3.83 | | 9.91 | 7.22 | | |
| 3 | 32744 | 3.32 | 3.20 | | 10.32 | 6.88 | | |
| 3 | 32745 | 2.50 | 2.45 | | 10.68 | 6.00 | | |
| 3 | 32746 | 23.35 | 17.93 | | 23.26 | 5.96 | | 8.76 |
| 3 | 32747 | 17.98 | 12.49 | | 18.17 | 4.53 | | 8.76 |
| 3 | 32748 | 13.03 | 8.19 | | 13.32 | 3.57 | | |
| 3 | 32749 | 9.59 | 5.68 | | 10.59 | 3.85 | | |
| 3 | 32750 | 6.76 | 4.47 | | 10.99 | 6.37 | | |
| 3 | 32751 | 5.72 | 4.39 | | 10.42 | 7.04 | | |
| 3 | 32752 | 4.81 | 3.98 | | 10.64 | 7.21 | | |
| 3 | 32753 | 3.93 | 3.30 | | 10.96 | 6.79 | | |
| 3 | 32754 | 2.92 | 2.50 | | 11.22 | 5.82 | | |
| 3 | 32755 | 22.80 | 17.77 | | 22.93 | 5.31 | | 8.76 |
| 3 | 32756 | 17.55 | 11.70 | | 18.14 | 3.83 | | 8.76 |
| 3 | 32757 | 13.86 | 7.38 | | 13.60 | 3.10 | | |
| 3 | 32758 | 10.64 | 5.80 | | 11.25 | 3.30 | | |
| 3 | 32759 | 7.86 | 4.83 | | 11.49 | 5.91 | | |
| 3 | 32760 | 6.42 | 4.41 | | 10.97 | 6.76 | | |
| 3 | 32761 | 5.40 | 3.96 | | 11.08 | 6.97 | | |
| 3 | 32762 | 4.38 | 3.26 | | 11.22 | 6.48 | | |
| 3 | 32763 | 3.26 | 2.42 | | 11.37 | 5.44 | | |
| 3 | 32764 | 22.33 | 17.45 | | 22.61 | 4.75 | | 8.76 |
| 3 | 32765 | 17.75 | 10.82 | | 18.04 | 3.20 | | 8.76 |
| 3 | 32766 | 14.50 | 6.83 | | 13.88 | 2.65 | | |
| 3 | 32767 | 11.49 | 5.99 | | 12.48 | 3.55 | | |
| 3 | 32768 | 8.82 | 5.12 | | 11.63 | 5.13 | | |
| 3 | 32769 | 6.93 | 4.31 | | 11.26 | 6.36 | | |
| 3 | 32770 | 5.81 | 3.83 | | 11.29 | 6.59 | | |
| 3 | 32771 | 4.69 | 3.12 | | 11.32 | 6.06 | | |
| 3 | 32772 | 3.46 | 2.30 | | 11.35 | 4.98 | | |
| 3 | 32773 | 21.81 | 16.98 | | 22.30 | 4.24 | | 8.76 |
| 3 | 32774 | 18.02 | 9.98 | | 17.89 | 2.65 | | 8.76 |
| 3 | 32775 | 15.01 | 6.31 | | 14.57 | 2.25 | | |
| 3 | 32776 | 12.16 | 6.12 | | 13.47 | 3.90 | | |
| 3 | 32777 | 9.60 | 5.35 | | 12.29 | 5.60 | | |
| 3 | 32778 | 7.30 | 4.18 | | 11.32 | 5.91 | | |
| 3 | 32779 | 6.09 | 3.64 | | 11.29 | 6.13 | | |
| 3 | 32780 | 4.88 | 2.92 | | 11.22 | 5.58 | | |
| 3 | 32781 | 3.47 | 2.08 | | 11.16 | 4.46 | | |
| 3 | 32782 | 21.28 | 16.48 | | 21.91 | 3.37 | | 8.76 |
| 3 | 32783 | 18.25 | 9.20 | | 17.73 | 2.16 | | 8.76 |
| 3 | 32784 | 15.40 | 6.27 | | 15.15 | 1.77 | | |
| 3 | 32785 | 12.71 | 6.23 | | 14.26 | 4.23 | | |
| 3 | 32786 | 10.24 | 5.51 | | 13.25 | 6.14 | | |
| 3 | 32787 | 7.97 | 4.38 | | 12.30 | 6.53 | | |
| 3 | 32788 | 6.28 | 3.42 | | 11.58 | 6.08 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 32789 | 5.00 | 2.72 | | 11.00 | 5.09 | | |
| 3 | 32790 | 3.45 | 1.86 | | 10.85 | 3.96 | | |
| 3 | 32791 | 21.17 | 16.14 | | 21.64 | 3.07 | | 8.76 |
| 3 | 32792 | 18.43 | 8.51 | | 17.55 | 1.75 | | 8.76 |
| 3 | 32793 | 15.71 | 6.29 | | 15.61 | 1.62 | | |
| 3 | 32794 | 13.16 | 6.31 | | 14.90 | 4.53 | | |
| 3 | 32795 | 10.75 | 5.64 | | 14.01 | 6.60 | | |
| 3 | 32796 | 8.51 | 4.54 | | 13.08 | 7.05 | | |
| 3 | 32797 | 6.43 | 3.24 | | 12.32 | 6.64 | | |
| 3 | 32798 | 5.06 | 2.50 | | 11.66 | 5.64 | | |
| 3 | 32799 | 3.43 | 1.66 | | 11.30 | 4.30 | | |
| 3 | 32800 | 21.17 | 15.63 | | 21.38 | 2.80 | | 8.76 |
| 3 | 32801 | 18.52 | 7.86 | | 17.38 | 1.39 | | 8.76 |
| 3 | 32802 | 15.96 | 6.32 | | 15.99 | 1.38 | | |
| 3 | 32803 | 13.52 | 6.37 | | 15.41 | 4.81 | | |
| 3 | 32804 | 11.17 | 5.74 | | 14.61 | 6.99 | | |
| 3 | 32805 | 8.95 | 4.66 | | 13.69 | 7.49 | | |
| 3 | 32806 | 6.85 | 3.38 | | 12.92 | 7.10 | | |
| 3 | 32807 | 5.09 | 2.28 | | 12.20 | 6.12 | | |
| 3 | 32808 | 3.41 | 1.48 | | 11.74 | 4.78 | | |
| 3 | 32809 | 21.17 | 15.15 | | 21.14 | 2.55 | | 8.76 |
| 3 | 32810 | 18.62 | 7.15 | | 17.20 | 1.07 | | 8.76 |
| 3 | 32811 | 16.16 | 6.34 | | 16.30 | 1.29 | | |
| 3 | 32812 | 13.80 | 6.43 | | 15.81 | 5.07 | | |
| 3 | 32813 | 11.51 | 5.81 | | 15.06 | 7.31 | | |
| 3 | 32814 | 9.30 | 4.75 | | 14.15 | 7.85 | | |
| 3 | 32815 | 7.19 | 3.48 | | 13.33 | 7.49 | | |
| 3 | 32816 | 5.18 | 2.19 | | 12.60 | 6.51 | | |
| 3 | 32817 | 3.39 | 1.32 | | 12.05 | 5.17 | | |
| 3 | 32818 | 14.55 | 3.78 | | 11.74 | 0.93 | | |
| 3 | 32819 | 14.56 | 4.32 | | 12.81 | 1.42 | | |
| 3 | 32820 | 14.25 | 4.55 | | 14.15 | 2.03 | | |
| 3 | 32821 | 13.79 | 3.99 | | 15.73 | 2.85 | | |
| 3 | 32822 | 13.18 | 2.16 | | 17.47 | 3.53 | | |
| 3 | 32823 | 17.44 | 1.61 | | 18.75 | 2.64 | | |
| 3 | 32824 | 12.30 | 4.29 | | 12.32 | 2.03 | | |
| 3 | 32825 | 12.19 | 4.48 | | 13.39 | 2.51 | | |
| 3 | 32826 | 12.04 | 4.47 | | 14.59 | 2.85 | | |
| 3 | 32827 | 11.88 | 3.87 | | 15.84 | 2.94 | | 8.76 |
| 3 | 32828 | 12.34 | 2.68 | | 16.98 | 2.85 | | 8.76 |
| 3 | 32829 | 13.73 | 1.08 | | 17.16 | 1.57 | | 8.76 |
| 3 | 32830 | 9.35 | 3.83 | | 11.94 | 2.54 | | 8.76 |
| 3 | 32831 | 9.38 | 3.84 | | 12.80 | 2.77 | | 8.76 |
| 3 | 32832 | 9.52 | 3.63 | | 13.69 | 2.81 | | 8.76 |
| 3 | 32833 | 9.96 | 3.20 | | 14.54 | 2.85 | | 8.76 |
| 3 | 32834 | 10.89 | 2.61 | | 15.16 | 2.95 | | 8.76 |
| 3 | 32835 | 11.41 | 1.27 | | 15.23 | 1.54 | | 8.76 |
| 3 | 32836 | 6.56 | 3.16 | | 11.07 | 2.75 | | 8.76 |
| 3 | 32837 | 6.76 | 3.12 | | 11.69 | 2.81 | | 8.76 |
| 3 | 32838 | 7.18 | 2.98 | | 12.29 | 3.36 | | 8.76 |
| 3 | 32839 | 7.85 | 2.89 | | 12.81 | 3.49 | | 8.76 |
| 3 | 32840 | 8.71 | 2.45 | | 13.16 | 3.21 | | 8.76 |
| 3 | 32841 | 8.86 | 1.26 | | 13.16 | 1.63 | | 9.97 |
| 3 | 32842 | 3.95 | 2.52 | | 9.89 | 3.44 | | |
| 3 | 32843 | 4.23 | 2.52 | | 10.29 | 3.65 | | |
| 3 | 32844 | 4.76 | 2.55 | | 10.65 | 3.79 | | |
| 3 | 32845 | 6.05 | 2.85 | | 10.93 | 3.78 | | 8.76 |
| 3 | 32846 | 6.38 | 2.44 | | 11.08 | 3.32 | | 8.76 |
| 3 | 32847 | 6.04 | 1.31 | | 10.96 | 1.70 | | 10.03 |
| 3 | 32848 | 1.51 | 2.00 | | 8.51 | 4.31 | | |
| 3 | 32849 | 1.81 | 2.11 | | 8.73 | 3.99 | | |
| 3 | 32850 | 2.22 | 2.23 | | 8.88 | 4.00 | | |
| 3 | 32851 | 2.72 | 2.32 | | 8.95 | 3.87 | | |
| 3 | 32852 | 3.10 | 2.22 | | 8.90 | 3.37 | | 8.76 |
| 3 | 32853 | 2.81 | 1.30 | | 8.63 | 1.77 | | 9.82 |
| 3 | 32854 | | 0.92 | | 7.25 | 4.85 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 32855 | | 1.20 | | 7.49 | 4.71 | | |
| 3 | 32856 | | 1.61 | | 7.64 | 4.46 | | |
| 3 | 32857 | | 2.07 | | 7.70 | 4.05 | | |
| 3 | 32858 | 0.13 | 2.05 | | 7.43 | 3.34 | | 8.76 |
| 3 | 32859 | | 0.78 | | 6.46 | 1.65 | | 8.88 |
| 3 | 32860 | 0.64 | 1.48 | | 8.72 | 5.17 | | |
| 3 | 32861 | 0.42 | 1.29 | | 8.91 | 4.87 | | |
| 3 | 32862 | 0.19 | 1.08 | | 9.05 | 4.51 | | |
| 3 | 32863 | | 0.74 | | 9.07 | 4.02 | | |
| 3 | 32864 | | 0.66 | | 8.74 | 3.20 | | 8.76 |
| 3 | 32865 | | 0.22 | | 7.43 | 1.50 | | 8.76 |
| 3 | 32866 | 1.30 | 1.78 | | 10.00 | 5.31 | | |
| 3 | 32867 | 1.02 | 1.53 | | 10.09 | 4.90 | | |
| 3 | 32868 | 0.72 | 1.28 | | 10.14 | 4.43 | | |
| 3 | 32869 | 0.38 | 1.00 | | 10.05 | 3.84 | | |
| 3 | 32870 | | 0.51 | | 9.63 | 2.98 | | |
| 3 | 32871 | | 0.08 | | 8.29 | 1.37 | | 8.76 |
| 3 | 32872 | 1.79 | 1.90 | | 10.85 | 5.21 | | |
| 3 | 32873 | 1.44 | 1.62 | | 10.83 | 4.72 | | |
| 3 | 32874 | 1.08 | 1.34 | | 10.80 | 4.18 | | |
| 3 | 32875 | 0.67 | 1.05 | | 10.65 | 3.54 | | |
| 3 | 32876 | 0.06 | 0.65 | | 10.21 | 2.68 | | |
| 3 | 32877 | | 0.07 | | 8.93 | 1.21 | | 8.76 |
| 3 | 32878 | 2.19 | 1.90 | | 11.31 | 4.93 | | |
| 3 | 32879 | 1.75 | 1.61 | | 11.33 | 4.39 | | |
| 3 | 32880 | 1.25 | 1.33 | | 11.29 | 3.81 | | |
| 3 | 32881 | 0.75 | 1.03 | | 11.15 | 3.15 | | |
| 3 | 32882 | 0.11 | 0.70 | | 10.76 | 2.32 | | |
| 3 | 32883 | | 0.06 | | 9.65 | 1.02 | | 8.76 |
| 3 | 32884 | 2.41 | 1.82 | | 11.45 | 4.51 | | |
| 3 | 32885 | 1.92 | 1.54 | | 11.48 | 3.94 | | |
| 3 | 32886 | 1.37 | 1.25 | | 11.44 | 3.34 | | |
| 3 | 32887 | 0.76 | 0.94 | | 11.30 | 2.67 | | |
| 3 | 32888 | 0.17 | 0.58 | | 10.95 | 1.88 | | |
| 3 | 32889 | | 0.05 | | 9.99 | 0.78 | | |
| 3 | 32890 | 2.45 | 1.67 | | 11.41 | 4.02 | | |
| 3 | 32891 | 1.89 | 1.38 | | 11.38 | 3.44 | | |
| 3 | 32892 | 1.30 | 1.11 | | 11.31 | 2.82 | | |
| 3 | 32893 | 0.77 | 0.84 | | 11.20 | 2.14 | | |
| 3 | 32894 | 0.18 | 0.48 | | 10.89 | 1.41 | | |
| 3 | 32895 | | 0.04 | | 10.15 | 0.54 | | |
| 3 | 32896 | 2.43 | 1.49 | | 11.15 | 3.50 | | |
| 3 | 32897 | 1.86 | 1.22 | | 11.12 | 2.91 | | |
| 3 | 32898 | 1.29 | 0.97 | | 11.04 | 2.28 | | |
| 3 | 32899 | 0.76 | 0.74 | | 10.90 | 1.61 | | |
| 3 | 32900 | 0.16 | 0.38 | | 10.74 | 0.94 | | |
| 3 | 32901 | | 0.03 | | 10.23 | 0.32 | | |
| 3 | 32902 | 2.35 | 1.31 | | 10.78 | 2.98 | | |
| 3 | 32903 | 1.75 | 1.07 | | 10.74 | 2.39 | | |
| 3 | 32904 | 1.26 | 0.84 | | 10.65 | 1.76 | | |
| 3 | 32905 | 0.73 | 0.63 | | 10.58 | 1.13 | | |
| 3 | 32906 | 0.15 | 0.32 | | 10.53 | 0.60 | | |
| 3 | 32907 | | 0.03 | | 10.26 | 0.18 | | |
| 3 | 32908 | 2.30 | 1.14 | | 11.27 | 3.34 | | |
| 3 | 32909 | 1.71 | 0.92 | | 11.26 | 2.80 | | |
| 3 | 32910 | 1.22 | 0.73 | | 11.24 | 2.23 | | |
| 3 | 32911 | 0.68 | 0.54 | | 11.16 | 1.65 | | |
| 3 | 32912 | 0.13 | 0.26 | | 10.94 | 1.04 | | |
| 3 | 32913 | | 0.02 | | 10.47 | 0.40 | | |
| 3 | 32914 | 2.25 | 0.98 | | 11.67 | 3.83 | | |
| 3 | 32915 | 1.67 | 0.79 | | 11.64 | 3.27 | | |
| 3 | 32916 | 1.18 | 0.62 | | 11.49 | 2.70 | | |
| 3 | 32917 | 0.64 | 0.45 | | 11.37 | 2.09 | | |
| 3 | 32918 | 0.10 | 0.21 | | 11.22 | 1.42 | | |
| 3 | 32919 | | 0.01 | | 10.58 | 0.59 | | |
| 3 | 32920 | 2.20 | 0.85 | | 11.95 | 4.23 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 32921 | 1.62 | 0.67 | | 11.88 | 3.69 | | |
| 3 | 32922 | 1.11 | 0.53 | | 11.77 | 3.10 | | |
| 3 | 32923 | 0.60 | 0.38 | | 11.60 | 2.47 | | |
| 3 | 32924 | 0.08 | 0.17 | | 11.38 | 1.75 | | |
| 3 | 32925 | | 0.01 | | 10.58 | 0.76 | | |
| 3 | 32926 | 12.53 | 6.73 | | 5.59 | | | |
| 3 | 32927 | 8.37 | 2.97 | | 4.13 | | | |
| 3 | 32928 | 5.69 | | | 9.13 | 2.45 | | 8.76 |
| 3 | 32929 | 2.31 | | | 7.89 | 1.14 | | |
| 3 | 32930 | 2.33 | | | 5.87 | | | |
| 3 | 32931 | 3.42 | | | 5.25 | | | |
| 3 | 32932 | 5.09 | | | 4.89 | | | |
| 3 | 32933 | 7.01 | | | 4.46 | | | |
| 3 | 32934 | 9.13 | | | 4.04 | | | |
| 3 | 32935 | 11.57 | 0.31 | | 3.15 | | | |
| 3 | 32936 | 13.45 | 1.28 | | 1.81 | | | |
| 3 | 32937 | 3.25 | | | 3.97 | | | 8.76 |
| 3 | 32938 | 2.34 | | | 5.18 | | | |
| 3 | 32939 | 3.51 | | | 5.96 | | | |
| 3 | 32940 | 5.30 | | | 6.46 | | | |
| 3 | 32941 | 7.21 | | | 6.70 | | | |
| 3 | 32942 | 9.22 | | | 6.76 | | | |
| 3 | 32943 | 11.39 | | | 6.72 | | | |
| 3 | 32944 | 13.60 | 0.99 | | 6.67 | | | |
| 3 | 32945 | 15.35 | 2.54 | | 6.69 | | | |
| 3 | 32946 | 14.10 | 1.91 | | 0.62 | | | |
| 3 | 32947 | 14.22 | 2.32 | | | | | |
| 3 | 32948 | 14.18 | 3.11 | | | | | |
| 3 | 32949 | 13.65 | 3.99 | | | | | 8.76 |
| 3 | 32950 | 11.94 | 5.29 | | | | | 9.35 |
| 3 | 32951 | 3.69 | 6.16 | | | | | 14.74 |
| 3 | 32952 | 15.63 | 3.41 | | 6.81 | 0.06 | | 8.76 |
| 3 | 32953 | 15.23 | 4.04 | | 7.02 | 0.50 | | 8.76 |
| 3 | 32954 | 14.33 | 4.55 | | 7.00 | 0.96 | | 8.76 |
| 3 | 32955 | 12.56 | 4.67 | | 6.82 | 1.48 | | 8.76 |
| 3 | 32956 | 9.95 | 3.90 | | 6.39 | 2.42 | | 8.76 |
| 3 | 32957 | 10.80 | 1.06 | | 7.64 | 3.16 | | 9.66 |
| 3 | 32958 | 25.17 | 16.27 | | 23.03 | 1.81 | | |
| 3 | 32959 | 23.63 | 14.07 | | 23.13 | 1.58 | | |
| 3 | 32960 | 23.92 | 14.54 | | 23.70 | 2.12 | | |
| 3 | 32961 | 24.59 | 15.11 | | 24.40 | 2.70 | | |
| 3 | 32962 | 25.45 | 15.86 | | 25.21 | 3.35 | | |
| 3 | 32963 | 26.39 | 16.66 | | 26.11 | 4.04 | | |
| 3 | 32964 | 27.24 | 17.40 | | 27.09 | 4.78 | | |
| 3 | 32965 | 28.24 | 18.07 | | 28.16 | 5.58 | | |
| 3 | 32966 | 29.19 | 18.53 | | 29.24 | 6.38 | | |
| 3 | 32967 | 30.16 | 18.78 | | 30.29 | 7.20 | | |
| 3 | 32968 | 31.12 | 18.79 | | 31.36 | 8.07 | | |
| 3 | 32969 | 31.86 | 18.48 | | 32.42 | 9.00 | | |
| 3 | 32970 | 32.16 | 17.88 | | 33.34 | 9.91 | | |
| 3 | 32971 | 31.81 | 17.11 | | 34.10 | 10.79 | | |
| 3 | 32972 | 30.70 | 16.25 | | 34.70 | 11.61 | | |
| 3 | 32973 | 28.61 | 14.99 | | 35.13 | 12.24 | | |
| 3 | 32974 | 25.58 | 13.20 | | 34.84 | 12.10 | | |
| 3 | 32975 | 21.88 | 12.28 | | 32.61 | 9.98 | | |
| 3 | 32976 | 21.66 | 9.20 | | 20.11 | 0.52 | | 8.76 |
| 3 | 32977 | 17.91 | 5.55 | | 16.35 | 2.10 | | 8.76 |
| 3 | 32978 | 16.30 | 7.64 | | 14.62 | 7.98 | | |
| 3 | 32979 | 14.81 | 8.44 | | 13.68 | 11.60 | | |
| 3 | 32980 | 13.82 | 8.49 | | 13.07 | 13.40 | | |
| 3 | 32981 | 13.38 | 7.89 | | 12.92 | 13.55 | | |
| 3 | 32982 | 13.57 | 6.77 | | 13.28 | 12.09 | | |
| 3 | 32983 | 14.49 | 5.23 | | 14.07 | 9.21 | | |
| 3 | 32984 | 15.93 | 3.60 | | 15.38 | 5.04 | | |
| 3 | 32985 | 20.62 | 9.97 | | 20.40 | 1.15 | | 8.76 |
| 3 | 32986 | 18.44 | 6.16 | | 16.91 | 2.46 | | 8.76 |

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| 3 | 32987 | 16.51 | 7.87 | | 14.85 | 8.25 | | |
| 3 | 32988 | 14.95 | 8.60 | | 13.85 | 11.79 | | |
| 3 | 32989 | 13.85 | 8.56 | | 13.08 | 13.45 | | |
| 3 | 32990 | 13.33 | 7.87 | | 12.85 | 13.51 | | |
| 3 | 32991 | 13.52 | 6.79 | | 13.31 | 12.14 | | |
| 3 | 32992 | 14.54 | 5.42 | | 14.29 | 9.46 | | |
| 3 | 32993 | 16.16 | 3.83 | | 15.84 | 5.41 | | |
| 3 | 32994 | 21.16 | 9.82 | | 20.88 | 1.62 | | 8.76 |
| 3 | 32995 | 18.78 | 6.55 | | 17.40 | 3.10 | | 8.76 |
| 3 | 32996 | 16.73 | 8.11 | | 15.14 | 8.57 | | |
| 3 | 32997 | 15.04 | 8.75 | | 13.96 | 11.97 | | |
| 3 | 32998 | 13.83 | 8.61 | | 13.05 | 13.50 | | |
| 3 | 32999 | 13.19 | 7.81 | | 12.71 | 13.41 | | |
| 3 | 33000 | 13.49 | 6.86 | | 13.36 | 12.26 | | |
| 3 | 33001 | 14.66 | 5.62 | | 14.49 | 9.74 | | |
| 3 | 33002 | 16.43 | 4.12 | | 16.32 | 5.84 | | |
| 3 | 33003 | 21.71 | 10.02 | | 21.50 | 2.24 | | 8.76 |
| 3 | 33004 | 19.14 | 6.94 | | 17.93 | 3.77 | | 8.76 |
| 3 | 33005 | 16.91 | 8.37 | | 15.42 | 8.98 | | |
| 3 | 33006 | 15.08 | 8.88 | | 14.03 | 12.15 | | |
| 3 | 33007 | 13.73 | 8.62 | | 12.94 | 13.53 | | |
| 3 | 33008 | 12.96 | 7.70 | | 12.51 | 13.35 | | |
| 3 | 33009 | 13.40 | 6.91 | | 13.35 | 12.37 | | |
| 3 | 33010 | 14.72 | 5.83 | | 14.64 | 10.04 | | |
| 3 | 33011 | 16.68 | 4.47 | | 16.80 | 6.33 | | |
| 3 | 33012 | 22.24 | 10.43 | | 22.22 | 2.95 | | 8.76 |
| 3 | 33013 | 19.48 | 7.37 | | 18.48 | 4.57 | | 8.76 |
| 3 | 33014 | 17.04 | 8.62 | | 15.66 | 9.43 | | |
| 3 | 33015 | 15.02 | 8.98 | | 14.00 | 12.33 | | |
| 3 | 33016 | 13.50 | 8.57 | | 12.72 | 13.51 | | |
| 3 | 33017 | 12.59 | 7.53 | | 12.21 | 13.26 | | |
| 3 | 33018 | 13.17 | 6.90 | | 13.20 | 12.44 | | |
| 3 | 33019 | 14.68 | 6.02 | | 14.71 | 10.33 | | |
| 3 | 33020 | 16.88 | 4.91 | | 17.27 | 6.86 | | |
| 3 | 33021 | 22.76 | 10.90 | | 23.03 | 3.77 | | 8.76 |
| 3 | 33022 | 19.77 | 7.82 | | 19.01 | 5.44 | | 8.76 |
| 3 | 33023 | 17.08 | 8.84 | | 15.82 | 9.91 | | |
| 3 | 33024 | 14.83 | 9.01 | | 13.85 | 12.48 | | |
| 3 | 33025 | 13.12 | 8.44 | | 12.35 | 13.42 | | |
| 3 | 33026 | 12.04 | 7.27 | | 11.76 | 13.24 | | |
| 3 | 33027 | 12.78 | 6.83 | | 12.91 | 12.45 | | |
| 3 | 33028 | 14.53 | 6.19 | | 14.66 | 10.60 | | |
| 3 | 33029 | 17.01 | 5.47 | | 17.70 | 7.43 | | |
| 3 | 33030 | 23.24 | 11.56 | | 23.89 | 4.70 | | 8.76 |
| 3 | 33031 | 19.94 | 8.25 | | 19.49 | 6.34 | | 8.76 |
| 3 | 33032 | 16.95 | 9.00 | | 15.78 | 10.35 | | |
| 3 | 33033 | 14.44 | 8.93 | | 13.49 | 12.51 | | |
| 3 | 33034 | 12.51 | 8.18 | | 11.84 | 13.31 | | |
| 3 | 33035 | 11.26 | 6.86 | | 11.08 | 12.81 | | |
| 3 | 33036 | 12.15 | 6.63 | | 12.41 | 12.32 | | |
| 3 | 33037 | 14.26 | 6.21 | | 14.42 | 10.79 | | |
| 3 | 33038 | 17.40 | 6.26 | | 18.05 | 8.01 | | |
| 3 | 33039 | 23.84 | 12.34 | | 24.77 | 5.73 | | 8.76 |
| 3 | 33040 | 19.95 | 8.63 | | 19.94 | 7.24 | | |
| 3 | 33041 | 16.60 | 9.03 | | 15.74 | 10.68 | | |
| 3 | 33042 | 13.79 | 8.68 | | 13.08 | 12.35 | | |
| 3 | 33043 | 11.59 | 7.57 | | 11.25 | 12.75 | | |
| 3 | 33044 | 10.20 | 6.27 | | 10.15 | 12.11 | | |
| 3 | 33045 | 11.24 | 6.03 | | 11.63 | 11.95 | | |
| 3 | 33046 | 13.75 | 6.20 | | 14.15 | 10.80 | | |
| 3 | 33047 | 17.28 | 7.05 | | 18.29 | 8.67 | | |
| 3 | 33048 | 24.60 | 13.07 | | 25.57 | 6.78 | | |
| 3 | 33049 | 19.72 | 8.91 | | 20.30 | 8.01 | | 8.76 |
| 3 | 33050 | 15.97 | 8.86 | | 15.51 | 10.75 | | |
| 3 | 33051 | 12.84 | 8.04 | | 12.44 | 11.87 | | |
| 3 | 33052 | 10.49 | 6.89 | | 10.48 | 11.87 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 33053 | 8.90 | 5.35 | | 9.00 | 11.18 | | |
| 3 | 33054 | 10.05 | 5.41 | | 10.70 | 11.26 | | |
| 3 | 33055 | 13.12 | 5.98 | | 13.91 | 10.55 | | |
| 3 | 33056 | 17.02 | 7.71 | | 18.35 | 9.34 | | |
| 3 | 33057 | 25.18 | 13.79 | | 26.26 | 7.82 | | |
| 3 | 33058 | 19.22 | 9.69 | | 20.47 | 8.56 | | 8.76 |
| 3 | 33059 | 14.97 | 8.28 | | 15.14 | 10.47 | | |
| 3 | 33060 | 11.63 | 7.27 | | 11.63 | 10.96 | | |
| 3 | 33061 | 9.14 | 5.92 | | 9.52 | 10.60 | | |
| 3 | 33062 | 7.45 | 4.32 | | 7.90 | 9.69 | | |
| 3 | 33063 | 8.64 | 4.51 | | 9.87 | 10.14 | | |
| 3 | 33064 | 12.05 | 5.73 | | 13.51 | 9.91 | | |
| 3 | 33065 | 16.35 | 8.37 | | 18.19 | 9.82 | | 8.76 |
| 3 | 33066 | 25.49 | 14.29 | | 26.80 | 8.86 | | 8.76 |
| 3 | 33067 | 18.51 | 10.17 | | 20.29 | 8.95 | | |
| 3 | 33068 | 13.54 | 7.45 | | 14.74 | 9.67 | | |
| 3 | 33069 | 10.01 | 6.05 | | 10.91 | 9.44 | | |
| 3 | 33070 | 7.47 | 4.53 | | 8.33 | 8.74 | | |
| 3 | 33071 | 5.76 | 2.93 | | 6.86 | 7.71 | | |
| 3 | 33072 | 7.03 | 3.18 | | 9.24 | 8.47 | | |
| 3 | 33073 | 10.67 | 5.07 | | 12.92 | 8.74 | | |
| 3 | 33074 | 15.71 | 8.71 | | 17.77 | 9.99 | | |
| 3 | 33075 | 25.32 | 14.45 | | 27.20 | 9.65 | | |
| 3 | 33076 | 17.43 | 10.11 | | 19.94 | 9.13 | | |
| 3 | 33077 | 11.71 | 6.03 | | 14.11 | 8.14 | | |
| 3 | 33078 | 7.92 | 4.22 | | 10.24 | 7.14 | | |
| 3 | 33079 | 5.49 | 2.69 | | 7.77 | 5.92 | | |
| 3 | 33080 | 3.85 | 1.26 | | 6.31 | 5.01 | | |
| 3 | 33081 | 4.76 | 1.59 | | 8.70 | 5.93 | | |
| 3 | 33082 | 8.74 | 4.33 | | 12.12 | 6.82 | | |
| 3 | 33083 | 14.59 | 8.41 | | 16.98 | 9.65 | | |
| 3 | 33084 | 24.52 | 14.08 | | 27.26 | 10.34 | | |
| 3 | 33085 | 15.87 | 9.26 | | 19.26 | 8.73 | | |
| 3 | 33086 | 9.51 | 4.46 | | 13.38 | 5.93 | | |
| 3 | 33087 | 5.65 | 1.92 | | 9.58 | 4.19 | | |
| 3 | 33088 | 3.43 | 0.54 | | 7.27 | 2.74 | | |
| 3 | 33089 | 1.67 | | | 6.18 | 1.89 | | |
| 3 | 33090 | 2.41 | | | 8.30 | 2.94 | | |
| 3 | 33091 | 7.27 | 2.98 | | 11.26 | 5.31 | | |
| 3 | 33092 | 12.76 | 7.26 | | 15.88 | 8.66 | | |
| 3 | 33093 | 22.86 | 12.98 | | 26.86 | 10.93 | | |
| 3 | 33094 | 13.67 | 7.39 | | 18.30 | 7.58 | | |
| 3 | 33095 | 7.66 | 2.31 | | 12.69 | 3.82 | | |
| 3 | 33096 | 2.56 | | | 9.32 | 0.91 | | |
| 3 | 33097 | 0.54 | | | 6.57 | | | |
| 3 | 33098 | | | | 6.06 | | | |
| 3 | 33099 | 0.88 | | | 8.00 | 0.33 | | |
| 3 | 33100 | 5.79 | 0.83 | | 10.46 | 3.14 | | |
| 3 | 33101 | 10.59 | 5.11 | | 14.57 | 6.88 | | |
| 3 | 33102 | 20.20 | 11.04 | | 26.08 | 10.56 | | |
| 3 | 33103 | 10.92 | 4.54 | | 17.09 | 5.72 | | |
| 3 | 33104 | 5.39 | | | 12.18 | 1.25 | | |
| 3 | 33105 | 1.02 | | | 8.33 | | | |
| 3 | 33106 | | | | 6.80 | | | |
| 3 | 33107 | | | | 6.40 | | | |
| 3 | 33108 | 0.81 | | | 6.90 | | | |
| 3 | 33109 | 3.47 | | | 9.66 | 0.56 | | |
| 3 | 33110 | 8.56 | 2.23 | | 13.23 | 4.32 | | |
| 3 | 33111 | 16.53 | 8.21 | | 24.59 | 9.30 | | |
| 3 | 33112 | 8.10 | 0.80 | | 15.97 | 3.25 | | |
| 3 | 33113 | 2.54 | | | 10.82 | | | |
| 3 | 33114 | 1.48 | | | 8.43 | | | |
| 3 | 33115 | 1.28 | | | 7.43 | | | |
| 3 | 33116 | 1.36 | | | 6.95 | | | |
| 3 | 33117 | 1.59 | | | 6.92 | | | |
| 3 | 33118 | 2.25 | | | 7.88 | | | |

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| 3 | 33119 | 5.17 | | | 12.26 | 1.11 | | |
| 3 | 33120 | 11.96 | 3.92 | | 22.32 | 6.68 | | |
| 3 | 33121 | 3.18 | | | 14.21 | | | |
| 3 | 33122 | 2.31 | | | 10.59 | | | |
| 3 | 33123 | 2.56 | | | 9.06 | | | |
| 3 | 33124 | 2.92 | | | 8.20 | | | |
| 3 | 33125 | 3.01 | | | 7.58 | | | |
| 3 | 33126 | 2.80 | | | 7.26 | | | |
| 3 | 33127 | 2.47 | | | 7.52 | | | |
| 3 | 33128 | 2.76 | | | 9.93 | | | |
| 3 | 33129 | 3.67 | | | 19.51 | 1.19 | | |
| 3 | 33130 | 2.14 | | | 13.39 | | | |
| 3 | 33131 | 2.99 | | | 11.22 | | | |
| 3 | 33132 | 4.14 | | | 9.97 | | | |
| 3 | 33133 | 4.85 | | | 9.03 | | | |
| 3 | 33134 | 4.91 | | | 8.25 | | | |
| 3 | 33135 | 4.34 | | | 7.70 | | | |
| 3 | 33136 | 3.31 | | | 7.67 | | | |
| 3 | 33137 | 2.25 | | | 9.55 | | | |
| 3 | 33138 | 17.86 | 5.01 | | 17.61 | 4.05 | | |
| 3 | 33139 | 19.39 | 7.24 | | 19.26 | 4.05 | | 8.76 |
| 3 | 33140 | 21.07 | 9.88 | | 20.98 | 4.10 | | |
| 3 | 33141 | 22.97 | 12.79 | | 22.73 | 4.21 | | |
| 3 | 33142 | 18.16 | 5.53 | | 18.14 | 4.60 | | |
| 3 | 33143 | 19.73 | 7.76 | | 19.82 | 4.59 | | 8.76 |
| 3 | 33144 | 21.47 | 10.38 | | 21.53 | 4.62 | | |
| 3 | 33145 | 23.42 | 13.35 | | 23.26 | 4.69 | | |
| 3 | 33146 | 18.48 | 5.89 | | 18.71 | 5.20 | | |
| 3 | 33147 | 20.12 | 8.12 | | 20.42 | 5.18 | | 8.76 |
| 3 | 33148 | 21.92 | 10.83 | | 22.15 | 5.17 | | |
| 3 | 33149 | 23.94 | 13.80 | | 23.85 | 5.18 | | |
| 3 | 33150 | 18.82 | 6.62 | | 19.30 | 5.86 | | |
| 3 | 33151 | 20.54 | 8.71 | | 21.07 | 5.83 | | 8.76 |
| 3 | 33152 | 22.42 | 11.45 | | 22.83 | 5.75 | | 8.76 |
| 3 | 33153 | 24.63 | 14.42 | | 24.51 | 5.67 | | |
| 3 | 33154 | 19.13 | 7.31 | | 19.91 | 6.57 | | |
| 3 | 33155 | 20.95 | 9.38 | | 21.75 | 6.52 | | 8.76 |
| 3 | 33156 | 23.09 | 12.12 | | 23.56 | 6.36 | | 8.76 |
| 3 | 33157 | 25.45 | 15.14 | | 25.25 | 6.14 | | |
| 3 | 33158 | 19.50 | 8.07 | | 20.52 | 7.35 | | |
| 3 | 33159 | 21.46 | 10.13 | | 22.48 | 7.28 | | |
| 3 | 33160 | 23.80 | 12.68 | | 24.37 | 7.04 | | 8.76 |
| 3 | 33161 | 26.25 | 15.73 | | 26.08 | 6.65 | | |
| 3 | 33162 | 19.85 | 9.04 | | 21.06 | 8.09 | | |
| 3 | 33163 | 22.08 | 10.85 | | 23.15 | 7.98 | | |
| 3 | 33164 | 24.64 | 13.39 | | 25.22 | 7.76 | | |
| 3 | 33165 | 27.15 | 16.43 | | 27.00 | 7.20 | | |
| 3 | 33166 | 20.30 | 9.78 | | 21.58 | 8.97 | | |
| 3 | 33167 | 22.73 | 11.80 | | 23.87 | 8.84 | | |
| 3 | 33168 | 25.41 | 13.95 | | 26.13 | 8.53 | | |
| 3 | 33169 | 28.09 | 16.94 | | 28.02 | 7.77 | | |
| 3 | 33170 | 20.68 | 10.46 | | 21.96 | 9.78 | | |
| 3 | 33171 | 23.29 | 12.43 | | 24.49 | 9.67 | | |
| 3 | 33172 | 26.17 | 14.46 | | 26.98 | 9.29 | | |
| 3 | 33173 | 28.95 | 17.21 | | 29.04 | 8.34 | | |
| 3 | 33174 | 20.57 | 10.96 | | 22.16 | 10.58 | | 8.76 |
| 3 | 33175 | 23.72 | 13.00 | | 25.00 | 10.54 | | |
| 3 | 33176 | 26.99 | 14.84 | | 27.76 | 10.03 | | 8.76 |
| 3 | 33177 | 29.80 | 17.56 | | 30.07 | 8.89 | | |
| 3 | 33178 | 20.39 | 11.40 | | 22.05 | 11.11 | | |
| 3 | 33179 | 23.88 | 13.18 | | 25.26 | 11.24 | | |
| 3 | 33180 | 27.60 | 15.08 | | 28.43 | 10.77 | | |
| 3 | 33181 | 30.81 | 17.67 | | 31.12 | 9.47 | | |
| 3 | 33182 | 19.42 | 11.39 | | 21.57 | 11.32 | | |
| 3 | 33183 | 23.52 | 13.14 | | 25.19 | 11.77 | | |
| 3 | 33184 | 27.80 | 15.13 | | 28.92 | 11.46 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 33185 | 31.66 | 17.51 | | 32.18 | 10.09 | | |
| 3 | 33186 | 17.91 | 10.64 | | 20.65 | 11.01 | | |
| 3 | 33187 | 22.47 | 12.74 | | 24.74 | 11.95 | | |
| 3 | 33188 | 27.39 | 14.60 | | 29.12 | 12.01 | | |
| 3 | 33189 | 32.07 | 16.82 | | 33.11 | 10.67 | | |
| 3 | 33190 | 15.76 | 8.89 | | 19.29 | 9.97 | | |
| 3 | 33191 | 20.53 | 11.54 | | 23.80 | 11.62 | | |
| 3 | 33192 | 26.11 | 13.84 | | 28.93 | 12.29 | | |
| 3 | 33193 | 31.87 | 16.21 | | 33.89 | 11.22 | | |
| 3 | 33194 | 12.94 | 6.16 | | 17.85 | 8.03 | | |
| 3 | 33195 | 17.64 | 9.16 | | 22.61 | 10.55 | | |
| 3 | 33196 | 23.86 | 12.41 | | 28.59 | 12.21 | | |
| 3 | 33197 | 30.93 | 15.63 | | 34.51 | 11.69 | | |
| 3 | 33198 | 9.65 | 2.19 | | 16.32 | 4.86 | | |
| 3 | 33199 | 13.73 | 5.66 | | 20.78 | 8.26 | | |
| 3 | 33200 | 20.32 | 9.94 | | 27.46 | 11.31 | | |
| 3 | 33201 | 29.06 | 14.74 | | 34.95 | 11.98 | | |
| 3 | 33202 | 4.35 | | | 15.20 | 0.84 | | |
| 3 | 33203 | 8.70 | 1.63 | | 18.52 | 4.12 | | |
| 3 | 33204 | 15.39 | 7.17 | | 24.97 | 9.06 | | |
| 3 | 33205 | 26.29 | 13.60 | | 34.98 | 11.65 | | |
| 3 | 33206 | 1.87 | | | 12.68 | | | |
| 3 | 33207 | 2.46 | | | 16.46 | | | |
| 3 | 33208 | 6.28 | 1.29 | | 20.60 | 3.09 | | |
| 3 | 33209 | 22.80 | 13.40 | | 32.84 | 9.98 | | |
| 3 | 33210 | 13.12 | 9.22 | | 8.48 | | | |
| 3 | 33211 | 13.51 | 8.89 | | 8.26 | | | |
| 3 | 33212 | 13.57 | 8.34 | | 7.65 | | | |
| 3 | 33213 | 12.79 | 7.17 | | 7.02 | | | |
| 3 | 33214 | 10.46 | 6.19 | | 6.54 | | | |
| 3 | 33215 | 5.66 | 6.26 | | 6.27 | | | |
| 3 | 33216 | 10.52 | 4.48 | | 7.82 | 1.61 | | 8.76 |
| 3 | 33217 | 8.32 | 1.96 | | 4.88 | 1.59 | | |
| 3 | 33218 | 6.15 | 0.71 | | 2.97 | 3.01 | | |
| 3 | 33219 | 4.11 | | | 1.20 | 3.39 | | |
| 3 | 33220 | 3.33 | | | 0.70 | 2.73 | | |
| 3 | 33221 | 3.30 | | | 0.30 | 2.08 | | |
| 3 | 33222 | 3.80 | | | 0.63 | 1.94 | | |
| 3 | 33223 | 4.93 | | | 1.34 | 1.78 | | |
| 3 | 33224 | 6.49 | 0.84 | | 1.90 | 1.17 | | |
| 3 | 33225 | 10.39 | 3.77 | | 7.61 | 1.38 | | 8.76 |
| 3 | 33226 | 7.78 | 1.22 | | 4.94 | 1.57 | | |
| 3 | 33227 | 4.83 | | | 3.22 | 2.75 | | |
| 3 | 33228 | 3.27 | | | 1.52 | 2.77 | | |
| 3 | 33229 | 2.67 | | | 0.85 | 1.68 | | |
| 3 | 33230 | 2.71 | | | 0.76 | 1.11 | | |
| 3 | 33231 | 3.33 | | | 0.85 | 1.03 | | |
| 3 | 33232 | 4.41 | | | 1.28 | 1.08 | | |
| 3 | 33233 | 6.46 | 0.22 | | 1.59 | 0.70 | | |
| 3 | 33234 | 9.88 | 2.78 | | 7.52 | 1.23 | | 8.76 |
| 3 | 33235 | 6.30 | 0.15 | | 5.22 | 1.39 | | |
| 3 | 33236 | 3.45 | | | 3.76 | 2.27 | | |
| 3 | 33237 | 2.21 | | | 2.20 | 1.77 | | |
| 3 | 33238 | 1.82 | | | 1.66 | 0.43 | | |
| 3 | 33239 | 1.97 | | | 1.42 | | | |
| 3 | 33240 | 2.69 | | | 1.24 | | | |
| 3 | 33241 | 3.92 | | | 1.05 | 0.15 | | |
| 3 | 33242 | 5.80 | | | 1.01 | 0.09 | | |
| 3 | 33243 | 8.69 | 1.64 | | 7.74 | 1.05 | | 8.76 |
| 3 | 33244 | 4.63 | | | 5.98 | 1.36 | | 8.76 |
| 3 | 33245 | 2.18 | | | 4.38 | 1.48 | | |
| 3 | 33246 | 1.03 | | | 3.31 | 0.25 | | |
| 3 | 33247 | 0.82 | | | 2.81 | | | |
| 3 | 33248 | 1.26 | | | 2.41 | | | |
| 3 | 33249 | 2.00 | | | 1.90 | | | |
| 3 | 33250 | 3.24 | | | 1.26 | | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 33251 | 5.18 | | | 0.39 | | | |
| 3 | 33252 | 6.29 | 0.26 | | 8.66 | 0.51 | | 8.76 |
| 3 | 33253 | 3.26 | | | 7.47 | 1.10 | | 8.76 |
| 3 | 33254 | 2.11 | | | 5.26 | 0.46 | | |
| 3 | 33255 | 1.74 | | | 4.50 | | | |
| 3 | 33256 | 1.87 | | | 3.99 | | | |
| 3 | 33257 | 2.25 | | | 3.54 | | | |
| 3 | 33258 | 2.69 | | | 2.86 | | | |
| 3 | 33259 | 3.09 | | | 1.99 | | | |
| 3 | 33260 | 4.60 | | | 0.73 | | | |
| 3 | 33261 | 3.77 | | | 11.18 | 0.22 | | |
| 3 | 33262 | 2.56 | | | 8.39 | 0.61 | | |
| 3 | 33263 | 2.46 | | | 6.69 | | | |
| 3 | 33264 | 2.84 | | | 5.83 | | | |
| 3 | 33265 | 3.25 | | | 5.19 | | | |
| 3 | 33266 | 3.77 | | | 4.58 | | | |
| 3 | 33267 | 4.26 | | | 4.00 | | | |
| 3 | 33268 | 4.39 | | | 3.15 | | | |
| 3 | 33269 | 4.18 | | | 1.98 | | | |
| 3 | 33270 | 7.53 | 1.66 | | 2.64 | 1.83 | | |
| 3 | 33271 | 7.87 | 2.17 | | 3.31 | 2.00 | | |
| 3 | 33272 | 8.11 | 3.23 | | 4.09 | 2.03 | | 8.76 |
| 3 | 33273 | 8.22 | 5.13 | | 4.90 | 1.88 | | 8.76 |
| 3 | 33274 | 8.05 | 7.08 | | 5.49 | 1.63 | | |
| 3 | 33275 | 8.52 | 8.43 | | 5.19 | 1.19 | | |
| 3 | 33276 | 7.62 | 1.05 | | 2.08 | 1.32 | | |
| 3 | 33277 | 8.28 | 1.79 | | 2.49 | 1.59 | | |
| 3 | 33278 | 8.92 | 2.84 | | 3.16 | 1.76 | | 8.76 |
| 3 | 33279 | 9.23 | 4.96 | | 4.01 | 1.57 | | 8.76 |
| 3 | 33280 | 9.30 | 7.31 | | 4.65 | 1.08 | | 8.76 |
| 3 | 33281 | 9.85 | 9.60 | | 3.90 | | | |
| 3 | 33282 | 7.92 | 0.26 | | 1.22 | 0.72 | | |
| 3 | 33283 | 8.66 | 1.05 | | 1.43 | 1.00 | | |
| 3 | 33284 | 9.37 | 2.16 | | 1.82 | 1.17 | | 8.76 |
| 3 | 33285 | 10.04 | 3.99 | | 2.33 | 1.13 | | 8.76 |
| 3 | 33286 | 11.02 | 7.02 | | 3.06 | 0.33 | | 8.76 |
| 3 | 33287 | 11.25 | 10.27 | | 2.05 | | | |
| 3 | 33288 | 6.99 | | | | | | |
| 3 | 33289 | 8.46 | | | | | | |
| 3 | 33290 | 9.94 | 0.92 | | 0.10 | 0.24 | | |
| 3 | 33291 | 10.92 | 2.73 | | 0.40 | 0.22 | | 8.76 |
| 3 | 33292 | 11.88 | 6.18 | | 0.58 | | | 8.76 |
| 3 | 33293 | 12.87 | 10.85 | | 0.21 | | | |
| 3 | 33294 | 6.15 | | | | | | |
| 3 | 33295 | 7.30 | | | | | | |
| 3 | 33296 | 8.87 | | | | | | |
| 3 | 33297 | 11.09 | 1.02 | | | | | 8.76 |
| 3 | 33298 | 12.01 | 4.23 | | | | | |
| 3 | 33299 | 14.27 | 11.82 | | | | | |
| 3 | 33300 | 5.41 | | | 0.91 | | | |
| 3 | 33301 | 6.18 | | | 0.14 | | | |
| 3 | 33302 | 7.17 | | | | | | |
| 3 | 33303 | 8.50 | | | | | | |
| 3 | 33304 | 10.44 | 1.35 | | | | | |
| 3 | 33305 | 9.23 | 8.23 | | | | | |
| 3 | 33306 | 10.97 | 11.24 | | 8.13 | 0.64 | | |
| 3 | 33307 | 11.92 | 9.73 | | 8.86 | 0.06 | | |
| 3 | 33308 | 9.58 | 5.94 | | 7.42 | 1.23 | | 8.76 |
| 3 | 33309 | 8.47 | 3.50 | | 5.21 | 0.95 | | |
| 3 | 33310 | 7.25 | 3.12 | | 3.01 | 3.72 | | |
| 3 | 33311 | 5.90 | 2.33 | | 1.76 | 4.94 | | |
| 3 | 33312 | 4.93 | 1.61 | | 1.58 | 5.45 | | |
| 3 | 33313 | 5.03 | 1.66 | | 1.23 | 5.28 | | |
| 3 | 33314 | 5.26 | 1.72 | | 1.05 | 4.80 | | |
| 3 | 33315 | 5.82 | 1.78 | | 1.56 | 3.90 | | |
| 3 | 33316 | 6.19 | 1.94 | | 2.68 | 2.62 | | |

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|---|---|---|---|---|---|---|---|---|
| 3 | 33317 | 10.27 | 5.27 | | 7.79 | 1.52 | | 8.76 |
| 3 | 33318 | 8.60 | 2.80 | | 5.02 | 1.40 | | |
| 3 | 33319 | 6.85 | 1.89 | | 2.90 | 3.74 | | |
| 3 | 33320 | 5.37 | 0.95 | | 1.41 | 4.21 | | |
| 3 | 33321 | 4.10 | 0.19 | | 0.98 | 4.22 | | |
| 3 | 33322 | 4.15 | 0.29 | | 0.49 | 3.60 | | |
| 3 | 33323 | 4.83 | 0.55 | | 0.65 | 3.22 | | |
| 3 | 33324 | 5.50 | 0.90 | | 1.37 | 2.72 | | |
| 3 | 33325 | 6.48 | 1.44 | | 2.41 | 1.73 | | |
| 3 | 33326 | 6.45 | 1.95 | | 3.59 | 2.25 | | |
| 3 | 33327 | 6.62 | 1.88 | | 4.09 | 2.33 | | |
| 3 | 33328 | 6.82 | 1.75 | | 4.57 | 2.34 | | |
| 3 | 33329 | 7.04 | 1.97 | | 5.01 | 2.28 | | |
| 3 | 33330 | 7.23 | 1.61 | | 5.32 | 2.09 | | |
| 3 | 33331 | 7.20 | 0.90 | | 5.26 | 1.40 | | |
| 3 | 33332 | 6.92 | 1.91 | | 3.29 | 1.99 | | |
| 3 | 33333 | 7.12 | 2.10 | | 3.92 | 2.27 | | |
| 3 | 33334 | 7.28 | 2.80 | | 4.57 | 2.28 | | |
| 3 | 33335 | 7.36 | 3.95 | | 5.22 | 2.20 | | |
| 3 | 33336 | 7.26 | 4.84 | | 5.68 | 2.05 | | |
| 3 | 33337 | 6.78 | 5.05 | | 5.73 | 1.82 | | |
| 4 | 40001 | 9.05 | 1.55 | | 4.28 | | | |
| 4 | 40002 | 8.84 | 2.90 | | 5.62 | 1.52 | | |
| 4 | 40003 | 8.50 | 4.04 | | 6.78 | 3.09 | | |
| 4 | 40004 | 9.16 | 4.91 | | 7.79 | 4.26 | | |
| 4 | 40005 | 9.74 | 5.32 | | 8.52 | 5.14 | | |
| 4 | 40006 | 10.10 | 5.39 | | 8.95 | 5.85 | | |
| 4 | 40007 | 10.21 | 5.24 | | 9.43 | 6.46 | | |
| 4 | 40008 | 10.11 | 5.05 | | 10.37 | 7.00 | | |
| 4 | 40009 | 9.79 | 5.33 | | 11.05 | 7.46 | | |
| 4 | 40010 | 9.64 | 5.60 | | 11.47 | 7.83 | | |
| 4 | 40011 | 9.67 | 5.81 | | 11.63 | 8.07 | | |
| 4 | 40012 | 9.46 | 5.91 | | 11.53 | 8.15 | | |
| 4 | 40013 | 9.05 | 5.83 | | 11.19 | 8.01 | | |
| 4 | 40014 | 8.41 | 5.48 | | 10.62 | 7.62 | | |
| 4 | 40015 | 7.50 | 4.76 | | 9.85 | 6.91 | | |
| 4 | 40016 | 6.29 | 3.55 | | 8.92 | 5.79 | | |
| 4 | 40017 | 4.84 | 1.73 | | 7.93 | 4.19 | | |
| 4 | 40018 | 2.72 | | | 7.01 | 2.05 | | |
| 4 | 40019 | 0.63 | | | 6.37 | | | |
| 4 | 40020 | | | | 5.89 | | | |
| 4 | 40021 | 9.55 | 1.64 | | 6.93 | 0.47 | | |
| 4 | 40022 | 10.61 | 3.86 | | 8.37 | 2.65 | | |
| 4 | 40023 | 11.65 | 5.22 | | 9.84 | 4.12 | | |
| 4 | 40024 | 12.51 | 5.86 | | 10.99 | 4.88 | | |
| 4 | 40025 | 13.09 | 5.97 | | 11.72 | 5.12 | | |
| 4 | 40026 | 13.35 | 5.74 | | 12.05 | 5.04 | | |
| 4 | 40027 | 13.32 | 5.32 | | 12.04 | 5.69 | | |
| 4 | 40028 | 13.05 | 4.81 | | 12.51 | 6.34 | | |
| 4 | 40029 | 12.56 | 4.88 | | 13.36 | 6.95 | | |
| 4 | 40030 | 12.32 | 5.35 | | 13.94 | 7.51 | | |
| 4 | 40031 | 12.52 | 5.80 | | 14.26 | 7.97 | | |
| 4 | 40032 | 12.46 | 6.14 | | 14.30 | 8.28 | | |
| 4 | 40033 | 12.22 | 6.32 | | 14.10 | 8.41 | | |
| 4 | 40034 | 11.67 | 6.24 | | 13.66 | 8.30 | | |
| 4 | 40035 | 10.75 | 5.79 | | 12.97 | 7.90 | | |
| 4 | 40036 | 9.40 | 4.83 | | 12.07 | 7.10 | | |
| 4 | 40037 | 7.61 | 3.14 | | 10.97 | 5.75 | | |
| 4 | 40038 | 5.51 | 0.53 | | 9.85 | 3.67 | | |
| 4 | 40039 | 2.00 | | | 9.24 | 0.72 | | |
| 4 | 40040 | 0.26 | | | 7.99 | | | |
| 4 | 40041 | 13.08 | 3.11 | | 10.10 | 1.88 | | |
| 4 | 40042 | 14.51 | 5.42 | | 12.13 | 4.22 | | |
| 4 | 40043 | 15.76 | 6.54 | | 13.87 | 5.39 | | |
| 4 | 40044 | 16.64 | 6.84 | | 15.04 | 5.68 | | |
| 4 | 40045 | 17.05 | 6.65 | | 15.58 | 5.45 | | |

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|---|---|---|---|---|---|---|---|---|
| 4 | 40046 | 17.08 | 6.09 | | 15.67 | 4.98 | | |
| 4 | 40047 | 16.83 | 5.32 | | 15.42 | 4.63 | | |
| 4 | 40048 | 16.35 | 4.49 | | 14.95 | 5.39 | | |
| 4 | 40049 | 15.69 | 4.29 | | 15.97 | 6.16 | | |
| 4 | 40050 | 15.38 | 4.99 | | 16.72 | 6.89 | | |
| 4 | 40051 | 15.79 | 5.68 | | 17.22 | 7.55 | | |
| 4 | 40052 | 15.94 | 6.29 | | 17.47 | 8.10 | | |
| 4 | 40053 | 15.92 | 6.76 | | 17.48 | 8.50 | | |
| 4 | 40054 | 15.56 | 7.01 | | 17.26 | 8.71 | | |
| 4 | 40055 | 14.75 | 6.91 | | 16.80 | 8.68 | | |
| 4 | 40056 | 13.39 | 6.31 | | 16.07 | 8.31 | | |
| 4 | 40057 | 11.37 | 4.98 | | 15.02 | 7.44 | | |
| 4 | 40058 | 8.69 | 2.48 | | 13.64 | 5.66 | | |
| 4 | 40059 | 4.70 | | | 12.47 | 2.58 | | |
| 4 | 40060 | 1.09 | | | 10.85 | | | |
| 4 | 40061 | 17.74 | 5.11 | | 14.55 | 4.05 | | |
| 4 | 40062 | 19.57 | 7.31 | | 17.24 | 6.30 | | |
| 4 | 40063 | 21.04 | 8.00 | | 19.23 | 6.75 | | |
| 4 | 40064 | 21.52 | 7.79 | | 19.92 | 6.21 | | 8.76 |
| 4 | 40065 | 21.51 | 7.09 | | 19.99 | 5.53 | | 8.76 |
| 4 | 40066 | 21.17 | 6.17 | | 19.70 | 4.67 | | 8.76 |
| 4 | 40067 | 20.61 | 5.18 | | 19.15 | 3.80 | | 8.76 |
| 4 | 40068 | 19.91 | 4.18 | | 18.41 | 4.17 | | 8.76 |
| 4 | 40069 | 19.10 | 3.61 | | 18.78 | 5.04 | | |
| 4 | 40070 | 18.80 | 4.53 | | 19.70 | 5.91 | | |
| 4 | 40071 | 19.44 | 5.45 | | 20.42 | 6.73 | | |
| 4 | 40072 | 19.86 | 6.33 | | 20.94 | 7.48 | | |
| 4 | 40073 | 20.13 | 7.11 | | 21.26 | 8.13 | | |
| 4 | 40074 | 20.08 | 7.70 | | 21.39 | 8.66 | | |
| 4 | 40075 | 19.53 | 8.01 | | 21.31 | 9.02 | | |
| 4 | 40076 | 18.34 | 7.89 | | 20.97 | 9.18 | | |
| 4 | 40077 | 16.37 | 7.11 | | 20.26 | 8.95 | | |
| 4 | 40078 | 13.41 | 5.29 | | 18.96 | 8.03 | | |
| 4 | 40079 | 9.22 | 1.31 | | 16.81 | 5.19 | | |
| 4 | 40080 | 3.27 | | | 14.96 | | | |
| 4 | 40081 | 24.08 | 7.98 | | 20.87 | 7.59 | | |
| 4 | 40082 | 27.02 | 9.34 | | 25.12 | 9.03 | | |
| 4 | 40083 | 27.44 | 8.75 | | 25.64 | 7.42 | | |
| 4 | 40084 | 27.16 | 7.91 | | 25.32 | 6.30 | | 8.76 |
| 4 | 40085 | 26.39 | 6.84 | | 24.71 | 5.19 | | 8.76 |
| 4 | 40086 | 25.40 | 5.73 | | 23.93 | 4.10 | | 8.76 |
| 4 | 40087 | 24.44 | 4.67 | | 23.04 | 3.04 | | |
| 4 | 40088 | 23.55 | 3.67 | | 22.09 | 2.71 | | 8.76 |
| 4 | 40089 | 22.68 | 2.93 | | 21.59 | 3.58 | | 8.76 |
| 4 | 40090 | 22.51 | 4.00 | | 22.69 | 4.46 | | |
| 4 | 40091 | 23.42 | 5.12 | | 23.69 | 5.34 | | |
| 4 | 40092 | 24.19 | 6.24 | | 24.58 | 6.23 | | |
| 4 | 40093 | 24.79 | 7.32 | | 25.34 | 7.10 | | |
| 4 | 40094 | 25.17 | 8.27 | | 25.95 | 7.93 | | |
| 4 | 40095 | 25.01 | 8.98 | | 26.40 | 8.69 | | |
| 4 | 40096 | 24.21 | 9.35 | | 26.66 | 9.35 | | |
| 4 | 40097 | 22.62 | 9.26 | | 26.60 | 9.84 | | |
| 4 | 40098 | 20.01 | 8.37 | | 26.01 | 9.90 | | |
| 4 | 40099 | 15.89 | 6.20 | | 24.18 | 9.01 | | |
| 4 | 40100 | 7.98 | | | 19.49 | 2.75 | | |
| 4 | 40101 | 38.68 | 11.95 | | 37.61 | 14.41 | | |
| 4 | 40102 | 36.80 | 8.65 | | 34.92 | 9.09 | | |
| 4 | 40103 | 35.08 | 7.78 | | 32.94 | 7.15 | | |
| 4 | 40104 | 33.27 | 6.73 | | 31.17 | 5.59 | | |
| 4 | 40105 | 31.30 | 5.65 | | 29.40 | 4.29 | | |
| 4 | 40106 | 29.46 | 4.66 | | 27.95 | 3.19 | | |
| 4 | 40107 | 27.96 | 3.78 | | 26.77 | 2.24 | | |
| 4 | 40108 | 27.01 | 2.98 | | 25.79 | 1.32 | | |
| 4 | 40109 | 26.25 | 2.39 | | 24.91 | 1.66 | | |
| 4 | 40110 | 26.38 | 3.52 | | 25.57 | 2.32 | | |
| 4 | 40111 | 27.67 | 4.76 | | 26.83 | 3.09 | | |

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|---|---|---|---|---|---|---|---|---|
| 4 | 40112 | 28.90 | 6.08 | | 28.20 | 4.01 | | |
| 4 | 40113 | 29.93 | 7.43 | | 29.60 | 5.07 | | |
| 4 | 40114 | 30.81 | 8.72 | | 30.88 | 6.25 | | |
| 4 | 40115 | 31.12 | 9.80 | | 31.97 | 7.49 | | |
| 4 | 40116 | 30.75 | 10.57 | | 32.79 | 8.67 | | |
| 4 | 40117 | 29.79 | 11.01 | | 33.45 | 9.70 | | |
| 4 | 40118 | 28.06 | 11.04 | | 33.87 | 10.54 | | |
| 4 | 40119 | 25.39 | 10.43 | | 33.79 | 10.98 | | |
| 4 | 40120 | 21.36 | 8.87 | | 31.26 | 9.92 | | |
| 4 | 40121 | 11.09 | 1.31 | | 3.75 | | | |
| 4 | 40122 | 13.25 | 4.92 | | 9.03 | 3.04 | | 8.76 |
| 4 | 40123 | 13.58 | 5.78 | | 11.18 | 4.37 | | 8.76 |
| 4 | 40124 | 13.89 | 6.37 | | 12.26 | 5.07 | | 8.76 |
| 4 | 40125 | 14.00 | 6.54 | | 12.78 | 5.36 | | 8.76 |
| 4 | 40126 | 14.05 | 6.47 | | 13.01 | 6.21 | | 8.76 |
| 4 | 40127 | 13.97 | 6.27 | | 12.93 | 6.94 | | |
| 4 | 40128 | 13.74 | 5.91 | | 13.43 | 7.52 | | |
| 4 | 40129 | 13.32 | 5.43 | | 14.15 | 7.95 | | |
| 4 | 40130 | 12.70 | 5.22 | | 14.61 | 8.27 | | |
| 4 | 40131 | 12.54 | 5.42 | | 14.82 | 8.47 | | |
| 4 | 40132 | 12.30 | 5.31 | | 14.77 | 8.54 | | |
| 4 | 40133 | 11.77 | 5.27 | | 14.48 | 8.46 | | |
| 4 | 40134 | 10.92 | 5.12 | | 13.92 | 8.20 | | |
| 4 | 40135 | 9.71 | 4.71 | | 13.11 | 7.67 | | 8.76 |
| 4 | 40136 | 8.12 | 3.85 | | 12.01 | 6.80 | | 8.76 |
| 4 | 40137 | 6.38 | 2.34 | | 11.24 | 5.43 | | 8.76 |
| 4 | 40138 | 4.52 | 0.13 | | 10.58 | 3.46 | | |
| 4 | 40139 | 1.24 | | | 10.06 | 0.76 | | |
| 4 | 40140 | 0.41 | | | 9.18 | | | |
| 4 | 40141 | 11.00 | 3.23 | | 1.20 | | | |
| 4 | 40142 | 10.17 | 4.86 | | 2.08 | 2.09 | | |
| 4 | 40143 | 8.75 | 5.68 | | 2.32 | 4.27 | | 8.76 |
| 4 | 40144 | 7.50 | 6.19 | | 3.52 | 5.63 | | 8.76 |
| 4 | 40145 | 6.64 | 6.45 | | 4.68 | 6.66 | | |
| 4 | 40146 | 6.10 | 6.51 | | 5.92 | 7.42 | | |
| 4 | 40147 | 5.97 | 6.44 | | 6.89 | 7.95 | | |
| 4 | 40148 | 6.09 | 6.53 | | 7.58 | 8.29 | | |
| 4 | 40149 | 6.11 | 6.48 | | 8.02 | 8.43 | | |
| 4 | 40150 | 6.00 | 6.30 | | 8.20 | 8.39 | | |
| 4 | 40151 | 5.73 | 5.97 | | 8.14 | 8.17 | | |
| 4 | 40152 | 5.29 | 5.49 | | 7.85 | 7.74 | | |
| 4 | 40153 | 4.67 | 4.81 | | 7.32 | 7.09 | | |
| 4 | 40154 | 3.95 | 4.04 | | 6.58 | 6.19 | | |
| 4 | 40155 | 3.37 | 3.30 | | 5.66 | 5.00 | | |
| 4 | 40156 | 3.17 | 2.70 | | 4.59 | 3.54 | | |
| 4 | 40157 | 2.46 | 1.55 | | 4.09 | 1.62 | | |
| 4 | 40158 | 1.55 | 0.21 | | 4.27 | 0.15 | | |
| 4 | 40159 | 0.04 | | | 4.34 | | | |
| 4 | 40160 | 0.20 | | | 4.78 | | | |
| 4 | 40161 | 11.32 | 4.86 | | 2.65 | 0.46 | | |
| 4 | 40162 | 10.24 | 5.69 | | 2.36 | 2.33 | | |
| 4 | 40163 | 8.52 | 6.18 | | 1.88 | 3.82 | | |
| 4 | 40164 | 6.83 | 6.42 | | 2.07 | 5.23 | | |
| 4 | 40165 | 5.40 | 6.52 | | 2.61 | 6.11 | | |
| 4 | 40166 | 4.35 | 6.62 | | 3.02 | 6.74 | | |
| 4 | 40167 | 3.40 | 6.61 | | 3.67 | 7.14 | | |
| 4 | 40168 | 3.03 | 6.70 | | 4.10 | 7.33 | | |
| 4 | 40169 | 2.82 | 6.60 | | 4.33 | 7.30 | | |
| 4 | 40170 | 2.53 | 6.31 | | 4.37 | 7.06 | | |
| 4 | 40171 | 2.18 | 5.85 | | 4.23 | 6.61 | | |
| 4 | 40172 | 1.80 | 5.26 | | 3.91 | 5.95 | | |
| 4 | 40173 | 1.80 | 4.94 | | 3.44 | 5.06 | | |
| 4 | 40174 | 1.97 | 4.85 | | 2.82 | 4.43 | | |
| 4 | 40175 | 1.89 | 4.18 | | 2.35 | 3.75 | | |
| 4 | 40176 | 1.75 | 3.32 | | 2.07 | 2.85 | | |
| 4 | 40177 | 1.54 | 2.24 | | 2.35 | 1.70 | | |

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|---|---|---|---|---|---|---|---|---|
| 4 | 40178 | 1.03 | 0.92 | | 2.21 | 0.43 | | |
| 4 | 40179 | 0.36 | | | 2.23 | | | |
| 4 | 40180 | 0.76 | | | 2.59 | | | |
| 4 | 40181 | 11.03 | 5.28 | | 2.85 | 0.66 | | |
| 4 | 40182 | 9.81 | 5.64 | | 2.36 | 1.67 | | |
| 4 | 40183 | 7.90 | 5.84 | | 1.57 | 2.91 | | |
| 4 | 40184 | 6.06 | 5.88 | | 0.90 | 3.81 | | |
| 4 | 40185 | 4.33 | 5.84 | | 1.23 | 4.68 | | |
| 4 | 40186 | 3.09 | 5.70 | | 1.50 | 5.19 | | |
| 4 | 40187 | 1.97 | 5.73 | | 1.93 | 5.53 | | |
| 4 | 40188 | 1.41 | 5.92 | | 2.29 | 5.67 | | |
| 4 | 40189 | 1.25 | 5.92 | | 2.50 | 5.62 | | |
| 4 | 40190 | 1.09 | 5.72 | | 2.56 | 5.37 | | |
| 4 | 40191 | 0.90 | 5.35 | | 2.48 | 4.92 | | |
| 4 | 40192 | 0.69 | 4.92 | | 2.27 | 4.27 | | |
| 4 | 40193 | 0.46 | 4.66 | | 1.95 | 3.99 | | |
| 4 | 40194 | 0.49 | 4.24 | | 1.51 | 3.63 | | |
| 4 | 40195 | 0.53 | 3.66 | | 0.84 | 2.97 | | |
| 4 | 40196 | 0.63 | 2.94 | | 0.57 | 2.15 | | |
| 4 | 40197 | 0.68 | 2.10 | | 0.83 | 1.20 | | |
| 4 | 40198 | 0.63 | 1.15 | | 1.15 | 0.36 | | |
| 4 | 40199 | 0.63 | 0.22 | | 1.11 | | | |
| 4 | 40200 | 1.22 | | | 1.45 | | | |
| 4 | 40201 | 10.10 | 4.85 | | 2.21 | 0.64 | | |
| 4 | 40202 | 8.81 | 4.95 | | 1.64 | 1.18 | | |
| 4 | 40203 | 6.85 | 4.95 | | 1.25 | 1.88 | | |
| 4 | 40204 | 5.01 | 4.96 | | 0.48 | 2.60 | | |
| 4 | 40205 | 3.29 | 4.83 | | | 2.87 | | |
| 4 | 40206 | 1.89 | 4.72 | | 0.30 | 3.50 | | |
| 4 | 40207 | 0.81 | 4.69 | | 0.78 | 3.92 | | |
| 4 | 40208 | 0.68 | 4.99 | | 1.12 | 4.11 | | |
| 4 | 40209 | 0.62 | 5.12 | | 1.38 | 4.13 | | |
| 4 | 40210 | 0.55 | 5.08 | | 1.54 | 3.98 | | |
| 4 | 40211 | 0.48 | 4.87 | | 1.59 | 3.75 | | |
| 4 | 40212 | 0.41 | 4.47 | | 1.51 | 3.52 | | |
| 4 | 40213 | 0.33 | 3.90 | | 1.32 | 3.06 | | |
| 4 | 40214 | 0.25 | 3.31 | | 1.01 | 2.40 | | |
| 4 | 40215 | 0.16 | 2.70 | | 0.32 | 1.74 | | |
| 4 | 40216 | 0.06 | 2.02 | | | 1.03 | | |
| 4 | 40217 | | 1.30 | | | 0.40 | | |
| 4 | 40218 | | 0.57 | | 0.11 | 0.05 | | |
| 4 | 40219 | 0.28 | | | 0.47 | | | |
| 4 | 40220 | 1.42 | | | 0.86 | | | |
| 4 | 40221 | 9.61 | 4.61 | | 1.49 | 0.57 | | |
| 4 | 40222 | 8.21 | 4.54 | | 1.07 | 1.20 | | |
| 4 | 40223 | 6.26 | 4.46 | | 0.52 | 1.85 | | |
| 4 | 40224 | 4.50 | 4.47 | | 0.17 | 2.52 | | |
| 4 | 40225 | 2.87 | 4.38 | | | 3.20 | | |
| 4 | 40226 | 1.44 | 4.35 | | 0.49 | 3.96 | | |
| 4 | 40227 | 0.25 | 4.28 | | 0.85 | 4.29 | | |
| 4 | 40228 | 0.30 | 4.36 | | 1.17 | 4.42 | | |
| 4 | 40229 | 0.33 | 4.60 | | 1.40 | 4.38 | | |
| 4 | 40230 | 0.36 | 4.70 | | 1.51 | 4.17 | | |
| 4 | 40231 | 0.38 | 4.63 | | 1.50 | 3.79 | | |
| 4 | 40232 | 0.40 | 4.41 | | 1.38 | 3.30 | | |
| 4 | 40233 | 0.41 | 4.04 | | 0.98 | 2.88 | | |
| 4 | 40234 | 0.48 | 3.53 | | 0.81 | 2.34 | | |
| 4 | 40235 | 0.41 | 2.92 | | 0.25 | 1.73 | | |
| 4 | 40236 | 0.38 | 2.30 | | | 1.05 | | |
| 4 | 40237 | 0.38 | 1.58 | | | 0.46 | | |
| 4 | 40238 | 0.31 | 0.79 | | 0.10 | | | |
| 4 | 40239 | 0.16 | 0.09 | | 0.29 | | | |
| 4 | 40240 | 1.30 | | | 0.57 | | | |
| 4 | 40241 | 9.99 | 5.01 | | 1.29 | 0.56 | | |
| 4 | 40242 | 8.84 | 5.25 | | 1.10 | 1.58 | | |
| 4 | 40243 | 7.16 | 5.37 | | 0.57 | 2.72 | | |

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|---|---|---|---|---|---|---|---|---|
| 4 | 40244 | 5.59 | 5.44 | | 0.68 | 4.05 | | |
| 4 | 40245 | 4.12 | 5.44 | | 1.25 | 4.87 | | |
| 4 | 40246 | 2.80 | 5.41 | | 1.70 | 5.31 | | |
| 4 | 40247 | 1.65 | 5.31 | | 1.99 | 5.57 | | |
| 4 | 40248 | 0.67 | 5.14 | | 2.17 | 5.65 | | |
| 4 | 40249 | 0.54 | 4.70 | | 2.33 | 5.54 | | |
| 4 | 40250 | 0.61 | 4.61 | | 2.35 | 5.25 | | |
| 4 | 40251 | 0.67 | 4.63 | | 2.24 | 4.78 | | |
| 4 | 40252 | 0.71 | 4.53 | | 2.02 | 4.16 | | |
| 4 | 40253 | 0.74 | 4.29 | | 1.54 | 3.96 | | |
| 4 | 40254 | 0.84 | 3.90 | | 1.28 | 3.70 | | |
| 4 | 40255 | 0.78 | 3.36 | | 0.79 | 3.05 | | |
| 4 | 40256 | 0.82 | 2.66 | | 0.43 | 2.23 | | |
| 4 | 40257 | 0.83 | 1.80 | | 0.59 | 1.27 | | |
| 4 | 40258 | 0.70 | 0.83 | | 0.71 | 0.31 | | |
| 4 | 40259 | 0.47 | | | 0.48 | | | |
| 4 | 40260 | 1.01 | | | 0.59 | | | |
| 4 | 40261 | 9.86 | 4.51 | | 1.44 | 0.48 | | |
| 4 | 40262 | 9.04 | 5.21 | | 1.78 | 2.09 | | |
| 4 | 40263 | 7.73 | 5.62 | | 1.63 | 4.12 | | |
| 4 | 40264 | 6.50 | 5.87 | | 1.98 | 5.11 | | |
| 4 | 40265 | 5.37 | 5.99 | | 2.68 | 5.86 | | |
| 4 | 40266 | 4.37 | 6.01 | | 3.22 | 6.40 | | |
| 4 | 40267 | 3.50 | 5.95 | | 3.70 | 6.73 | | |
| 4 | 40268 | 2.75 | 5.81 | | 4.05 | 6.88 | | |
| 4 | 40269 | 2.28 | 5.60 | | 4.21 | 6.84 | | |
| 4 | 40270 | 2.02 | 5.30 | | 4.20 | 6.61 | | |
| 4 | 40271 | 1.94 | 4.89 | | 4.03 | 6.19 | | |
| 4 | 40272 | 1.84 | 4.53 | | 3.71 | 5.58 | | |
| 4 | 40273 | 1.71 | 4.25 | | 3.26 | 4.88 | | |
| 4 | 40274 | 1.55 | 3.81 | | 2.71 | 4.43 | | |
| 4 | 40275 | 1.44 | 3.25 | | 2.09 | 3.86 | | |
| 4 | 40276 | 1.30 | 2.46 | | 1.88 | 2.98 | | |
| 4 | 40277 | 1.13 | 1.44 | | 1.94 | 1.83 | | |
| 4 | 40278 | 0.91 | 0.33 | | 1.89 | 0.48 | | |
| 4 | 40279 | 0.07 | | | 1.29 | | | |
| 4 | 40280 | 0.55 | | | 1.32 | | | |
| 4 | 40281 | 9.41 | 3.01 | | 1.98 | | | |
| 4 | 40282 | 8.98 | 4.24 | | 2.67 | 2.41 | | |
| 4 | 40283 | 8.20 | 4.89 | | 3.17 | 3.92 | | |
| 4 | 40284 | 7.53 | 5.28 | | 3.82 | 5.07 | | |
| 4 | 40285 | 7.00 | 5.48 | | 4.88 | 5.93 | | |
| 4 | 40286 | 6.60 | 5.59 | | 5.90 | 6.57 | | |
| 4 | 40287 | 6.31 | 5.65 | | 6.73 | 7.04 | | |
| 4 | 40288 | 6.08 | 5.69 | | 7.34 | 7.37 | | |
| 4 | 40289 | 5.88 | 5.70 | | 7.74 | 7.56 | | |
| 4 | 40290 | 5.85 | 5.66 | | 7.91 | 7.62 | | |
| 4 | 40291 | 5.66 | 5.53 | | 7.87 | 7.50 | | |
| 4 | 40292 | 5.30 | 5.27 | | 7.60 | 7.20 | | |
| 4 | 40293 | 4.74 | 4.84 | | 7.14 | 6.68 | | |
| 4 | 40294 | 4.01 | 4.16 | | 6.51 | 5.90 | | |
| 4 | 40295 | 3.25 | 3.20 | | 5.76 | 4.85 | | |
| 4 | 40296 | 2.47 | 1.85 | | 4.94 | 3.49 | | |
| 4 | 40297 | 1.65 | 0.47 | | 4.12 | 1.83 | | |
| 4 | 40298 | 0.65 | | | 3.44 | 0.41 | | |
| 4 | 40299 | | | | 3.34 | | | |
| 4 | 40300 | 0.08 | | | 3.40 | | | |
| 4 | 40301 | 34.10 | 6.98 | | 28.91 | 8.91 | | |
| 4 | 40302 | 29.13 | 5.96 | | 26.23 | 6.24 | | |
| 4 | 40303 | 26.62 | 6.42 | | 25.05 | 6.17 | | |
| 4 | 40304 | 25.48 | 6.58 | | 24.34 | 6.05 | | 8.76 |
| 4 | 40305 | 24.66 | 6.25 | | 23.83 | 5.83 | | 8.76 |
| 4 | 40306 | 23.82 | 5.57 | | 23.11 | 5.37 | | 8.76 |
| 4 | 40307 | 22.88 | 4.74 | | 22.12 | 4.73 | | 8.76 |
| 4 | 40308 | 21.94 | 3.87 | | 21.12 | 5.34 | | 8.76 |
| 4 | 40309 | 20.90 | 3.57 | | 20.89 | 5.96 | | |

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|---|---|---|---|---|---|---|---|---|
| 4 | 40310 | 20.36 | 4.36 | | 21.57 | 6.52 | | 8.76 |
| 4 | 40311 | 20.61 | 5.22 | | 22.07 | 7.07 | | |
| 4 | 40312 | 20.65 | 6.04 | | 22.40 | 7.61 | | |
| 4 | 40313 | 20.43 | 6.76 | | 22.57 | 8.15 | | 8.76 |
| 4 | 40314 | 19.90 | 7.33 | | 22.56 | 8.64 | | 8.76 |
| 4 | 40315 | 19.07 | 7.68 | | 22.41 | 9.02 | | 8.76 |
| 4 | 40316 | 17.99 | 7.66 | | 22.23 | 9.23 | | 8.76 |
| 4 | 40317 | 16.30 | 7.08 | | 21.83 | 9.15 | | 8.76 |
| 4 | 40318 | 13.74 | 5.54 | | 20.94 | 8.52 | | |
| 4 | 40319 | 10.03 | 2.38 | | 19.14 | 6.48 | | |
| 4 | 40320 | 2.96 | | | 16.09 | 0.32 | | |
| 4 | 40321 | 32.98 | 4.66 | | 32.15 | 4.28 | | |
| 4 | 40322 | 32.71 | 2.94 | | 33.65 | 4.82 | | |
| 4 | 40323 | 33.72 | 4.32 | | 33.86 | 6.02 | | |
| 4 | 40324 | 33.23 | 4.76 | | 33.17 | 6.25 | | |
| 4 | 40325 | 32.18 | 4.49 | | 32.10 | 5.89 | | |
| 4 | 40326 | 31.00 | 3.93 | | 30.83 | 5.19 | | |
| 4 | 40327 | 29.71 | 3.17 | | 29.44 | 4.30 | | |
| 4 | 40328 | 28.34 | 2.42 | | 27.99 | 3.29 | | |
| 4 | 40329 | 26.90 | 3.66 | | 27.23 | 4.10 | | |
| 4 | 40330 | 27.33 | 4.86 | | 27.89 | 4.99 | | |
| 4 | 40331 | 27.75 | 6.02 | | 28.53 | 5.87 | | |
| 4 | 40332 | 28.04 | 7.11 | | 29.15 | 6.74 | | |
| 4 | 40333 | 28.17 | 8.10 | | 29.75 | 7.59 | | |
| 4 | 40334 | 28.08 | 8.98 | | 30.31 | 8.40 | | |
| 4 | 40335 | 27.77 | 9.71 | | 30.84 | 9.16 | | |
| 4 | 40336 | 27.35 | 10.22 | | 31.33 | 9.84 | | |
| 4 | 40337 | 26.50 | 10.44 | | 31.76 | 10.40 | | |
| 4 | 40338 | 24.99 | 10.23 | | 32.04 | 10.79 | | |
| 4 | 40339 | 22.54 | 9.24 | | 31.76 | 10.71 | | |
| 4 | 40340 | 18.68 | 6.72 | | 29.06 | 8.58 | | |
| 4 | 40341 | 17.03 | 9.34 | | 16.78 | 8.43 | | |
| 4 | 40342 | 16.69 | 9.26 | | 18.44 | 7.04 | | |
| 4 | 40343 | 16.81 | 6.98 | | 18.57 | 5.10 | | |
| 4 | 40344 | 16.91 | 5.00 | | 18.55 | 3.56 | | |
| 4 | 40345 | 17.16 | 3.48 | | 18.46 | 2.39 | | |
| 4 | 40346 | 19.22 | 3.76 | | 20.18 | 3.36 | | |
| 4 | 40347 | 20.96 | 4.56 | | 21.78 | 4.18 | | |
| 4 | 40348 | 22.47 | 5.39 | | 23.21 | 4.93 | | |
| 4 | 40349 | 23.80 | 6.25 | | 24.51 | 5.65 | | |
| 4 | 40350 | 24.96 | 7.11 | | 25.73 | 6.36 | | |
| 4 | 40351 | 25.94 | 7.96 | | 26.86 | 7.07 | | |
| 4 | 40352 | 26.73 | 8.77 | | 27.92 | 7.78 | | |
| 4 | 40353 | 27.32 | 9.52 | | 28.90 | 8.49 | | |
| 4 | 40354 | 27.65 | 10.17 | | 29.82 | 9.18 | | |
| 4 | 40355 | 27.80 | 10.69 | | 30.68 | 9.84 | | |
| 4 | 40356 | 27.74 | 11.02 | | 31.46 | 10.44 | | |
| 4 | 40357 | 27.34 | 11.09 | | 32.16 | 10.93 | | |
| 4 | 40358 | 26.50 | 10.77 | | 32.70 | 11.21 | | |
| 4 | 40359 | 25.19 | 9.83 | | 32.84 | 10.93 | | |
| 4 | 40360 | 23.46 | 9.10 | | 31.45 | 9.66 | | |
| 4 | 40361 | 6.64 | 8.37 | | 7.92 | 5.53 | | |
| 4 | 40362 | 9.07 | 8.52 | | 9.47 | 6.50 | | |
| 4 | 40363 | 10.77 | 7.04 | | 11.31 | 5.76 | | |
| 4 | 40364 | 12.85 | 6.39 | | 13.29 | 5.71 | | |
| 4 | 40365 | 14.76 | 6.10 | | 15.06 | 5.88 | | |
| 4 | 40366 | 16.39 | 6.03 | | 16.82 | 6.18 | | |
| 4 | 40367 | 17.76 | 6.11 | | 18.26 | 6.52 | | |
| 4 | 40368 | 18.90 | 6.28 | | 19.43 | 6.89 | | |
| 4 | 40369 | 19.83 | 6.53 | | 20.39 | 7.28 | | |
| 4 | 40370 | 20.54 | 6.86 | | 21.21 | 7.69 | | |
| 4 | 40371 | 21.03 | 7.35 | | 21.86 | 8.11 | | |
| 4 | 40372 | 21.28 | 7.93 | | 22.35 | 8.54 | | 8.76 |
| 4 | 40373 | 21.26 | 8.46 | | 22.80 | 9.02 | | 8.76 |
| 4 | 40374 | 20.93 | 8.87 | | 23.16 | 9.52 | | 8.76 |
| 4 | 40375 | 20.22 | 9.08 | | 23.34 | 9.92 | | 8.76 |

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|---|---|---|---|---|---|---|---|---|
| 4 | 40376 | 19.13 | 8.99 | | 23.32 | 10.17 | | 8.76 |
| 4 | 40377 | 17.72 | 8.39 | | 22.98 | 10.12 | | |
| 4 | 40378 | 15.55 | 6.92 | | 22.09 | 9.43 | | |
| 4 | 40379 | 12.27 | 4.23 | | 20.24 | 7.55 | | |
| 4 | 40380 | 5.43 | | | 16.71 | 1.77 | | |
| 4 | 40381 | 17.55 | 6.55 | | 17.32 | 4.63 | | |
| 4 | 40382 | 18.19 | 6.45 | | 16.71 | 5.06 | | |
| 4 | 40383 | 17.51 | 5.35 | | 14.73 | 4.08 | | |
| 4 | 40384 | 15.85 | 4.25 | | 12.21 | 3.08 | | |
| 4 | 40385 | 13.84 | 2.87 | | 9.65 | 1.95 | | |
| 4 | 40386 | 11.96 | 1.46 | | 7.43 | 1.03 | | |
| 4 | 40387 | 12.33 | 2.29 | | 7.31 | 2.18 | | |
| 4 | 40388 | 13.44 | 4.00 | | 7.79 | 3.36 | | |
| 4 | 40389 | 14.52 | 5.90 | | 9.16 | 4.57 | | |
| 4 | 40390 | 15.88 | 7.53 | | 15.79 | 6.07 | | 8.76 |
| 4 | 40391 | 16.28 | 6.18 | | 15.59 | 5.28 | | 8.76 |
| 4 | 40392 | 15.13 | 5.32 | | 13.57 | 4.54 | | 8.76 |
| 4 | 40393 | 13.51 | 4.08 | | 11.10 | 3.34 | | 8.76 |
| 4 | 40394 | 11.51 | 2.86 | | 8.77 | 2.24 | | 8.76 |
| 4 | 40395 | 9.76 | 1.46 | | 6.76 | 1.29 | | |
| 4 | 40396 | 10.23 | 2.28 | | 6.54 | 2.22 | | |
| 4 | 40397 | 11.30 | 3.71 | | 7.13 | 3.29 | | |
| 4 | 40398 | 12.44 | 5.11 | | 8.44 | 4.41 | | |
| 4 | 40399 | 14.74 | 8.22 | | 14.74 | 7.50 | | 8.76 |
| 4 | 40400 | 14.87 | 6.37 | | 14.60 | 5.78 | | 8.76 |
| 4 | 40401 | 13.15 | 5.28 | | 12.45 | 4.83 | | 8.76 |
| 4 | 40402 | 11.30 | 4.04 | | 10.09 | 3.61 | | 8.76 |
| 4 | 40403 | 9.55 | 2.77 | | 7.89 | 2.44 | | 8.76 |
| 4 | 40404 | 7.80 | 1.44 | | 6.10 | 1.48 | | |
| 4 | 40405 | 8.39 | 2.21 | | 5.88 | 2.24 | | |
| 4 | 40406 | 9.70 | 3.31 | | 6.60 | 3.17 | | |
| 4 | 40407 | 10.54 | 4.22 | | 7.87 | 4.08 | | |
| 4 | 40408 | 14.21 | 8.55 | | 14.24 | 8.24 | | |
| 4 | 40409 | 13.72 | 7.07 | | 13.61 | 7.07 | | 8.76 |
| 4 | 40410 | 11.75 | 5.36 | | 11.03 | 5.07 | | 8.76 |
| 4 | 40411 | 9.67 | 4.00 | | 9.10 | 3.80 | | 8.76 |
| 4 | 40412 | 7.88 | 2.70 | | 7.06 | 2.57 | | |
| 4 | 40413 | 6.02 | 1.35 | | 5.45 | 1.58 | | |
| 4 | 40414 | 6.90 | 2.10 | | 5.47 | 2.23 | | |
| 4 | 40415 | 8.03 | 2.92 | | 6.31 | 3.01 | | |
| 4 | 40416 | 9.11 | 3.34 | | 7.42 | 3.64 | | |
| 4 | 40417 | 14.48 | 8.55 | | 14.15 | 8.61 | | |
| 4 | 40418 | 13.01 | 7.66 | | 12.66 | 8.01 | | |
| 4 | 40419 | 10.39 | 5.68 | | 10.23 | 5.87 | | 8.76 |
| 4 | 40420 | 8.18 | 4.00 | | 7.79 | 3.89 | | |
| 4 | 40421 | 6.35 | 2.65 | | 5.77 | 2.61 | | |
| 4 | 40422 | 4.45 | 1.24 | | 4.39 | 1.59 | | |
| 4 | 40423 | 5.52 | 1.96 | | 5.18 | 2.21 | | |
| 4 | 40424 | 6.71 | 2.54 | | 6.08 | 2.82 | | |
| 4 | 40425 | 8.14 | 2.59 | | 7.13 | 3.17 | | |
| 4 | 40426 | 14.83 | 8.45 | | 14.57 | 8.83 | | |
| 4 | 40427 | 12.71 | 7.99 | | 12.13 | 8.63 | | |
| 4 | 40428 | 9.94 | 6.05 | | 9.58 | 6.52 | | |
| 4 | 40429 | 7.19 | 4.07 | | 7.19 | 4.17 | | |
| 4 | 40430 | 4.97 | 2.51 | | 5.27 | 2.57 | | |
| 4 | 40431 | 3.58 | 1.25 | | 4.07 | 1.51 | | |
| 4 | 40432 | 4.44 | 1.84 | | 4.94 | 2.16 | | |
| 4 | 40433 | 5.71 | 2.26 | | 5.94 | 2.65 | | |
| 4 | 40434 | 7.27 | 2.02 | | 6.98 | 2.74 | | |
| 4 | 40435 | 15.17 | 8.34 | | 15.20 | 8.99 | | |
| 4 | 40436 | 12.37 | 8.11 | | 11.77 | 9.00 | | |
| 4 | 40437 | 9.49 | 6.25 | | 8.93 | 6.94 | | |
| 4 | 40438 | 6.81 | 4.21 | | 6.57 | 4.51 | | |
| 4 | 40439 | 4.60 | 2.41 | | 4.75 | 2.44 | | |
| 4 | 40440 | 2.95 | 1.03 | | 3.78 | 1.37 | | |
| 4 | 40441 | 3.88 | 1.73 | | 4.72 | 2.10 | | |

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|---|---|---|---|---|---|---|---|---|
| 4 | 40442 | 5.18 | 2.10 | | 5.86 | 2.53 | | |
| 4 | 40443 | 6.81 | 1.65 | | 6.98 | 2.38 | | |
| 4 | 40444 | 15.45 | 8.25 | | 15.70 | 9.12 | | |
| 4 | 40445 | 11.98 | 8.08 | | 11.74 | 9.17 | | |
| 4 | 40446 | 8.96 | 6.28 | | 8.49 | 7.13 | | |
| 4 | 40447 | 6.34 | 4.21 | | 5.94 | 4.66 | | |
| 4 | 40448 | 4.23 | 2.38 | | 4.24 | 2.52 | | |
| 4 | 40449 | 2.74 | 0.96 | | 3.52 | 1.33 | | |
| 4 | 40450 | 3.71 | 1.64 | | 4.52 | 2.03 | | |
| 4 | 40451 | 5.11 | 2.04 | | 5.80 | 2.46 | | |
| 4 | 40452 | 6.95 | 1.63 | | 7.15 | 2.25 | | |
| 4 | 40453 | 15.62 | 8.17 | | 16.03 | 9.22 | | |
| 4 | 40454 | 11.53 | 7.91 | | 11.57 | 9.17 | | |
| 4 | 40455 | 8.36 | 6.14 | | 8.21 | 7.10 | | |
| 4 | 40456 | 5.81 | 4.08 | | 5.70 | 4.61 | | |
| 4 | 40457 | 3.82 | 2.25 | | 3.83 | 2.49 | | |
| 4 | 40458 | 2.50 | 0.93 | | 3.28 | 1.25 | | |
| 4 | 40459 | 3.48 | 1.56 | | 4.32 | 1.93 | | |
| 4 | 40460 | 4.98 | 2.06 | | 5.74 | 2.43 | | |
| 4 | 40461 | 7.03 | 1.95 | | 7.46 | 2.51 | | |
| 4 | 40462 | 15.63 | 8.07 | | 16.19 | 9.28 | | |
| 4 | 40463 | 10.99 | 7.62 | | 11.25 | 9.01 | | |
| 4 | 40464 | 7.68 | 5.82 | | 7.77 | 6.86 | | |
| 4 | 40465 | 5.22 | 3.79 | | 5.40 | 4.36 | | |
| 4 | 40466 | 3.37 | 2.00 | | 3.50 | 2.24 | | |
| 4 | 40467 | 2.24 | 0.83 | | 3.20 | 1.17 | | |
| 4 | 40468 | 3.19 | 1.47 | | 4.40 | 1.79 | | |
| 4 | 40469 | 4.74 | 2.14 | | 5.95 | 2.51 | | |
| 4 | 40470 | 6.92 | 2.46 | | 7.91 | 2.93 | | |
| 4 | 40471 | 15.47 | 7.94 | | 16.16 | 9.29 | | |
| 4 | 40472 | 10.33 | 7.19 | | 10.75 | 8.67 | | |
| 4 | 40473 | 6.92 | 5.33 | | 7.19 | 6.40 | | |
| 4 | 40474 | 4.59 | 3.35 | | 4.96 | 3.94 | | |
| 4 | 40475 | 2.90 | 1.64 | | 3.19 | 1.83 | | |
| 4 | 40476 | 1.94 | 0.64 | | 3.13 | 0.98 | | |
| 4 | 40477 | 2.83 | 1.33 | | 4.34 | 1.64 | | |
| 4 | 40478 | 4.34 | 2.23 | | 5.96 | 2.58 | | |
| 4 | 40479 | 6.57 | 3.02 | | 8.18 | 3.45 | | |
| 4 | 40480 | 15.10 | 7.72 | | 15.94 | 9.21 | | 8.76 |
| 4 | 40481 | 9.53 | 6.59 | | 10.09 | 8.16 | | |
| 4 | 40482 | 6.08 | 4.66 | | 6.47 | 5.72 | | |
| 4 | 40483 | 3.91 | 2.75 | | 4.30 | 3.22 | | |
| 4 | 40484 | 2.41 | 1.17 | | 2.77 | 1.28 | | |
| 4 | 40485 | 1.63 | 0.35 | | 2.94 | 0.67 | | |
| 4 | 40486 | 2.41 | 1.06 | | 4.00 | 1.38 | | |
| 4 | 40487 | 3.78 | 2.24 | | 5.77 | 2.56 | | |
| 4 | 40488 | 5.97 | 3.54 | | 8.19 | 3.97 | | |
| 4 | 40489 | 14.46 | 7.38 | | 15.50 | 9.02 | | 8.76 |
| 4 | 40490 | 8.55 | 5.81 | | 9.24 | 7.44 | | |
| 4 | 40491 | 5.16 | 3.79 | | 5.67 | 4.83 | | |
| 4 | 40492 | 3.21 | 1.99 | | 3.49 | 2.40 | | |
| 4 | 40493 | 1.92 | 0.62 | | 2.27 | 0.59 | | |
| 4 | 40494 | 1.14 | | | 2.64 | 0.25 | | |
| 4 | 40495 | 1.93 | 0.74 | | 3.63 | 1.00 | | |
| 4 | 40496 | 3.08 | 2.09 | | 5.33 | 2.40 | | |
| 4 | 40497 | 5.08 | 3.87 | | 7.92 | 4.40 | | |
| 4 | 40498 | 13.52 | 6.85 | | 14.97 | 8.71 | | 8.76 |
| 4 | 40499 | 7.39 | 4.78 | | 8.26 | 6.48 | | |
| 4 | 40500 | 4.18 | 2.71 | | 4.72 | 3.73 | | |
| 4 | 40501 | 2.50 | 1.03 | | 2.70 | 1.37 | | |
| 4 | 40502 | 1.50 | 0.10 | | 1.71 | | | |
| 4 | 40503 | 0.80 | | | 2.01 | | | |
| 4 | 40504 | 1.43 | 0.22 | | 3.13 | 0.50 | | |
| 4 | 40505 | 2.27 | 1.74 | | 4.73 | 2.04 | | |
| 4 | 40506 | 3.95 | 3.85 | | 7.34 | 4.58 | | |
| 4 | 40507 | 12.22 | 6.09 | | 14.55 | 8.22 | | |

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|---|---|---|---|---|---|---|---|---|
| 4 | 40508 | 6.05 | 3.48 | | 7.32 | 5.24 | | |
| 4 | 40509 | 3.15 | 1.43 | | 3.78 | 2.35 | | |
| 4 | 40510 | 1.79 | 0.21 | | 1.80 | 0.30 | | |
| 4 | 40511 | 0.89 | | | 1.32 | | | |
| 4 | 40512 | 0.52 | | | 1.60 | | | |
| 4 | 40513 | 0.58 | | | 2.68 | | | |
| 4 | 40514 | 1.42 | 1.04 | | 4.03 | 1.56 | | |
| 4 | 40515 | 2.67 | 3.31 | | 6.46 | 4.32 | | |
| 4 | 40516 | 10.53 | 5.10 | | 13.93 | 7.40 | | |
| 4 | 40517 | 4.55 | 1.83 | | 6.78 | 3.69 | | |
| 4 | 40518 | 2.03 | 0.09 | | 3.39 | 0.78 | | |
| 4 | 40519 | 0.85 | | | 1.58 | | | |
| 4 | 40520 | 0.50 | | | 1.26 | | | |
| 4 | 40521 | 0.26 | | | 1.41 | | | |
| 4 | 40522 | 0.05 | | | 2.00 | | | |
| 4 | 40523 | 0.48 | 0.14 | | 3.55 | 0.93 | | |
| 4 | 40524 | 1.46 | 2.21 | | 5.63 | 3.66 | | |
| 4 | 40525 | 8.39 | 3.60 | | 13.12 | 6.05 | | |
| 4 | 40526 | 2.75 | | | 6.28 | 1.87 | | |
| 4 | 40527 | 0.60 | | | 2.83 | | | |
| 4 | 40528 | 0.29 | | | 1.69 | | | |
| 4 | 40529 | 0.15 | | | 1.30 | | | |
| 4 | 40530 | 0.01 | | | 1.32 | | | |
| 4 | 40531 | | | | 1.67 | | | |
| 4 | 40532 | | | | 3.15 | 0.08 | | |
| 4 | 40533 | 0.38 | 0.44 | | 5.05 | 2.58 | | |
| 4 | 40534 | 6.22 | 1.24 | | 12.15 | 4.27 | | |
| 4 | 40535 | 0.51 | | | 5.84 | | | |
| 4 | 40536 | | | | 2.85 | | | |
| 4 | 40537 | | | | 1.81 | | | |
| 4 | 40538 | | | | 1.37 | | | |
| 4 | 40539 | | | | 1.28 | | | |
| 4 | 40540 | | | | 1.50 | | | |
| 4 | 40541 | | | | 2.27 | | | |
| 4 | 40542 | | | | 4.43 | 1.03 | | |
| 4 | 40543 | 2.61 | | | 11.23 | 1.35 | | |
| 4 | 40544 | | | | 5.23 | | | |
| 4 | 40545 | | | | 3.06 | | | |
| 4 | 40546 | | | | 2.01 | | | |
| 4 | 40547 | 0.02 | | | 1.48 | | | |
| 4 | 40548 | 0.02 | | | 1.26 | | | |
| 4 | 40549 | | | | 1.35 | | | |
| 4 | 40550 | | | | 1.94 | | | |
| 4 | 40551 | | | | 3.57 | | | |
| 4 | 40552 | 0.82 | | | 9.69 | | | |
| 4 | 40553 | 0.34 | | | 5.47 | | | |
| 4 | 40554 | 0.68 | | | 3.41 | | | |
| 4 | 40555 | 0.94 | | | 2.27 | | | |
| 4 | 40556 | 1.02 | | | 1.65 | | | |
| 4 | 40557 | 0.93 | | | 1.31 | | | |
| 4 | 40558 | 0.68 | | | 1.26 | | | |
| 4 | 40559 | 0.26 | | | 1.72 | | | |
| 4 | 40560 | | | | 3.11 | | | |
| 4 | 40561 | 14.14 | 3.65 | | 22.80 | 7.91 | | 8.76 |
| 4 | 40562 | 9.53 | 4.54 | | 19.03 | 8.20 | | |
| 4 | 40563 | 21.35 | 5.59 | | 30.68 | 10.14 | | |
| 4 | 40564 | 20.28 | 0.11 | | 29.79 | 4.69 | | |
| 4 | 40565 | 8.50 | 5.97 | | 16.73 | 9.32 | | |
| 4 | 40566 | 9.74 | 4.71 | | 17.74 | 8.92 | | |
| 4 | 40567 | 4.96 | 3.61 | | 12.53 | 7.76 | | |
| 4 | 40568 | 6.06 | 5.73 | | 13.28 | 9.03 | | |
| 4 | 40569 | 8.05 | 4.89 | | 16.09 | 6.43 | | 8.76 |
| 4 | 40570 | 3.64 | 1.01 | | 8.12 | 0.08 | | |
| 4 | 40571 | | | | 3.16 | | | |
| 4 | 40572 | 1.06 | 4.06 | | 8.97 | 6.37 | | |
| 4 | 40573 | 8.08 | 5.85 | | 14.49 | 6.71 | | |

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|---|---|---|---|---|---|---|---|---|
| 4 | 40574 | 8.12 | 5.75 | | 12.52 | 6.03 | | |
| 4 | 40575 | 8.49 | 4.37 | | 10.87 | 4.01 | | |
| 4 | 40576 | 7.68 | 3.92 | | 11.29 | 3.32 | | |
| 4 | 40577 | | | | 4.73 | | | |
| 4 | 40578 | | | | 5.76 | 0.77 | | |
| 4 | 40579 | | | | 7.62 | 2.43 | | |
| 4 | 40580 | | | | 6.21 | | | |
| 4 | 40581 | 21.41 | 8.23 | | 20.10 | 5.93 | | |
| 4 | 40582 | 21.68 | 8.54 | | 19.71 | 5.57 | | |
| 4 | 40583 | 24.56 | 7.12 | | 22.23 | 3.73 | | |
| 4 | 40584 | 25.87 | 6.68 | | 23.92 | 4.26 | | |
| 4 | 40585 | 12.09 | 5.63 | | 10.03 | 5.30 | | |
| 4 | 40586 | 10.82 | 4.29 | | 9.51 | 4.75 | | |
| 4 | 40587 | 9.93 | 3.69 | | 8.47 | 4.17 | | |
| 4 | 40588 | 11.35 | 4.98 | | 9.17 | 4.85 | | |
| 4 | 40589 | | 0.90 | | | 0.07 | | |
| 4 | 40590 | | 0.84 | | 0.70 | 0.26 | | |
| 4 | 40591 | 2.89 | 2.33 | | 3.69 | 0.52 | | |
| 4 | 40592 | 4.04 | 3.53 | | 1.80 | 1.98 | | |
| 4 | 40593 | 8.33 | 3.54 | | 9.86 | 3.83 | | |
| 4 | 40594 | 8.80 | 3.97 | | 10.44 | 3.94 | | |
| 4 | 40595 | 8.02 | 5.28 | | 11.18 | 5.52 | | |
| 4 | 40596 | 7.60 | 4.60 | | 10.13 | 4.95 | | |
| 4 | 40597 | 24.50 | 8.63 | | 31.37 | 9.08 | | |
| 4 | 40598 | 9.52 | 0.29 | | 17.75 | 3.54 | | |
| 4 | 40599 | 15.83 | 5.11 | | 23.59 | 8.64 | | |
| 4 | 40600 | 25.99 | 6.41 | | 32.98 | 7.48 | | |
| 4 | 40601 | 8.89 | 2.41 | | 7.94 | 3.34 | | |
| 4 | 40602 | 9.39 | 2.47 | | 8.42 | 3.56 | | |
| 4 | 40603 | 8.80 | 0.95 | | 7.70 | 2.16 | | |
| 4 | 40604 | 8.33 | 1.54 | | 7.61 | 2.63 | | |
| 4 | 40605 | 0.29 | | | 8.52 | | | |
| 4 | 40606 | 2.99 | 0.09 | | 10.87 | 4.74 | | |
| 4 | 40607 | 8.26 | 2.64 | | 16.31 | 7.18 | | |
| 4 | 40608 | 2.72 | | | 12.45 | 0.89 | | |
| 4 | 40609 | 8.97 | 0.85 | | 8.08 | 1.48 | | |
| 4 | 40610 | 9.23 | 2.25 | | 9.43 | 2.37 | | |
| 4 | 40611 | 8.50 | 2.37 | | 9.16 | 2.79 | | |
| 4 | 40612 | 8.48 | 1.44 | | 8.36 | 2.08 | | |
| 4 | 40613 | 3.38 | 4.24 | | 9.91 | 7.32 | | |
| 4 | 40614 | 1.79 | 1.63 | | 8.85 | 5.54 | | |
| 4 | 40615 | 0.14 | | | 6.45 | 3.38 | | |
| 4 | 40616 | 1.44 | 2.41 | | 7.35 | 5.21 | | |
| 4 | 40617 | 6.18 | 6.64 | | 11.87 | 8.20 | | |
| 4 | 40618 | 7.33 | 6.55 | | 12.85 | 7.62 | | |
| 4 | 40619 | 7.40 | 6.89 | | 14.61 | 8.81 | | |
| 4 | 40620 | 6.20 | 6.60 | | 12.92 | 8.98 | | |
| 4 | 40621 | | | | | | | |
| 4 | 40622 | 7.61 | 1.46 | | 2.63 | 1.01 | | |
| 4 | 40623 | 11.64 | 3.34 | | 7.37 | 5.12 | | |
| 4 | 40624 | | 12.16 | | | 5.59 | | |
| 4 | 40625 | 13.23 | 6.14 | | 9.93 | 5.23 | | |
| 4 | 40626 | 15.39 | 7.14 | | 10.71 | 5.37 | | |
| 4 | 40627 | 15.87 | 7.53 | | 11.97 | 5.63 | | |
| 4 | 40628 | 13.73 | 6.61 | | 10.77 | 5.55 | | |
| 4 | 40629 | 4.05 | 5.12 | | 8.83 | 6.67 | | |
| 4 | 40630 | 4.94 | 6.00 | | 10.27 | 7.68 | | |
| 4 | 40631 | 4.37 | 5.59 | | 10.34 | 7.93 | | |
| 4 | 40632 | 2.79 | 4.16 | | 8.10 | 6.27 | | |
| 4 | 40633 | 29.94 | 16.50 | | 26.44 | 14.70 | | |
| 4 | 40634 | 14.35 | 8.02 | | 13.91 | 9.56 | | 8.76 |
| 4 | 40635 | 19.75 | 8.91 | | 19.68 | 8.54 | | 8.76 |
| 4 | 40636 | 26.58 | 10.29 | | 26.37 | 10.42 | | |
| 4 | 40637 | 7.09 | 5.96 | | 11.30 | 6.64 | | |
| 4 | 40638 | 5.97 | 6.12 | | 10.72 | 7.23 | | |
| 4 | 40639 | 5.36 | 5.48 | | 9.53 | 6.46 | | |

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|---|---|---|---|---|---|---|---|---|
| 4 | 40640 | 6.59 | 5.28 | | 10.00 | 5.86 | | |
| 4 | 40641 | 12.97 | 5.56 | | 12.52 | 6.62 | | |
| 4 | 40642 | 11.96 | 4.99 | | 11.21 | 5.53 | | |
| 4 | 40643 | 14.50 | 6.63 | | 13.55 | 6.12 | | |
| 4 | 40644 | 15.92 | 7.27 | | 15.56 | 6.73 | | 8.76 |
| 4 | 40645 | 17.38 | 8.42 | | 14.63 | 6.15 | | |
| 4 | 40646 | 19.27 | 8.81 | | 17.10 | 6.13 | | |
| 4 | 40647 | 18.25 | 8.06 | | 16.98 | 6.38 | | 8.76 |
| 4 | 40648 | 16.22 | 7.56 | | 14.59 | 6.23 | | 8.76 |
| 4 | 40649 | 9.43 | 0.58 | | 7.73 | 0.95 | | |
| 4 | 40650 | 8.29 | 1.54 | | 5.94 | 0.88 | | |
| 4 | 40651 | 6.69 | 2.92 | | 7.09 | 1.71 | | |
| 4 | 40652 | 8.95 | 2.49 | | 8.97 | 2.07 | | |
| 4 | 40653 | 9.89 | 0.06 | | 6.41 | 1.03 | | |
| 4 | 40654 | 9.22 | 0.28 | | 7.31 | 1.66 | | |
| 4 | 40655 | 9.93 | 2.48 | | 8.82 | 3.84 | | |
| 4 | 40656 | 10.03 | 2.34 | | 8.03 | 4.32 | | |
| 4 | 40657 | 12.22 | 5.53 | | 10.84 | 5.46 | | |
| 4 | 40658 | 13.37 | 6.46 | | 11.11 | 5.65 | | |
| 4 | 40659 | 15.63 | 7.66 | | 12.81 | 6.02 | | |
| 4 | 40660 | 14.55 | 6.92 | | 12.87 | 6.07 | | |
| 4 | 40661 | 26.96 | 7.21 | | 25.52 | 6.10 | | |
| 4 | 40662 | 27.05 | 8.53 | | 26.45 | 8.35 | | |
| 4 | 40663 | 22.45 | 8.14 | | 22.12 | 6.85 | | |
| 4 | 40664 | 8.06 | 0.98 | | 7.52 | 2.02 | | |
| 4 | 40665 | 8.63 | 0.36 | | 7.83 | 1.56 | | |
| 4 | 40666 | 8.21 | 0.95 | | 7.85 | 1.82 | | |
| 4 | 40667 | 26.73 | 5.17 | | 33.36 | 6.49 | | |
| 4 | 40668 | 19.22 | 3.97 | | 27.00 | 7.41 | | |
| 4 | 40669 | 24.76 | 2.74 | | 32.00 | 5.27 | | |
| 4 | 40670 | 14.39 | 6.45 | | 4.37 | | | |
| 4 | 40671 | 14.36 | 6.43 | | 4.36 | | | |
| 4 | 40672 | 14.27 | 6.23 | | 4.01 | | | |
| 4 | 40673 | 13.63 | 5.65 | | 3.82 | | | |
| 4 | 40674 | 11.29 | 4.56 | | 4.09 | | | |
| 4 | 40675 | 3.15 | 1.86 | | 5.34 | | | |
| 4 | 40676 | 6.86 | 3.08 | | 4.64 | | | |
| 4 | 40677 | 15.27 | 6.44 | | 4.15 | | | |
| 4 | 40678 | 10.62 | 2.82 | | 0.96 | | | |
| 4 | 40679 | 9.98 | 2.25 | | 0.77 | | | 8.76 |
| 4 | 40680 | 9.10 | 1.26 | | 0.63 | | | 8.76 |
| 4 | 40681 | 7.17 | | | 0.70 | | | 8.76 |
| 4 | 40682 | 3.80 | | | 2.29 | | | 8.76 |
| 4 | 40683 | | | | 7.08 | | | |
| 4 | 40684 | 2.89 | | | 4.53 | | | |
| 4 | 40685 | 10.00 | 2.17 | | 0.25 | | | 8.76 |
| 4 | 40686 | 6.23 | | | | | | |
| 4 | 40687 | 3.01 | | | | 0.47 | | |
| 4 | 40688 | 1.54 | | | | | | |
| 4 | 40689 | 1.03 | | | | | | |
| 4 | 40690 | 0.74 | | | | | | |
| 4 | 40691 | 0.51 | | | | | | |
| 4 | 40692 | 0.39 | | | | | | |
| 4 | 40693 | 0.70 | | | | | | |
| 4 | 40694 | 2.11 | | | | 0.33 | | |
| 4 | 40695 | 5.86 | | | | | | |
| 4 | 40696 | 2.80 | | | | 0.69 | | |
| 4 | 40697 | 1.47 | | | | | | |
| 4 | 40698 | 1.02 | | | | | | |
| 4 | 40699 | 0.77 | | | | | | |
| 4 | 40700 | 0.55 | | | | | | |
| 4 | 40701 | 0.39 | | | | | | |
| 4 | 40702 | 0.64 | | | | 0.06 | | |
| 4 | 40703 | 1.97 | | | | 0.81 | | |
| 4 | 40704 | 4.93 | | | 0.16 | 0.75 | | |
| 4 | 40705 | 2.19 | | | 0.40 | 1.58 | | |

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| 4 | 40706 | 1.19 | | | 0.52 | 0.25 | | |
| 4 | 40707 | 0.89 | | | 0.11 | | | |
| 4 | 40708 | 0.71 | | | 0.07 | | | |
| 4 | 40709 | 0.50 | | | 0.04 | | | |
| 4 | 40710 | 0.32 | | | 0.04 | | | |
| 4 | 40711 | 0.37 | | | 0.35 | 0.62 | | |
| 4 | 40712 | 1.50 | | | 0.07 | 1.88 | | |
| 4 | 40713 | 3.31 | | | 1.94 | 1.56 | | 8.76 |
| 4 | 40714 | 1.14 | | | 2.42 | 1.85 | | |
| 4 | 40715 | 0.72 | | | 1.83 | 0.39 | | |
| 4 | 40716 | 0.62 | | | 0.88 | | | |
| 4 | 40717 | 0.52 | | | 0.52 | | | |
| 4 | 40718 | 0.37 | | | 0.40 | | | |
| 4 | 40719 | 0.18 | | | 0.51 | | | |
| 4 | 40720 | 0.07 | | | 1.36 | 0.30 | | |
| 4 | 40721 | 0.77 | | | 1.78 | 2.04 | | |
| 4 | 40722 | 0.77 | | | 4.77 | 1.15 | | 8.76 |
| 4 | 40723 | | | | 4.07 | 0.52 | | |
| 4 | 40724 | 0.02 | | | 2.46 | | | |
| 4 | 40725 | 0.16 | | | 1.37 | | | |
| 4 | 40726 | 0.25 | | | 0.97 | | | |
| 4 | 40727 | 0.22 | | | 0.72 | | | |
| 4 | 40728 | 0.06 | | | 0.78 | | | |
| 4 | 40729 | | | | 1.51 | | | |
| 4 | 40730 | | | | 3.08 | 0.38 | | |
| 4 | 40731 | | | | 6.34 | | | |
| 4 | 40732 | | | | 4.20 | | | |
| 4 | 40733 | 0.45 | | | 2.58 | | | |
| 4 | 40734 | 0.98 | | | 1.72 | | | |
| 4 | 40735 | 1.26 | | | 1.26 | | | |
| 4 | 40736 | 1.21 | | | 0.94 | | | |
| 4 | 40737 | 0.87 | | | 0.80 | | | |
| 4 | 40738 | 0.32 | | | 1.28 | | | |
| 4 | 40739 | | | | 2.71 | | | |
| 4 | 40740 | 0.32 | | | 5.58 | | | 8.76 |
| 4 | 40741 | | | | 3.79 | | | |
| 4 | 40742 | | | | 2.28 | | | |
| 4 | 40743 | | | | 1.58 | | | |
| 4 | 40744 | | | | 1.23 | | | |
| 4 | 40745 | | | | 0.95 | | | |
| 4 | 40746 | | | | 0.77 | | | |
| 4 | 40747 | | | | 1.16 | | | |
| 4 | 40748 | | | | 2.43 | | | |
| 4 | 40749 | 5.23 | | | | 0.18 | | |
| 4 | 40750 | 2.21 | | | | 0.45 | | |
| 4 | 40751 | 1.03 | | | | | | |
| 4 | 40752 | 0.63 | | | | | | |
| 4 | 40753 | 0.41 | | | 0.07 | | | |
| 4 | 40754 | 0.24 | | | 0.01 | | | |
| 4 | 40755 | 0.14 | | | | | | |
| 4 | 40756 | 0.33 | | | | | | |
| 4 | 40757 | 1.49 | | | | 0.54 | | |
| 4 | 40758 | 3.99 | | | | 0.47 | | |
| 4 | 40759 | 5.75 | | | | 0.01 | | |
| 4 | 40760 | 7.86 | 1.32 | | | | | |
| 4 | 40761 | 10.55 | 3.22 | | 0.65 | | | 8.76 |
| 4 | 40762 | 13.65 | 5.21 | | 3.02 | | | |
| 4 | 40763 | 16.88 | 7.02 | | 5.57 | | | |
| 4 | 40764 | 3.80 | | | | 0.83 | | |
| 4 | 40765 | 5.47 | | | | 0.30 | | |
| 4 | 40766 | 7.74 | 0.93 | | | | | |
| 4 | 40767 | 10.44 | 2.71 | | 0.53 | | | |
| 4 | 40768 | 13.51 | 4.78 | | 2.81 | | | |
| 4 | 40769 | 17.20 | 6.77 | | 5.74 | | | |
| 4 | 40770 | 3.12 | | | | 1.79 | | |
| 4 | 40771 | 4.58 | | | | 1.03 | | |

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|---|---|---|---|---|---|---|---|---|
| 4 | 40772 | 6.76 | | | | | | 8.76 |
| 4 | 40773 | 9.69 | 1.60 | | 0.17 | | | 8.76 |
| 4 | 40774 | 12.90 | 3.88 | | 2.45 | | | 8.76 |
| 4 | 40775 | 16.86 | 6.42 | | 5.40 | | | |
| 4 | 40776 | 1.94 | | | 1.62 | 2.45 | | |
| 4 | 40777 | 3.13 | | | 1.34 | 1.97 | | 8.76 |
| 4 | 40778 | 4.84 | | | 0.99 | 0.71 | | 8.76 |
| 4 | 40779 | 7.55 | | | 0.21 | | | 8.76 |
| 4 | 40780 | 11.02 | 2.05 | | 1.93 | | | 8.76 |
| 4 | 40781 | 16.35 | 6.62 | | 4.94 | | | |
| 4 | 40782 | 0.20 | | | 3.80 | 1.06 | | |
| 4 | 40783 | 0.95 | | | 4.05 | 1.42 | | 8.76 |
| 4 | 40784 | 2.27 | | | 3.83 | 0.94 | | 8.76 |
| 4 | 40785 | 4.26 | | | 2.54 | | | 8.76 |
| 4 | 40786 | 7.34 | | | 1.85 | | | |
| 4 | 40787 | 13.67 | 6.20 | | 4.79 | | | |
| 4 | 40788 | | | | 4.27 | | | |
| 4 | 40789 | | | | 5.38 | | | |
| 4 | 40790 | | | | 6.37 | | | |
| 4 | 40791 | 0.02 | | | 6.87 | | | |
| 4 | 40792 | 1.40 | | | 6.21 | | | |
| 4 | 40793 | 3.50 | 3.47 | | 5.27 | | | |
| 4 | 40794 | | | | 3.37 | | | |
| 4 | 40795 | 0.18 | | | 3.57 | | | |
| 4 | 40796 | 0.80 | | | 3.55 | | | 8.76 |
| 4 | 40797 | 1.73 | | | 2.88 | | | 8.76 |
| 4 | 40798 | 3.17 | | | 2.78 | | | |
| 4 | 40799 | 6.79 | 4.07 | | 3.72 | | | |
| 4 | 40800 | 3.02 | | | | 1.12 | | |
| 4 | 40801 | 4.34 | | | | 0.75 | | |
| 4 | 40802 | 6.39 | | | | | | |
| 4 | 40803 | 8.97 | 2.21 | | | | | 8.76 |
| 4 | 40804 | 12.39 | 4.96 | | 1.67 | | | |
| 4 | 40805 | 16.54 | 7.68 | | 4.51 | | | |
| 5 | 50001 | | 1.75 | | | 1.80 | | |
| 5 | 50002 | 2.09 | 0.38 | | 2.13 | 0.40 | | |
| 5 | 50003 | 2.74 | 0.16 | | 2.72 | 0.16 | | |
| 5 | 50004 | 3.30 | 0.58 | | 3.26 | 0.57 | | |
| 5 | 50005 | 3.29 | 0.54 | | 3.36 | 0.61 | | |
| 5 | 50006 | | | | | | | |
| 5 | 50007 | | | | | | | |
| 5 | 50008 | | 0.51 | | | 0.53 | | |
| 5 | 50009 | | 0.31 | | | 0.33 | | |
| 5 | 50010 | 0.04 | 0.86 | | 0.03 | 0.86 | | |
| 5 | 50011 | 0.77 | 0.76 | | 0.77 | 0.76 | | |
| 5 | 50012 | 1.33 | 0.67 | | 1.33 | 0.67 | | |
| 5 | 50013 | 1.83 | 0.60 | | 1.83 | 0.59 | | |
| 5 | 50014 | 2.28 | 0.52 | | 2.28 | 0.52 | | |
| 5 | 50015 | 2.67 | 0.45 | | 2.67 | 0.45 | | |
| 5 | 50016 | 3.00 | 0.39 | | 3.01 | 0.39 | | |
| 5 | 50017 | 3.29 | 0.33 | | 3.29 | 0.33 | | |
| 5 | 50018 | 3.53 | 0.28 | | 3.53 | 0.28 | | |
| 5 | 50019 | 3.72 | 0.23 | | 3.73 | 0.23 | | |
| 5 | 50020 | 3.88 | 0.17 | | 3.88 | 0.19 | | |
| 5 | 50021 | 3.99 | 0.13 | | 3.99 | 0.15 | | |
| 5 | 50022 | 4.06 | 0.08 | | 4.07 | 0.10 | | |
| 5 | 50023 | 4.10 | 0.04 | | 4.10 | 0.06 | | |
| 5 | 50024 | 4.07 | | | 4.08 | 0.02 | | |
| 5 | 50025 | 4.05 | 0.02 | | 4.06 | | | |
| 5 | 50026 | 4.07 | 0.06 | | 4.08 | 0.04 | | |
| 5 | 50027 | 4.05 | 0.10 | | 4.05 | 0.08 | | |
| 5 | 50028 | 3.98 | 0.16 | | 3.98 | 0.13 | | |
| 5 | 50029 | 3.86 | 0.22 | | 3.86 | 0.19 | | |
| 5 | 50030 | 3.69 | 0.28 | | 3.68 | 0.25 | | |
| 5 | 50031 | 3.49 | 0.36 | | 3.46 | 0.33 | | |
| 5 | 50032 | 3.23 | 0.44 | | 3.21 | 0.43 | | |

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|---|---|---|---|---|---|---|---|---|
| 5 | 50033 | 2.91 | 0.56 | | 2.88 | 0.54 | | |
| 5 | 50034 | 2.54 | 0.62 | | 2.51 | 0.61 | | |
| 5 | 50035 | 1.90 | 1.24 | | 1.91 | 1.24 | | |
| 5 | 50036 | 0.42 | 1.72 | | 0.44 | 1.76 | | |
| 5 | 50037 | | 2.79 | | | 2.87 | | |
| 5 | 50038 | | | | | | | |
| 5 | 50039 | 0.01 | | | 0.03 | | | |
| 5 | 50040 | 0.62 | 1.01 | | 0.63 | 1.04 | | |
| 5 | 50041 | 0.69 | 0.53 | | 0.71 | 0.56 | | |
| 5 | 50042 | 1.04 | 0.49 | | 1.05 | 0.51 | | |
| 5 | 50043 | 1.40 | 0.41 | | 1.41 | 0.42 | | |
| 5 | 50044 | 1.71 | 0.33 | | 1.72 | 0.36 | | |
| 5 | 50045 | 1.96 | 0.27 | | 1.97 | 0.29 | | |
| 5 | 50046 | 2.18 | 0.22 | | 2.19 | 0.25 | | |
| 5 | 50047 | 2.35 | 0.17 | | 2.36 | 0.19 | | |
| 5 | 50048 | 2.47 | 0.12 | | 2.48 | 0.15 | | |
| 5 | 50049 | 2.56 | 0.09 | | 2.57 | 0.11 | | |
| 5 | 50050 | 2.61 | 0.05 | | 2.62 | 0.08 | | |
| 5 | 50051 | 2.61 | 0.01 | | 2.63 | 0.04 | | |
| 5 | 50052 | 2.62 | | | 2.62 | 0.01 | | |
| 5 | 50053 | 2.65 | 0.02 | | 2.63 | 0.01 | | |
| 5 | 50054 | 2.66 | 0.04 | | 2.65 | 0.03 | | |
| 5 | 50055 | 2.62 | 0.09 | | 2.61 | 0.08 | | |
| 5 | 50056 | 2.54 | 0.13 | | 2.53 | 0.12 | | |
| 5 | 50057 | 2.43 | 0.18 | | 2.42 | 0.17 | | |
| 5 | 50058 | 2.27 | 0.24 | | 2.26 | 0.22 | | |
| 5 | 50059 | 2.06 | 0.29 | | 2.06 | 0.28 | | |
| 5 | 50060 | 1.80 | 0.35 | | 1.81 | 0.34 | | |
| 5 | 50061 | 1.49 | 0.42 | | 1.49 | 0.41 | | |
| 5 | 50062 | 1.14 | 0.49 | | 1.15 | 0.49 | | |
| 5 | 50063 | 0.73 | 0.57 | | 0.73 | 0.57 | | |
| 5 | 50064 | 0.25 | 0.66 | | 0.26 | 0.65 | | |
| 5 | 50065 | | 0.44 | | | 0.44 | | |
| 5 | 50066 | | 0.07 | | | 0.07 | | |
| 5 | 50067 | | 0.26 | | | 0.26 | | |
| 5 | 50068 | | | | | | | |
| 5 | 50069 | | | | | | | |
| 5 | 50070 | 1.36 | 0.53 | | 1.40 | 0.59 | | |
| 5 | 50071 | | | | | | | |
| 5 | 50072 | 1.85 | 0.60 | | 2.07 | | | |
| 5 | 50073 | 2.32 | 0.74 | | 1.87 | 0.02 | | |
| 5 | 50074 | 2.40 | 0.31 | | 1.75 | 0.09 | | |
| 5 | 50075 | 2.12 | 0.11 | | 1.79 | 0.04 | | |
| 5 | 50076 | 1.88 | 0.05 | | 1.90 | 0.14 | | |
| 5 | 50077 | 1.74 | 0.05 | | 1.85 | 0.13 | | |
| 6 | 60001 | 17.20 | 3.91 | | 17.12 | 4.76 | | |
| 6 | 60002 | 16.86 | 3.70 | | 17.24 | 4.49 | | |
| 6 | 60003 | 16.49 | 3.27 | | 16.96 | 4.22 | | 8.76 |
| 6 | 60004 | 16.14 | 2.87 | | 16.60 | 3.89 | | 8.76 |
| 6 | 60005 | 15.67 | 2.40 | | 16.15 | 3.48 | | 8.76 |
| 6 | 60006 | 15.14 | 1.86 | | 15.67 | 2.96 | | 8.76 |
| 6 | 60007 | 14.64 | 1.55 | | 15.14 | 2.35 | | 8.76 |
| 6 | 60008 | 15.56 | 2.25 | | 15.70 | 2.53 | | 8.76 |
| 6 | 60009 | 16.64 | 2.97 | | 16.67 | 3.14 | | 8.76 |
| 6 | 60010 | 17.79 | 3.73 | | 17.68 | 3.87 | | 8.76 |
| 6 | 60011 | 19.01 | 4.52 | | 18.78 | 4.84 | | 8.76 |
| 6 | 60012 | 20.33 | 5.35 | | 19.92 | 5.91 | | 8.76 |
| 6 | 60013 | 21.57 | 6.08 | | 20.98 | 6.95 | | 8.76 |
| 6 | 60014 | 22.68 | 6.69 | | 21.87 | 7.96 | | 8.76 |
| 6 | 60015 | 23.57 | 7.15 | | 22.53 | 8.84 | | 8.76 |
| 6 | 60016 | 24.08 | 7.40 | | 22.76 | 9.53 | | |
| 6 | 60017 | 24.18 | 7.43 | | 22.27 | 10.00 | | |
| 6 | 60018 | 24.57 | 7.04 | | 20.01 | 10.01 | | |
| 6 | 60019 | 15.21 | 4.13 | | 15.65 | 5.67 | | 8.76 |
| 6 | 60020 | 12.52 | 5.11 | | 13.37 | 5.96 | | |
| 6 | 60021 | 10.27 | 5.60 | | 11.05 | 6.23 | | |

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|---|---|---|---|---|---|---|---|---|
| 6 | 60022 | 8.45 | 5.89 | | 9.33 | 6.28 | | |
| 6 | 60023 | 7.13 | 5.89 | | 8.08 | 6.08 | | |
| 6 | 60024 | 6.43 | 5.60 | | 7.28 | 5.62 | | |
| 6 | 60025 | 6.39 | 5.01 | | 7.12 | 4.89 | | |
| 6 | 60026 | 7.08 | 4.14 | | 7.57 | 4.11 | | |
| 6 | 60027 | 8.48 | 3.04 | | 9.03 | 3.39 | | |
| 6 | 60028 | 14.88 | 4.06 | | 15.48 | 5.38 | | 8.76 |
| 6 | 60029 | 12.21 | 4.89 | | 13.06 | 5.75 | | |
| 6 | 60030 | 10.12 | 5.50 | | 10.95 | 6.09 | | |
| 6 | 60031 | 8.36 | 5.87 | | 9.26 | 6.23 | | |
| 6 | 60032 | 7.17 | 5.98 | | 8.17 | 6.14 | | |
| 6 | 60033 | 6.58 | 5.79 | | 7.43 | 5.78 | | |
| 6 | 60034 | 6.63 | 5.31 | | 7.36 | 5.15 | | |
| 6 | 60035 | 7.47 | 4.52 | | 7.89 | 4.46 | | |
| 6 | 60036 | 8.86 | 3.49 | | 9.02 | 3.63 | | |
| 6 | 60037 | 14.50 | 3.78 | | 15.20 | 5.00 | | 8.76 |
| 6 | 60038 | 11.94 | 4.65 | | 12.83 | 5.52 | | |
| 6 | 60039 | 9.86 | 5.35 | | 10.74 | 5.91 | | |
| 6 | 60040 | 8.24 | 5.83 | | 9.32 | 6.17 | | |
| 6 | 60041 | 7.15 | 6.06 | | 8.21 | 6.20 | | |
| 6 | 60042 | 6.69 | 6.00 | | 7.63 | 5.95 | | |
| 6 | 60043 | 6.92 | 5.63 | | 7.59 | 5.43 | | |
| 6 | 60044 | 7.88 | 4.96 | | 8.22 | 4.79 | | |
| 6 | 60045 | 9.37 | 4.00 | | 9.51 | 4.04 | | |
| 6 | 60046 | 14.08 | 3.45 | | 14.84 | 4.59 | | 8.76 |
| 6 | 60047 | 11.61 | 4.35 | | 12.54 | 5.22 | | |
| 6 | 60048 | 9.56 | 5.16 | | 10.54 | 5.72 | | |
| 6 | 60049 | 8.04 | 5.77 | | 9.20 | 6.09 | | |
| 6 | 60050 | 7.08 | 6.14 | | 8.21 | 6.25 | | |
| 6 | 60051 | 6.74 | 6.22 | | 7.65 | 6.14 | | |
| 6 | 60052 | 7.18 | 6.00 | | 7.80 | 5.75 | | |
| 6 | 60053 | 8.28 | 5.45 | | 8.61 | 5.17 | | |
| 6 | 60054 | 9.89 | 4.59 | | 10.04 | 4.51 | | |
| 6 | 60055 | 13.59 | 3.03 | | 14.39 | 4.12 | | 8.76 |
| 6 | 60056 | 11.18 | 4.00 | | 12.16 | 4.84 | | |
| 6 | 60057 | 9.22 | 4.93 | | 10.27 | 5.47 | | |
| 6 | 60058 | 7.77 | 5.69 | | 9.01 | 5.98 | | |
| 6 | 60059 | 6.96 | 6.21 | | 8.11 | 6.29 | | |
| 6 | 60060 | 6.75 | 6.46 | | 7.78 | 6.33 | | |
| 6 | 60061 | 7.39 | 6.39 | | 7.95 | 6.09 | | |
| 6 | 60062 | 8.65 | 6.00 | | 9.01 | 5.58 | | |
| 6 | 60063 | 10.41 | 5.27 | | 10.59 | 5.03 | | |
| 6 | 60064 | 13.03 | 2.55 | | 13.88 | 3.59 | | 8.76 |
| 6 | 60065 | 10.65 | 3.60 | | 11.66 | 4.39 | | |
| 6 | 60066 | 8.73 | 4.66 | | 10.06 | 5.17 | | |
| 6 | 60067 | 7.41 | 5.58 | | 8.70 | 5.84 | | |
| 6 | 60068 | 6.72 | 6.27 | | 7.90 | 6.31 | | |
| 6 | 60069 | 6.76 | 6.69 | | 7.70 | 6.53 | | |
| 6 | 60070 | 7.53 | 6.81 | | 8.09 | 6.46 | | |
| 6 | 60071 | 8.96 | 6.60 | | 9.37 | 6.09 | | |
| 6 | 60072 | 10.91 | 6.02 | | 11.14 | 5.61 | | |
| 6 | 60073 | 13.00 | 2.58 | | 13.29 | 2.98 | | |
| 6 | 60074 | 10.99 | 3.47 | | 11.09 | 3.87 | | |
| 6 | 60075 | 8.88 | 4.34 | | 9.50 | 4.81 | | |
| 6 | 60076 | 7.06 | 5.42 | | 8.21 | 5.65 | | |
| 6 | 60077 | 6.40 | 6.29 | | 7.53 | 6.31 | | |
| 6 | 60078 | 6.60 | 6.90 | | 7.48 | 6.72 | | |
| 6 | 60079 | 7.56 | 7.22 | | 8.23 | 6.83 | | |
| 6 | 60080 | 9.18 | 7.21 | | 9.65 | 6.65 | | |
| 6 | 60081 | 11.33 | 6.82 | | 11.67 | 6.25 | | |
| 6 | 60082 | 13.93 | 3.31 | | 13.71 | 3.36 | | |
| 6 | 60083 | 11.68 | 4.15 | | 11.27 | 4.09 | | |
| 6 | 60084 | 9.35 | 4.48 | | 8.98 | 4.39 | | |
| 6 | 60085 | 7.31 | 5.23 | | 7.51 | 5.42 | | |
| 6 | 60086 | 5.99 | 6.26 | | 6.94 | 6.27 | | |
| 6 | 60087 | 6.27 | 7.06 | | 7.06 | 6.86 | | |

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|---|---|---|---|---|---|---|---|---|
| 6 | 60088 | 7.45 | 7.59 | | 8.01 | 7.18 | | |
| 6 | 60089 | 9.28 | 7.81 | | 9.77 | 7.21 | | |
| 6 | 60090 | 11.67 | 7.63 | | 12.07 | 6.93 | | |
| 6 | 60091 | 14.92 | 4.06 | | 14.49 | 4.00 | | |
| 6 | 60092 | 12.31 | 4.80 | | 11.76 | 4.63 | | |
| 6 | 60093 | 9.70 | 4.92 | | 9.15 | 4.69 | | |
| 6 | 60094 | 7.44 | 4.99 | | 6.93 | 5.14 | | |
| 6 | 60095 | 5.68 | 6.16 | | 6.17 | 6.15 | | |
| 6 | 60096 | 5.88 | 7.11 | | 6.52 | 6.92 | | |
| 6 | 60097 | 7.22 | 7.83 | | 7.75 | 7.43 | | |
| 6 | 60098 | 9.23 | 8.28 | | 9.74 | 7.67 | | |
| 6 | 60099 | 11.86 | 8.35 | | 12.32 | 7.62 | | |
| 6 | 60100 | 15.81 | 4.82 | | 15.22 | 4.63 | | |
| 6 | 60101 | 12.82 | 5.40 | | 12.10 | 5.12 | | |
| 6 | 60102 | 9.91 | 5.26 | | 9.15 | 4.93 | | |
| 6 | 60103 | 7.44 | 4.70 | | 6.64 | 4.81 | | |
| 6 | 60104 | 5.55 | 5.97 | | 5.21 | 5.95 | | |
| 6 | 60105 | 5.46 | 7.02 | | 5.89 | 6.86 | | |
| 6 | 60106 | 6.89 | 7.91 | | 7.41 | 7.53 | | |
| 6 | 60107 | 9.04 | 8.60 | | 9.50 | 7.97 | | |
| 6 | 60108 | 11.92 | 8.95 | | 12.35 | 8.17 | | |
| 6 | 60109 | 16.66 | 5.60 | | 15.89 | 5.27 | | |
| 6 | 60110 | 13.20 | 5.94 | | 12.27 | 5.52 | | |
| 6 | 60111 | 9.94 | 5.43 | | 8.89 | 5.01 | | |
| 6 | 60112 | 7.30 | 4.42 | | 6.09 | 4.38 | | |
| 6 | 60113 | 5.35 | 5.63 | | 4.19 | 5.60 | | |
| 6 | 60114 | 5.16 | 6.73 | | 5.08 | 6.61 | | |
| 6 | 60115 | 6.52 | 7.75 | | 6.73 | 7.43 | | |
| 6 | 60116 | 8.79 | 8.71 | | 9.01 | 8.07 | | |
| 6 | 60117 | 11.88 | 9.40 | | 12.09 | 8.54 | | |
| 6 | 60118 | 17.44 | 6.34 | | 16.44 | 5.87 | | |
| 6 | 60119 | 13.35 | 6.32 | | 12.14 | 5.74 | | |
| 6 | 60120 | 9.75 | 5.33 | | 8.31 | 4.81 | | |
| 6 | 60121 | 7.02 | 4.11 | | 5.25 | 3.81 | | |
| 6 | 60122 | 5.09 | 5.09 | | 3.02 | 5.06 | | |
| 6 | 60123 | 4.93 | 6.18 | | 4.05 | 6.10 | | |
| 6 | 60124 | 6.13 | 7.28 | | 5.75 | 7.03 | | |
| 6 | 60125 | 8.43 | 8.47 | | 8.19 | 7.89 | | |
| 6 | 60126 | 11.67 | 9.63 | | 11.46 | 8.63 | | |
| 6 | 60127 | 17.99 | 6.95 | | 16.73 | 6.50 | | |
| 6 | 60128 | 13.23 | 6.44 | | 11.69 | 5.67 | | |
| 6 | 60129 | 9.37 | 4.95 | | 7.42 | 4.28 | | |
| 6 | 60130 | 6.65 | 3.53 | | 4.21 | 3.15 | | |
| 6 | 60131 | 4.83 | 4.40 | | 2.07 | 4.33 | | |
| 6 | 60132 | 4.82 | 5.41 | | 3.11 | 5.35 | | |
| 6 | 60133 | 5.97 | 6.54 | | 4.74 | 6.32 | | |
| 6 | 60134 | 8.04 | 7.92 | | 7.13 | 7.33 | | |
| 6 | 60135 | 11.29 | 9.51 | | 10.47 | 8.36 | | |
| 6 | 60136 | 18.25 | 7.32 | | 16.68 | 6.89 | | |
| 6 | 60137 | 12.84 | 6.27 | | 10.82 | 5.32 | | |
| 6 | 60138 | 8.86 | 4.29 | | 6.22 | 3.42 | | |
| 6 | 60139 | 6.26 | 2.81 | | 3.01 | 2.34 | | |
| 6 | 60140 | 4.61 | 3.51 | | 1.37 | 3.42 | | |
| 6 | 60141 | 4.85 | 4.45 | | 2.38 | 4.35 | | |
| 6 | 60142 | 5.93 | 5.56 | | 3.83 | 5.31 | | |
| 6 | 60143 | 7.73 | 7.04 | | 5.96 | 6.41 | | |
| 6 | 60144 | 10.96 | 8.97 | | 9.22 | 7.70 | | |
| 6 | 60145 | 18.18 | 7.42 | | 16.24 | 7.08 | | |
| 6 | 60146 | 12.29 | 5.72 | | 9.56 | 4.75 | | |
| 6 | 60147 | 8.32 | 3.48 | | 4.79 | 2.46 | | |
| 6 | 60148 | 5.91 | 1.85 | | 1.76 | 1.42 | | |
| 6 | 60149 | 4.27 | 2.49 | | 0.94 | 2.35 | | |
| 6 | 60150 | 4.59 | 3.37 | | 1.86 | 3.18 | | |
| 6 | 60151 | 5.95 | 4.51 | | 3.06 | 4.07 | | |
| 6 | 60152 | 7.61 | 5.98 | | 4.81 | 5.18 | | |
| 6 | 60153 | 10.78 | 8.07 | | 7.68 | 6.63 | | |

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|---|---|---|---|---|---|---|---|---|
| 6 | 60154 | 17.83 | 7.16 | | 15.25 | 6.86 | | |
| 6 | 60155 | 11.71 | 4.68 | | 7.87 | 3.86 | | |
| 6 | 60156 | 7.90 | 2.46 | | 3.22 | 1.32 | | |
| 6 | 60157 | 5.73 | 0.82 | | 0.75 | 0.61 | | |
| 6 | 60158 | 4.12 | 1.34 | | 0.71 | 1.25 | | |
| 6 | 60159 | 4.51 | 2.23 | | 1.50 | 1.88 | | |
| 6 | 60160 | 5.70 | 3.34 | | 2.43 | 2.66 | | |
| 6 | 60161 | 7.90 | 4.84 | | 3.76 | 3.64 | | |
| 6 | 60162 | 10.94 | 6.92 | | 5.91 | 5.15 | | |
| 6 | 60163 | 17.39 | 6.35 | | 13.59 | 6.20 | | |
| 6 | 60164 | 11.30 | 3.61 | | 5.86 | 2.52 | | |
| 6 | 60165 | 7.70 | 1.32 | | 1.62 | 0.04 | | |
| 6 | 60166 | 4.89 | 0.10 | | | | | |
| 6 | 60167 | 3.97 | 0.13 | | 0.58 | 0.27 | | |
| 6 | 60168 | 4.08 | 1.08 | | 1.30 | 0.79 | | |
| 6 | 60169 | 5.59 | 2.21 | | 1.97 | 1.30 | | |
| 6 | 60170 | 7.83 | 3.73 | | 2.80 | 2.11 | | |
| 6 | 60171 | 11.37 | 5.82 | | 4.16 | 3.35 | | |
| 6 | 60172 | 17.24 | 5.14 | | 10.94 | 4.43 | | |
| 6 | 60173 | 11.41 | 2.49 | | 3.64 | 0.55 | | |
| 6 | 60174 | 7.27 | 0.32 | | | | | |
| 6 | 60175 | 4.69 | | | | | | |
| 6 | 60176 | 3.85 | | | | | | |
| 6 | 60177 | 3.64 | | | 1.14 | | | |
| 6 | 60178 | 4.99 | 1.15 | | 1.82 | 0.39 | | |
| 6 | 60179 | 7.36 | 2.71 | | 2.31 | 0.92 | | |
| 6 | 60180 | 11.77 | 4.81 | | 2.89 | 1.60 | | |
| 6 | 60181 | 10.04 | 2.30 | | 10.74 | 3.59 | | |
| 6 | 60182 | 10.93 | 2.11 | | 11.54 | 3.47 | | |
| 6 | 60183 | 11.84 | 1.93 | | 12.35 | 3.30 | | |
| 6 | 60184 | 12.76 | 1.74 | | 13.17 | 3.07 | | 8.76 |
| 6 | 60185 | 13.70 | 1.55 | | 13.99 | 2.75 | | 8.76 |
| 6 | 60186 | 14.68 | 1.40 | | 14.76 | 2.32 | | |
| 6 | 60187 | 10.01 | 2.70 | | 10.43 | 3.10 | | |
| 6 | 60188 | 10.71 | 2.29 | | 11.20 | 2.97 | | |
| 6 | 60189 | 11.49 | 1.88 | | 11.98 | 2.80 | | |
| 6 | 60190 | 12.39 | 1.48 | | 12.76 | 2.56 | | 8.76 |
| 6 | 60191 | 13.30 | 1.14 | | 13.54 | 2.43 | | 8.76 |
| 6 | 60192 | 14.25 | 1.00 | | 14.25 | 1.99 | | |
| 6 | 60193 | 10.56 | 3.25 | | 10.56 | 3.45 | | |
| 6 | 60194 | 11.23 | 2.84 | | 11.16 | 3.13 | | |
| 6 | 60195 | 11.95 | 2.42 | | 11.87 | 2.80 | | 8.76 |
| 6 | 60196 | 12.75 | 2.01 | | 12.63 | 2.53 | | 8.76 |
| 6 | 60197 | 13.55 | 1.63 | | 13.44 | 2.39 | | 8.76 |
| 6 | 60198 | 14.35 | 1.27 | | 14.25 | 2.22 | | |
| 6 | 60199 | 11.14 | 3.88 | | 11.14 | 3.96 | | |
| 6 | 60200 | 11.83 | 3.47 | | 11.77 | 3.66 | | |
| 6 | 60201 | 12.52 | 3.05 | | 12.42 | 3.49 | | |
| 6 | 60202 | 13.25 | 2.61 | | 13.19 | 3.32 | | 8.76 |
| 6 | 60203 | 14.03 | 2.19 | | 13.99 | 3.15 | | 8.76 |
| 6 | 60204 | 14.77 | 1.78 | | 14.76 | 2.87 | | |
| 6 | 60205 | 11.76 | 4.61 | | 11.80 | 4.56 | | |
| 6 | 60206 | 12.49 | 4.21 | | 12.47 | 4.29 | | |
| 6 | 60207 | 13.21 | 3.78 | | 13.16 | 4.06 | | |
| 6 | 60208 | 13.90 | 3.31 | | 13.84 | 3.94 | | |
| 6 | 60209 | 14.58 | 2.83 | | 14.67 | 3.82 | | 8.76 |
| 6 | 60210 | 15.29 | 2.32 | | 15.45 | 3.73 | | |
| 6 | 60211 | 12.37 | 5.44 | | 12.50 | 5.24 | | |
| 6 | 60212 | 13.16 | 5.06 | | 13.25 | 5.01 | | |
| 6 | 60213 | 13.95 | 4.62 | | 14.01 | 4.76 | | 8.76 |
| 6 | 60214 | 14.70 | 4.13 | | 14.76 | 4.67 | | 8.76 |
| 6 | 60215 | 15.37 | 3.56 | | 15.52 | 4.61 | | 8.76 |
| 6 | 60216 | 15.87 | 2.91 | | 16.45 | 4.60 | | |
| 6 | 60217 | 12.94 | 6.34 | | 13.21 | 6.01 | | |
| 6 | 60218 | 13.82 | 6.00 | | 14.07 | 5.84 | | |
| 6 | 60219 | 14.69 | 5.58 | | 14.95 | 5.65 | | |

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|---|---|---|---|---|---|---|---|---|
| 6 | 60220 | 15.55 | 5.07 | | 15.83 | 5.52 | | 8.76 |
| 6 | 60221 | 16.35 | 4.44 | | 16.79 | 5.53 | | 8.76 |
| 6 | 60222 | 16.99 | 3.61 | | 17.89 | 5.61 | | |
| 6 | 60223 | 13.45 | 7.28 | | 13.86 | 6.77 | | |
| 6 | 60224 | 14.43 | 6.98 | | 14.88 | 6.68 | | |
| 6 | 60225 | 15.42 | 6.60 | | 15.94 | 6.58 | | |
| 6 | 60226 | 16.42 | 6.10 | | 17.06 | 6.60 | | |
| 6 | 60227 | 17.42 | 5.47 | | 18.27 | 6.64 | | |
| 6 | 60228 | 18.39 | 4.60 | | 19.70 | 6.87 | | |
| 6 | 60229 | 13.84 | 8.14 | | 14.27 | 7.54 | | |
| 6 | 60230 | 14.94 | 7.90 | | 15.41 | 7.56 | | |
| 6 | 60231 | 16.07 | 7.56 | | 16.59 | 7.72 | | |
| 6 | 60232 | 17.23 | 7.12 | | 17.86 | 7.78 | | |
| 6 | 60233 | 18.43 | 6.56 | | 19.24 | 7.72 | | |
| 6 | 60234 | 19.69 | 5.81 | | 20.87 | 8.06 | | |
| 6 | 60235 | 14.13 | 8.93 | | 14.50 | 8.19 | | |
| 6 | 60236 | 15.37 | 8.76 | | 15.71 | 8.27 | | |
| 6 | 60237 | 16.65 | 8.49 | | 16.97 | 8.49 | | |
| 6 | 60238 | 17.98 | 8.13 | | 18.40 | 8.63 | | |
| 6 | 60239 | 19.34 | 7.67 | | 19.84 | 8.67 | | |
| 6 | 60240 | 20.74 | 7.11 | | 21.57 | 9.16 | | |
| 6 | 60241 | 14.31 | 9.66 | | 14.44 | 8.76 | | |
| 6 | 60242 | 15.71 | 9.61 | | 15.77 | 8.87 | | |
| 6 | 60243 | 17.17 | 9.44 | | 17.14 | 9.04 | | |
| 6 | 60244 | 18.69 | 9.16 | | 18.65 | 9.36 | | |
| 6 | 60245 | 20.17 | 8.79 | | 20.21 | 9.48 | | |
| 6 | 60246 | 21.60 | 8.36 | | 21.97 | 10.06 | | |
| 6 | 60247 | 14.31 | 10.28 | | 14.01 | 9.09 | | |
| 6 | 60248 | 15.90 | 10.41 | | 15.48 | 9.29 | | |
| 6 | 60249 | 17.56 | 10.40 | | 17.07 | 9.59 | | |
| 6 | 60250 | 19.26 | 10.21 | | 18.74 | 9.94 | | |
| 6 | 60251 | 20.89 | 9.86 | | 20.43 | 10.34 | | |
| 6 | 60252 | 22.31 | 9.40 | | 22.08 | 11.07 | | |
| 6 | 60253 | 14.04 | 10.61 | | 13.22 | 9.07 | | |
| 6 | 60254 | 15.76 | 11.00 | | 14.91 | 9.45 | | |
| 6 | 60255 | 17.62 | 11.19 | | 16.72 | 9.87 | | |
| 6 | 60256 | 19.55 | 11.13 | | 18.64 | 10.48 | | |
| 6 | 60257 | 21.40 | 10.75 | | 20.62 | 11.14 | | |
| 6 | 60258 | 22.93 | 10.07 | | 22.56 | 12.21 | | |
| 6 | 60259 | 13.67 | 10.50 | | 12.05 | 8.64 | | |
| 6 | 60260 | 15.39 | 11.19 | | 13.87 | 9.19 | | |
| 6 | 60261 | 17.34 | 11.70 | | 15.91 | 9.80 | | |
| 6 | 60262 | 19.47 | 11.86 | | 18.15 | 10.69 | | |
| 6 | 60263 | 21.66 | 11.46 | | 20.59 | 11.81 | | |
| 6 | 60264 | 23.54 | 10.43 | | 23.12 | 13.51 | | |
| 6 | 60265 | 13.39 | 9.86 | | 10.36 | 7.77 | | |
| 6 | 60266 | 15.00 | 10.85 | | 12.24 | 8.48 | | |
| 6 | 60267 | 16.91 | 11.75 | | 14.47 | 9.31 | | |
| 6 | 60268 | 19.17 | 12.29 | | 17.08 | 10.48 | | |
| 6 | 60269 | 21.65 | 12.05 | | 20.09 | 12.14 | | |
| 6 | 60270 | 24.11 | 10.58 | | 23.49 | 14.70 | | |
| 6 | 60271 | 13.53 | 8.74 | | 8.12 | 6.40 | | |
| 6 | 60272 | 15.04 | 9.86 | | 9.82 | 7.19 | | |
| 6 | 60273 | 16.79 | 11.07 | | 11.99 | 8.16 | | |
| 6 | 60274 | 18.92 | 12.15 | | 14.77 | 9.58 | | |
| 6 | 60275 | 21.69 | 12.48 | | 18.36 | 11.90 | | |
| 6 | 60276 | 24.78 | 10.87 | | 22.85 | 15.79 | | |
| 6 | 60277 | 14.22 | 7.56 | | 5.58 | 4.49 | | 8.76 |
| 6 | 60278 | 15.84 | 8.69 | | 6.74 | 5.23 | | 8.76 |
| 6 | 60279 | 17.61 | 9.94 | | 8.38 | 6.20 | | 8.76 |
| 6 | 60280 | 19.56 | 11.27 | | 10.73 | 7.68 | | 8.76 |
| 6 | 60281 | 21.96 | 12.40 | | 14.33 | 10.52 | | |
| 6 | 60282 | 25.92 | 11.52 | | 19.80 | 16.58 | | |
| 6 | 60283 | 15.13 | 6.50 | | 3.39 | 2.31 | | |
| 6 | 60284 | 17.24 | 7.64 | | 3.72 | 2.75 | | |
| 6 | 60285 | 19.64 | 8.95 | | 4.19 | 3.32 | | |

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|---|---|---|---|---|---|---|---|---|
| 6 | 60286 | 22.23 | 10.38 | | 4.94 | 4.37 | | |
| 6 | 60287 | 25.18 | 11.78 | | 6.30 | 6.46 | | |
| 6 | 60288 | 29.12 | 11.84 | | 9.61 | 14.25 | | |
| 6 | 60289 | 28.29 | 40.54 | | 27.41 | 39.62 | | 8.76 |
| 6 | 60290 | 28.75 | 21.40 | | 27.68 | 21.31 | | |
| 6 | 60291 | 26.83 | 13.74 | | 26.01 | 14.51 | | |
| 6 | 60292 | 25.15 | 9.54 | | 24.63 | 10.76 | | 8.76 |
| 6 | 60293 | 23.70 | 7.17 | | 23.46 | 8.91 | | 8.76 |
| 6 | 60294 | 22.53 | 6.35 | | 22.52 | 7.84 | | 8.76 |
| 6 | 60295 | 21.53 | 5.91 | | 21.70 | 7.20 | | 8.76 |
| 6 | 60296 | 20.63 | 5.61 | | 20.94 | 6.82 | | 8.76 |
| 6 | 60297 | 19.88 | 5.36 | | 20.27 | 6.52 | | 8.76 |
| 6 | 60298 | 19.22 | 5.12 | | 19.66 | 6.18 | | 8.76 |
| 6 | 60299 | 18.64 | 4.91 | | 19.12 | 5.81 | | |
| 6 | 60300 | 18.10 | 4.72 | | 18.64 | 5.42 | | 8.76 |
| 6 | 60301 | 17.50 | 4.48 | | 18.19 | 5.04 | | |
| 6 | 60302 | 17.02 | 4.23 | | 18.11 | 5.08 | | |
| 6 | 60303 | 1.82 | 5.81 | | 1.56 | 6.91 | | |
| 6 | 60304 | 0.38 | | | 0.49 | | | |
| 6 | 60305 | 0.04 | | | 0.05 | | | |
| 6 | 60306 | | | | 0.01 | | | |
| 6 | 60307 | 0.01 | | | 0.02 | | | |
| 6 | 60308 | | | | 0.01 | | | |
| 6 | 60309 | 0.01 | | | 0.02 | | | |
| 6 | 60310 | | | | 0.01 | | | |
| 6 | 60311 | 0.07 | | | 0.10 | | | |
| 6 | 60312 | 12.52 | 13.66 | | 12.08 | 14.75 | | 8.76 |
| 6 | 60313 | 2.09 | | | 2.35 | 1.46 | | |
| 6 | 60314 | 0.67 | | | 0.86 | | | |
| 6 | 60315 | 0.11 | | | 0.17 | | | |
| 6 | 60316 | 0.07 | | | 0.12 | | | |
| 6 | 60317 | 0.02 | | | 0.07 | | | |
| 6 | 60318 | 0.04 | | | 0.08 | | | |
| 6 | 60319 | 0.09 | | | 0.14 | | | |
| 6 | 60320 | 0.45 | | | 0.55 | | | |
| 6 | 60321 | 16.68 | 11.43 | | 16.30 | 12.81 | | 8.76 |
| 6 | 60322 | 6.55 | 4.00 | | 6.55 | 5.81 | | |
| 6 | 60323 | 1.86 | | | 2.91 | 0.16 | | |
| 6 | 60324 | 0.67 | | | 0.90 | | | |
| 6 | 60325 | 0.24 | | | 0.36 | | | |
| 6 | 60326 | 0.13 | | | 0.23 | | | |
| 6 | 60327 | 0.15 | | | 0.23 | | | |
| 6 | 60328 | 0.39 | | | 0.51 | | | |
| 6 | 60329 | 1.74 | | | 1.91 | | | |
| 6 | 60330 | 18.30 | 9.43 | | 18.09 | 10.89 | | 8.76 |
| 6 | 60331 | 9.73 | 5.51 | | 9.81 | 7.25 | | |
| 6 | 60332 | 4.86 | 0.99 | | 5.05 | 2.73 | | |
| 6 | 60333 | 1.69 | | | 2.54 | | | |
| 6 | 60334 | 0.71 | | | 1.00 | | | |
| 6 | 60335 | 0.35 | | | 0.53 | | | |
| 6 | 60336 | 0.39 | | | 0.52 | | | |
| 6 | 60337 | 1.09 | | | 1.31 | | | |
| 6 | 60338 | 4.08 | 0.77 | | 4.41 | 0.75 | | |
| 6 | 60339 | 18.64 | 7.75 | | 18.64 | 9.37 | | 8.76 |
| 6 | 60340 | 11.80 | 5.96 | | 12.02 | 7.62 | | |
| 6 | 60341 | 6.83 | 2.93 | | 7.11 | 4.53 | | |
| 6 | 60342 | 4.01 | 0.72 | | 4.29 | 1.76 | | |
| 6 | 60343 | 1.65 | | | 2.53 | | | |
| 6 | 60344 | 0.82 | | | 1.15 | | | |
| 6 | 60345 | 0.86 | | | 1.09 | | | |
| 6 | 60346 | 2.73 | 0.32 | | 3.11 | 0.40 | | |
| 6 | 60347 | 5.59 | 2.36 | | 5.97 | 2.36 | | |
| 6 | 60348 | 18.48 | 6.84 | | 18.65 | 8.22 | | 8.76 |
| 6 | 60349 | 13.02 | 6.06 | | 13.37 | 7.50 | | |
| 6 | 60350 | 8.43 | 4.32 | | 8.82 | 5.63 | | |
| 6 | 60351 | 5.30 | 2.52 | | 5.68 | 3.50 | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 6 | 60352 | 3.37 | 1.13 | | 3.71 | 1.71 | | |
| 6 | 60353 | 1.75 | 0.13 | | 2.47 | 0.42 | | |
| 6 | 60354 | 1.87 | 0.45 | | 2.25 | 0.65 | | |
| 6 | 60355 | 3.77 | 1.82 | | 4.19 | 1.92 | | |
| 6 | 60356 | 6.86 | 3.48 | | 7.31 | 3.49 | | |
| 6 | 60357 | 18.08 | 6.47 | | 18.39 | 7.71 | | |
| 6 | 60358 | 13.57 | 6.22 | | 14.04 | 7.23 | | |
| 6 | 60359 | 9.51 | 5.17 | | 10.00 | 6.17 | | |
| 6 | 60360 | 6.40 | 3.84 | | 6.86 | 4.66 | | |
| 6 | 60361 | 4.26 | 2.60 | | 4.68 | 3.17 | | |
| 6 | 60362 | 2.87 | 1.54 | | 3.29 | 1.87 | | |
| 6 | 60363 | 2.60 | 1.74 | | 3.00 | 1.91 | | |
| 6 | 60364 | 4.69 | 2.91 | | 5.19 | 2.99 | | |
| 6 | 60365 | 7.77 | 4.09 | | 8.23 | 4.20 | | |
| 6 | 60366 | 17.65 | 6.18 | | 18.04 | 7.19 | | 8.76 |
| 6 | 60367 | 13.77 | 6.25 | | 14.29 | 7.10 | | |
| 6 | 60368 | 10.17 | 5.68 | | 10.75 | 6.42 | | |
| 6 | 60369 | 7.24 | 4.76 | | 7.79 | 5.37 | | |
| 6 | 60370 | 5.08 | 3.73 | | 5.57 | 4.18 | | |
| 6 | 60371 | 3.63 | 2.69 | | 4.15 | 2.99 | | |
| 6 | 60372 | 3.29 | 2.65 | | 3.78 | 2.80 | | |
| 6 | 60373 | 5.42 | 3.57 | | 5.96 | 3.65 | | |
| 6 | 60374 | 8.37 | 4.34 | | 8.85 | 4.55 | | |
| 6 | 60375 | 17.20 | 5.93 | | 17.64 | 6.95 | | |
| 6 | 60376 | 13.74 | 6.16 | | 14.31 | 7.03 | | |
| 6 | 60377 | 10.51 | 5.90 | | 11.15 | 6.60 | | |
| 6 | 60378 | 7.78 | 5.30 | | 8.40 | 5.79 | | |
| 6 | 60379 | 5.71 | 4.47 | | 6.27 | 4.80 | | |
| 6 | 60380 | 4.31 | 3.52 | | 4.92 | 3.72 | | |
| 6 | 60381 | 3.84 | 3.17 | | 4.36 | 3.30 | | |
| 6 | 60382 | 5.90 | 3.85 | | 6.46 | 3.97 | | |
| 6 | 60383 | 8.65 | 4.29 | | 9.16 | 4.59 | | |
| 6 | 60384 | 16.74 | 5.66 | | 17.24 | 6.70 | | |
| 6 | 60385 | 13.60 | 6.00 | | 14.21 | 6.93 | | |
| 6 | 60386 | 10.64 | 5.97 | | 11.32 | 6.68 | | |
| 6 | 60387 | 8.13 | 5.60 | | 8.79 | 6.09 | | |
| 6 | 60388 | 6.20 | 4.96 | | 6.83 | 5.27 | | |
| 6 | 60389 | 4.90 | 4.12 | | 5.58 | 4.27 | | |
| 6 | 60390 | 4.28 | 3.42 | | 4.84 | 3.53 | | |
| 6 | 60391 | 6.17 | 3.89 | | 6.77 | 4.07 | | |
| 6 | 60392 | 8.72 | 4.07 | | 9.24 | 4.42 | | |
| 6 | 60393 | 16.30 | 5.37 | | 16.87 | 6.48 | | |
| 6 | 60394 | 13.41 | 5.79 | | 14.08 | 6.81 | | |
| 6 | 60395 | 10.69 | 5.94 | | 11.40 | 6.67 | | |
| 6 | 60396 | 8.33 | 5.76 | | 9.02 | 6.24 | | |
| 6 | 60397 | 6.54 | 5.29 | | 7.25 | 5.58 | | |
| 6 | 60398 | 5.38 | 4.56 | | 6.11 | 4.70 | | |
| 6 | 60399 | 4.88 | 3.60 | | 5.60 | 3.70 | | |
| 6 | 60400 | 6.28 | 3.79 | | 6.87 | 4.00 | | |
| 6 | 60401 | 8.79 | 3.77 | | 9.25 | 4.25 | | |
| 6 | 60402 | 15.89 | 5.04 | | 16.54 | 6.33 | | 8.76 |
| 6 | 60403 | 13.21 | 5.58 | | 13.94 | 6.65 | | |
| 6 | 60404 | 10.65 | 5.88 | | 11.39 | 6.58 | | |
| 6 | 60405 | 8.42 | 5.85 | | 9.15 | 6.31 | | |
| 6 | 60406 | 6.78 | 5.51 | | 7.57 | 5.77 | | |
| 6 | 60407 | 5.74 | 4.90 | | 6.54 | 5.00 | | |
| 6 | 60408 | 5.38 | 4.03 | | 6.12 | 4.08 | | |
| 6 | 60409 | 6.39 | 3.62 | | 7.07 | 3.86 | | |
| 6 | 60410 | 8.80 | 3.43 | | 9.36 | 4.09 | | |
| 6 | 60411 | 15.53 | 4.71 | | 16.29 | 6.27 | | |
| 6 | 60412 | 13.02 | 5.37 | | 13.76 | 6.41 | | |
| 6 | 60413 | 10.55 | 5.80 | | 11.32 | 6.47 | | |
| 6 | 60414 | 8.45 | 5.88 | | 9.27 | 6.32 | | |
| 6 | 60415 | 6.93 | 5.67 | | 7.80 | 5.91 | | |
| 6 | 60416 | 6.03 | 5.17 | | 6.87 | 5.25 | | |
| 6 | 60417 | 5.78 | 4.39 | | 6.51 | 4.34 | | |

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|---|---|---|---|---|---|---|---|---|
| 6 | 60418 | 6.47 | 3.42 | | 7.19 | 3.76 | | |
| 6 | 60419 | 8.74 | 3.13 | | 9.26 | 3.78 | | |
| 6 | 60420 | 15.26 | 4.33 | | 16.22 | 6.11 | | |
| 6 | 60421 | 12.79 | 5.22 | | 13.52 | 6.15 | | |
| 6 | 60422 | 10.43 | 5.72 | | 11.20 | 6.37 | | |
| 6 | 60423 | 8.48 | 5.89 | | 9.27 | 6.31 | | |
| 6 | 60424 | 7.07 | 5.79 | | 7.96 | 6.01 | | |
| 6 | 60425 | 6.26 | 5.39 | | 7.08 | 5.44 | | |
| 6 | 60426 | 6.11 | 4.71 | | 6.83 | 4.62 | | |
| 6 | 60427 | 6.66 | 3.76 | | 7.25 | 3.85 | | |
| 6 | 60428 | 8.63 | 2.88 | | 9.36 | 3.82 | | |
| 6 | 60429 | 0.17 | | | 0.22 | | | |
| 6 | 60430 | 0.32 | | | 0.38 | | | |
| 6 | 60431 | 0.92 | | | 0.99 | | | |
| 6 | 60432 | 3.08 | 2.71 | | 3.39 | 2.24 | | |
| 6 | 60433 | 6.32 | 10.48 | | 7.26 | 9.94 | | |
| 6 | 60434 | 17.83 | 26.93 | | 19.60 | 26.52 | | |
| 6 | 60435 | 1.46 | | | 1.59 | | | |
| 6 | 60436 | 3.47 | 0.65 | | 3.70 | 0.48 | | |
| 6 | 60437 | 5.45 | 3.26 | | 5.74 | 2.85 | | |
| 6 | 60438 | 8.85 | 7.30 | | 9.30 | 6.68 | | |
| 6 | 60439 | 15.23 | 12.04 | | 16.02 | 10.91 | | 8.76 |
| 6 | 60440 | 20.66 | 11.61 | | 21.22 | 9.72 | | |
| 6 | 60441 | 4.58 | 1.17 | | 4.82 | 1.06 | | |
| 6 | 60442 | 6.40 | 3.04 | | 6.62 | 2.78 | | |
| 6 | 60443 | 9.04 | 5.23 | | 9.26 | 4.80 | | |
| 6 | 60444 | 12.76 | 7.36 | | 12.97 | 6.66 | | |
| 6 | 60445 | 16.72 | 8.32 | | 16.76 | 7.23 | | |
| 6 | 60446 | 20.95 | 8.76 | | 20.69 | 7.48 | | |
| 6 | 60447 | 6.72 | 3.04 | | 7.00 | 2.91 | | |
| 6 | 60448 | 8.78 | 4.36 | | 8.99 | 4.14 | | |
| 6 | 60449 | 11.36 | 5.59 | | 11.48 | 5.25 | | |
| 6 | 60450 | 14.25 | 6.43 | | 14.25 | 5.95 | | |
| 6 | 60451 | 17.43 | 6.91 | | 17.12 | 6.31 | | |
| 6 | 60452 | 20.57 | 6.73 | | 20.71 | 6.31 | | |
| 6 | 60453 | 8.41 | 4.08 | | 8.75 | 3.99 | | |
| 6 | 60454 | 10.36 | 4.87 | | 10.66 | 4.73 | | |
| 6 | 60455 | 12.55 | 5.49 | | 12.76 | 5.31 | | |
| 6 | 60456 | 14.91 | 5.89 | | 15.01 | 5.71 | | |
| 6 | 60457 | 17.58 | 5.96 | | 17.51 | 5.93 | | |
| 6 | 60458 | 19.94 | 5.76 | | 20.21 | 6.25 | | |
| 6 | 60459 | 9.60 | 4.61 | | 10.02 | 4.63 | | |
| 6 | 60460 | 11.34 | 5.04 | | 11.72 | 5.12 | | |
| 6 | 60461 | 13.20 | 5.33 | | 13.60 | 5.51 | | |
| 6 | 60462 | 15.20 | 5.44 | | 15.57 | 5.80 | | |
| 6 | 60463 | 17.34 | 5.36 | | 17.53 | 6.00 | | |
| 6 | 60464 | 19.47 | 5.08 | | 19.80 | 6.25 | | |
| 6 | 60465 | 10.32 | 4.78 | | 10.77 | 4.97 | | |
| 6 | 60466 | 11.84 | 4.98 | | 12.34 | 5.25 | | |
| 6 | 60467 | 13.44 | 5.07 | | 13.94 | 5.47 | | |
| 6 | 60468 | 15.16 | 5.03 | | 15.60 | 5.73 | | 8.76 |
| 6 | 60469 | 17.02 | 4.84 | | 17.31 | 5.87 | | 8.76 |
| 6 | 60470 | 19.00 | 4.44 | | 19.25 | 6.12 | | |
| 6 | 60471 | 10.69 | 4.69 | | 11.21 | 5.06 | | |
| 6 | 60472 | 12.02 | 4.73 | | 12.55 | 5.28 | | |
| 6 | 60473 | 13.45 | 4.68 | | 13.95 | 5.44 | | |
| 6 | 60474 | 15.06 | 4.53 | | 15.47 | 5.54 | | 8.76 |
| 6 | 60475 | 16.70 | 4.26 | | 16.97 | 5.60 | | 8.76 |
| 6 | 60476 | 18.40 | 3.99 | | 18.59 | 5.65 | | |
| 6 | 60477 | 10.76 | 4.41 | | 11.31 | 4.99 | | |
| 6 | 60478 | 12.06 | 4.35 | | 12.50 | 5.08 | | |
| 6 | 60479 | 13.44 | 4.21 | | 13.81 | 5.20 | | |
| 6 | 60480 | 14.85 | 4.06 | | 15.20 | 5.24 | | |
| 6 | 60481 | 16.28 | 3.80 | | 16.60 | 5.24 | | |
| 6 | 60482 | 17.77 | 3.57 | | 17.86 | 5.15 | | |
| 6 | 60483 | 10.81 | 4.01 | | 11.21 | 4.68 | | |

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|---|---|---|---|---|---|---|---|---|
| 6 | 60484 | 12.03 | 3.91 | | 12.38 | 4.84 | | |
| 6 | 60485 | 13.26 | 3.77 | | 13.58 | 4.86 | | |
| 6 | 60486 | 14.53 | 3.61 | | 14.82 | 4.83 | | |
| 6 | 60487 | 15.80 | 3.39 | | 16.08 | 4.65 | | 8.76 |
| 6 | 60488 | 17.15 | 3.18 | | 17.27 | 4.46 | | |
| 6 | 60489 | 10.78 | 3.63 | | 11.15 | 4.54 | | |
| 6 | 60490 | 11.89 | 3.51 | | 12.24 | 4.55 | | |
| 6 | 60491 | 13.03 | 3.39 | | 13.33 | 4.51 | | |
| 6 | 60492 | 14.18 | 3.22 | | 14.43 | 4.32 | | 8.76 |
| 6 | 60493 | 15.33 | 3.00 | | 15.55 | 4.16 | | 8.76 |
| 6 | 60494 | 16.56 | 2.83 | | 16.61 | 3.61 | | |
| 6 | 60495 | 10.66 | 3.30 | | 11.07 | 4.28 | | |
| 6 | 60496 | 11.69 | 3.16 | | 12.03 | 4.26 | | |
| 6 | 60497 | 12.75 | 3.01 | | 13.02 | 4.17 | | |
| 6 | 60498 | 13.82 | 2.84 | | 14.03 | 3.71 | | 8.76 |
| 6 | 60499 | 14.89 | 2.64 | | 15.05 | 3.48 | | 8.76 |
| 6 | 60500 | 16.03 | 2.48 | | 16.02 | 3.13 | | |
| 6 | 60501 | 10.49 | 2.96 | | 11.05 | 4.02 | | |
| 6 | 60502 | 11.46 | 2.81 | | 11.94 | 3.94 | | |
| 6 | 60503 | 12.46 | 2.65 | | 12.86 | 3.81 | | |
| 6 | 60504 | 13.46 | 2.47 | | 13.80 | 3.61 | | |
| 6 | 60505 | 14.47 | 2.28 | | 14.74 | 3.35 | | |
| 6 | 60506 | 15.55 | 2.12 | | 15.64 | 2.96 | | |
| 6 | 60507 | 10.28 | 2.64 | | 10.91 | 3.82 | | |
| 6 | 60508 | 11.21 | 2.46 | | 11.75 | 3.72 | | |
| 6 | 60509 | 12.16 | 2.30 | | 12.61 | 3.57 | | |
| 6 | 60510 | 13.12 | 2.12 | | 13.48 | 3.35 | | |
| 6 | 60511 | 14.08 | 1.92 | | 14.36 | 3.06 | | 8.76 |
| 6 | 60512 | 15.11 | 1.77 | | 15.20 | 2.65 | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Grp | primary group number | | Element | element number | | |
| asu | Principal reinforcements (1st layer) | Top | asu2 | Cross reinforcements (2nd layer) | | Top |
| asu3 | Third reinforcements | Top | asl | Principal reinforcements (1st layer) | | Bottom |
| asl2 | Cross reinforcements (2nd layer) | Bottom | asl3 | Third reinforcements | | Bottom |
| ass | Shear reinforcement | | | | | |

# DIMENSIONAMIENTO

**BEMESS - DESIGN OF PLATES AND SHELLS**

Load Cases for the Design

| Loadcase | factor | Designation |
|---|---|---|
| 501 | 1.000 | MAX-MXX QUAD ELS1 |
| 502 | 1.000 | MIN-MXX QUAD ELS1 |
| 503 | 1.000 | MAX-MYY QUAD ELS1 |
| 504 | 1.000 | MIN-MYY QUAD ELS1 |
| 505 | 1.000 | MAX-MXY QUAD ELS1 |
| 506 | 1.000 | MIN-MXY QUAD ELS1 |
| 507 | 1.000 | MAX-NXX QUAD ELS1 |
| 508 | 1.000 | MIN-NXX QUAD ELS1 |
| 509 | 1.000 | MAX-NYY QUAD ELS1 |
| 510 | 1.000 | MIN-NYY QUAD ELS1 |
| 511 | 1.000 | MAX-NXY QUAD ELS1 |
| 512 | 1.000 | MIN-NXY QUAD ELS1 |
| 513 | 1.000 | MAX-VX QUAD ELS1 |
| 514 | 1.000 | MIN-VX QUAD ELS1 |
| 515 | 1.000 | MAX-VY QUAD ELS1 |
| 516 | 1.000 | MIN-VY QUAD ELS1 |

Material (EuroNorm: EN 1992-1-1:2004 Design of concrete structures)

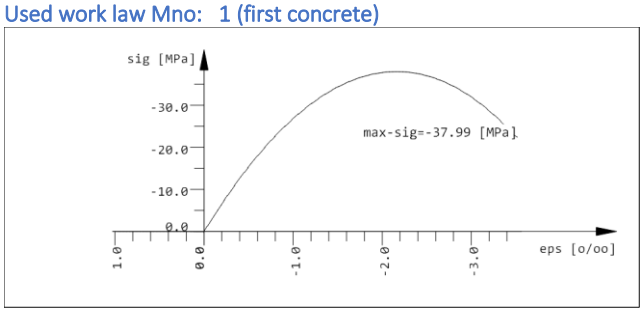
| MAT | fck | fc | fctm | fy | ft | eps,ud | minT | Type |
|---|---|---|---|---|---|---|---|---|
| | [MPa] | [MPa] | [MPa] | [MPa] | [MPa] | [o/oo] | | |
| 1 | 30.00 | 30.00 | 2.90 | | | | 0.00 | |
| 2 | | | | 500.00 | 536.00 | 45.0 | | |

| | | | |
|---|---|---|---|
| MAT | material number | fck | nominal strength of the concrete |
| fc | strength of the concrete | fctm | tensile strength of the concrete |
| fy | yield stress reinforcing steel | ft | tensile stress reinforcing steel |
| eps,ud | maximum strain - limited to max. 0.9*50 o/oo | minT | minimum transverse reinforcement |
| Type | character of the loading | | |

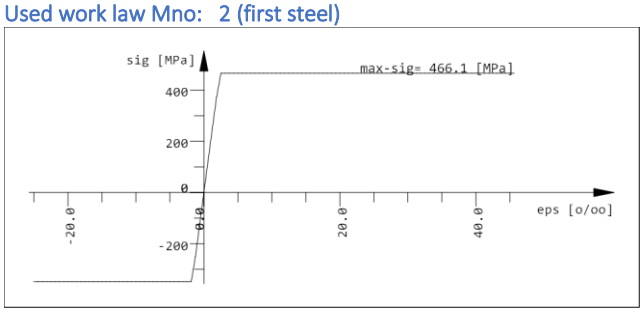
A robustness minimum reinforcement has not been requested and
has to be checked separately.

A minimum reinforcement has not been requested and
has to be checked separately.

Used work law Mno: 1 (first concrete)



Used work law Mno: 2 (first steel)




Reinforcementparameter two layer reinforcement

| Selection | distance | | bar-diameter | | crackwidth | | steelstress | | min.reinf. | |
|---|---|---|---|---|---|---|---|---|---|---|
| Grp elem | d1-u | 2.lay | ds-u | 2.lay | wk-u | 2.lay | sigsu | 2.lay | asu | 2.lay |
| no. no. | d1-l | 2.lay | ds-l | 2.lay | wk-l | 2.lay | sigsl | 2.lay | asl | 2.lay |
| | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [MPa] | [MPa] | [cm2/m] | [cm2/m] |
| default | 50.0 | 66.0 | 16 | 16 | 0.30 | 0.30 | - | - | - | - |
| | 50.0 | 66.0 | 16 | 16 | 0.30 | 0.30 | - | - | - | - |

distance upper / lower distance center of bar to surface
bar-diameter upper / lower bar diameter
crackwidth upper / lower required crack width
steelstress upper / lower maximum steel stress in SLS check
min.reinf. upper / lower minimum reinforcement

The reinforcement directions relate to the local coordinate system of
the elements and have to be plotted graphically.
With the input of a steel stress sigsu... the 'crack design according tables'
uses this given stress sigsu for the corresponding layer. With this input, the check can
be done for bar distances instead of bar diameters, see legend SLS control parameters.

The reinforcement is saved in the data base as reinforcement distribution number 2

Serviceability limit state control parameters

| No | Code | dNW [mm] | |
|---|---|---|---|
| 1 | EN-1992 | ->para | diameter check acc. EN 1992 7.3.3[1] |

Reinforcement has been increased by SLS design -> WINGRAF: Decisive design check ✓

[1] with national annex

dNW Check diameter in crack width design: ->para = values from design parameter definition
9260 elements/nodes were designed with the bar diameter in the crack check (table EN 1992-1-1 7.2N)

Design via bar spacing/steel stress for elements with defined steel stress!
(In this case the maximum bar distance has to keep the condition of
table bar diameter according to the choosen steel stress).
Crack design via bar diameter for elements without defined steel stress!

Required Reinforcements acc. to EuroNorm: EN 1992-1-1:2004 Design of concrete structures

| Grp | Element | t | asu | asu2 | asu3 | asl | asl2 | asl3 | supp | shear | ass |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | [m] | [cm2/m] | [cm2/m] | [cm2/m] | [cm2/m] | [cm2/m] | [cm2/m] | [-] | [-] | [cm2/m2] |
| 3 | 32395 | 0.450 | 34.97 | 19.31 | | 8.63 | 4.22 | | | | |
| 4 | 40101 | 0.450 | 26.90 | 6.87 | | 25.89 | 9.78 | | | | |
| 6 | 60289 | 0.250 | 19.52 | 26.82 | | 18.78 | 25.12 | | | | |

Grp primary group number
Element element number
t plate thickness
asu Principal reinforcements (1st layer) Top
asu2 Cross reinforcements (2nd layer) Top
asu3 Third reinforcements Top
asl Principal reinforcements (1st layer) Bottom
asl2 Cross reinforcements (2nd layer) Bottom
asl3 Third reinforcements Bottom
supp reduction factor for the shear force near supports, punc=point in punching zone -> punching shear design
shear shear zone: 1=Ok, punc=punching area, 1s=asu/l increased for shear, 1d=for punching, 2=required ass, 2m=minimum shear reinf., 3=
Elements with maximum values are printed. You can select an element with ELEM.
ass in a SLS design no shear design is done

Serviceability load results according to EN 1992-1-1

| ELEM | LC | x | wk | as1 | as2 | as3 | d1 | d2 | d3 | wk+ | as1+ | as2+ | as3+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No | No | [m] | [mm] | | | | [mm] | [mm] | [mm] | [mm] | | | |
| 32395 | 501 U | | >0.30 | 30.5 | 16.6 | | 16 | 16 | | 0.30 | 64.1 | 39.3 | |
| 32395 | 502 U | | >0.30 | 35.0 | 19.3 | | 16 | 16 | | 0.30 | 72.3 | 45.1 | |

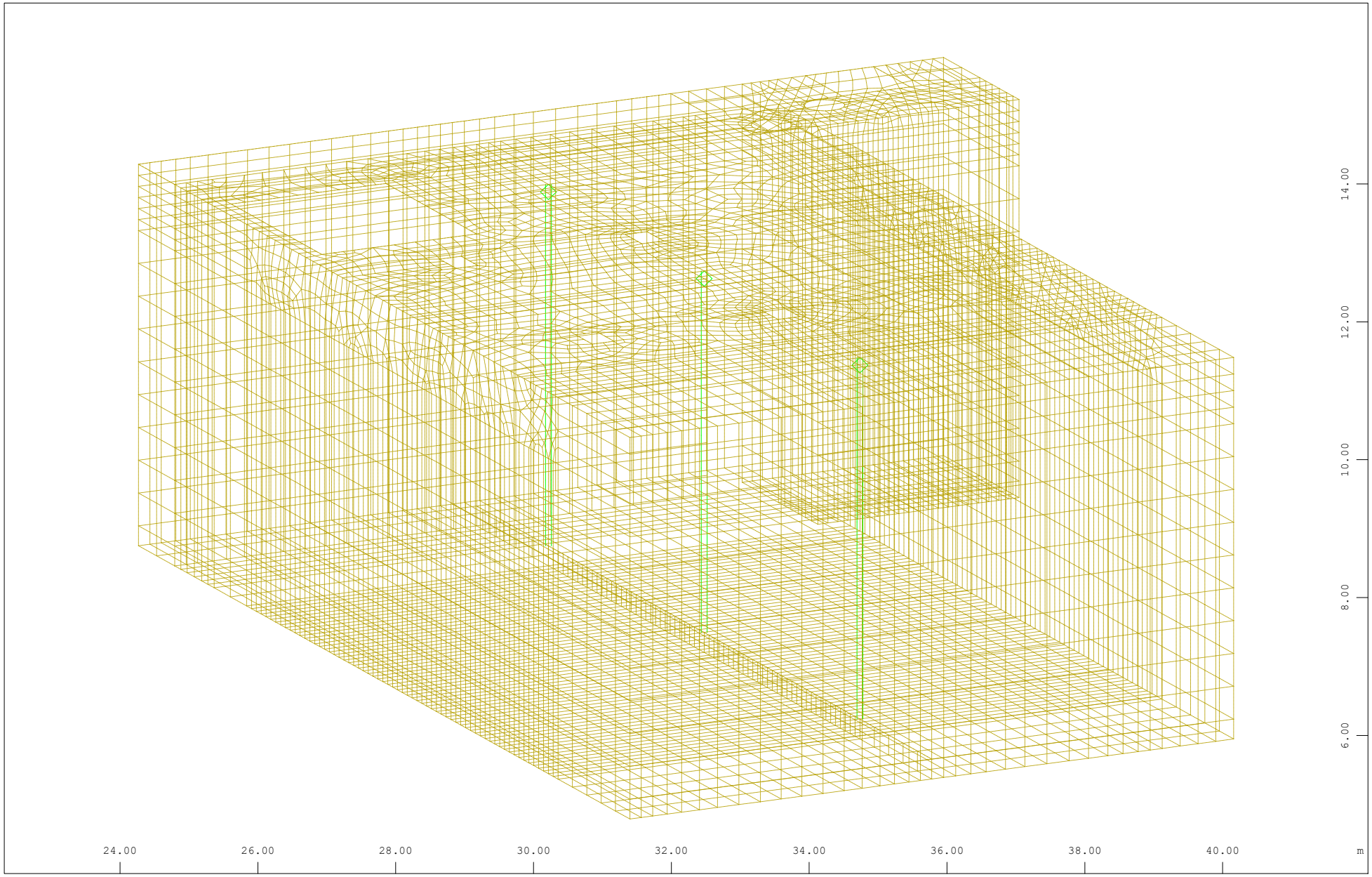
| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 60289 | 501 L | | >0.30 | 18.1 | 23.5 | | 16 | 16 | | 0.30 | 52.8 | 68.7 | |
| 60289 | 501 U | | >0.30 | 18.8 | 25.1 | | 16 | 16 | | 0.30 | 54.8 | 73.4 | |
| 60289 | 502 L | | >0.30 | 18.8 | 25.1 | | 16 | 16 | | 0.30 | 54.8 | 73.4 | |
| 60289 | 502 U | | >0.30 | 19.5 | 26.8 | | 16 | 16 | | 0.30 | 57.0 | 78.3 | |

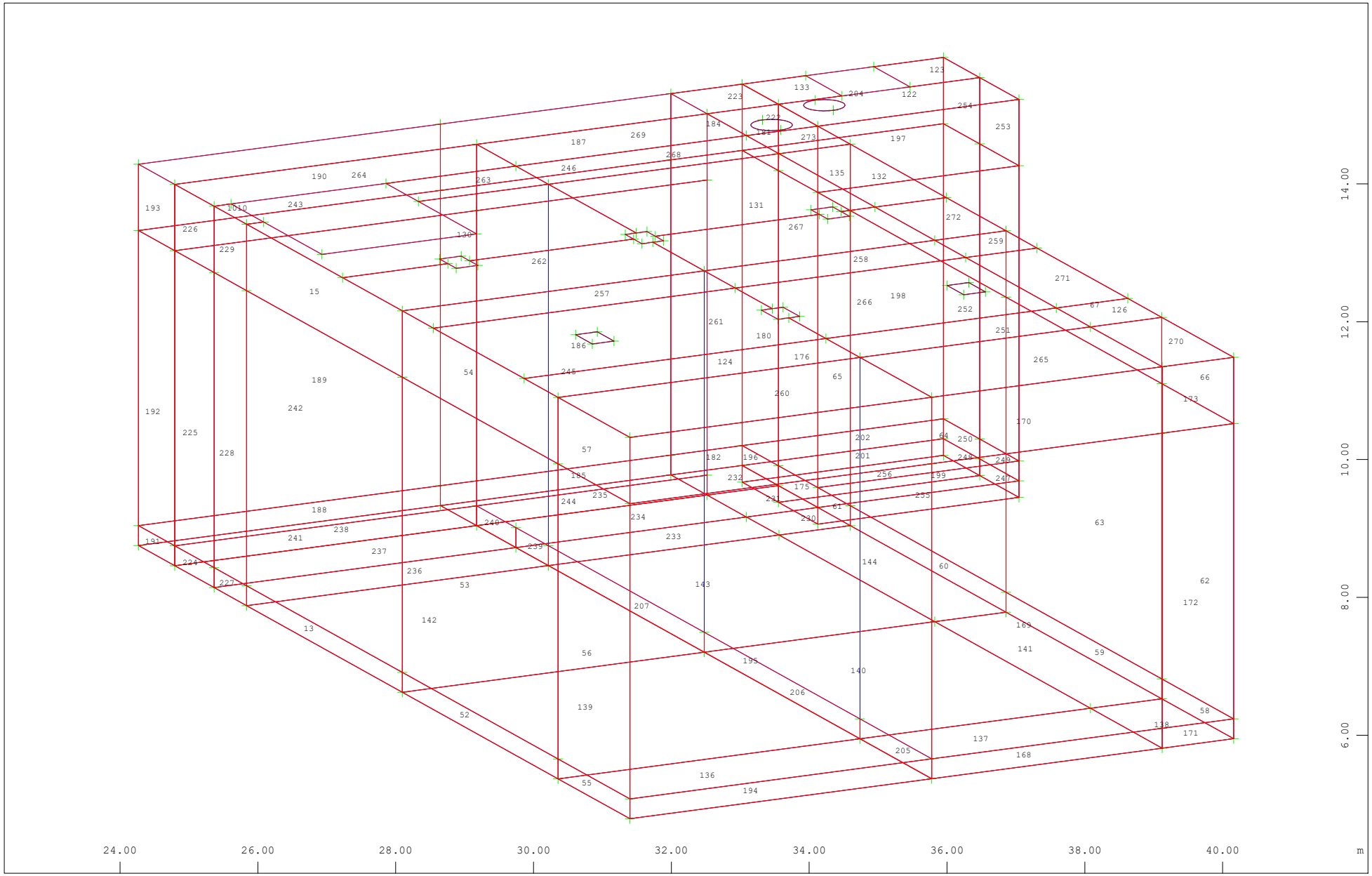
x height of compression zone
as1 reinforcement 1. layer before increase of reinforcement
as3 reinforcement 3. layer before increase of reinforcement
wk+ crack width after increase of reinforcement - interim -> ECHO REIN EXTR
Elements with maximum values are printed. You can select an element with ELEM.
wk crack width before increase of reinforcement
as2 reinforcement 2. layer before increase of reinforcement
d1 reinforcement diameter layer 1-3
as1+ reinforcement after increase of reinforcement layer 1-3

**BEMESS - DESIGN OF PLATES AND SHELLS**

## Maximum of reinforcement-distributions

The reinforcement maximum was build out of the numbers of reinforcement-distributions:
1 , 2
and stored as new reinforcement-distribution 3 .

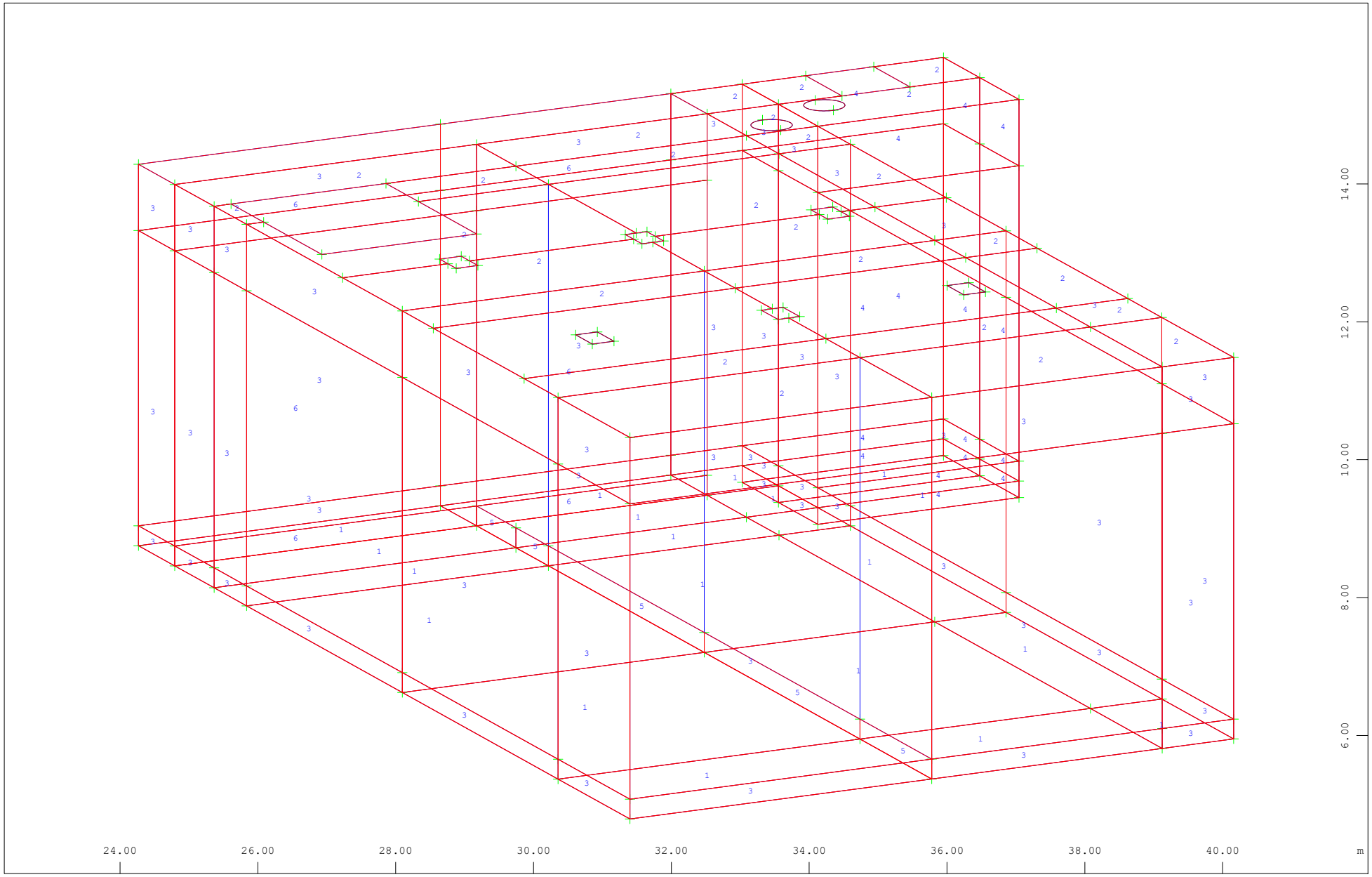

14.00
12.00
10.00
8.00
6.00
24.00
26.00
28.00
30.00
32.00
34.00
36.00
38.00
40.00
m
Z
Y
X
Structure
M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962




Structural Areas (Max=1010)

Z
Y
X

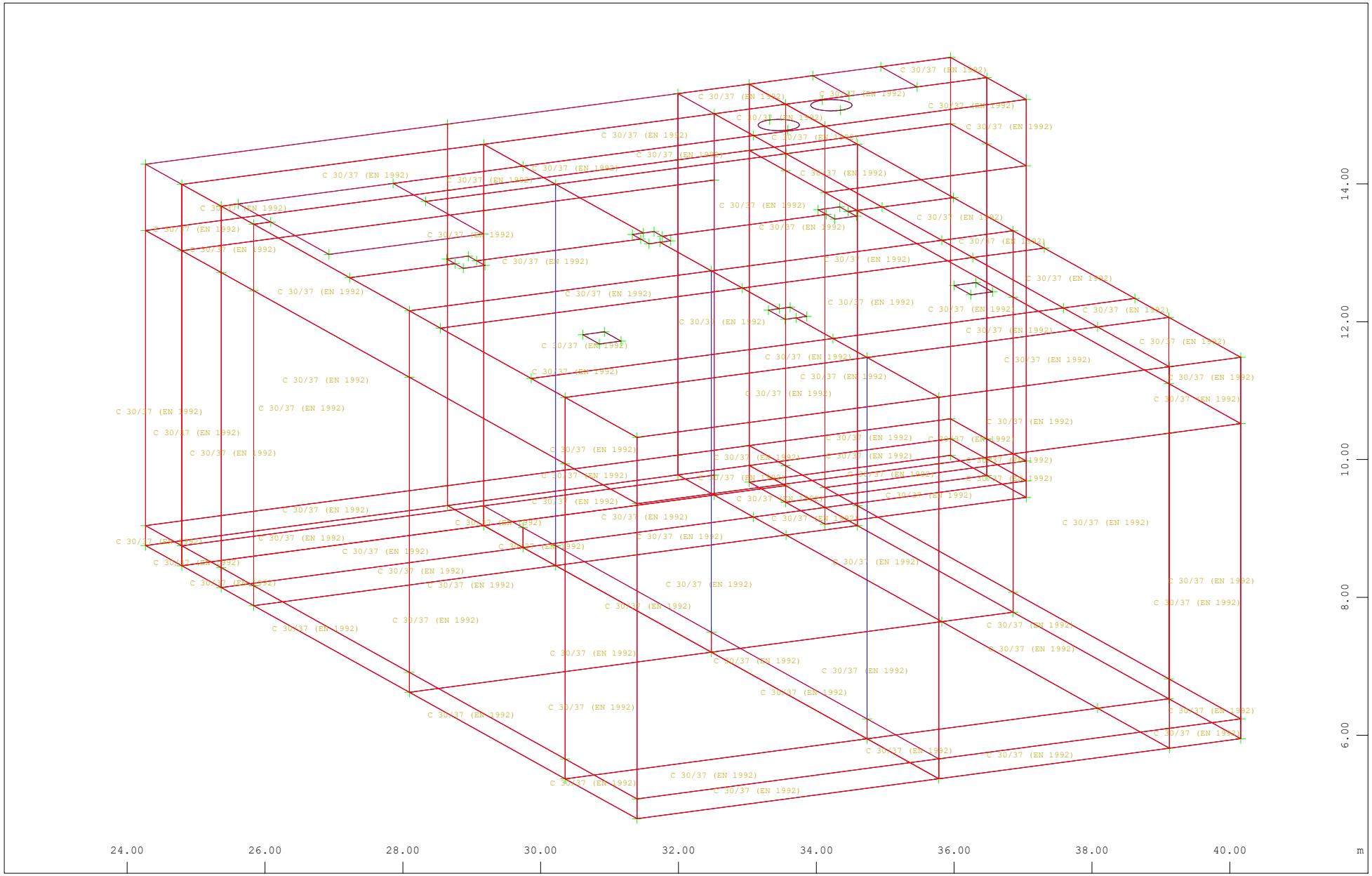
M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Structural Areas , Number of group (Max=6)

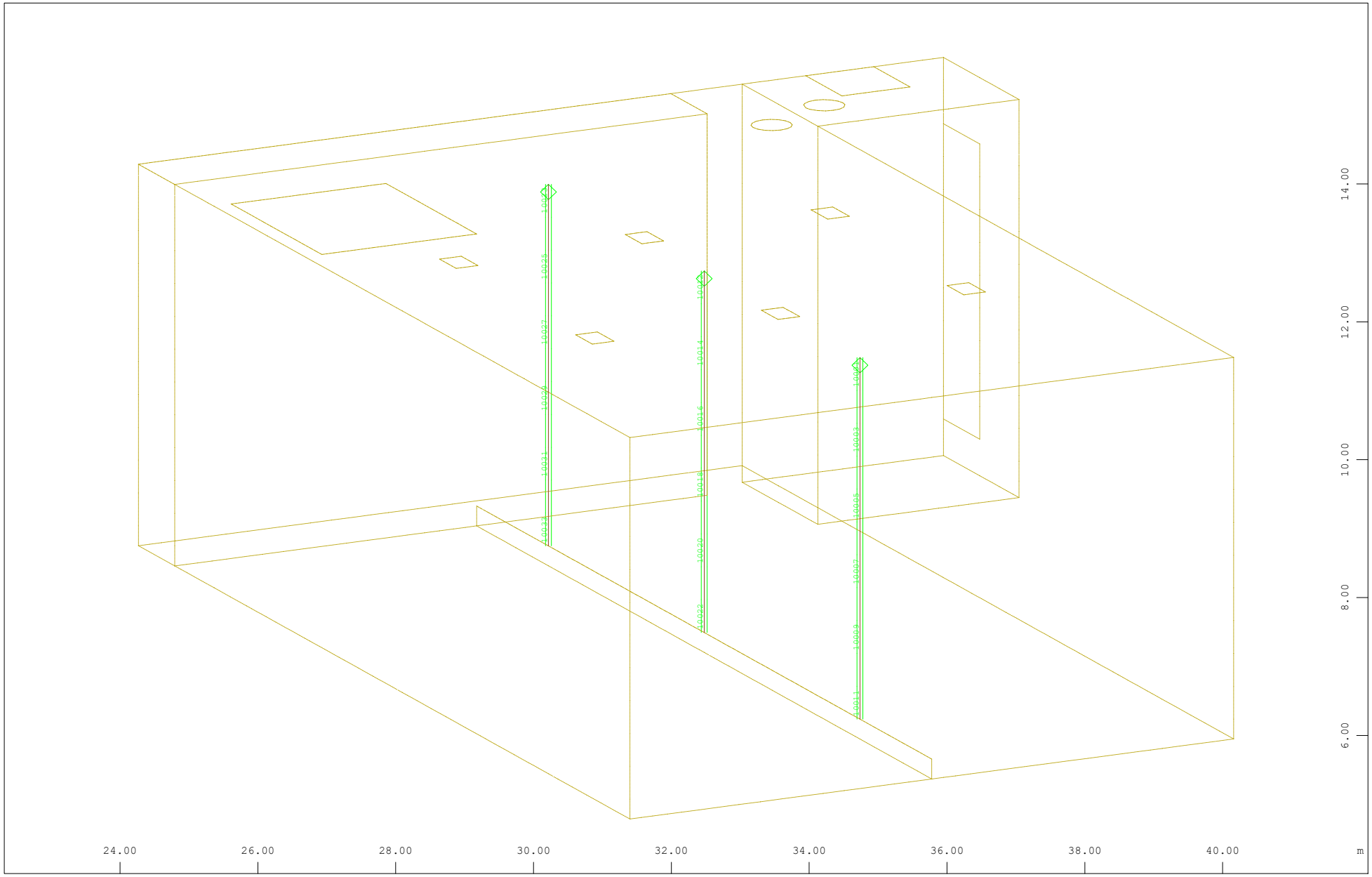
M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962

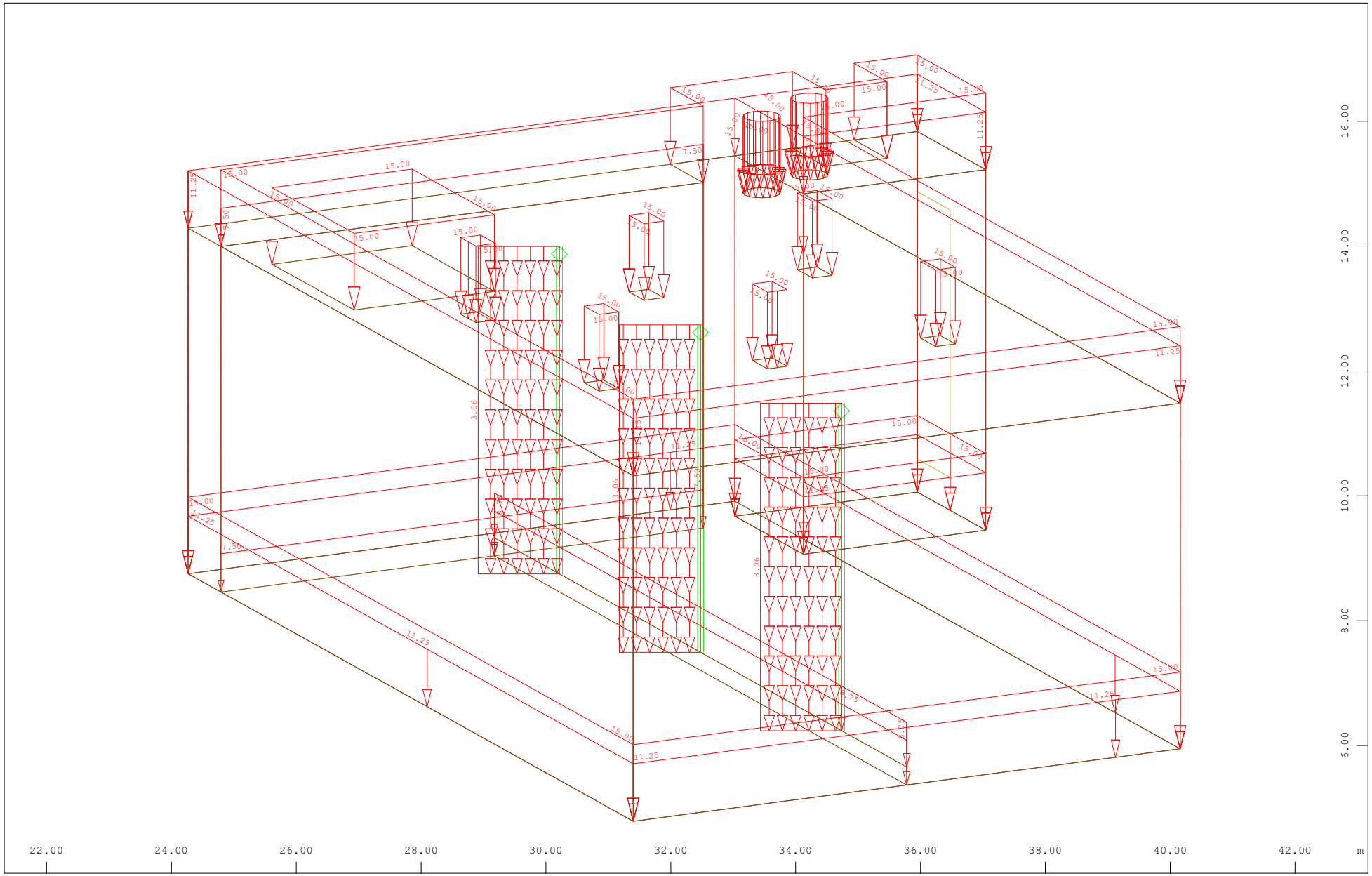


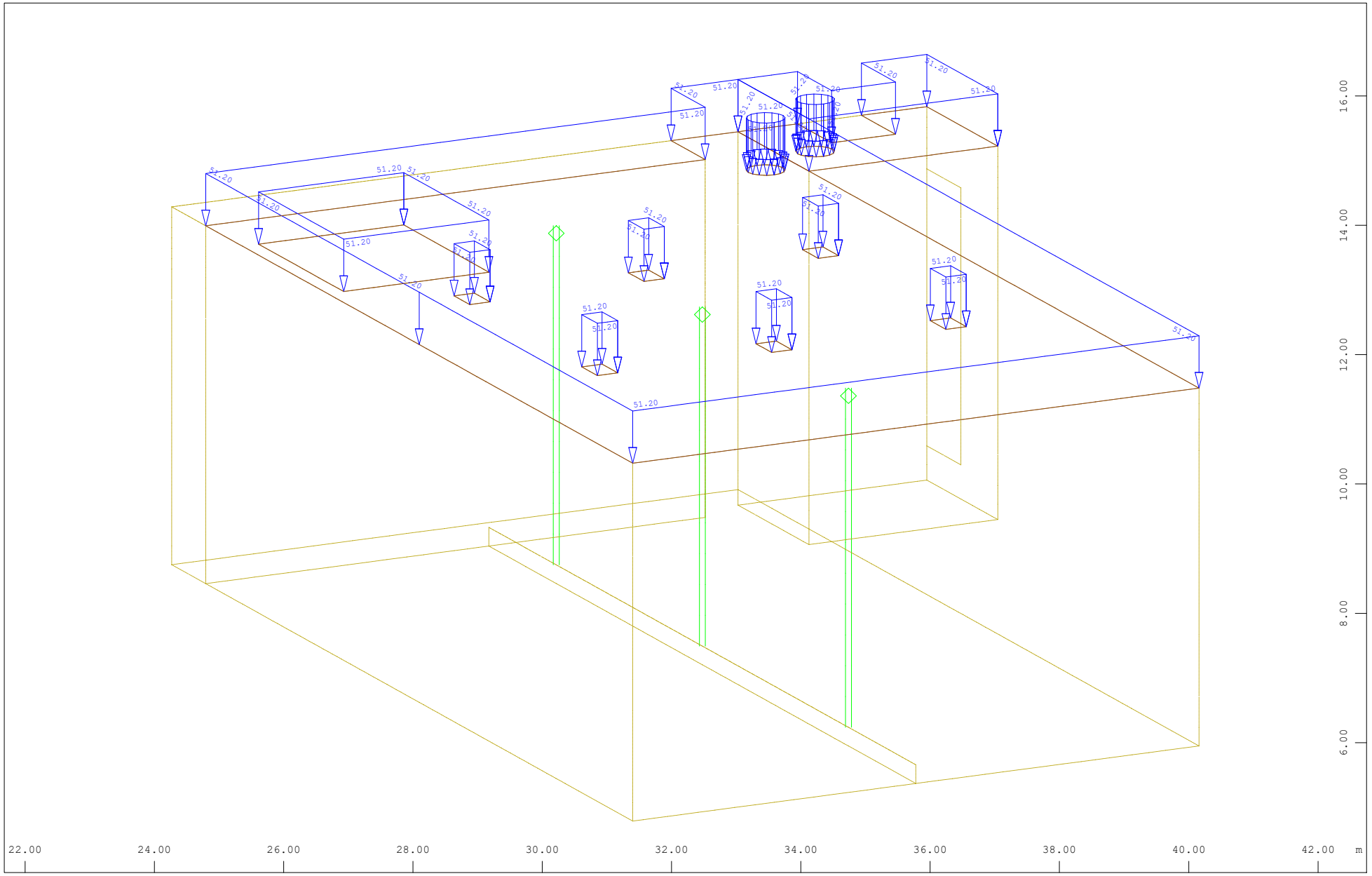

Structural Areas , Material designations

Z
Y
X

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962


14.00
12.00
10.00
8.00
6.00
24.00
26.00
28.00
30.00
32.00
34.00
36.00
38.00
40.00
m
Z
Y
X
Beam Elements , Number of element (Max=10033)
M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962

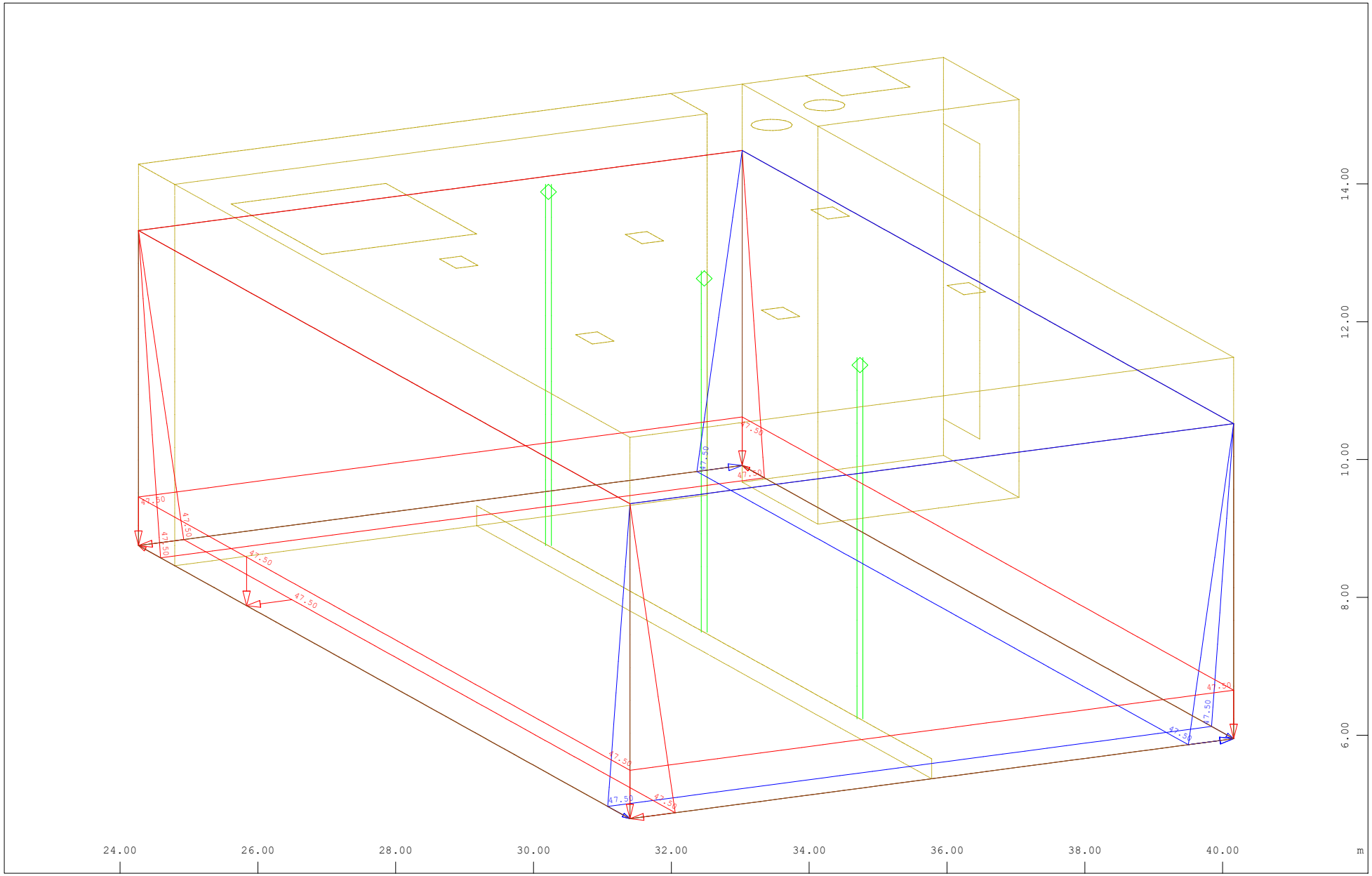

16.00
14.00
12.00
10.00
8.00
6.00
22.00
24.00
26.00
28.00
30.00
32.00
34.00
36.00
38.00
40.00
42.00
m
Z
Y
X
All loads, Loadcase 1 PP , (1 cm 3D = unit) QUAD-Area dead load in global Z in Element (Unit=10.00 kN/m2,Min=-15.00 Max=-7.50
Beam dead load in global Z (Unit=2.00 kN/m,Min=-3.06 Max=-3.06
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

All loads, Loadcase 2 CM , (1 cm 3D = unit) Area element load (force) vector (Unit=50.00 kN/m2 ) (Max=51.20)

M 1 : 82
X * 0.502
Y * 0.906
Z * 0.962

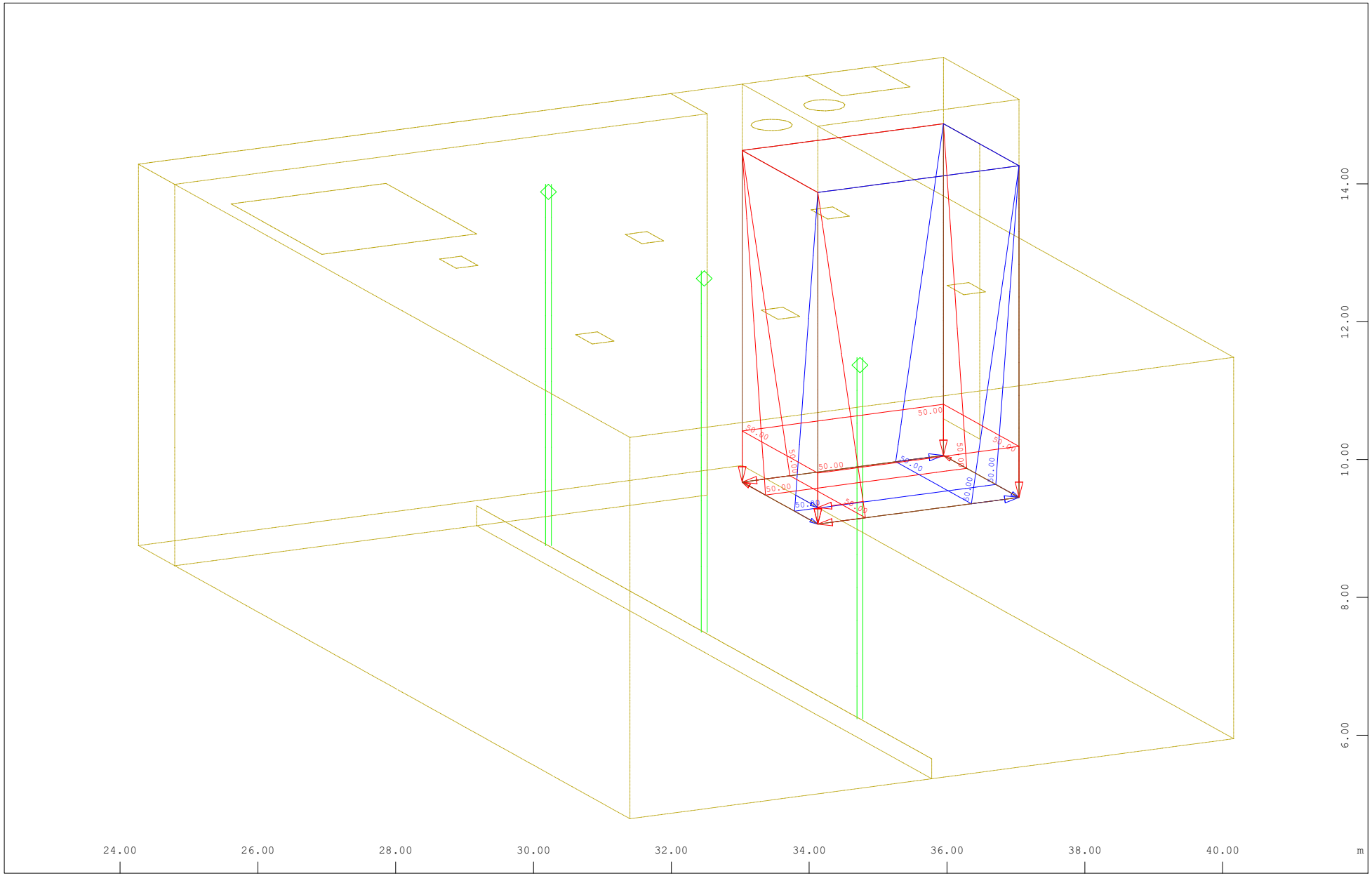



Z
Y
X

All loads, Loadcase 3 AGUA 1 , (1 cm 3D = unit) Free area load (force) in global X (Unit=50.00 kN/m2,Min=-47.50 Max=47.50 ), Free area load (force) in global Y (Unit=50.00 kN/m2,Min=-47.50 Max=47.50 ), Free area load (force) in global Z (Unit=50.00 kN/m2,Min=-47.50 Max=-47.50 )

M 1 : 77

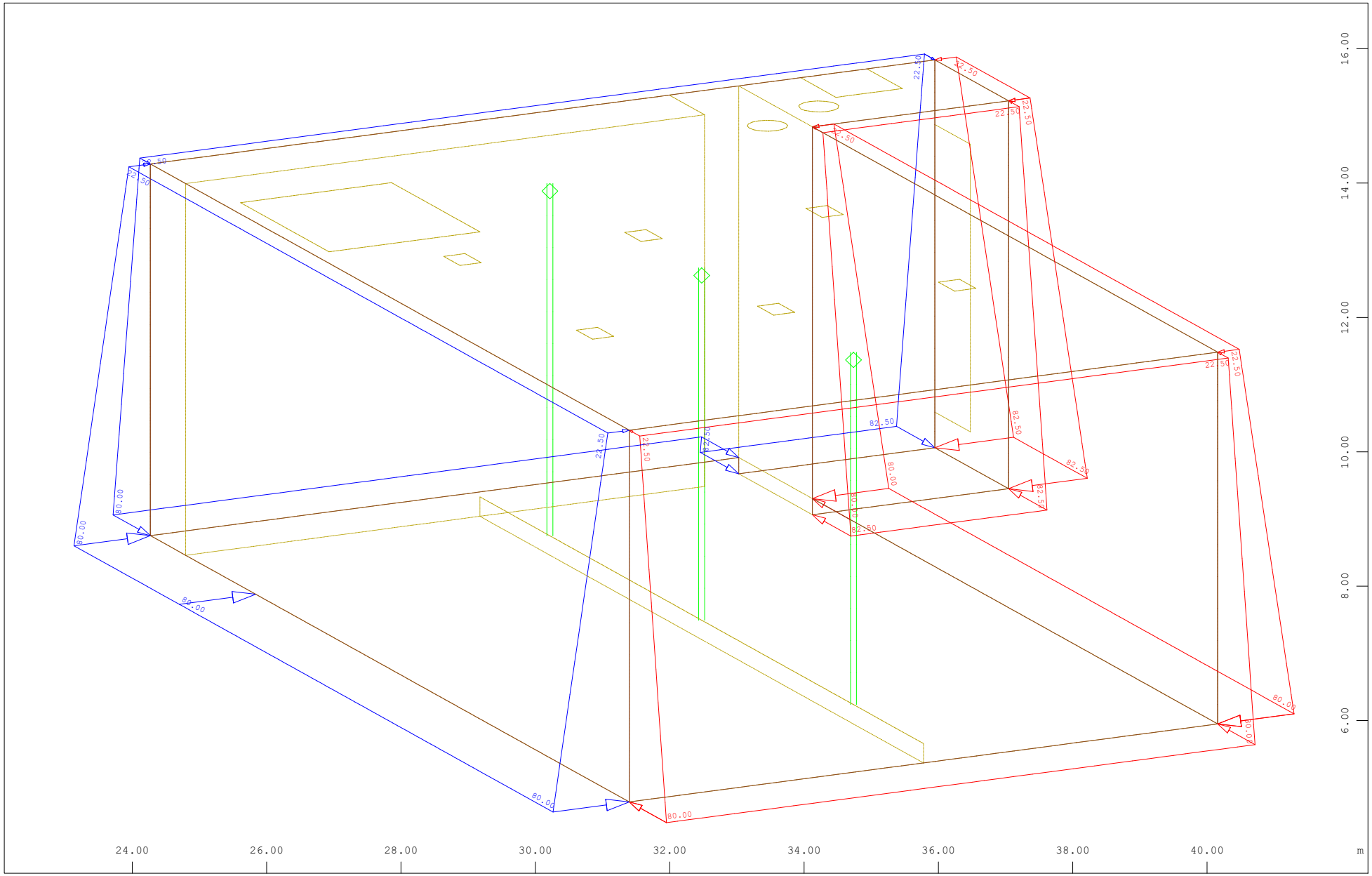
X * 0.502
Y * 0.906
Z * 0.962




All loads, Loadcase 4 AGUA 2 , (1 cm 3D = unit) Free area load (force) in global X (Unit=50.00 kN/m2,Min=-50.00 Max=50.00 ), Free area load (force) in global Y (Unit=50.00 kN/m2,Min=-50.00 Max=50.00 ), Free area load (force) in global Z (Unit=50.00 kN/m2,Min=-50.00 Max=-50.00 )

M 1 : 77

X * 0.502
Y * 0.906
Z * 0.962

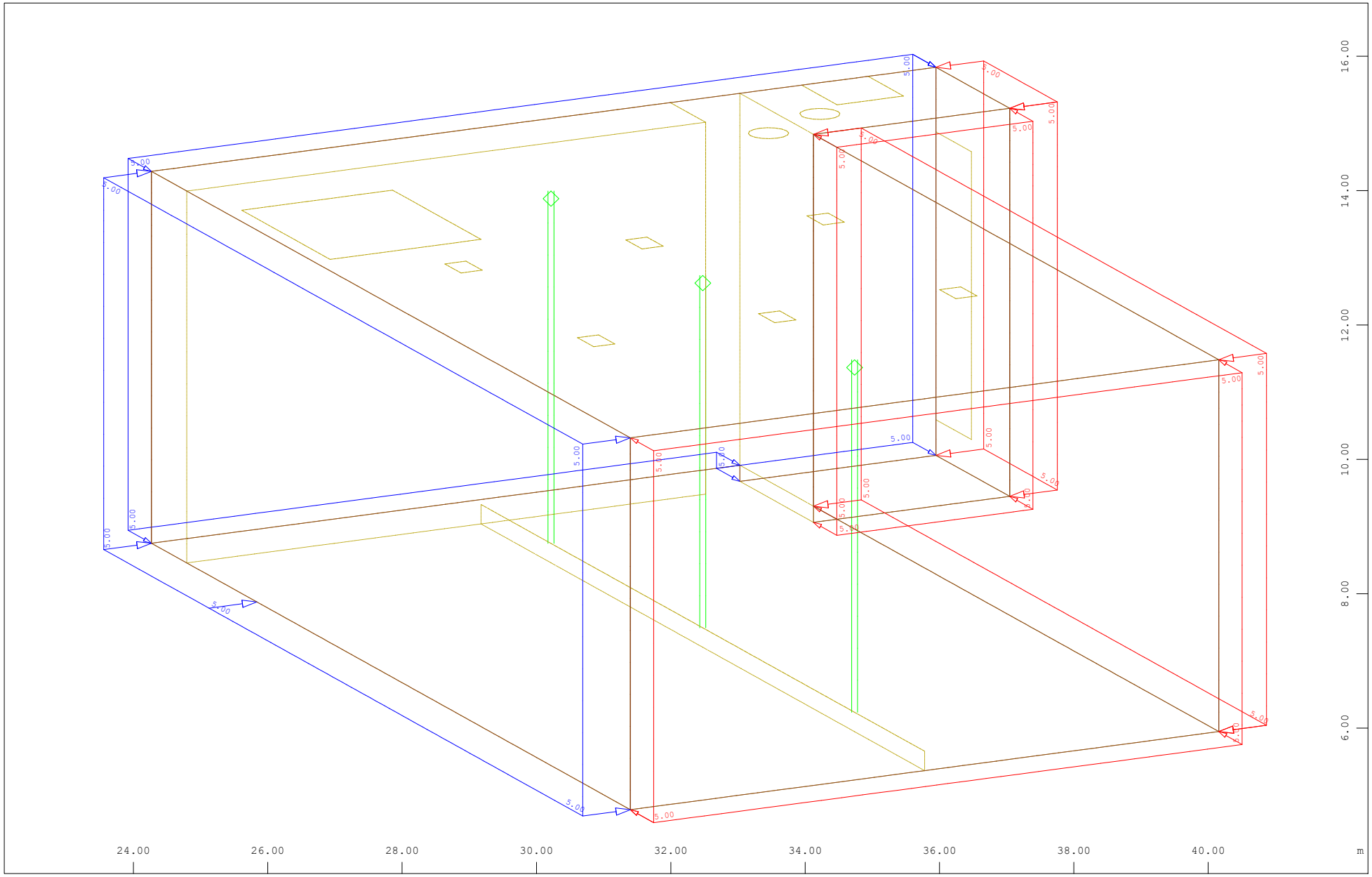



All loads, Loadcase 5 TIERRAS , (1 cm 3D = unit) Free area load (force) in global X (Unit=50.00 kN/m2,Min=-82.50 Max=82.50 ), Free

area load (force) in global Y (Unit=50.00 kN/m2,Min=-82.50 Max=80.00 )

M 1 : 79

X * 0.502
Y * 0.906
Z * 0.962



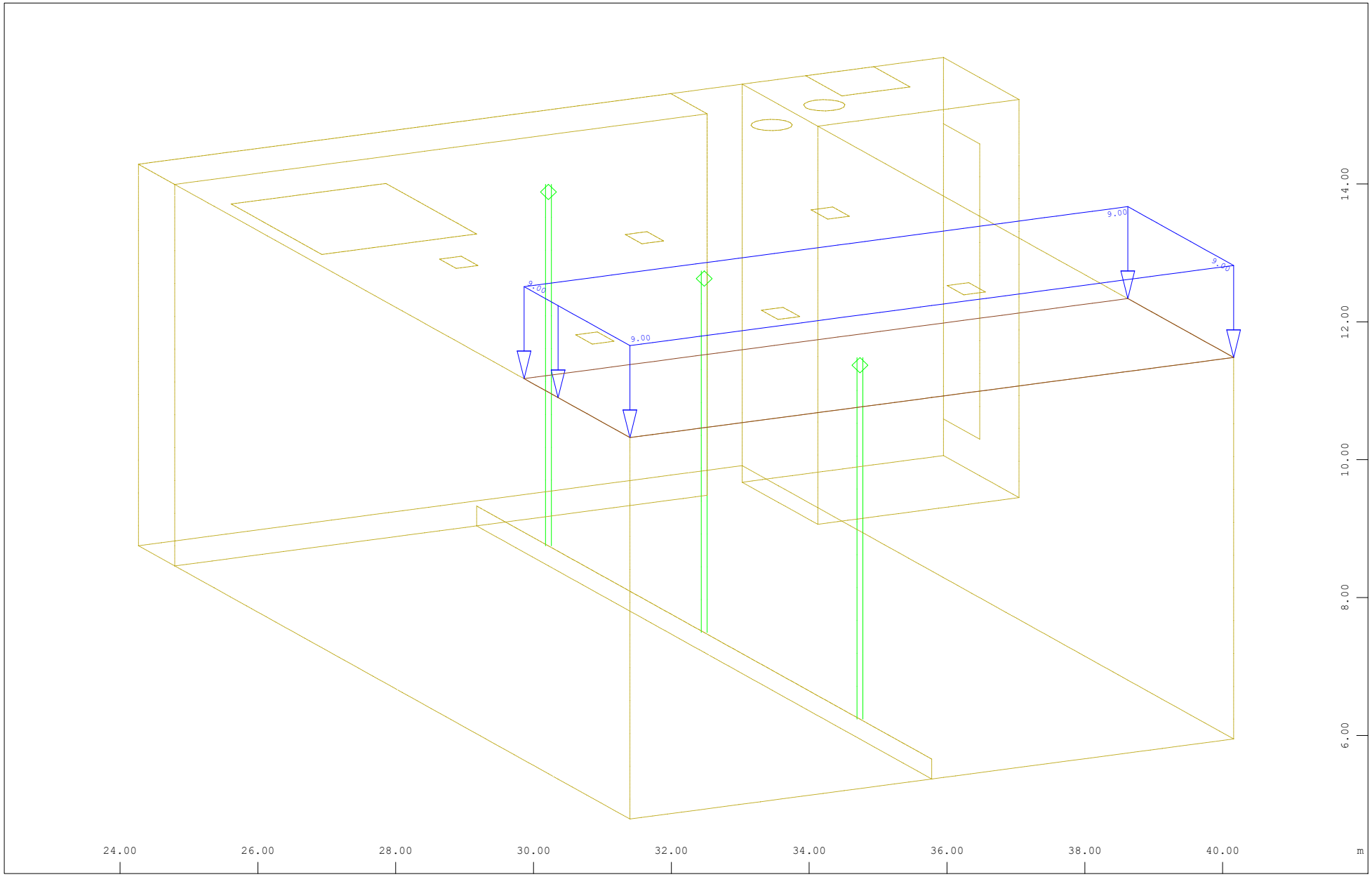

Z
Y
X

All loads, Loadcase 6 SCU TIERRAS , (1 cm 3D = unit) Free area load (force) in global X (Unit=5.00 kN/m2,Min=-5.00 Max=5.00 ), Free

area load (force) in global Y (Unit=5.00 kN/m2,Min=-5.00 Max=5.00 )

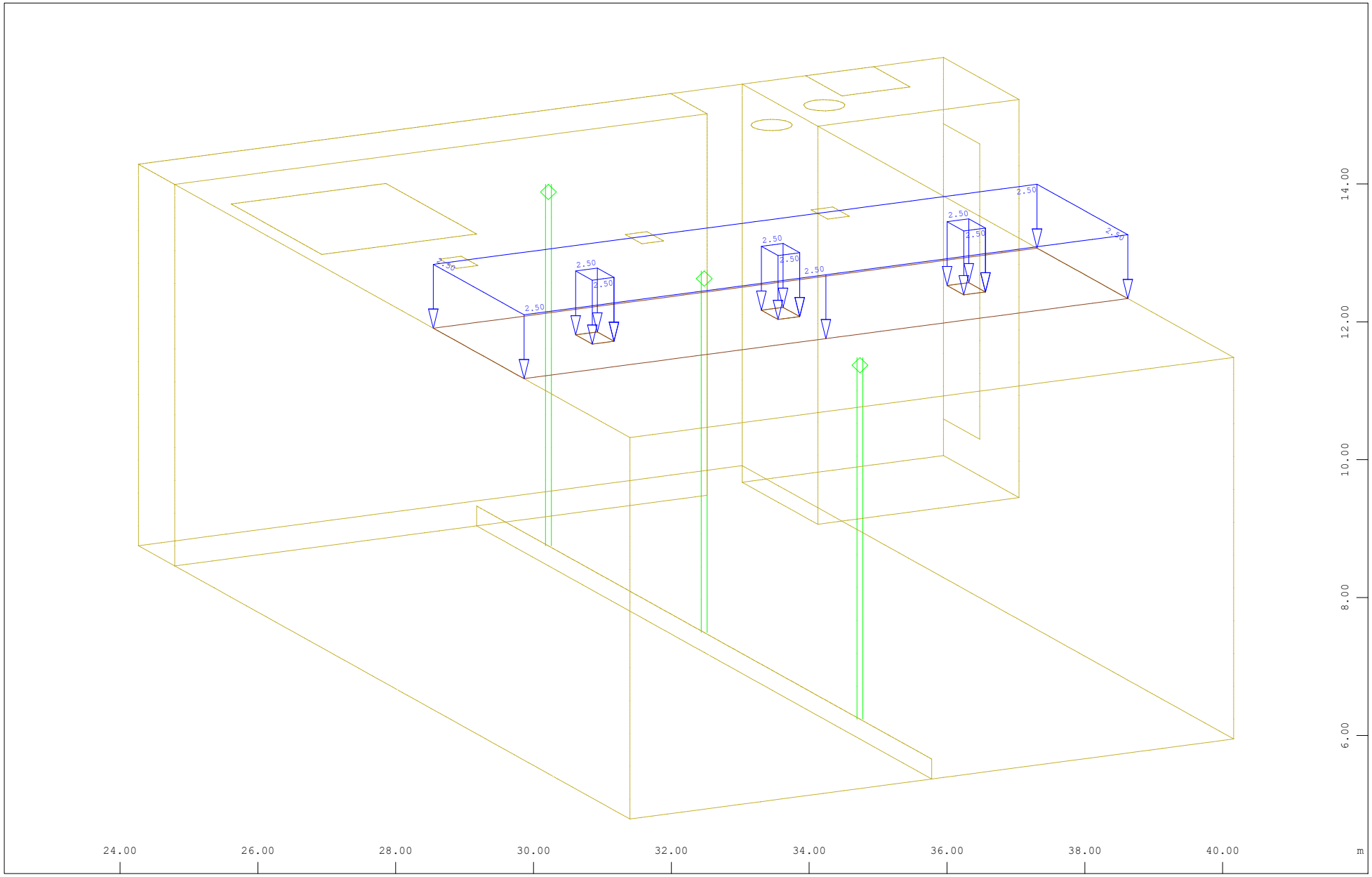
M 1 : 79

X * 0.502
Y * 0.906
Z * 0.962




All loads, Loadcase 7 CV 1 , (1 cm 3D = unit) Area element load (force) vector (Unit=5.00 kN/m2 ) (Max=9.00)

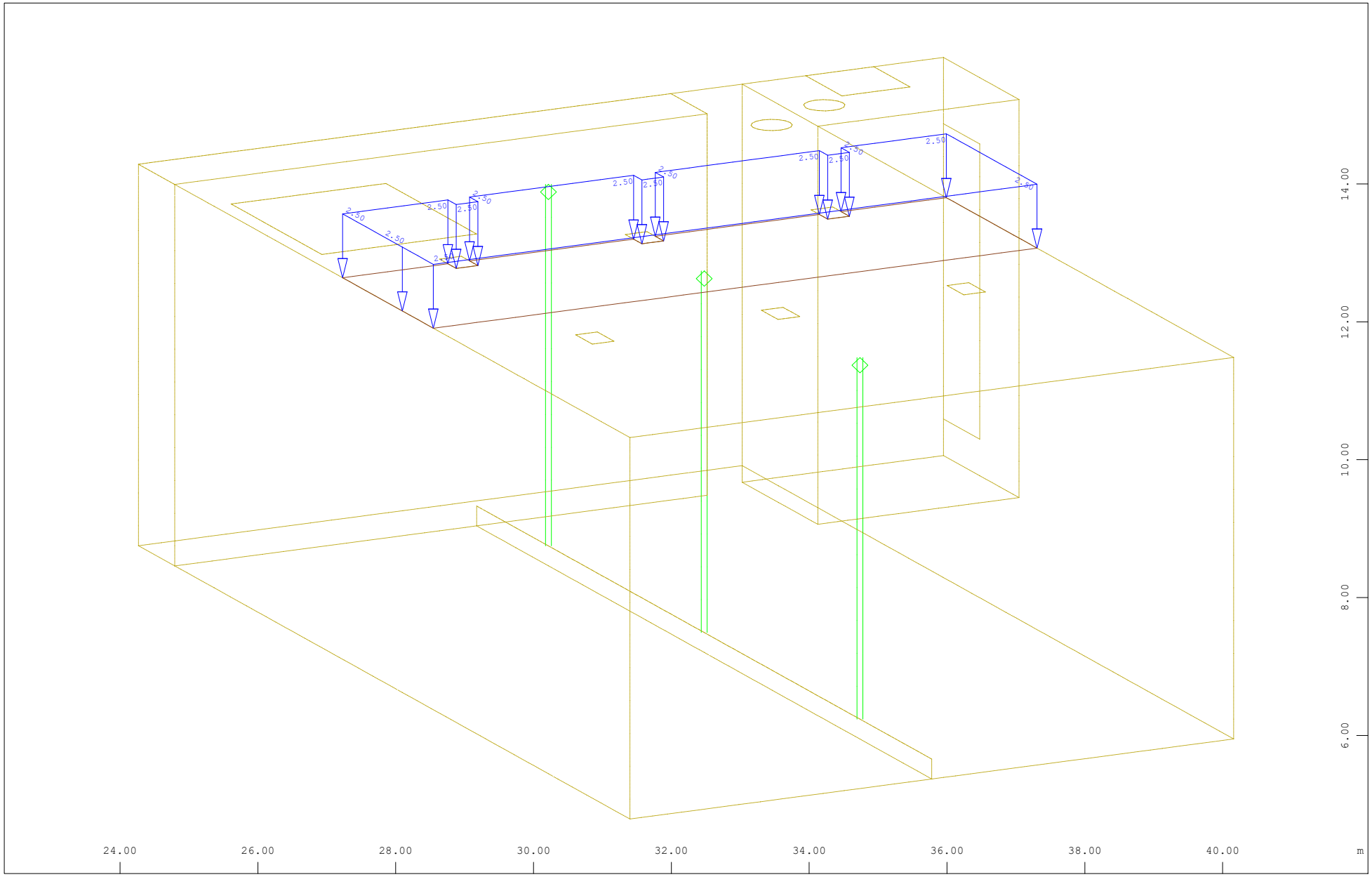
M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962




All loads, Loadcase 8 CV 2 , (1 cm 3D = unit) Area element load (force) vector (Unit=2.00 kN/m2 ) (Max=2.50)

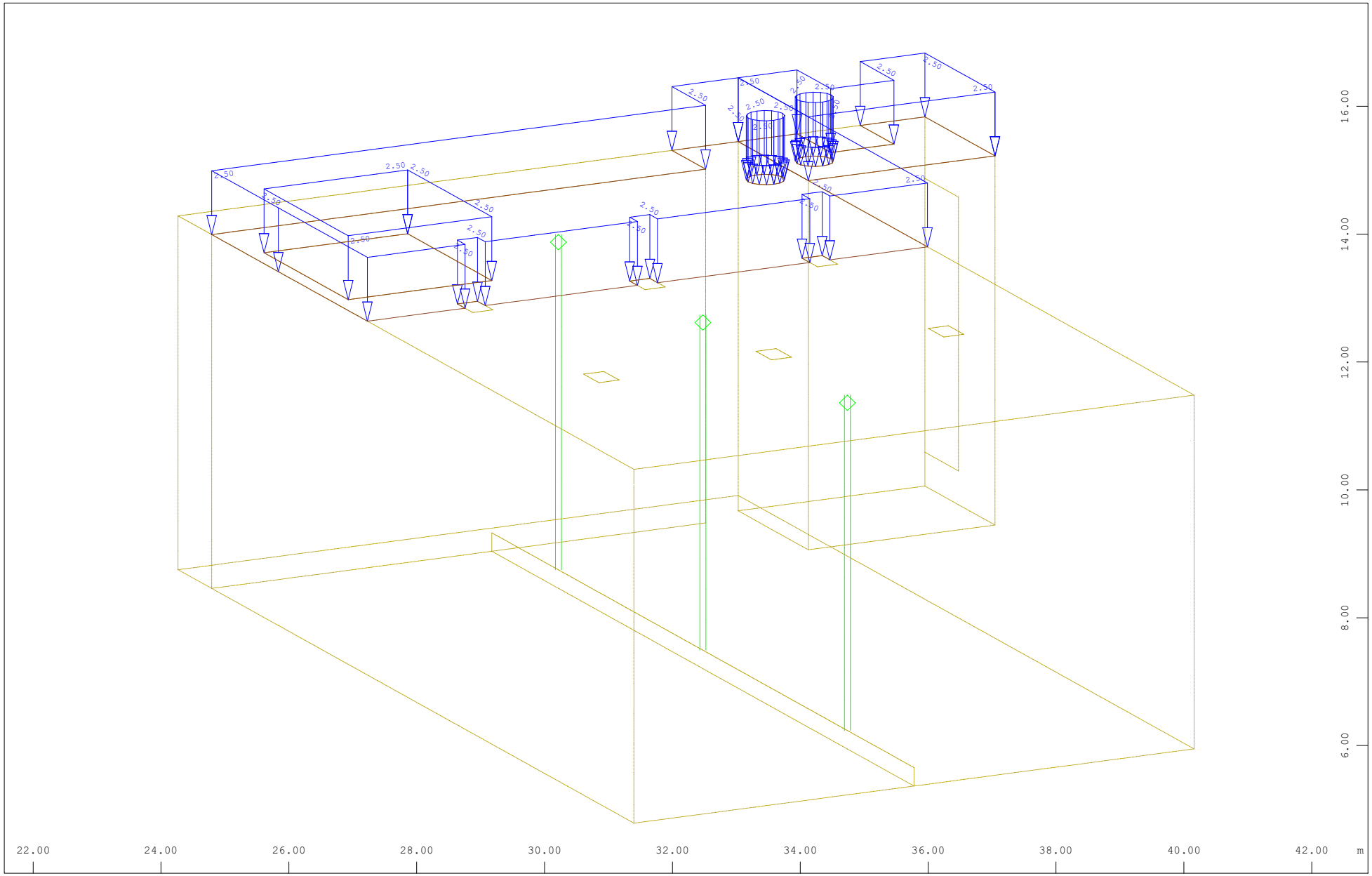
M 1 : 77

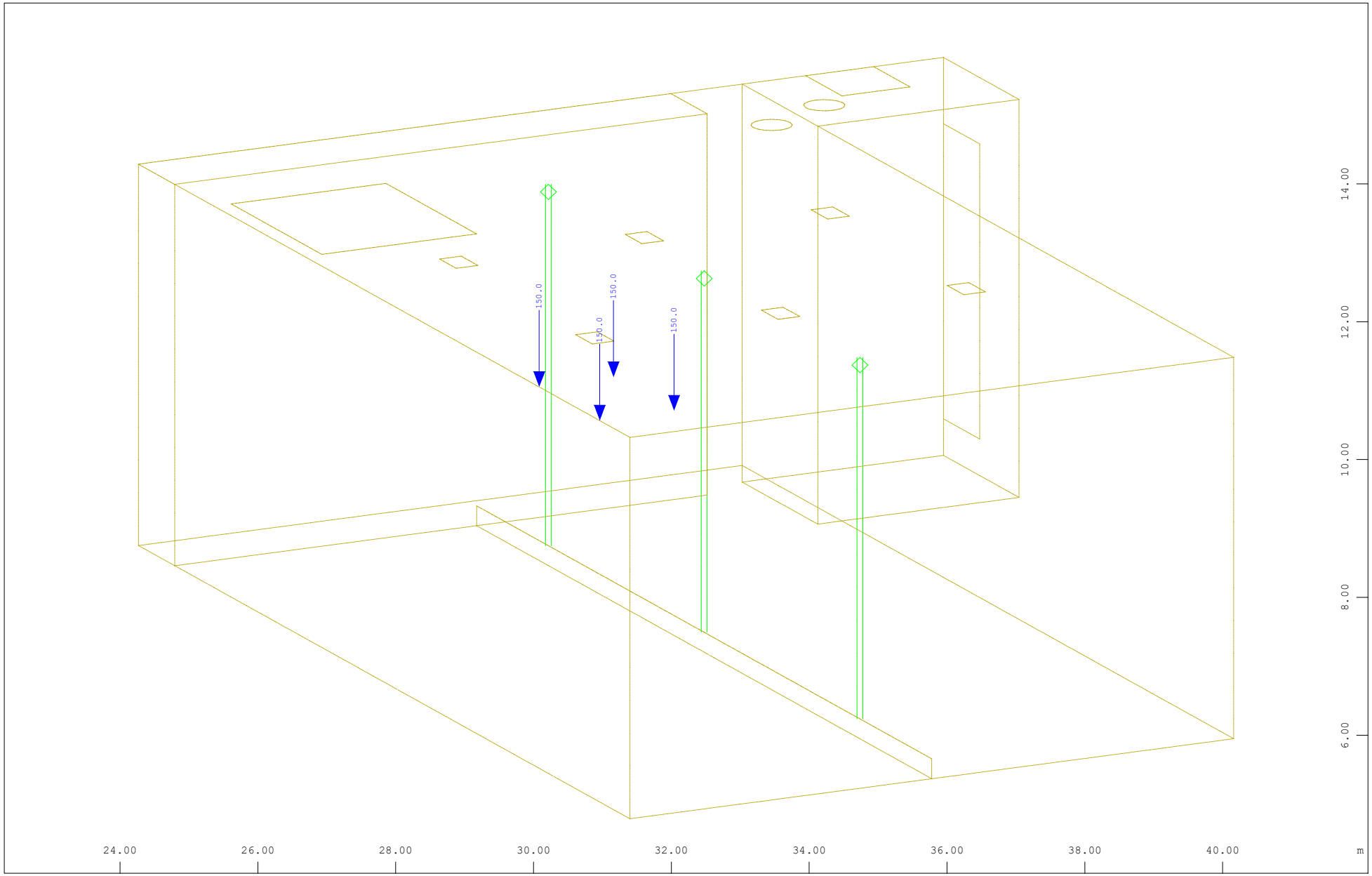
X * 0.502
Y * 0.906
Z * 0.962




All loads, Loadcase 9 CV 3 , (1 cm 3D = unit) Area element load (force) vector (Unit=2.00 kN/m2 ) (Max=2.50)

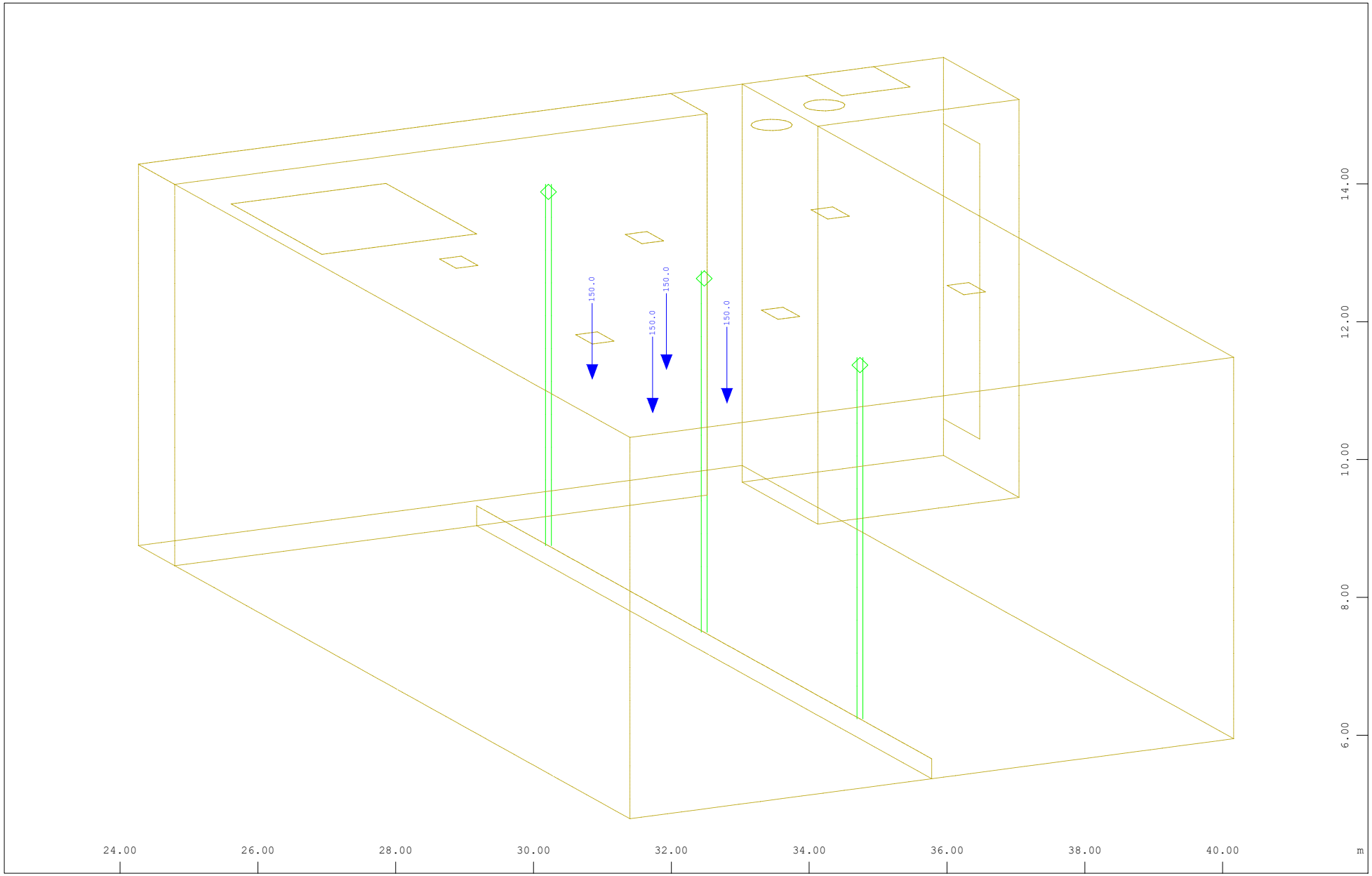
M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962


2.50
16.00
14.00
12.00
10.00
8.00
6.00
22.00
24.00
26.00
28.00
30.00
32.00
34.00
36.00
38.00
40.00
42.00
m
Z
Y
X
All loads, Loadcase 10 AR , (1 cm 3D = unit) Area element load (force) vector (Unit=2.00 kN/m2
) (Max=2.50)
M 1 : 83
X * 0.502
Y * 0.906
Z * 0.962




All loads, Loadcase 11 CARRO 1 , (1 cm 3D = unit) Free single load (force) vector (Unit=100.0 kN ) (Max=150.0)

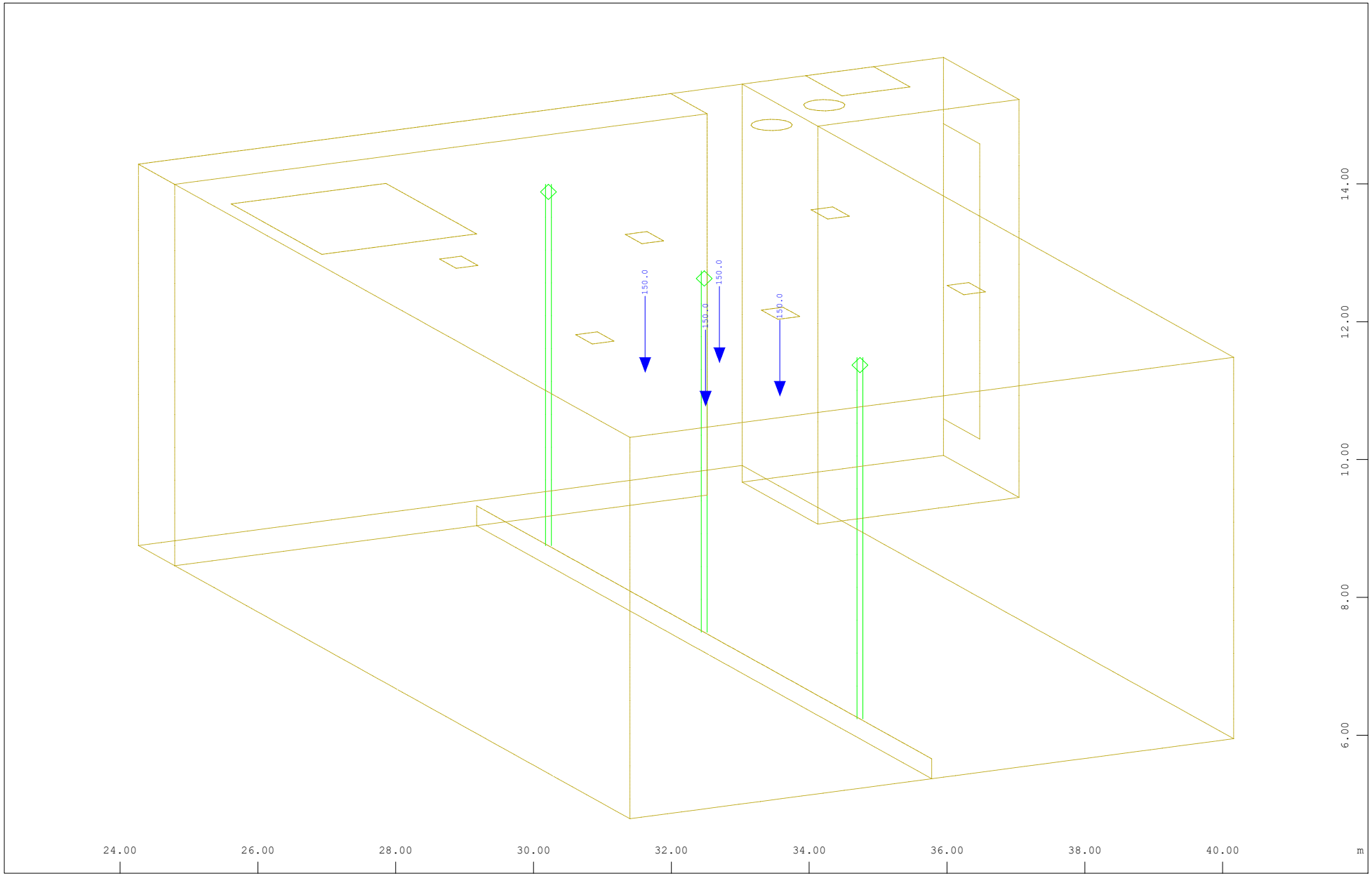
M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

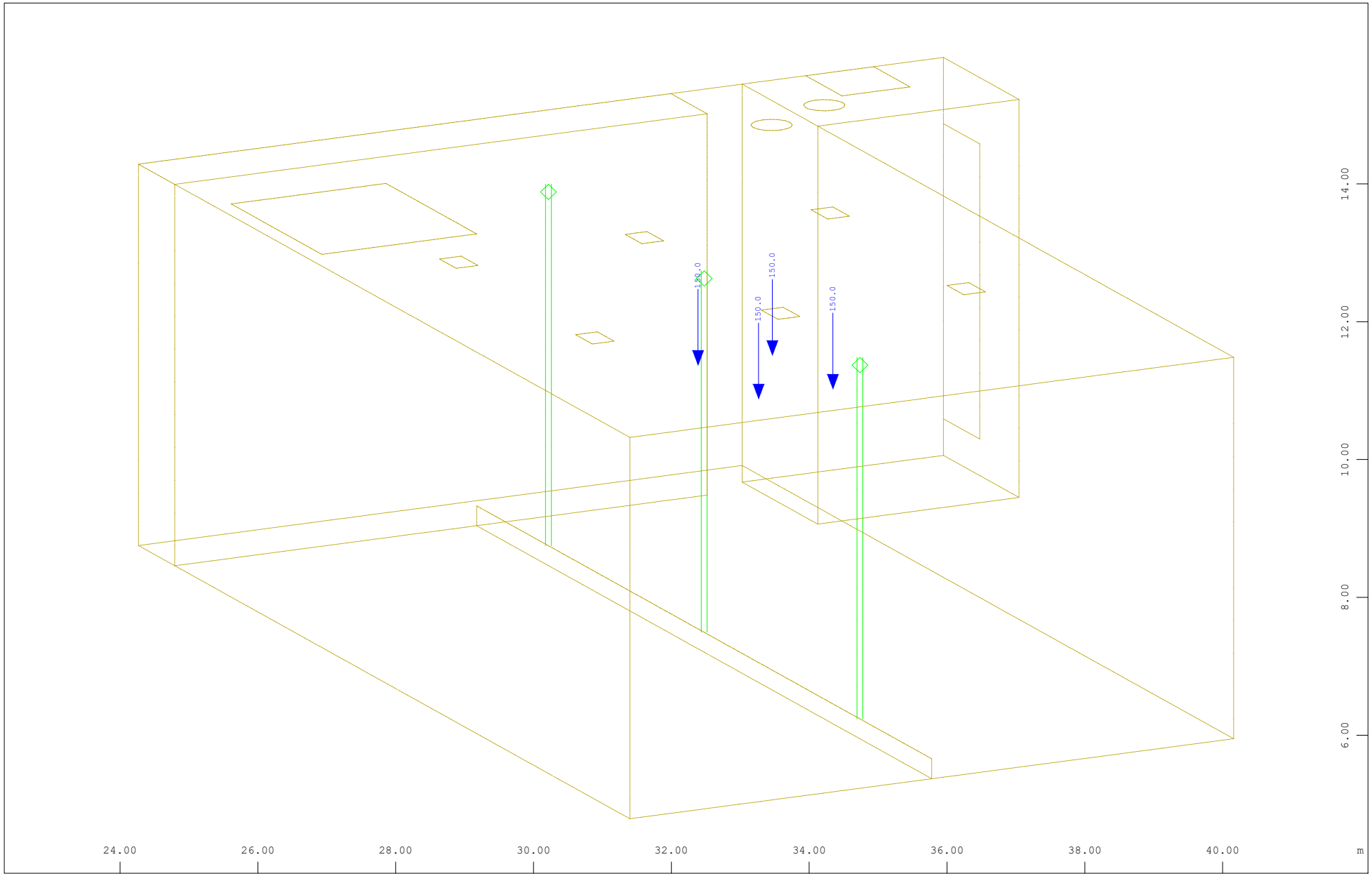
All loads, Loadcase 12 CARRO 1 , (1 cm 3D = unit) Free single load (force) vector (Unit=100.0 kN ) (Max=150.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



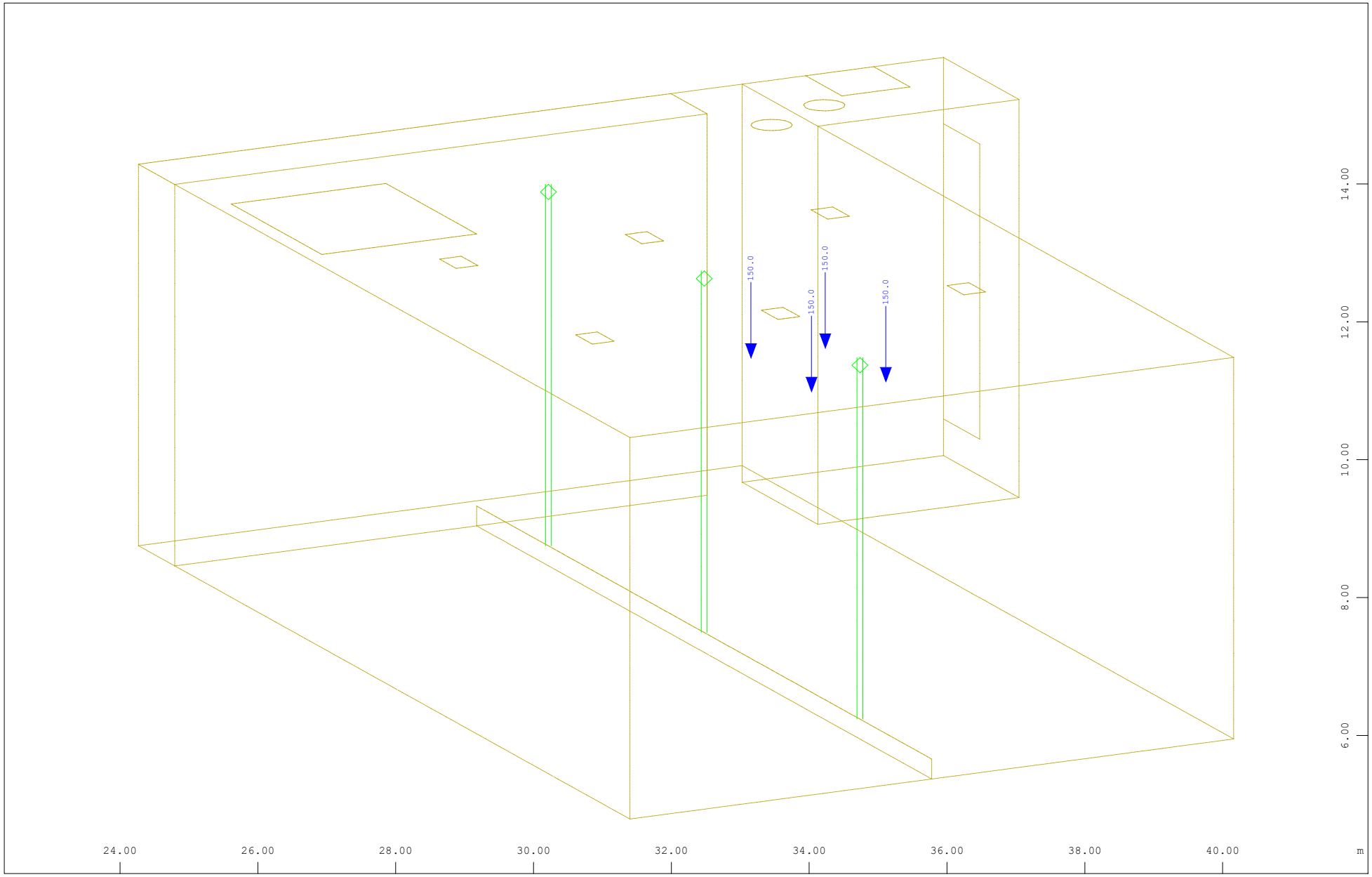

All loads, Loadcase 13 CARRO 1 , (1 cm 3D = unit) Free single load (force) vector (Unit=100.0 kN ) (Max=150.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



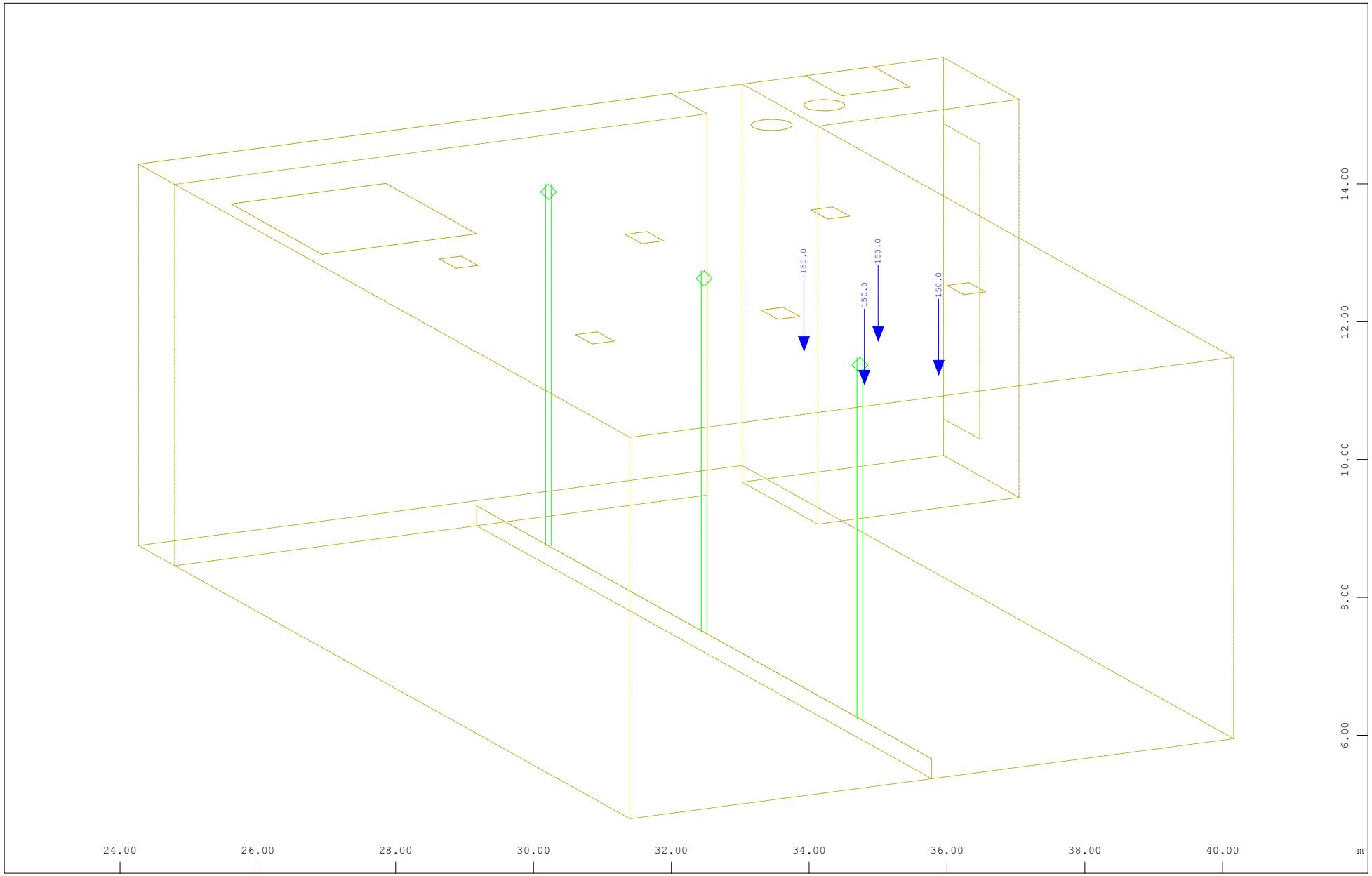

All loads, Loadcase 14 CARRO 1 , (1 cm 3D = unit) Free single load (force) vector (Unit=100.0 kN ) (Max=150.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



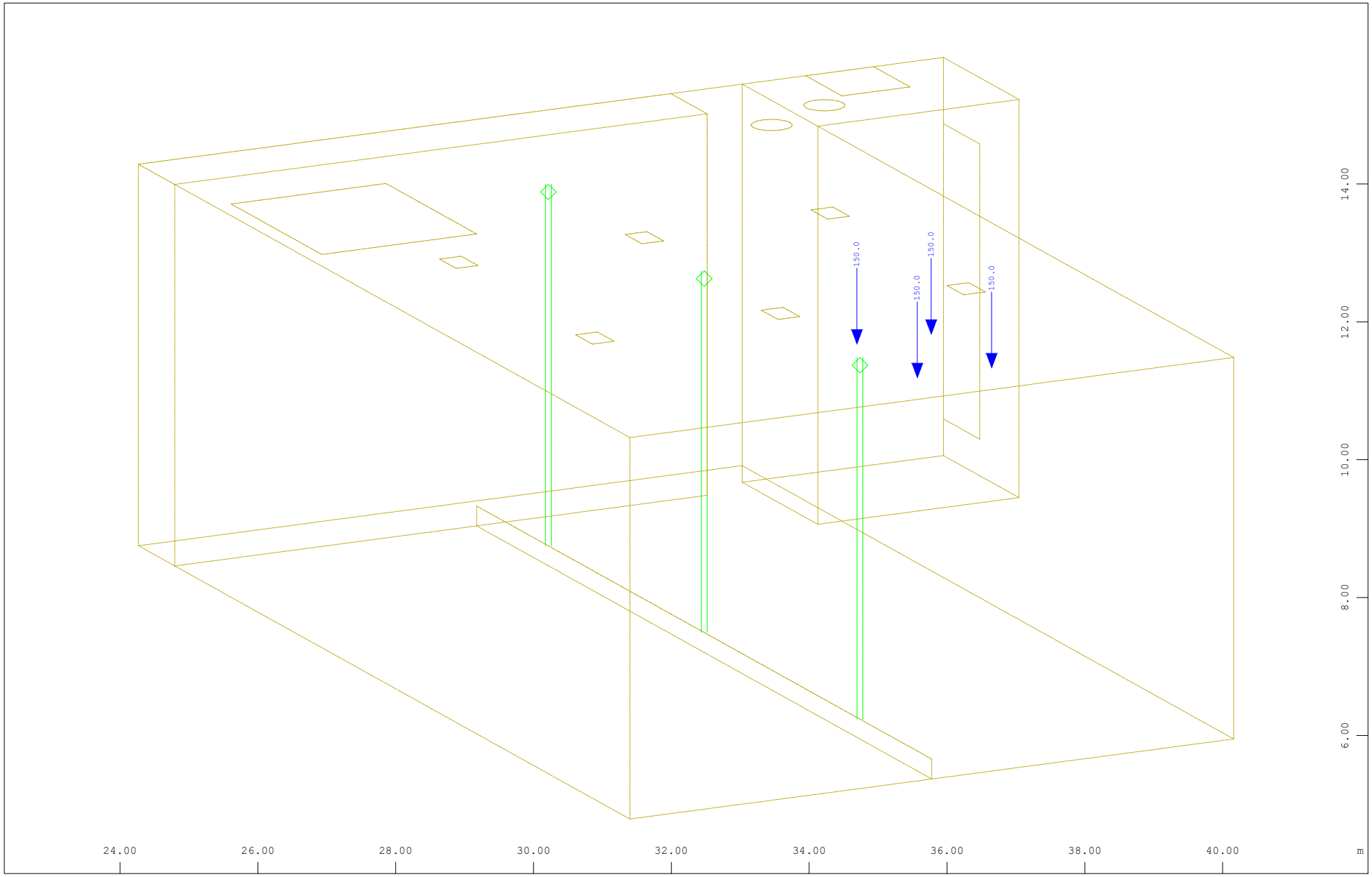

All loads, Loadcase 15 CARRO 1 , (1 cm 3D = unit) Free single load (force) vector (Unit=100.0 kN ) (Max=150.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



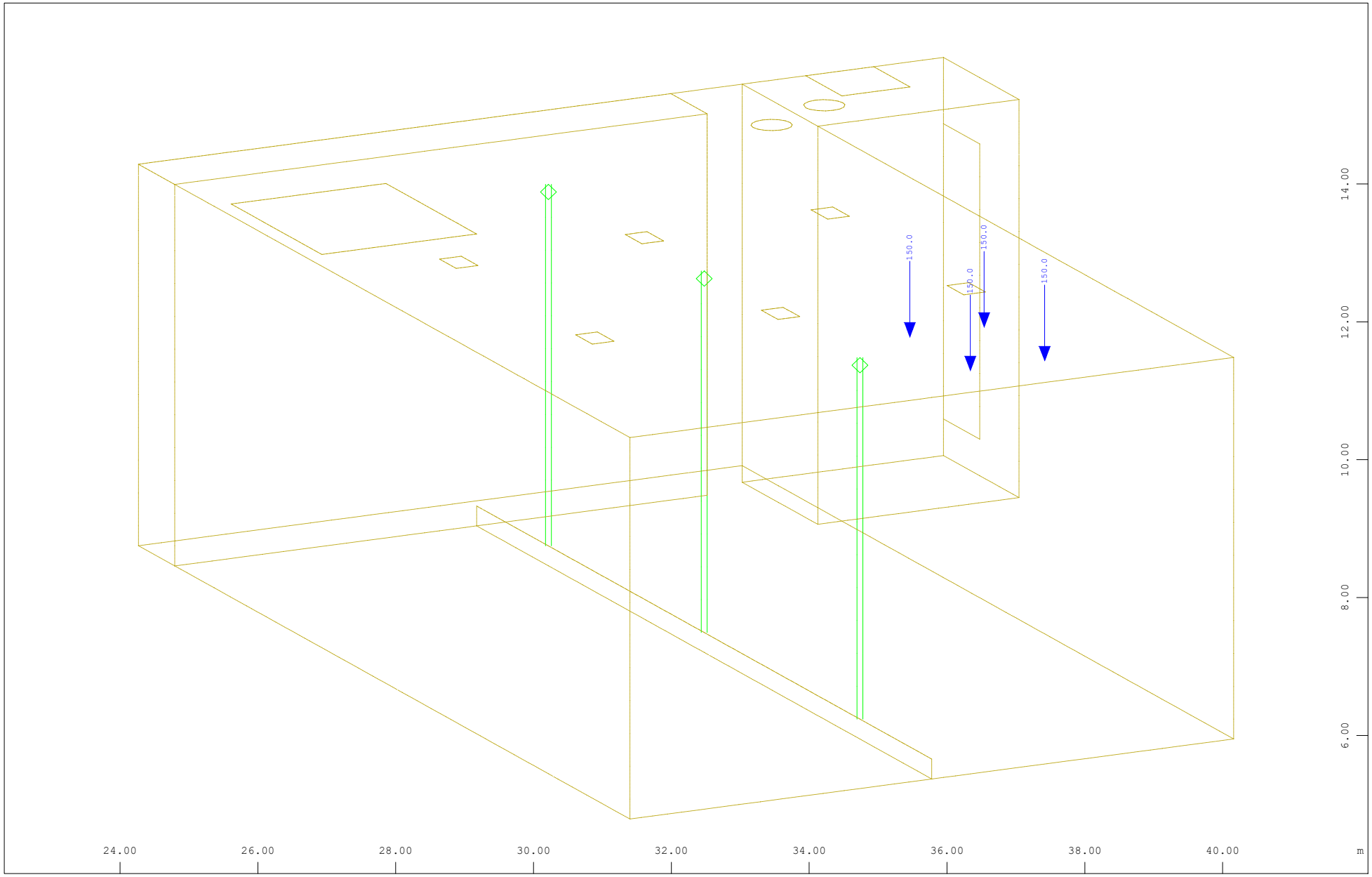

All loads, Loadcase 16 CARRO 1 , (1 cm 3D = unit) Free single load (force) vector (Unit=100.0 kN ) (Max=150.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



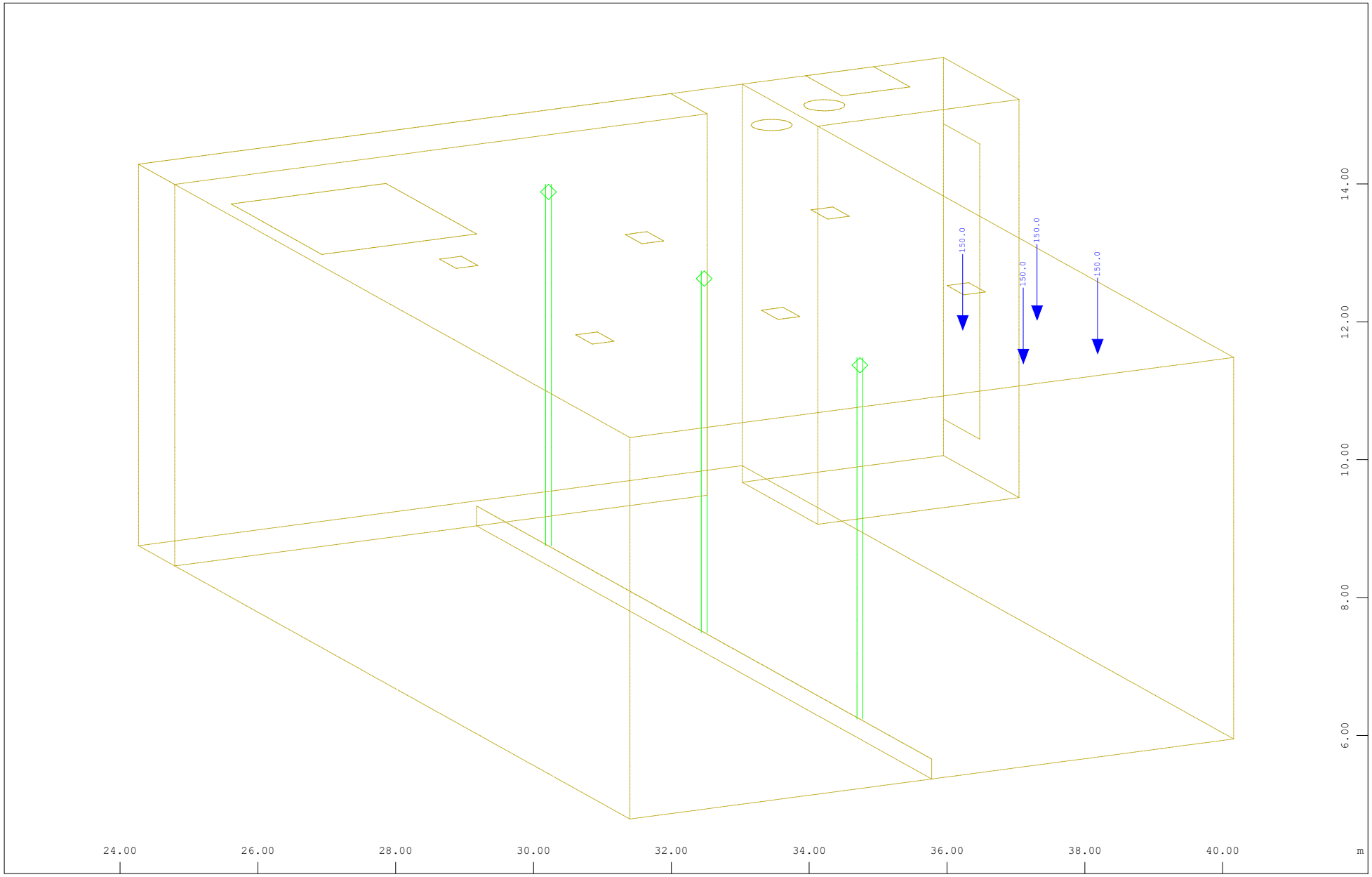

All loads, Loadcase 17 CARRO 1 , (1 cm 3D = unit) Free single load (force) vector (Unit=100.0 kN ) (Max=150.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



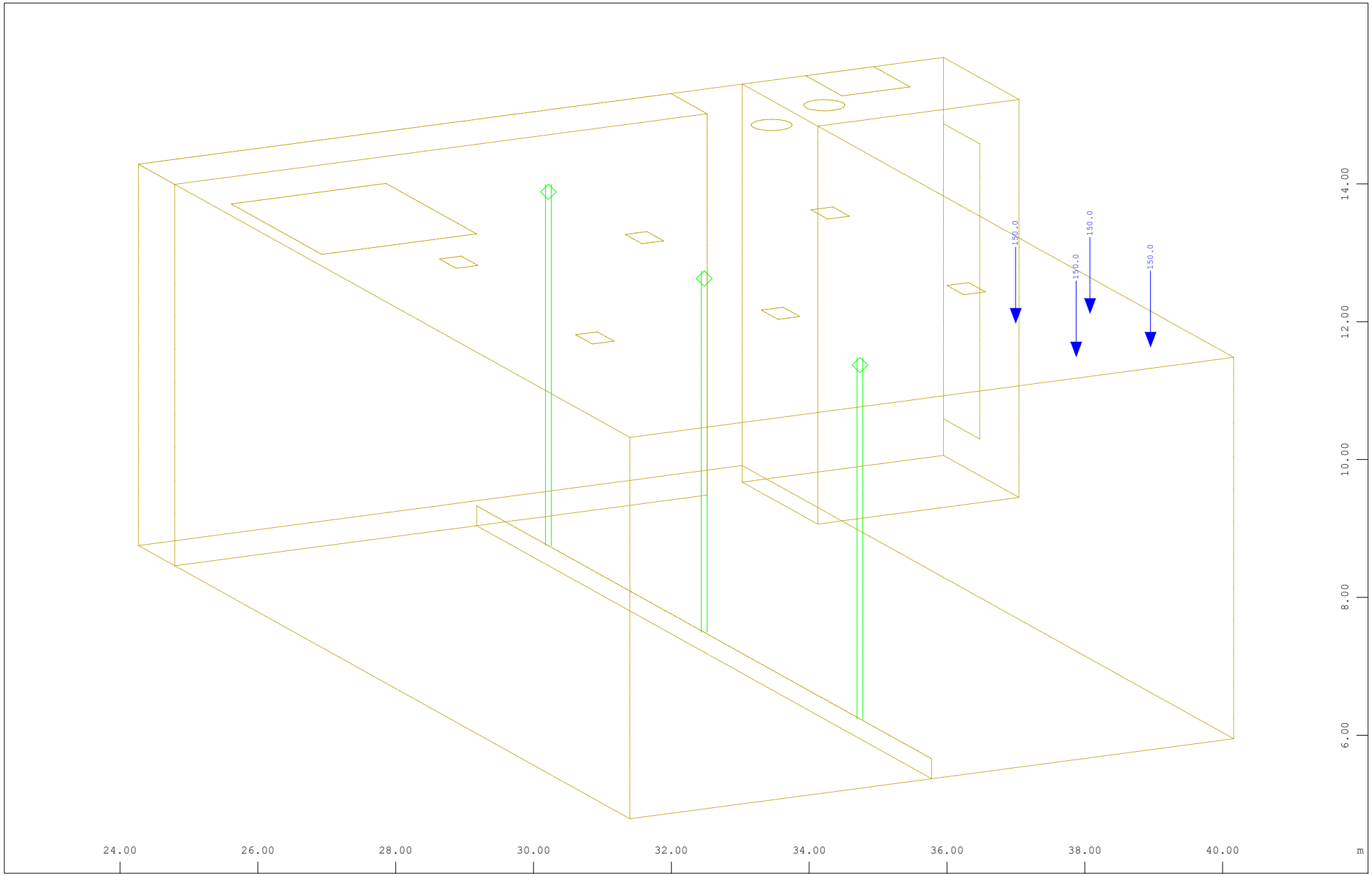

All loads, Loadcase 18 CARRO 1 , (1 cm 3D = unit) Free single load (force) vector (Unit=100.0 kN ) (Max=150.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



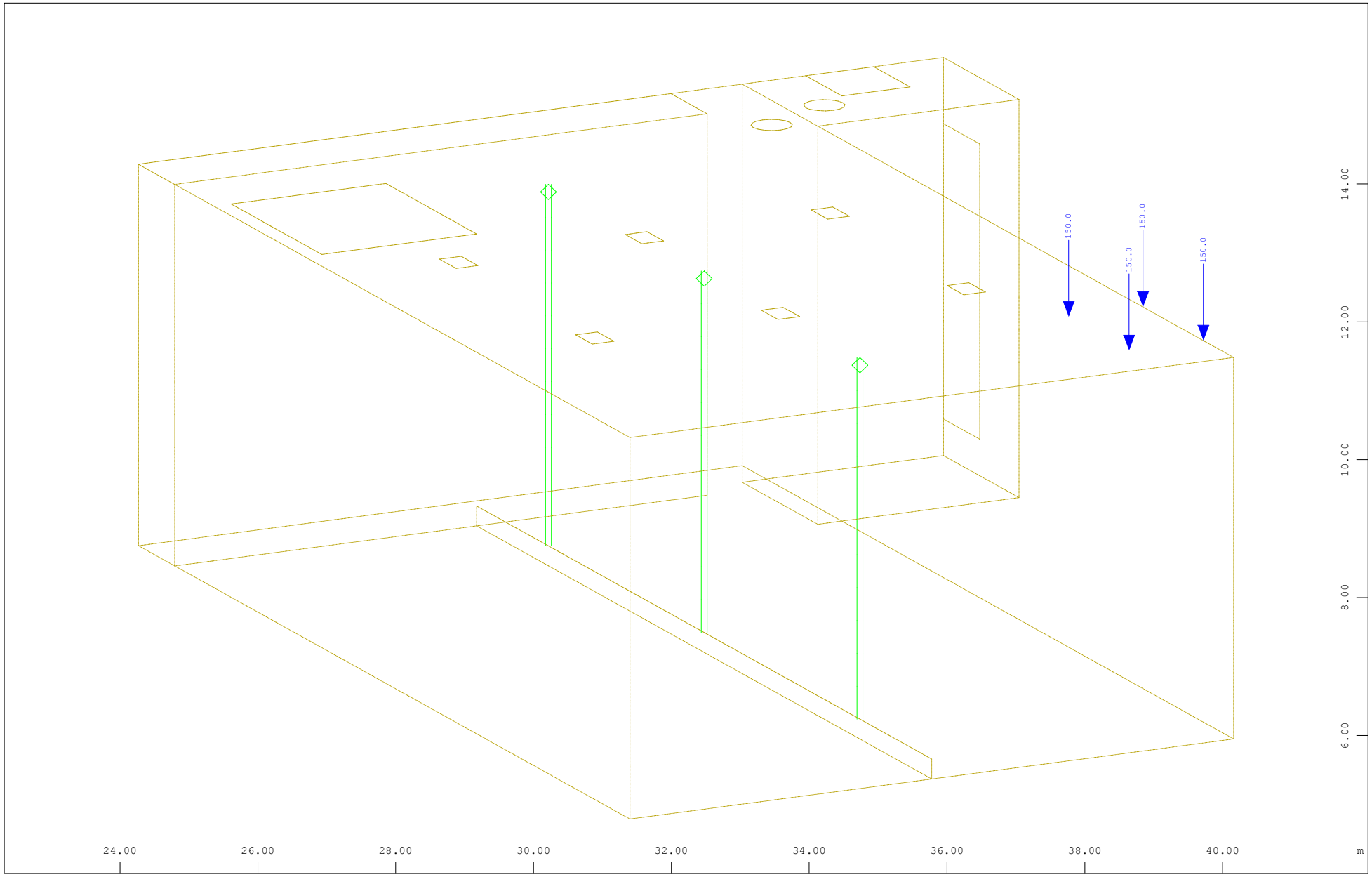

All loads, Loadcase 19 CARRO 1 , (1 cm 3D = unit) Free single load (force) vector (Unit=100.0 kN ) (Max=150.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



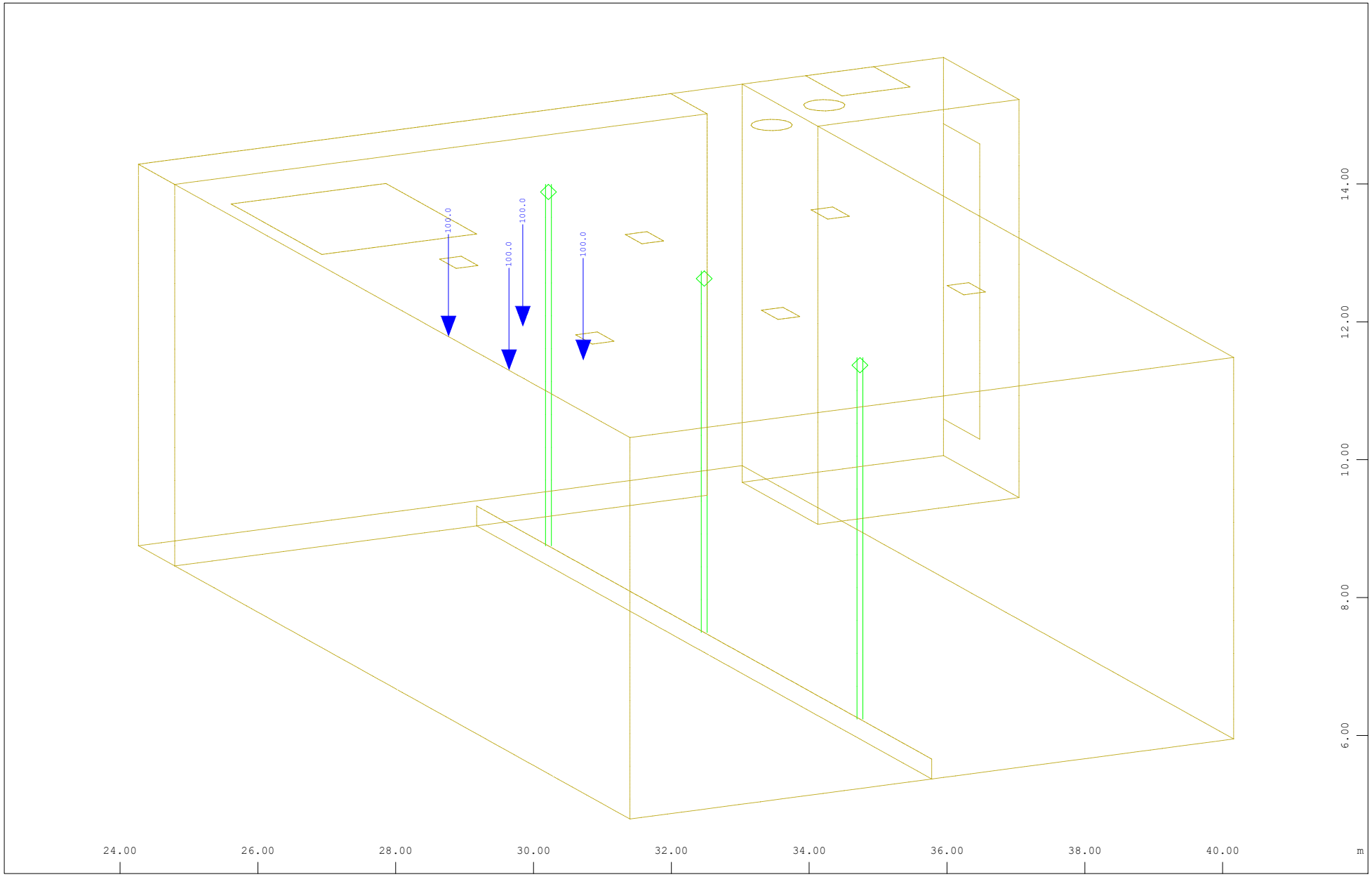

All loads, Loadcase 20 CARRO 1 , (1 cm 3D = unit) Free single load (force) vector (Unit=100.0 kN ) (Max=150.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



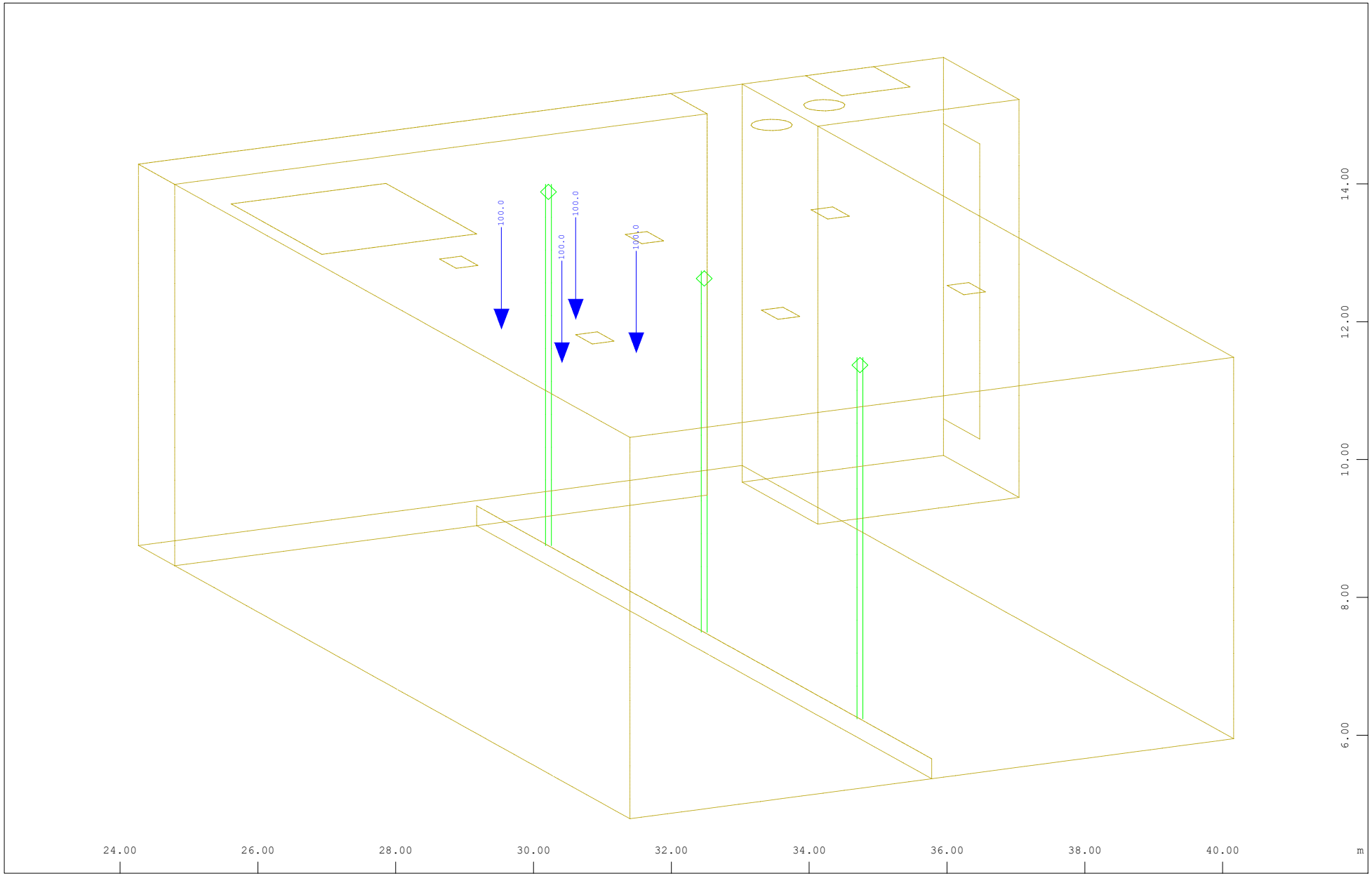

All loads, Loadcase 21 CARRO 1 , (1 cm 3D = unit) Free single load (force) vector (Unit=100.0 kN ) (Max=150.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



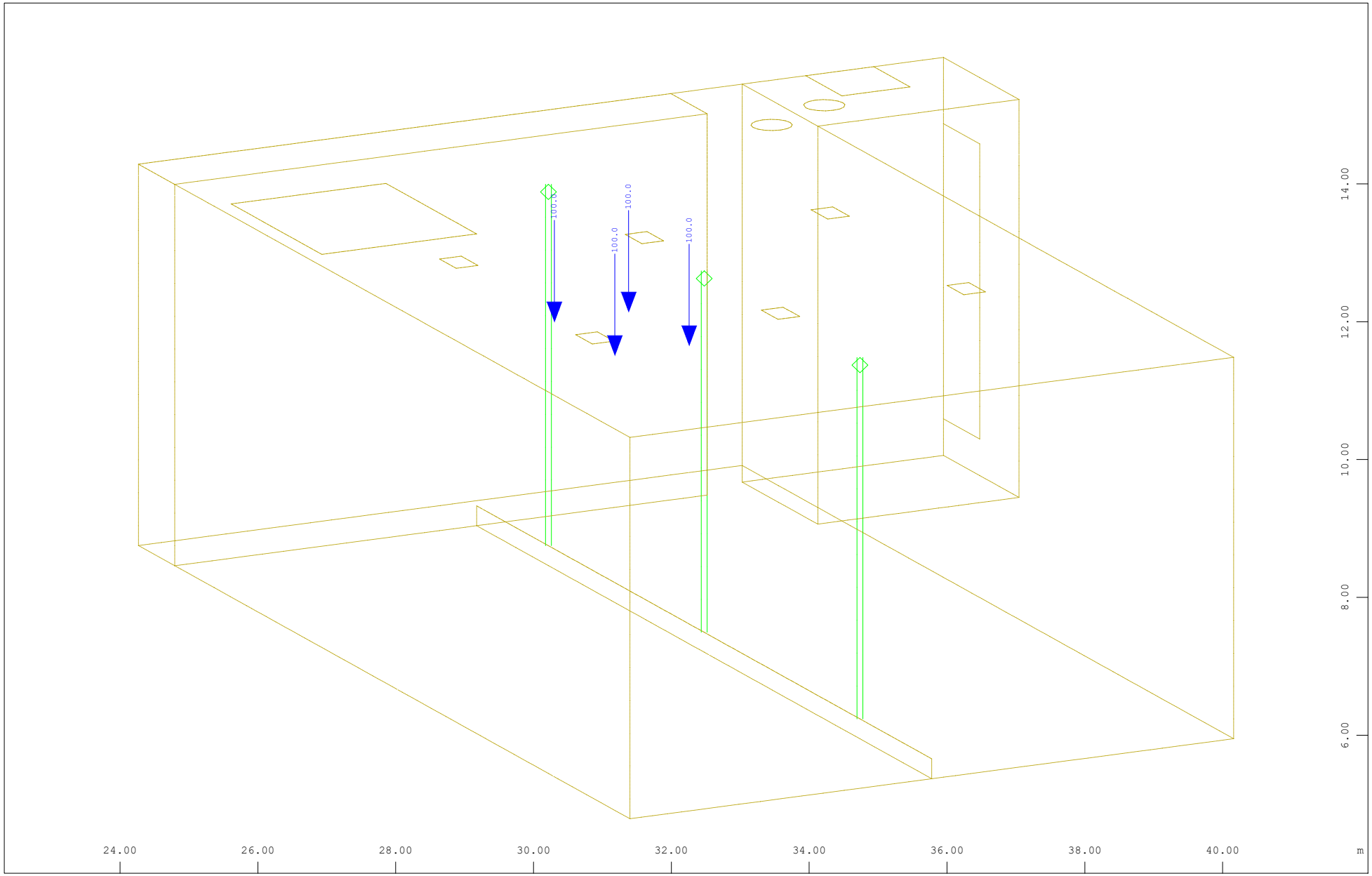

All loads, Loadcase 22 CARRO 2 , (1 cm 3D = unit) Free single load (force) vector (Unit=50.0 kN ) (Max=100.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



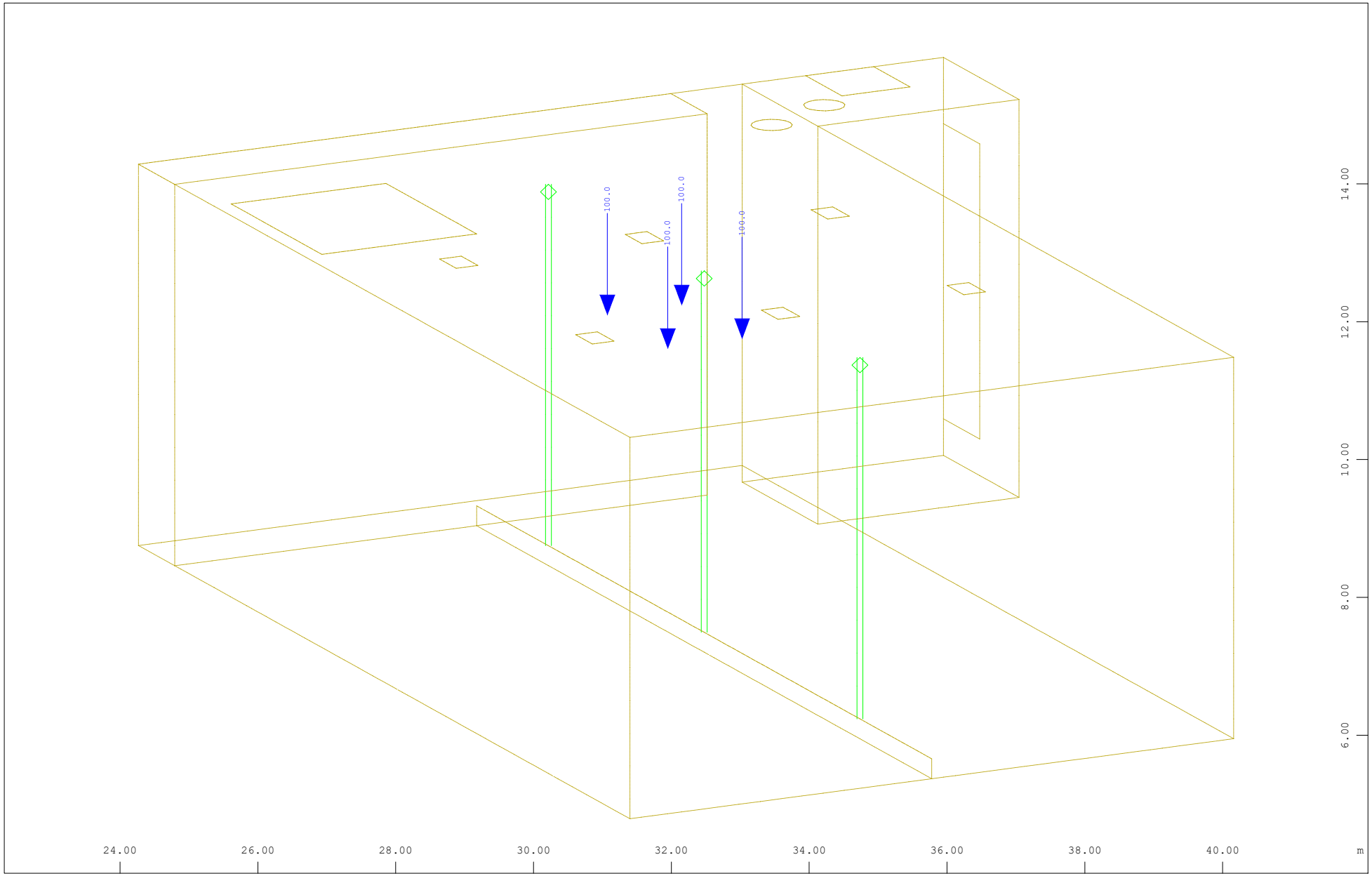

All loads, Loadcase 23 CARRO 2 , (1 cm 3D = unit) Free single load (force) vector (Unit=50.0 kN ) (Max=100.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



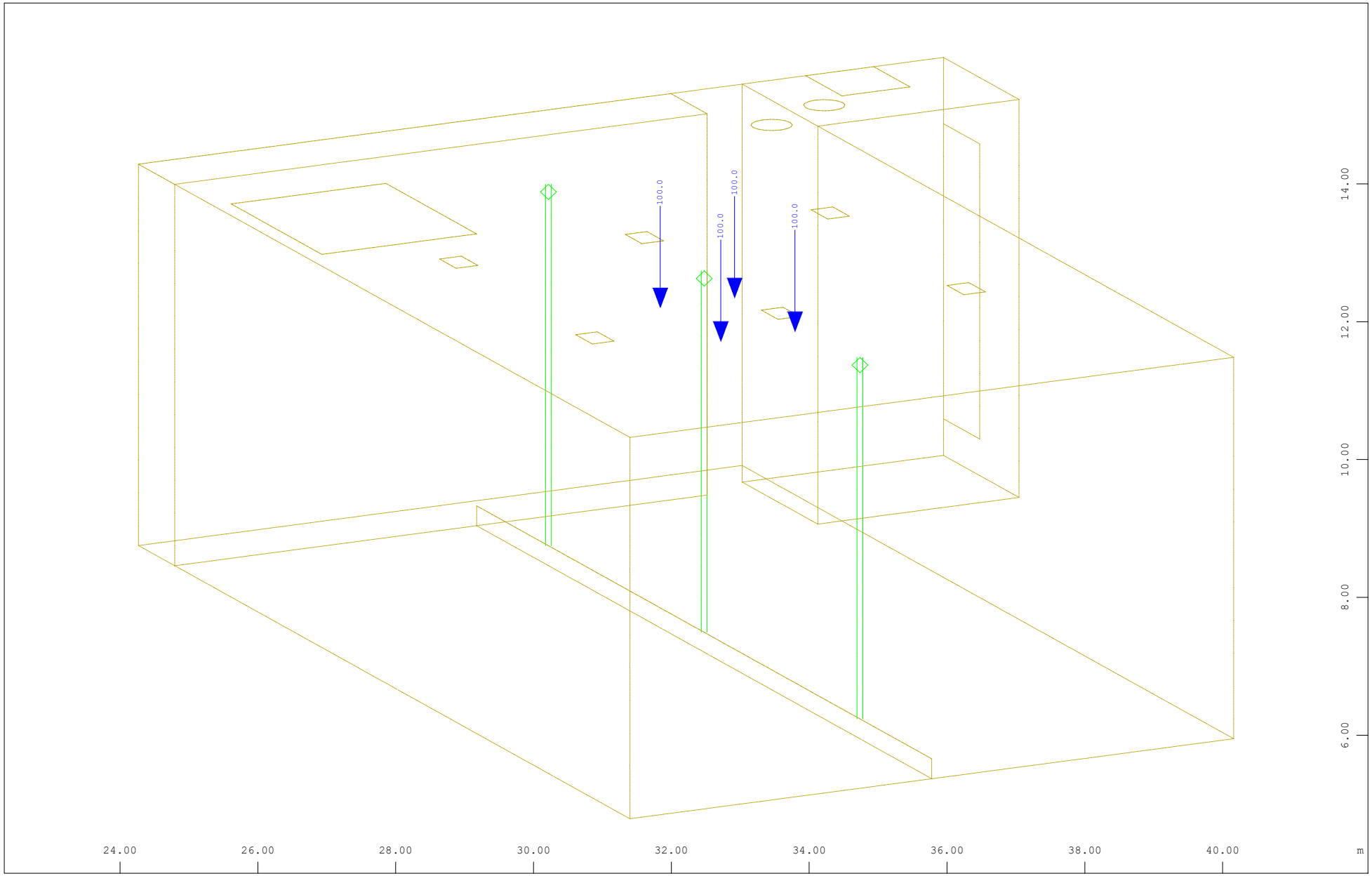

All loads, Loadcase 24 CARRO 2 , (1 cm 3D = unit) Free single load (force) vector (Unit=50.0 kN ) (Max=100.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



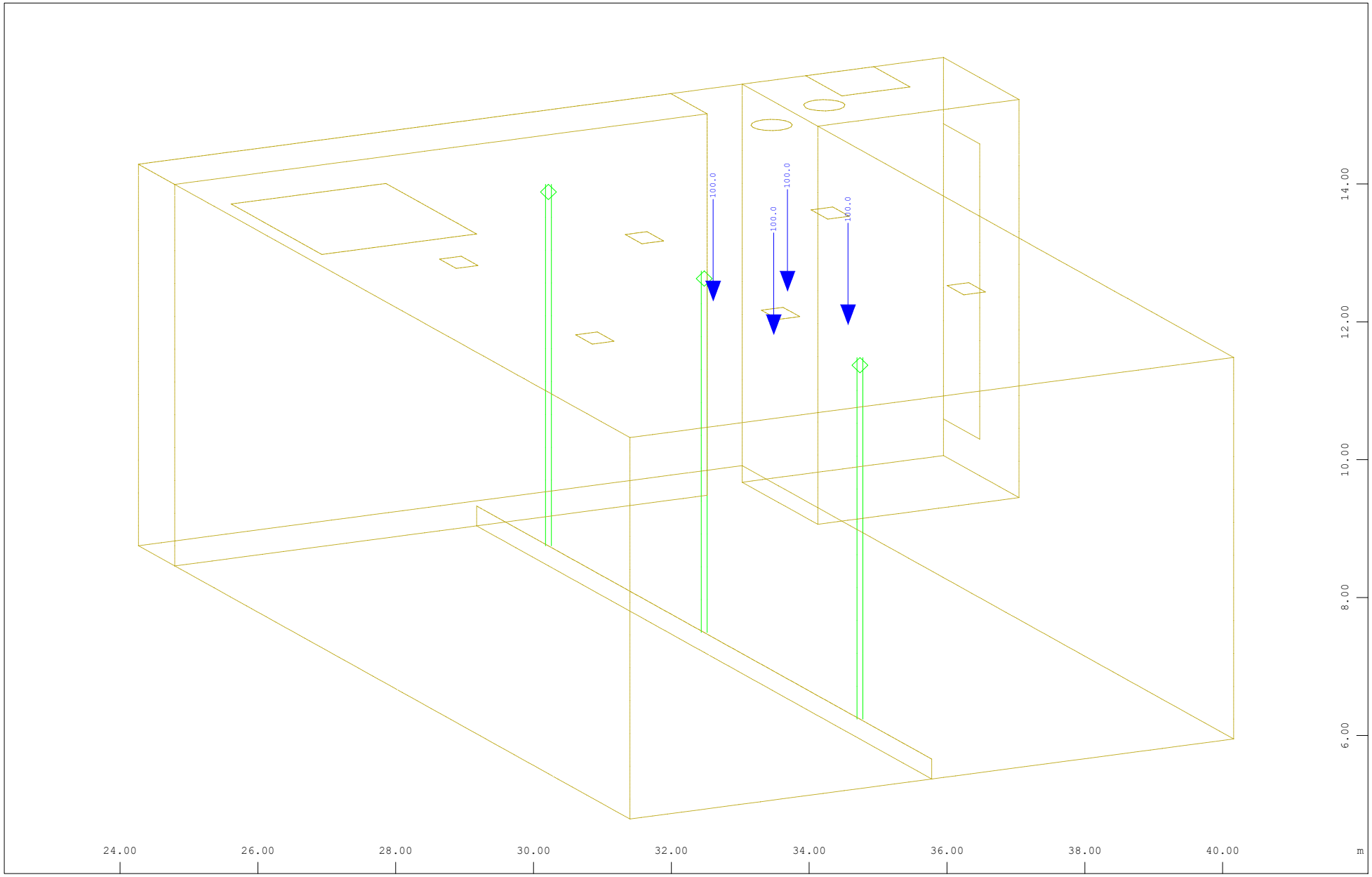

All loads, Loadcase 25 CARRO 2 , (1 cm 3D = unit) Free single load (force) vector (Unit=50.0 kN ) (Max=100.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



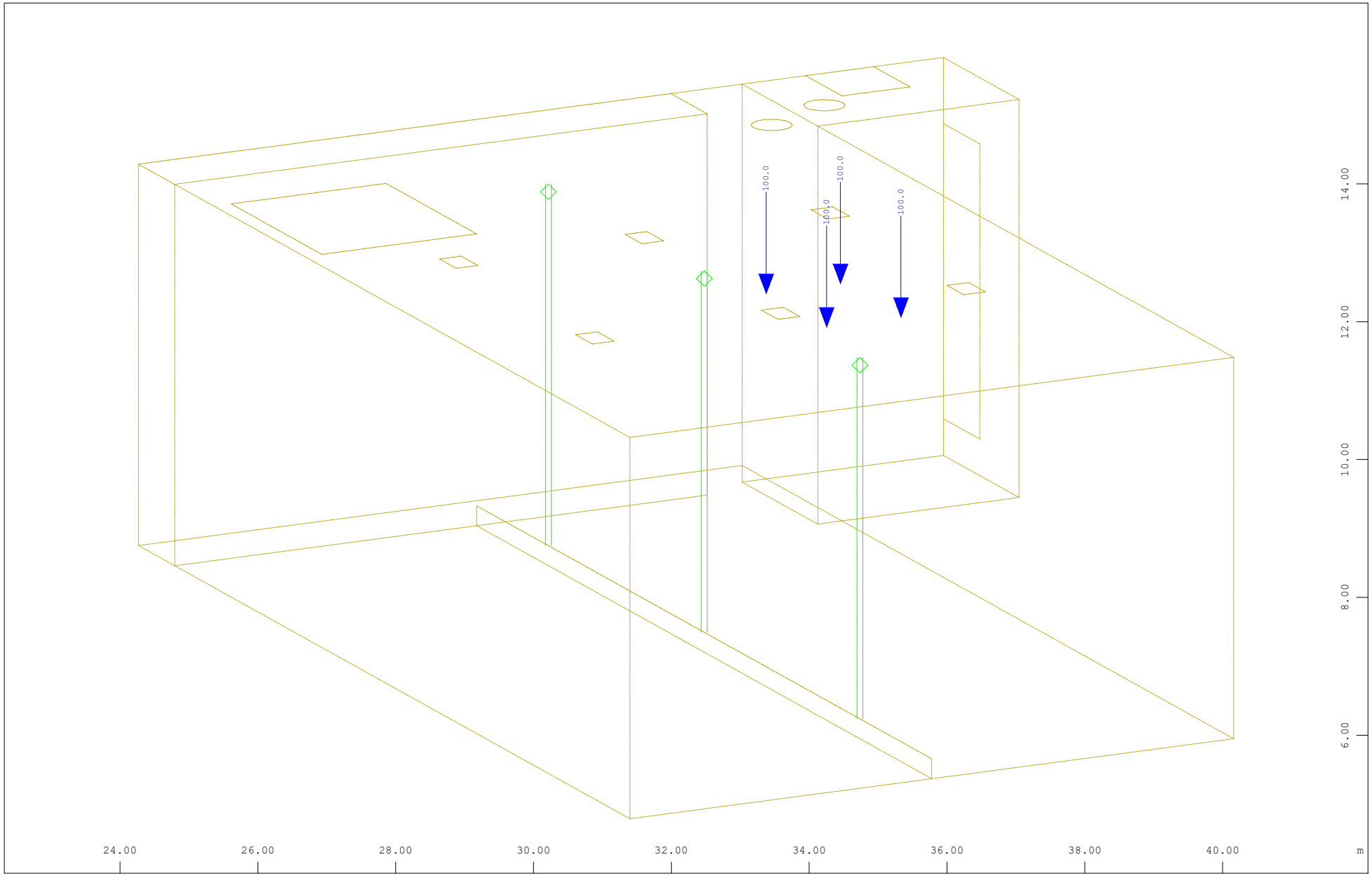

All loads, Loadcase 26 CARRO 2 , (1 cm 3D = unit) Free single load (force) vector (Unit=50.0 kN ) (Max=100.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



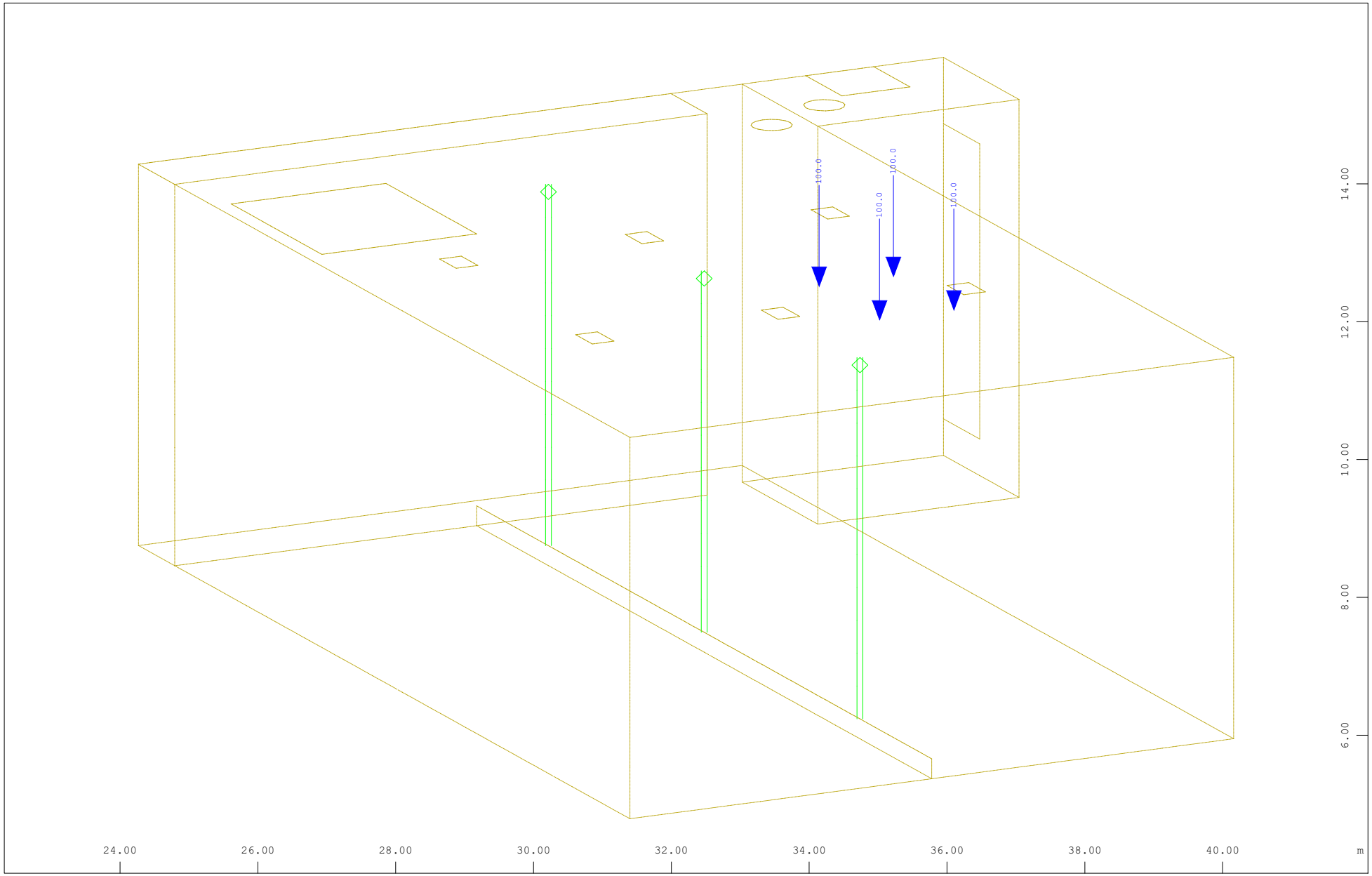

All loads, Loadcase 27 CARRO 2 , (1 cm 3D = unit) Free single load (force) vector (Unit=50.0 kN ) (Max=100.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



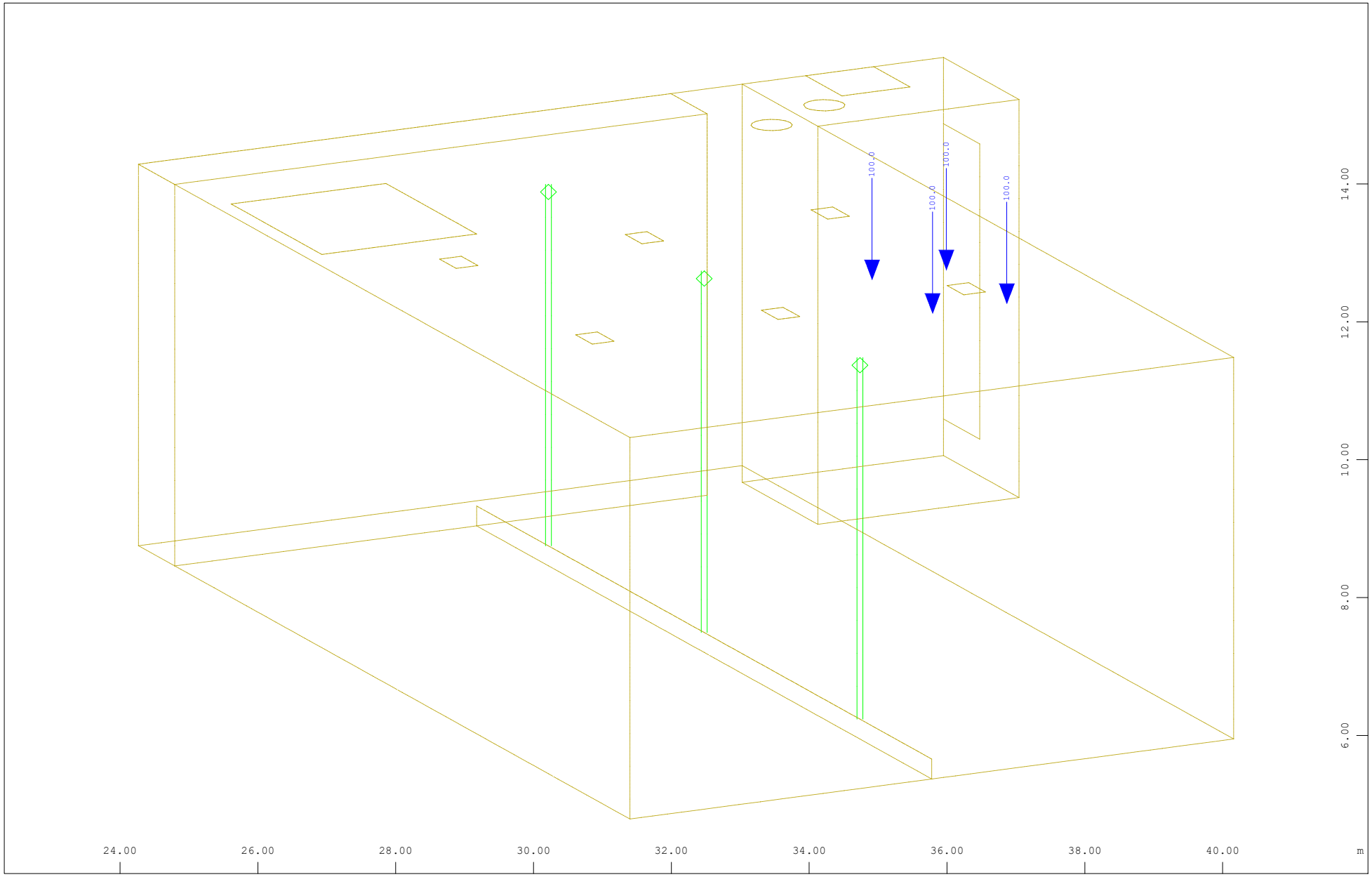

All loads, Loadcase 28 CARRO 2 , (1 cm 3D = unit) Free single load (force) vector (Unit=50.0 kN ) (Max=100.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



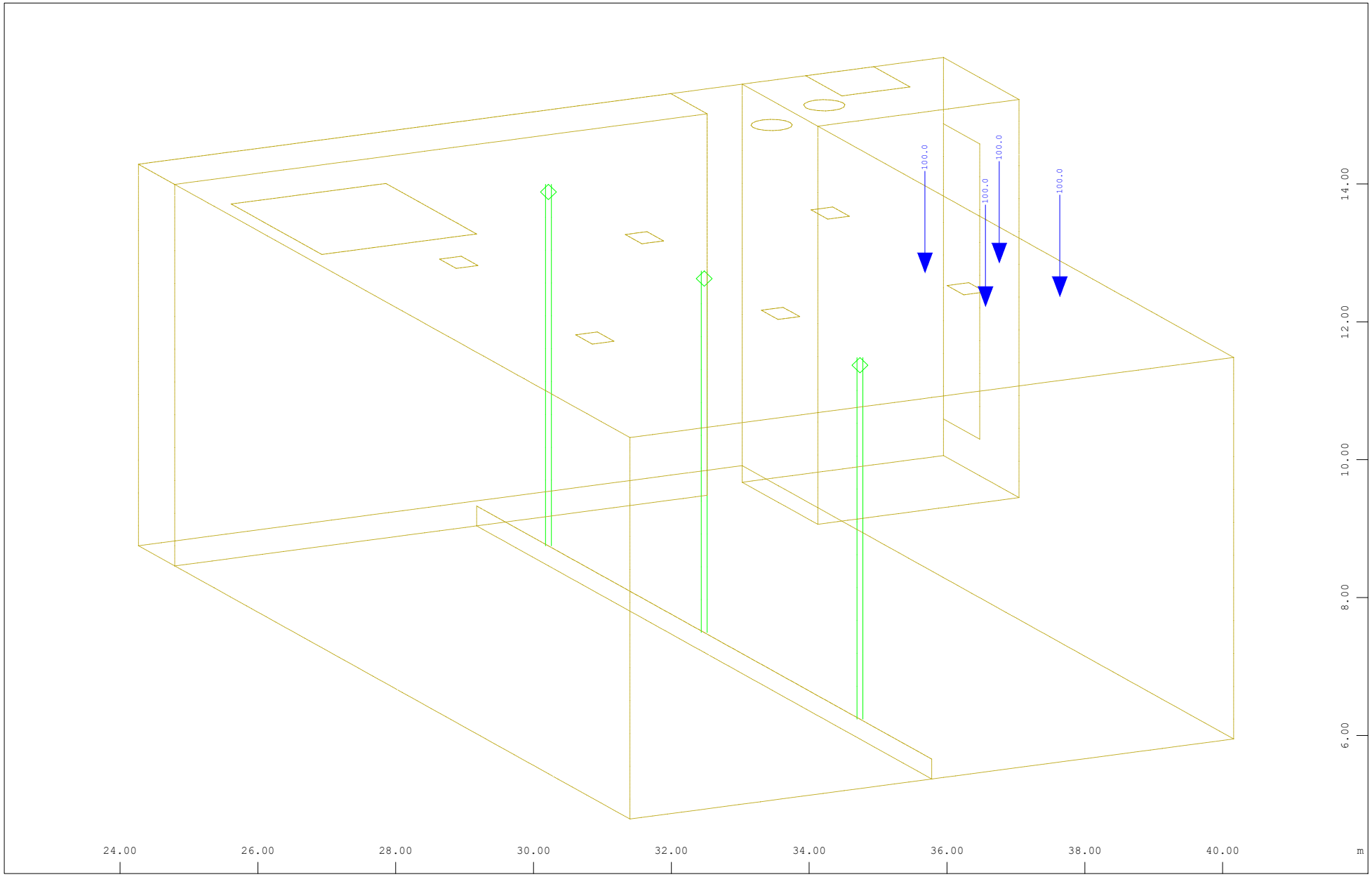

All loads, Loadcase 29 CARRO 2 , (1 cm 3D = unit) Free single load (force) vector (Unit=50.0 kN ) (Max=100.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



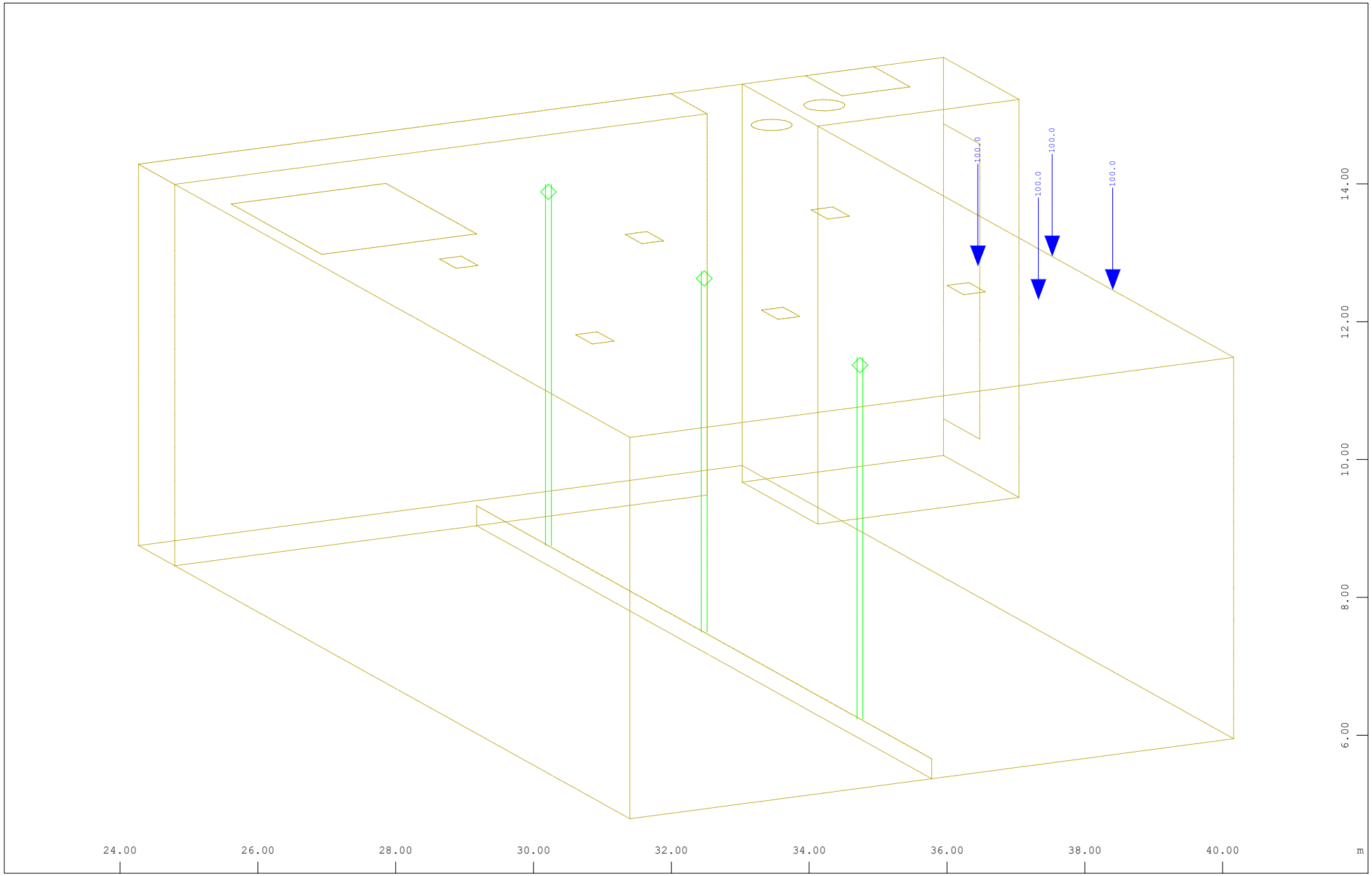

All loads, Loadcase 30 CARRO 2 , (1 cm 3D = unit) Free single load (force) vector (Unit=50.0 kN ) (Max=100.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



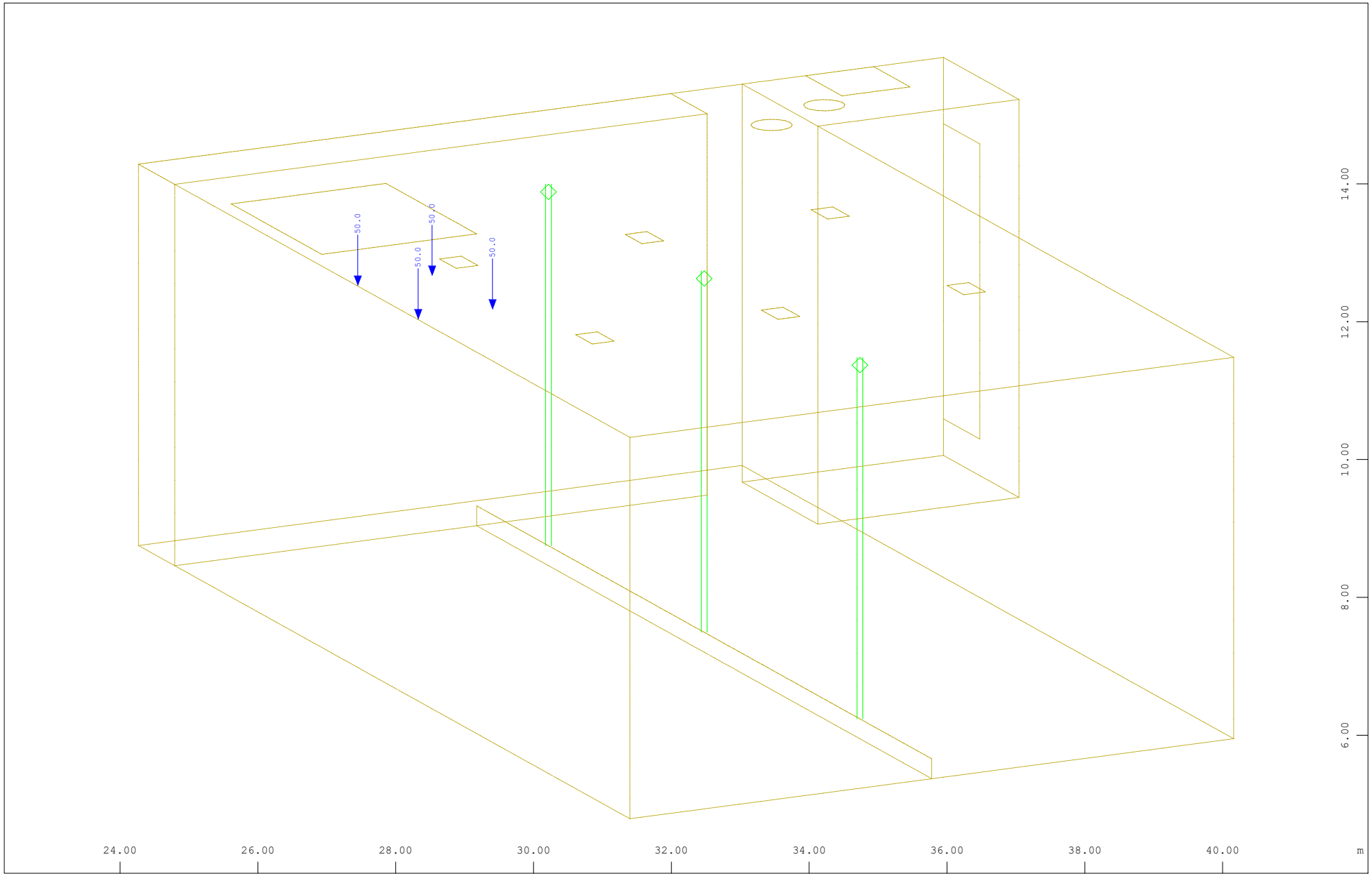

All loads, Loadcase 31 CARRO 2 , (1 cm 3D = unit) Free single load (force) vector (Unit=50.0 kN ) (Max=100.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



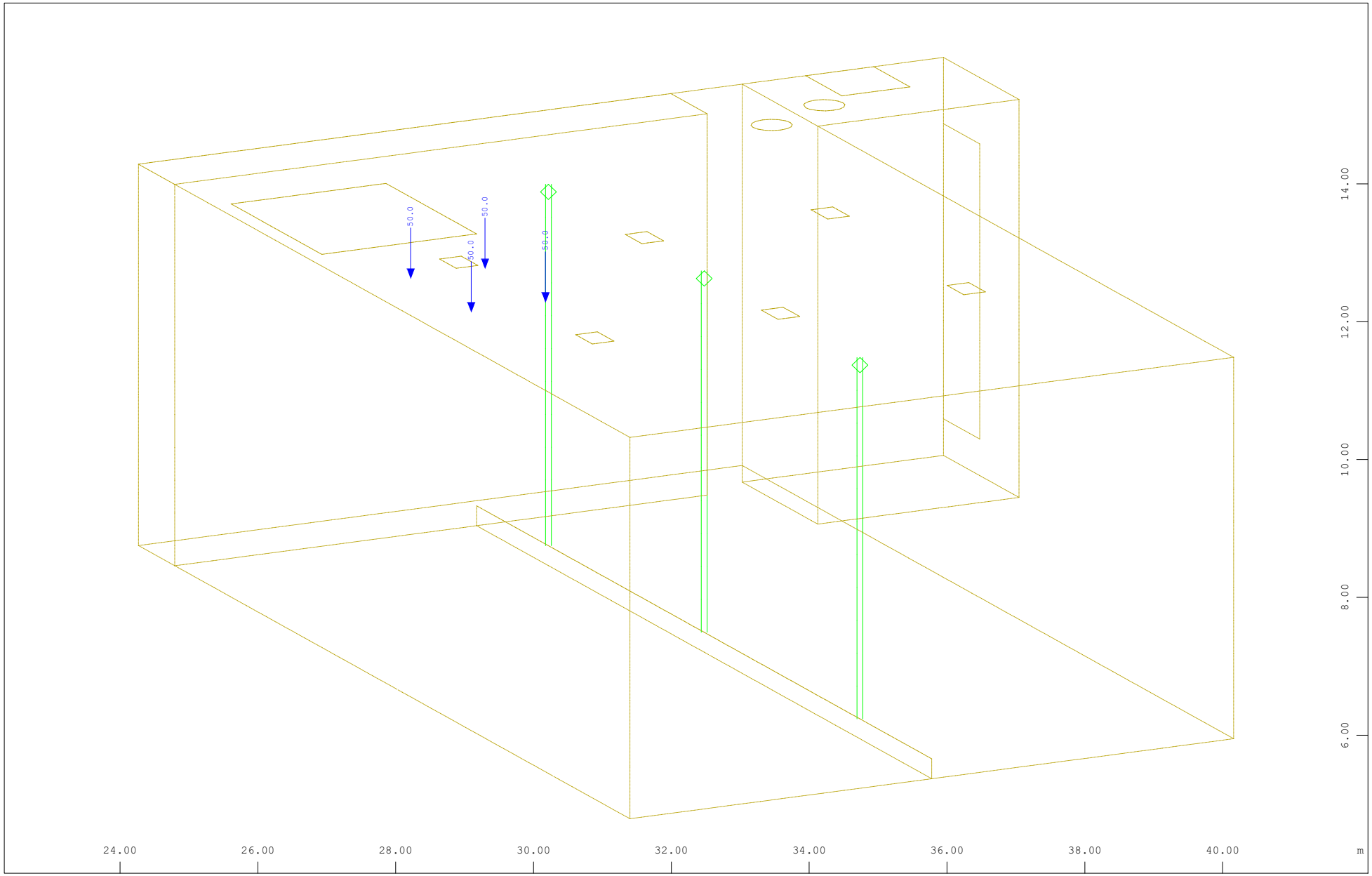

All loads, Loadcase 32 CARRO 2 , (1 cm 3D = unit) Free single load (force) vector (Unit=50.0 kN ) (Max=100.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



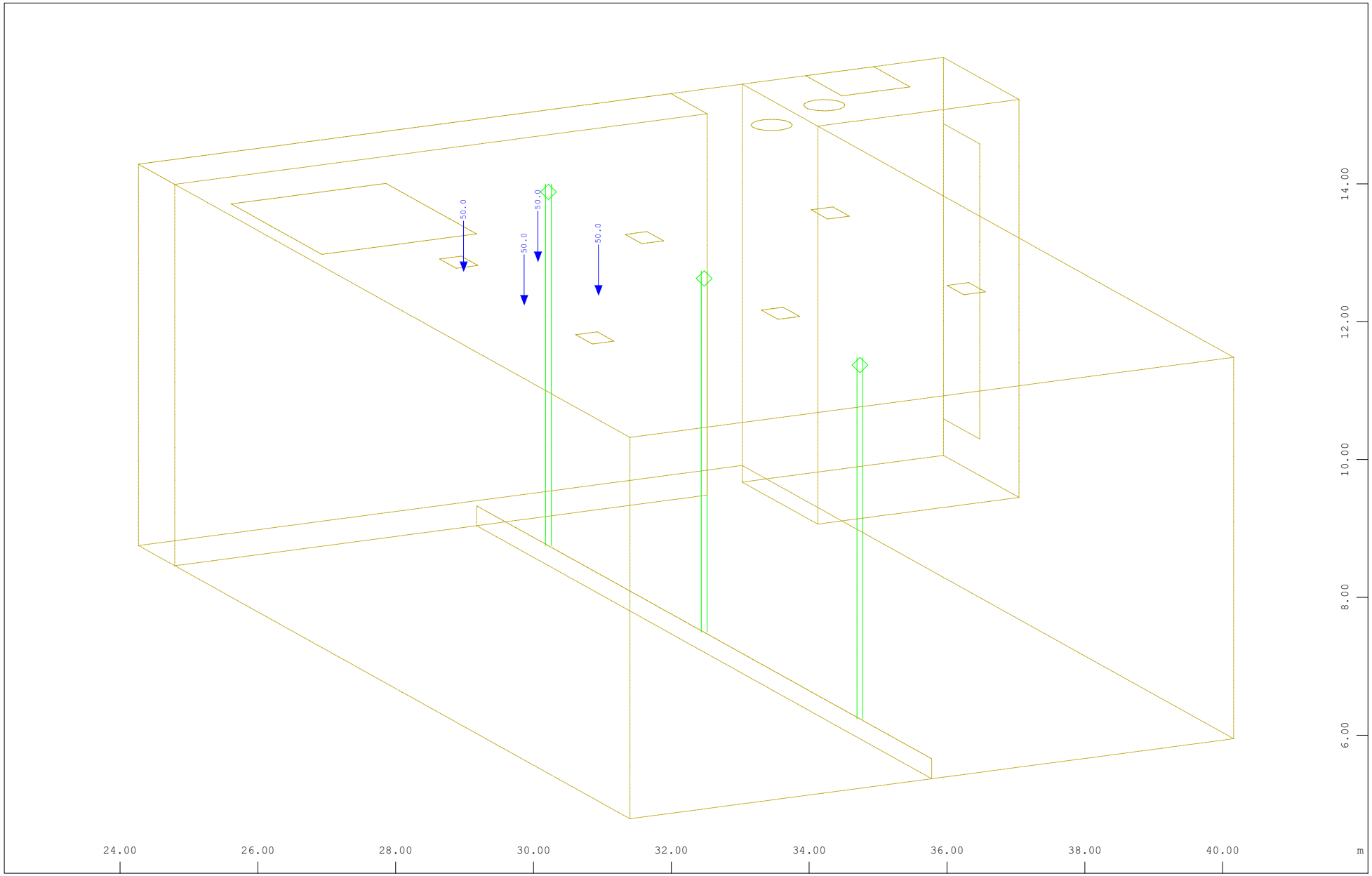

All loads, Loadcase 33 CARRO 3 , (1 cm 3D = unit) Free single load (force) vector (Unit=50.0 kN ) (Max=50.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



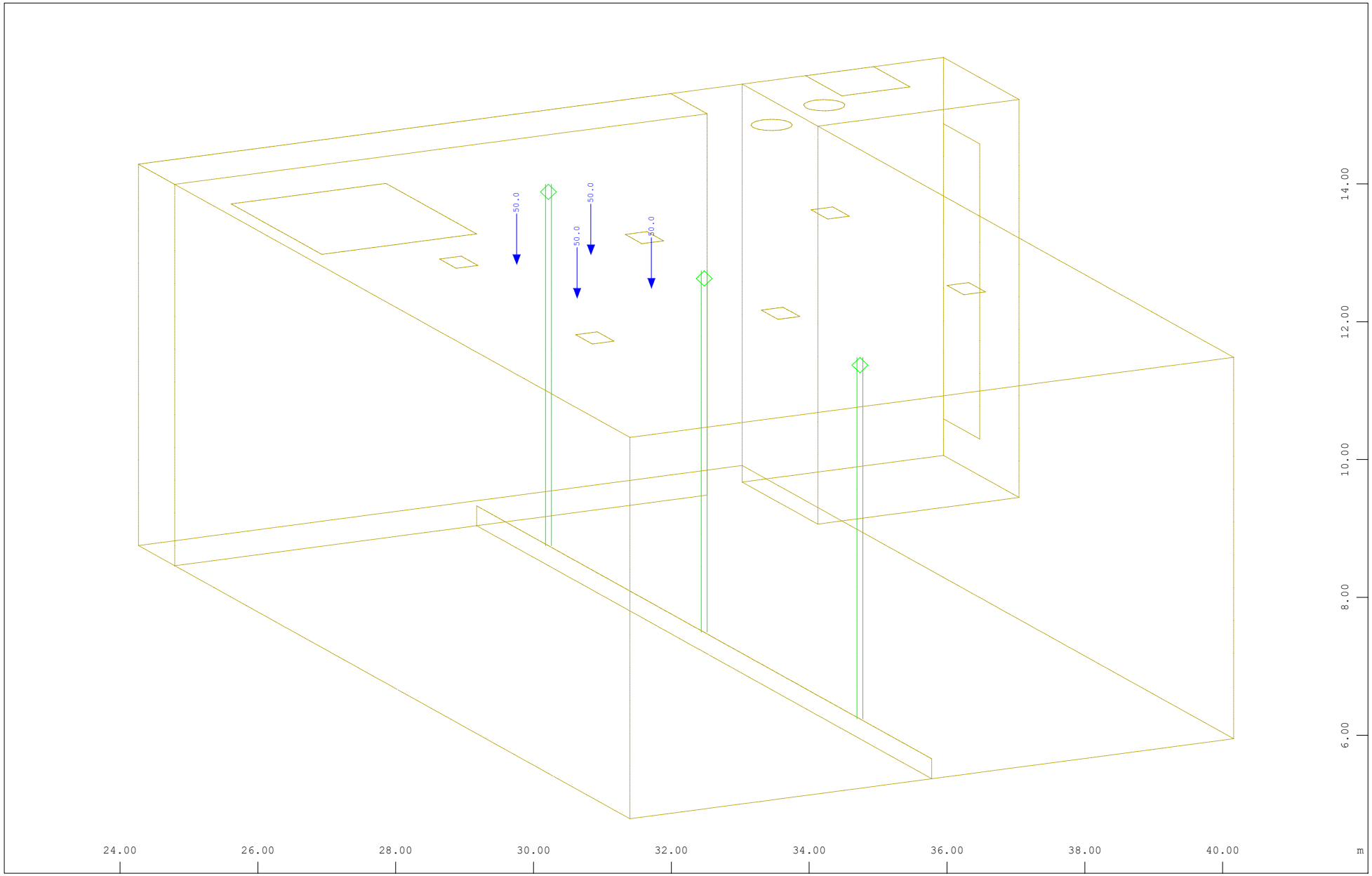

All loads, Loadcase 34 CARRO 3 , (1 cm 3D = unit) Free single load (force) vector (Unit=50.0 kN ) (Max=50.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962




All loads, Loadcase 35 CARRO 3 , (1 cm 3D = unit) Free single load (force) vector (Unit=50.0 kN ) (Max=50.0)

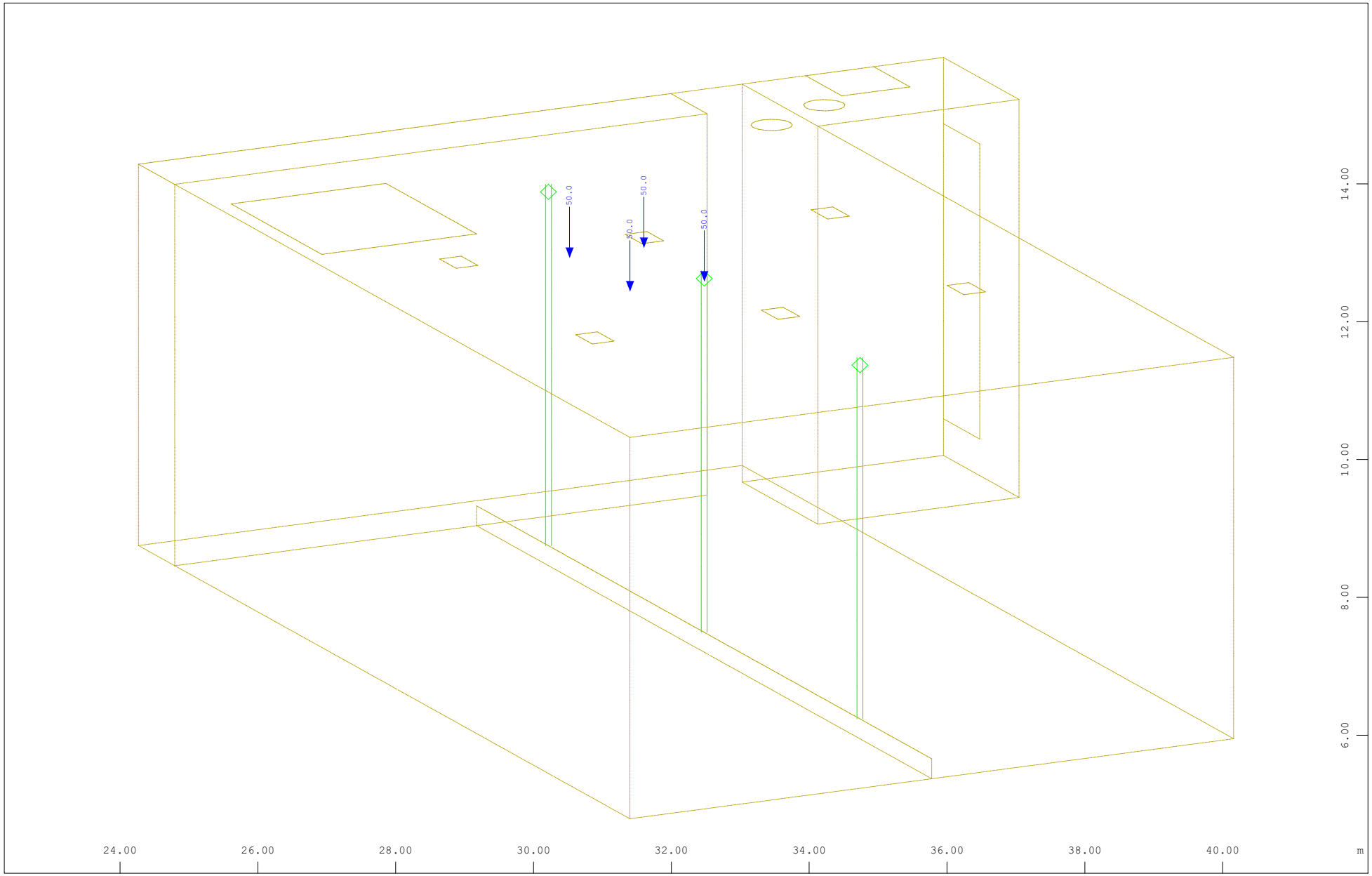
M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

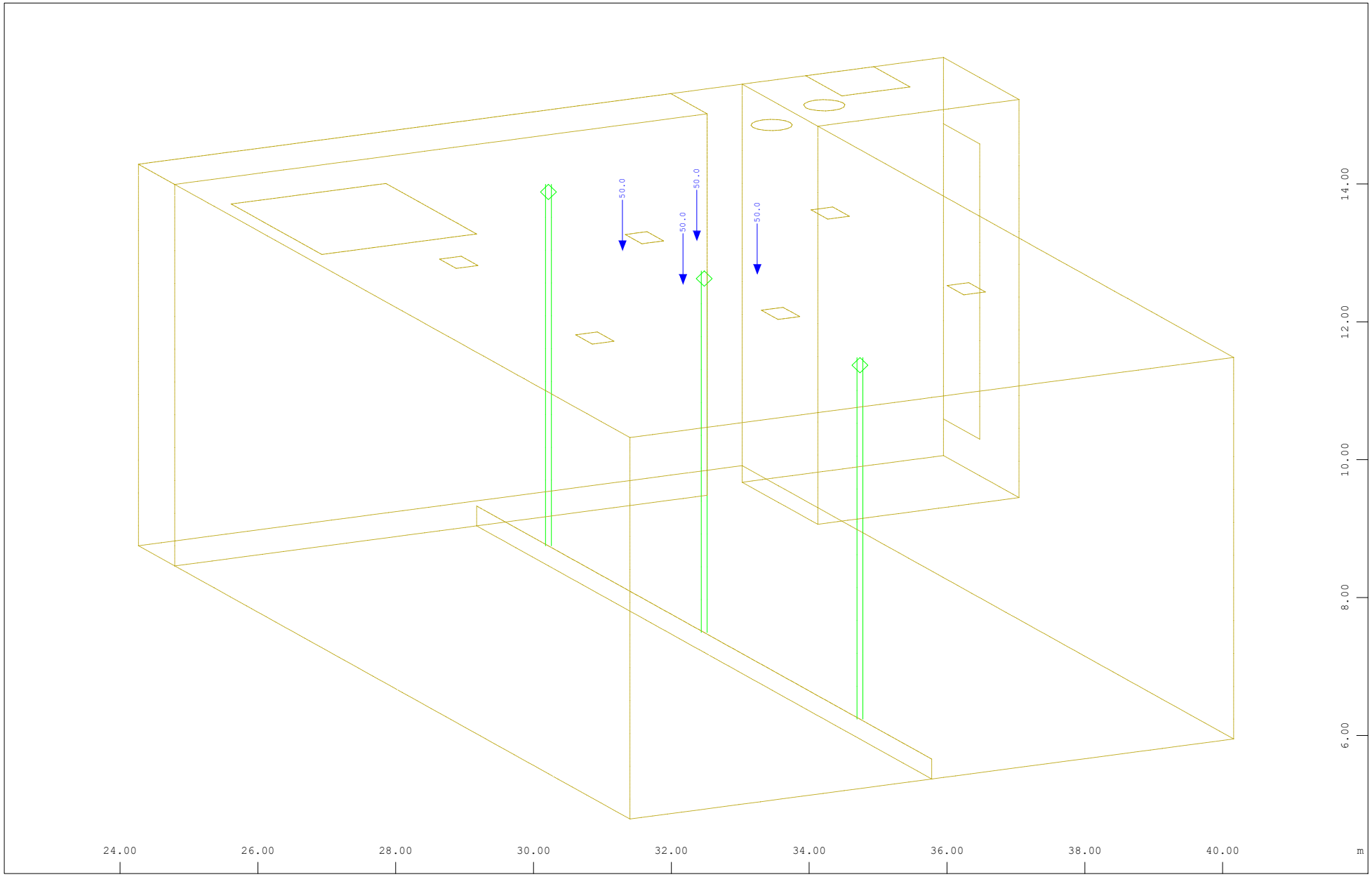
All loads, Loadcase 36 CARRO 3 , (1 cm 3D = unit) Free single load (force) vector (Unit=50.0 kN ) (Max=50.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962




All loads, Loadcase 37 CARRO 3 , (1 cm 3D = unit) Free single load (force) vector (Unit=50.0 kN ) (Max=50.0)

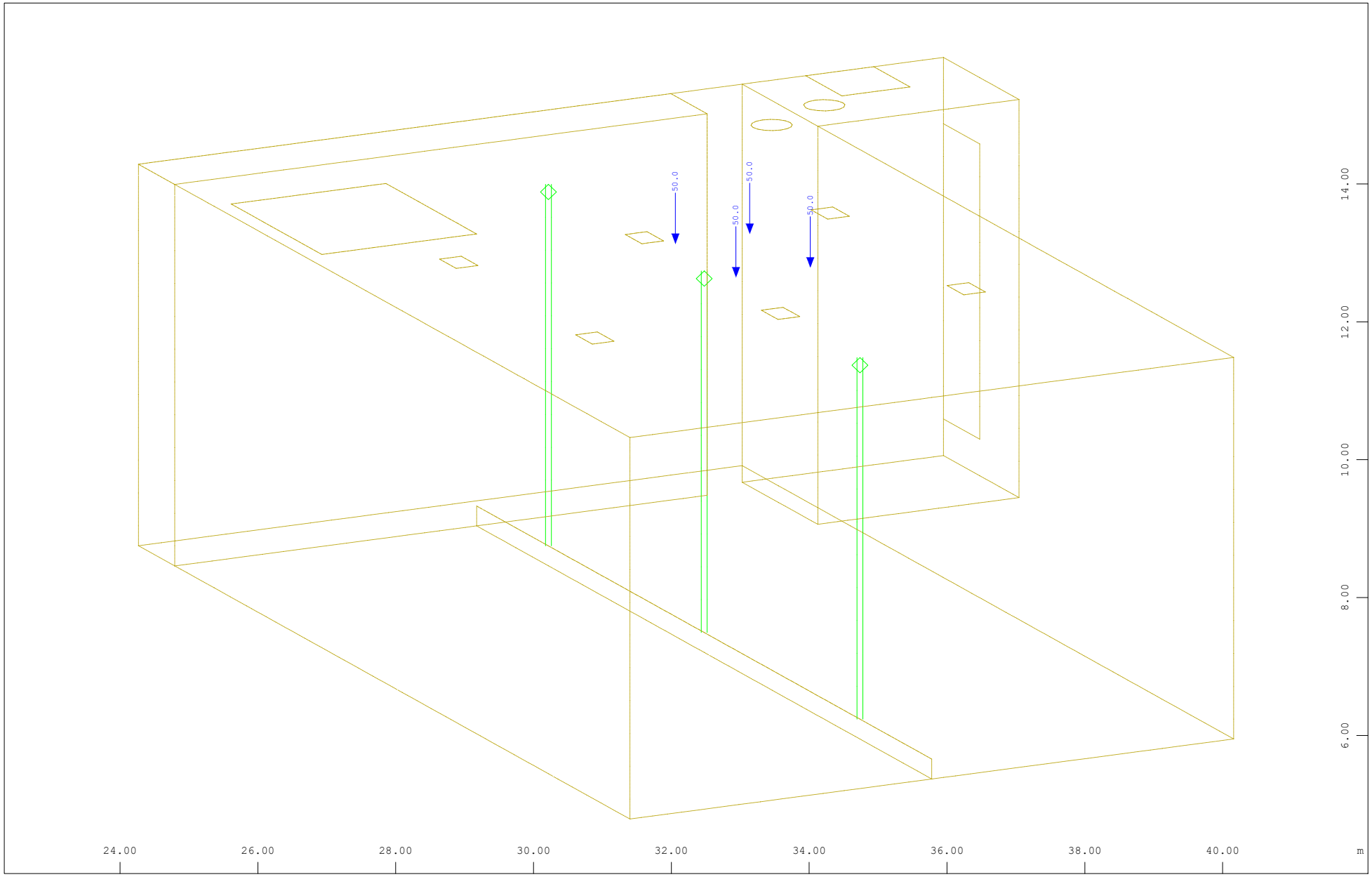
M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

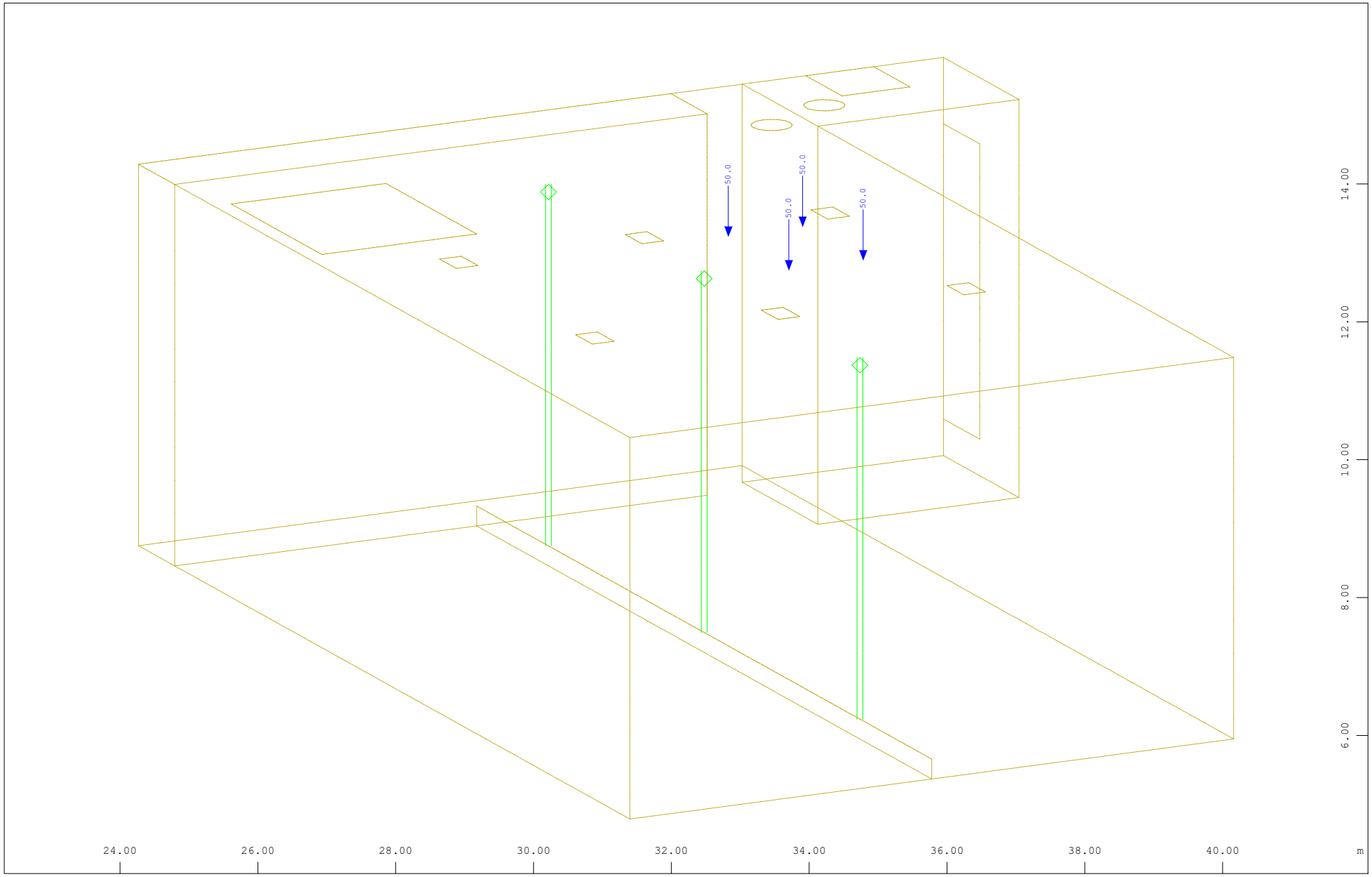
All loads, Loadcase 38 CARRO 3 , (1 cm 3D = unit) Free single load (force) vector (Unit=50.0 kN ) (Max=50.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



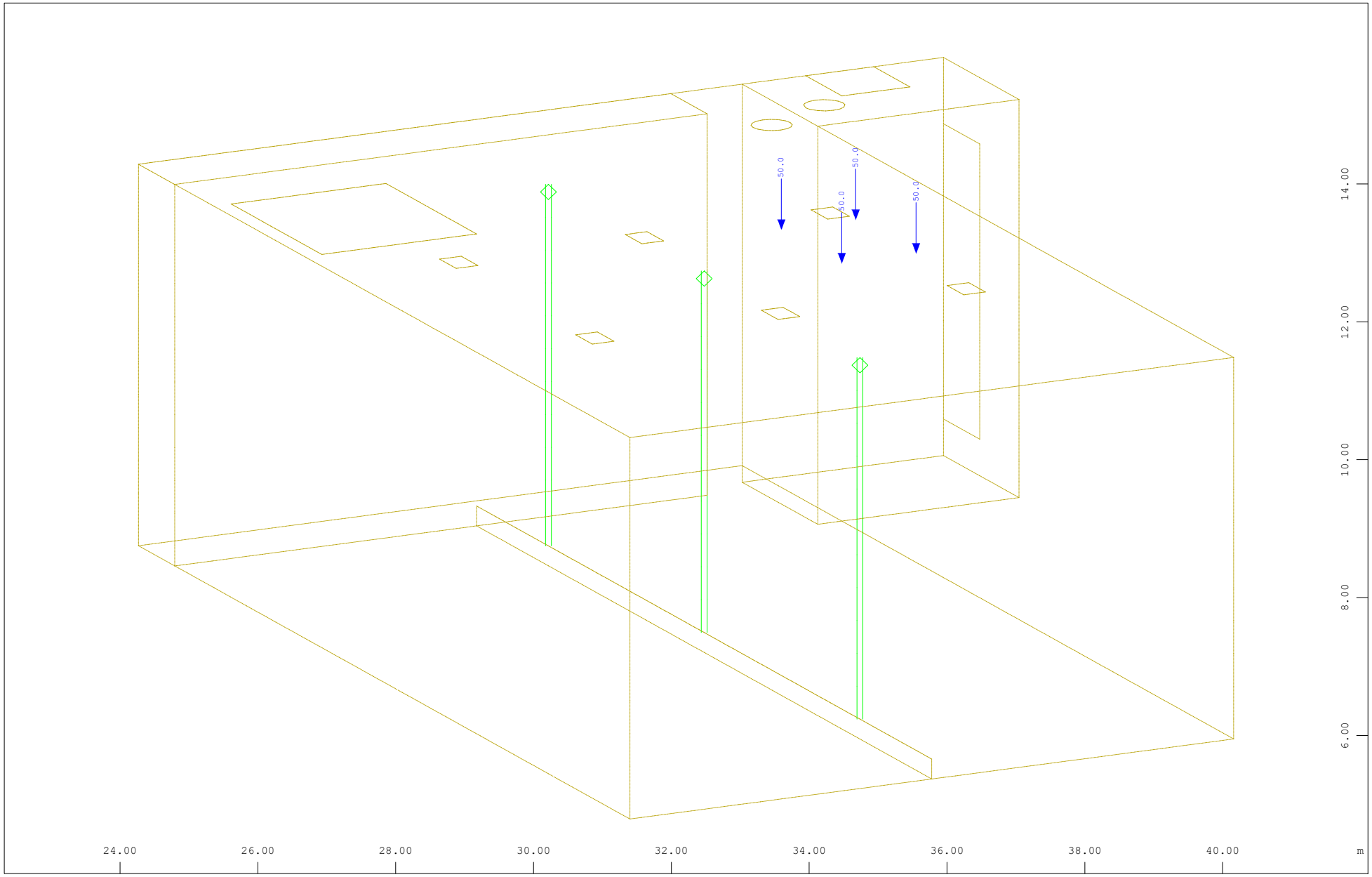

All loads, Loadcase 39 CARRO 3 , (1 cm 3D = unit) Free single load (force) vector (Unit=50.0 kN ) (Max=50.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



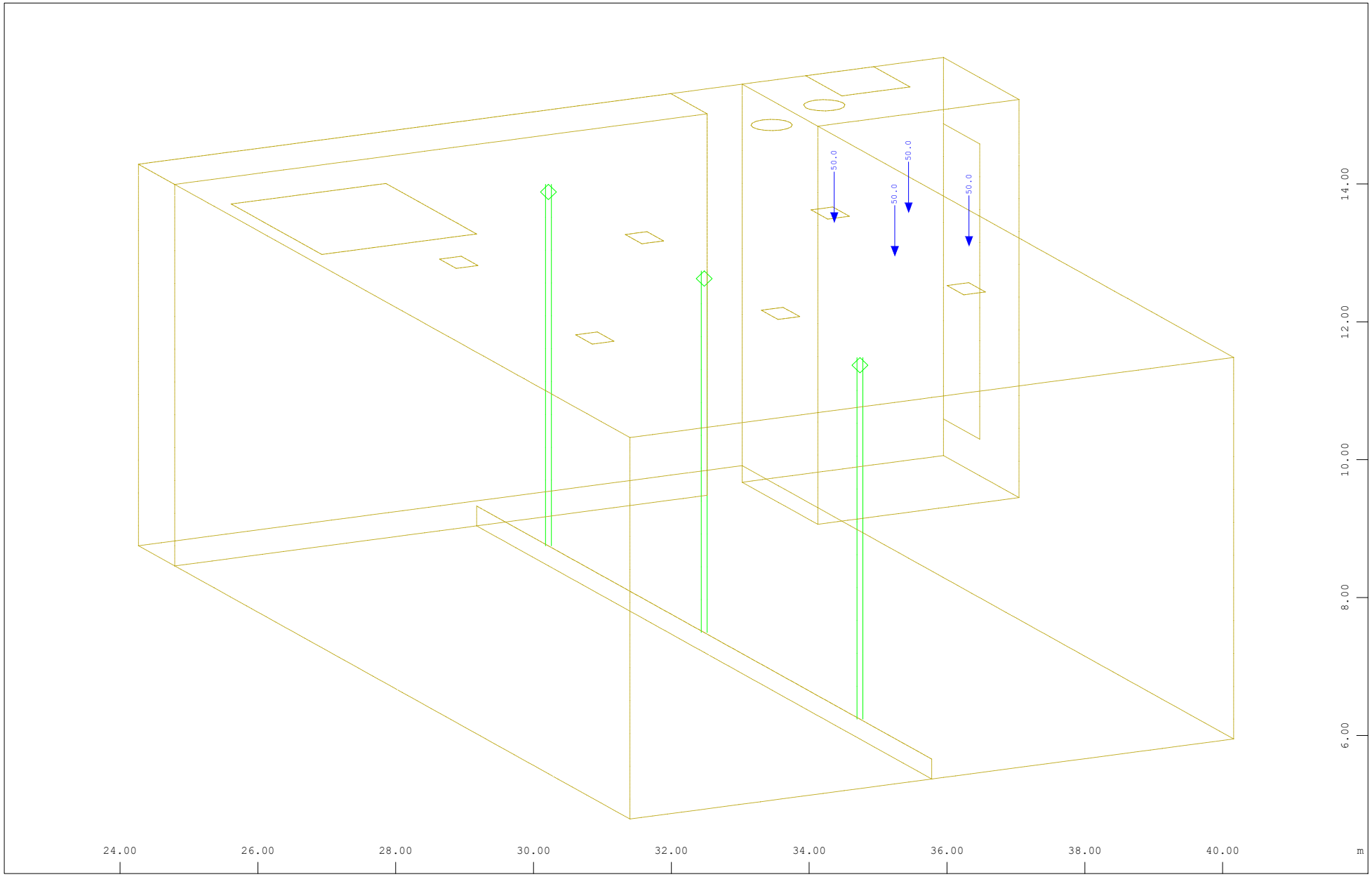

All loads, Loadcase 40 CARRO 3 , (1 cm 3D = unit) Free single load (force) vector (Unit=50.0 kN ) (Max=50.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



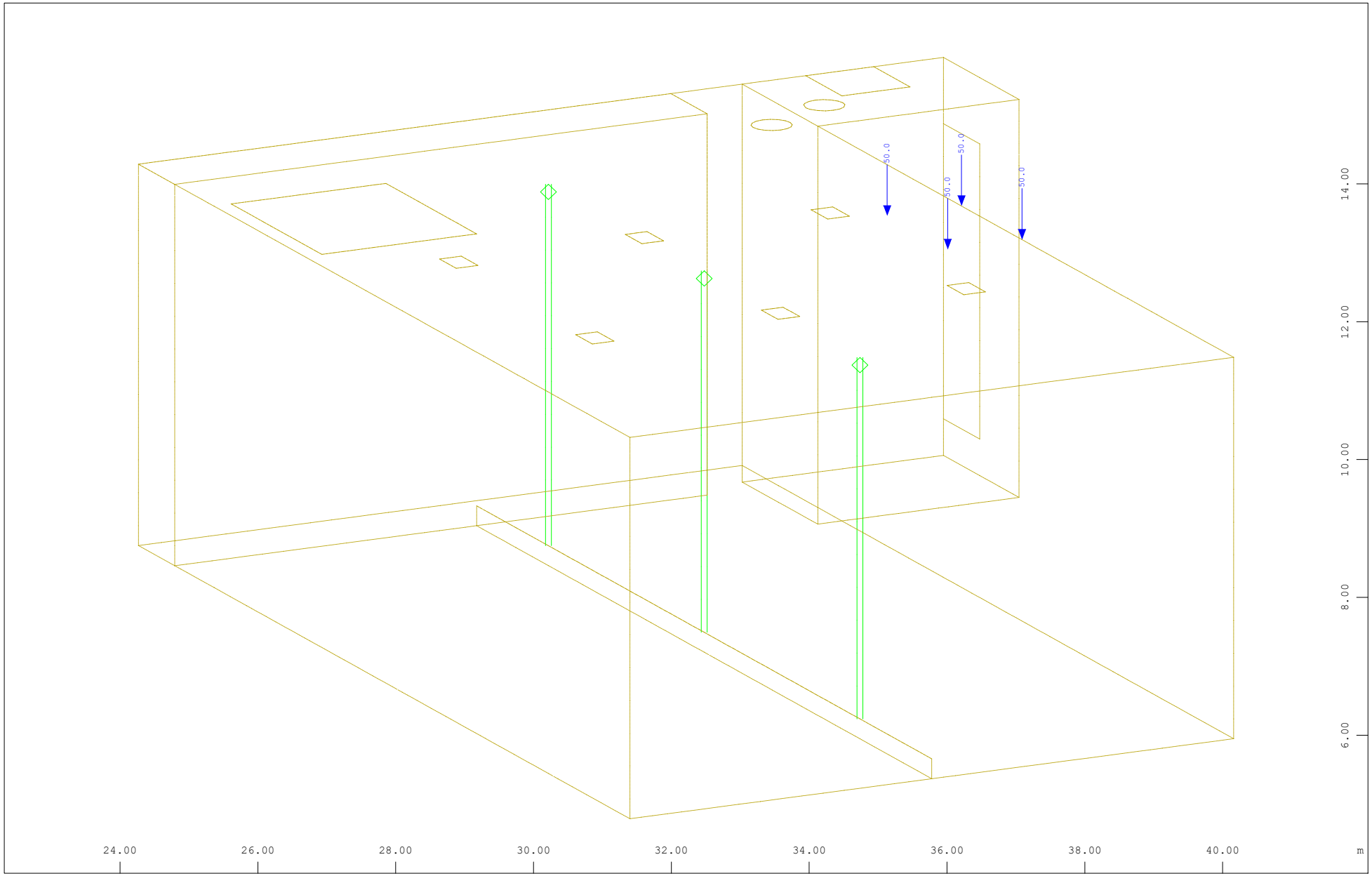

All loads, Loadcase 41 CARRO 3 , (1 cm 3D = unit) Free single load (force) vector (Unit=50.0 kN ) (Max=50.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



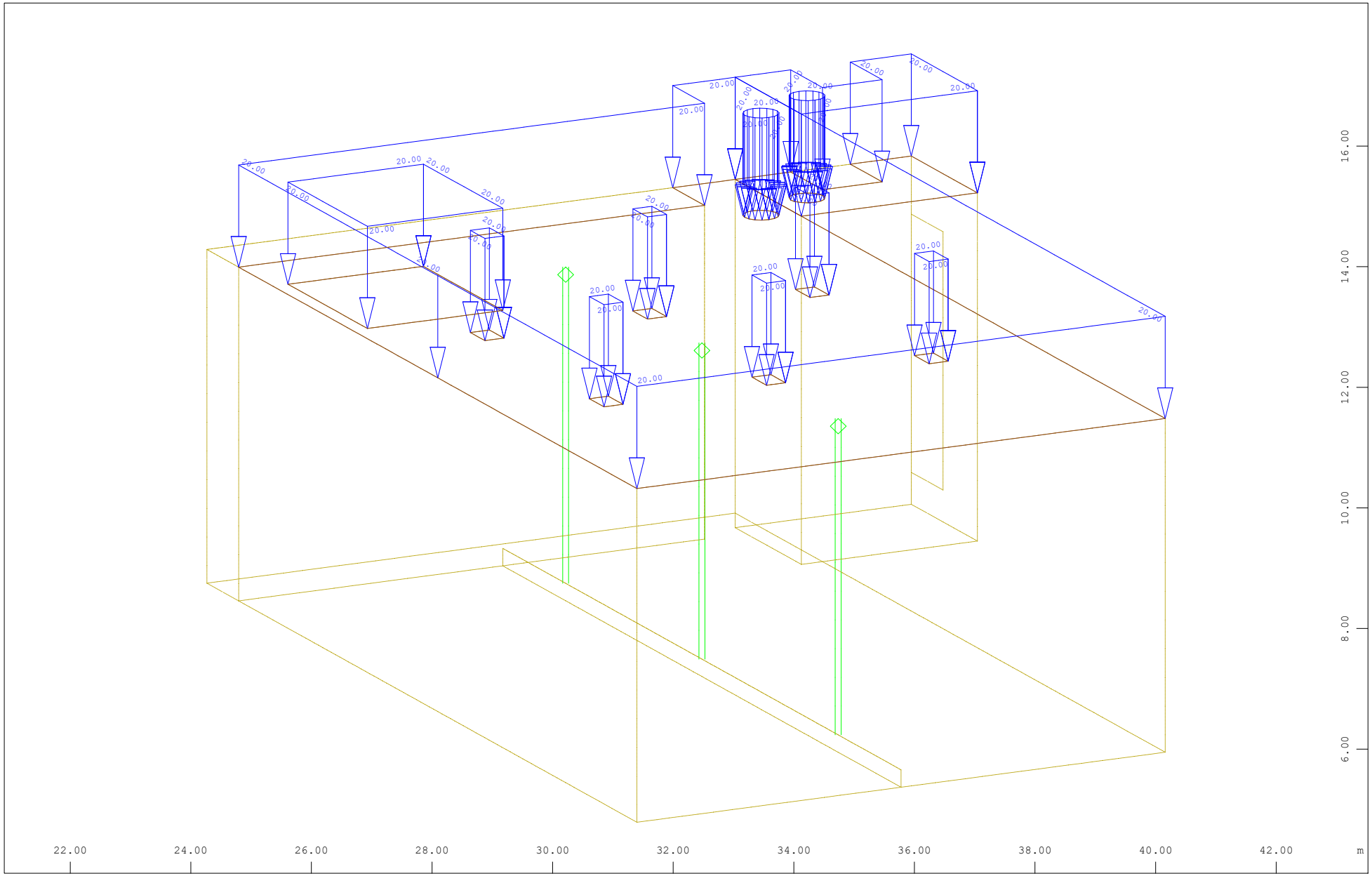

All loads, Loadcase 42 CARRO 3 , (1 cm 3D = unit) Free single load (force) vector (Unit=50.0 kN ) (Max=50.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



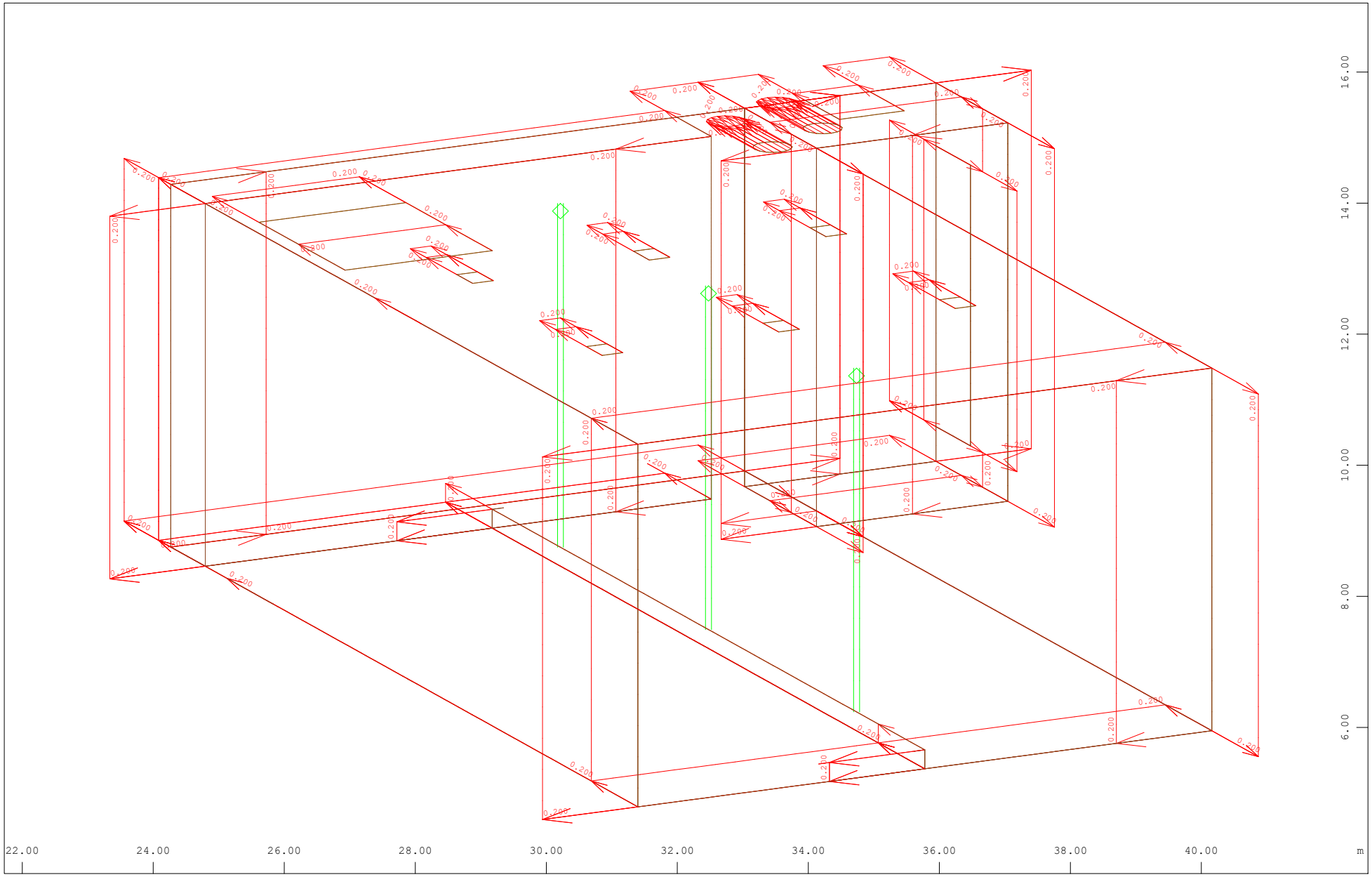

All loads, Loadcase 43 CARRO 3 , (1 cm 3D = unit) Free single load (force) vector (Unit=50.0 kN ) (Max=50.0)

M 1 : 77
X * 0.502
Y * 0.906
Z * 0.962



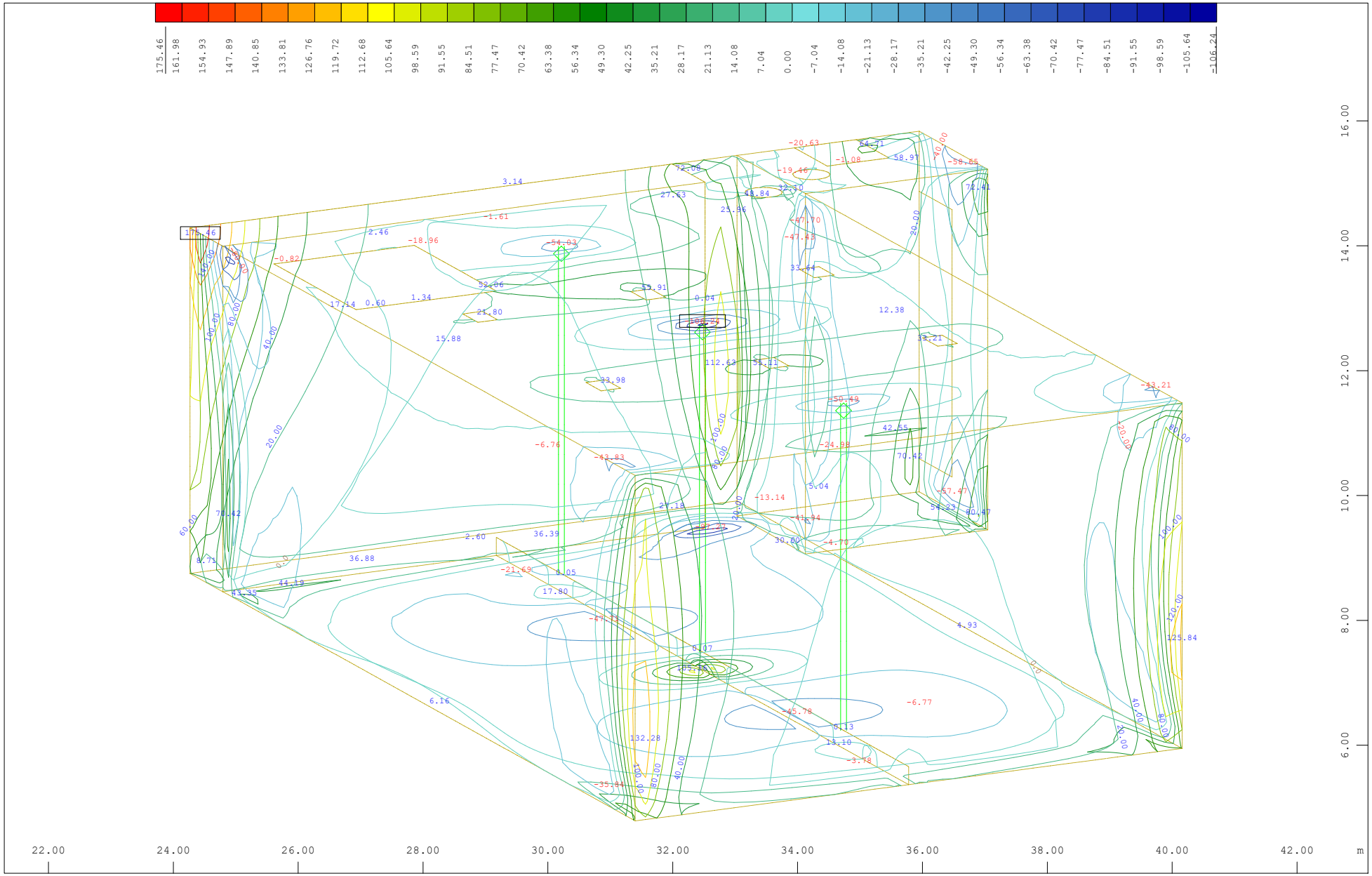

All loads, Loadcase 44 BOMBEROS , (1 cm 3D = unit) Area element load (force) vector (Unit=10.00 kN/m2 ) (Max=20.00)

M 1 : 88
X * 0.502
Y * 0.906
Z * 0.962




All loads, Loadcase 45 RETRACCIÓN , (1 cm 3D = unit) Area element load (strain) in local x (Unit=0.100 o/oo ) (Min=-0.200)
(Max=-0.200)

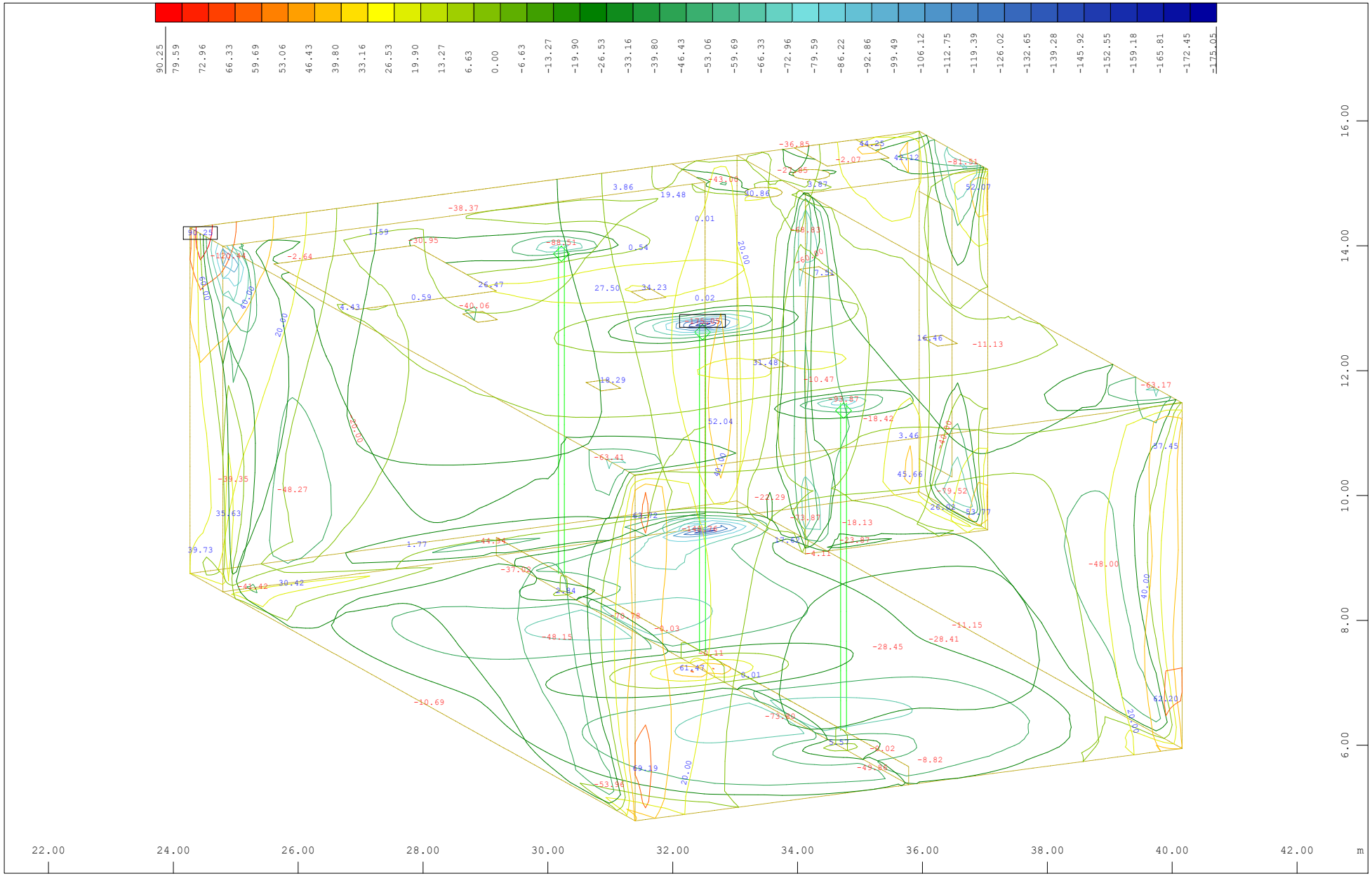
M 1 : 81
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Bending moment m-xx in local x from middle of element, Loadcase 101 MAX-MXX QUAD ELU1 , from -106.24 to 175.46 step 20.00 kNm/m

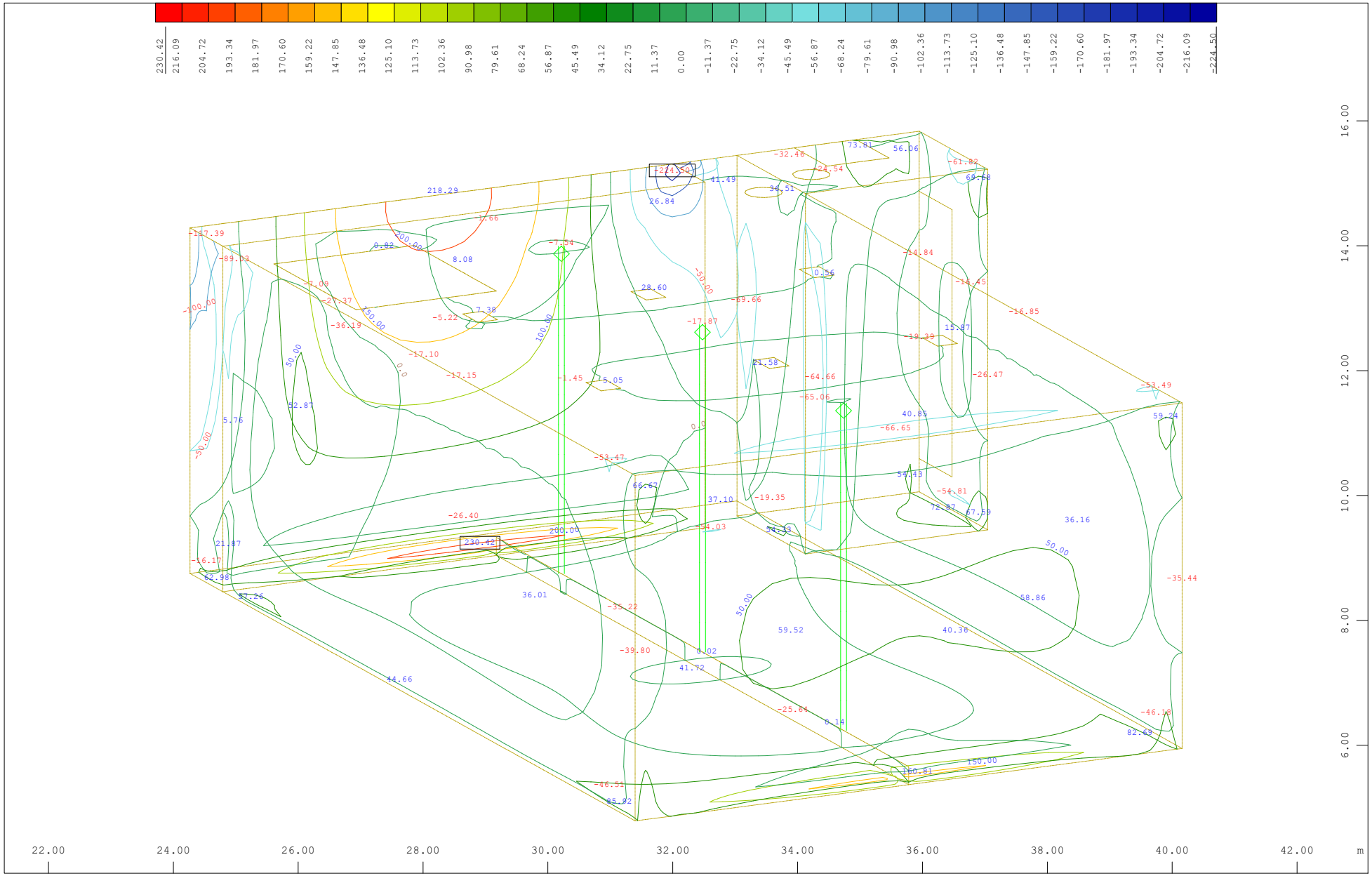
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

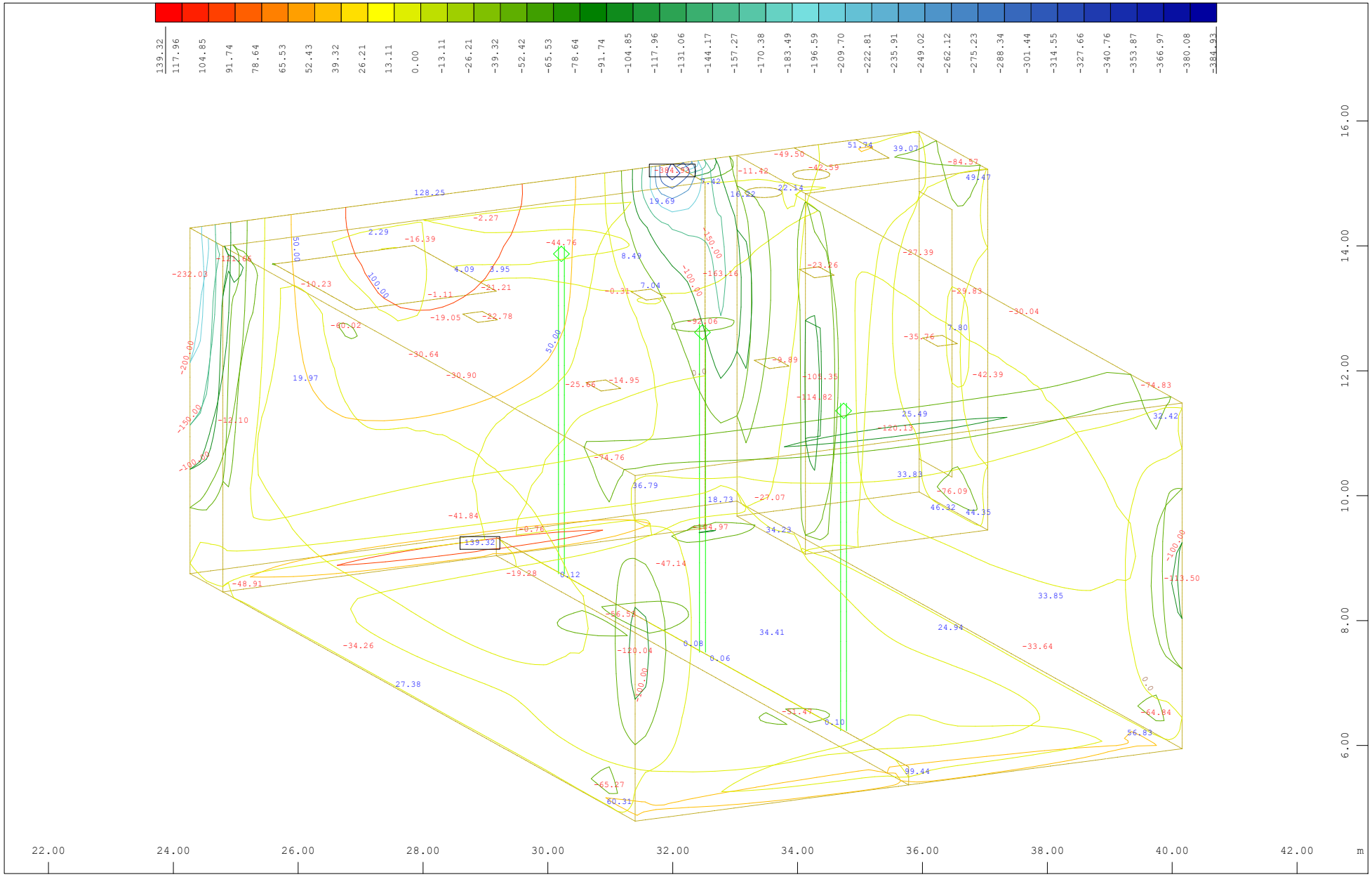
Bending moment m-xx in local x from middle of element, Loadcase 102 MIN-MXX QUAD ELU1 , from -175.05 to 90.25 step 20.00 kNm/m

M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962



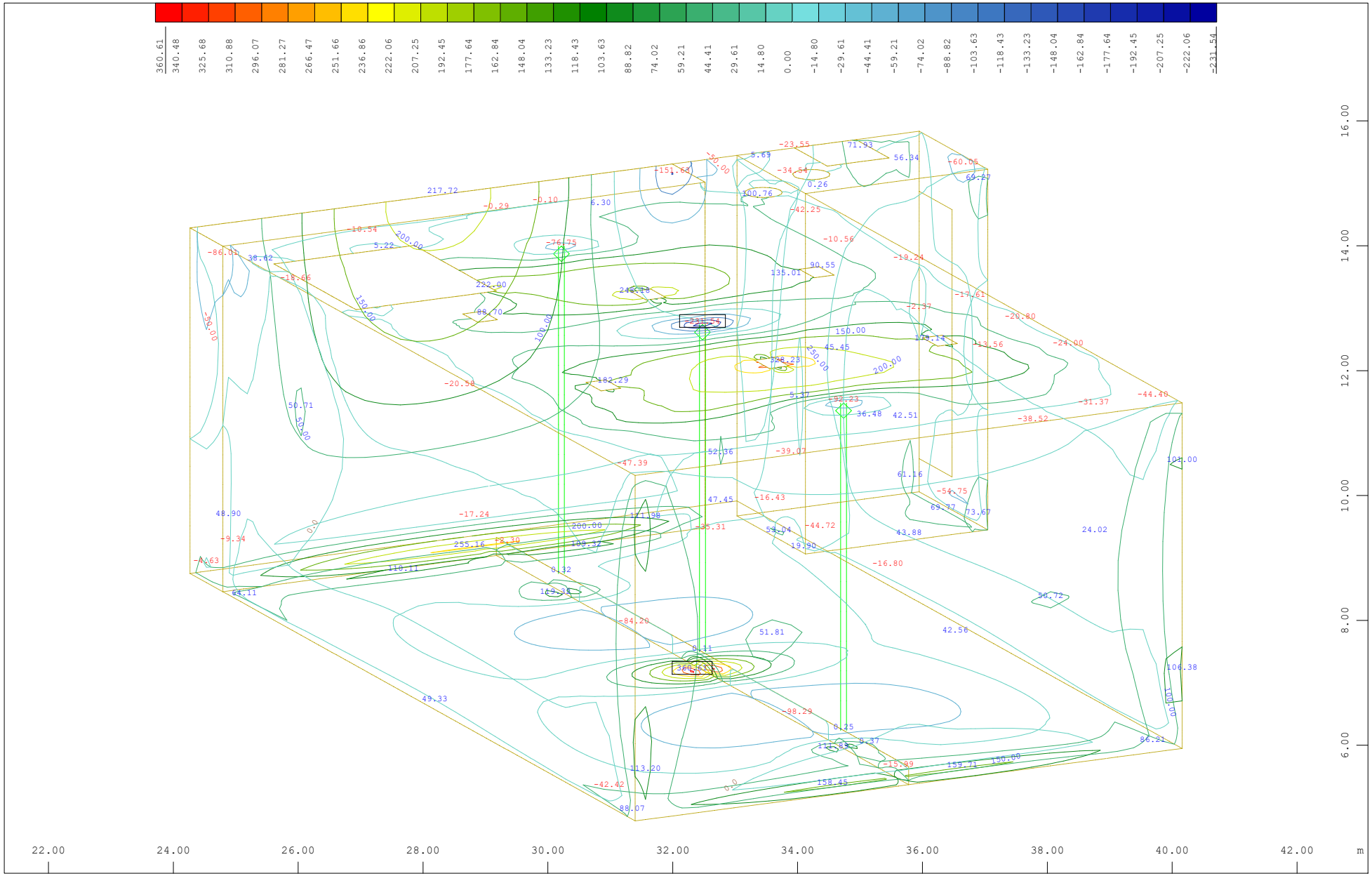

Bending moment m-xx in local x from middle of element, Loadcase 201 MAX-MXX QUAD ELU2 , from -224.50 to 230.42 step 50.00 kNm/m

M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Bending moment m-xx in local x from middle of element, Loadcase 202 MIN-MXX QUAD ELU2 , from -384.93 to 139.32 step 50.00 kNm/m

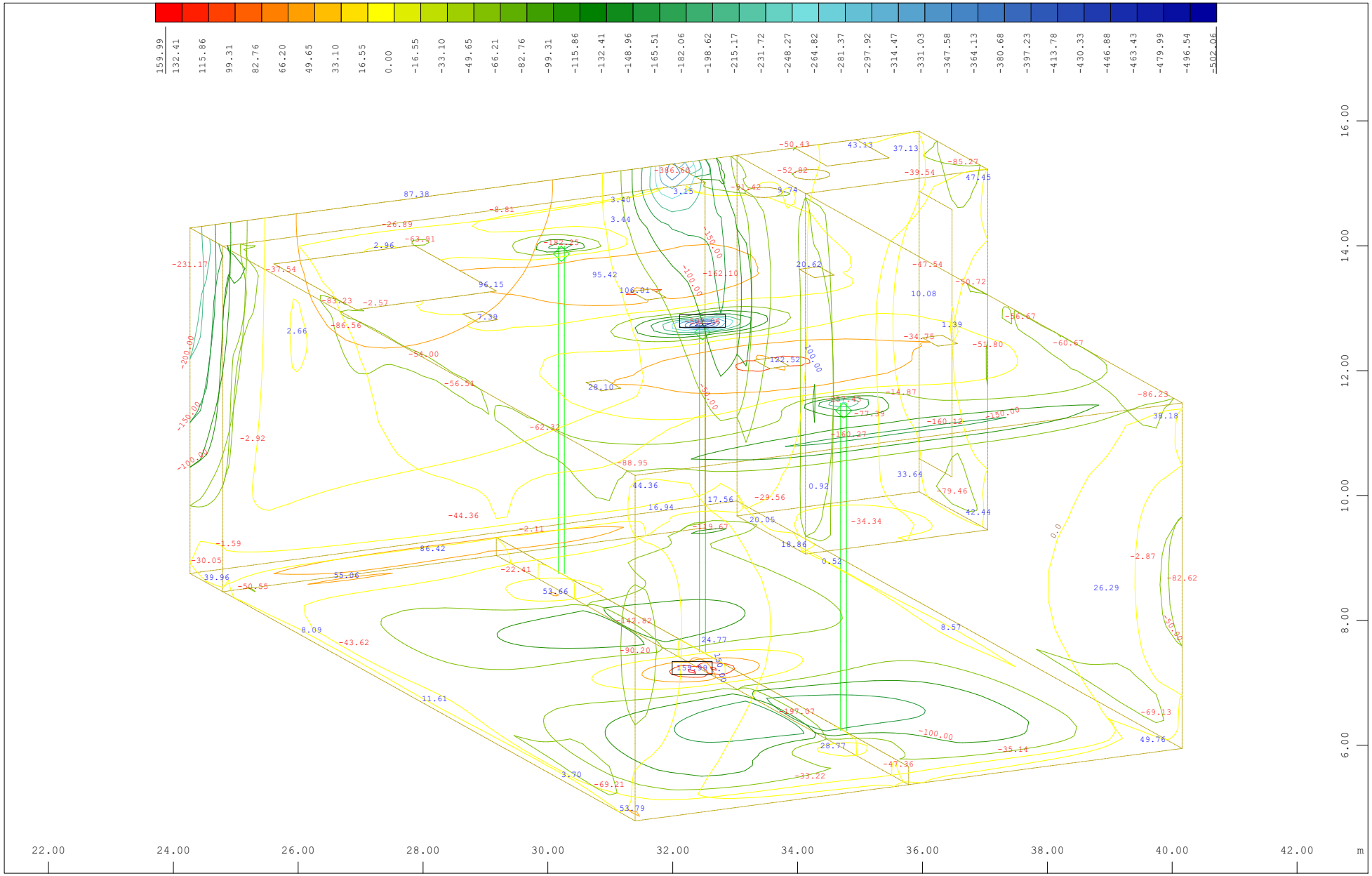
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Bending moment m-xx in local x from middle of element, Loadcase 301 MAX-MXX QUAD ELU3 , from -231.54 to 360.61 step 50.00 kNm/m

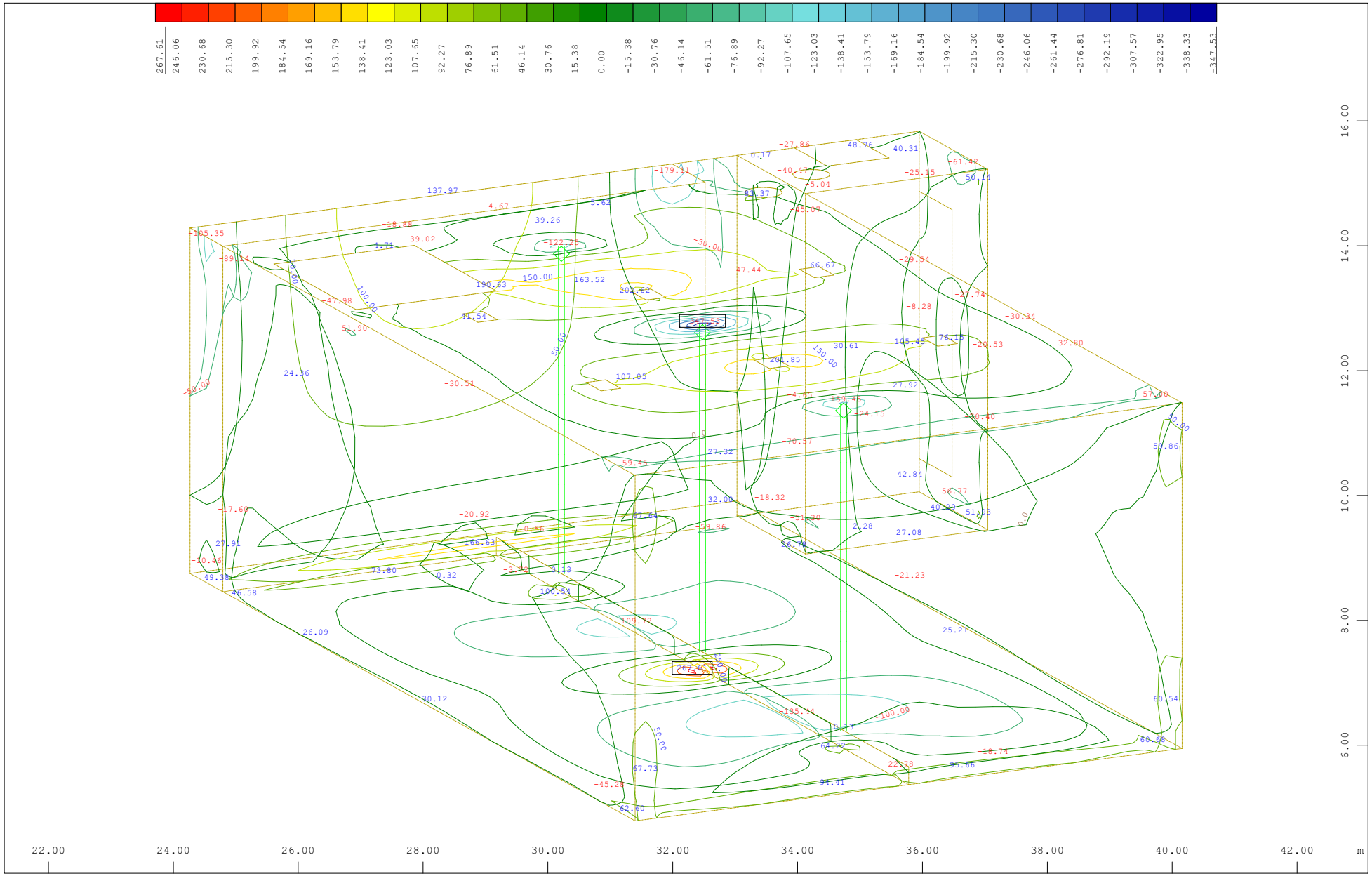
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Bending moment m-xx in local x from middle of element, Loadcase 302 MIN-MXX QUAD ELU3 , from -502.06 to 159.99 step 50.00 kNm/m

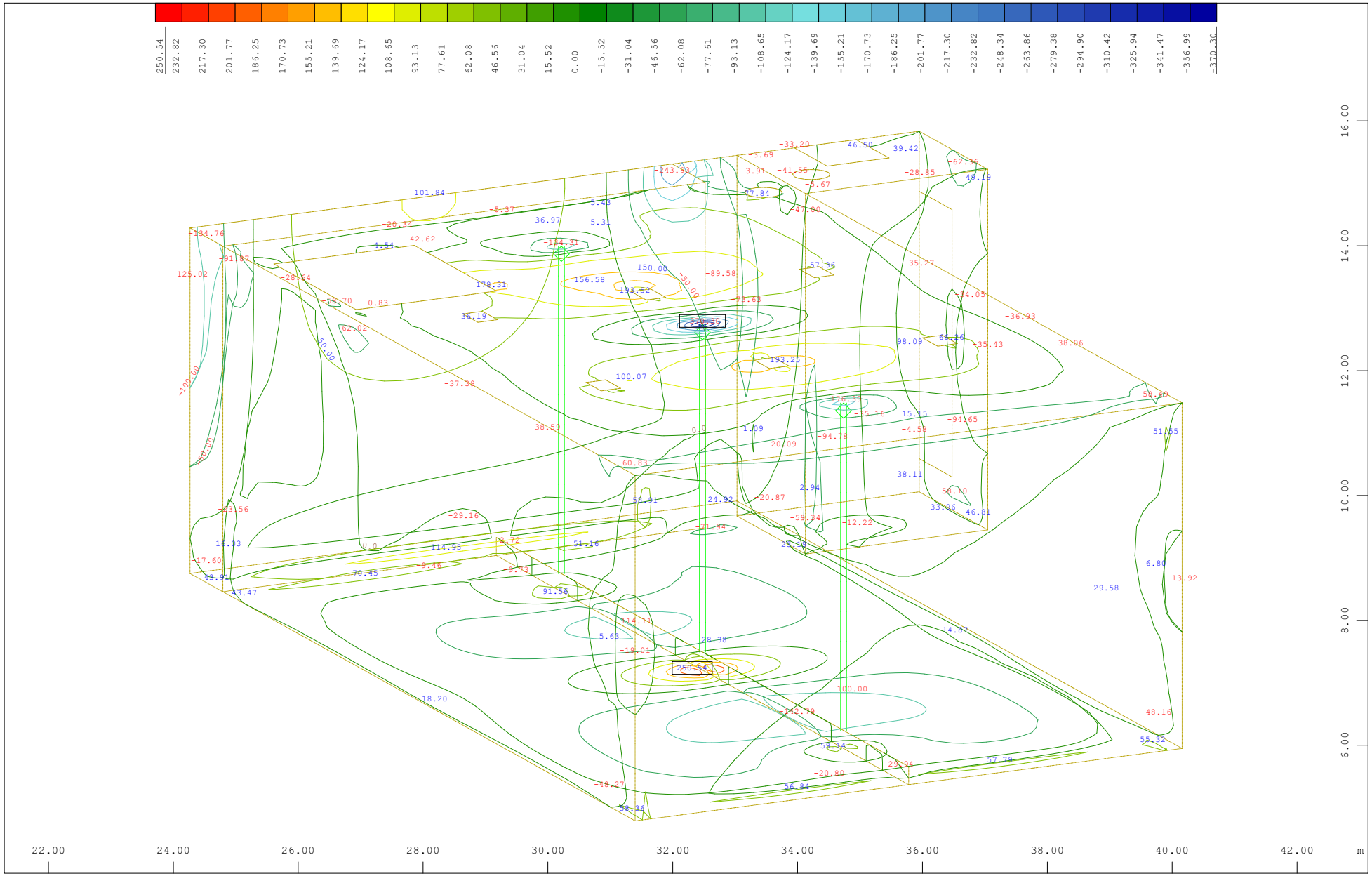
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Bending moment m-xx in local x from middle of element, Loadcase 401 MAX-MXX QUAD ELU4 , from -347.53 to 267.61 step 50.00 kNm/m

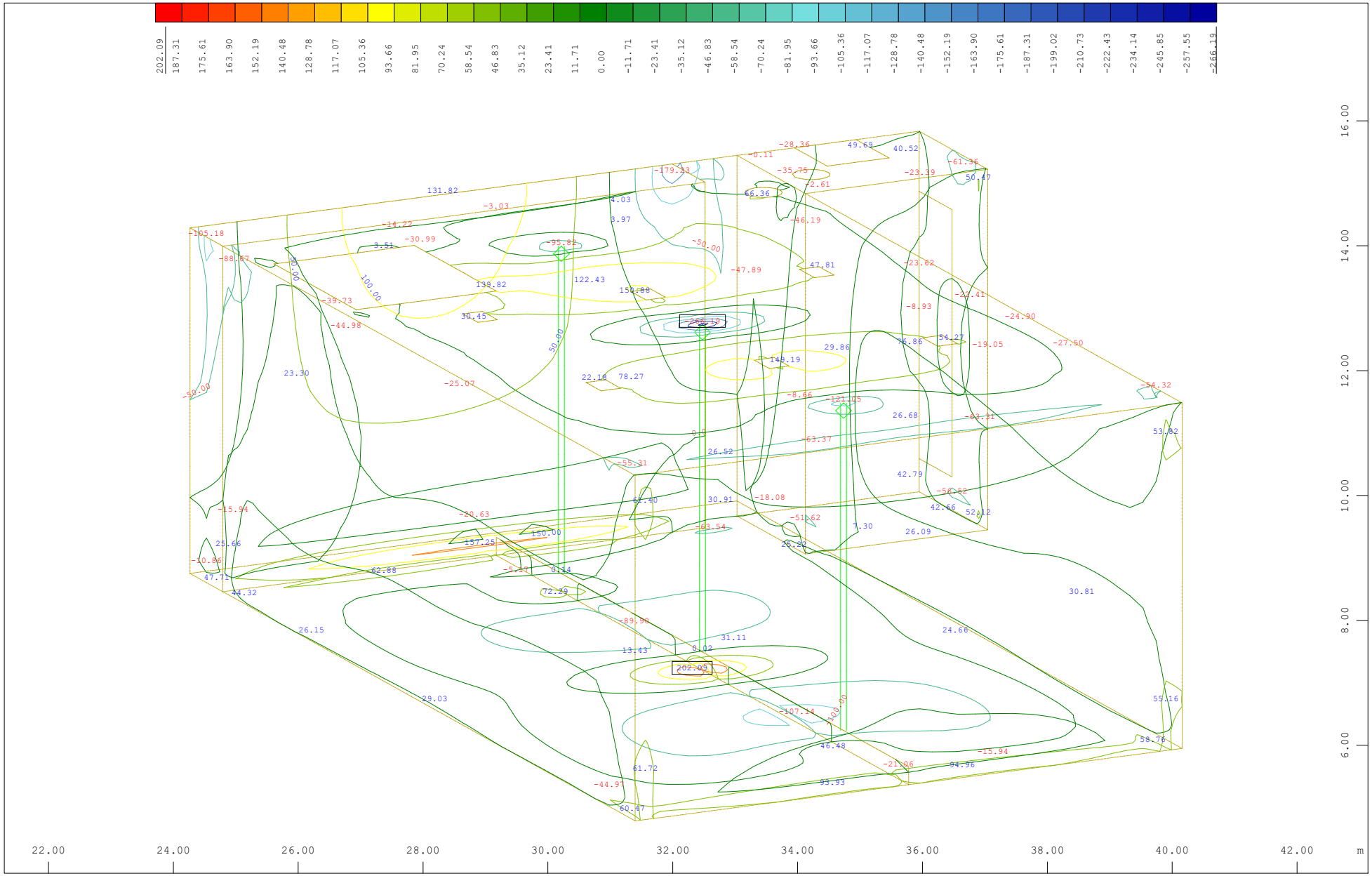
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Bending moment m-xx in local x from middle of element, Loadcase 402 MIN-MXX QUAD ELU4 , from -370.30 to 250.54 step 50.00 kNm/m

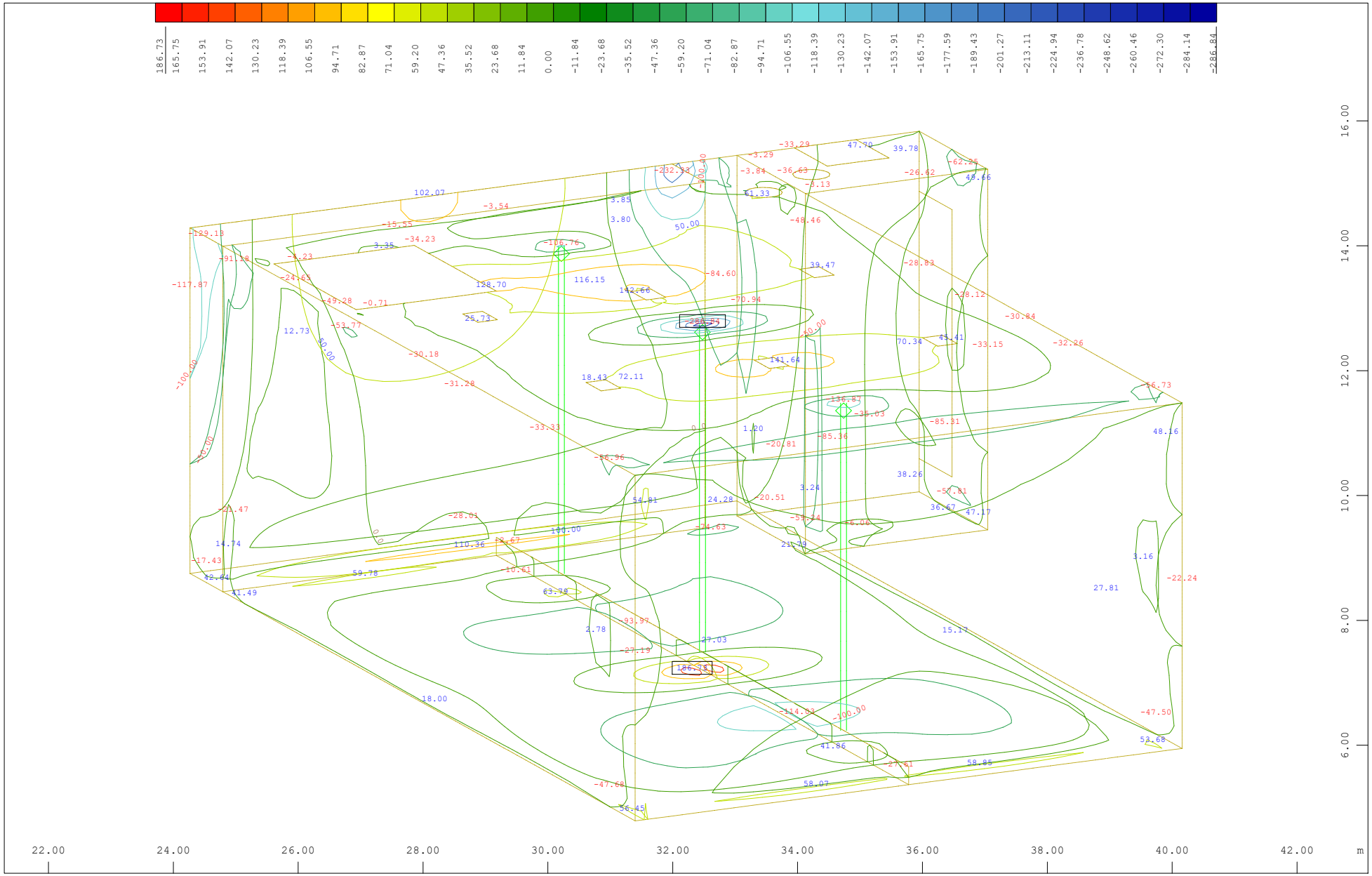
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Bending moment m-xx in local x from middle of element, Loadcase 501 MAX-MXX QUAD ELS1 , from -266.19 to 202.09 step 50.00 kNm/m

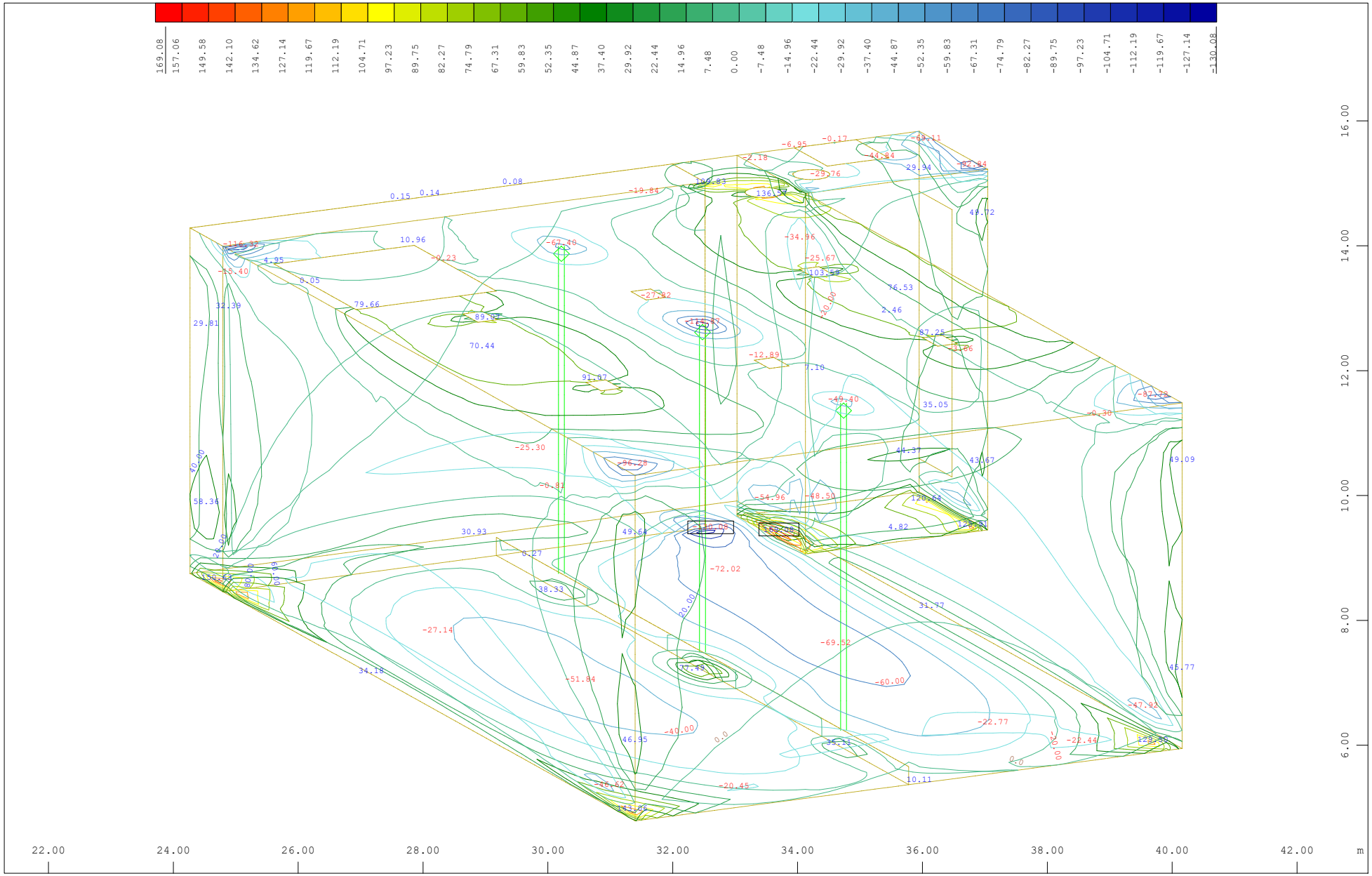
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Bending moment m-xx in local x from middle of element, Loadcase 502 MIN-MXX QUAD ELS1 , from -286.84 to 186.73 step 50.00 kNm/m

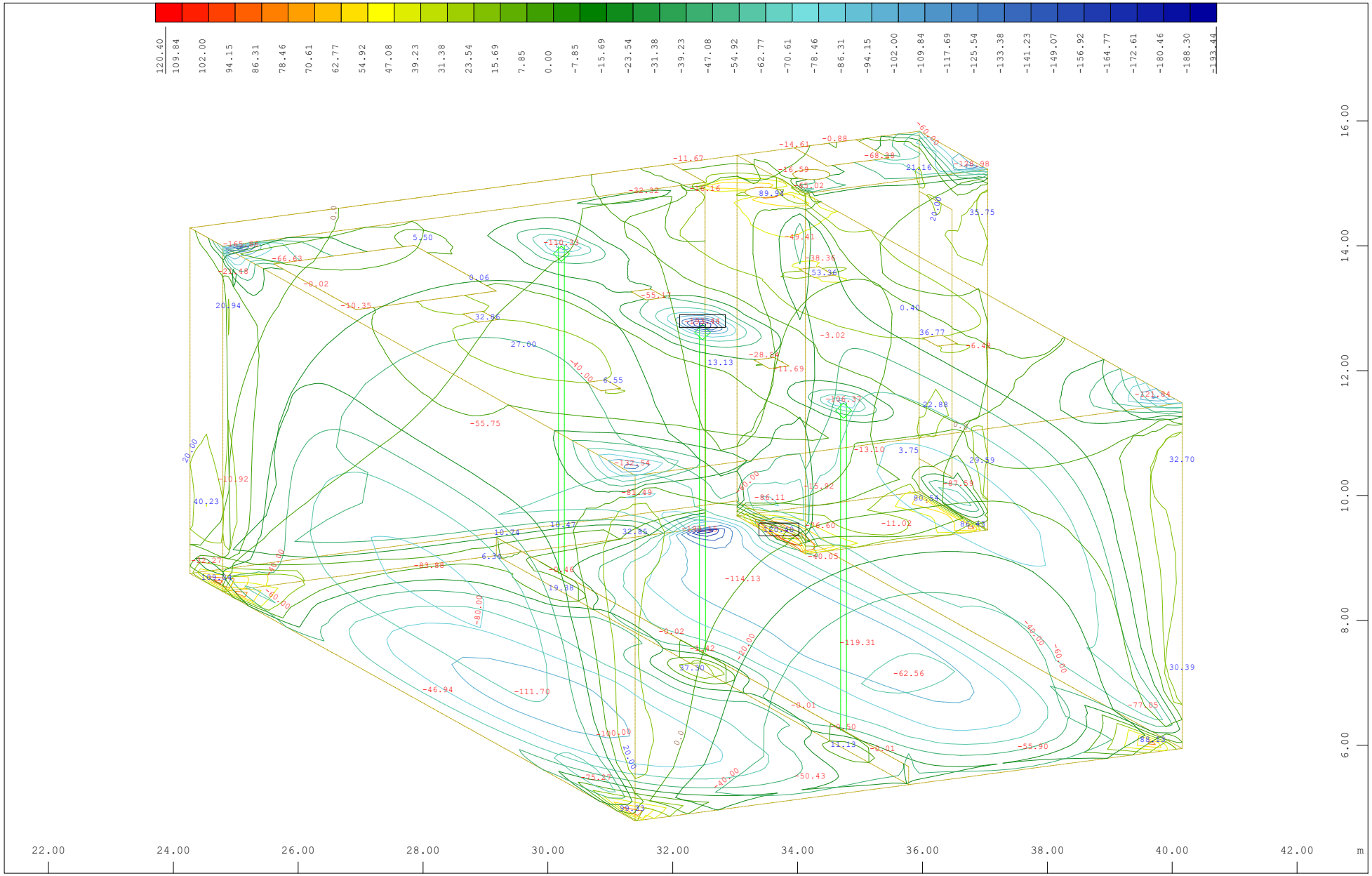
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Bending moment m-yy in local y from middle of element, Loadcase 103 MAX-MYY QUAD ELU1 , from -130.08 to 169.08 step 20.00 kNm/m

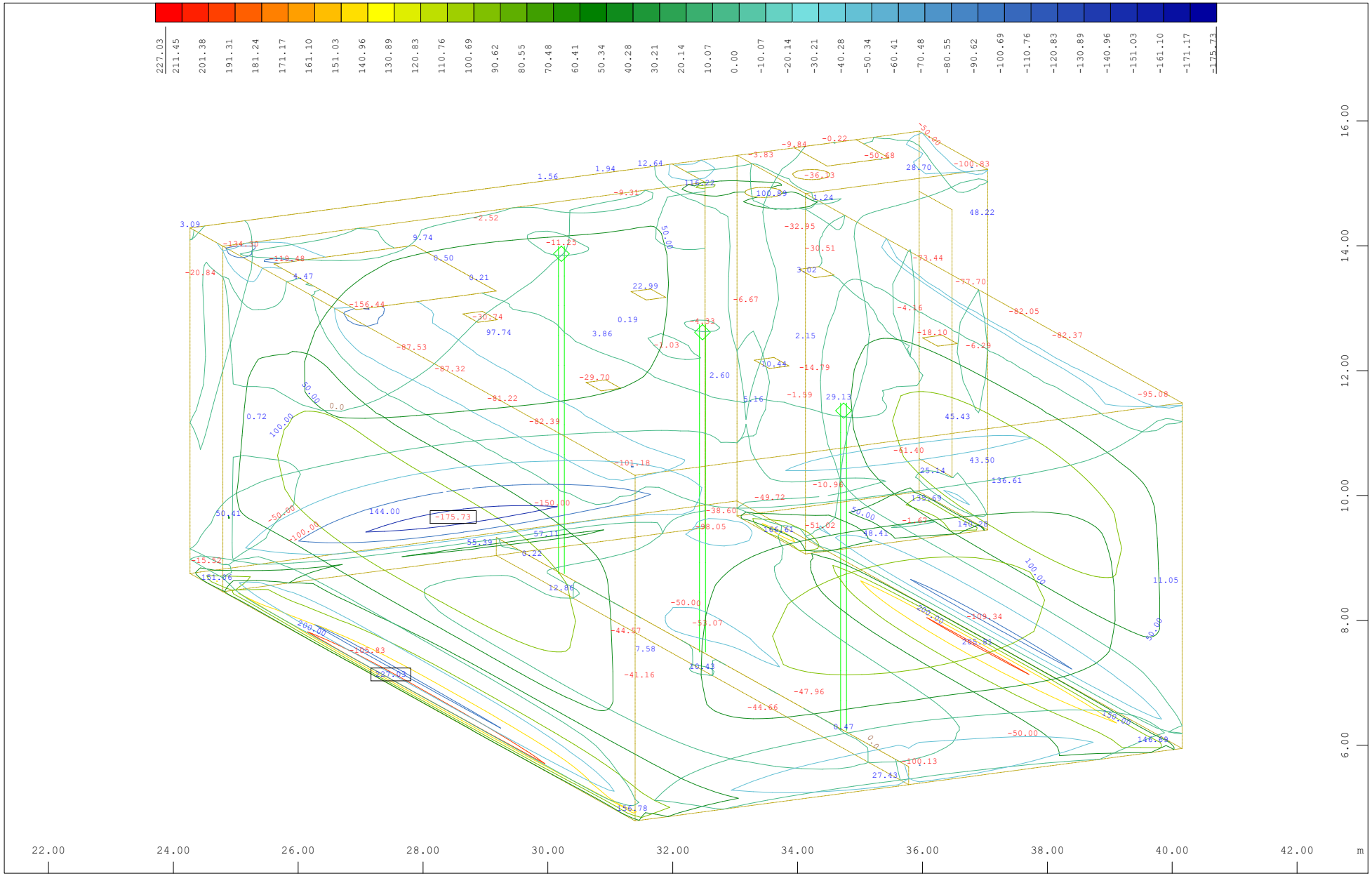
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Bending moment m-yy in local y from middle of element, Loadcase 104 MIN-MYY QUAD ELU1 , from -193.44 to 120.40 step 20.00 kNm/m

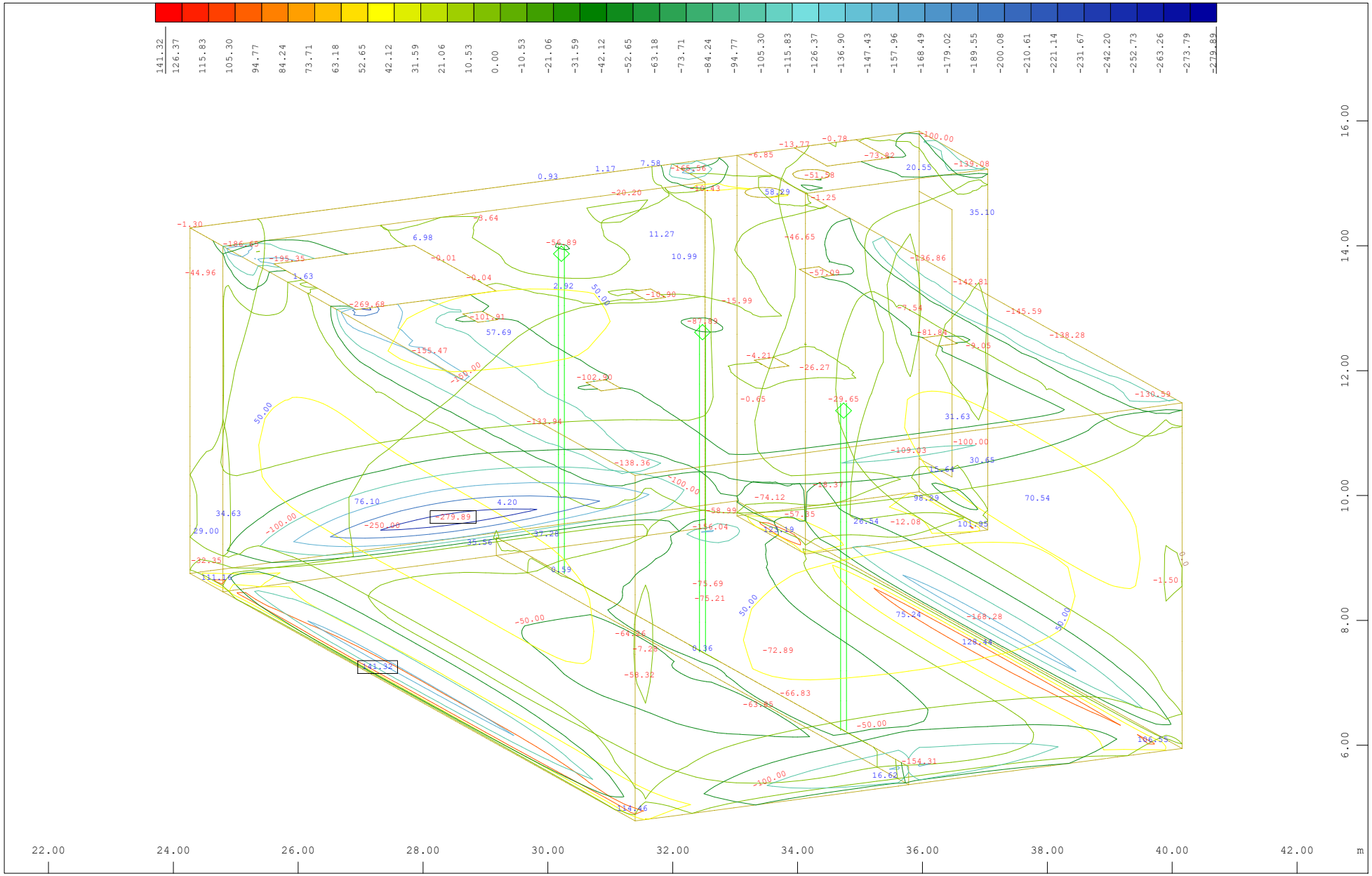
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Bending moment m-yy in local y from middle of element, Loadcase 203 MAX-MYY QUAD ELU2 , from -175.73 to 227.03 step 50.00 kNm/m

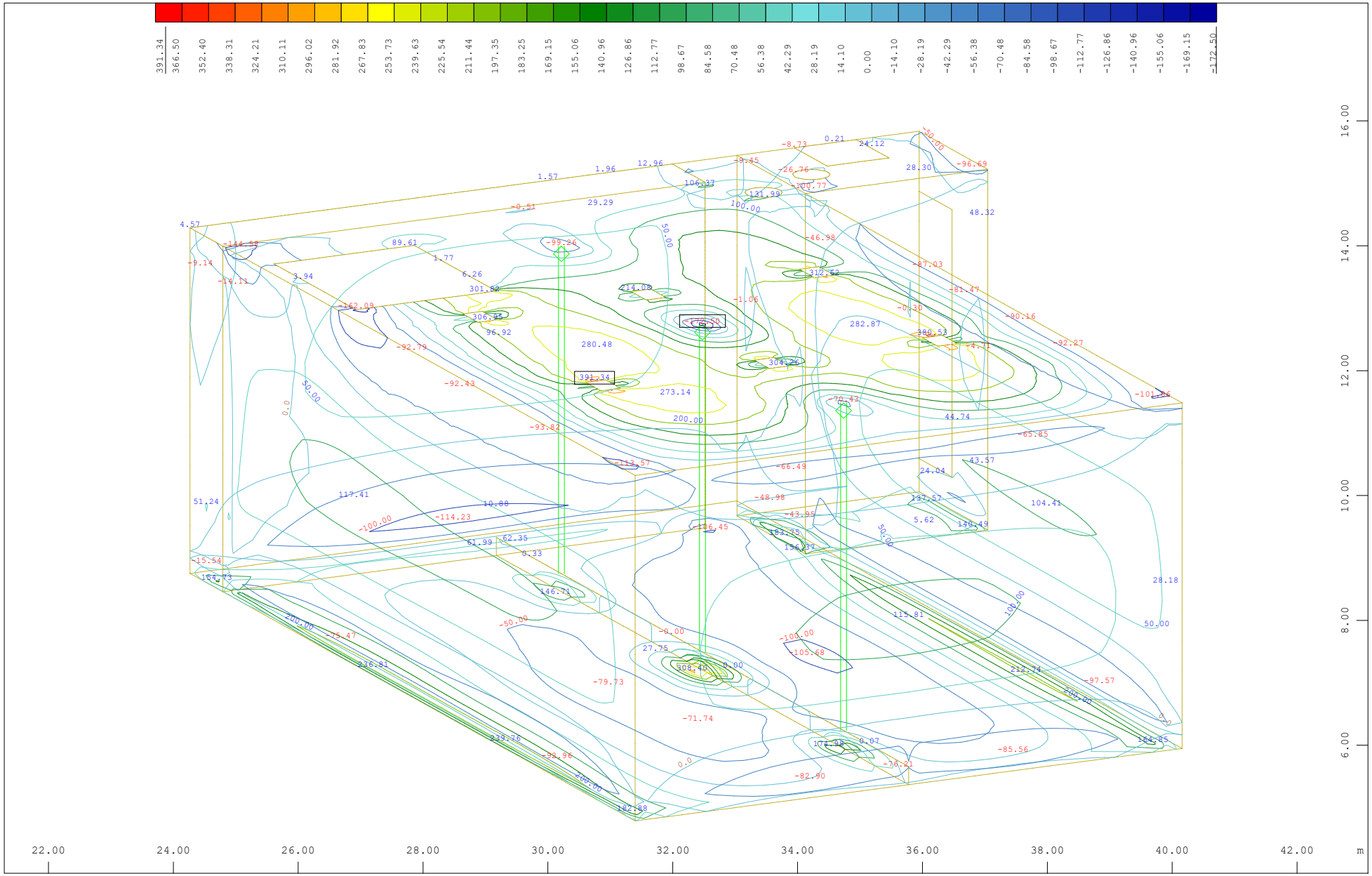
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Bending moment m-yy in local y from middle of element, Loadcase 204 MIN-MYY QUAD ELU2 , from -279.89 to 141.32 step 50.00 kNm/m

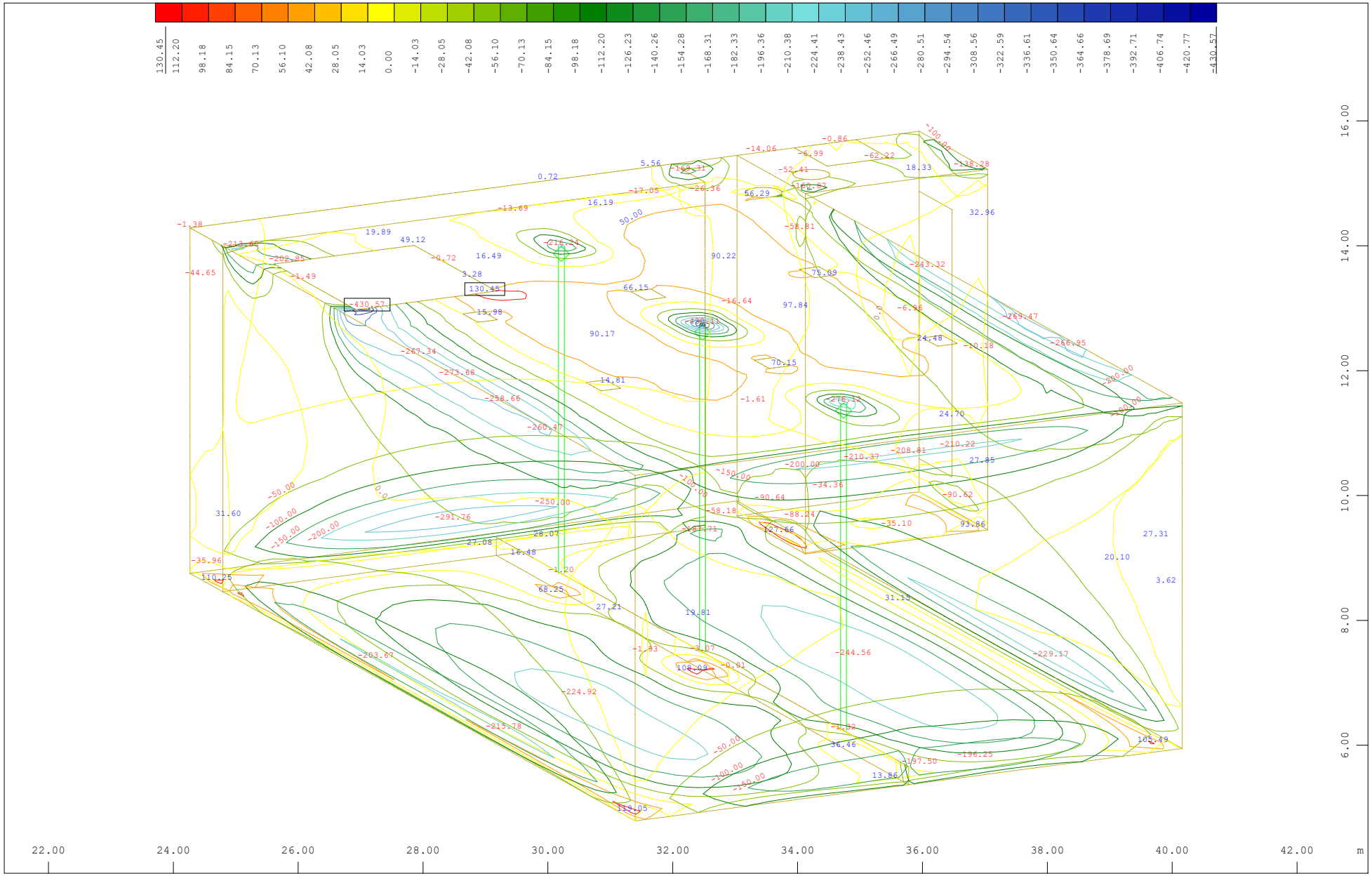
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Bending moment m-yy in local y from middle of element, Loadcase 303 MAX-MYY QUAD ELU3 , from -172.50 to 391.34 step 50.00 kNm/m

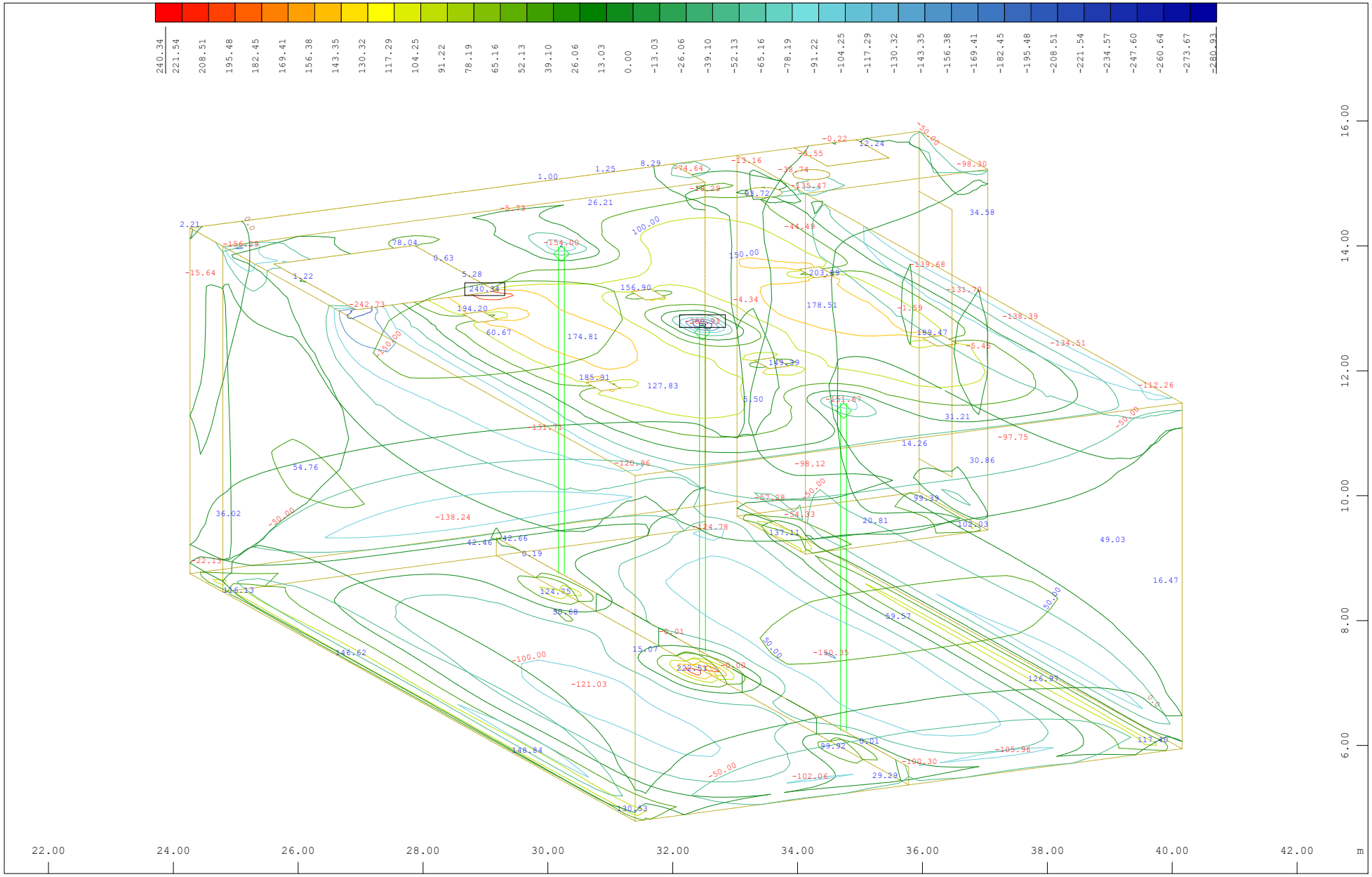
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Bending moment m-yy in local y from middle of element, Loadcase 304 MIN-MYY QUAD ELU3 , from -430.57 to 130.45 step 50.00 kNm/m

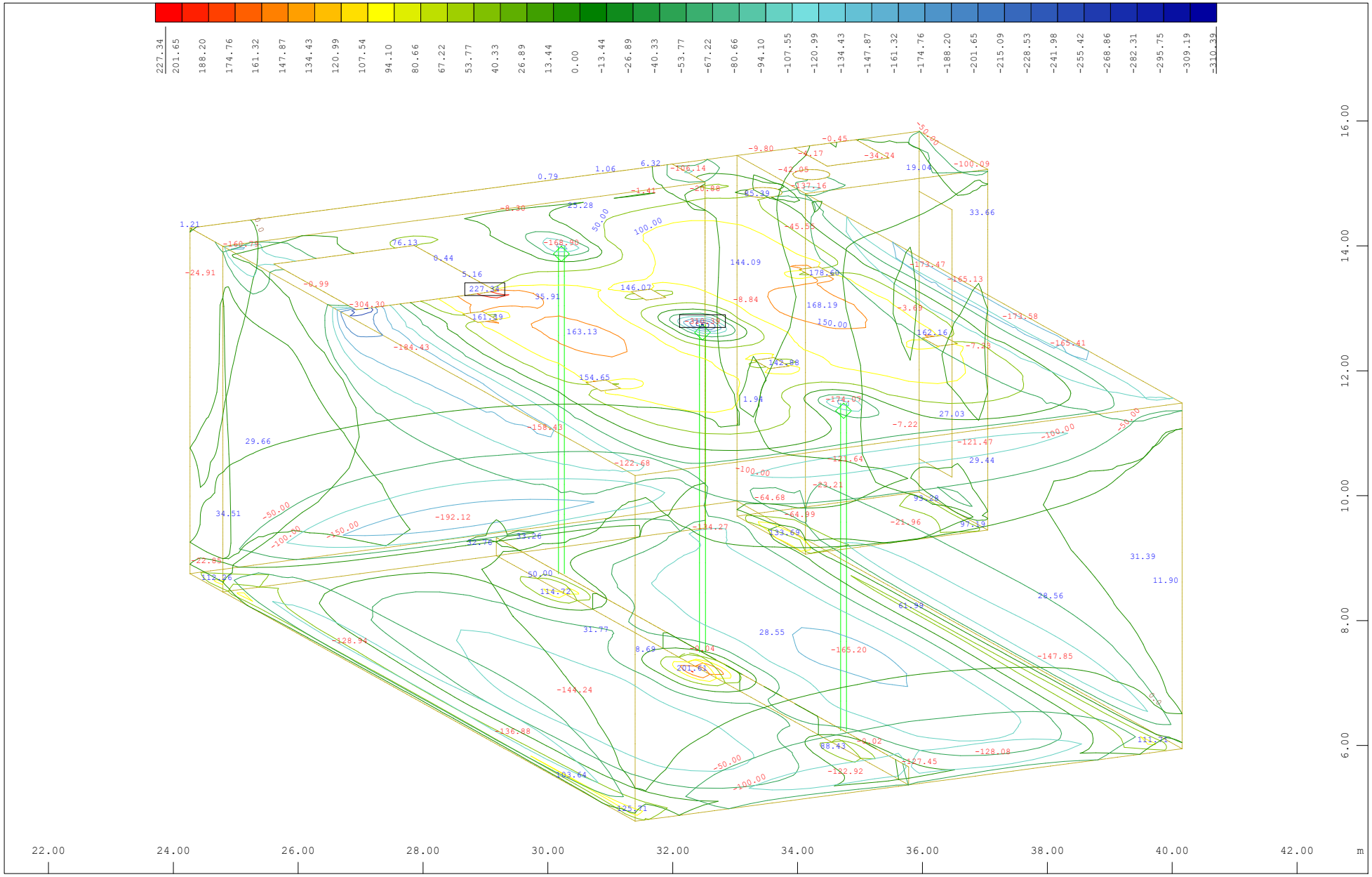
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Bending moment m-yy in local y from middle of element, Loadcase 403 MAX-MYY QUAD ELU4 , from -280.93 to 240.34 step 50.00 kNm/m

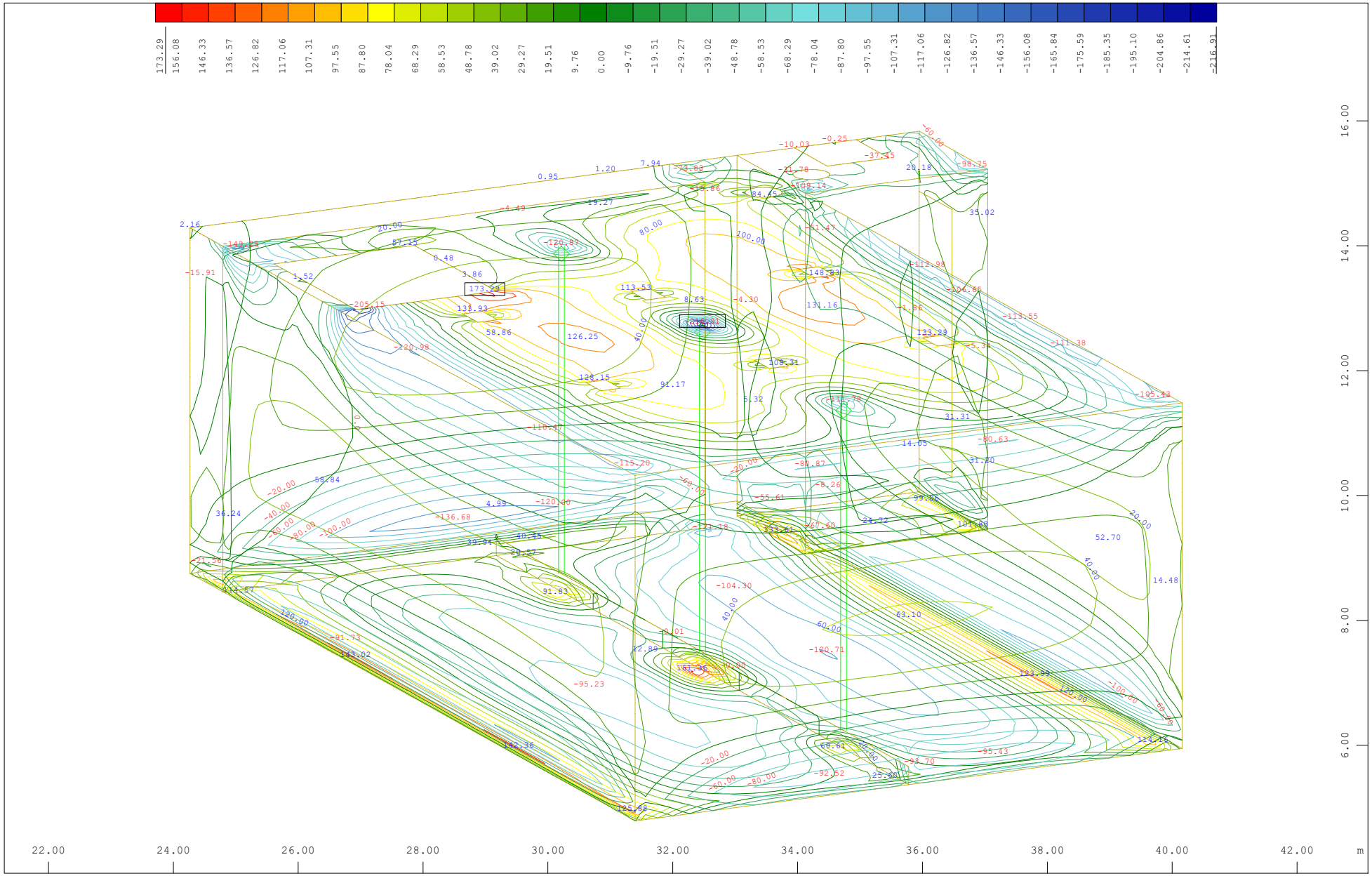
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Bending moment m-yy in local y from middle of element, Loadcase 404 MIN-MYY QUAD ELU4 , from -310.39 to 227.34 step 50.00 kNm/m

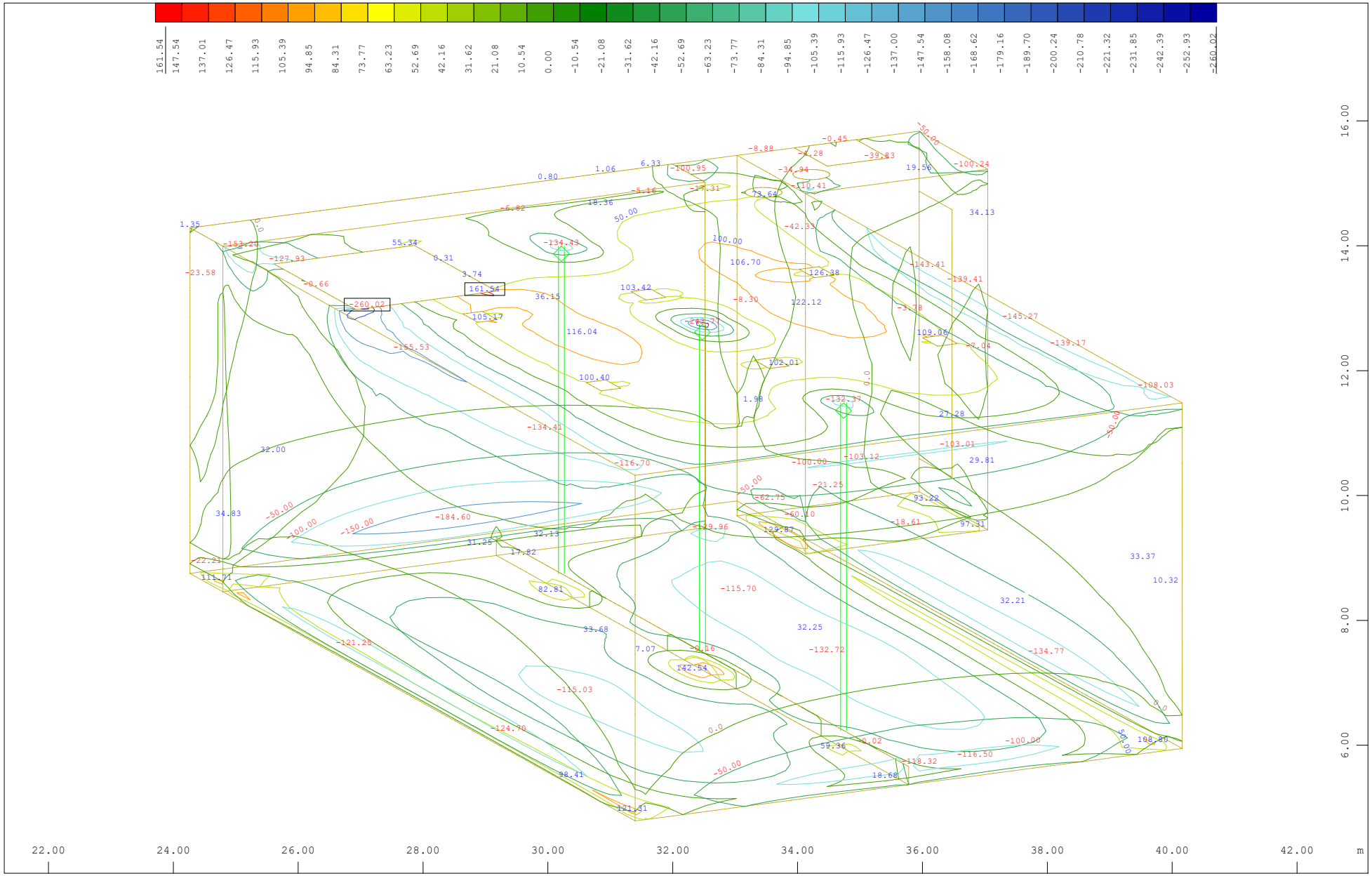
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Bending moment m-yy in local y from middle of element, Loadcase 503 MAX-MYY QUAD ELS1 , from -216.91 to 173.29 step 20.00 kNm/m

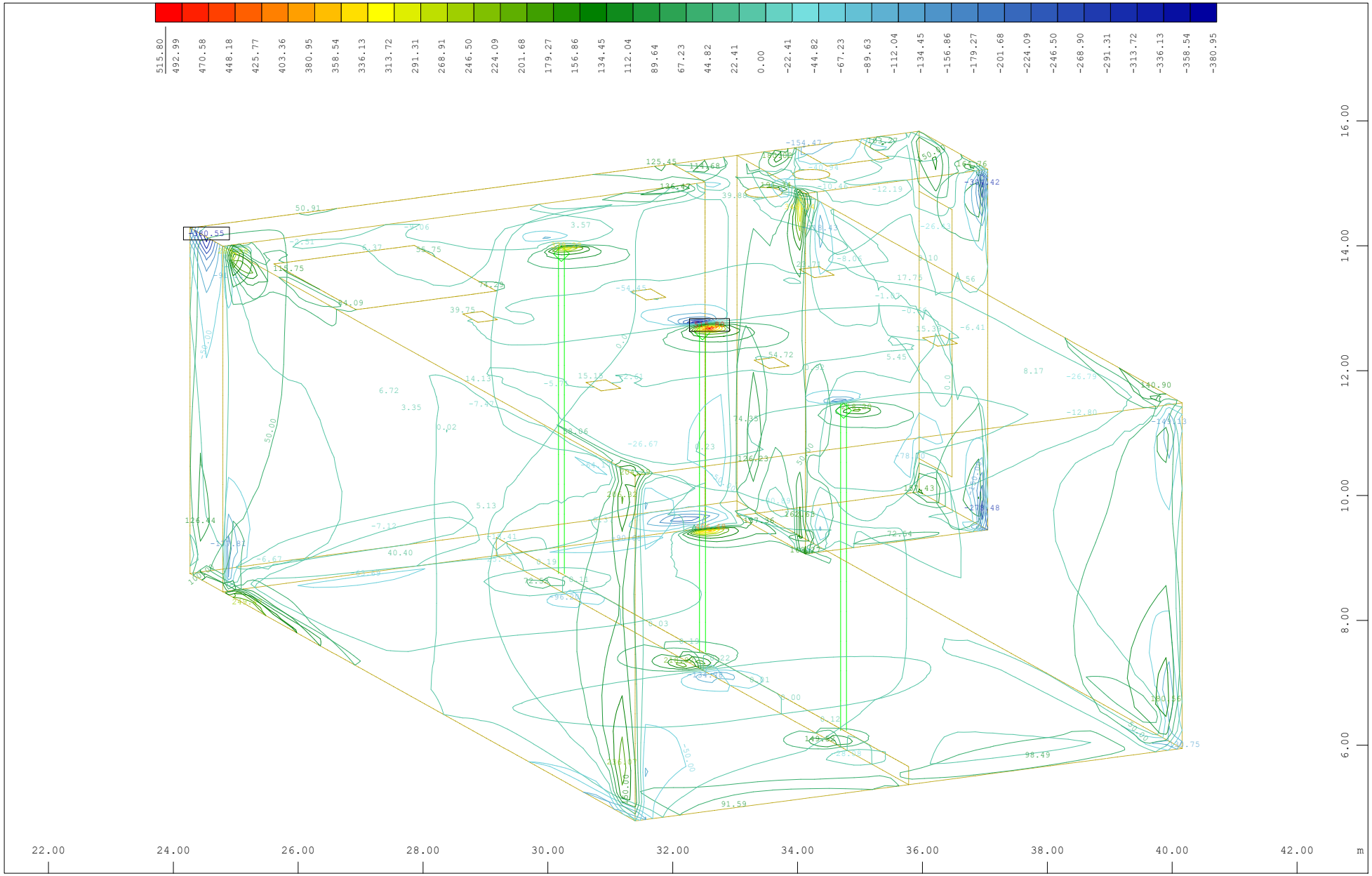
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

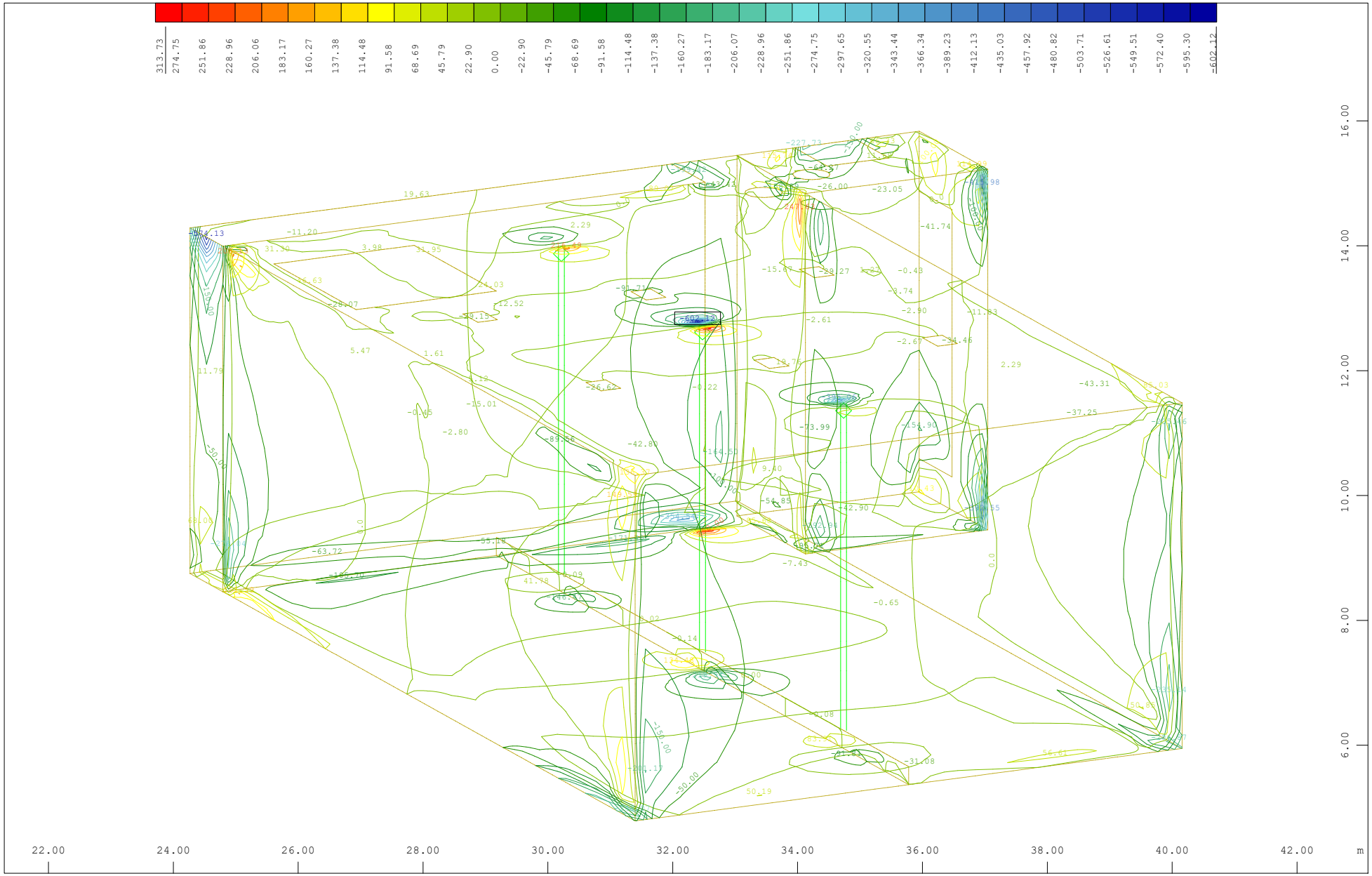
Bending moment m-yy in local y from middle of element, Loadcase 504 MIN-MYY QUAD ELS1 , from -260.02 to 161.54 step 50.00 kNm/m

M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962



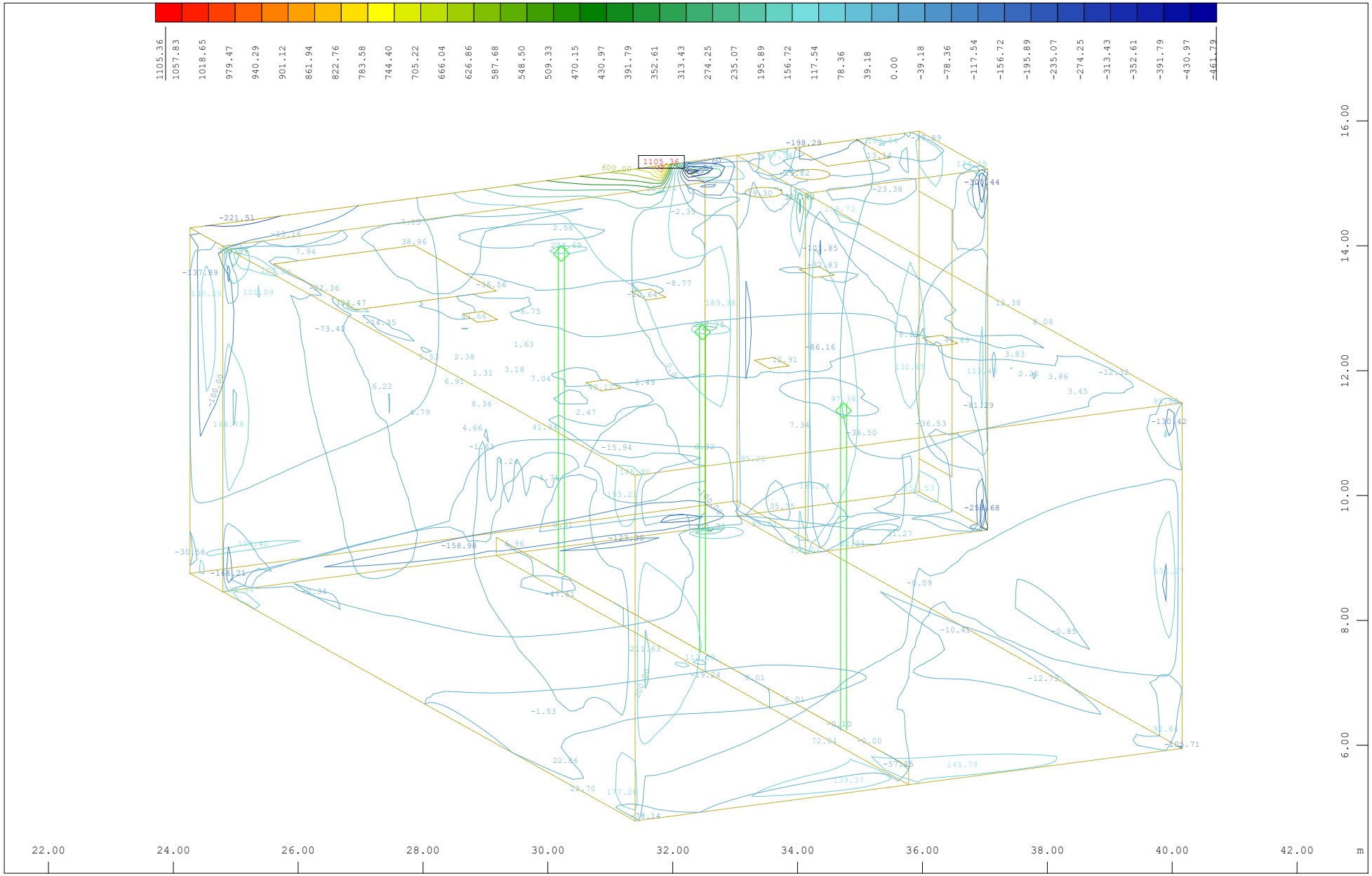

Shear force v-x in local x from middle of element, Loadcase 113 MAX-VX QUAD ELU1 , from -380.55 to 515.80 step 50.00 kN/m

M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962



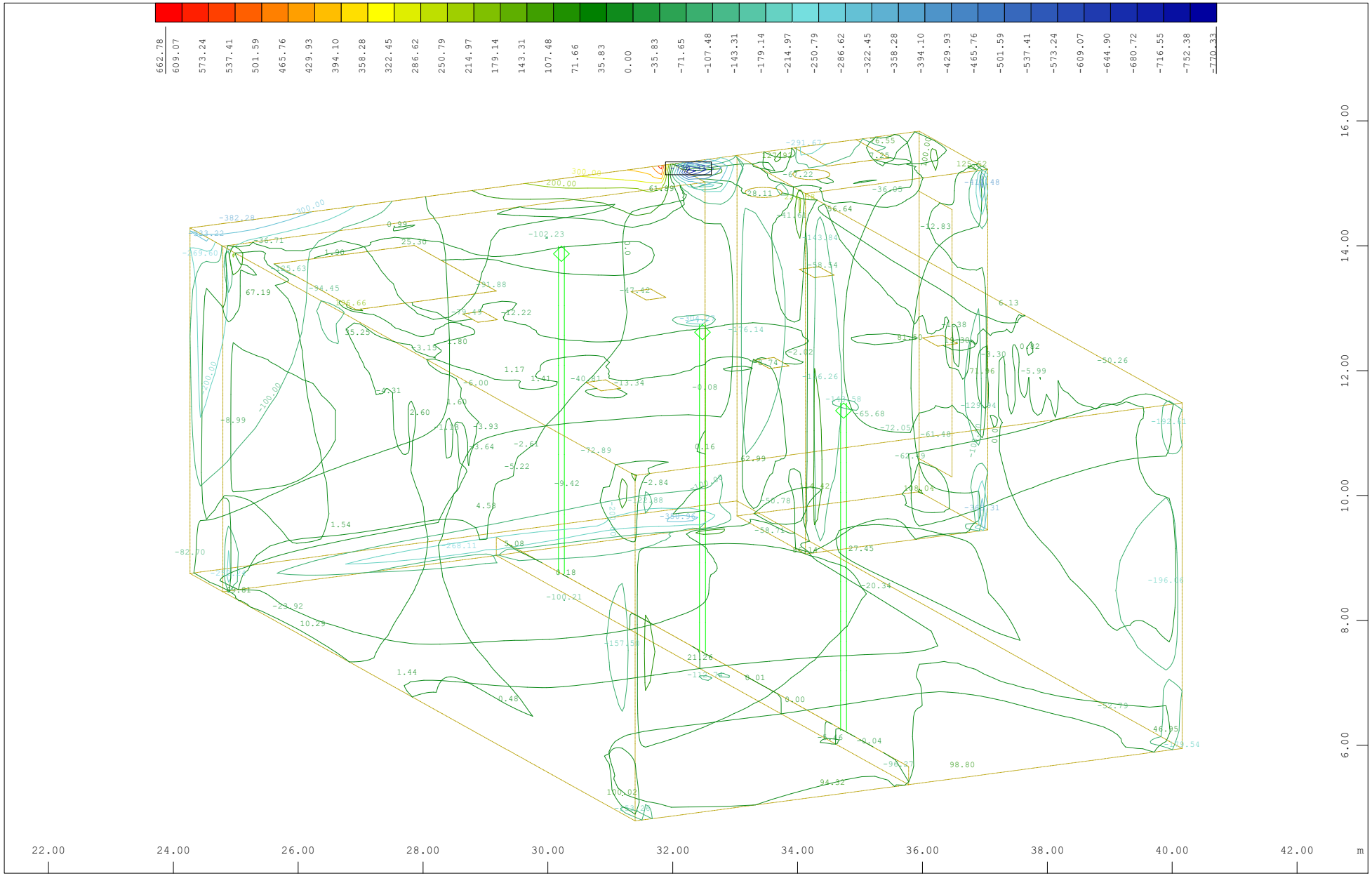

Shear force v-x in local x from middle of element, Loadcase 114 MIN-VX QUAD ELU1 , from -602.12 to 313.73 step 50.00 kN/m

M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Shear force v-x in local x from middle of element, Loadcase 213 MAX-VX QUAD ELU2 , from -461.79 to 1105.36 step 100.00 kN/m

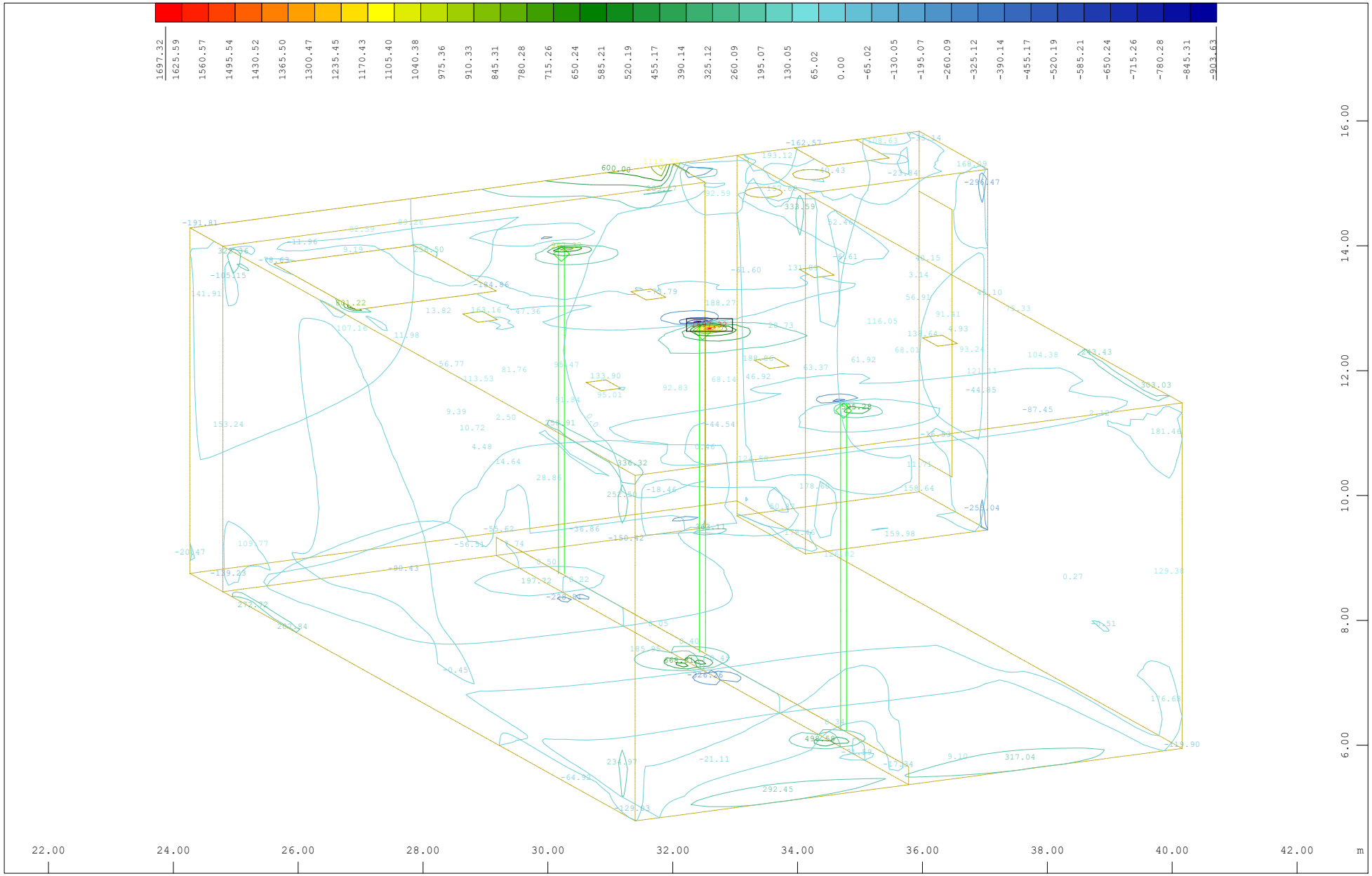
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Shear force v-x in local x from middle of element, Loadcase 214 MIN-VX QUAD ELU2 , from -770.33 to 662.78 step 100.00 kN/m

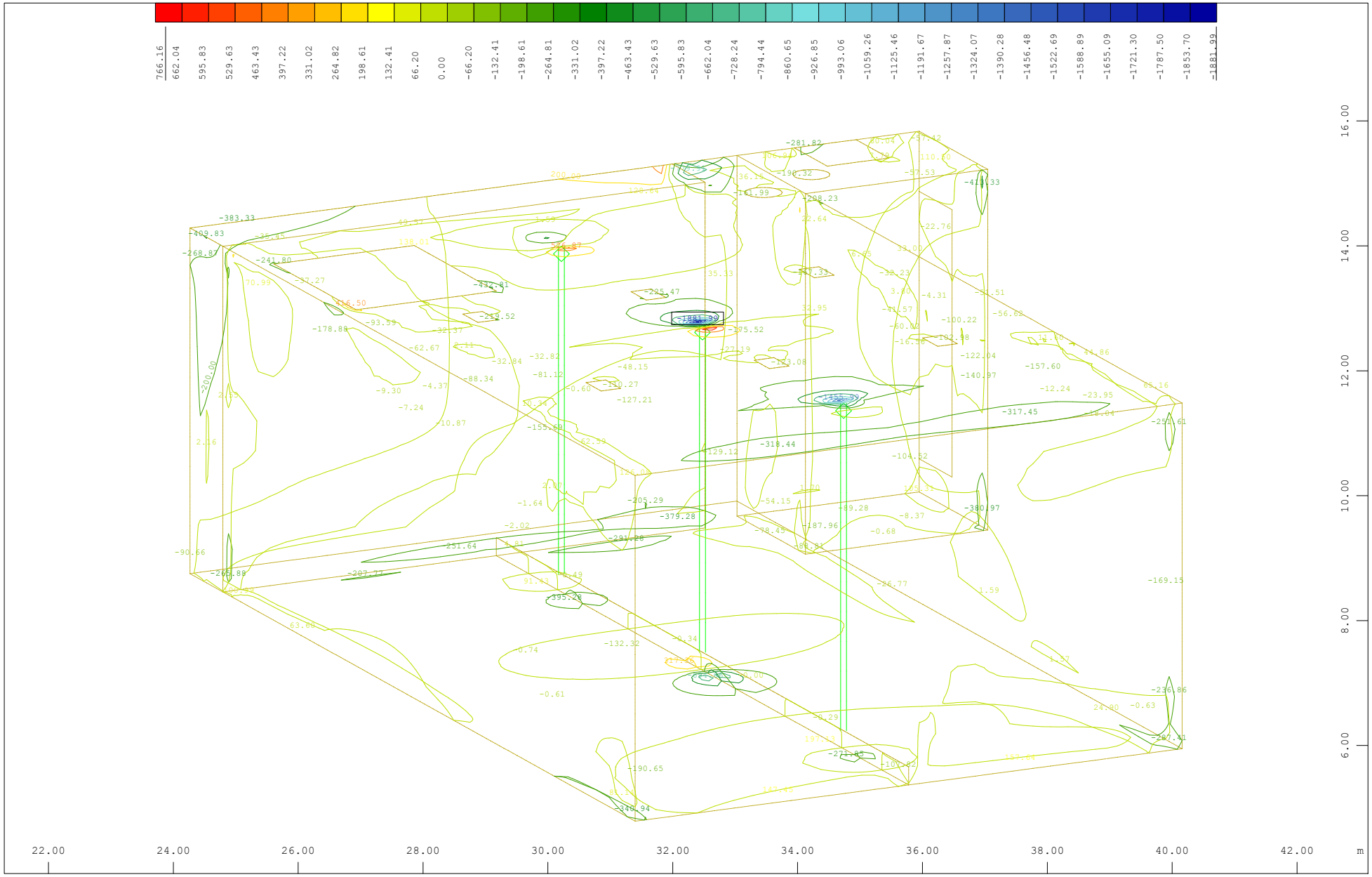
Z
Y
X

M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Shear force v-x in local x from middle of element, Loadcase 313 MAX-VX QUAD ELU3 , from -903.63 to 1697.32 step 200.00 kN/m

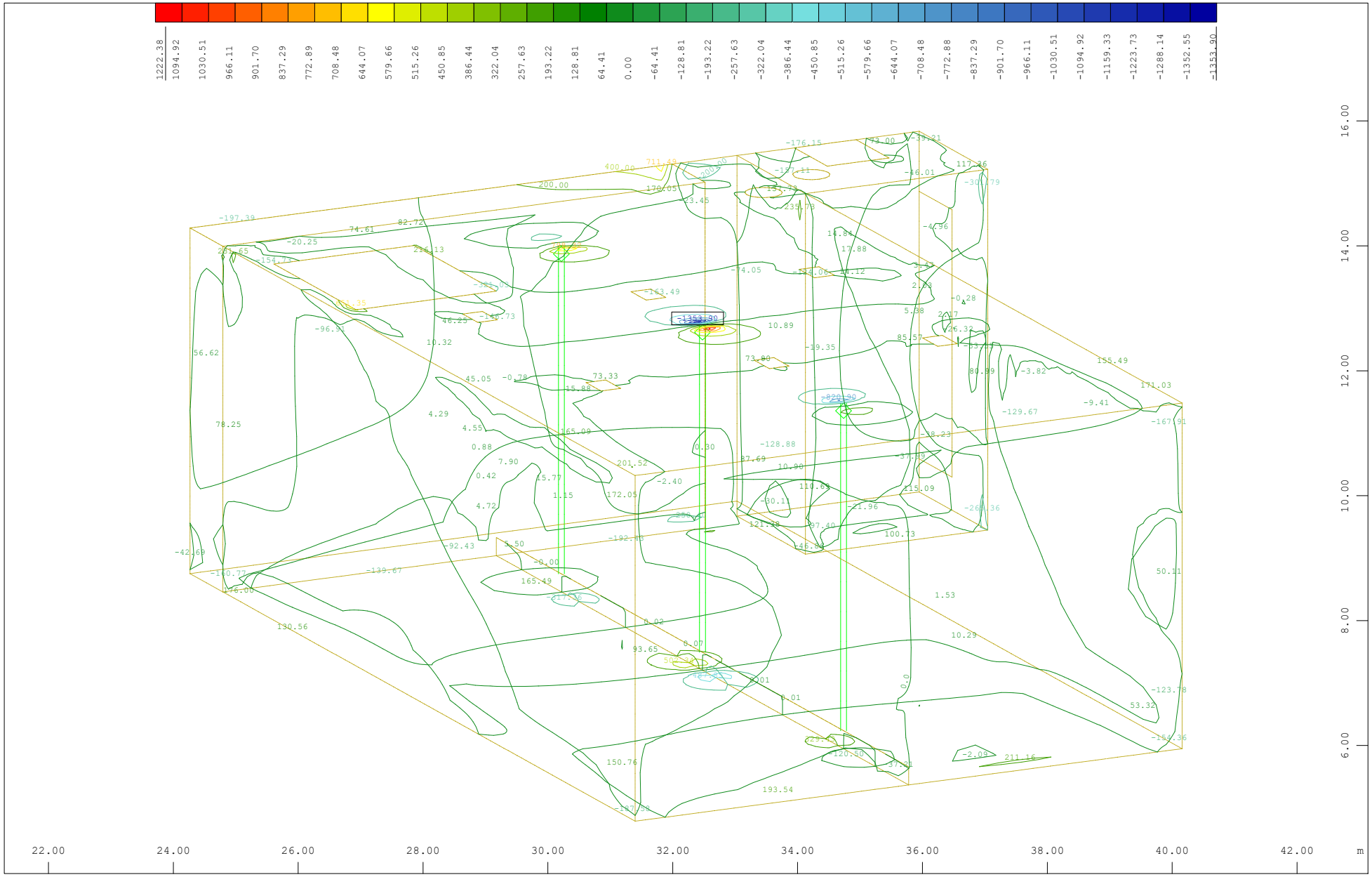
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Shear force v-x in local x from middle of element, Loadcase 314 MIN-VX QUAD ELU3 , from -1881.99 to 766.16 step 200.00 kN/m

Z
Y
X

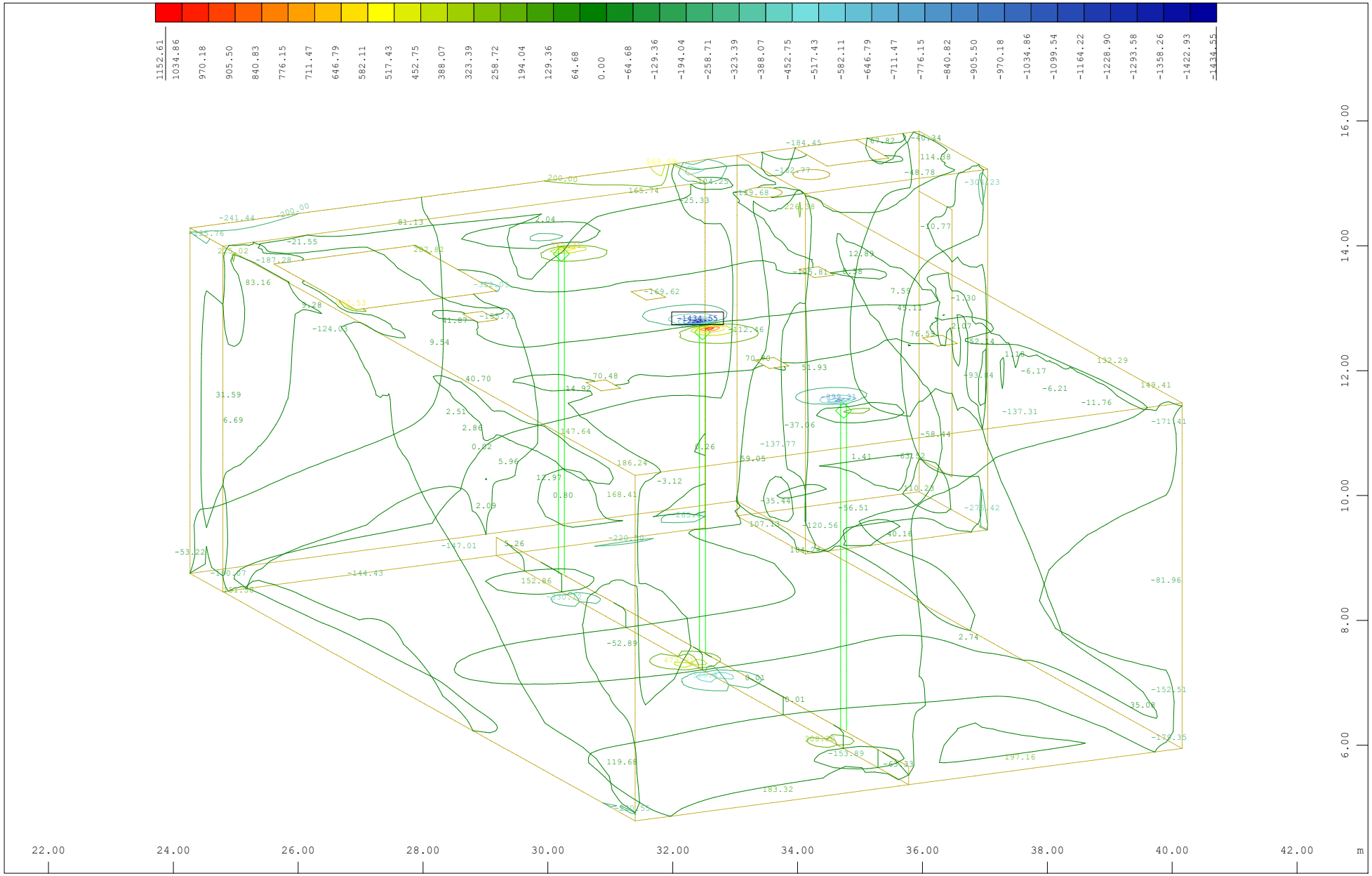
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Shear force v-x in local x from middle of element, Loadcase 413 MAX-VX QUAD ELU4 , from -1353.90 to 1222.38 step 200.00 kN/m

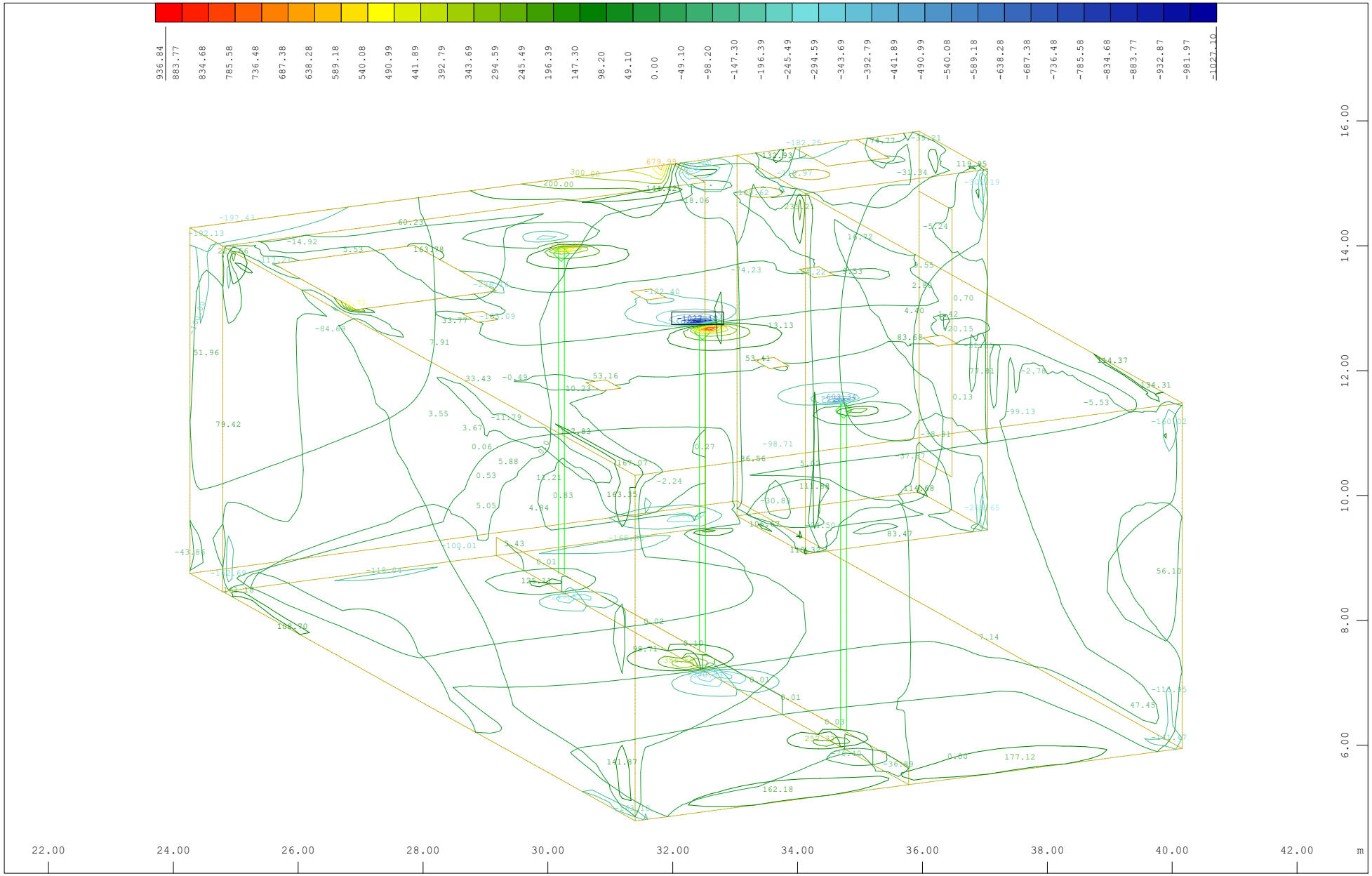
Z
Y
X

M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962



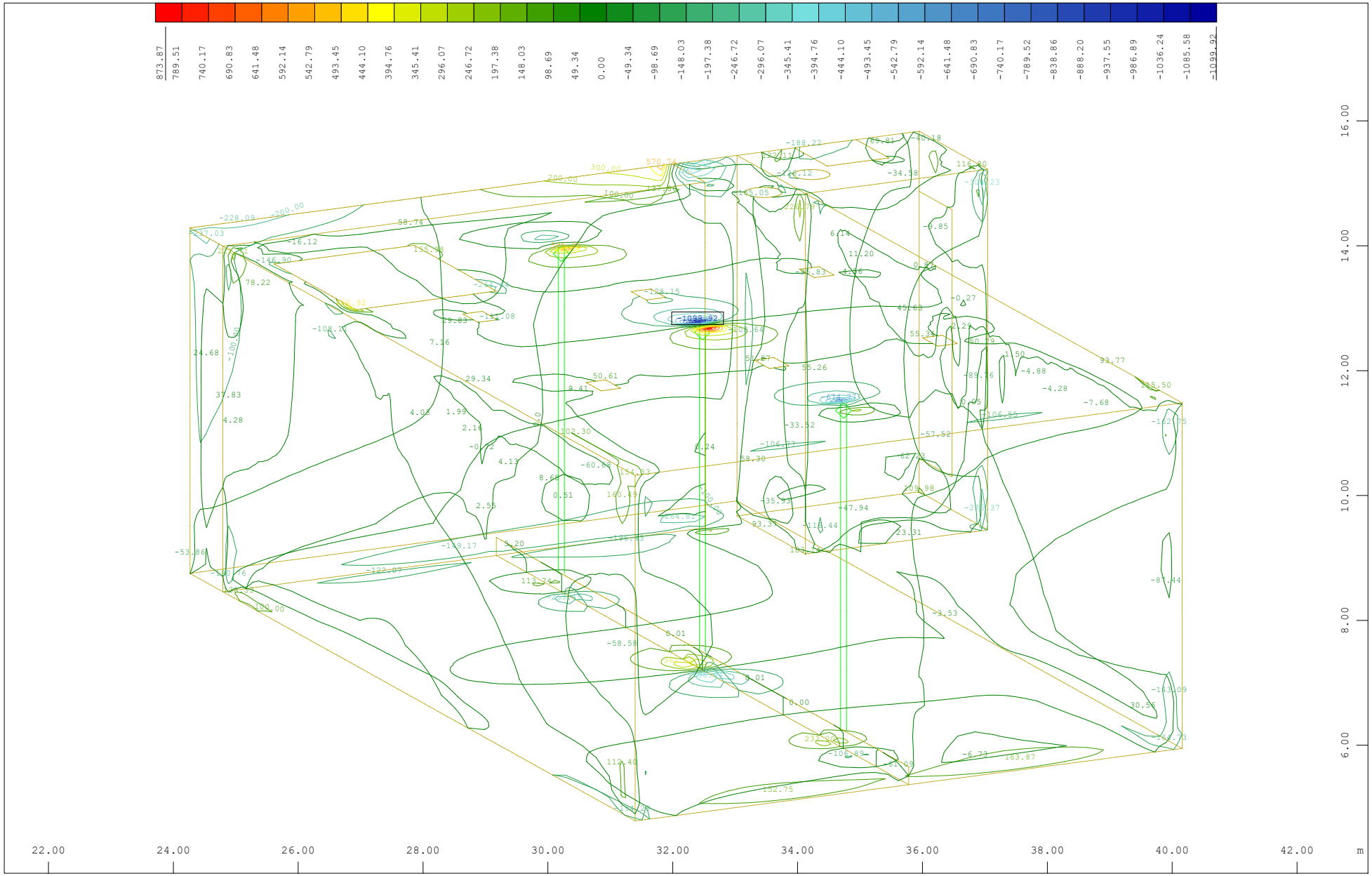

Shear force v-x in local x from middle of element, Loadcase 414 MIN-VX QUAD ELU4 , from -1434.55 to 1152.61 step 200.00 kN/m

M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Shear force v-x in local x from middle of element, Loadcase 513 MAX-VX QUAD ELS1 , from -1027.10 to 936.84 step 100.00 kN/m

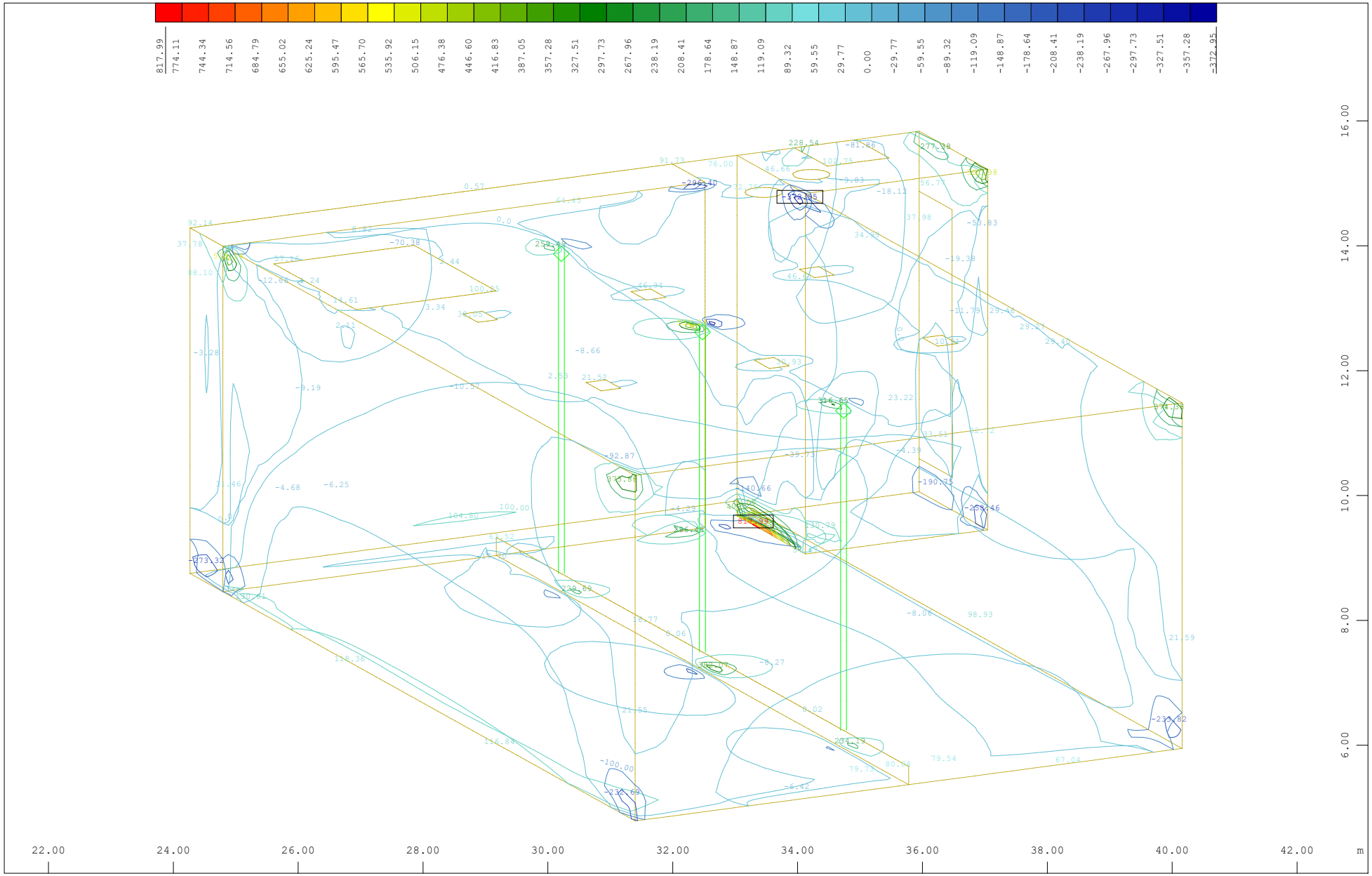
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Shear force v-x in local x from middle of element, Loadcase 514 MIN-VX QUAD ELS1 , from -1099.92 to 873.87 step 100.00 kN/m

Z
Y
X

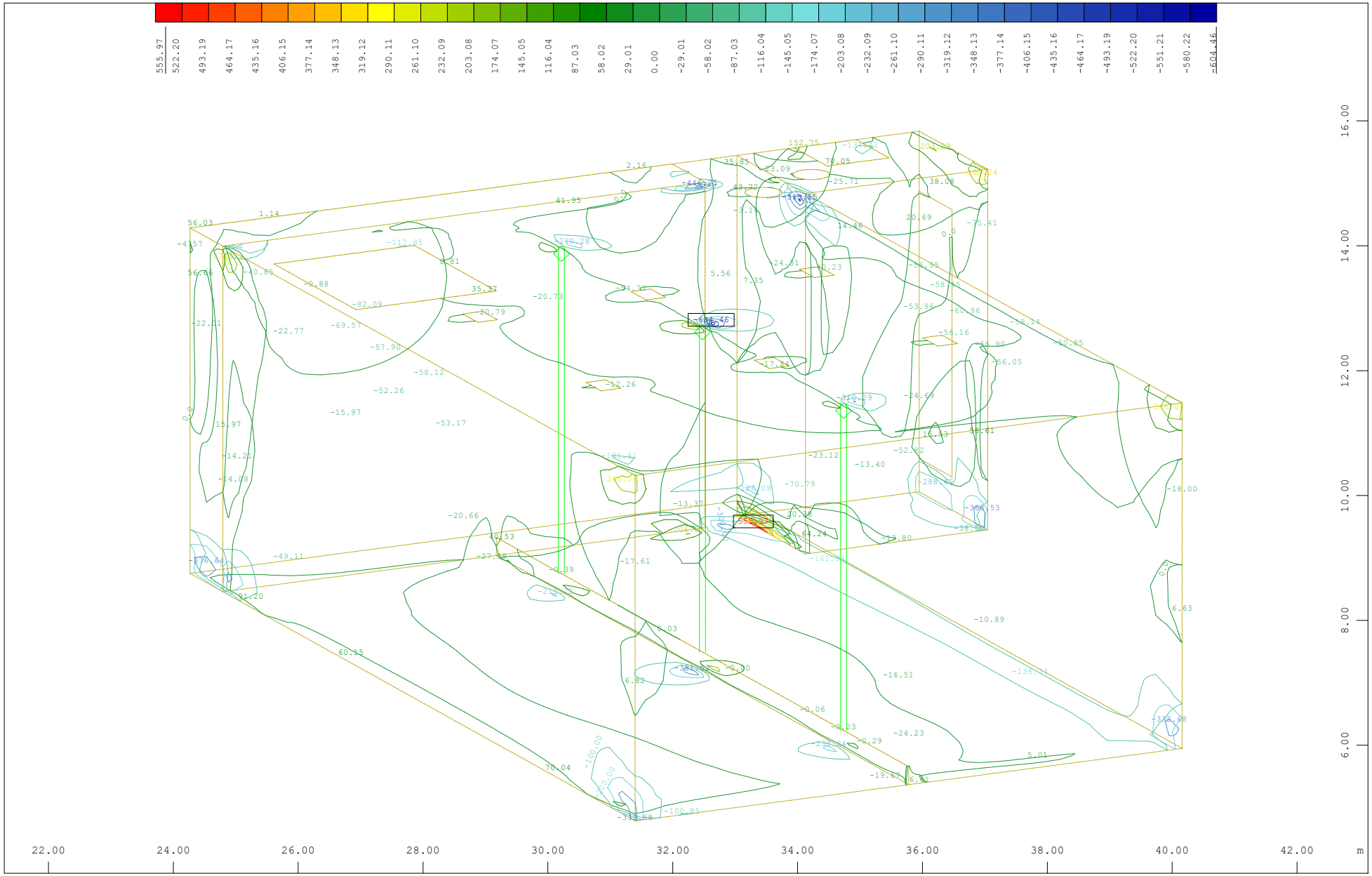
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Shear force v-y in local y from middle of element, Loadcase 115 MAX-VY QUAD ELU1 , from -372.95 to 817.99 step 100.00 kN/m

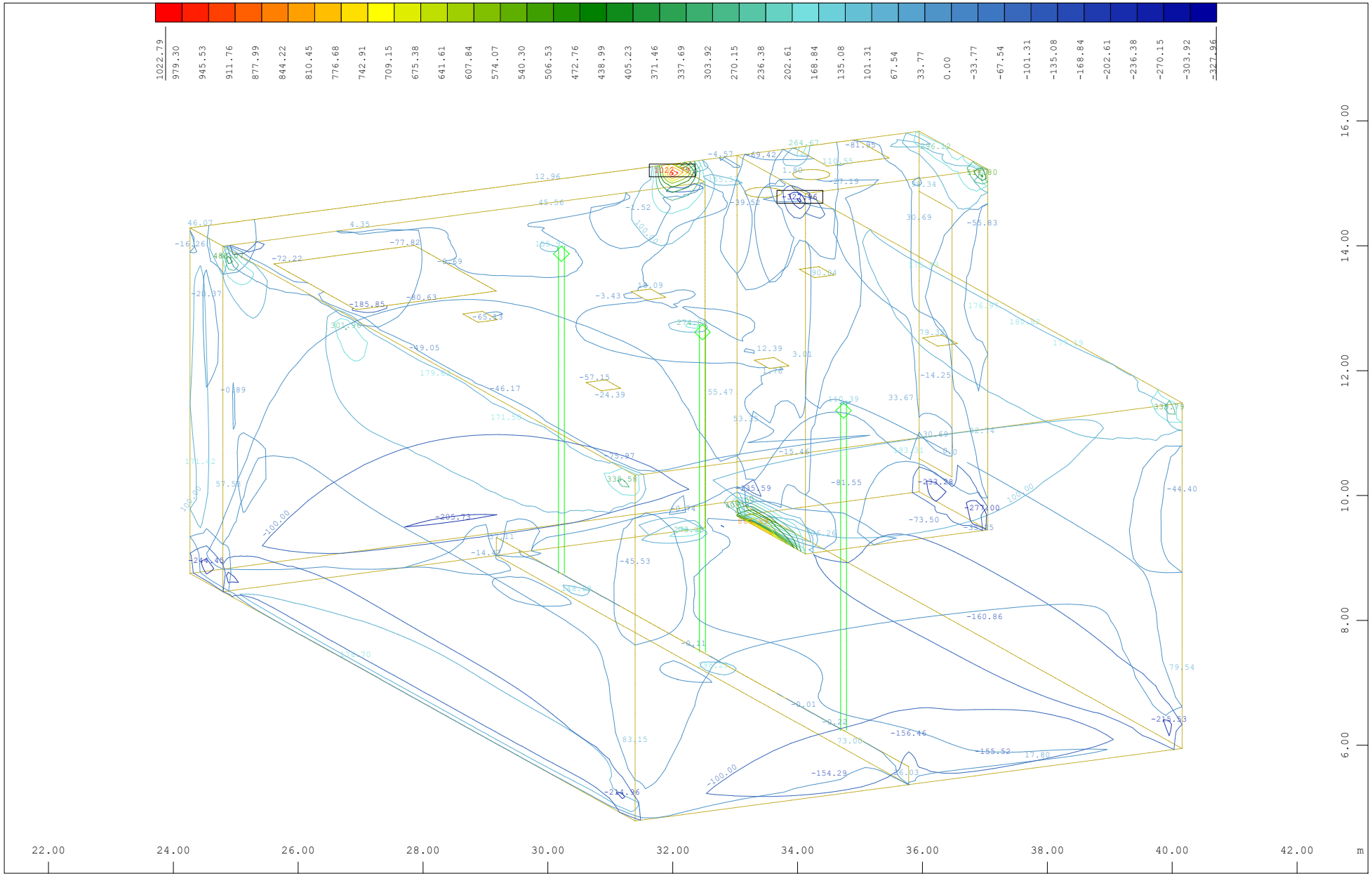
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Shear force v-y in local y from middle of element, Loadcase 116 MIN-VY QUAD ELU1 , from -604.46 to 555.97 step 100.00 kN/m

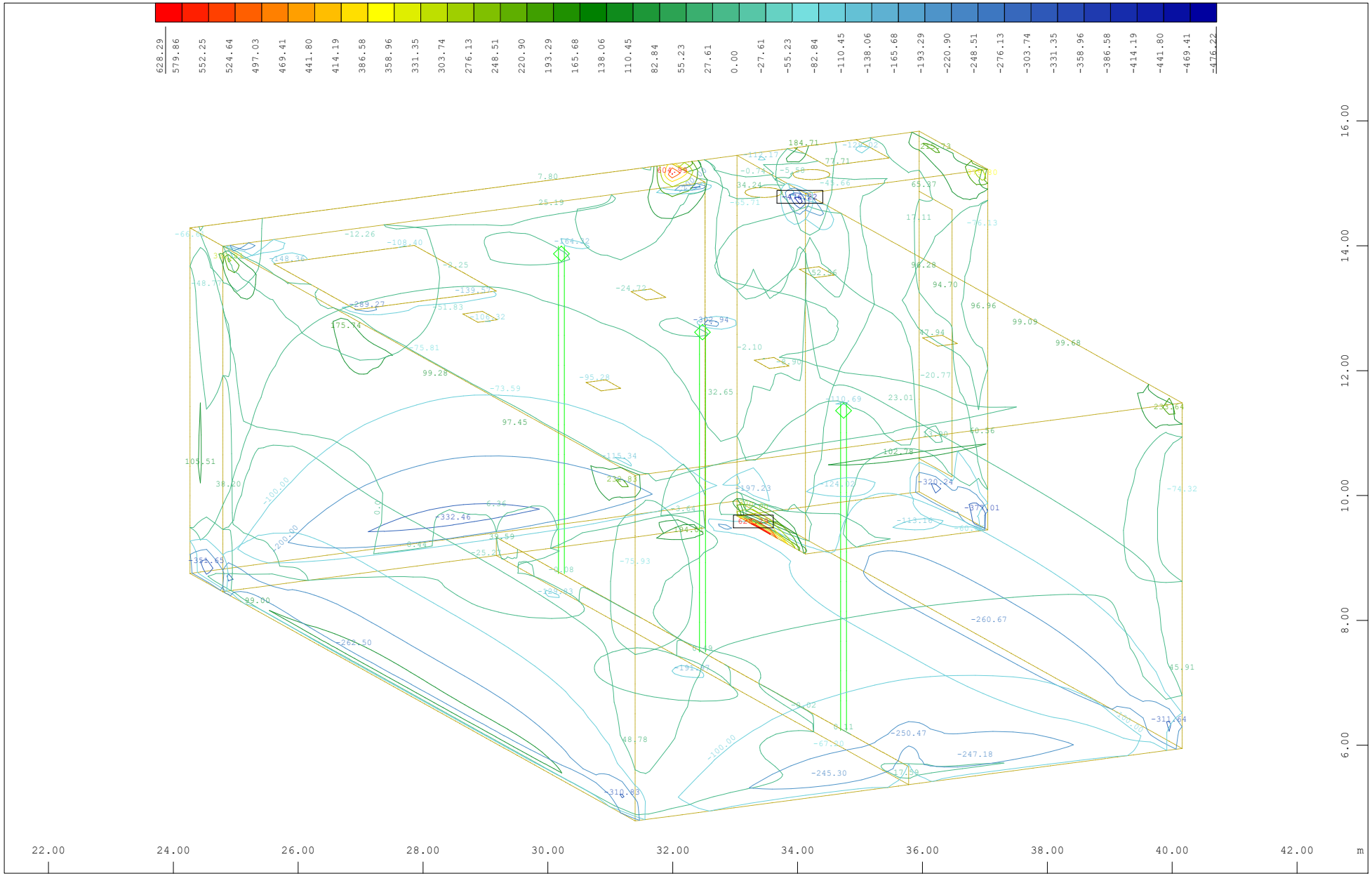
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Shear force v-y in local y from middle of element, Loadcase 215 MAX-VY QUAD ELU2 , from -327.96 to 1022.79 step 100.00 kN/m

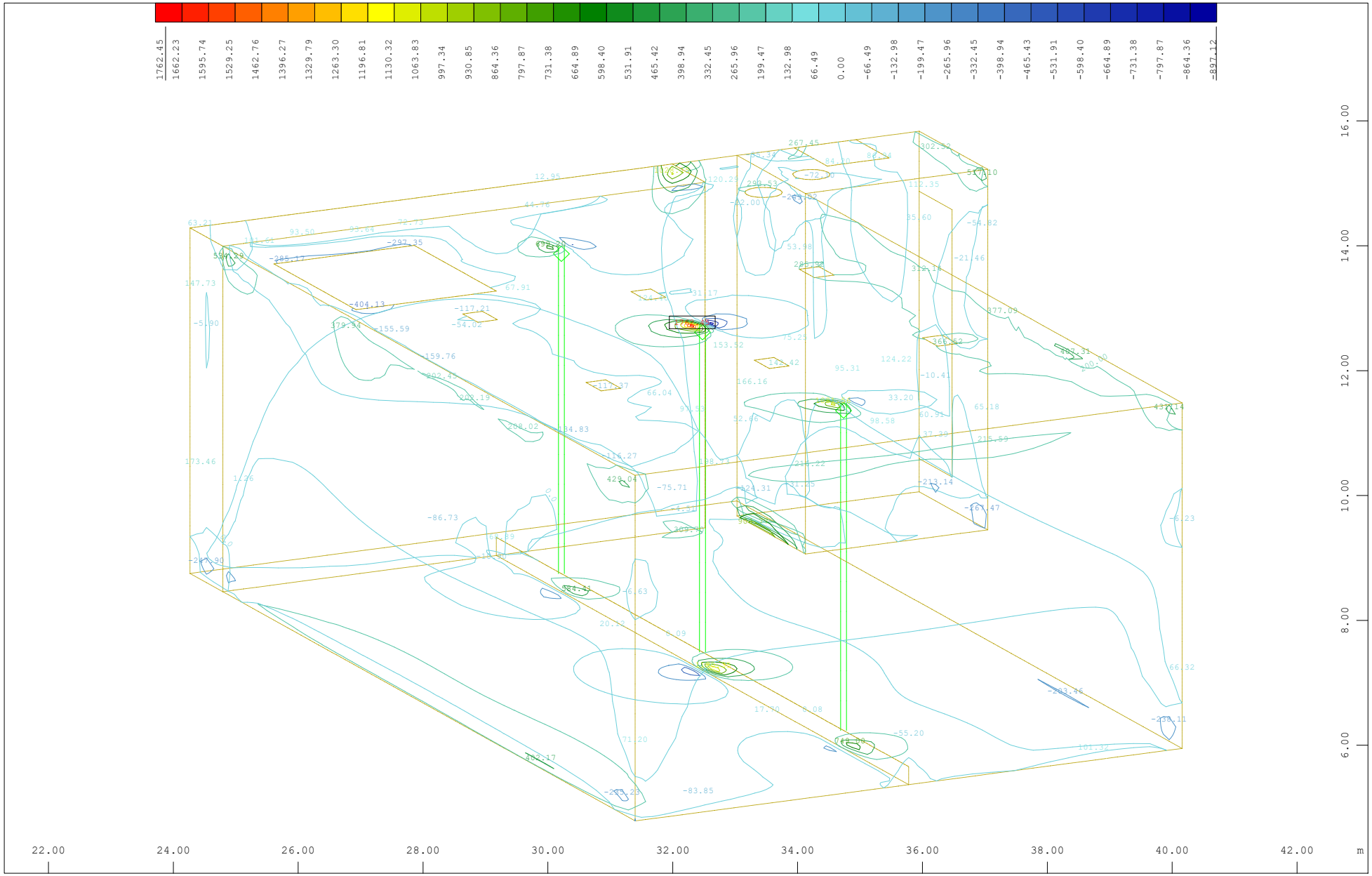
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Shear force v-y in local y from middle of element, Loadcase 216 MIN-VY QUAD ELU2 , from -476.22 to 628.29 step 100.00 kN/m

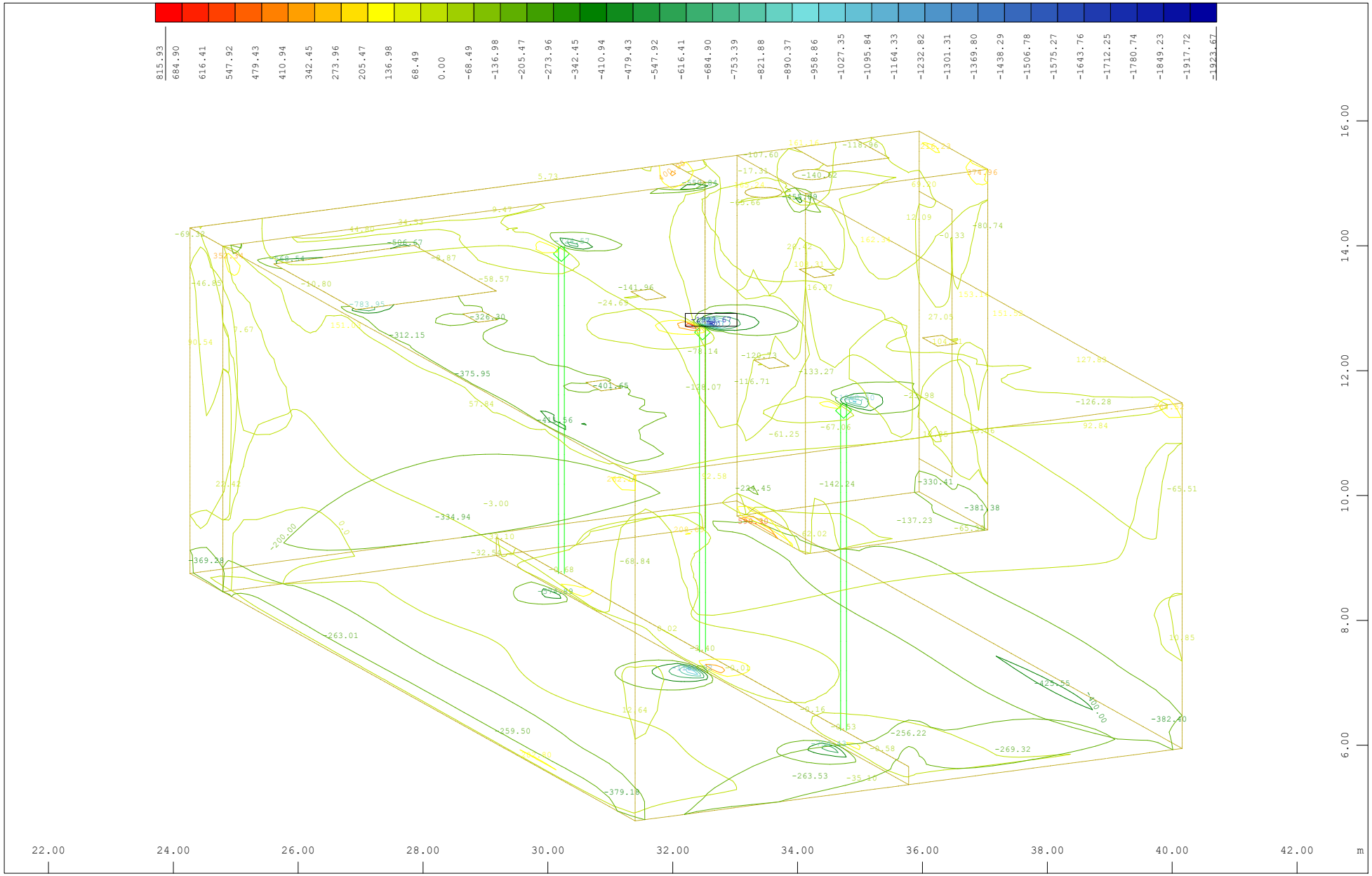
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Shear force v-y in local y from middle of element, Loadcase 315 MAX-VY QUAD ELU3 , from -897.12 to 1762.45 step 200.00 kN/m

M 1 : 85

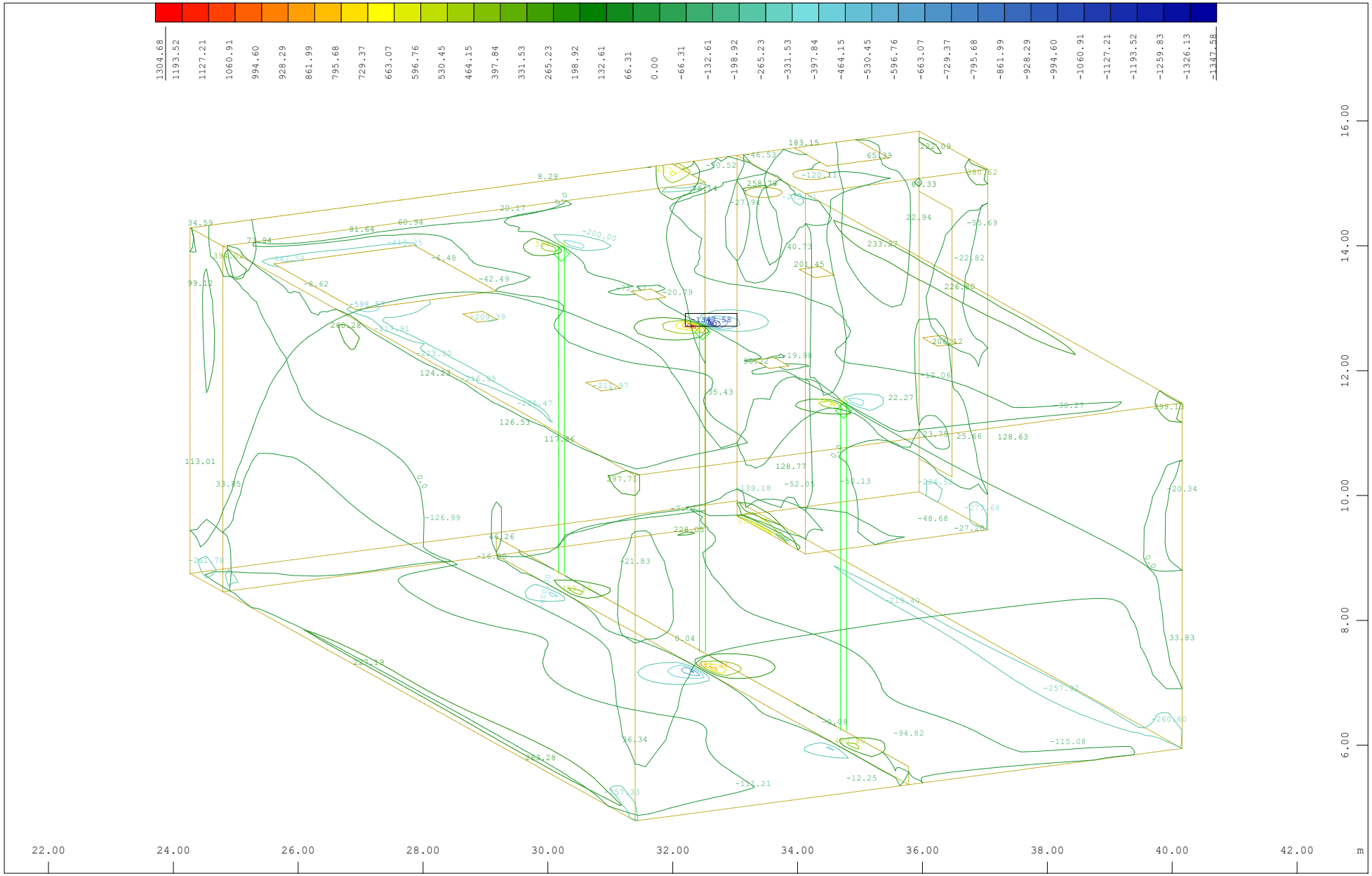
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

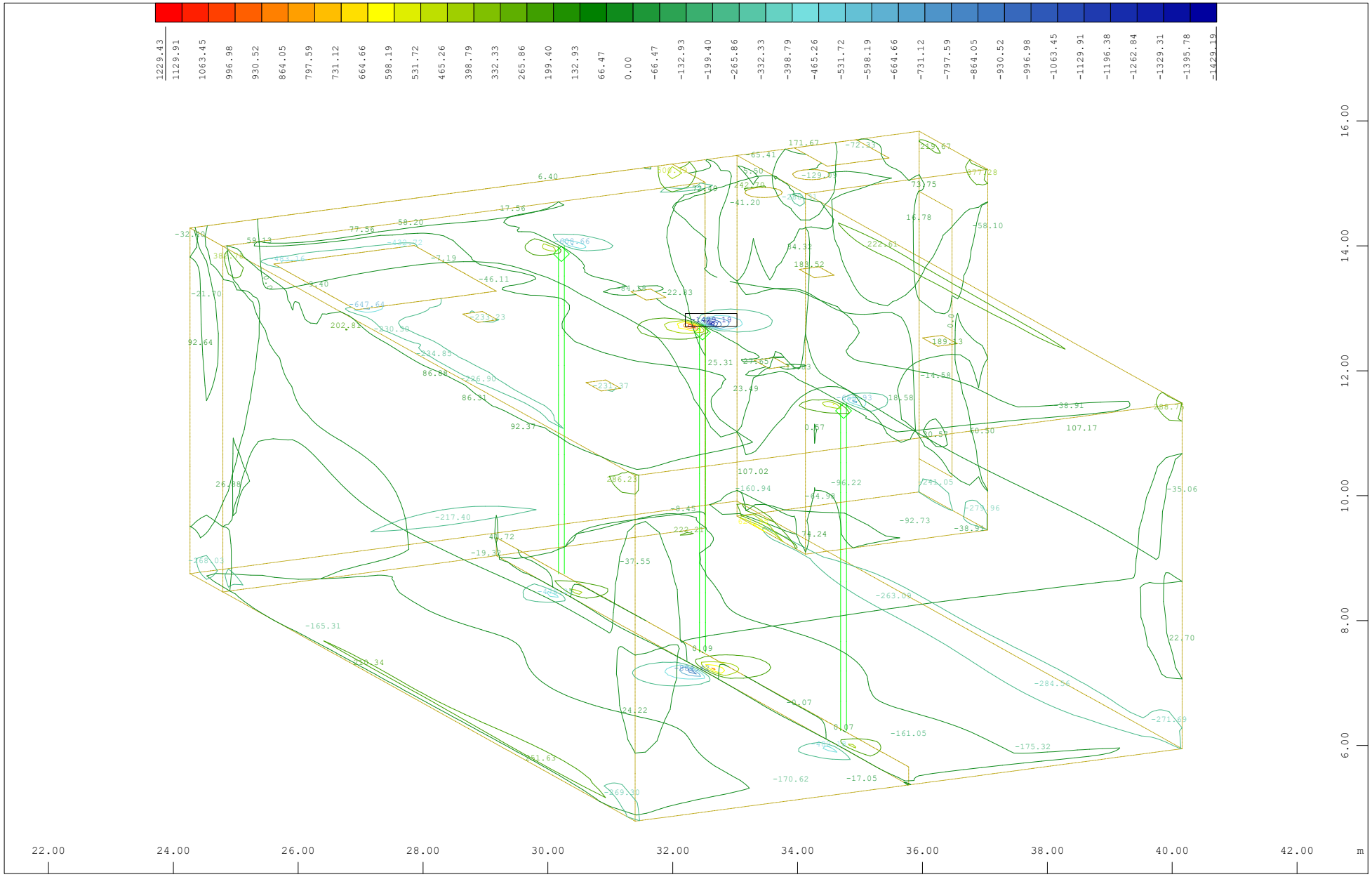
Shear force v-y in local y from middle of element, Loadcase 316 MIN-VY QUAD ELU3 , from -1923.67 to 815.93 step 200.00 kN/m

M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Shear force v-y in local y from middle of element, Loadcase 415 MAX-VY QUAD ELU4 , from -1347.58 to 1304.68 step 200.00 kN/m

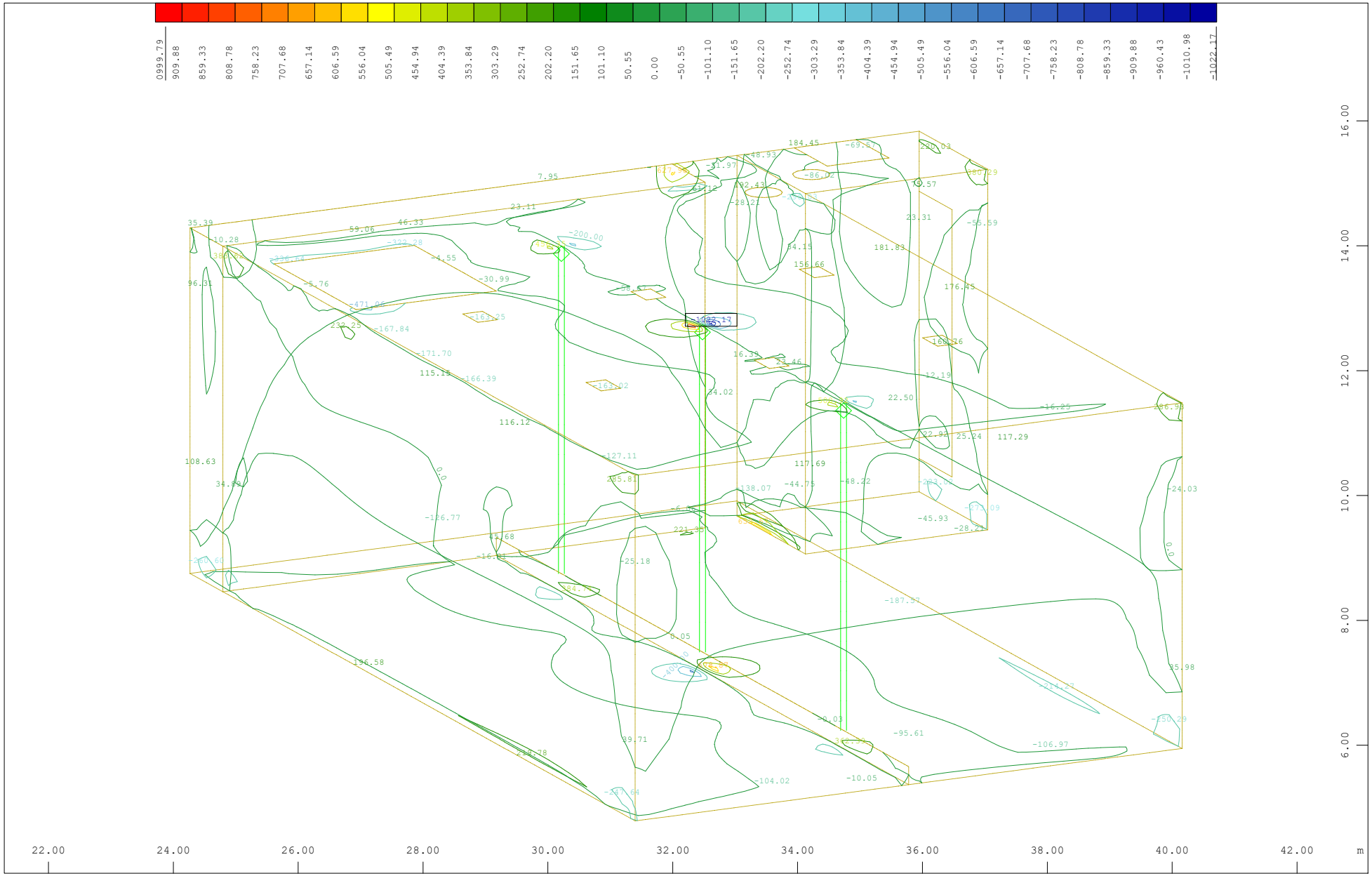
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

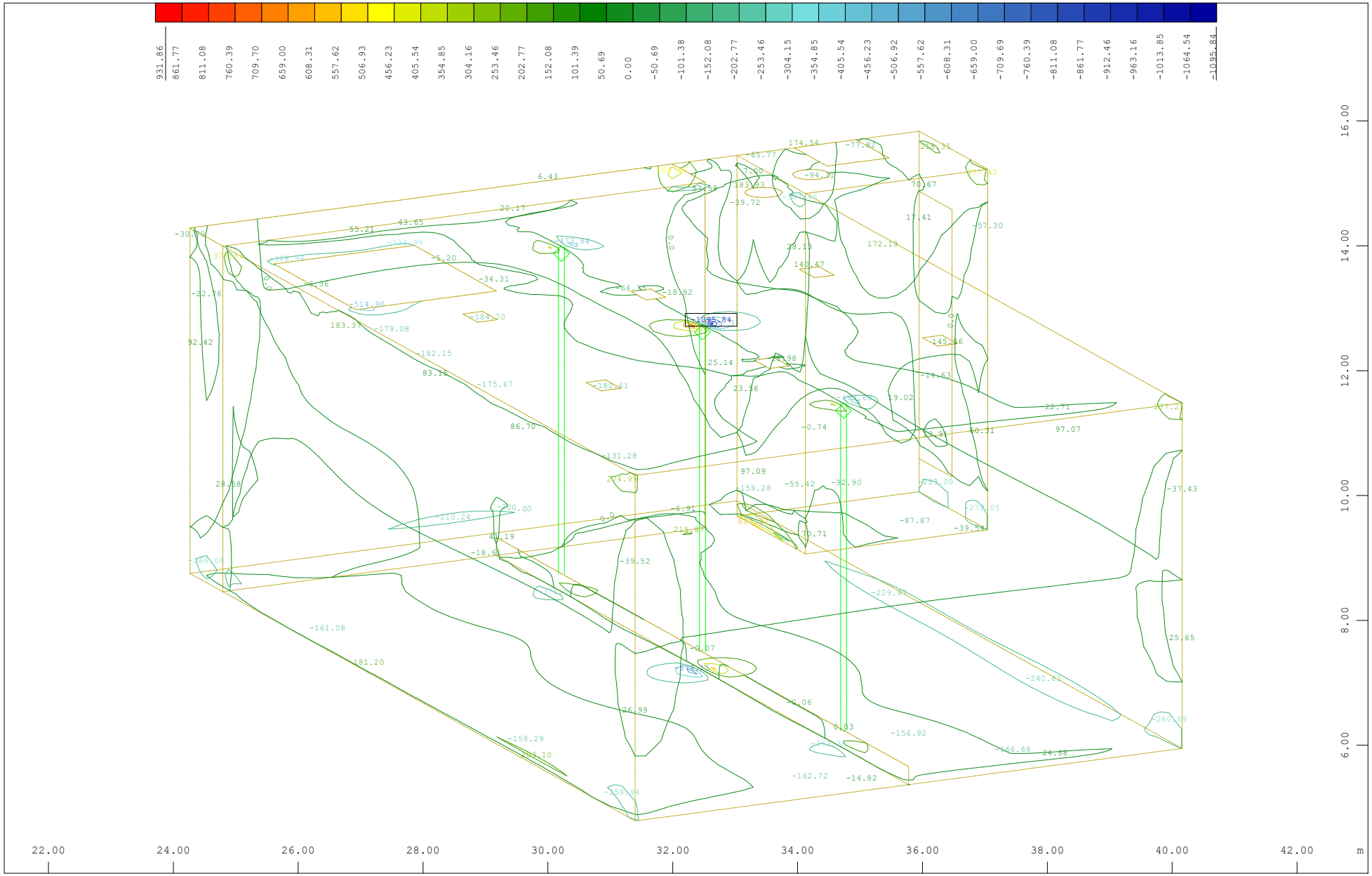
Shear force v-y in local y from middle of element, Loadcase 416 MIN-VY QUAD ELU4 , from -1429.19 to 1229.43 step 200.00 kN/m

M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Shear force v-y in local y from middle of element, Loadcase 515 MAX-VY QUAD ELS1 , from -1022.17 to 999.79 step 200.00 kN/m

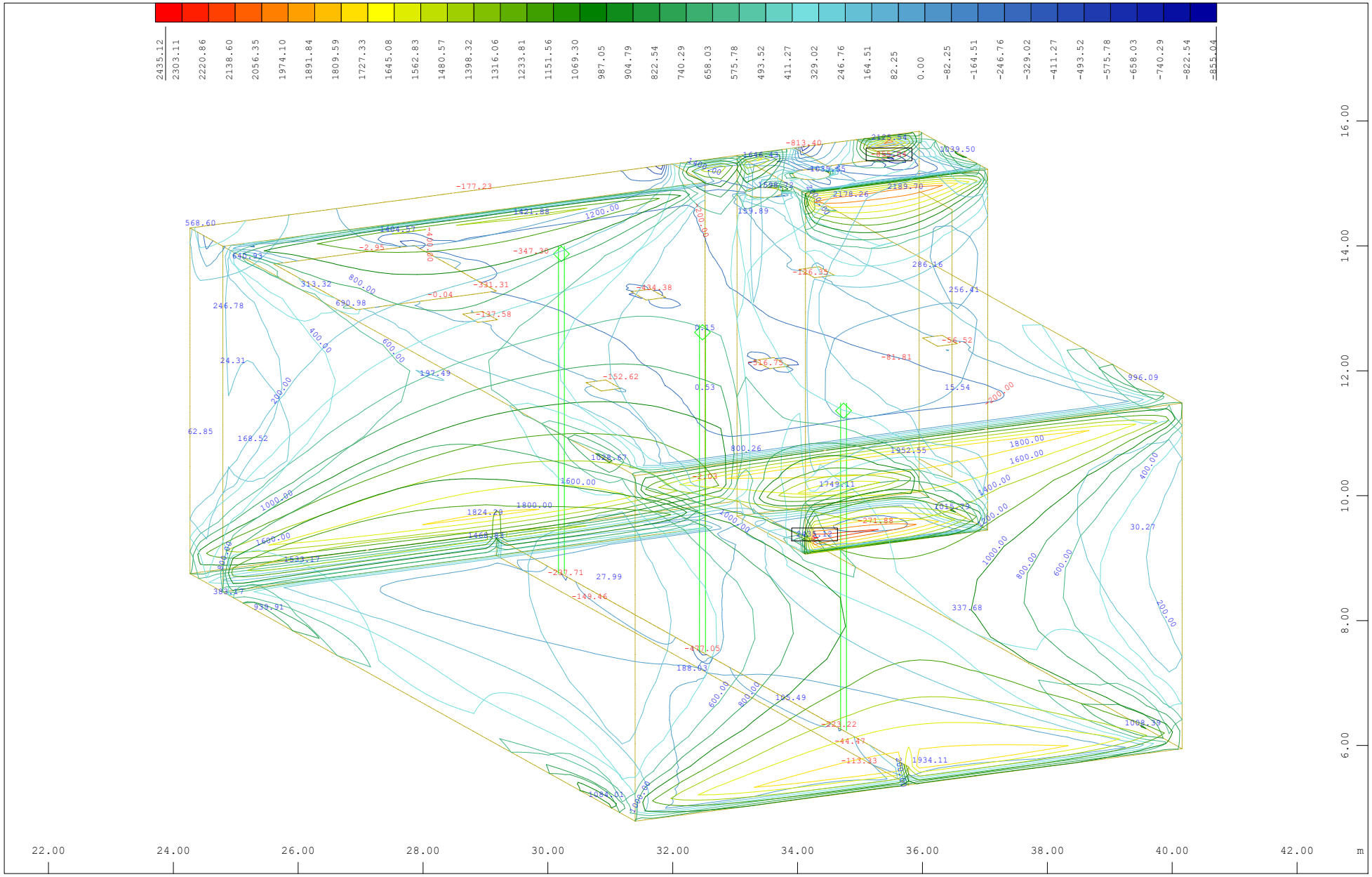
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

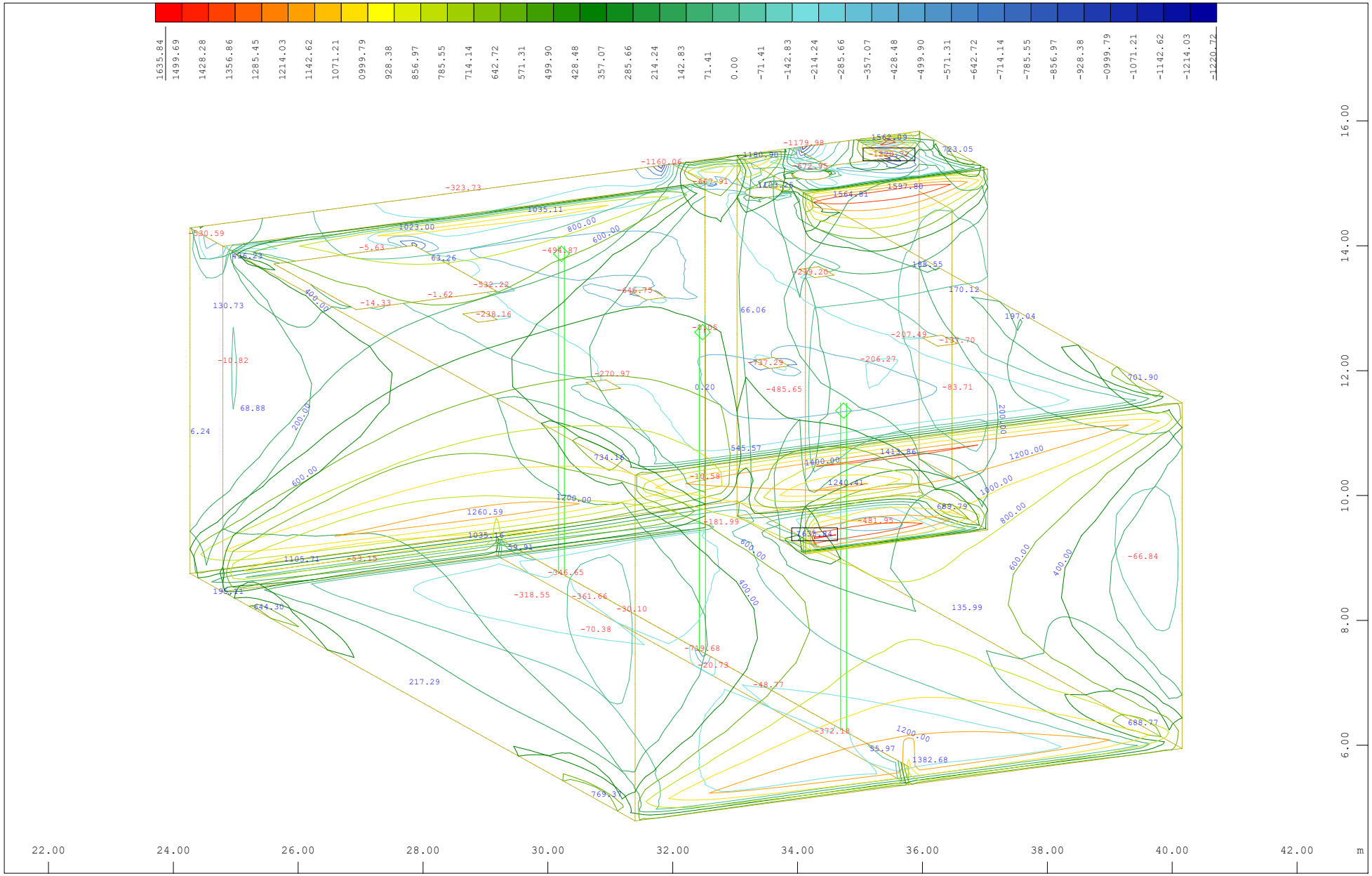
Shear force v-y in local y from middle of element, Loadcase 516 MIN-VY QUAD ELS1 , from -1095.84 to 931.86 step 200.00 kN/m

M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Membrane force n-xx in local x from middle of element, Loadcase 107 MAX-NXX QUAD ELU1 , from -855.04 to 2435.12 step 200.00 kN/m

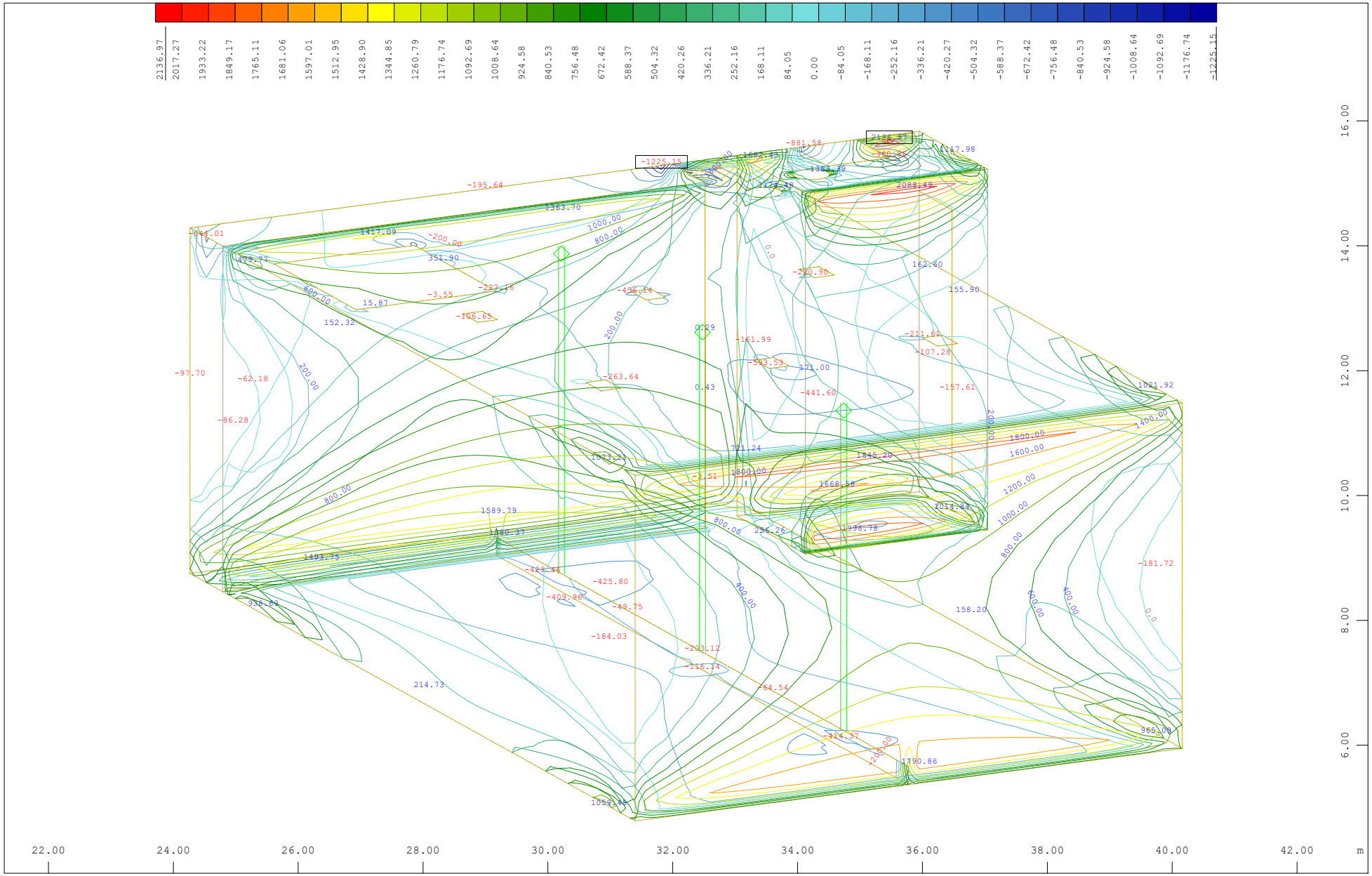
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Membrane force n-xx in local x from middle of element, Loadcase 108 MIN-NXX QUAD ELU1 , from -1220.72 to 1635.84 step 200.00 kN/m

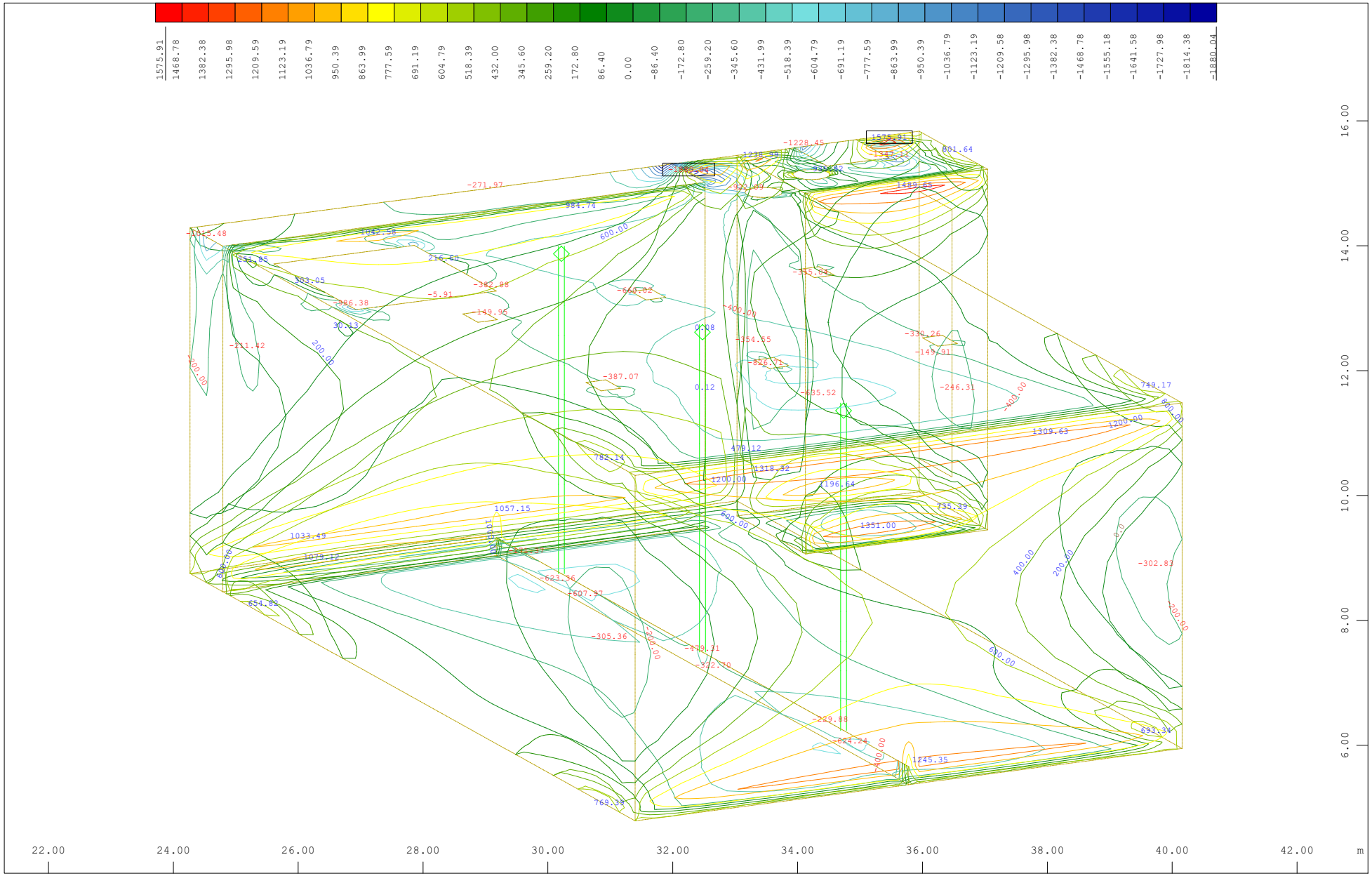
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Membrane force n-xx in local x from middle of element, Loadcase 207 MAX-NXX QUAD ELU2 , from -1225.15 to 2136.97 step 200.00 kN/m

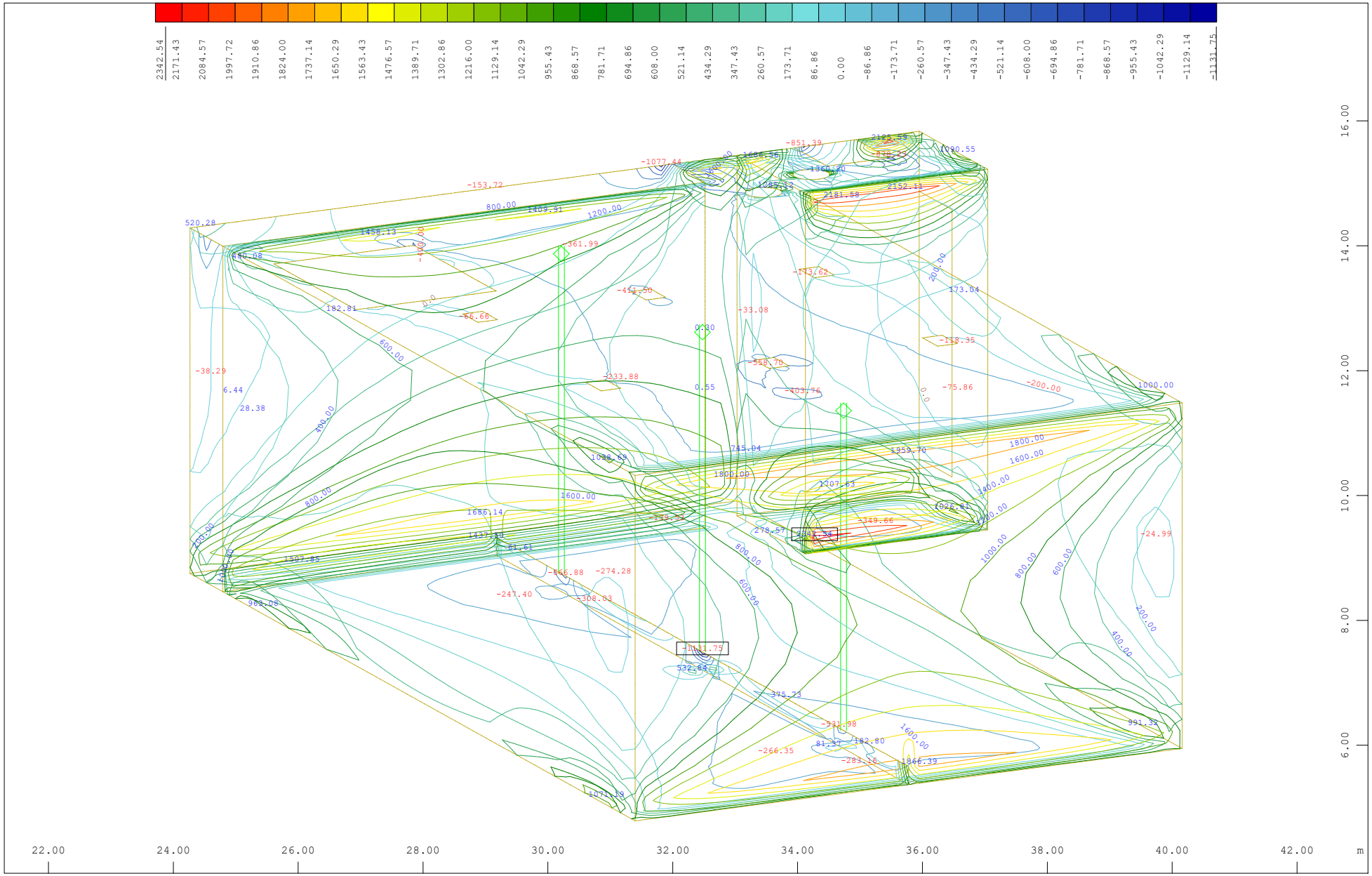
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Membrane force n-xx in local x from middle of element, Loadcase 208 MIN-NXX QUAD ELU2 , from -1880.04 to 1575.91 step 200.00 kN/m

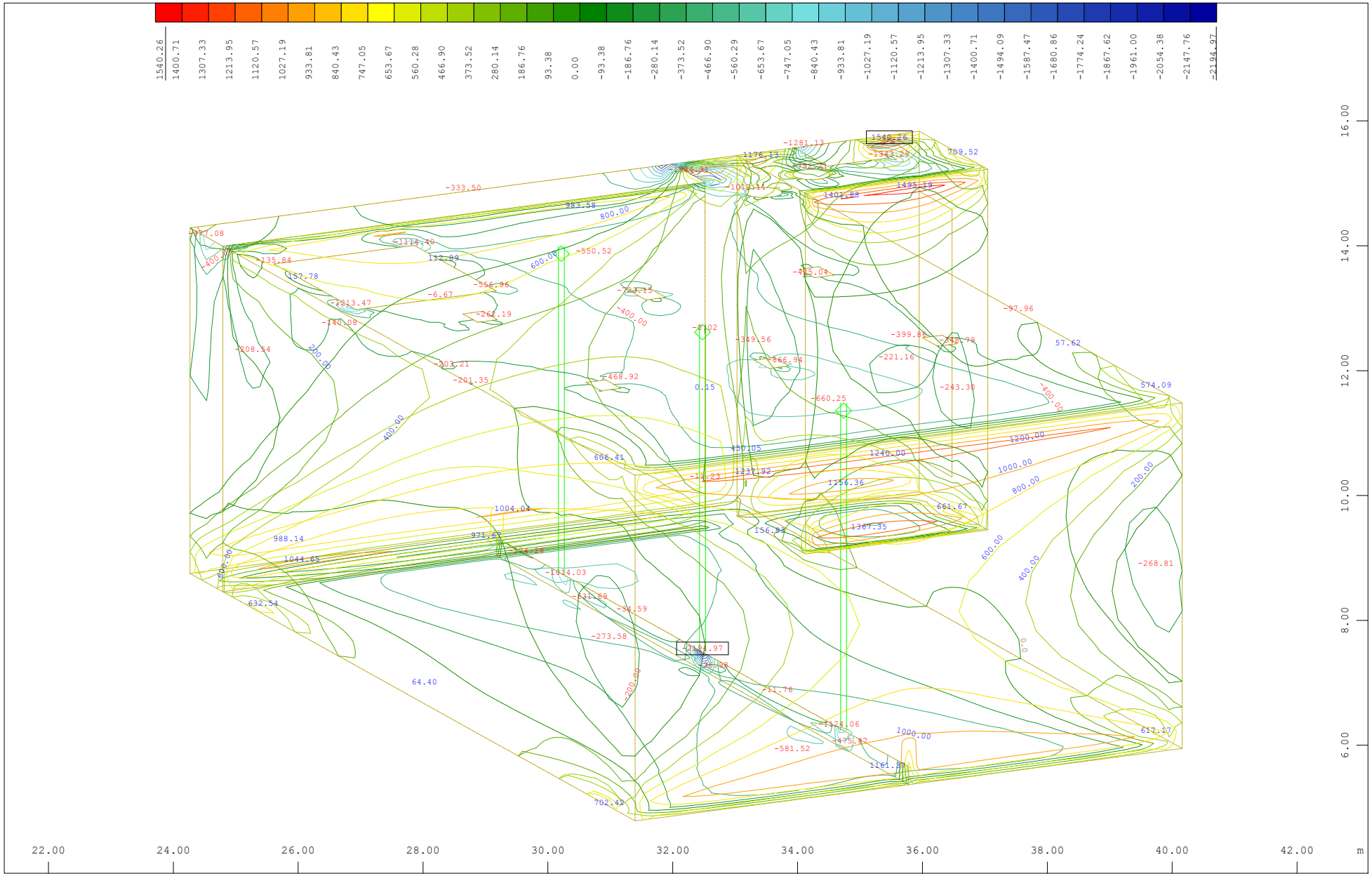
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Membrane force n-xx in local x from middle of element, Loadcase 307 MAX-NXX QUAD ELU3 , from -1131.75 to 2342.54 step 200.00 kN/m

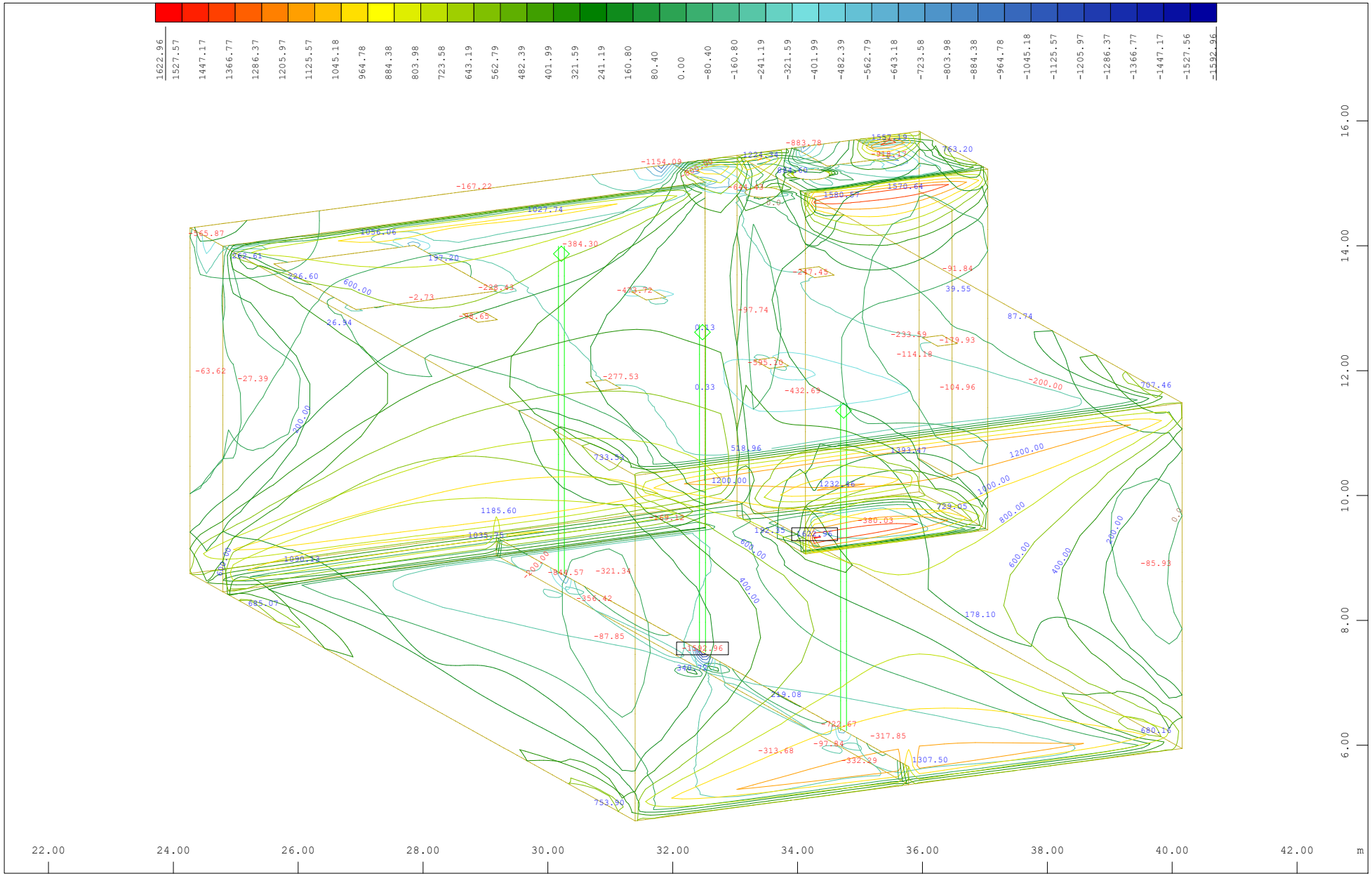
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Membrane force n-xx in local x from middle of element, Loadcase 308 MIN-NXX QUAD ELU3 , from -2194.97 to 1540.26 step 200.00 kN/m

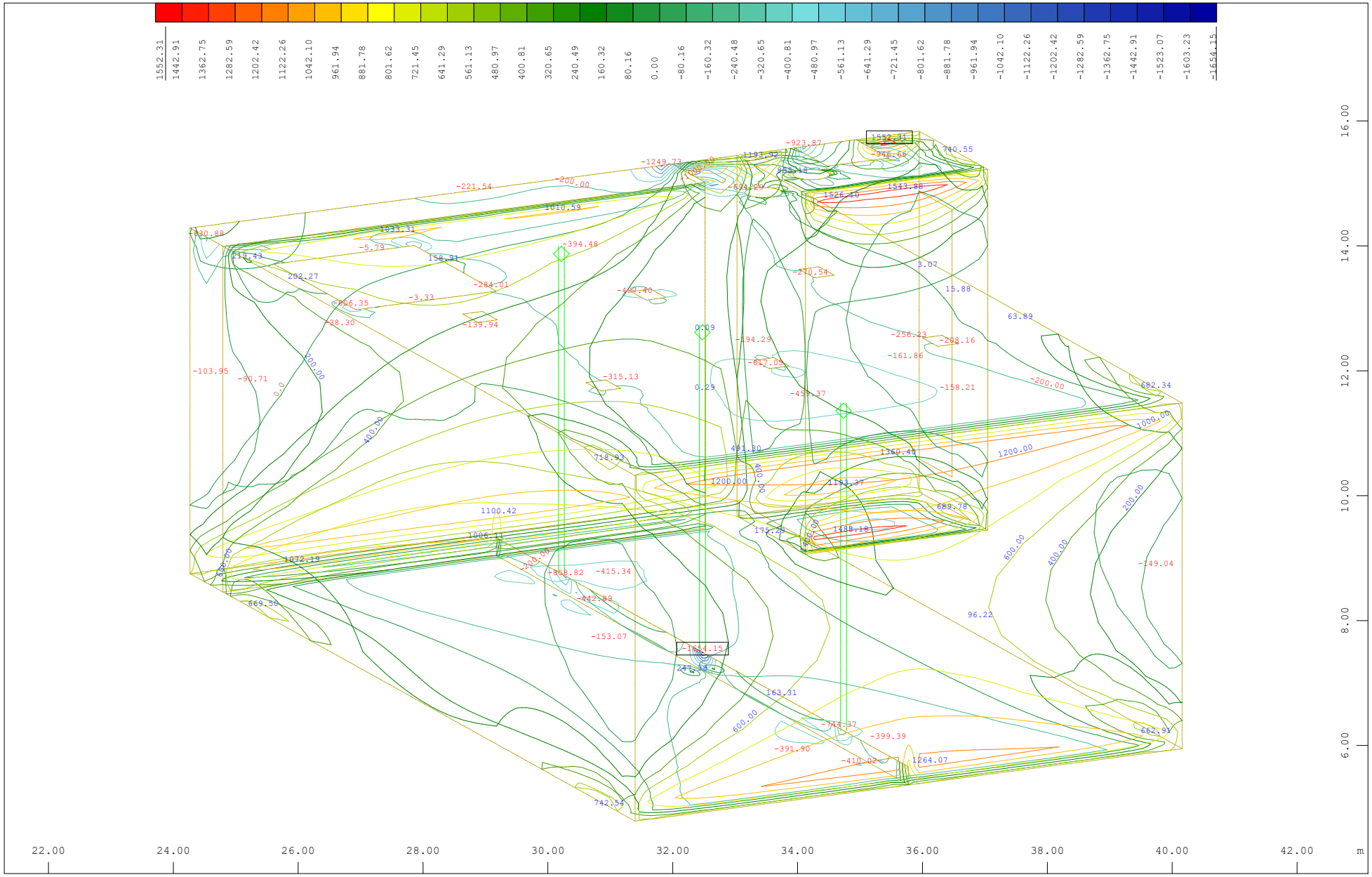
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Membrane force n-xx in local x from middle of element, Loadcase 407 MAX-NXX QUAD ELU4 , from -1592.96 to 1622.96 step 200.00 kN/m

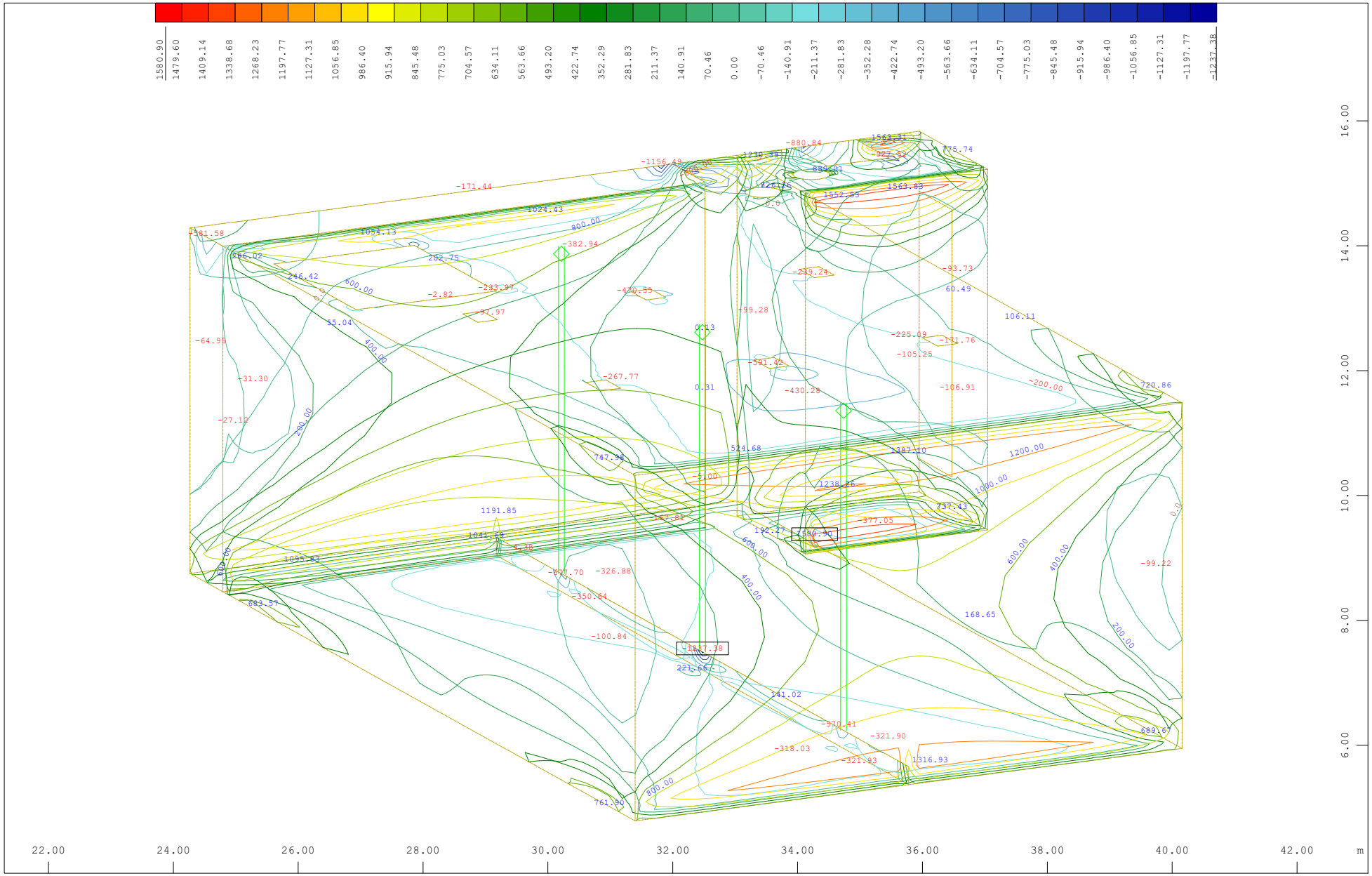
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Membrane force n-xx in local x from middle of element, Loadcase 408 MIN-NXX QUAD ELU4 , from -1654.15 to 1552.31 step 200.00 kN/m

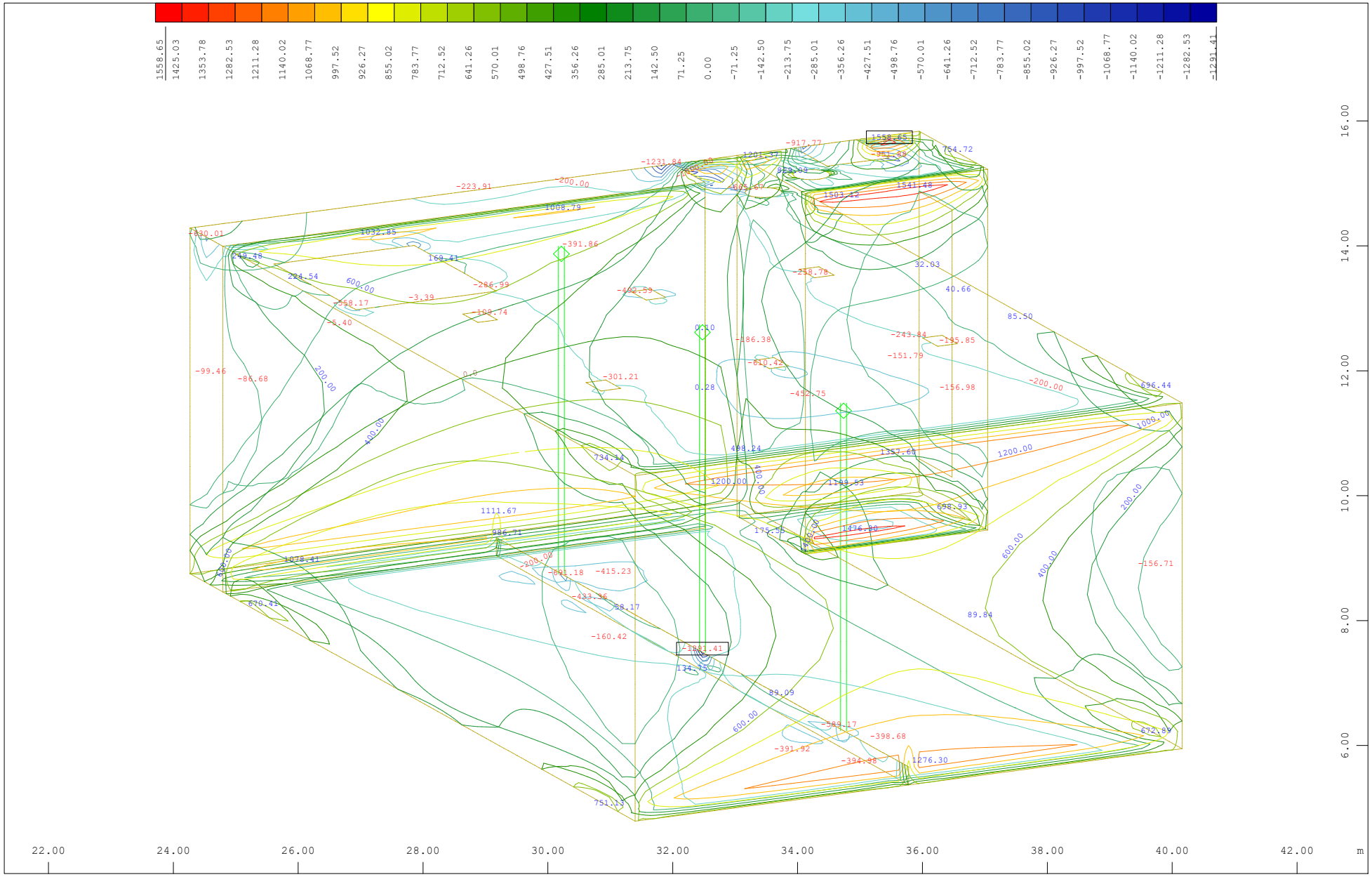
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Membrane force n-xx in local x from middle of element, Loadcase 507 MAX-NXX QUAD ELS1 , from -1237.38 to 1580.90 step 200.00 kN/m

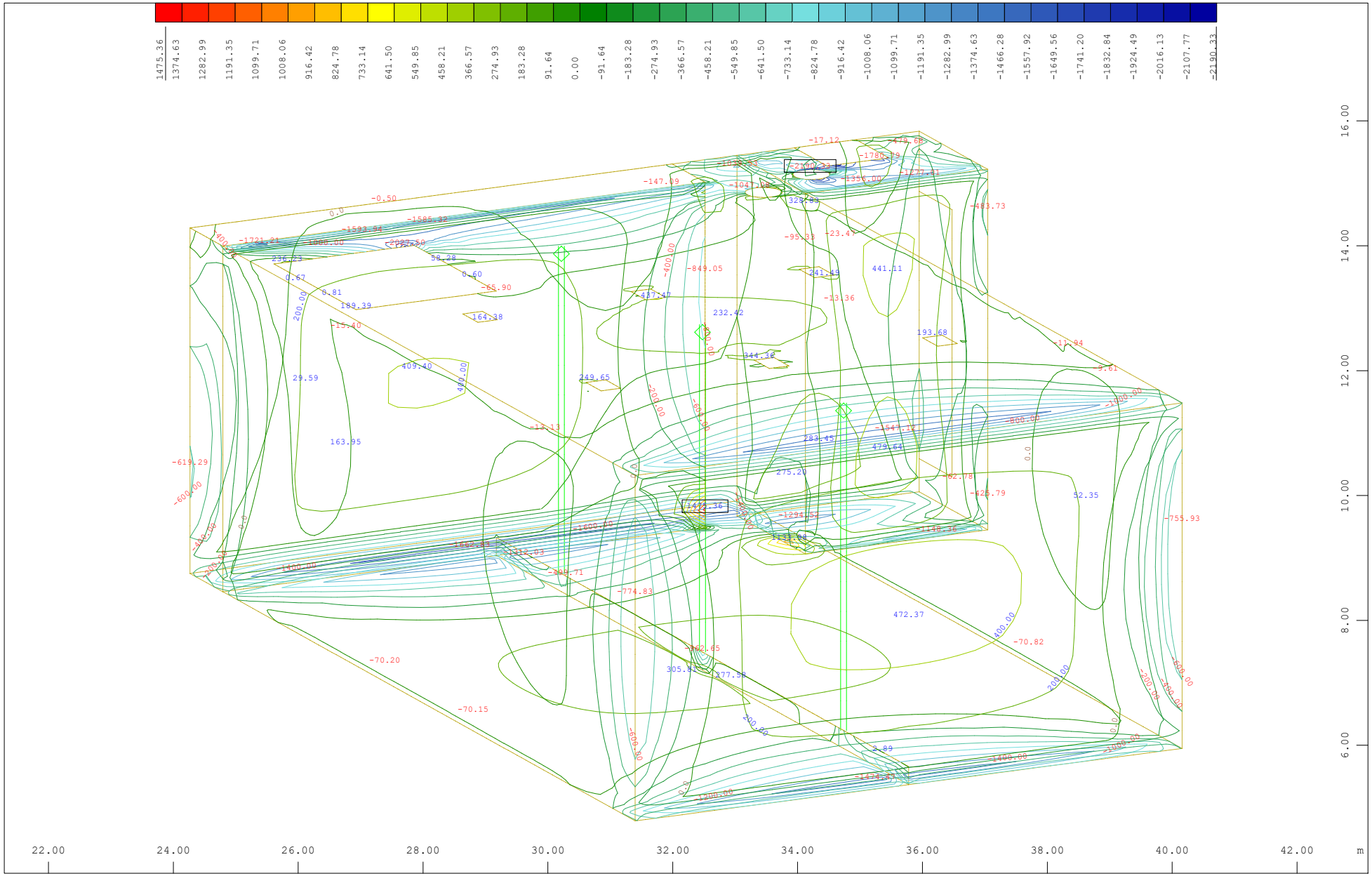
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Membrane force n-xx in local x from middle of element, Loadcase 508 MIN-NXX QUAD ELS1 , from -1291.41 to 1558.65 step 200.00 kN/m

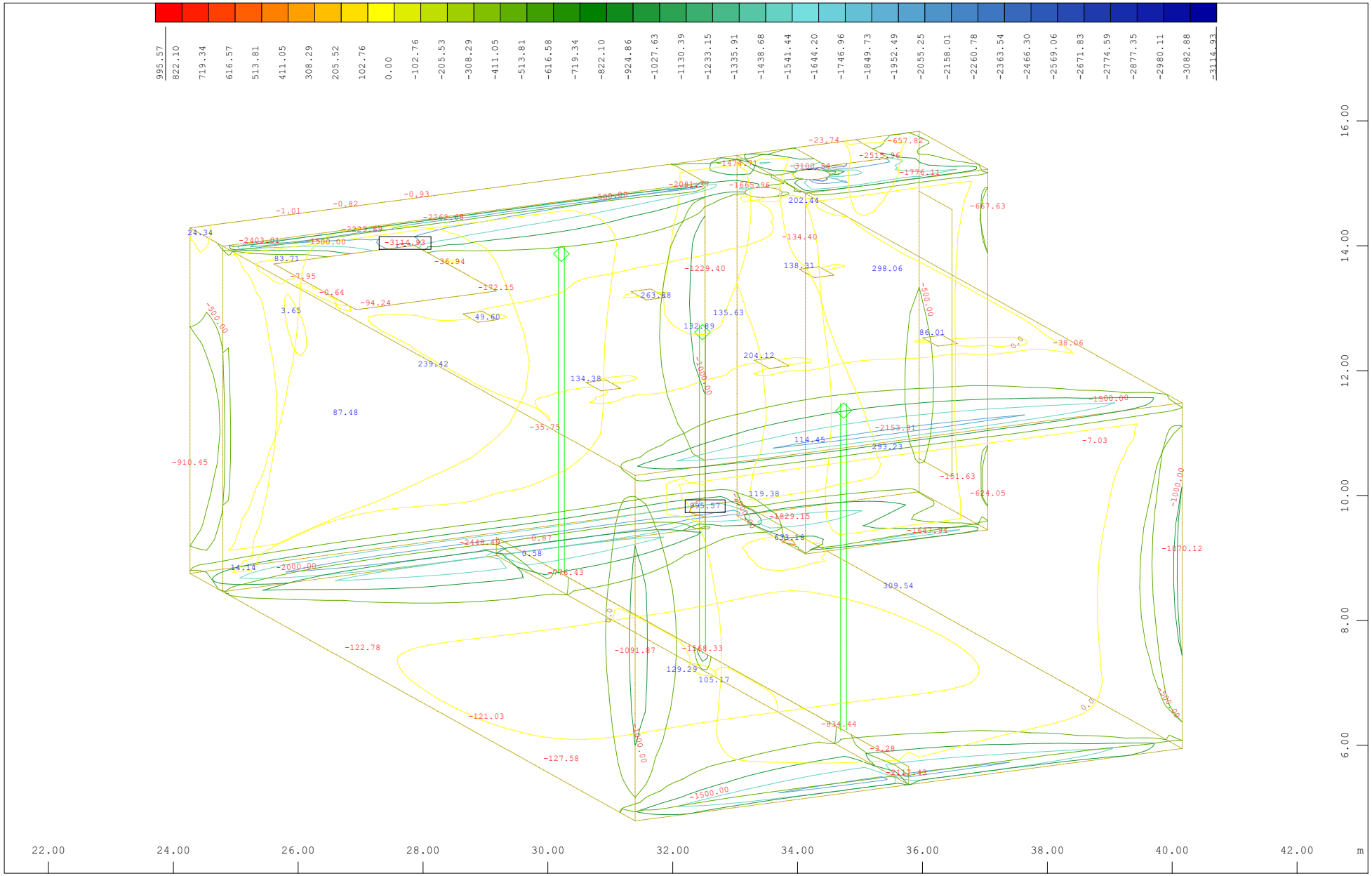
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Membrane force n-yy in local y from middle of element, Loadcase 109 MAX-NYY QUAD ELU1 , from -2190.33 to 1475.36 step 200.00 kN/m

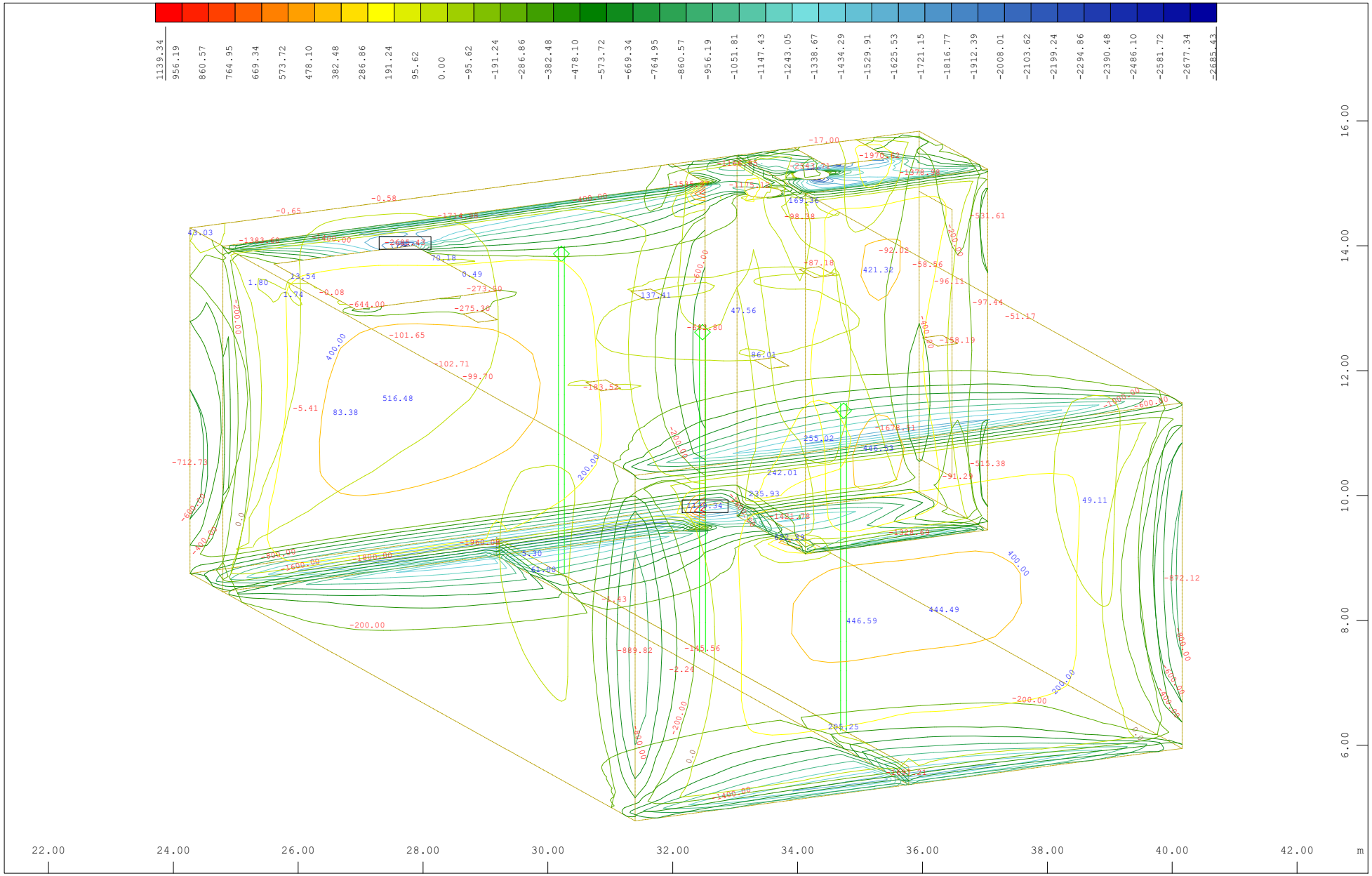
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Membrane force n-yy in local y from middle of element, Loadcase 110 MIN-NYY QUAD ELU1 , from -3114.93 to 995.57 step 500.00 kN/m

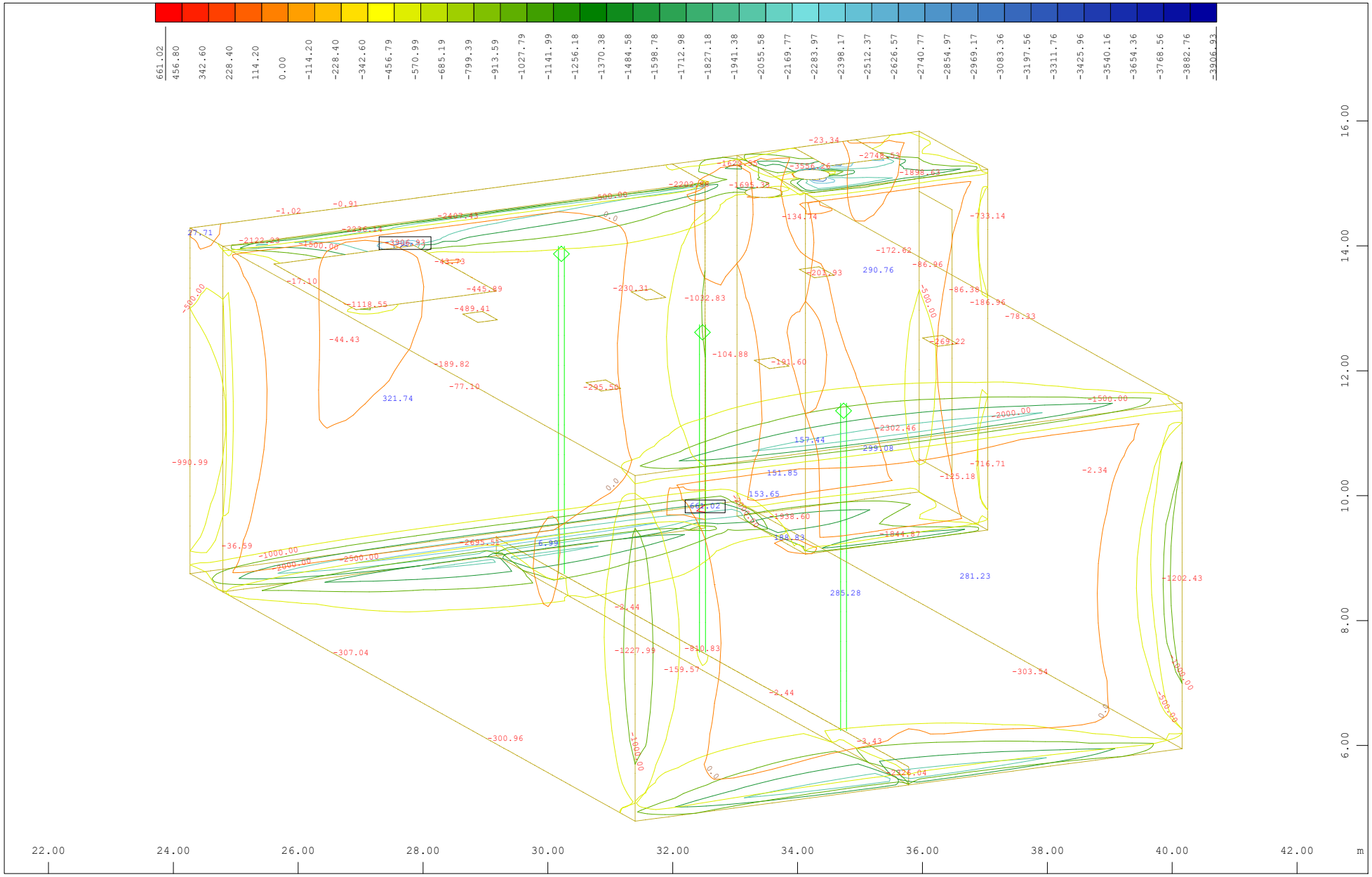
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Membrane force n-yy in local y from middle of element, Loadcase 209 MAX-NYY QUAD ELU2 , from -2685.43 to 1139.34 step 200.00 kN/m

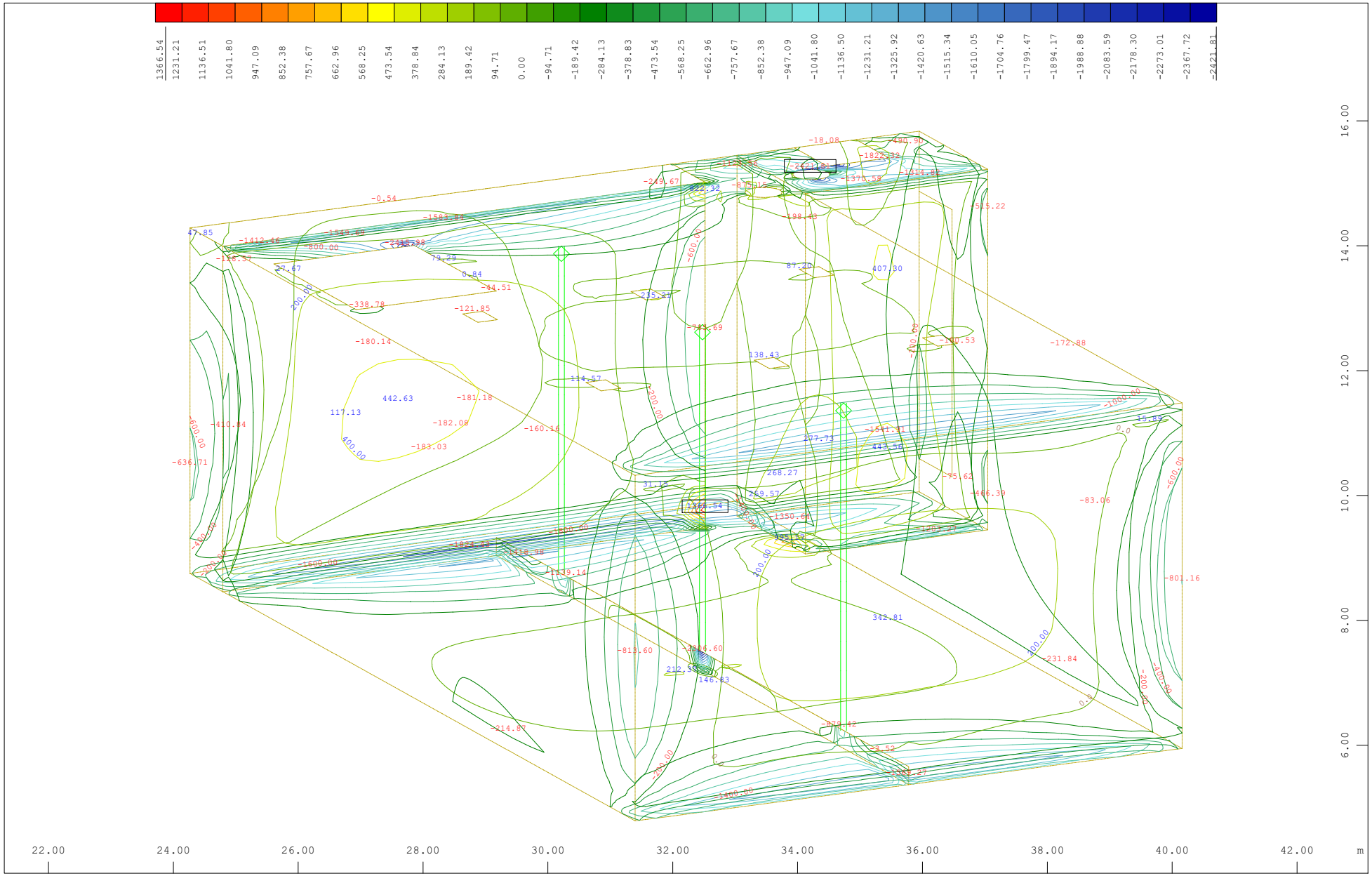
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Membrane force n-yy in local y from middle of element, Loadcase 210 MIN-NYY QUAD ELU2 , from -3906.93 to 661.02 step 500.00 kN/m

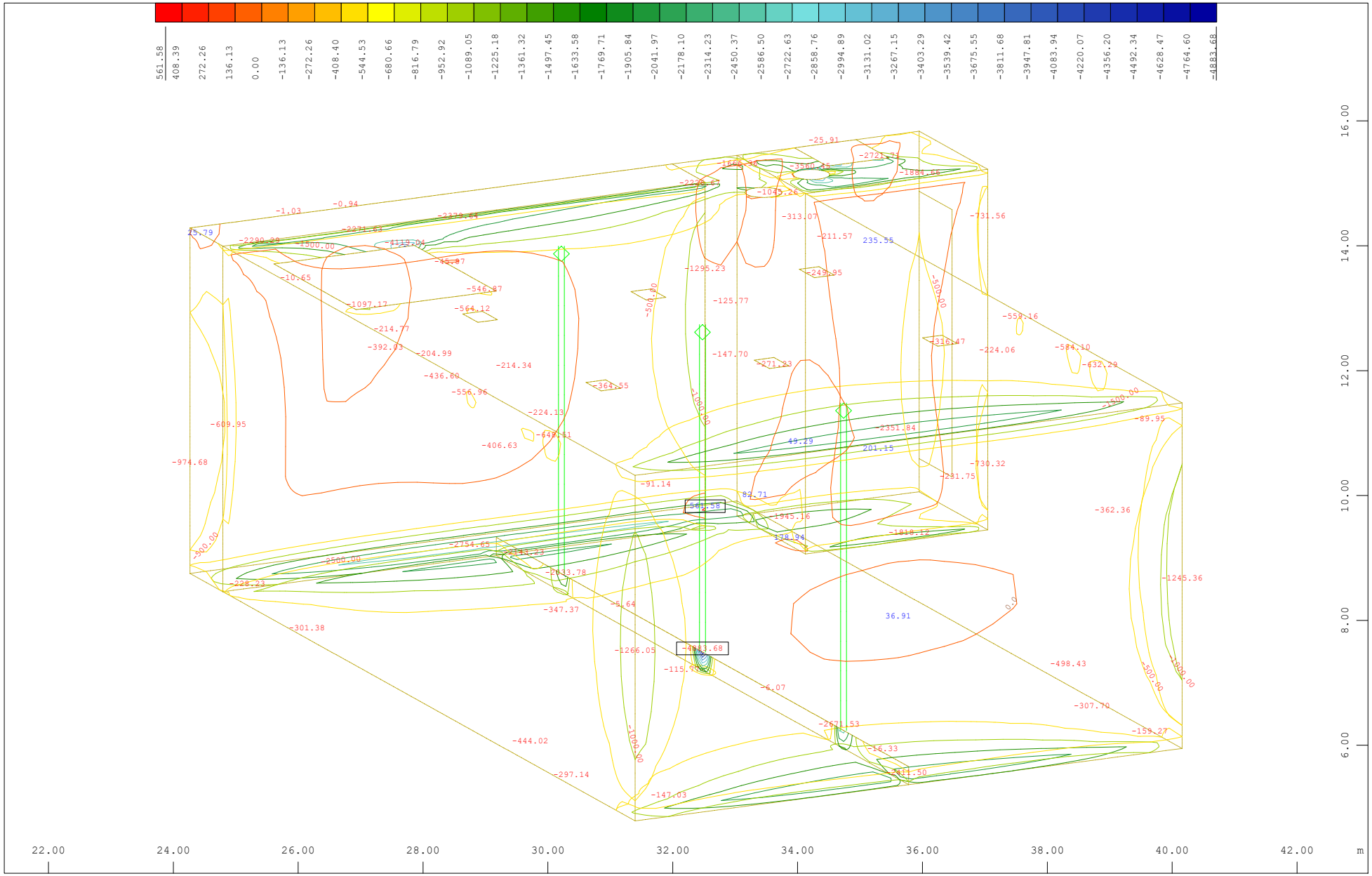
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Membrane force n-yy in local y from middle of element, Loadcase 309 MAX-NYY QUAD ELU3 , from -2421.81 to 1366.54 step 200.00 kN/m

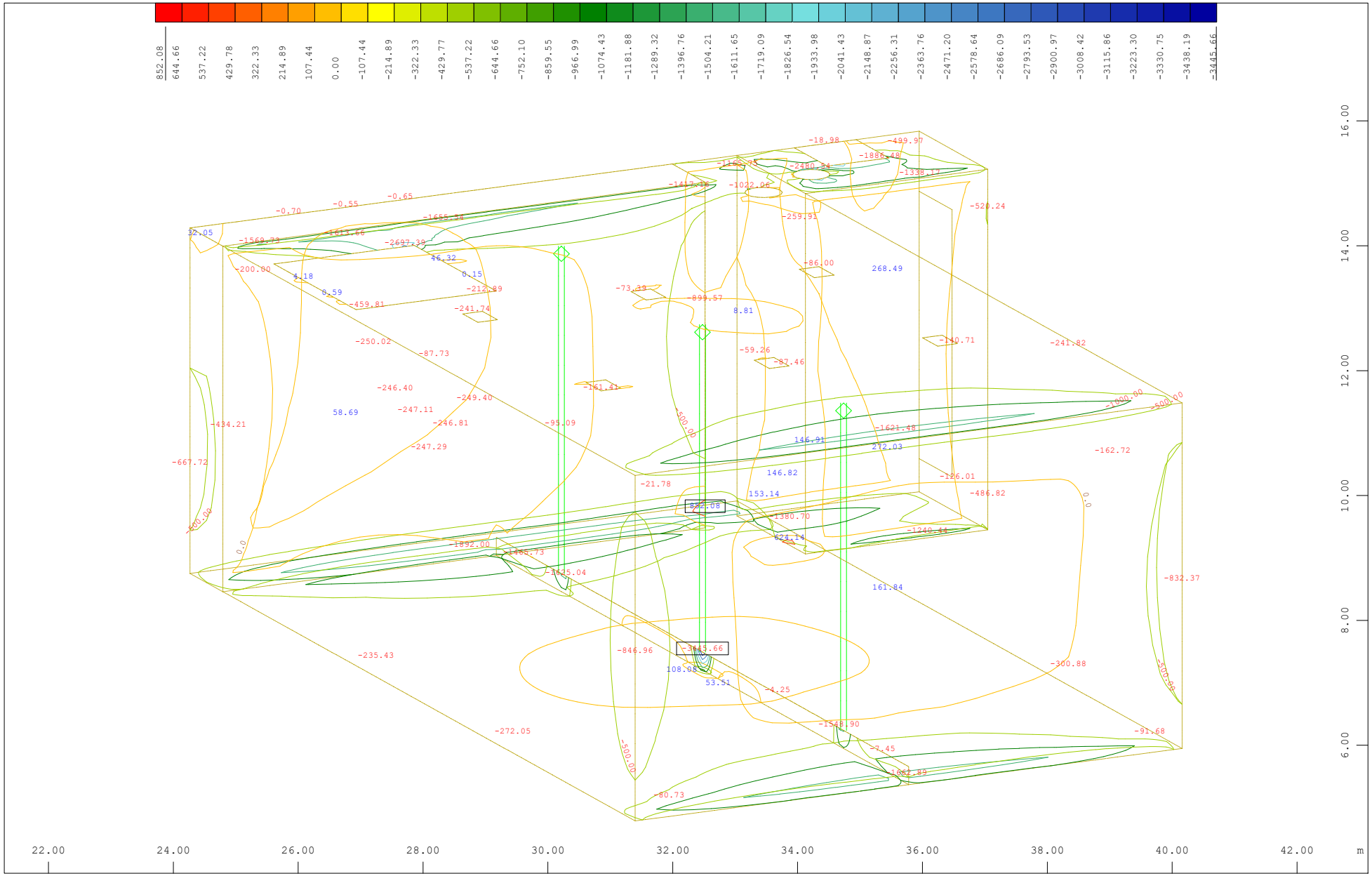
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Membrane force n-yy in local y from middle of element, Loadcase 310 MIN-NYY QUAD ELU3 , from -4883.68 to 561.58 step 500.00 kN/m

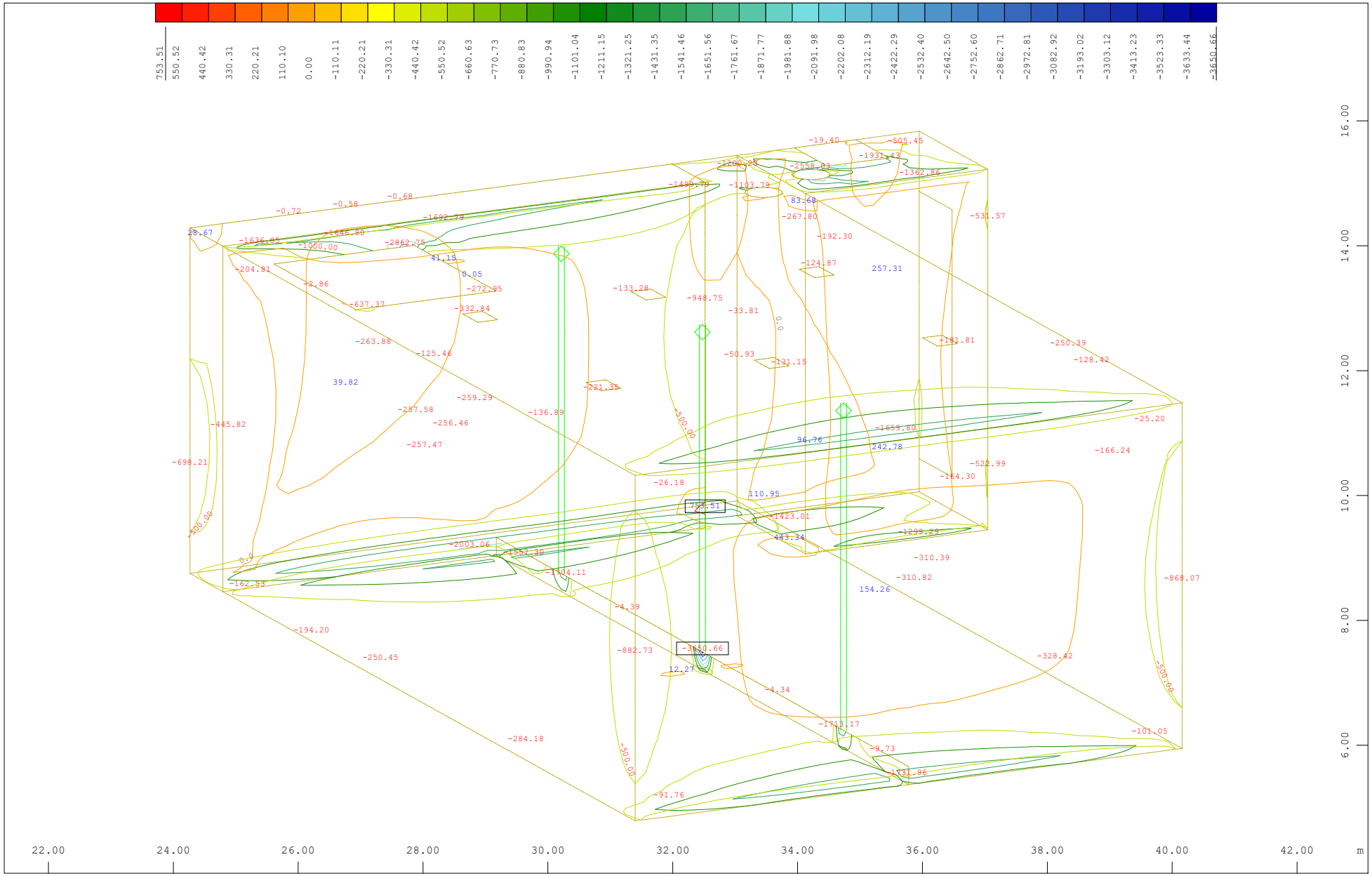
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Membrane force n-yy in local y from middle of element, Loadcase 409 MAX-NYY QUAD ELU4 , from -3445.66 to 852.08 step 500.00 kN/m

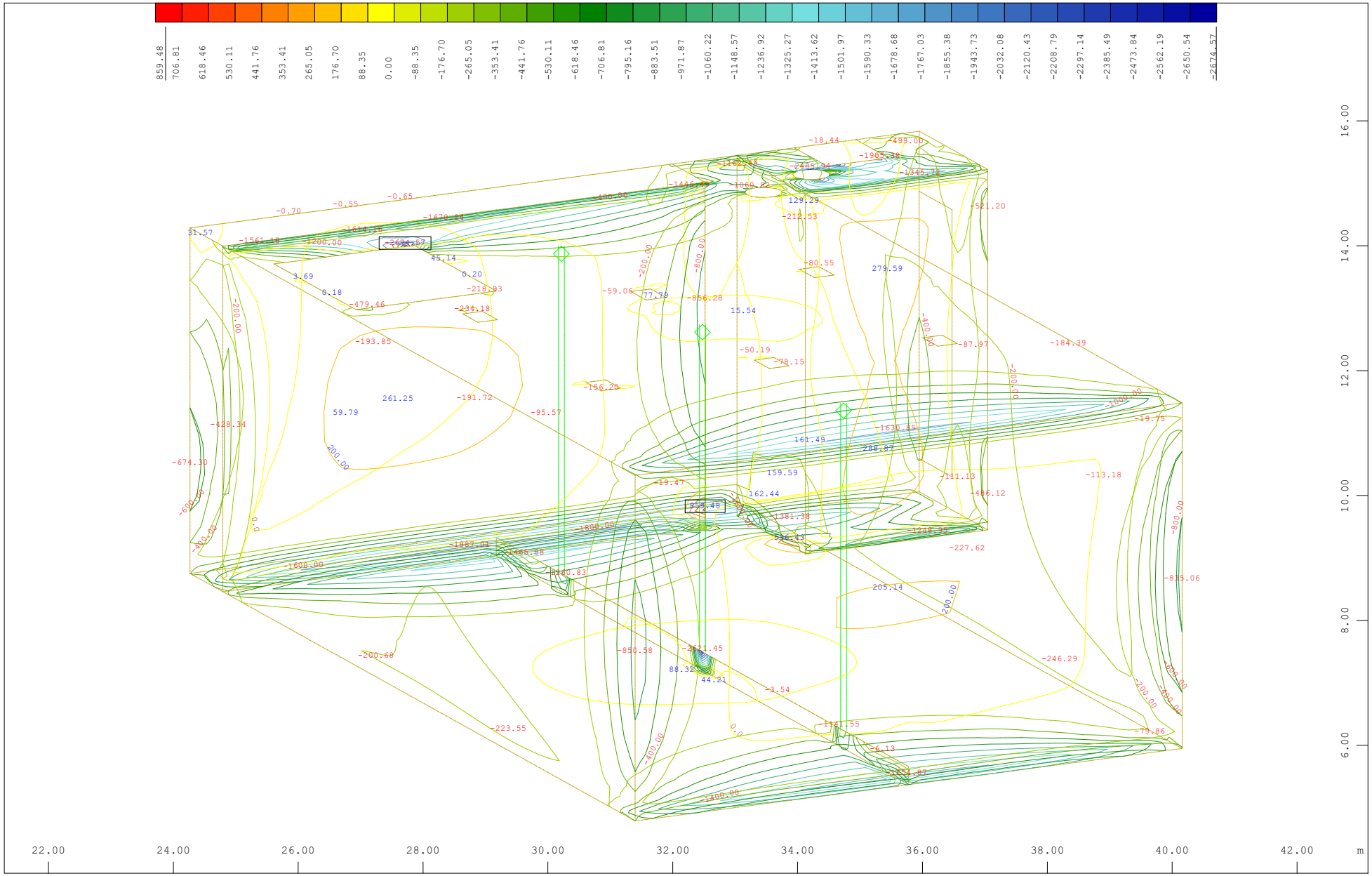
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Membrane force n-yy in local y from middle of element, Loadcase 410 MIN-NYY QUAD ELU4 , from -3650.66 to 753.51 step 500.00 kN/m

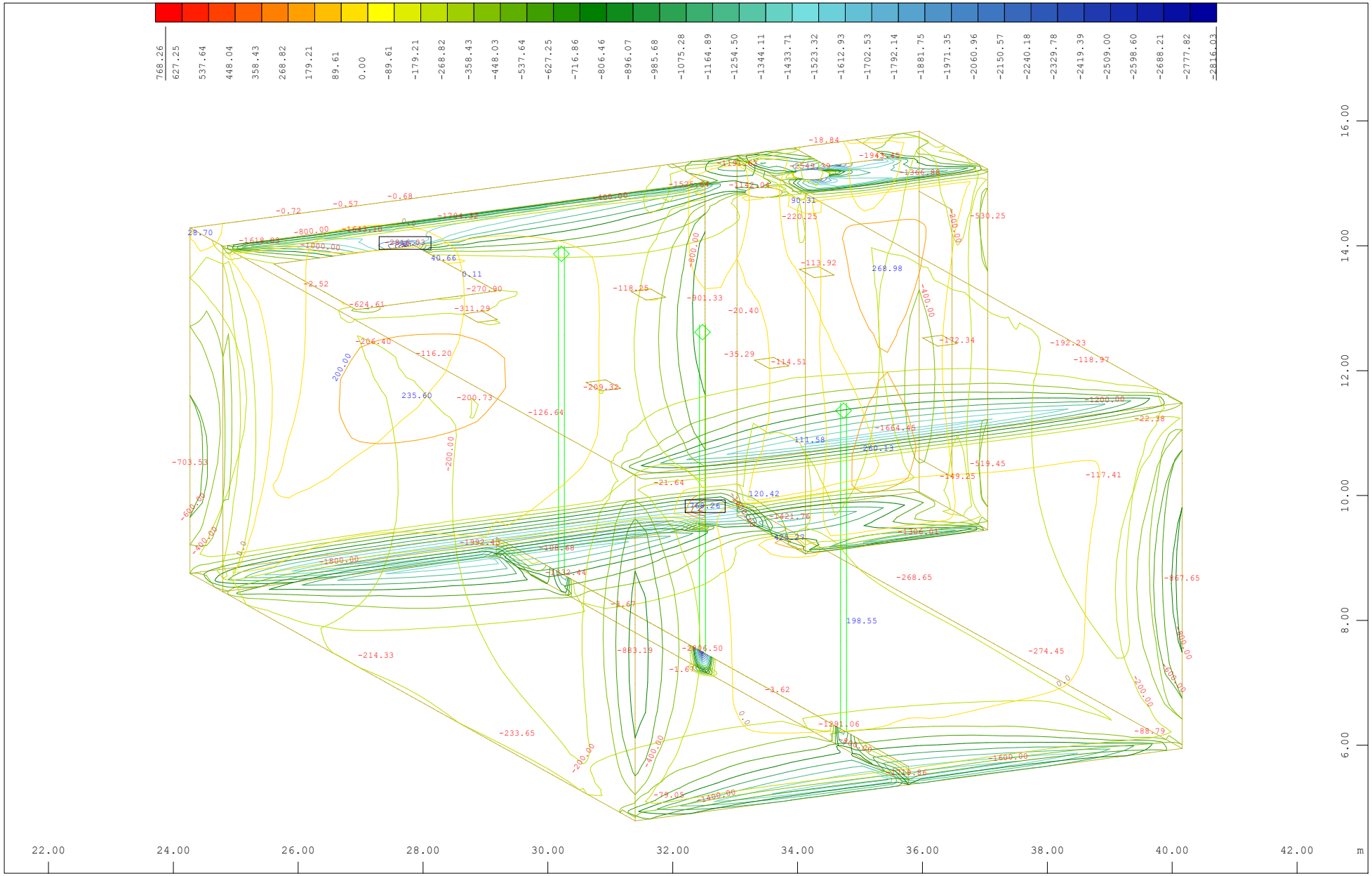
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Membrane force n-yy in local y from middle of element, Loadcase 509 MAX-NYY QUAD ELS1 , from -2674.57 to 859.48 step 200.00 kN/m

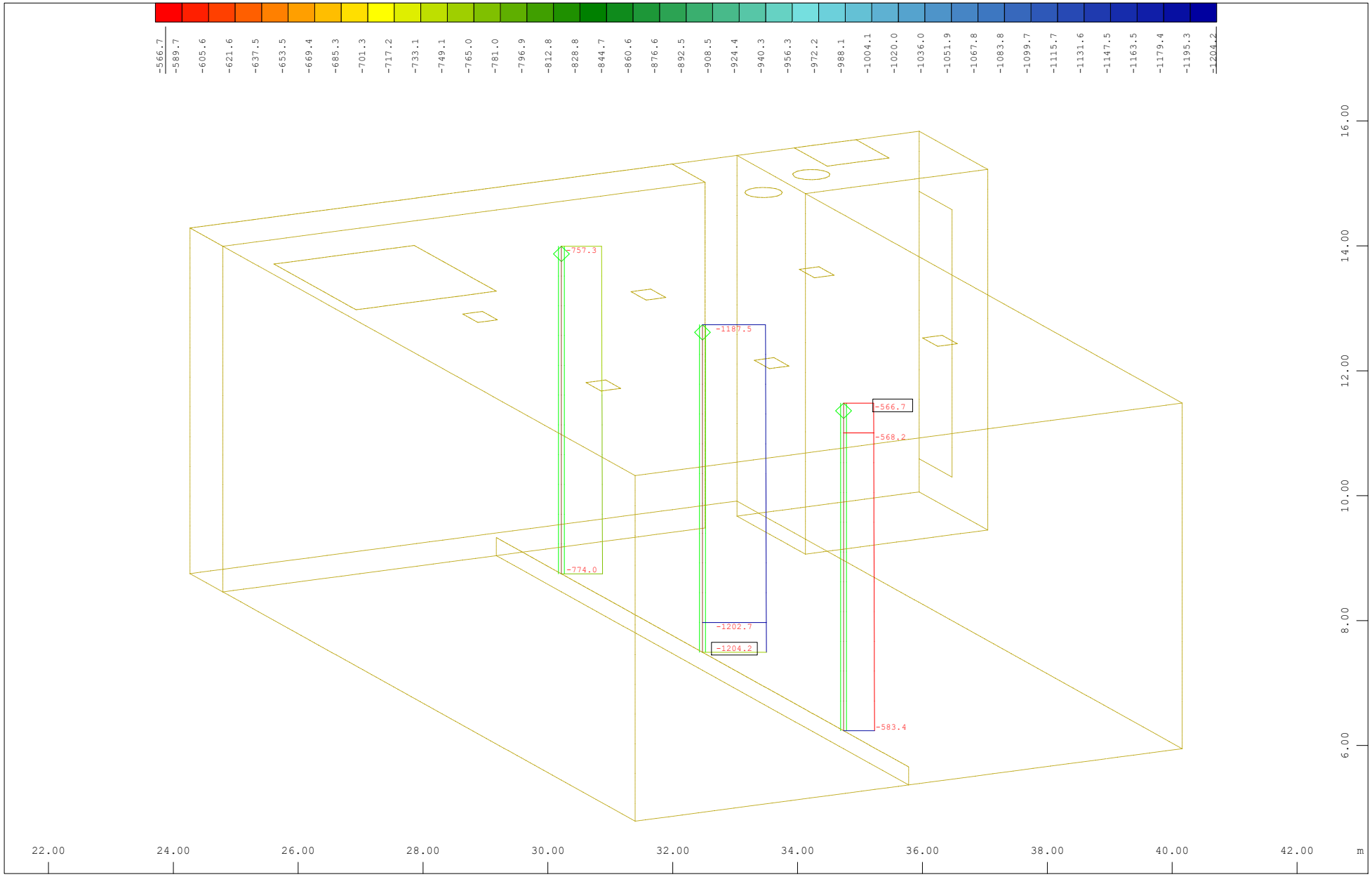
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Membrane force n-yy in local y from middle of element, Loadcase 510 MIN-NYY QUAD ELS1 , from -2816.03 to 768.26 step 200.00 kN/m

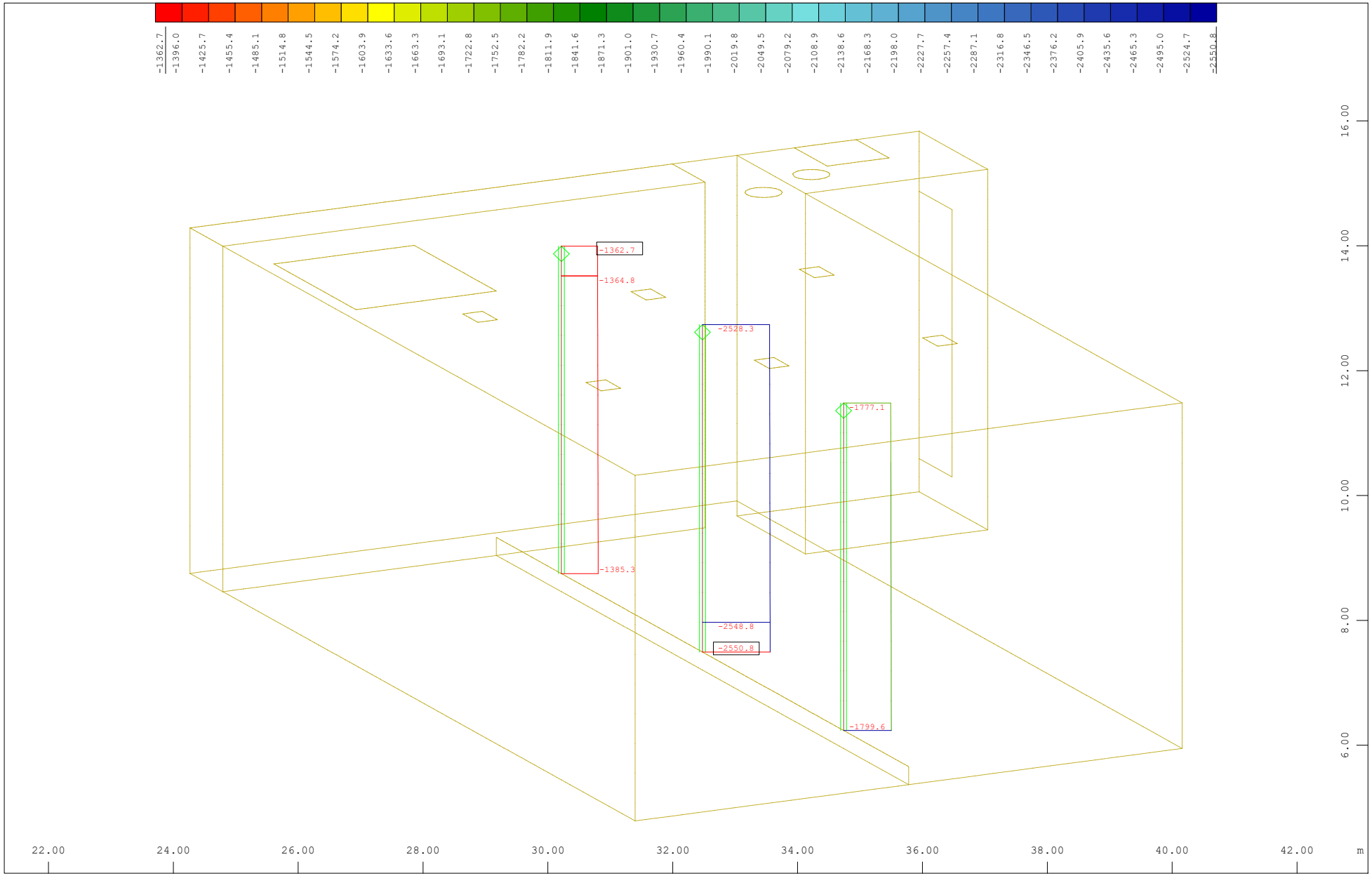
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962

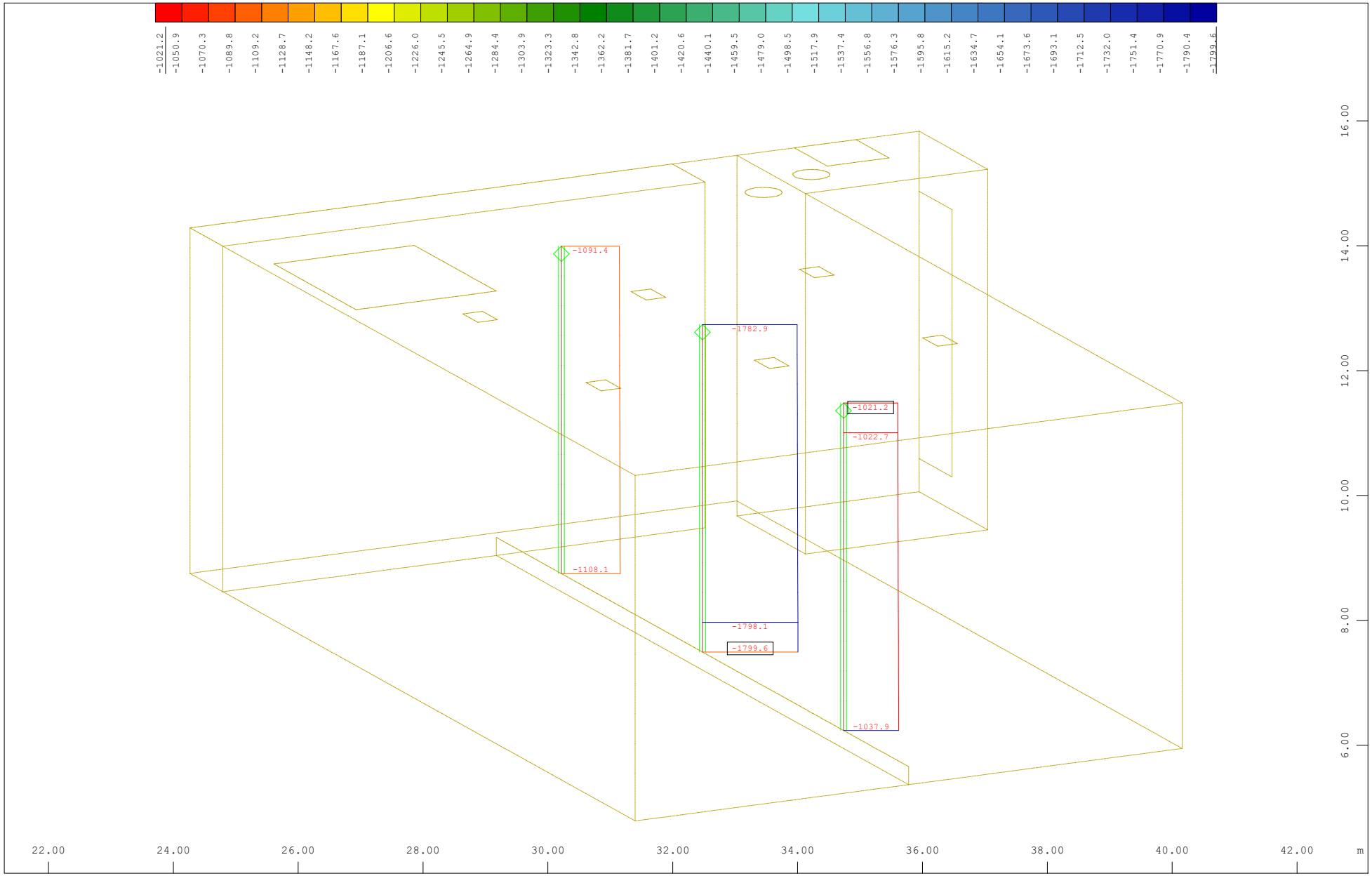



Beam Elements , Normal force Nx, Loadcase 331 MAX-N BEAM ELU3 , 1 cm 3D = 1000.0 kN (Min=-1204.2) (Max=-566.7)

Z
Y
X

M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962

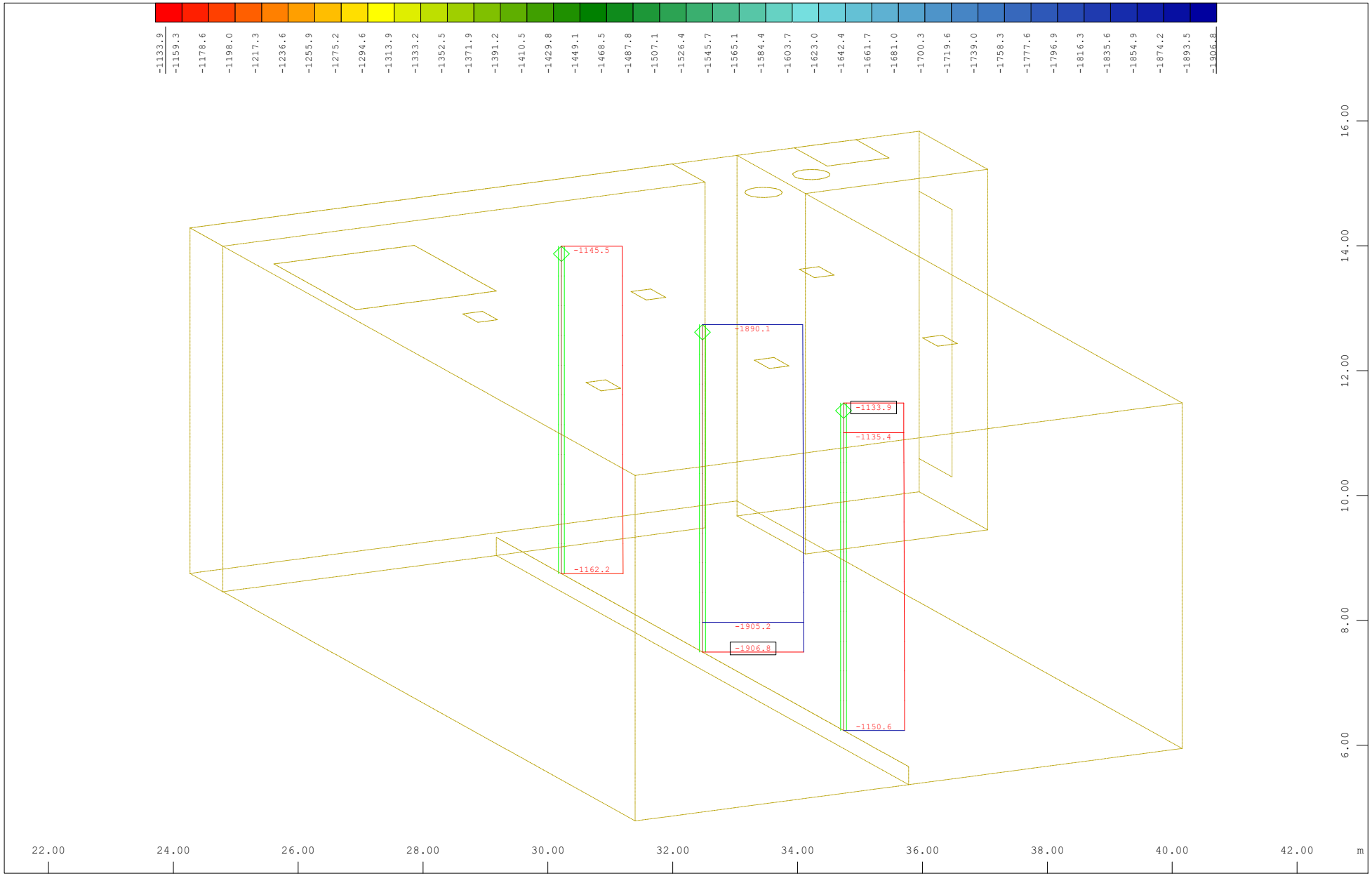

-1362.7
-1396.0
-1425.7
-1455.4
-1485.1
-1514.8
-1544.5
-1574.2
-1603.9
-1633.6
-1663.3
-1693.1
-1722.8
-1752.5
-1782.2
-1811.9
-1841.6
-1871.3
-1901.0
-1930.7
-1960.4
-1990.1
-2019.8
-2049.5
-2079.2
-2108.9
-2138.6
-2168.3
-2198.0
-2227.7
-2257.4
-2287.1
-2316.8
-2346.5
-2376.2
-2405.9
-2435.6
-2465.3
-2495.0
-2524.7
-2550.8
-1362.7
-1364.8
-1385.3
-2528.3
-2548.8
-2550.8
-1777.1
-1799.6
16.00
14.00
12.00
10.00
8.00
6.00
22.00
24.00
26.00
28.00
30.00
32.00
34.00
36.00
38.00
40.00
42.00
m
Z
Y
X
Beam Elements , Normal force Nx, Loadcase 332 MIN-N BEAM ELU3 , 1 cm 3D = 2000.0 kN (Min=-2550.8) (Max=-1362.7)
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962

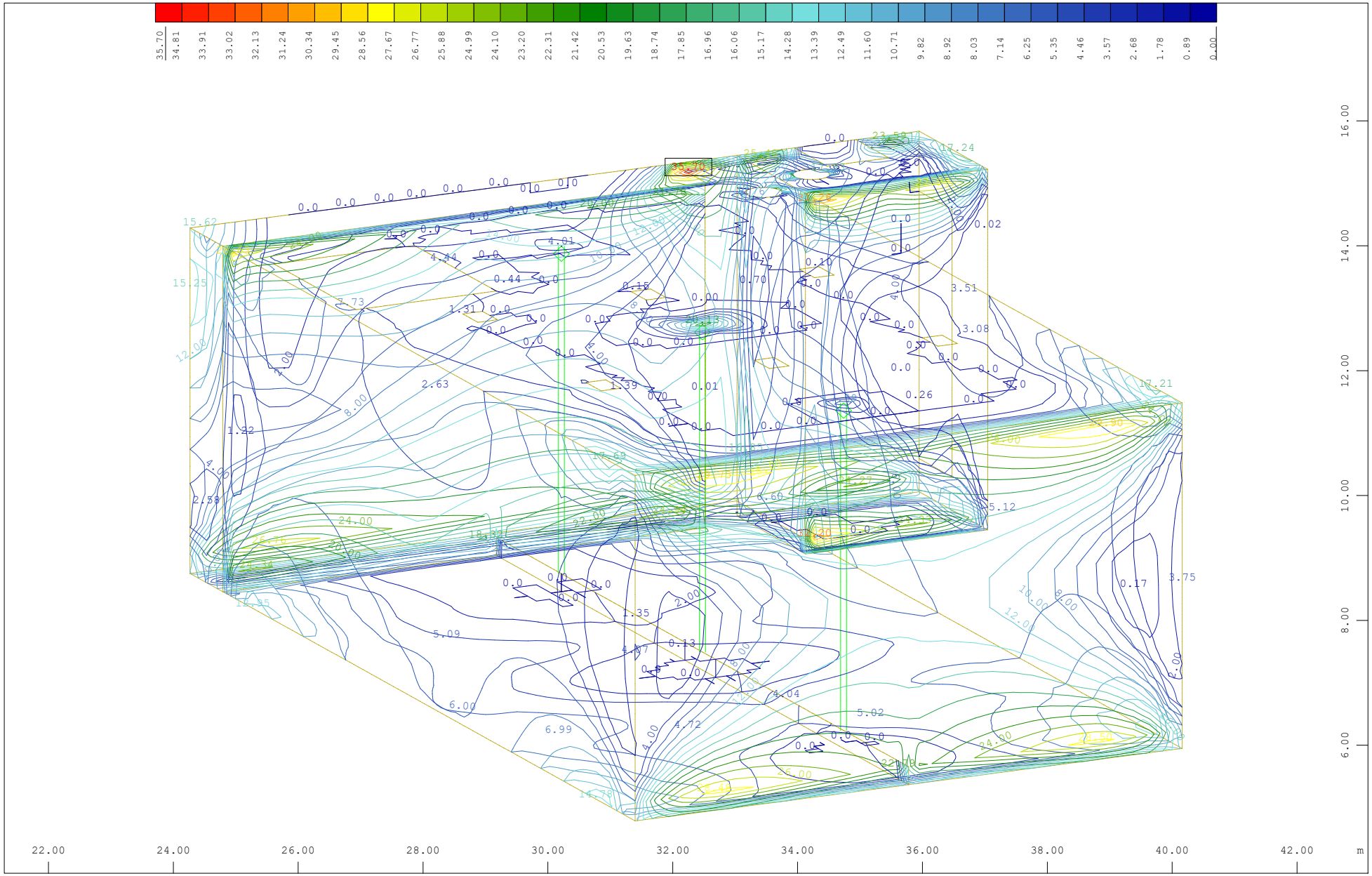



Z
Y
X

Beam Elements , Normal force Nx, Loadcase 431 MAX-N BEAM ELU4 , 1 cm 3D = 1000.0 kN (Min=-1799.6) (Max=-1021.2)

M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962

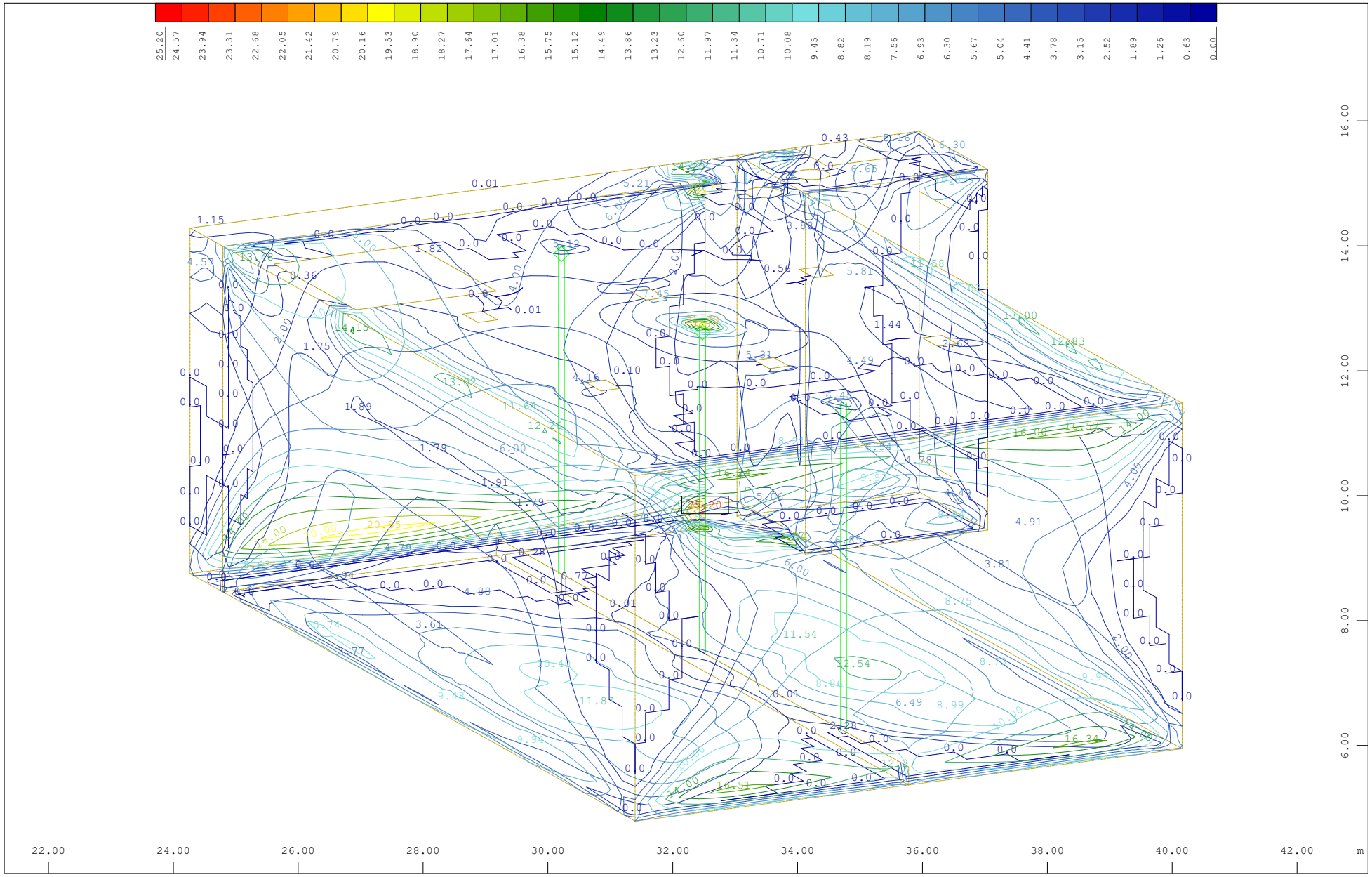

-1133.9
-1159.3
-1178.6
-1198.0
-1217.3
-1236.6
-1255.9
-1275.2
-1294.6
-1313.9
-1333.2
-1352.5
-1371.9
-1391.2
-1410.5
-1429.8
-1449.1
-1468.5
-1487.8
-1507.1
-1526.4
-1545.7
-1565.1
-1584.4
-1603.7
-1623.0
-1642.4
-1661.7
-1681.0
-1700.3
-1719.6
-1739.0
-1758.3
-1777.6
-1796.9
-1816.3
-1835.6
-1854.9
-1874.2
-1893.5
-1906.8
-1145.5
-1890.1
-1133.9
-1135.4
-1162.2
-1905.2
-1906.8
-1150.6
16.00
14.00
12.00
10.00
8.00
6.00
22.00
24.00
26.00
28.00
30.00
32.00
34.00
36.00
38.00
40.00
42.00
m
Z
Y
X
Beam Elements , Normal force Nx, Loadcase 432 MIN-N BEAM ELU4 , 1 cm 3D = 1000.0 kN (Min=-1906.8) (Max=-1133.9)
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Quadrilateral Elements , upper Principal reinforcements (1st layer), Design Case 1 ULS design , from 0 to 35.70 step 2.00 cm2/m

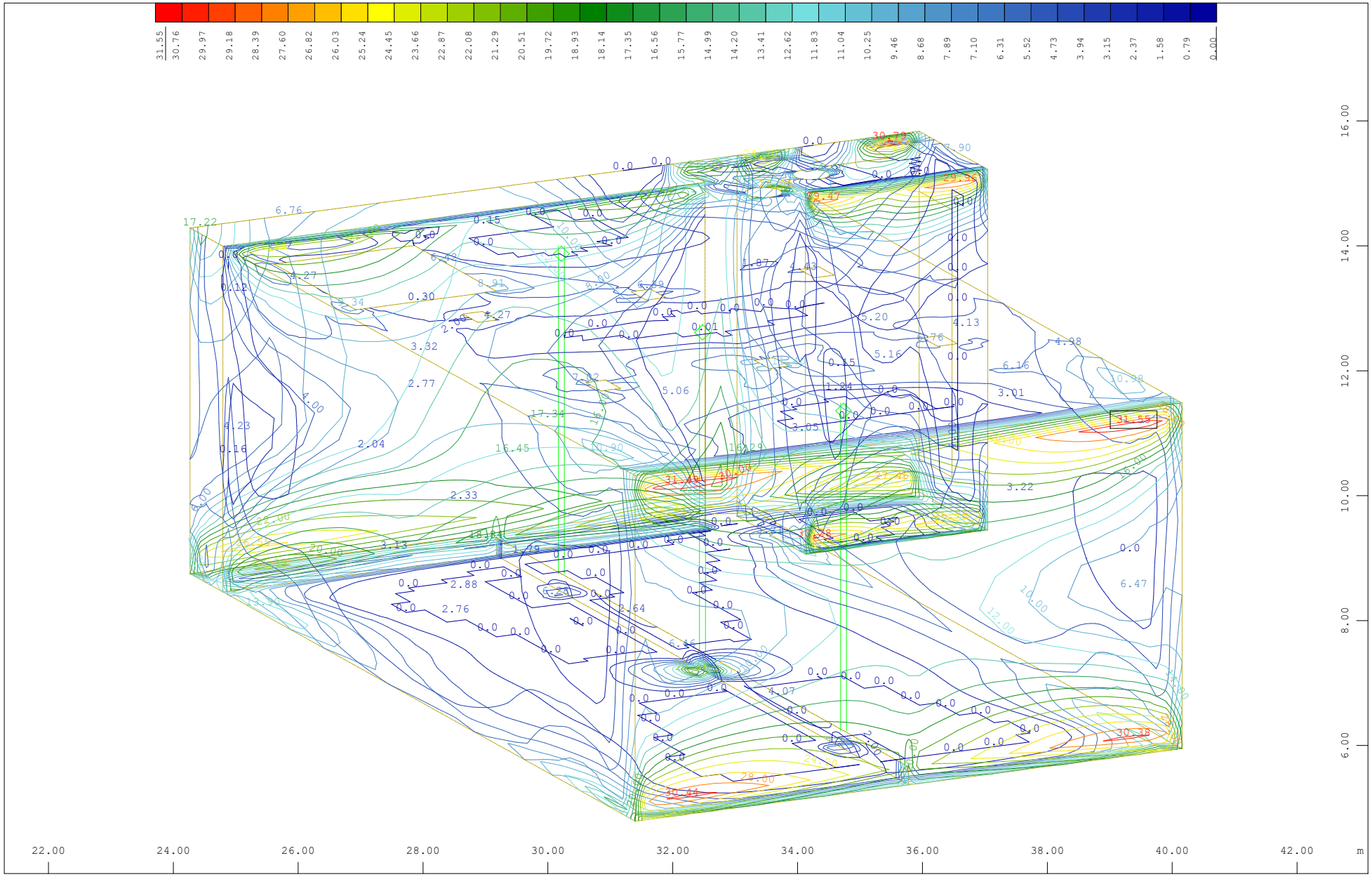
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Quadrilateral Elements , upper Cross reinforcements (2nd layer), Design Case 1 ULS design , from 0 to 25.20 step 2.00 cm2/m

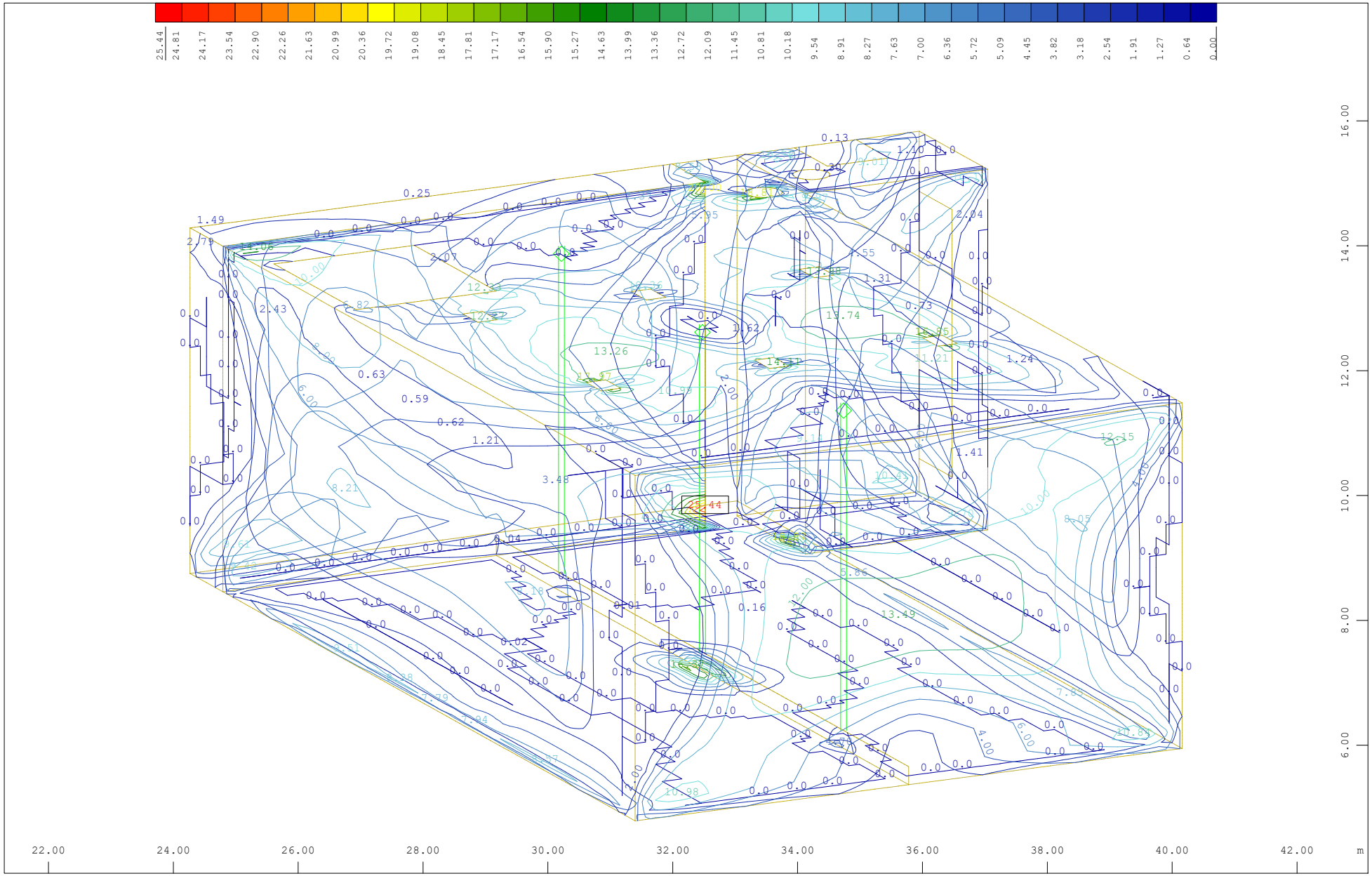
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Quadrilateral Elements , lower Principal reinforcements (1st layer), Design Case 1 ULS design , from 0 to 31.55 step 2.00 cm2/m

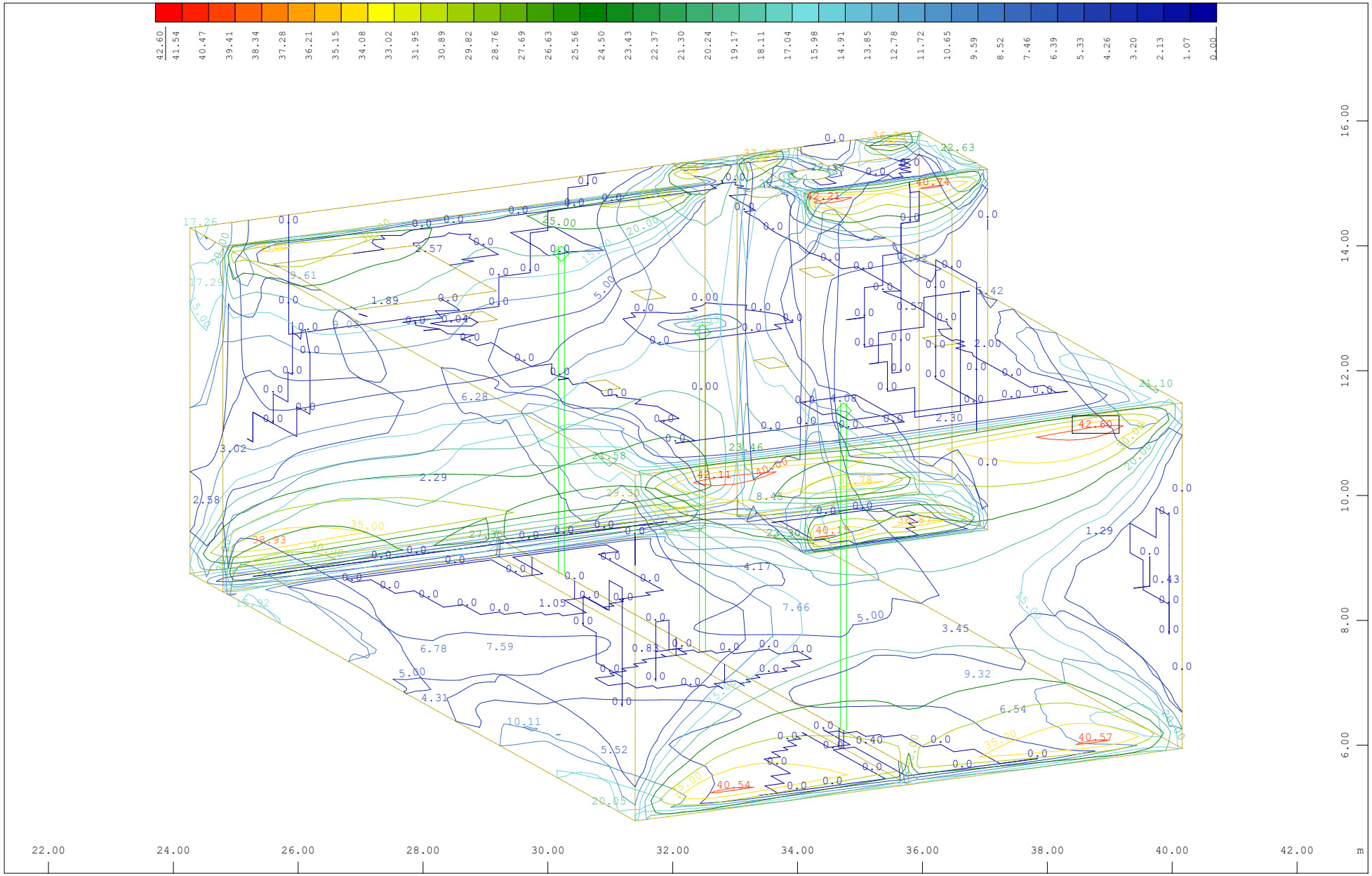
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Quadrilateral Elements , lower Cross reinforcements (2nd layer), Design Case 1 ULS design , from 0 to 25.44 step 2.00 cm2/m

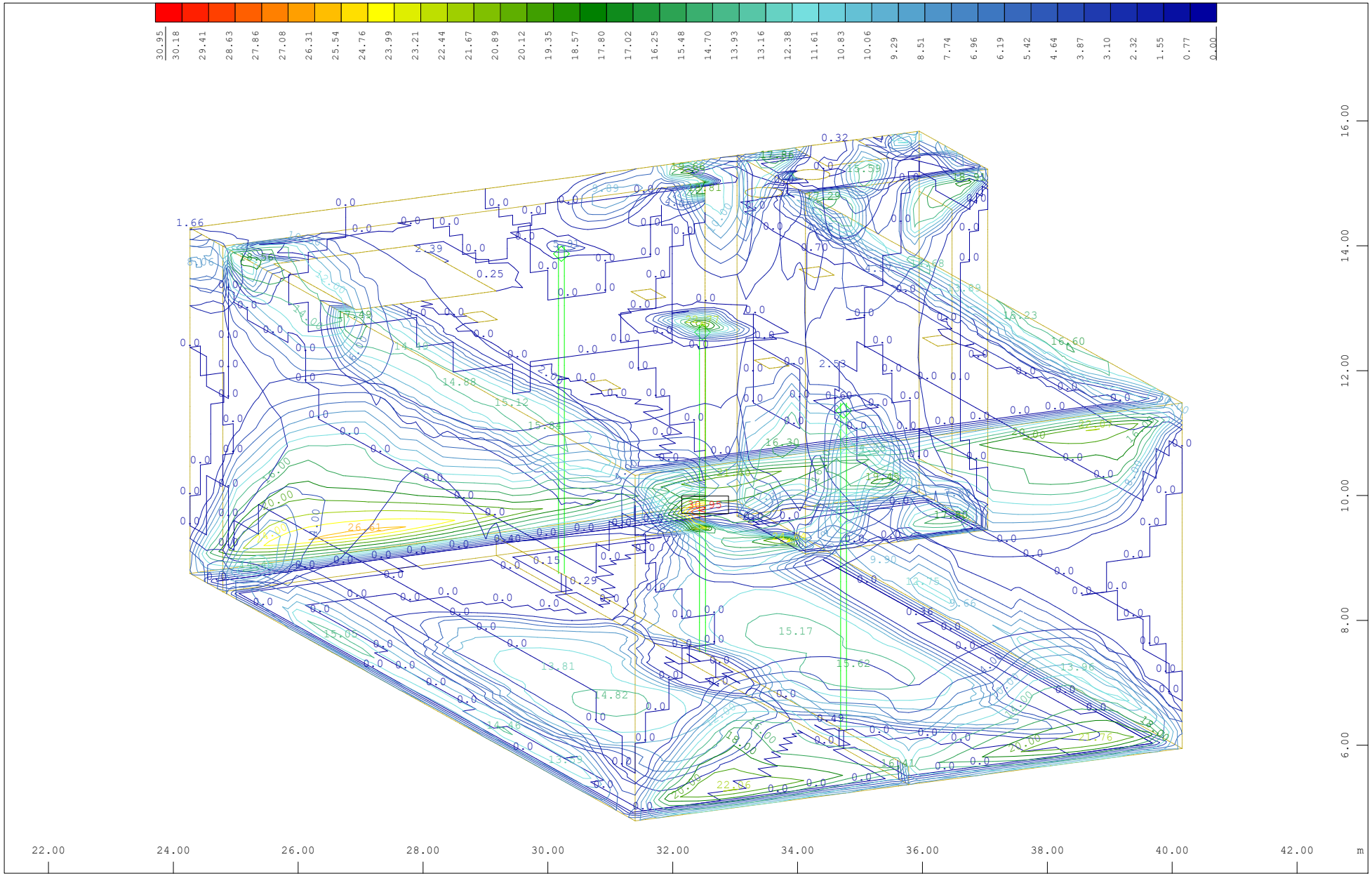
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Quadrilateral Elements , upper Principal reinforcements (1st layer), Design Case 2 , from 0 to 42.60 step 5.00 cm2/m

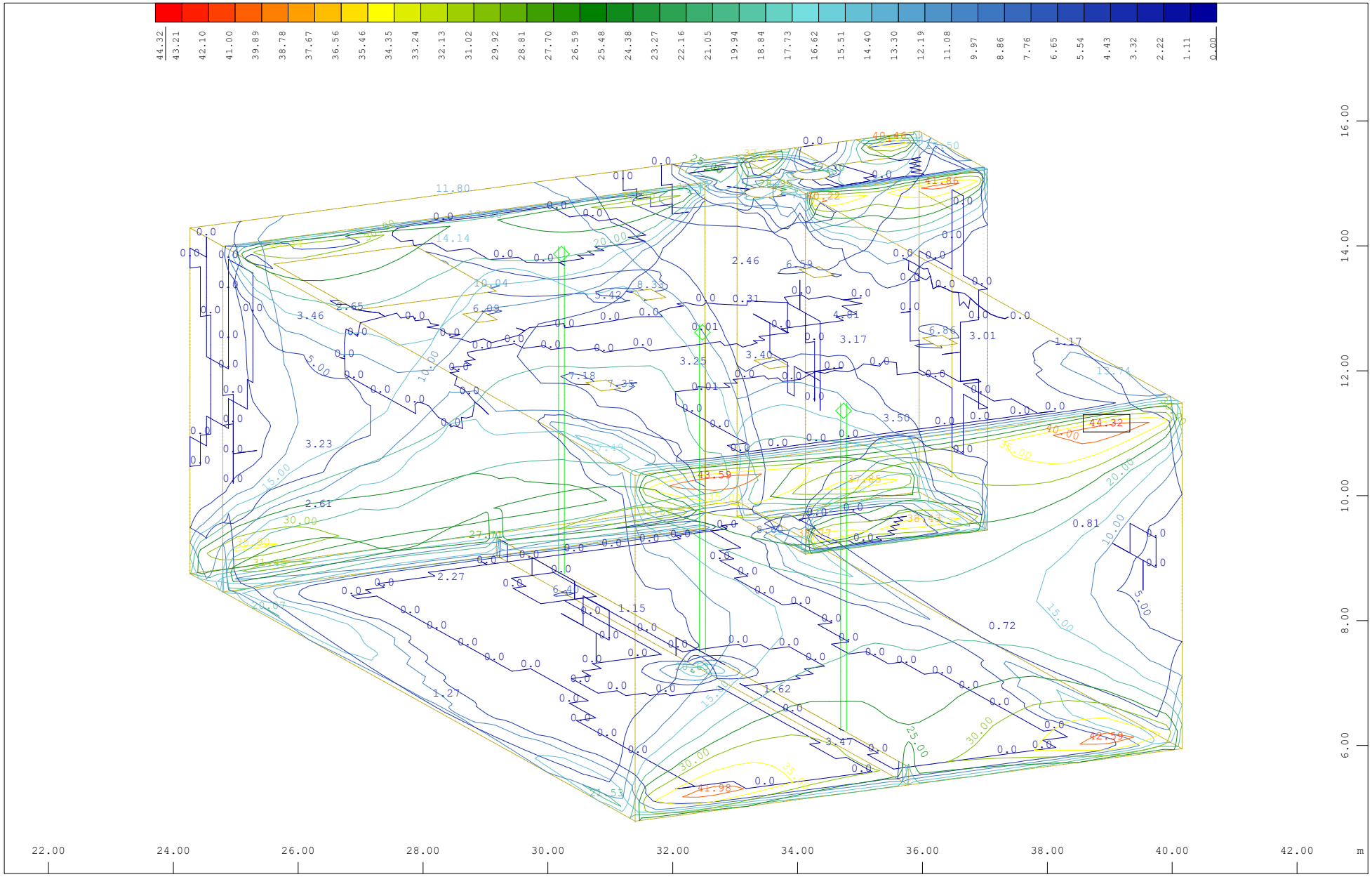
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Quadrilateral Elements , upper Cross reinforcements (2nd layer), Design Case 2 , from 0 to 30.95 step 2.00 cm2/m

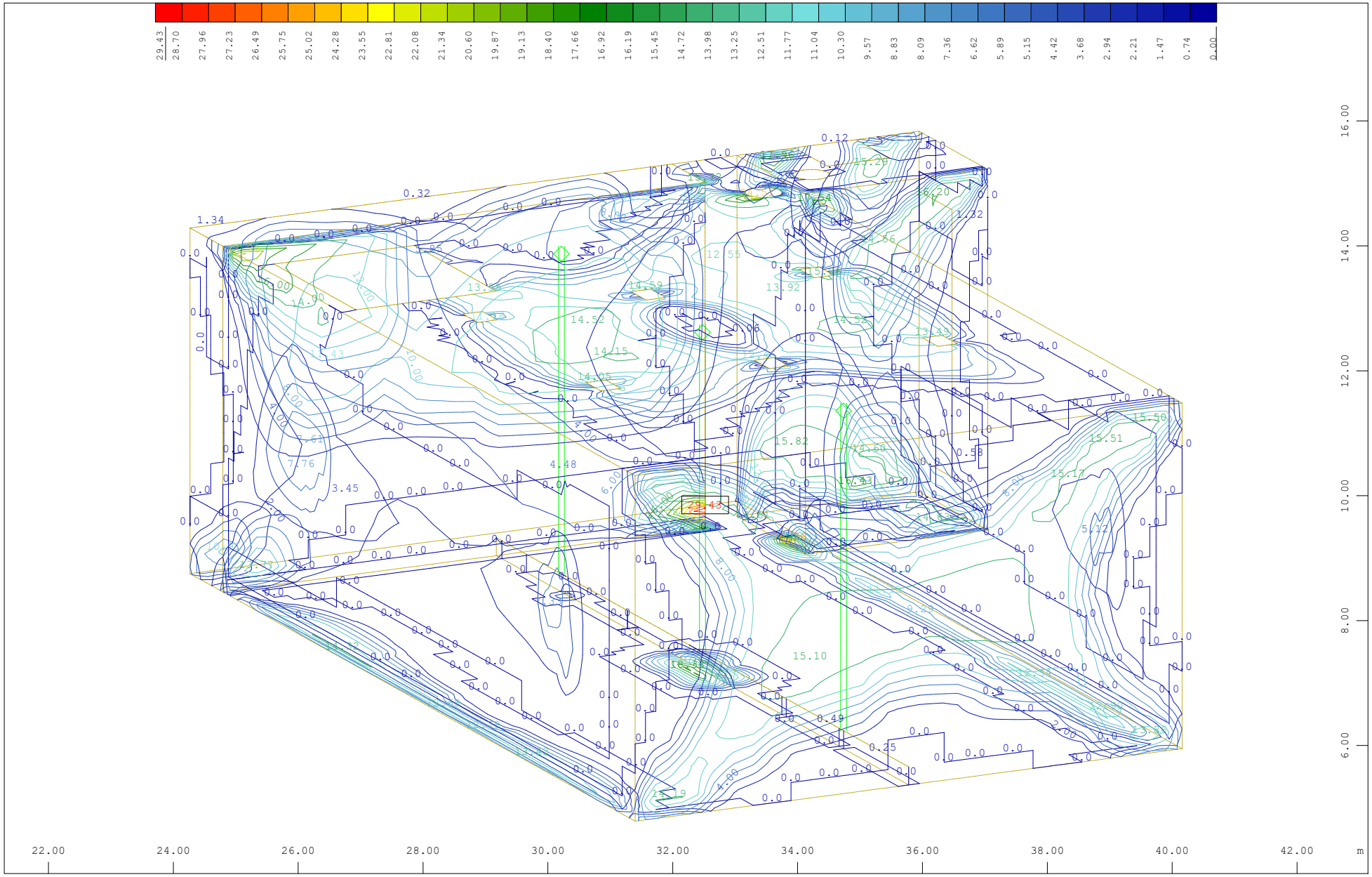
M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Quadrilateral Elements , lower Principal reinforcements (1st layer), Design Case 2 , from 0 to 44.32 step 5.00 cm2/m

M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

Quadrilateral Elements , lower Cross reinforcements (2nd layer), Design Case 2 , from 0 to 29.43 step 2.00 cm2/m

M 1 : 85
X * 0.502
Y * 0.906
Z * 0.962

## 13.5. ANEJO 5. CÁLCULOS ELÉCTRICOS DE LAS INSTALACIONES

En el siguiente documento se reflejan los cálculos y diseño de las distintas instalaciones eléctricas del interior del tanque de tormentas, así como los resultados obtenidos.

# Cálculos eléctricos de la instalación

Tanque Tormentas Norte

Schneider Electric

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# 1 Descripción del proyecto

## 1.1 Parámetros generales del proyecto

| | |
|---|---|
| **Instalación simple** | IEC60364 |
| **Cálculo simple** | TR50480 |
| **Norma interruptores automaticos** | IEC 60947-2 |
| **Frecuencia** | 50 Hz |

## 1.2 Parámetros de cálculo del cableado

| | |
|---|---|
| **CSA máxima** | 300 mm² |

## 1.3 Listado de cargas

### 1.3.1 Cargas genéricas

| Nombre | Sr (kVA) | Pr (kW) | Ir (A) | Cosφ | Nbr | Polaridad | Carga no lineal | THDi 3 (%) |
|---|---|---|---|---|---|---|---|---|
| AA 9 | 2,35 | 2 | 3,4 | 0,85 | 1 | 3F+ N | No | 0 |
| AA 10 | 1,76 | 1,5 | 4,41 | 0,85 | 1 | 2F | No | 0 |
| AA 10 (1) | 1,76 | 1,5 | 4,41 | 0,85 | 1 | 2F | No | 0 |

### 1.3.2 Tomas de corriente

| Nombre | Sr (kVA) | Pr (kW) | Ir (A) | Cosφ | Nbr | Polaridad | Carga no lineal | THDi 3 (%) |
|---|---|---|---|---|---|---|---|---|
| AA 5 | 22,2 | 18,8 | 32 | 0,85 | 2 | 3F+ N | No | 0 |
| AA 6 | 6,4 | 5,44 | 16 | 0,85 | 2 | 2F | No | 0 |
| AA 7 | 6,4 | 5,44 | 16 | 0,85 | 3 | 2F | No | 0 |

### 1.3.3 Distribución de la iluminación

| Nombre | Tipo de lámpara | Lámpara (W) | P Balasto (W) | N.° de lámparas/luminarias | N.° de luminarias |
|---|---|---|---|---|---|
| EA 3 | Módulo LED con piloto electrónico | 50 | 0 | 10 | 1 |
| EA 4 | Módulo LED con piloto electrónico | 150 | 0 | 4 | 1 |

### 1.3.4 Cargas del motor

| Nombre | Sr (kVA) | Pr (kW) | Ir (A) | Cosφ | Nbr | Polaridad | Carga no lineal | THDi 3 (%) |
|---|---|---|---|---|---|---|---|---|
| MA 8 | 1,87 | 1,48 | 3,6 | 0,8 | 1 | 3F | No | 0 |

# 2 Diseño general de la instalación

## 2.1 Listado de aparamenta

### 2.1.1 Juego de barras y cuadros de BT

| Nombre del cuadro | Rango | Calibre (A)) | IP |
|---|---|---|---|
| UC 2 | Cualquiera | 0,00 | Sin definir |

| Nombre del juego de barras | Nombre del cuadro | Ks | Polaridad | SEA | Conexión equipotencial |
|---|---|---|---|---|---|
| WC 1 | UC 2 | 1 | 3F+ N | TN-S | Con |

### 2.1.2 Interruptor automatic

| Nombre | Nbr | Rango - Designación | Calibre (A) | Polos | Curva de disparo/unidad de control | Bloque diferencial | Clase de bloque diferencial | Denominación del PowerTag Energy | Tipo de conexión del PowerTag Energy |
|---|---|---|---|---|---|---|---|---|---|
| QA 0 | 1 | Acti9 NG125 - NG125 N | 50 | 4P4d | C | | | | |
| QA 3 | 1 | Acti9 iC60 - iC60LMA | 10 | 2P2d | MA | | | | |
| QA 4 | 1 | Acti9 iC60 - iC60LMA | 10 | 2P2d | MA | | | | |
| QA 5 | 2 | Acti9 iC40 - iC40 | 32 | 4P3d | C | Vigi iC40 | NA | | |
| QA 6 | 2 | Acti9 iC60 - iC60N | 16 | 2P2d | C | Vigi iC60 | NA | | |
| QA 7 | 3 | Acti9 iC60 - iC60N | 16 | 2P2d | C | Vigi iC60 | NA | | |
| QA 8 | 1 | Acti9 P25M - P25M | 10 | 3P3d | M | | | | |
| QA 9 | 1 | Acti9 iC60 - iC60LMA | 10 | 4P4d | MA | | | | |
| QA 10 | 1 | Acti9 iC60 - iC60LMA | 10 | 2P2d | MA | | | | |
| QA 10 (1) | 1 | Acti9 iC60 - iC60LMA | 10 | 2P2d | MA | | | | |

### 2.1.1 Programa de cables

| Nombre | N.° | Entrada | Alimentador | Tipo | Aislamiento | L (m) | L1/L2/L3 | N | PE/PEN |
|---|---|---|---|---|---|---|---|---|---|
| WD 0 | 1 | W 0 | QA 0 | Multiconductor | PR | 300 | 1x120 Aluminio | 1x120 Aluminio | 1x70 Aluminio |
| WD 4 | 1 | QA 4 | EA 4 | Multiconductor | PR | 300 | 1x1,5 Cobre | 1x1,5 Cobre | 1x1,5 Cobre |
| WD 9 | 1 | QA 9 | AA 9 | Multiconductor | PR | 300 | 1x1,5 Cobre | 1x1,5 Cobre | 1x1,5 Cobre |
| WD 8 | 1 | QA 8 | MA 8 | Multiconductor | PR | 300 | 1x1,5 Cobre | | 1x1,5 Cobre |
| WD 7 | 3 | QA 7 | AA 7 | Multiconductor | PR | 300 | 1x1,5 Cobre | | 1x1,5 Cobre |
| WD 6 | 2 | QA 6 | AA 6 | Multiconductor | PR | 300 | 1x1,5 Cobre | | 1x1,5 Cobre |
| WD 5 | 2 | QA 5 | AA 5 | Multiconductor | PR | 300 | 1x2,5 Cobre | 1x2,5 Cobre | 1x2,5 Cobre |
| WD 3 | 1 | QA 3 | EA 3 | Multiconductor | PR | 300 | 1x1,5 Cobre | 1x1,5 Cobre | 1x1,5 Cobre |
| WD 10 (1) | 1 | QA 10 (1) | AA 10 (1) | Multiconductor | PR | 300 | 1x1,5 Cobre | | 1x1,5 Cobre |
| WD 10 | 1 | QA 10 | AA 10 | Multiconductor | PR | 300 | 1x1,5 Cobre | | 1x1,5 Cobre |

**AVISO**

**Riesgo de resultados incorrectos.**

- Asegúrese de haber proporcionado todos los datos requeridos para dimensionar el conductor.
- Es recomendable referirse al catálogo del proveedor del cable antes de hacer la selección.

**El incumplimiento de estas instrucciones puede dar como resultado una lista de materiales incorrecta y la pérdida de negocio.**

# 3 Notas de cálculo

## 3.1 Circuitos de la fuente de BT

### 3.1.1 CircuitoRed 0

| Entrada BT | W 0 |
|---|---|
| **Descripción de la conexión** | |
| Tipo de conexión | Puesto privado |
| Ur | 400 V |
| Capacidad de la conexión - Ir | 45 A |
| Polaridad | 3F+ N |
| Esquema de puesta a tierra | TN-S |
| Unión equipotencial | No |
| Rb (puesta en tierra del neutro) | NA |
| Ra (puesta en tierra de las masas) | NA |
| **Características de cortocircuito** | |
| Ik3máx | 20 kA |
| Ik1mín | 16 kA |
| Ief | 17,2 kA |
| Ief2mín | 5 kA |
| Cos $\varphi_{cc}$ | 0,3 |
| **Cable** | **WD 0** |
| **Parámetros** | |
| Longitud | 300 m |
| Longitud máxima | NA |
| Modo de colocación según tabla 52-3 de la IEC 60364-5-52 (2001) y tabla 52-B2 de la UNE 20460-5-523 (2004) | 70<br>D1<br>Cables multiconductores en tubos o en conductos de sección no circular enterrados |
| Tipo de cable | Multiconductor |
| Cdad de circuitos juntos suplementarios | NA |
| Aislante | PR |
| Temperatura sección enterrados | 20 °C |
| THDI de rango 3 en el neutro | 1,28 % |
| Ib | 45 A |
| Limitación de dimensionamiento | Caída de tensión |
| Información de dimensionamiento | La sección del cable [WD 0] ha sido aumentada de 16 a 120 para respetar la caída de tensión del circuito.<br>Fase de dimensionamiento<br>Dimensionada con Ir |
| **Factores de corrección** | |
| Factor de temperatura | 1 |
| Cuadro de referencia normativa | B-52-15 |
| Factor de resistividad térmica del | 1 |
| Referencia de tabla estándar | B-52-16 |
| Factor de neutro cargado | 1 |
| Cuadro de referencia normativa | E-52-1 |
| Factor de agrupamiento | 1 |
| Cuadro de referencia normativa | B-52-19 |
| Usuario factor de corrección | 1 |
| Factor global | 1 |

| **Fase seleccionada** | |
|---|---|
| Sección | 1x120 mm² |
| Ánima | Aluminio |

| | |
|---|---|
| Iz | 174 A |
| Iz' | 174 A |
| **Neutro seleccionado** | |
| Sección | 1x120 mm² |
| Ánima | Aliminio |
| Iz | 174 A |
| Iz' | 174 A |
| **PE seleccionado** | |
| Sección | 1x70 mm² |
| Ánima | Aliminio |

| Corrientes de cortocircuito | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Ik3max | Ik2max | Ik1max | Ik2min | Ik1min | Iefmin | Ief2min | Iefmax |
| **Modo de explotación Normal** | | | | | | | | |
| (kA) | 2,98 | 2,58 | 1,56 | 1,50 | 0,89 | 0,67 | NA | 0,77 |
| **Resumen para todos los modos de explotación** | | | | | | | | |
| (kA) | 2,98 | 2,58 | 1,56 | 1,50 | 0,89 | 0,67 | NA | 0,77 |

Resultados de cálculo en base al informe técnico Cenelec TR50480.Hipótesis y selección de la aparamenta bajo la responsabilidad del usuario.

| Protección | QA 0 |
|---|---|
| Ib | 45 A |
| Distancia desde el origen | NA |
| Información de dimensionamiento | de tamaño por el sistema |
| Gama | Acti9 NG125 |
| Designación | NG125N |
| Circuito nominal del interruptor | 50 A |
| Poder de corte | 25 kA |
| TNS Un polo poder de corte | 25 kA |
| IT Uno de los polos Capacidad de ruptura | NA |
| Poder de corte reforzado | NA |
| Pole y protegido polo | 4P4d |
| Designación de la unidad de viaje | C |
| Trip calificación unidad | 50 A |
| **Ajustes de retardo largos** | |
| Ir | 50 A |
| Tr | NA |
| **Ajustes de retardo cortos** | |
| corriente Isd | 400 A |
| Tsd | NA |
| **Disparo instantáneo** | |
| Corriente Ii | OFF |
| Corriente Ti | NA |

| Resultados selectividad<br>Previo | Límite de selectividad |
|---|---|
| **Modo Operativo Normal** | |
| NA | Selectividad no calculada: no hay protección BT aguas arriba |

| Corrientes de empleo | IL1 | IL2 | IL3 | IN |
|---|---|---|---|---|
| **Modo de explotación Normal** | | | | |
| (A) | 44,997 | 39,820 | 38,996 | 5,63 |

| Resumen para todos los modos de explotación | | | | |
|---|---|---|---|---|
| (A) | 44,997 | 39,820 | 38,996 | 5,63 |

| Caídas de tensión | Acumuladas aguas arriba | Circuito |
|---|---|---|
| **Modo de operación Normal** | | |
| $\Delta U_{3L}$ (%) | 1,810 | 1,810 |
| $\Delta U_{L1L2}$ (%) | 2,086 | 2,086 |
| $\Delta U_{L2L3}$ (%) | 2,081 | 2,081 |
| $\Delta U_{L3L1}$ (%) | 2,086 | 2,086 |
| $\Delta U_{L1N}$ (%) | 1,810 | 1,810 |
| $\Delta U_{L2N}$ (%) | 1,802 | 1,802 |
| $\Delta U_{L3N}$ (%) | 1,802 | 1,802 |

## 3.2 Circuitos de carga genérica

### 3.2.1 CircuitoControl Limpieza

| Protección | QA 9 |
|---|---|
| Ib | 3,4 A |
| Distancia desde el origen | NA |
| Información de dimensionamiento | de tamaño por el sistema |
| Gama | Acti9 iC60 |
| Designación | iC60LMA |
| Circuito nominal del interruptor | 10 A |
| Poder de corte | 20 kA |
| TNS Un polo poder de corte | 20 kA |
| IT Uno de los polos Capacidad de ruptura | NA |
| Poder de corte reforzado | NA |
| Pole y protegido polo | 4P4d |
| Designación de la unidad de viaje | MA |
| Trip calificación unidad | 10 A |
| **Ajustes de retardo largos** | |
| Ir | NA |
| Tr | NA |
| **Ajustes de retardo cortos** | |
| corriente Isd | 120 A |
| Tsd | NA |
| **Disparo instantáneo** | |
| Corriente Ii | OFF |
| Corriente Ti | NA |

| Resultados selectividad<br>Previo | Límite de selectividad |
|---|---|
| **Modo Operativo Normal** | |
| QA 0<br>NG125N<br>C<br>50 A / 4P4d | Sin selectividad |

| Cable | WD 9 |
|---|---|
| **Parámetros** | |
| Longitud | 15 m |
| Longitud máxima | 100 m |
| Modo de colocación según tabla 52-3 de la IEC 60364-5-52 (2001) y tabla 52-B2 de la UNE 20460-5-523 (2004) | 31<br>E<br>Cables multiconductores en bandejas perforadas colocadas horizontalmente |
| Tipo de cable | Multiconductor |
| Cdad de circuitos juntos suplementarios | NA |
| Aislante | PR |
| Temperatura ambiente | 30 °C |
| THDI de rango 3 en el neutro | NA % |
| Ib | 3 A |
| Limitación de dimensionamiento | Iz |
| Información de dimensionamiento | Dimensionada con Ir |
| **Factores de corrección** | |
| Factor de temperatura | 1 |
| Cuadro de referencia normativa | B-52-14 |
| Factor de resistividad térmica del | 1 |
| Referencia de tabla estándar | B-52-16 |
| Factor de neutro cargado | 1 |
| Cuadro de referencia normativa | E-52-1 |
| Factor de agrupamiento | 1 |
| Cuadro de referencia normativa | B-52-20 |
| Usuario factor de corrección | 1 |
| Factor global | 1 |

| **Fase seleccionada** | |
|---|---|
| Sección | 1x1,5 mm² |
| Ánima | Cobre |
| Iz | 23 A |
| Iz' | 23 A |
| **Neutro seleccionado** | |
| Sección | 1x1,5 mm² |
| Ánima | Cobre |
| Iz | 23 A |
| Iz' | 23 A |
| **PE seleccionado** | |
| Sección | 1x1,5 mm² |
| Ánima | Cobre |

| Corrientes de cortocircuito | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Ik3max | Ik2max | Ik1max | Ik2min | Ik1min | Iefmin | Ief2min | Iefmax |
| **Modo de explotación Normal** | | | | | | | | |
| (kA) | 0,96 | 0,83 | 0,48 | 0,56 | 0,33 | 0,30 | NA | 0,35 |
| **Resumen para todos los modos de explotación** | | | | | | | | |
| (kA) | 0,96 | 0,83 | 0,48 | 0,56 | 0,33 | 0,30 | NA | 0,35 |

Resultados de cálculo en base al informe técnico Cenelec TR50480.Hipótesis y selección de la aparamenta bajo la responsabilidad del usuario.

| Carga | AA 9 |
|---|---|
| U | 400 V |
| S | 2,35 kVA |
| P | 2 kW |
| I | 3,4 A |
| cosφ | 0,85 |
| Polaridad | 3F+ N |
| Fase(s) de alimentación | |
| Número de circuitos | 1 |
| Ku (Normal) | 1 |
| Generador de armónicos | No |
| THDI3 | NA |
| Sensibilidad a sobretensión | NA |

| Corrientes de empleo | IL1 | IL2 | IL3 | IN |
|---|---|---|---|---|
| **Modo de explotación Normal** | | | | |
| (A) | 3,396 | 3,396 | 3,396 | 0 |

| Resumen para todos los modos de explotación | | | | |
|---|---|---|---|---|
| (A) | 3,396 | 3,396 | 3,396 | NA |

| Caídas de tensión | Acumuladas aguas arriba | Circuito |
|---|---|---|
| **Modo de operación Normal** | | |
| $\Delta U_{3L}$ (%) | 2,107 | 0,297 |
| $\Delta U_{L1L2}$ (%) | 2,429 | 0,343 |
| $\Delta U_{L2L3}$ (%) | 2,424 | 0,343 |
| $\Delta U_{L3L1}$ (%) | 2,429 | 0,343 |
| $\Delta U_{L1N}$ (%) | 2,107 | 0,297 |
| $\Delta U_{L2N}$ (%) | 2,099 | 0,297 |
| $\Delta U_{L3N}$ (%) | 2,099 | 0,297 |

| Resumen para todos los modos de explotación | |
|---|---|
| $\Delta U_{3L}$ (%) | 2,107 |
| $\Delta U_{L1L2}$ (%) | 2,429 |
| $\Delta U_{L2L3}$ (%) | 2,424 |
| $\Delta U_{L3L1}$ (%) | 2,429 |
| $\Delta U_{L1N}$ (%) | 2,107 |
| $\Delta U_{L2N}$ (%) | 2,099 |
| $\Delta U_{L3N}$ (%) | 2,099 |

### 3.2.2 CircuitoRACK

| Protección | QA 10 |
|---|---|
| Ib | 4,41 A |
| Distancia desde el origen | NA |
| Información de dimensionamiento | de tamaño por el sistema |
| Gama | Acti9 iC60 |
| Designación | iC60LMA |
| Circuito nominal del interruptor | 10 A |
| Poder de corte | 20 kA |
| TNS Un polo poder de corte | 20 kA |
| IT Uno de los polos Capacidad de ruptura | NA |
| Poder de corte reforzado | NA |
| Pole y protegido polo | 2P2d |
| Designación de la unidad de viaje | MA |
| Trip calificación unidad | 10 A |
| **Ajustes de retardo largos** | |
| Ir | NA |
| Tr | NA |
| **Ajustes de retardo cortos** | |
| corriente Isd | 120 A |
| Tsd | NA |
| **Disparo instantáneo** | |
| Corriente Ii | OFF |
| Corriente Ti | NA |

| Resultados selectividad<br>Previo | Límite de selectividad |
|---|---|
| **Modo Operativo Normal** | |
| QA 0<br>NG125N<br>C<br>50 A / 4P4d | Sin selectividad |

| Cable | WD 10 |
|---|---|
| **Parámetros** | |
| Longitud | 5 m |
| Longitud máxima | 67 m |
| Modo de colocación según tabla 52-3 de la IEC 60364-5-52 (2001) y tabla 52-B2 de la UNE 20460-5-523 (2004) | 31<br>E<br>Cables multiconductores en bandejas perforadas colocadas horizontalmente |
| Tipo de cable | Multiconductor |
| Cdad de circuitos juntos suplementarios | NA |
| Aislante | PR |
| Temperatura ambiente | 30 °C |
| THDI de rango 3 en el neutro | NA % |
| Ib | 4 A |
| Limitación de dimensionamiento | Iz |
| Información de dimensionamiento | Dimensionada con Ir |
| **Factores de corrección** | |
| Factor de temperatura | 1 |
| Cuadro de referencia normativa | B-52-14 |
| Factor de resistividad térmica del | 1 |
| Referencia de tabla estándar | B-52-16 |
| Factor de neutro cargado | 1 |
| Cuadro de referencia normativa | E-52-1 |
| Factor de agrupamiento | 1 |
| Cuadro de referencia normativa | B-52-20 |
| Usuario factor de corrección | 1 |
| Factor global | 1 |

| Fase seleccionada | |
|---|---|
| Sección | 1x1,5 mm² |
| Ánima | Cobre |
| Iz | 26 A |
| Iz' | 26 A |
| **PE seleccionado** | |
| Sección | 1x1,5 mm² |
| Ánima | Cobre |

| Corrientes de cortocircuito | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Ik3max | Ik2max | Ik1max | Ik2min | Ik1min | Iefmin | Ief2min | Iefmax |
| **Modo de explotación Normal** | | | | | | | | |
| (kA) | NA | 1,53 | NA | 1,05 | NA | 0,52 | NA | 0,60 |
| **Resumen para todos los modos de explotación** | | | | | | | | |
| (kA) | NA | 1,53 | NA | 1,05 | NA | 0,52 | NA | 0,60 |

Resultados de cálculo en base al informe técnico Cenelec TR50480.Hipótesis y selección de la aparamenta bajo la responsabilidad del usuario.

| Carga | AA 10 |
|---|---|
| U | 400 V |
| S | 1,76 kVA |
| P | 1,5 kW |
| I | 4,41 A |
| cosφ | 0,85 |
| Polaridad | 2F |
| Fase(s) de alimentación | L1-L2 |
| Número de circuitos | 1 |
| Ku (Normal) | 1 |
| Generador de armónicos | No |
| THDI3 | NA |
| Sensibilidad a sobretensión | NA |

| Corrientes de empleo | IL1 | IL2 | IL3 | IN |
|---|---|---|---|---|
| **Modo de explotación Normal** | | | | |
| (A) | 4,412 | 4,412 | 0,000 | 0 |
| **Resumen para todos los modos de explotación** | | | | |
| (A) | 4,412 | 4,412 | NA | NA |

| Caídas de tensión | Acumuladas aguas arriba | Circuito |
|---|---|---|
| **Modo de operación Normal** | | |
| $\Delta U_{3L}$ (%) | 1,939 | 0,129 |
| $\Delta U_{L1L2}$ (%) | 2,234 | 0,149 |
| $\Delta U_{L2L3}$ (%) | 2,081 | 0,000 |
| $\Delta U_{L3L1}$ (%) | 2,086 | 0,000 |
| $\Delta U_{L1N}$ (%) | 1,810 | 0,000 |
| $\Delta U_{L2N}$ (%) | 1,802 | 0,000 |
| $\Delta U_{L3N}$ (%) | 1,802 | 0,000 |

| Resumen para todos los modos de explotación | |
|---|---|
| $\Delta U_{3L}$ (%) | 1,939 |
| $\Delta U_{L1L2}$ (%) | 2,234 |
| $\Delta U_{L2L3}$ (%) | 2,081 |
| $\Delta U_{L3L1}$ (%) | 2,086 |
| $\Delta U_{L1N}$ (%) | 1,810 |
| $\Delta U_{L2N}$ (%) | 1,802 |
| $\Delta U_{L3N}$ (%) | 1,802 |

### 3.2.3 CircuitoVENTILACIÓN

| Protección | QA 10 (1) |
|---|---|
| Ib | 4,41 A |
| Distancia desde el origen | NA |
| Información de dimensionamiento | de tamaño por el sistema |
| Gama | Acti9 iC60 |
| Designación | iC60LMA |
| Circuito nominal del interruptor | 10 A |
| Poder de corte | 20 kA |
| TNS Un polo poder de corte | 20 kA |
| IT Uno de los polos Capacidad de ruptura | NA |
| Poder de corte reforzado | NA |
| Pole y protegido polo | 2P2d |
| Designación de la unidad de viaje | MA |
| Trip calificación unidad | 10 A |
| **Ajustes de retardo largos** | |
| Ir | NA |
| Tr | NA |
| **Ajustes de retardo cortos** | |
| corriente Isd | 120 A |
| Tsd | NA |
| **Disparo instantáneo** | |
| Corriente Ii | OFF |
| Corriente Ti | NA |

| Resultados selectividad<br>Previo | Límite de selectividad |
|---|---|
| **Modo Operativo Normal** | |
| QA 0<br>NG125N<br>C<br>50 A / 4P4d | Sin selectividad |

| Cable | WD 10 (1) |
|---|---|
| **Parámetros** | |
| Longitud | 5 m |
| Longitud máxima | 67 m |
| Modo de colocación según tabla 52-3 de la IEC 60364-5-52 (2001) y tabla 52-B2 de la UNE 20460-5-523 (2004) | 31<br>E<br>Cables multiconductores en bandejas perforadas colocadas horizontalmente |
| Tipo de cable | Multiconductor |
| Cdad de circuitos juntos suplementarios | NA |
| Aislante | PR |
| Temperatura ambiente | 30 °C |
| THDI de rango 3 en el neutro | NA % |
| Ib | 4 A |
| Limitación de dimensionamiento | Iz |
| Información de dimensionamiento | Dimensionada con Ir |
| **Factores de corrección** | |
| Factor de temperatura | 1 |
| Cuadro de referencia normativa | B-52-14 |
| Factor de resistividad térmica del | 1 |
| Referencia de tabla estándar | B-52-16 |
| Factor de neutro cargado | 1 |
| Cuadro de referencia normativa | E-52-1 |
| Factor de agrupamiento | 1 |
| Cuadro de referencia normativa | B-52-20 |
| Usuario factor de corrección | 1 |
| Factor global | 1 |

| Fase seleccionada | |
|---|---|
| Sección | 1x1,5 mm² |
| Ánima | Cobre |
| Iz | 26 A |
| Iz' | 26 A |
| **PE seleccionado** | |
| Sección | 1x1,5 mm² |
| Ánima | Cobre |

| Corrientes de cortocircuito | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Ik3max | Ik2max | Ik1max | Ik2min | Ik1min | Iefmin | Ief2min | Iefmax |
| **Modo de explotación Normal** | | | | | | | | |
| (kA) | NA | 1,53 | NA | 1,05 | NA | 0,52 | NA | 0,60 |
| **Resumen para todos los modos de explotación** | | | | | | | | |
| (kA) | NA | 1,53 | NA | 1,05 | NA | 0,52 | NA | 0,60 |

Resultados de cálculo en base al informe técnico Cenelec TR50480.Hipótesis y selección de la aparamenta bajo la responsabilidad del usuario.

| Carga | AA 10 (1) |
|---|---|
| U | 400 V |
| S | 1,76 kVA |
| P | 1,5 kW |
| I | 4,41 A |
| cosφ | 0,85 |
| Polaridad | 2F |
| Fase(s) de alimentación | L1-L2 |
| Número de circuitos | 1 |
| Ku (Normal) | 1 |
| Generador de armónicos | No |
| THDI3 | NA |
| Sensibilidad a sobretensión | NA |

| Corrientes de empleo | IL1 | IL2 | IL3 | IN |
|---|---|---|---|---|
| **Modo de explotación Normal** | | | | |
| (A) | 4,412 | 4,412 | 0,000 | 0 |
| **Resumen para todos los modos de explotación** | | | | |
| (A) | 4,412 | 4,412 | NA | NA |

| Caídas de tensión | Acumuladas aguas arriba | Circuito |
|---|---|---|
| **Modo de operación Normal** | | |
| $\Delta U_{3L}$ (%) | 1,939 | 0,129 |
| $\Delta U_{L1L2}$ (%) | 2,234 | 0,149 |
| $\Delta U_{L2L3}$ (%) | 2,081 | 0,000 |
| $\Delta U_{L3L1}$ (%) | 2,086 | 0,000 |
| $\Delta U_{L1N}$ (%) | 1,810 | 0,000 |
| $\Delta U_{L2N}$ (%) | 1,802 | 0,000 |
| $\Delta U_{L3N}$ (%) | 1,802 | 0,000 |

| Resumen para todos los modos de explotación | |
|---|---|
| $\Delta U_{3L}$ (%) | 1,939 |
| $\Delta U_{L1L2}$ (%) | 2,234 |
| $\Delta U_{L2L3}$ (%) | 2,081 |
| $\Delta U_{L3L1}$ (%) | 2,086 |
| $\Delta U_{L1N}$ (%) | 1,810 |
| $\Delta U_{L2N}$ (%) | 1,802 |
| $\Delta U_{L3N}$ (%) | 1,802 |

## 3.3 Circuitos de carga de la iluminación

### 3.3.1 CircuitoAl Caseta

| Protección | QA 3 |
|---|---|
| Ib | 2,35 A |
| Distancia desde el origen | NA |
| Información de dimensionamiento | de tamaño por el sistema |
| Gama | Acti9 iC60 |
| Designación | iC60LMA |
| Circuito nominal del interruptor | 10 A |
| Poder de corte | 40 kA |
| TNS Un polo poder de corte | 20 kA |
| IT Uno de los polos Capacidad de ruptura | NA |
| Poder de corte reforzado | NA |
| Pole y protegido polo | 2P2d |
| Designación de la unidad de viaje | MA |
| Trip calificación unidad | 10 A |
| **Ajustes de retardo largos** | |
| Ir | NA |
| Tr | NA |
| **Ajustes de retardo cortos** | |
| corriente Isd | 120 A |
| Tsd | NA |
| **Disparo instantáneo** | |
| Corriente Ii | OFF |
| Corriente Ti | NA |

| Resultados selectividad<br>Previo | Límite de selectividad |
|---|---|
| **Modo Operativo Normal** | |
| QA 0<br>NG125N<br>C<br>50 A / 4P4d | Sin selectividad |

| Cable | WD 3 |
|---|---|
| **Parámetros** | |
| Longitud | 15 m |
| Longitud máxima | 67 m |
| Modo de colocación según tabla 52-3 de la IEC 60364-5-52 (2001) y tabla 52-B2 de la UNE 20460-5-523 (2004) | 31<br>E<br>Cables multiconductores en bandejas perforadas colocadas horizontalmente |
| Tipo de cable | Multiconductor |
| Cdad de circuitos juntos suplementarios | NA |
| Aislante | PR |
| Temperatura ambiente | 30 °C |
| THDI de rango 3 en el neutro | 33 % |
| Ib | 2 A |
| Limitación de dimensionamiento | Iz |
| Información de dimensionamiento | Fase de dimensionamiento<br>Dimensionada con Ir |
| **Factores de corrección** | |
| Factor de temperatura | 1 |
| Cuadro de referencia normativa | B-52-14 |
| Factor de resistividad térmica del | 1 |
| Referencia de tabla estándar | B-52-16 |
| Factor de neutro cargado | 1 |
| Cuadro de referencia normativa | E-52-1 |
| Factor de agrupamiento | 1 |
| Cuadro de referencia normativa | B-52-20 |
| Usuario factor de corrección | 1 |
| Factor global | 1 |

| Fase seleccionada | |
|---|---|
| Sección | 1x1,5 mm² |
| Ánima | Cobre |
| Iz | 26 A |
| Iz' | 26 A |
| **Neutro seleccionado** | |
| Sección | 1x1,5 mm² |
| Ánima | Cobre |
| Iz | 26 A |
| Iz' | 26 A |
| **PE seleccionado** | |
| Sección | 1x1,5 mm² |
| Ánima | Cobre |

| Corrientes de cortocircuito | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Ik3max | Ik2max | Ik1max | Ik2min | Ik1min | Iefmin | Ief2min | Iefmax |
| **Modo de explotación Normal** | | | | | | | | |
| (kA) | NA | NA | 0,48 | NA | 0,33 | 0,30 | NA | 0,35 |
| **Resumen para todos los modos de explotación** | | | | | | | | |
| (kA) | NA | NA | 0,48 | NA | 0,33 | 0,30 | NA | 0,35 |

Resultados de cálculo en base al informe técnico Cenelec TR50480.Hipótesis y selección de la aparamenta bajo la responsabilidad del usuario.

| Carga | EA 3 |
|---|---|
| U | 400 V |
| S | 0,543 kVA |
| P | 0,5 kW |
| I | 2,35 A |
| cos□ | 0,92 |
| Ku (Normal) | 1 |
| Número de circuitos | 1 |
| Polaridad | F+N |
| Fase(s) de alimentación | L1-N |
| Tipo de luminarias | Módulo LED con piloto electrónico |
| Cantidad de luminarias | 1 |
| Cantidad de lámparas/ luminarias | 10 |
| Potencia lámpara | 50 W |
| Potencia del balasto | NA W |
| Ia (corriente de alumbrado) | 2,35 A |
| Generador de armónicos | No |
| THDI de rango 3 generado | 33 % |
| | NA |

Sensibilidad a sobretensión

| Corrientes de empleo | IL1 | IL2 | IL3 | IN |
|---|---|---|---|---|
| **Modo de explotación Normal** | | | | |
| (A) | 2,353 | 0,000 | 0,000 | 2,35 |

| Resumen para todos los modos de explotación | | | | |
|---|---|---|---|---|
| (A) | 2,353 | NA | NA | 2,35 |

| Caídas de tensión | Acumuladas aguas arriba | Circuito |
|---|---|---|
| **Modo de operación Normal** | | |
| $\Delta U_{3L}$ (%) | 2,033 | 0,223 |
| $\Delta U_{L1L2}$ (%) | 2,086 | 0,000 |
| $\Delta U_{L2L3}$ (%) | 2,081 | 0,000 |
| $\Delta U_{L3L1}$ (%) | 2,086 | 0,000 |
| $\Delta U_{L1N}$ (%) | 2,256 | 0,445 |
| $\Delta U_{L2N}$ (%) | 1,802 | 0,000 |
| $\Delta U_{L3N}$ (%) | 1,802 | 0,000 |

| Resumen para todos los modos de explotación | |
|---|---|
| $\Delta U_{3L}$ (%) | 2,033 |
| $\Delta U_{L1L2}$ (%) | 2,086 |
| $\Delta U_{L2L3}$ (%) | 2,081 |
| $\Delta U_{L3L1}$ (%) | 2,086 |
| $\Delta U_{L1N}$ (%) | 2,256 |
| $\Delta U_{L2N}$ (%) | 1,802 |
| $\Delta U_{L3N}$ (%) | 1,802 |

### 3.3.2 CircuitoAl tanque

| Protección | QA 4 |
|---|---|
| Ib | 2,82 A |
| Distancia desde el origen | NA |
| Información de dimensionamiento | de tamaño por el sistema |
| Gama | Acti9 iC60 |
| Designación | iC60LMA |
| Circuito nominal del interruptor | 10 A |
| Poder de corte | 40 kA |
| TNS Un polo poder de corte | 20 kA |
| IT Uno de los polos Capacidad de ruptura | NA |
| Poder de corte reforzado | NA |
| Pole y protegido polo | 2P2d |
| Designación de la unidad de viaje | MA |
| Trip calificación unidad | 10 A |
| **Ajustes de retardo largos** | |
| Ir | NA |
| Tr | NA |
| **Ajustes de retardo cortos** | |
| corriente Isd | 120 A |
| Tsd | NA |
| **Disparo instantáneo** | |
| Corriente Ii | OFF |
| Corriente Ti | NA |

| Resultados selectividad<br>Previo | Límite de selectividad |
|---|---|
| **Modo Operativo Normal** | |
| QA 0<br>NG125N<br>C<br>50 A / 4P4d | Sin selectividad |

| Cable | WD 4 |
|---|---|
| **Parámetros** | |
| Longitud | 25 m |
| Longitud máxima | 56 m |
| Modo de colocación según tabla 52-3 de la IEC 60364-5-52 (2001) y tabla 52-B2 de la UNE 20460-5-523 (2004) | 31<br>E<br>Cables multiconductores en bandejas perforadas colocadas horizontalmente |
| Tipo de cable | Multiconductor |
| Cdad de circuitos juntos suplementarios | NA |
| Aislante | PR |
| Temperatura ambiente | 30 °C |
| THDI de rango 3 en el neutro | 33 % |
| Ib | 3 A |
| Limitación de dimensionamiento | Iz |
| Información de dimensionamiento | Fase de dimensionamiento<br>Dimensionada con Ir |
| **Factores de corrección** | |
| Factor de temperatura | 1 |
| Cuadro de referencia normativa | B-52-14 |
| Factor de resistividad térmica del | 1 |
| Referencia de tabla estándar | B-52-16 |
| Factor de neutro cargado | 1 |
| Cuadro de referencia normativa | E-52-1 |
| Factor de agrupamiento | 1 |
| Cuadro de referencia normativa | B-52-20 |
| Usuario factor de corrección | 1 |
| Factor global | 1 |

| **Fase seleccionada** | |
|---|---|
| Sección | 1x1,5 mm² |
| Ánima | Cobre |
| Iz | 26 A |
| Iz' | 26 A |
| **Neutro seleccionado** | |
| Sección | 1x1,5 mm² |
| Ánima | Cobre |
| Iz | 26 A |
| Iz' | 26 A |
| **PE seleccionado** | |
| Sección | 1x1,5 mm² |
| Ánima | Cobre |

| Corrientes de cortocircuito | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Ik3max | Ik2max | Ik1max | Ik2min | Ik1min | Iefmin | Ief2min | Iefmax |
| **Modo de explotación Normal** | | | | | | | | |
| (kA) | NA | NA | 0,33 | NA | 0,22 | 0,21 | NA | 0,24 |
| **Resumen para todos los modos de explotación** | | | | | | | | |
| (kA) | NA | NA | 0,33 | NA | 0,22 | 0,21 | NA | 0,24 |

Resultados de cálculo en base al informe técnico Cenelec TR50480.Hipótesis y selección de la aparamenta bajo la responsabilidad del usuario.

| Carga | EA 4 |
|---|---|
| U | 400 V |
| S | 0,652 kVA |
| P | 0,6 kW |
| I | 2,82 A |
| cos□ | 0,92 |
| Ku (Normal) | 1 |
| Número de circuitos | 1 |
| Polaridad | F+N |
| Fase(s) de alimentación | L1-N |
| Tipo de luminarias | Módulo LED con piloto electrónico |
| Cantidad de luminarias | 1 |
| Cantidad de lámparas/ luminarias | 4 |
| Potencia lámpara | 150 W |
| Potencia del balasto | NA W |
| Ia (corriente de alumbrado) | 2,82 A |
| Generador de armónicos | No |
| THDI de rango 3 generado | 33 % |
| | NA |

Sensibilidad a sobretensión

| Corrientes de empleo | IL1 | IL2 | IL3 | IN |
|---|---|---|---|---|
| **Modo de explotación Normal** | | | | |
| (A) | 2,824 | 0,000 | 0,000 | 2,82 |

| Resumen para todos los modos de explotación | | | | |
|---|---|---|---|---|
| (A) | 2,824 | NA | NA | 2,82 |

| Caídas de tensión | Acumuladas aguas arriba | Circuito |
|---|---|---|
| **Modo de operación Normal** | | |
| $\Delta U_{3L}$ (%) | 2,256 | 0,445 |
| $\Delta U_{L1L2}$ (%) | 2,086 | 0,000 |
| $\Delta U_{L2L3}$ (%) | 2,081 | 0,000 |
| $\Delta U_{L3L1}$ (%) | 2,086 | 0,000 |
| $\Delta U_{L1N}$ (%) | 2,701 | 0,890 |
| $\Delta U_{L2N}$ (%) | 1,802 | 0,000 |
| $\Delta U_{L3N}$ (%) | 1,802 | 0,000 |

| Resumen para todos los modos de explotación | |
|---|---|
| $\Delta U_{3L}$ (%) | 2,256 |
| $\Delta U_{L1L2}$ (%) | 2,086 |
| $\Delta U_{L2L3}$ (%) | 2,081 |
| $\Delta U_{L3L1}$ (%) | 2,086 |
| $\Delta U_{L1N}$ (%) | 2,701 |
| $\Delta U_{L2N}$ (%) | 1,802 |
| $\Delta U_{L3N}$ (%) | 1,802 |

## 3.4 Circuitos de carga de las tomas de corriente

### 3.4.1 CircuitoTC 32

| Protección | QA 5 |
|---|---|
| Ib | 32 A |
| Distancia desde el origen | NA |
| Información de dimensionamiento | de tamaño por el sistema |
| Gama | Acti9 iC40 |
| Designación | iC40 |
| Circuito nominal del interruptor | 32 A |
| Poder de corte | 6 kA |
| TNS Un polo poder de corte | NaN kA |
| IT Uno de los polos Capacidad de ruptura | NA |
| Poder de corte reforzado | NA |
| Pole y protegido polo | 4P3d |
| Designación de la unidad de viaje | C |
| Trip calificación unidad | 32 A |
| **Ajustes de retardo largos** | |
| Ir | 32 A |
| Tr | NA |
| **Ajustes de retardo cortos** | |
| corriente Isd | 240 A |
| Tsd | NA |
| **Disparo instantáneo** | |
| Corriente Ii | OFF |
| Corriente Ti | NA |

| Resultados selectividad<br>Previo | Límite de selectividad |
|---|---|
| **Modo Operativo Normal** | |
| QA 0<br>NG125N<br>C<br>50 A / 4P4d | 95 A |

| Designación RCD | Vigi iC40 |
|---|---|
| Clase | A |
| I∆n | 30 mA |
| Tiempo de la rotura | 0,04 s |
| ∆t | NA s |
| Selectividad | NA |

| Resultados selectividad<br>Previo | Límite de selectividad |
|---|---|
| **Modo Operativo Normal** | |
| NA | Selectividad no calculada |

| Cable | WD 5 |
|---|---|
| **Parámetros** | |
| Longitud | 15 m |
| Longitud máxima | 17 m |
| Modo de colocación según tabla 52-3 de la IEC 60364-5-52 (2001) y tabla 52-B2 de la UNE 20460-5-523 (2004) | 31<br>E<br>Cables multiconductores en bandejas perforadas colocadas horizontalmente |
| Tipo de cable | Multiconductor |
| Cdad de circuitos juntos suplementarios | NA |
| Aislante | PR |
| Temperatura ambiente | 30 °C |
| THDI de rango 3 en el neutro | NA % |
| Ib | 32 A |
| Limitación de dimensionamiento | Iz |
| Información de dimensionamiento | Dimensionada con Ir |
| **Factores de corrección** | |
| Factor de temperatura | 1 |
| Cuadro de referencia normativa | B-52-14 |
| Factor de resistividad térmica del | 1 |
| Referencia de tabla estándar | B-52-16 |
| Factor de neutro cargado | 1 |
| Cuadro de referencia normativa | E-52-1 |
| Factor de agrupamiento | 1 |
| Cuadro de referencia normativa | B-52-20 |
| Usuario factor de corrección | 1 |
| Factor global | 1 |

| **Fase seleccionada** | |
|---|---|
| Sección | 1x2,5 mm² |
| Ánima | Cobre |
| Iz | 32 A |
| Iz' | 32 A |
| **Neutro seleccionado** | |
| Sección | 1x2,5 mm² |
| Ánima | Cobre |
| Iz | 32 A |
| Iz' | 32 A |
| **PE seleccionado** | |
| Sección | 1x2,5 mm² |
| Ánima | Cobre |

| Corrientes de cortocircuito | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Ik3max | Ik2max | Ik1max | Ik2min | Ik1min | Iefmin | Ief2min | Iefmax |
| **Modo de explotación Normal** | | | | | | | | |
| (kA) | 1,32 | 1,15 | 0,67 | 0,78 | 0,46 | 0,40 | NA | 0,46 |
| **Resumen para todos los modos de explotación** | | | | | | | | |
| (kA) | 1,32 | 1,15 | 0,67 | 0,78 | 0,46 | 0,40 | NA | 0,46 |

Resultados de cálculo en base al informe técnico Cenelec TR50480.Hipótesis y selección de la aparamenta bajo la responsabilidad del usuario.

| Carga | AA 5 |
|---|---|
| U | 400 V |
| S | 22,2 kVA |
| P | 18,8 kW |
| I | 32 A |
| cosφ | 0,85 |
| Polaridad | 3F+ N |
| Fase(s) de alimentación | |
| Número de circuitos | 2 |
| Ku (Normal) | 0,25 |
| Generador de armónicos | No |
| THDI3 | NA |
| Sensibilidad a sobretensión | NA |

| Corrientes de empleo | | | | |
|---|---|---|---|---|
| | IL1 | IL2 | IL3 | IN |
| **Modo de explotación Normal** | | | | |
| (A) | 32,000 | 32,000 | 32,000 | 0 |
| **Resumen para todos los modos de explotación** | | | | |
| (A) | 32,000 | 32,000 | 32,000 | NA |

| Caídas de tensión | Acumuladas aguas arriba | Circuito |
|---|---|---|
| **Modo de operación Normal** | | |
| $\Delta U_{3L}$ (%) | 3,493 | 1,683 |
| $\Delta U_{L1L2}$ (%) | 4,029 | 1,943 |
| $\Delta U_{L2L3}$ (%) | 4,025 | 1,943 |
| $\Delta U_{L3L1}$ (%) | 4,029 | 1,943 |
| $\Delta U_{L1N}$ (%) | 3,493 | 1,683 |
| $\Delta U_{L2N}$ (%) | 3,485 | 1,683 |
| $\Delta U_{L3N}$ (%) | 3,485 | 1,683 |
| **Resumen para todos los modos de explotación** | | |
| $\Delta U_{3L}$ (%) | 3,493 | |
| $\Delta U_{L1L2}$ (%) | 4,029 | |
| $\Delta U_{L2L3}$ (%) | 4,025 | |
| $\Delta U_{L3L1}$ (%) | 4,029 | |
| $\Delta U_{L1N}$ (%) | 3,493 | |
| $\Delta U_{L2N}$ (%) | 3,485 | |
| $\Delta U_{L3N}$ (%) | 3,485 | |

### 3.4.2 CircuitoTC 16

| Protección | QA 6 |
|---|---|
| Ib | 16 A |
| Distancia desde el origen | NA |
| Información de dimensionamiento | de tamaño por el sistema |
| Gama | Acti9 iC60 |
| Designación | iC60N |
| Circuito nominal del interruptor | 16 A |
| Poder de corte | 10 kA |
| TNS Un polo poder de corte | 3 kA |
| IT Uno de los polos Capacidad de ruptura | NA |
| Poder de corte reforzado | NA |
| Pole y protegido polo | 2P2d |
| Designación de la unidad de viaje | C |
| Trip calificación unidad | 16 A |
| **Ajustes de retardo largos** | |
| Ir | 16 A |
| Tr | NA |
| **Ajustes de retardo cortos** | |
| corriente Isd | 128 A |
| Tsd | NA |
| **Disparo instantáneo** | |
| Corriente Ii | OFF |
| Corriente Ti | NA |

| Resultados selectividad<br>Previo | Límite de selectividad |
|---|---|
| **Modo Operativo Normal** | |
| QA 0<br>NG125N<br>C<br>50 A / 4P4d | 770 A |

| Designación RCD | Vigi iC60 |
|---|---|
| Clase | A |
| I∆n | 30 mA |
| Tiempo de la rotura | 0,03 s |
| ∆t | NA s |
| Selectividad | NA |

| Resultados selectividad<br>Previo | Límite de selectividad |
|---|---|
| **Modo Operativo Normal** | |
| NA | Selectividad no calculada |

| Cable | WD 6 |
|---|---|
| **Parámetros** | |
| Longitud | 15 m |
| Longitud máxima | 18 m |
| Modo de colocación según tabla 52-3 de la IEC 60364-5-52 (2001) y tabla 52-B2 de la UNE 20460-5-523 (2004) | 31<br>E<br>Cables multiconductores en bandejas perforadas colocadas horizontalmente |
| Tipo de cable | Multiconductor |
| Cdad de circuitos juntos suplementarios | NA |
| Aislante | PR |
| Temperatura ambiente | 30 °C |
| THDI de rango 3 en el neutro | NA % |
| Ib | 16 A |
| Limitación de dimensionamiento | Iz |
| Información de dimensionamiento | Dimensionada con Ir |
| **Factores de corrección** | |
| Factor de temperatura | 1 |
| Cuadro de referencia normativa | B-52-14 |
| Factor de resistividad térmica del | 1 |
| Referencia de tabla estándar | B-52-16 |
| Factor de neutro cargado | 1 |
| Cuadro de referencia normativa | E-52-1 |
| Factor de agrupamiento | 1 |
| Cuadro de referencia normativa | B-52-20 |
| Usuario factor de corrección | 1 |
| Factor global | 1 |

| Fase seleccionada | |
|---|---|
| Sección | 1x1,5 mm² |
| Ánima | Cobre |
| Iz | 26 A |
| Iz' | 26 A |
| **PE seleccionado** | |
| Sección | 1x1,5 mm² |
| Ánima | Cobre |

| Corrientes de cortocircuito | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Ik3max | Ik2max | Ik1max | Ik2min | Ik1min | Iefmin | Ief2min | Iefmax |
| **Modo de explotación Normal** | | | | | | | | |
| (kA) | NA | 0,83 | NA | 0,56 | NA | 0,30 | NA | 0,35 |
| **Resumen para todos los modos de explotación** | | | | | | | | |
| (kA) | NA | 0,83 | NA | 0,56 | NA | 0,30 | NA | 0,35 |

Resultados de cálculo en base al informe técnico Cenelec TR50480.Hipótesis y selección de la aparamenta bajo la responsabilidad del usuario.

| Carga | AA 6 |
|---|---|
| U | 400 V |
| S | 6,4 kVA |
| P | 5,44 kW |
| I | 16 A |
| cosφ | 0,85 |
| Polaridad | 2F |
| Fase(s) de alimentación | L2-L3 |
| Número de circuitos | 2 |
| Ku (Normal) | 0,25 |
| Generador de armónicos | No |
| THDI3 | NA |
| Sensibilidad a sobretensión | NA |

| Corrientes de empleo | IL1 | IL2 | IL3 | IN |
|---|---|---|---|---|
| **Modo de explotación Normal** | | | | |
| (A) | 0,000 | 16,000 | 16,000 | 0 |

| Resumen para todos los modos de explotación | | | | |
|---|---|---|---|---|
| (A) | NA | 16,000 | 16,000 | NA |

| Caídas de tensión | Acumuladas aguas arriba | Circuito |
|---|---|---|
| **Modo de operación Normal** | | |
| $\Delta U_{3L}$ (%) | 3,210 | 1,400 |
| $\Delta U_{L1L2}$ (%) | 2,086 | 0,000 |
| $\Delta U_{L2L3}$ (%) | 3,697 | 1,616 |
| $\Delta U_{L3L1}$ (%) | 2,086 | 0,000 |
| $\Delta U_{L1N}$ (%) | 1,810 | 0,000 |
| $\Delta U_{L2N}$ (%) | 1,802 | 0,000 |
| $\Delta U_{L3N}$ (%) | 1,802 | 0,000 |

| Resumen para todos los modos de explotación | |
|---|---|
| $\Delta U_{3L}$ (%) | 3,210 |
| $\Delta U_{L1L2}$ (%) | 2,086 |
| $\Delta U_{L2L3}$ (%) | 3,697 |
| $\Delta U_{L3L1}$ (%) | 2,086 |
| $\Delta U_{L1N}$ (%) | 1,810 |
| $\Delta U_{L2N}$ (%) | 1,802 |
| $\Delta U_{L3N}$ (%) | 1,802 |

### 3.4.3 CircuitoTC Shucko

| Protección | QA 7 |
|---|---|
| Ib | 16 A |
| Distancia desde el origen | NA |
| Información de dimensionamiento | de tamaño por el sistema |
| Gama | Acti9 iC60 |
| Designación | iC60N |
| Circuito nominal del interruptor | 16 A |
| Poder de corte | 10 kA |
| TNS Un polo poder de corte | 3 kA |
| IT Uno de los polos Capacidad de ruptura | NA |
| Poder de corte reforzado | NA |
| Pole y protegido polo | 2P2d |
| Designación de la unidad de viaje | C |
| Trip calificación unidad | 16 A |
| **Ajustes de retardo largos** | |
| Ir | 16 A |
| Tr | NA |
| **Ajustes de retardo cortos** | |
| corriente Isd | 128 A |
| Tsd | NA |
| **Disparo instantáneo** | |
| Corriente Ii | OFF |
| Corriente Ti | NA |

| Resultados selectividad<br>Previo | Límite de selectividad |
|---|---|
| **Modo Operativo Normal** | |
| QA 0<br>NG125N<br>C<br>50 A / 4P4d | 770 A |

| Designación RCD | Vigi iC60 |
|---|---|
| Clase | A |
| I∆n | 30 mA |
| Tiempo de la rotura | 0,03 s |
| ∆t | NA s |
| Selectividad | NA |

| Resultados selectividad<br>Previo | Límite de selectividad |
|---|---|
| **Modo Operativo Normal** | |
| NA | Selectividad no calculada |

| Cable | WD 7 |
|---|---|
| **Parámetros** | |
| Longitud | 15 m |
| Longitud máxima | 18 m |
| Modo de colocación según tabla 52-3 de la IEC 60364-5-52 (2001) y tabla 52-B2 de la UNE 20460-5-523 (2004) | 31<br>E<br>Cables multiconductores en bandejas perforadas colocadas horizontalmente |
| Tipo de cable | Multiconductor |
| Cdad de circuitos juntos suplementarios | NA |
| Aislante | PR |
| Temperatura ambiente | 30 °C |
| THDI de rango 3 en el neutro | NA % |
| Ib | 16 A |
| Limitación de dimensionamiento | Iz |
| Información de dimensionamiento | Dimensionada con Ir |
| **Factores de corrección** | |
| Factor de temperatura | 1 |
| Cuadro de referencia normativa | B-52-14 |
| Factor de resistividad térmica del | 1 |
| Referencia de tabla estándar | B-52-16 |
| Factor de neutro cargado | 1 |
| Cuadro de referencia normativa | E-52-1 |
| Factor de agrupamiento | 1 |
| Cuadro de referencia normativa | B-52-20 |
| Usuario factor de corrección | 1 |
| Factor global | 1 |

| **Fase seleccionada** | |
|---|---|
| Sección | 1x1,5 mm² |
| Ánima | Cobre |
| Iz | 26 A |
| Iz' | 26 A |
| **PE seleccionado** | |
| Sección | 1x1,5 mm² |
| Ánima | Cobre |

| Corrientes de cortocircuito | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Ik3max | Ik2max | Ik1max | Ik2min | Ik1min | Iefmin | Ief2min | Iefmax |
| **Modo de explotación Normal** | | | | | | | | |
| (kA) | NA | 0,83 | NA | 0,56 | NA | 0,30 | NA | 0,35 |
| **Resumen para todos los modos de explotación** | | | | | | | | |
| (kA) | NA | 0,83 | NA | 0,56 | NA | 0,30 | NA | 0,35 |

Resultados de cálculo en base al informe técnico Cenelec TR50480.Hipótesis y selección de la aparamenta bajo la responsabilidad del usuario.

| Carga | AA 7 |
|---|---|
| U | 400 V |
| S | 6,4 kVA |
| P | 5,44 kW |
| I | 16 A |
| cosφ | 0,85 |
| Polaridad | 2F |
| Fase(s) de alimentación | L1-L3 |
| Número de circuitos | 3 |
| Ku (Normal) | 0,16666 |
| Generador de armónicos | No |
| THDI3 | NA |
| Sensibilidad a sobretensión | NA |

| Corrientes de empleo | IL1 | IL2 | IL3 | IN |
|---|---|---|---|---|
| **Modo de explotación Normal** | | | | |
| (A) | 16,000 | 0,000 | 16,000 | 0 |
| **Resumen para todos los modos de explotación** | | | | |
| (A) | 16,000 | NA | 16,000 | NA |

| Caídas de tensión | Acumuladas aguas arriba | Circuito |
|---|---|---|
| **Modo de operación Normal** | | |
| $\Delta U_{3L}$ (%) | 3,210 | 1,400 |
| $\Delta U_{L1L2}$ (%) | 2,086 | 0,000 |
| $\Delta U_{L2L3}$ (%) | 2,081 | 0,000 |
| $\Delta U_{L3L1}$ (%) | 3,702 | 1,616 |
| $\Delta U_{L1N}$ (%) | 1,810 | 0,000 |
| $\Delta U_{L2N}$ (%) | 1,802 | 0,000 |
| $\Delta U_{L3N}$ (%) | 1,802 | 0,000 |

| Resumen para todos los modos de explotación | |
|---|---|
| $\Delta U_{3L}$ (%) | 3,210 |
| $\Delta U_{L1L2}$ (%) | 2,086 |
| $\Delta U_{L2L3}$ (%) | 2,081 |
| $\Delta U_{L3L1}$ (%) | 3,702 |
| $\Delta U_{L1N}$ (%) | 1,810 |
| $\Delta U_{L2N}$ (%) | 1,802 |
| $\Delta U_{L3N}$ (%) | 1,802 |

## 3.5 Conjunto del regulador de arranque

### 3.5.1 CircuitoReja

| Protección | QA 8 |
|---|---|
| Ib | NA |
| Distancia desde el origen | NA |
| Información de dimensionamiento | de tamaño por el sistema |
| Gama | Acti9 P25M |
| Designación | P25M |
| Circuito nominal del interruptor | 10 A |
| Poder de corte | 150 kA |
| TNS Un polo poder de corte | NaN kA |
| IT Uno de los polos Capacidad de ruptura | NA |
| Poder de corte reforzado | NA |
| Pole y protegido polo | 3P3d |
| Designación de la unidad de viaje | M |
| Trip calificación unidad | 10 A |
| **Ajustes de retardo largos** | |
| Ir | 6 A |
| Tr | NA |
| **Ajustes de retardo cortos** | |
| corriente Isd | 138 A |
| Tsd | NA |
| **Disparo instantáneo** | |
| Corriente Ii | OFF |
| Corriente Ti | NA |

| Resultados selectividad<br>Previo | Límite de selectividad |
|---|---|
| **Modo Operativo Normal** | |
| QA 0<br>NG125N<br>C<br>50 A / 4P4d | Sin selectividad |

| Contactor | LC1K06 |
|---|---|
| Designación | LC1K06 |
| Tipo de coordinación | T1 |

| Cable | WD 8 |
|---|---|
| **Parámetros** | |
| Longitud | 15 m |
| Longitud máxima | 101 m |
| Modo de colocación según tabla 52-3 de la IEC 60364-5-52 (2001) y tabla 52-B2 de la UNE 20460-5-523 (2004) | 31<br>E<br>Cables multiconductores en bandejas perforadas colocadas horizontalmente |
| Tipo de cable | Multiconductor |
| Cdad de circuitos juntos suplementarios | NA |
| Aislante | PR |
| Temperatura ambiente | 30 °C |
| THDI de rango 3 en el neutro | NA % |
| Ib | 4 A |
| Limitación de dimensionamiento | Iz |
| Información de dimensionamiento | Dimensionada con Ir |
| **Factores de corrección** | |
| Factor de temperatura | 1 |
| Cuadro de referencia normativa | B-52-14 |
| Factor de resistividad térmica del | 1 |
| Referencia de tabla estándar | B-52-16 |
| Factor de neutro cargado | 1 |
| Cuadro de referencia normativa | E-52-1 |
| Factor de agrupamiento | 1 |
| Cuadro de referencia normativa | B-52-20 |
| Usuario factor de corrección | 1 |
| Factor global | 1 |

| Fase seleccionada | |
|---|---|
| Sección | 1x1,5 mm² |
| Ánima | Cobre |
| Iz | 23 A |
| Iz' | 23 A |
| **PE seleccionado** | |
| Sección | 1x1,5 mm² |
| Ánima | Cobre |

| Corrientes de cortocircuito | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Ik3max | Ik2max | Ik1max | Ik2min | Ik1min | Iefmin | Ief2min | Iefmax |
| **Modo de explotación Normal** | | | | | | | | |
| (kA) | 0,96 | 0,83 | NA | 0,56 | NA | 0,30 | NA | 0,35 |
| **Resumen para todos los modos de explotación** | | | | | | | | |
| (kA) | 0,96 | 0,83 | NA | 0,56 | NA | 0,30 | NA | 0,35 |

Resultados de cálculo en base al informe técnico Cenelec TR50480.Hipótesis y selección de la aparamenta bajo la responsabilidad del usuario.

| Motor asíncrono LV | MA 8 |
|---|---|
| Tipo de inicio | Directo |
| U | 400 V |
| Potencía mecánica | 1,5 kW |
| Id/Ir | 6 |
| I''d/Ir | <=19 |
| Ir | 3,6 A |
| Sr | 1,87 kVA |
| Pr | 1,48 kW |
| cosφ | 0,8 |
| Polaridad | 3F |
| Número de circuito | 1 |
| Ku (mode Normal) | 1 |
| Generador de armónico | No |
| THDI3 | NA %<br>NA |

Sensibilidad a exceso de voltaje

| Corrientes de empleo | IL1 | IL2 | IL3 | IN |
|---|---|---|---|---|
| **Modo de explotación Normal** | | | | |
| (A) | 3,600 | 3,600 | 3,600 | 0 |

| Resumen para todos los modos de explotación | | | | |
|---|---|---|---|---|
| (A) | 3,600 | 3,600 | 3,600 | NA |

| Caídas de tensión | Acumuladas aguas arriba | Circuito |
|---|---|---|
| **Modo de explotación Normal** | | |
| $\Delta U_{3L}$ (%) | 2,107 | 0,297 |
| $\Delta U_{L1L2}$ (%) | 2,428 | 0,342 |
| $\Delta U_{L2L3}$ (%) | 2,424 | 0,342 |
| $\Delta U_{L3L1}$ (%) | 2,428 | 0,342 |
| $\Delta U_{L1N}$ (%) | 1,810 | 0,000 |
| $\Delta U_{L2N}$ (%) | 1,802 | 0,000 |
| $\Delta U_{L3N}$ (%) | 1,802 | 0,000 |

| Caídas de tensión | |
|---|---|
| $\Delta U_{StartUp}$ | 2,365 |

## 3.6 Circuitos del juego de barras

### 3.6.1 CircuitoWC 1

| Juego de barras | WC 1 | |
|---|---|---|
| **Parámetros** | | |
| Nombre del cuadro | UC 2 | |
| Gama del cuadro | Cualquiera | |
| Calibre | NA | |
| IP | Sin definir | |
| **Salidas** | | |
| Circuito | Protección | Tipo de protección |
| Al Caseta | QA 3 | iC60LMA |
| Al tanque | QA 4 | iC60LMA |
| TC 32 | QA 5 | iC40 |

| | | |
|---|---|---|
| TC 16 | QA 6 | iC60N |
| TC Shucko | QA 7 | iC60N |
| Reja | QA 8 | P25M |
| Control Limpieza | QA 9 | iC60LMA |
| RACK | QA 10 | iC60LMA |
| VENTILACIÓN | QA 10 (1) | iC60LMA |

| Corrientes de cortocircuito | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Ik3max | Ik2max | Ik1max | Ik2min | Ik1min | Iefmin | Ief2min | Iefmax |
| **Modo de explotación Normal** | | | | | | | | |
| (kA) | 2,98 | 2,58 | 1,56 | 1,82 | 1,09 | 0,82 | NA | 0,95 |
| **Resumen para todos los modos de explotación** | | | | | | | | |
| (kA) | 2,98 | 2,58 | 1,56 | 1,82 | 1,09 | 0,82 | NA | 0,95 |

Resultados de cálculo en base al informe técnico Cenelec TR50480.Hipótesis y selección de la aparamenta bajo la responsabilidad del usuario.

## *AVISO*

**PELIGRO A TENER UN INFORME DE PROYECTO INCORRECTO.**

• Configure el software correctamente para obtener informes precisos y / o resultados de datos.
• No confíe únicamente en mensajes de software e informes para determinar si el sistema está funcionando correctamente.
• Asegúrese de haber ingresado las entradas correctas para los componentes requeridos.
• Revise los resultados calculados y las soluciones proporcionadas por el software antes de enviar el informe.

**El incumplimiento de estas instrucciones puede dar como resultado una lista de materiales incorrecta y la pérdida de negocios.**

## 13.6. ANEJO 6. SOLICITUD DE ENERGÍA ELÉCTRICA PARA SUMINISTRO

En el siguiente documento se recogen la solicitud de suministro de energía eléctrica realizada en la compañía i-DE IBERDROLA para dotar de energía eléctrica de Baja Tensión al tanque de tormentas Norte.

Remite: Apartado de Correos 180 – 48008 Bilbao

JUNTA DE COMPENSACION UE VII-1 SIST. GRA
CAMINO DE LA ZARZUELA, 15, Bajo

28023 MADRID

| | |
|---|---|
| Referencia: | 9041004615 |
| Fecha: | 07.03.2022 |
| Asunto: | Solicitud de suministro de energía para bombas de achique |
| Potencia Solicitada: | 5 kW. |
| Situación: | C/ FORMENTERA, 1-99 LAS ROZAS DE MADRID - MADRID |
| CUPS: | ES0021000042186858DW |

Muy Sres. nuestros:

En relación con el asunto de referencia, les indicamos a continuación las condiciones técnico-económicas en que será atendida su solicitud.

El suministro se efectuará a la tensión de 3X400/230 V. y las infraestructuras eléctricas de red de distribución necesarias serán realizadas por esta empresa distribuidora.

Las instalaciones de enlace serán realizadas por su Instalador Electricista, según las "Normas Particulares para Instalaciones de Enlace" de esta empresa distribuidora y/o las aprobadas por la Administración correspondiente.

El importe a abonar por ustedes correspondiente a los Derechos de Extensión **, según el RD 1048/2013, asciende a 105,11 €(Pr.C.E x Pot.Solicitada + IVA), según precios vigentes.

Precio Cuota de Extensión (Pr.C.E): 17,374714 €/kW

El abono de estos Derechos de Extensión será realizado según las formas de pago indicada en el Anexo adjunto.

Asimismo le será facturado a su comercializadora a la firma del contrato de acceso a la red según precios vigentes en su momento y que, a fecha de hoy, son los siguientes:

| | |
|---|---|
| Cuota de Acceso: | 19,703137 € por kW de potencia contratada, más IVA |
| Derechos de Enganche: | 9,04476 €, más IVA |

El plazo de validez de esta propuesta es de 3 meses a partir de la fecha de este escrito. Transcurrido dicho plazo o modificadas las características de su solicitud, las presentes condiciones no serán válidas, debiendo realizar una nueva solicitud.

Para continuar con la tramitación de su solicitud, deberán remitir documento de conformidad y aceptación debidamente firmado por la misma vía que realizó su solicitud o acceder a nuestro canal GEA de gestiones de solicitud de acceso y conexión, habilitado para tal efecto https://www.i-de.es/geafr/#/, incorporándolo al expediente.

En cualquier caso, informamos que las instalaciones de extensión no podrán ser finalizadas en tanto no se hayan realizado sus instalaciones de enlace (Caja General de Protección), por lo que **agradeceremos nos informen de la conclusión de las mismas** y nos faciliten la Hoja de Instalaciones de Enlace, que obra en poder de su Instalador, así como el Certificado de Instalación Eléctrica.

La contratación del suministro se llevará a cabo a través de una empresa comercializadora, a quien deberán comunicar el Código Universal del Punto de Suministro (CUPS) indicado en el encabezado.

En la confianza de dar adecuada respuesta a su solicitud, aprovechamos la ocasión para saludarles muy atentamente.

José Miguel Melgar
Jefe Distribución Madrid Sur y Oeste

HETIR4

I-DE REDES ELÉCTRICAS INTELIGENTES, S.A.U. con sede social en Avenida San Adrián, 48 - 48003 BILBAO. Inscrita en el Registro Mercantil de Vizcaya al Tomo 3863, Libro 0, Folio 179, Sección 8, Hoja BI-27057, Inscripción 1ª - CIF A-95075578

**Para cualquier consulta o asesoramiento puede dirigirse a nuestro teléfono 900171171 o a la dirección electrónica contacto@i-de.es**
**Página web: www.i-de.es**

**** detalle en www.i-de.es**

TRATAMIENTOS PERSONALES

Los datos personales recogidos en su solicitud serán tratados por I-DE REDES ELÉCTRICAS INTELIGENTES, S.A.U. con la finalidad de gestionar la misma, siendo las bases legales del tratamiento, el interés legítimo de I-DE REDES ELECTRICAS INTELIGENTES, S.A.U. en su tramitación, su obligación legal de atenderla y, en su caso, la relación contractual que se formalice como consecuencia de ella. El titular de los datos y/o su representante legal tienen derecho a acceder a sus datos personales objeto de tratamiento, así como solicitar la rectificación de los datos inexactos o, en su caso, solicitar su supresión cuando los datos ya no sean necesarios para los fines que fueron recogidos, además de ejercer el derecho de oposición y limitación al tratamiento y de portabilidad de los datos. Podrán ejercer dichos derechos enviando un escrito a la Oficina Puntos Suministros, Apartado de Correos nº 61147, 28080 Madrid, adjuntando copia de su DNI o Pasaporte o mediante correo electrónico al Delegado de Protección de Datos en la dirección electrónica atencionderechos@i-de.es. En el caso de que no fueran atendidos sus derechos pueden presentar una reclamación ante la Agencia Española de Protección de Datos. Sus datos personales no serán comunicados a ningún tercero ajeno a I-DE REDES ELECTRICAS INTELIGENTES, S.A.U. , salvo que los mismos le sean requeridos por imperativo legal y serán conservados durante la tramitación de su solicitud, la vigencia de la relación contractual que se formalice, en su caso, como consecuencia de la misma y el plazo necesario para cumplir con las obligaciones legales de custodia de la información. Asimismo, sus datos se podrán mantener debidamente bloqueados durante el tiempo que sea exigido por la normativa aplicable.

I-DE REDES ELÉCTRICAS INTELIGENTES, S.A.U. con sede social en Avenida San Adrián, 48 - 48003 BILBAO. Inscrita en el Registro Mercantil de Vizcaya al Tomo 3863, Libro 0, Folio 179, Sección 8, Hoja BI-27057, Inscripción 1ª - CIF A-95075578

Remite: Apartado de Correos 180 – 48008 Bilbao

JUNTA DE COMPENSACION UE VII-1 SIST. GRA
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| Situación: | C/ FORMENTERA, 1-99 LAS ROZAS DE MADRID - MADRID |
| CUPS: | ES0021000042186858DW |

Muy Sres. nuestros:

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Precio Cuota de Extensión (Pr.C.E): 17,374714 €/kW

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El plazo de validez de esta propuesta es de 3 meses a partir de la fecha de este escrito. Transcurrido dicho plazo o modificadas las características de su solicitud, las presentes condiciones no serán válidas, debiendo realizar una nueva solicitud.

Para continuar con la tramitación de su solicitud, deberán remitir documento de conformidad y aceptación debidamente firmado por la misma vía que realizó su solicitud o acceder a nuestro canal GEA de gestiones de solicitud de acceso y conexión, habilitado para tal efecto https://www.i-de.es/geafr/#/, incorporándolo al expediente.

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En la confianza de dar adecuada respuesta a su solicitud, aprovechamos la ocasión para saludarles muy atentamente.

**ACEPTACIÓN: Nombre:** _____

**Firma:** _____ **Fecha:** _____

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TRATAMIENTOS PERSONALES

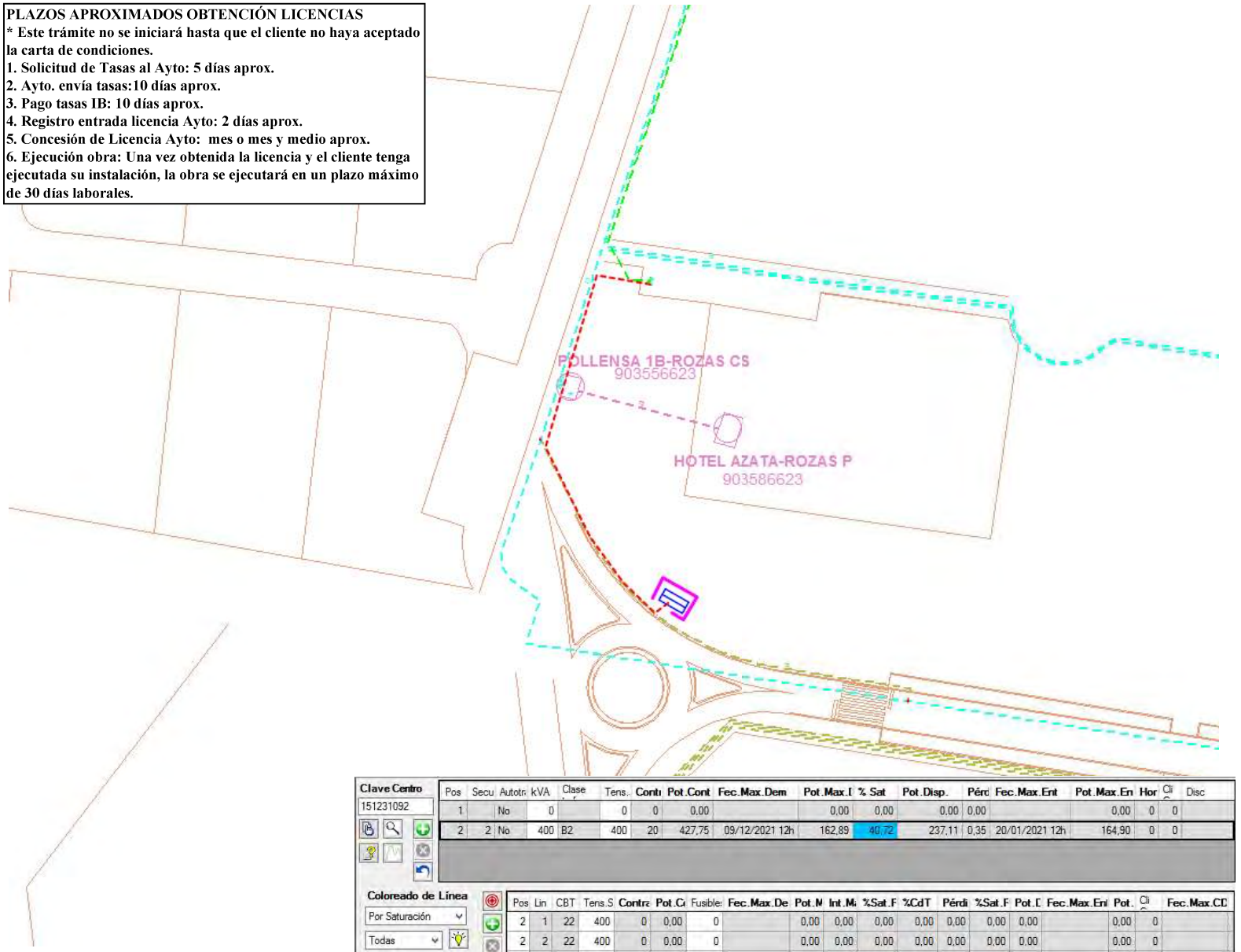
Los datos personales recogidos en su solicitud serán tratados por I-DE REDES ELÉCTRICAS INTELIGENTES, S.A.U. con la finalidad de gestionar la misma, siendo las bases legales del tratamiento, el interés legítimo de I-DE REDES ELECTRICAS INTELIGENTES, S.A.U. en su tramitación, su obligación legal de atenderla y, en su caso, la relación contractual que se formalice como consecuencia de ella. El titular de los datos y/o su representante legal tienen derecho a acceder a sus datos personales objeto de tratamiento, así como solicitar la rectificación de los datos inexactos o, en su caso, solicitar su supresión cuando los datos ya no sean necesarios para los fines que fueron recogidos, además de ejercer el derecho de oposición y limitación al tratamiento y de portabilidad de los datos. Podrán ejercer dichos derechos enviando un escrito a la Oficina Puntos Suministros, Apartado de Correos nº 61147, 28080 Madrid, adjuntando copia de su DNI o Pasaporte o mediante correo electrónico al Delegado de Protección de Datos en la dirección electrónica atencionderechos@i-de.es. En el caso de qué no fueran atendidos sus derechos pueden presentar una reclamación ante la Agencia Española de Protección de Datos. Sus datos personales no serán comunicados a ningún tercero ajeno a I-DE REDES ELECTRICAS INTELIGENTES, S.A.U. , salvo que los mismos le sean requeridos por imperativo legal y serán conservados durante la tramitación de su solicitud, la vigencia de la relación contractual que se formalice, en su caso, como consecuencia de la misma y el plazo necesario para cumplir con las obligaciones legales de custodia de la información. Asimismo, sus datos se podrán mantener debidamente bloqueados durante el tiempo que sea exigido por la normativa aplicable.

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**PLAZOS APROXIMADOS OBTENCIÓN LICENCIAS**

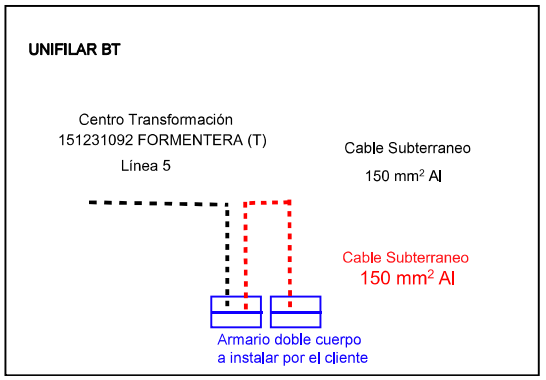
*** Este trámite no se iniciará hasta que el cliente no haya aceptado la carta de condiciones.**

**1. Solicitud de Tasas al Ayto: 5 días aprox.**
**2. Ayto. envía tasas:10 días aprox.**
**3. Pago tasas IB: 10 días aprox.**
**4. Registro entrada licencia Ayto: 2 días aprox.**
**5. Concesión de Licencia Ayto: mes o mes y medio aprox.**
**6. Ejecución obra: Una vez obtenida la licencia y el cliente tenga ejecutada su instalación, la obra se ejecutará en un plazo máximo de 30 días laborales.**




ESCALA 1: 250

ENTRONQUE EN LSBT + EXTENSION EN LSBT




INSTALACIONES EXISTENTES
INSTALACIONES PROYECTADAS

OBRA A REALIZAR

ARMARIO (a realizar por el solicitante)

- Instalar nuevo armario de doble cuerpo a 40 cm del suelo con dos tubos de 160 mm hacia la acera.
- Realizar puesta a tierra del neutro(pica + Cu 50 mm2 aislado DN-RA 0,6/1kV), del armario instalado.
- Dejar instalados fusibles necesarios en el módulo de seccionamiento y de medida.

BAREMO (a realizar por i-DE)

- Solicitud de permisos necesarios para la realización de la obra.
- Apertura y cierre de canalización con dos tubos de 160 mm en acera.
- Tender nueva LSBT con cable XZ1 0.6/1 kV 3x150 + 1x95 mm2 Al.
- Instalar terminales.
- Conectar nueva LSBT a nuevo armario doble cuerpo.
- Conectar nueva LSBT a armario existente.

**OBSERVACIONES:**

- Para realizar consultas sobre el avance del expediente, se deben dirigir al módulo "Conversaciones" habilitado en GEA. Para entregar la documentación utilizar el módulo "Documentación".
- Subir fotos a GEA con todos los trabajos realizados por parte del cliente, previo a la conexión a la red de I-DE.
- Subir fotos a GEA una vez instalados, con las dos puertas abiertas que se vean los tubos, los fusibles instalados y la derivación individual, posterior a la conexión a la red de I-DE.

Clave Centro: 151231092

| Pos | Secu | Autotr | kVA | Clase | Tens. | Contr | Pot.Cont | Fec.Max.Dem | Pot.Max.D | % Sat | Pot.Disp. | Pérd | Fec.Max.Ent | Pot.Max.En | Hor | Cli | Disc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | No | 0 | | 0 | 0 | 0,00 | | 0,00 | 0,00 | 0,00 | 0,00 | | 0,00 | 0 | 0 | |
| 2 | 2 | No | 400 | B2 | 400 | 20 | 427,75 | 09/12/2021 12h | 162,89 | 40,72 | 237,11 | 0,35 | 20/01/2021 12h | 164,90 | 0 | 0 | |

Coloreado de Línea: Por Saturación; Todas; Visualizar todas las líneas del CT

| Pos | Lin | CBT | Tens.S | Contra | Pot.C | Fusible | Fec.Max.De | Pot.M | Int.M | %Sat.F | %CdT | Pérdi | %Sat.F | Pot.D | Fec.Max.En | Pot. | Cli | Fec.Max.CD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 1 | 22 | 400 | 0 | 0,00 | 0 | | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | | 0,00 | 0 | |
| 2 | 2 | 22 | 400 | 0 | 0,00 | 0 | | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | | 0,00 | 0 | |
| 2 | 3 | 22 | 400 | 0 | 0,00 | 0 | | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | | 0,00 | 0 | |
| 2 | 5 | 21 | 400 | 1 | 55,00 | 400 | 23/03/2021... | 8,61 | 12,56 | 3,14 | 0,05 | 0,00 | 2,21 | 265... | | 0,00 | 0 | 23/03/202... |

## LEYENDA

- CENTRO DE TRANSFORMACION i-DE
- CENTRO DE TRANSFORMACION DE CLIENTE
- CANALIZACION SUBTERRANEA EXISTENTE
- CANALIZACION SUBTERRANEA PROYECTADA
- ARQUETA EXISTENTE
- ARQUETA PROYECTADA
- TUBO LIBRE
- TUBO OCUPADO MT
- TUBO OCUPADO BT
- LINEA AEREA BAJA TENSION EXISTENTE
- LINEA AEREA BAJA TENSION A DESMONTAR
- LINEA SUBTERRANEA BAJA TENSION EXISTENTE
- LINEA SUBTERRANEA BAJA TENSION A DESMONTAR
- LINEA BAJA TENSION SUBT. PROYECTADA
- LINEA BAJA TENSION AEREA PROYECTADA
- CAJA DE PROTECCION O CPM EXISTENTE
- CAJA DE PROTECCION O CPM PROYECTADA
- APOYO MADERA EXISTENTE
- APOYO HORMIGON EXISTENTE
- APOYO CHAPA EXISTENTE
- APOYO CELOSIA EXISTENTE
- APOYO HORMIGON PROYECTADO
- APOYO CHAPA PROYECTADO
- APOYO CELOSIA PROYECTADO

| Fecha | 07/03/22 | Preparado | E863980 |
|---|---|---|---|

PLANO 9041004615

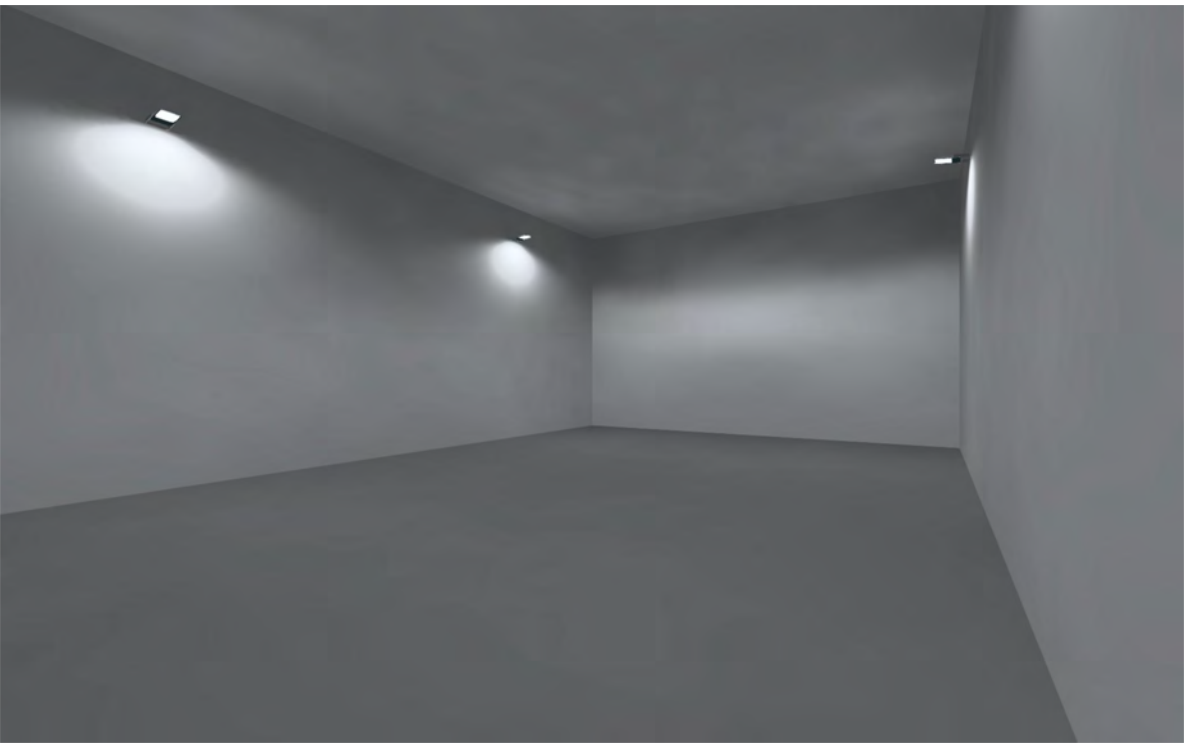
S. SUMINISTRO DE ENERGÍA PARA BOMBA DE ACHIQUE 5.000 W I

CALLE FORMENTERA 1 99, LAS ROZAS DE MADRID, MADRID

i-DE Grupo IBERDROLA

## 13.7. ANEJO 7. CÁLCULOS LUMINOTÉCNICOS DE LAS INSTALACIONES

En el siguiente documento se recogen los cálculos luminotécnicos y diseño de la instalación de luz artificial en el interior del tanque de tormentas, así como los resultados obtenidos.



# Depósito norte

Created with DIALux

# Preface

Notes on planning:

The energy consumption quantities do not take into account light scenes and their dimming levels.

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Site 1 - Building 1

## Storey 1

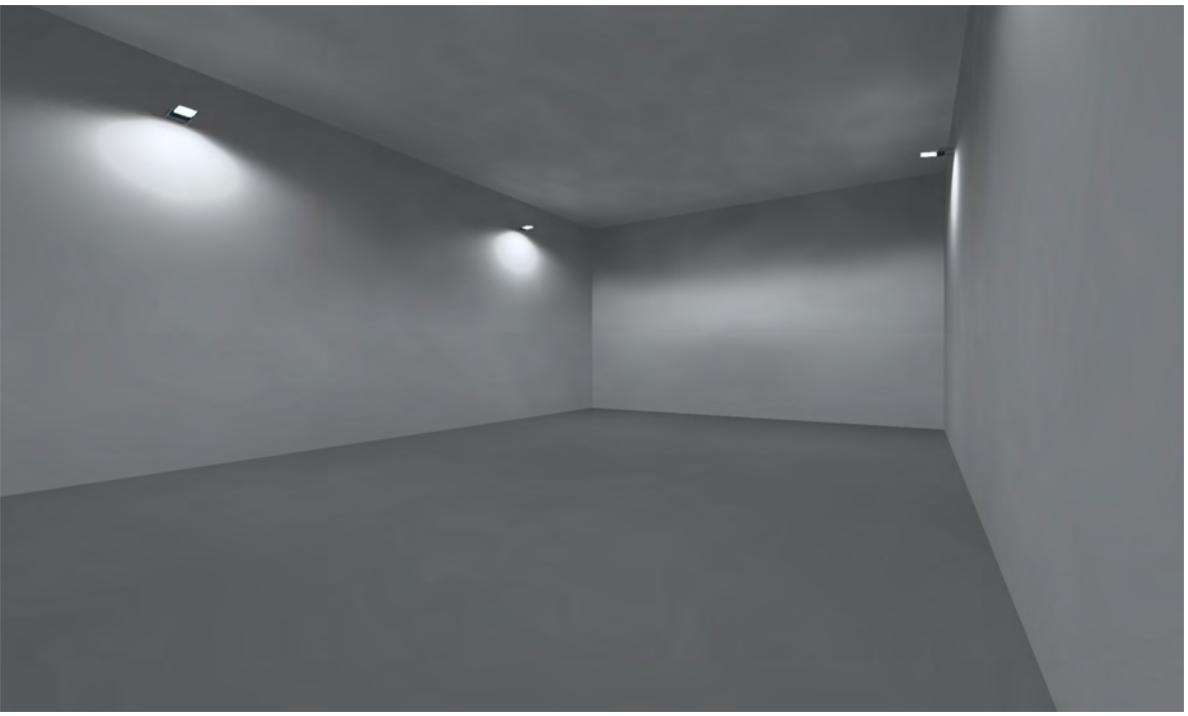
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Site 1 - Building 1 - Storey 1

## Depósito norte

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## Description

DIALux

# Luminaire list

| $\Phi_{total}$ | $P_{total}$ | Luminous efficacy |
|---|---|---|
| 80000 lm | 520.0 W | 153.8 lm/W |

| pcs. | Manufacturer | Article No. | Article name | P | Φ | Luminous efficacy |
|---|---|---|---|---|---|---|
| 4 | SITECO | 5XA7571F 2K23 | SiCompact® 31 mini | 130.0 W | 20000 lm | 153.8 lm/W |

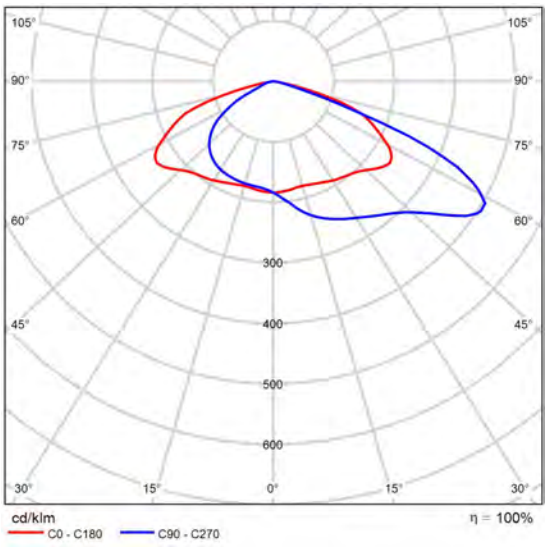
DIALux

# Product data sheet

## SITECO - SiCompact® 31 mini



| | |
|---|---|
| Article No. | 5XA7571F2K23 |
| P | 130.0 W |
| $\Phi_{Lamp}$ | 20000 lm |
| $\Phi_{Luminaire}$ | 20000 lm |
| η | 100.00 % |
| Luminous efficacy | 153.8 lm/W |
| CCT | 4000 K |
| CRI | 70 |




Polar LDC

5XA7571F2K23

SiCompact® 31 mini, floodlight, primary light control with lens, of plastic, of toughened safety glass, transparent, light distribution: PL32, light emission: direct distribution, primary light characteristic: asymmetric, installation type: surface-mounted, LED, High Power LED, rated luminous flux: 20.000lm, luminous efficacy: 154lm/W, light colour: 740, colour temperature: 4000K, control gear: ECG, with cable, 3x 1.5mm$^2$, mains connection: 220..240V, AC, 50/60Hz, connection cable pre-assembled, cable length: 2m, rated input power: 130W, of diecast aluminium, specular, metallic grey (RAL 9006), length: 461mm, width: 261mm, height: 62mm, bracket, of sheet steel, coated, metallic grey (RAL 9006), ON/OFF, protection rating (complete): IP66, insulation class (complete): insulation class I (protective earthing), certification: CE, impact resistance: IK08, permissible operating ambient temperature: -40..+45°C, packaging unit: 1 piece

Light Distribution: PL32

Test report number: 59297

Building 1

# Luminaire list

| $\Phi_{total}$ | $P_{total}$ | Luminous efficacy |
|---|---|---|
| 80000 lm | 520.0 W | 153.8 lm/W |

| pcs. | Manufacturer | Article No. | Article name | P | Φ | Luminous efficacy |
|---|---|---|---|---|---|---|
| 4 | SITECO | 5XA7571F 2K23 | SiCompact® 31 mini | 130.0 W | 20000 lm | 153.8 lm/W |

Building 1 · Storey 1 (Light scene 1)

## Room list



Building 1 · Storey 1 (Light scene 1)

# Room list

## Depósito norte

| $P_{total}$ | $A_{Room}$ | Lighting power density | $\bar{E}_{perpendicular\ (Working\ plane)}$ |
|---|---|---|---|
| 520.0 W | 140.60 m² | 3.70 W/m² = 1.37 W/m²/100 lx (Room) | 270 lx |

| pcs. | Manufacturer | Article No. | Article name | P | $\Phi_{Luminaire}$ |
|---|---|---|---|---|---|
| 4 | SITECO | 5XA7571F 2K23 | SiCompact® 31 mini | 130.0 W | 20000 lm |

Building 1 · Storey 1

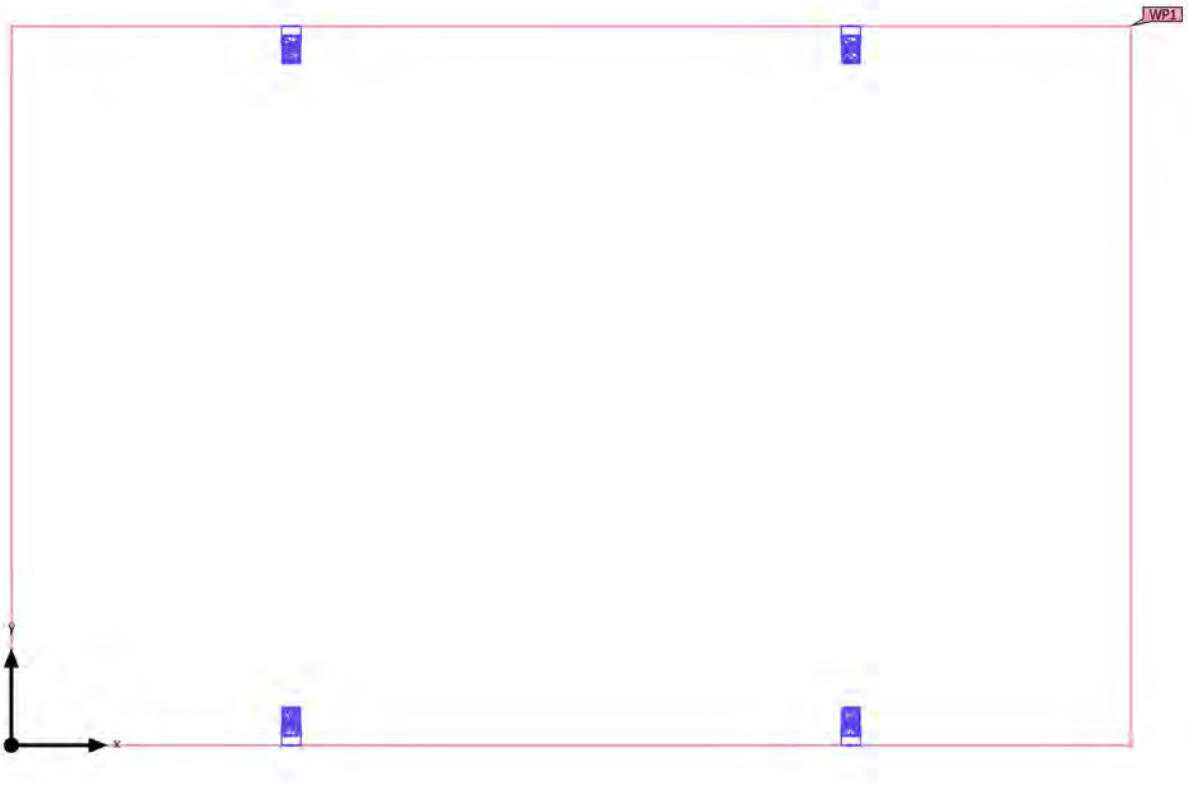
# Luminaire list

| $\Phi_{total}$ | $P_{total}$ | Luminous efficacy |
|---|---|---|
| 80000 lm | 520.0 W | 153.8 lm/W |

| pcs. | Manufacturer | Article No. | Article name | P | Φ | Luminous efficacy |
|---|---|---|---|---|---|---|
| 4 | SITECO | 5XA7571F 2K23 | SiCompact® 31 mini | 130.0 W | 20000 lm | 153.8 lm/W |

Building 1 · Storey 1 (Light scene 1)

## Calculation objects



Building 1 · Storey 1 (Light scene 1)

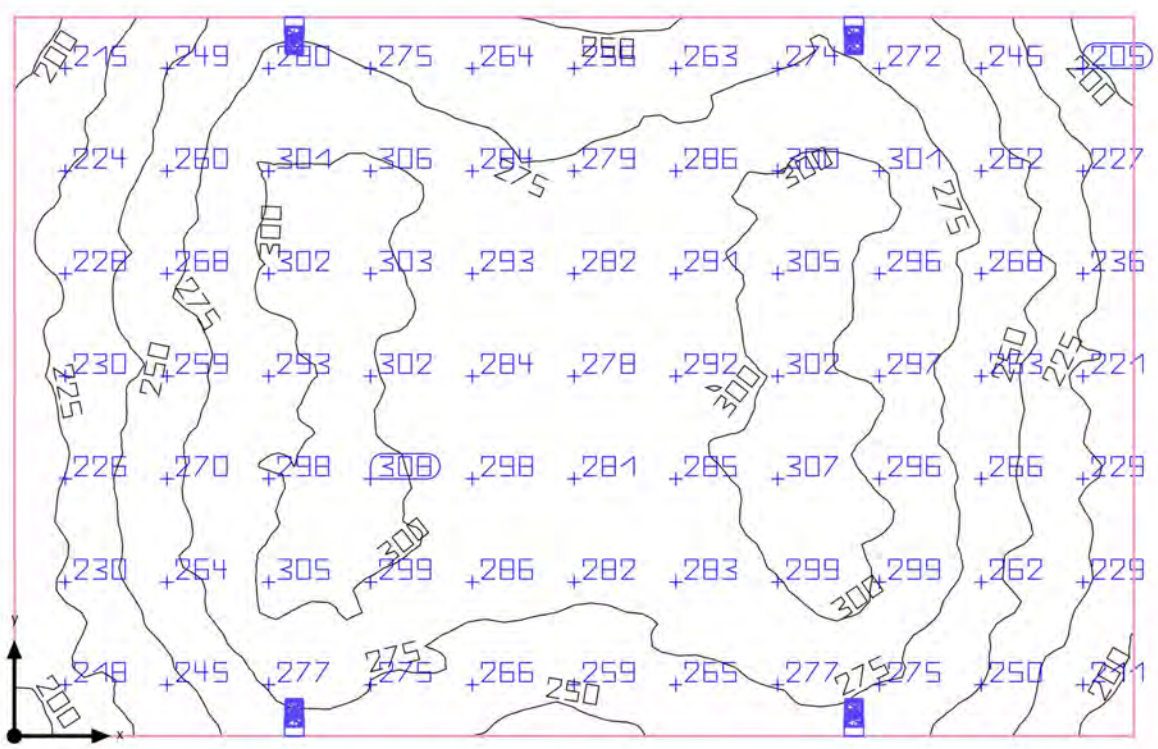
# Calculation objects

## Working planes

| Properties | $\bar{E}$ (Target) | $E_{min}$ | $E_{max}$ | $U_o$ ($g_1$) (Target) | $g_2$ | Index |
|---|---|---|---|---|---|---|
| Working plane (Depósito norte)<br>Perpendicular illuminance (adaptive)<br>Height: 0.000 m, Wall zone: 0.000 m | 270 lx<br>(≥ 500 lx)<br>✗ | 182 lx | 315 lx | 0.67<br>(≥ 0.60)<br>✓ | 0.58 | WP1 |

Building 1 · Storey 1 · Depósito norte (Light scene 1)

## Summary




| | | | |
|---|---|---|---|
| Ground area | 140.60 m² | Clearance height | 5.850 m |
| Reflection factors | Ceiling: 70.0 %,<br>Walls: 50.0 %,<br>Floor: 20.0 % | Mounting height | 5.000 m |
| | | Height Working plane | 0.000 m |
| Maintenance factor | 0.80 (fixed) | Wall zone Working plane | 0.000 m |

Building 1 · Storey 1 · Depósito norte (Light scene 1)

# Summary

## Results

| | Symbol | Calculated | Target | Check | Index |
|---|---|---|---|---|---|
| Working plane | $\bar{E}_{perpendicular}$ | 270 lx | ≥ 500 lx | ✗ | WP1 |
| | $U_o$ ($g_1$) | 0.67 | ≥ 0.60 | ✓ | WP1 |
| Energy estimation(2) | Consumption | 1430 kWh/a | max. 4950 kWh/a | ✓ | |
| Room | Lighting power density | 3.70 W/m² | – | | |
| | | 1.37 W/m²/100 lx | – | | |

(1) Based on a rectangular space of 14.800 m x 9.500 m and SHR of 0.25.
(2) Calculated using DIN:18599-4.

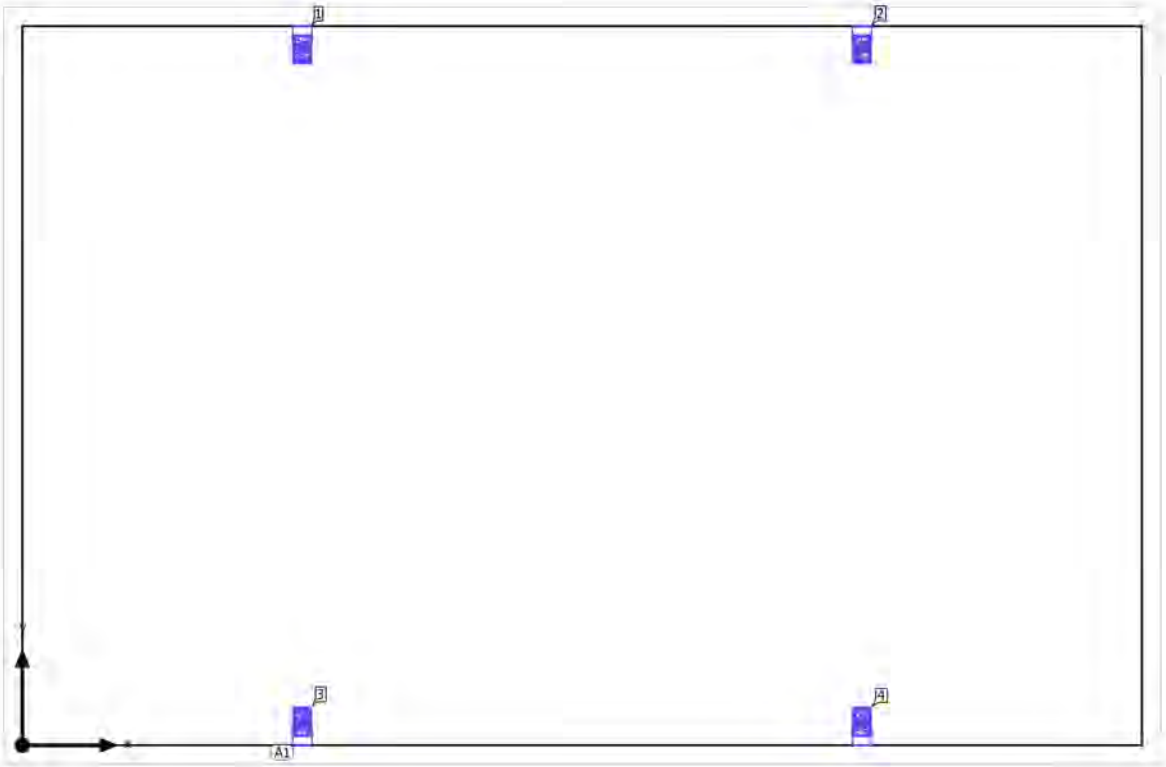
Utilisation profile: DIALux presetting (5.26.2 Standard (office))

## Luminaire list

| pcs. | Manufacturer | Article No. | Article name | $R_{UG}$ | P | Φ | Luminous efficacy |
|---|---|---|---|---|---|---|---|
| 4 | SITECO | 5XA7571F 2K23 | SiCompact® 31 mini | – | 130.0 W | 20000 lm | 153.8 lm/W |

Building 1 · Storey 1 · Depósito norte

## Luminaire layout plan

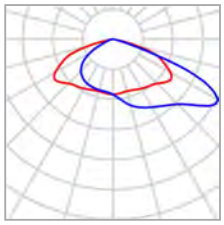


Building 1 · Storey 1 · Depósito norte

# Luminaire layout plan





| | | | |
|---|---|---|---|
| Manufacturer | SITECO | P | 130.0 W |
| Article No. | 5XA7571F2K23 | $\Phi_{Luminaire}$ | 20000 lm |
| Article name | SiCompact® 31 mini | | |
| Fitting | 1x LED | | |

## 4 x SITECO SiCompact® 31 mini

| Type | Field Arrangement |
|---|---|
| 1st luminaire (X/Y/Z) | 3.700 m / 0.000 m / 5.000 m |
| X-direction | 2 pcs., Centre - centre, 7.400 m |
| Y-direction | 2 pcs., Outer edge - outer edge, 8.997 m |
| Arrangement | A1 |

| X | Y | Mounting height | Luminaire |
|---|---|---|---|
| 3.700 m | 9.500 m | 5.000 m | 1 |
| 11.100 m | 9.500 m | 5.000 m | 2 |
| 3.700 m | 0.000 m | 5.000 m | 3 |
| 11.100 m | 0.000 m | 5.000 m | 4 |

Building 1 · Storey 1 · Depósito norte

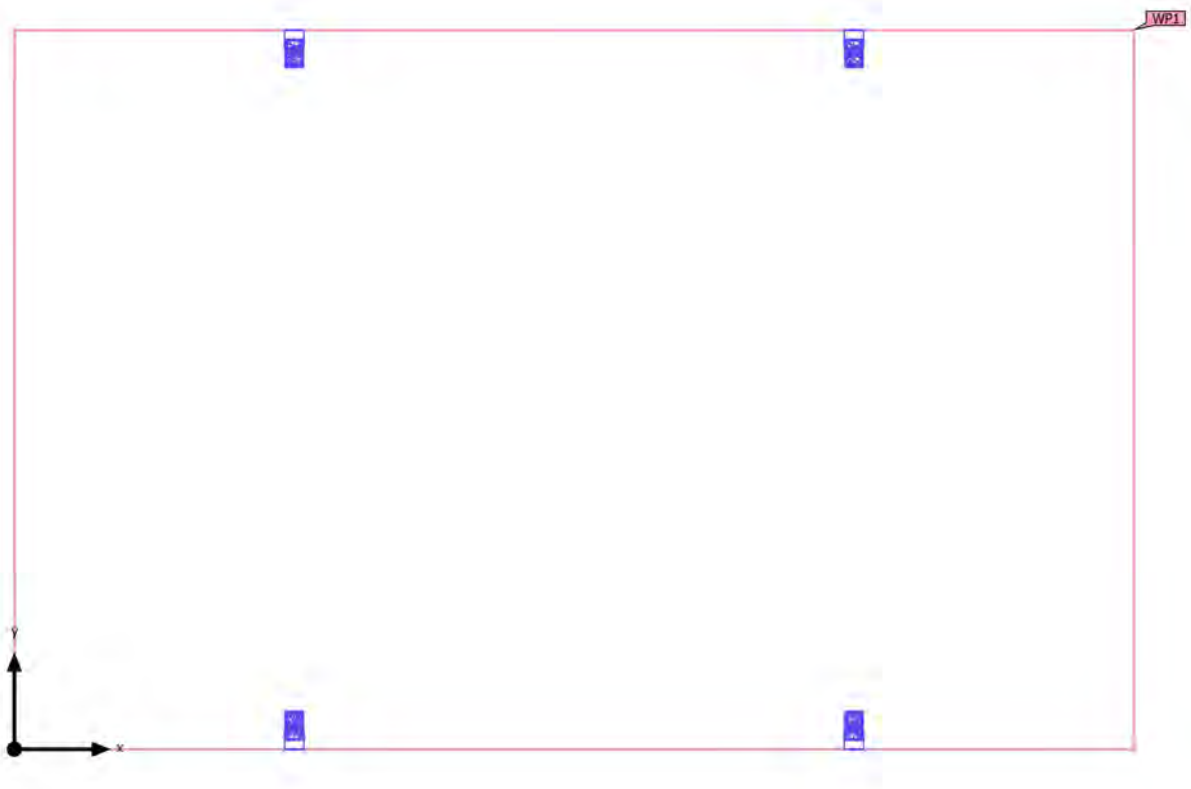
# Luminaire list

| $\Phi_{total}$ | $P_{total}$ | Luminous efficacy |
|---|---|---|
| 80000 lm | 520.0 W | 153.8 lm/W |

| pcs. | Manufacturer | Article No. | Article name | P | Φ | Luminous efficacy |
|---|---|---|---|---|---|---|
| 4 | SITECO | 5XA7571F 2K23 | SiCompact® 31 mini | 130.0 W | 20000 lm | 153.8 lm/W |

Building 1 · Storey 1 · Depósito norte (Light scene 1)

## Calculation objects



Building 1 · Storey 1 · Depósito norte (Light scene 1)

# Calculation objects

## Working planes

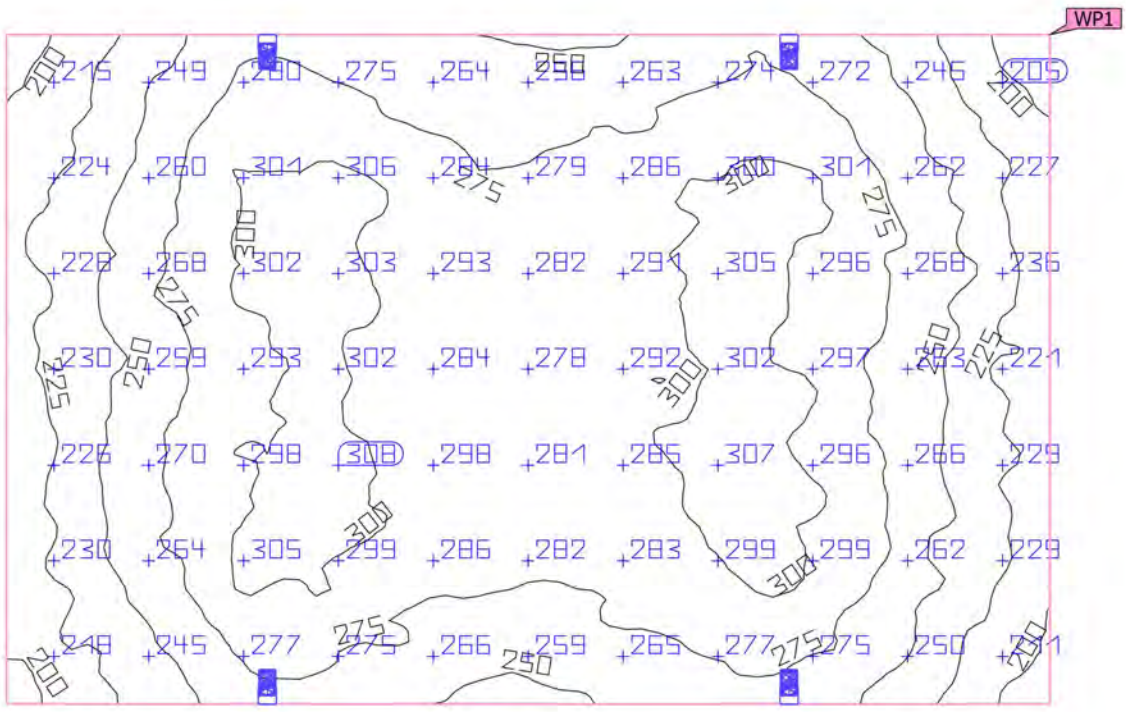
| Properties | $\bar{E}$ (Target) | $E_{min}$ | $E_{max}$ | $U_o$ ($g_1$) (Target) | $g_2$ | Index |
|---|---|---|---|---|---|---|
| Working plane (Depósito norte)<br>Perpendicular illuminance (adaptive)<br>Height: 0.000 m, Wall zone: 0.000 m | 270 lx<br>(≥ 500 lx)<br>✗ | 182 lx | 315 lx | 0.67<br>(≥ 0.60)<br>✓ | 0.58 | WP1 |

Utilisation profile: DIALux presetting (5.26.2 Standard (office))

Building 1 · Storey 1 · Depósito norte (Light scene 1)

## Working plane (Depósito norte)






| Properties | Ē (Target) | $E_{min}$ | $E_{max}$ | $U_o$ ($g_1$) (Target) | $g_2$ | Index |
|---|---|---|---|---|---|---|
| Working plane (Depósito norte)<br>Perpendicular illuminance (adaptive)<br>Height: 0.000 m, Wall zone: 0.000 m | 270 lx<br>(≥ 500 lx)<br>✗ | 182 lx | 315 lx | 0.67<br>(≥ 0.60)<br>✓ | 0.58 | WP1 |

Utilisation profile: DIALux presetting (5.26.2 Standard (office))

# Glossary

## A

| | |
|---|---|
| A | Formula symbol for a surface in the geometry |

## B

| | |
|---|---|
| Background area | The background area borders the direct ambient area according to DIN EN 12464-1 and reaches up to the borders of the room. In larger rooms, the background area is at least 3 m wide. It is located horizontally at floor level. |

## C

| | |
|---|---|
| CCT | (Engl. correlated colour temperature)<br>Body temperature of a thermal radiator which serves to describe its light colour. Unit: Kelvin [K]. The lesser the numerical value the redder; the greater the numerical value the bluer the light colour. The colour temperature of gas-discharge lamps and semi-conductors are termed "correlated colour temperature" in contrast to the colour temperature of thermal radiators.<br><br>Allocation of the light colours to the colour temperature ranges acc. to EN 12464-1:<br><br>Light colour - colour temperature [K]<br>warm white (ww) < 3,300 K<br>neutral white (nw) ≥ 3,300 – 5,300 K<br>daylight white (dw) > 5,300 K |
| Clearance height | The designation for the distance between upper edge of the floor and bottom edge of the ceiling (in the completely furnished status of room). |
| Control group | A group of luminaires that are dimmed and controlled together. For each lighting scene, a control group provides its own dimming value. All luminaires within a control group share this dimming value. The control groups with their luminaires are automatically determined by DIALux on the basis of the created light scenes and their luminaire groups. |
| CRI | (Engl. colour rendering index)<br>Designation for the colour rendering index of a luminaire or a lamp acc. to DIN 6169: 1976 or CIE 13.3: 1995.<br><br>The general colour rendering index Ra (or CRI) is a dimensionless figure that describes the quality of a white light source in regards to its similarity with the remission spectra of defined 8 test colours (see DIN 6169 or CIE 1974) to a reference light source. |

# Glossary

## D

| | |
|---|---|
| Daylight autonomy | Describes what percentage of the daily working time the required illuminance is met by daylight. The nominal illuminance is used from the room profile, unlike described in EN 17037. The calculation is not done in the centre of the room but at the placed sensor measuring point. A room is considered sufficiently supplied with daylight if it achieves at least 50% daylight autonomy. |
| Daylight factor | Ratio of the illuminance achieved solely by daylight incidence at a point in the inside to the horizontal illuminance in the outer area under an unobstructed sky.<br><br>Formula symbol: D (Engl. daylight factor)<br>Unit: % |
| Daylight quotient effective area | A calculation surface within which the daylight quotient is calculated. |

## E

| | |
|---|---|
| Energy evaluation | Based on an hourly calculation procedure for daylight in indoor spaces, considering the project geometry and any existing daylight control systems. Orientation and location of the project are also considered. The calculation uses the specified system power of the luminaires to determine the energy demand. A linear relationship between power and luminous flux in the dimmed state is assumed for daylight-controlled luminaires. Times of use and nominal illuminance are determined from the usage profiles of the spaces. Switched-on luminaires that are explicitly excluded from control also consider the specified times-of-use. The daylight control systems use a simplified control logic that closes them at an outdoor horizontal illuminance of 27,500lx.<br><br>The calendar year 2022 is used as a reference only. It is not a simulation of this year. The reference year is only used to assign the days of the week to the calculated results. The changeover to summer time is not considered. The reference sky type used is the average sky described in CIE 110 without direct sunlight.<br><br>The method was developed together with the Fraunhofer Institute for Building Physics and is available for review by the Joint Working Group 1 ISO TC 274 as an extension of the previous annual regression-based method. |
| Eta (η) | (light output ratio)<br>The light output ratio describes what percentage of the luminous flux of a free radiating lamp (or LED module) is emitted by the luminaire when installed.<br><br>Unit: % |

# Glossary

## G

| | |
|---|---|
| $g_1$ | Often also $U_o$ (Engl. overall uniformity)<br>Designates the overall uniformity of the illuminance on a surface. It is the quotient from $E_{min}$ to $\bar{E}$ and is required, for instance, in standards for illumination of workstations. |
| $g_2$ | Actually it designates the "non-uniformity" of the illuminance on a surface. It is the quotient of $E_{min}$ to $E_{max}$ and is generally only relevant for certifying the emergency lighting acc. to EN 1838. |

## I

| | |
|---|---|
| Illuminance | Describes the ratio of the luminous flux that strikes a certain surface to the size of this surface ($lm/m^2 = lx$). The illuminance is not tied to an object surface. It can be determined anywhere in space (inside or outside). The illuminance is not a product feature because it is a recipient value. Luxometers are used for measuring.<br><br>Unit: Lux<br>Abbreviation: lx<br>Formula symbol: E |
| Illuminance, adaptive | For the determining of the middle adaptive illuminance on a surface, this is rastered "adaptively". In the area of large illuminance differences within the surface, the raster is subdivided finer; within lesser differences, a rougher classification is made. |
| Illuminance, horizontal | Illuminance that is calculated or measured on a horizontal (level) surface (this can be for example a table top or the floor). The horizontal illuminance is usually identified by the formula letter $E_h$. |
| Illuminance, perpendicular | Illuminance that is calculated or measured plumb-vertical to a surface. This needs to be taken into account for tilted surfaces. If the surface is horizontal or vertical, then there is no difference between the perpendicular and the horizontal or vertical illuminance. |
| Illuminance, vertical | Illuminance that is calculated or measured on a vertical surface (this can be for example the front of some shelves). The vertical illuminance is usually identified by the formula letter $E_v$. |

## L

| | |
|---|---|
| LENI | (Engl. lighting energy numeric indicator)<br>Lighting energy numeric indicator acc. to EN 15193<br><br>Unit: $kWh/(m^2 * a)$ |

# Glossary

| | |
|---|---|
| LLMF | (Engl. lamp lumen maintenance factor)/acc. to CIE 97: 2005<br>Lamp flux maintenance factor that takes the luminous flux reduction into account of a luminaire or an LED module in the course of the operating time. The lamp flux maintenance factor is specified as a decimal digit and can have a maximum value of 1 (no luminous flux reduction existing). |
| LMF | (Engl. luminaire maintenance factor)/acc. to CIE 97: 2005<br>Luminaire maintenance factor that takes the soiling into account of the luminaire in the course of the operating time. The luminaire maintenance factor is specified as a decimal digit and can have a maximum value of 1 (no soiling existing). |
| LSF | (Engl. lamp survival factor)/acc. to CIE 97: 2005<br>Lamp survival factor that takes the total failure into account of a luminaire in the course of the operating time. The lamp survival factor is specified as a decimal digit and can have a maximum value of 1 (no failures existing within the time concerned or prompt replacement after the failure). |
| Luminance | Dimension for the "brightness impression" that the human eye has of a surface. The surface itself can emit light thereby or light striking it can be reflected (emitter value). It is the only photometric value that the human eye can perceive.<br><br>Unit: Candela per square metre<br>Abbreviation: cd/m$^2$<br>Formula symbol: L |
| Luminous efficacy | Ratio of the emitted luminous flux Φ [lm] to the absorbed electrical power P [W] Unit: lm/W.<br><br>This ratio can be formed for the lamp or LED module (lamp or module light output), the lamp or module with control gear (system light output) and the complete luminaire (luminaire light output). |
| Luminous flux | Dimension for the total light output that is emitted from one light source in all directions. It is thus an "emitter value" that specifies the entire emitting output. The luminous flux of a light source can only be determined in a laboratory. A difference is made between the lamp or LED module luminous flux and the luminaire luminous flux.<br><br>Unit: Lumen<br>Abbreviation: lm<br>Formula symbol: Φ |
| Luminous intensity | Describes the intensity of the light in a certain direction (emitter value). The luminous intensity is a matter of the luminous flux Φ that is emitted in a certain spherical angle Ω. The radiation characteristics of a light source are presented graphically in a light distribution curve (LDC). The luminous intensity is an SI base unit.<br><br>Unit: Candela<br>Abbreviation: cd<br>Formula symbol: I |

# Glossary

## M

| | |
|---|---|
| Maintenance factor | See MF |
| MF | (Engl. maintenance factor)/acc. to CIE 97: 2005<br>Maintenance factor as decimal number between 0 and 1 that describes the ratio of the new value of a photometric planning parameter (e.g. of the illuminance) to a maintenance value after a certain time. The maintenance factor takes into account the soiling of luminaires and rooms as well as the luminous flux reduction and the failure of light sources.<br>The maintenance factor is taken into account either overall or determined in detail acc. to CIE 97: 2005 by the formula RMF x LMF x LLMF x LSF. |

## P

| | |
|---|---|
| P | (Engl. power)<br>Electric power consumption<br><br>Unit: watt<br>Abbreviation: W |

## R

| | |
|---|---|
| $R_{(UG)}$ max | Measure of the psychological glare in indoor spaces.<br>In addition to the luminance of luminaires, the level of the $R_{(UG)}$ value also depends on the observer position, the viewing direction and the ambient luminance. The calculation is made according to the table method, see CIE 117. Among other things, EN 12464-1:2021 specifies maximum permissible $R_{(UG)}$- values $R_{(UGL)}$ for various indoor workplaces. |
| Reflection factor | The reflection factor of a surface describes how much of the striking light is reflected back. The reflection factor is defined by the colour of the surface. |
| RMF | (Engl. room maintenance factor)/acc. to CIE 97: 2005<br>Room maintenance factor that takes the soiling into account of the space encompassing surfaces in the course of the operating time. The room maintenance factor is specified as a decimal digit and can have a maximum value of 1 (no soiling existing). |

## S

| | |
|---|---|
| Surrounding area | The ambient area directly borders the area of the visual task and should be planned with a width of at least 0.5 m according to DIN EN 12464-1. It is at the same height as the area of the visual task. |

# Glossary

## U

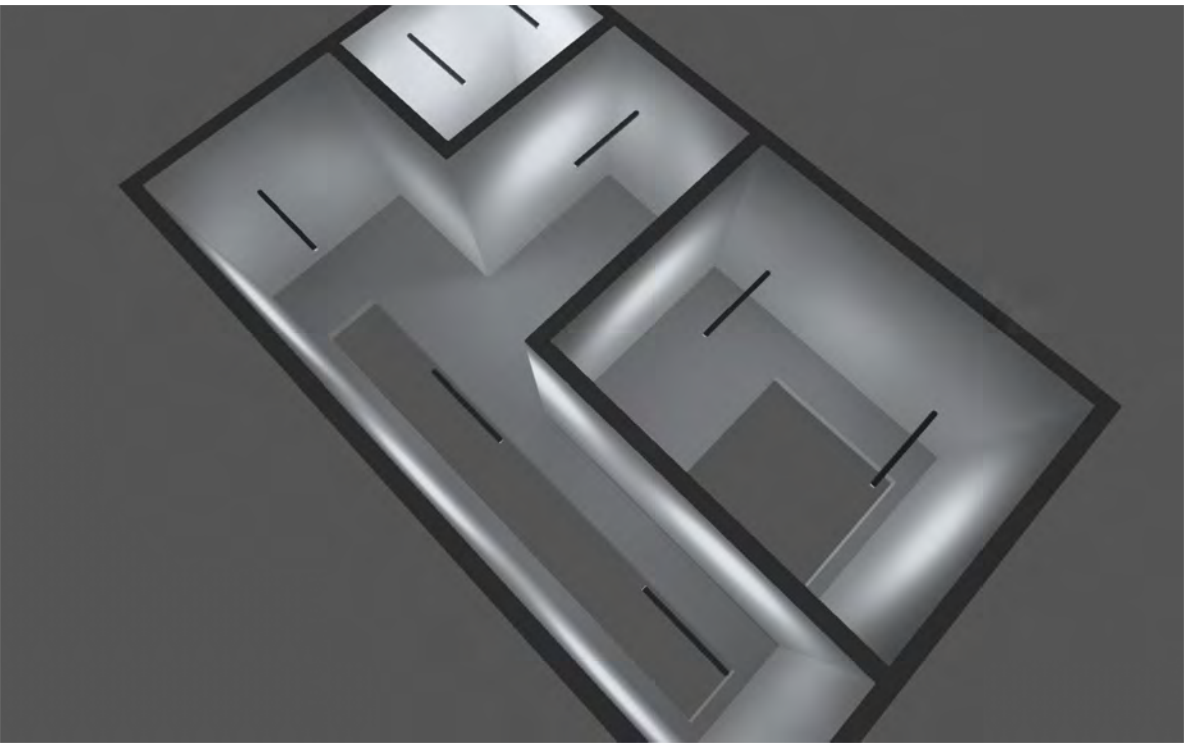
| | |
|---|---|
| UGR (max) | (unified glare rating)<br>Measure for the psychological glare effect in interiors.<br>In addition to luminaire luminance, the UGR value also depends on the position of the observer, the viewing direction and the ambient luminance. Among other things, EN 12464-1 specifies maximum permissible UGR values for various indoor workplaces. |
| UGR observer | Calculation point in the room, for the DIALux the UGR value is determined. The location and height of the calculation point should correspond to the typical observer position (position and eye level of the user). |

## V

| | |
|---|---|
| Visual task area | The area that is needed for carrying out the visual task in accordance with DIN EN 12464 -1. The height corresponds with the height at which the visual task is executed. |

## W

| | |
|---|---|
| Wall zone | Circumferential area between working plane and walls which is not taken into account for the calculation. |
| Working plane | Virtual measuring or calculation surface at the height of the visual task that generally follows the room geometry. The working plane may also feature a wall zone. |



# Project

Created with DIALux

DIALux

# Preface

Notes on planning:

The energy consumption quantities do not take into account light scenes and their dimming levels.

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Site 1 - Building 1 - Storey 1

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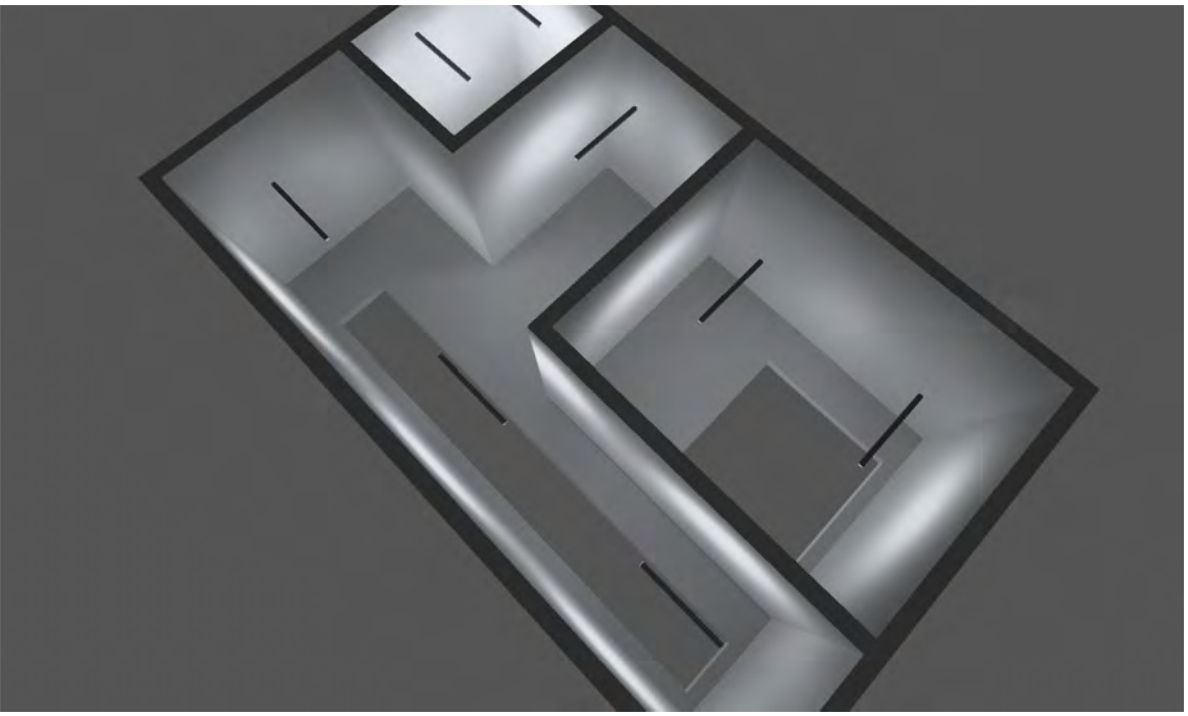
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## Description

DIALux

## Luminaire list

| $\Phi_{total}$ | $P_{total}$ | Luminous efficacy |
|---|---|---|
| 64000 lm | 432.0 W | 148.1 lm/W |

| pcs. | Manufacturer | Article No. | Article name | P | Φ | Luminous efficacy |
|---|---|---|---|---|---|---|
| 8 | Philips | | SM504T LED80S/840 DA35W | 54.0 W | 8000 lm | 148.2 lm/W |

DIALux

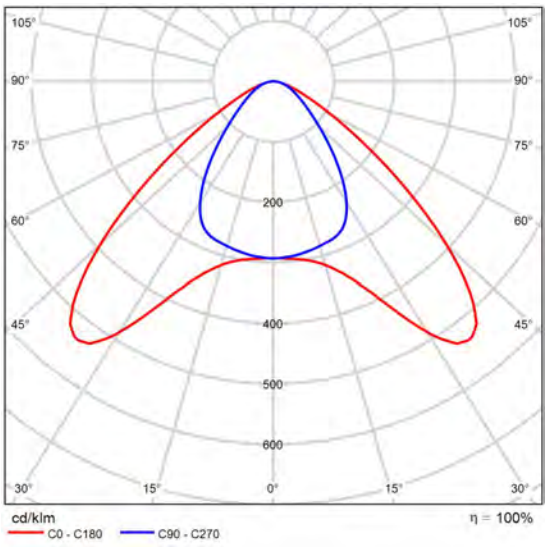
# Product data sheet

## Philips - SM504T LED80S/840 DA35W






| | |
|---|---|
| P | 54.0 W |
| $\Phi_{Lamp}$ | 8000 lm |
| $\Phi_{Luminaire}$ | 8000 lm |
| η | 100.00 % |
| Luminous efficacy | 148.2 lm/W |
| CCT | 4000 K |
| CRI | 80 |




Polar LDC

Philips StoreSet Linear – A slim, discreet design for smaller format stores of the future StoreSet Linear is an ultra-flexible linear luminaire for retail track systems that offers excellent quality with the promise of future-proof upgrades. In retail applications such as supermarkets, city format shops, express stores, each linear panel can be combined with a wide range of spots from our portfolio, and integrated smoothly into your existing track system. So you can give your merchandise sparkle and stand out on the shelves, as well as in aisles and open areas.
StoreSet Linear (SM504T) has a discreet, slim panel design that makes it easy to position the luminaires anywhere you like along the tracks - and accommodate future layout changes. Versions with a wireless driver offer enhanced comfort with dimming and scene setting on existing three-circuit track-mounted infrastructure without the need for wired controls. Plus integrated sensors for data collection will shed light on insightful, granular information that you can use to support your business.

**Glare evaluation according to UGR**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ρ Ceiling | | 70 | 70 | 50 | 50 | 30 | 70 | 70 | 50 | 50 | 30 |
| ρ Walls | | 50 | 30 | 50 | 30 | 30 | 50 | 30 | 50 | 30 | 30 |
| ρ Floor | | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| Room size X | Y | Viewing direction at right angles to lamp axis | | | | | Viewing direction parallel to lamp axis | | | | |
| 2H | 2H | 26.5 | 27.7 | 26.8 | 27.9 | 28.1 | 22.2 | 23.4 | 22.5 | 23.6 | 23.9 |
| | 3H | 26.6 | 27.7 | 26.9 | 28.0 | 28.2 | 22.5 | 23.5 | 22.8 | 23.8 | 24.1 |
| | 4H | 26.6 | 27.7 | 27.0 | 27.9 | 28.2 | 22.6 | 23.6 | 22.9 | 23.9 | 24.2 |
| | 6H | 26.6 | 27.6 | 27.0 | 27.9 | 28.2 | 22.7 | 23.6 | 23.0 | 23.9 | 24.2 |
| | 8H | 26.6 | 27.5 | 27.0 | 27.8 | 28.1 | 22.7 | 23.6 | 23.1 | 23.9 | 24.3 |
| | 12H | 26.6 | 27.4 | 26.9 | 27.8 | 28.1 | 22.7 | 23.6 | 23.1 | 23.9 | 24.3 |
| 4H | 2H | 26.5 | 27.5 | 26.8 | 27.8 | 28.1 | 22.9 | 23.9 | 23.2 | 24.2 | 24.5 |
| | 3H | 26.8 | 27.6 | 27.1 | 27.9 | 28.3 | 23.3 | 24.2 | 23.7 | 24.5 | 24.8 |
| | 4H | 26.8 | 27.6 | 27.2 | 27.9 | 28.3 | 23.5 | 24.3 | 23.9 | 24.6 | 25.0 |
| | 6H | 26.9 | 27.5 | 27.3 | 27.9 | 28.3 | 23.7 | 24.3 | 24.1 | 24.7 | 25.1 |
| | 8H | 26.8 | 27.5 | 27.3 | 27.9 | 28.3 | 23.7 | 24.3 | 24.2 | 24.7 | 25.1 |
| | 12H | 26.8 | 27.4 | 27.3 | 27.8 | 28.2 | 23.8 | 24.3 | 24.2 | 24.7 | 25.2 |
| 8H | 4H | 26.8 | 27.4 | 27.2 | 27.8 | 28.2 | 23.6 | 24.3 | 24.1 | 24.6 | 25.1 |
| | 6H | 26.9 | 27.4 | 27.3 | 27.8 | 28.3 | 23.9 | 24.4 | 24.3 | 24.8 | 25.3 |
| | 8H | 26.9 | 27.3 | 27.4 | 27.8 | 28.2 | 24.0 | 24.4 | 24.5 | 24.9 | 25.4 |
| | 12H | 26.9 | 27.3 | 27.4 | 27.7 | 28.2 | 24.1 | 24.4 | 24.5 | 24.9 | 25.4 |
| 12H | 4H | 26.8 | 27.3 | 27.2 | 27.7 | 28.2 | 23.6 | 24.2 | 24.1 | 24.6 | 25.0 |
| | 6H | 26.8 | 27.3 | 27.3 | 27.7 | 28.2 | 23.9 | 24.3 | 24.4 | 24.8 | 25.3 |
| | 8H | 26.9 | 27.3 | 27.4 | 27.7 | 28.2 | 24.0 | 24.4 | 24.5 | 24.9 | 25.4 |
| Variation of the observer position for the luminaire distances S | | | | | | | | | | | |
| S = 1.0H<br>S = 1.5H<br>S = 2.0H | | +1.0 / -1.1<br>+1.8 / -2.9<br>+3.4 / -4.2 | | | | | +1.0 / -1.2<br>+2.4 / -2.2<br>+2.8 / -3.0 | | | | |
| Standard table | | BK01 | | | | | BK03 | | | | |
| Correction summand | | 8.9 | | | | | 6.4 | | | | |
| Corrected glare indices referring to 8000lm Total luminous flux | | | | | | | | | | | |

UGR diagram (SHR: 0.25)

Building 1

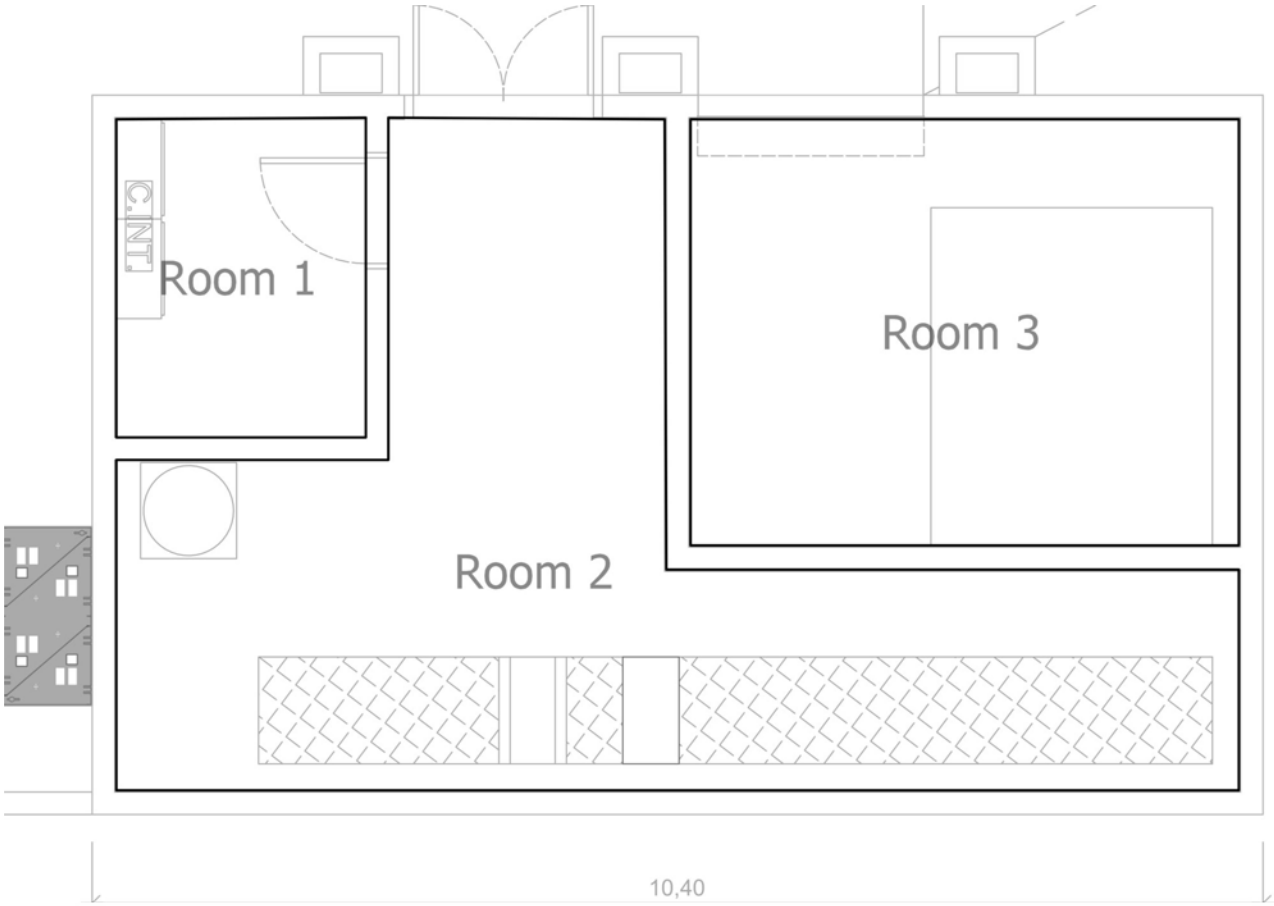
# Luminaire list

| $\Phi_{total}$ | $P_{total}$ | Luminous efficacy |
|---|---|---|
| 64000 lm | 432.0 W | 148.1 lm/W |

| pcs. | Manufacturer | Article No. | Article name | P | Φ | Luminous efficacy |
|---|---|---|---|---|---|---|
| 8 | Philips | | SM504T LED80S/840 DA35W | 54.0 W | 8000 lm | 148.2 lm/W |

Building 1 · Storey 1 (Light scene 1)

## Room list



Building 1 · Storey 1 (Light scene 1)

# Room list

## Room 1

| $P_{total}$ | $A_{Room}$ | Lighting power density | $\bar{E}_{perpendicular\ (Working\ plane)}$ |
|---|---|---|---|
| 108.0 W | 6.28 m² | 17.20 W/m² = 3.15 W/m²/100 lx (Room) | 546 lx |

| pcs. | Manufacturer | Article No. | Article name | P | $\Phi_{Luminaire}$ |
|---|---|---|---|---|---|
| 2 | Philips | | SM504T LED80S/840 DA35W | 54.0 W | 8000 lm |

## Room 2

| $P_{total}$ | $A_{Room}$ | Lighting power density | $\bar{E}_{perpendicular\ (Working\ plane)}$ |
|---|---|---|---|
| 216.0 W | 31.77 m² | 6.80 W/m² = 1.97 W/m²/100 lx (Room) | 345 lx |

| pcs. | Manufacturer | Article No. | Article name | P | $\Phi_{Luminaire}$ |
|---|---|---|---|---|---|
| 4 | Philips | | SM504T LED80S/840 DA35W | 54.0 W | 8000 lm |

## Room 3

| $P_{total}$ | $A_{Room}$ | Lighting power density | $\bar{E}_{perpendicular\ (Working\ plane)}$ |
|---|---|---|---|
| 108.0 W | 18.43 m² | 5.86 W/m² = 1.58 W/m²/100 lx (Room) | 372 lx |

| pcs. | Manufacturer | Article No. | Article name | P | $\Phi_{Luminaire}$ |
|---|---|---|---|---|---|
| 2 | Philips | | SM504T LED80S/840 DA35W | 54.0 W | 8000 lm |

DIALux

Building 1 · Storey 1

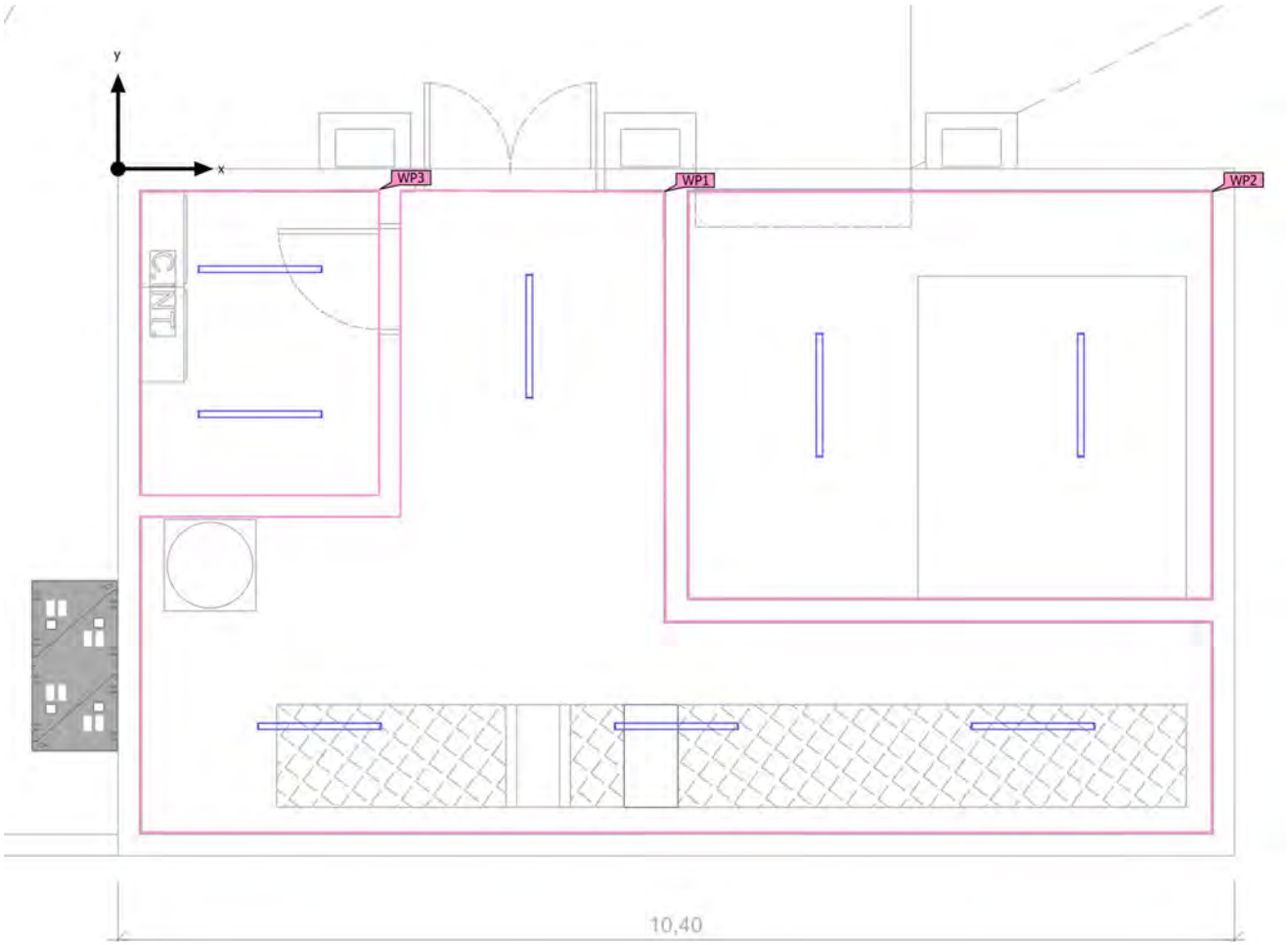
# Luminaire list

| $\Phi_{total}$ | $P_{total}$ | Luminous efficacy |
|---|---|---|
| 64000 lm | 432.0 W | 148.1 lm/W |

| pcs. | Manufacturer | Article No. | Article name | P | Φ | Luminous efficacy |
|---|---|---|---|---|---|---|
| 8 | Philips | | SM504T LED80S/840 DA35W | 54.0 W | 8000 lm | 148.2 lm/W |

Building 1 · Storey 1 (Light scene 1)

## Calculation objects



Building 1 · Storey 1 (Light scene 1)

# Calculation objects

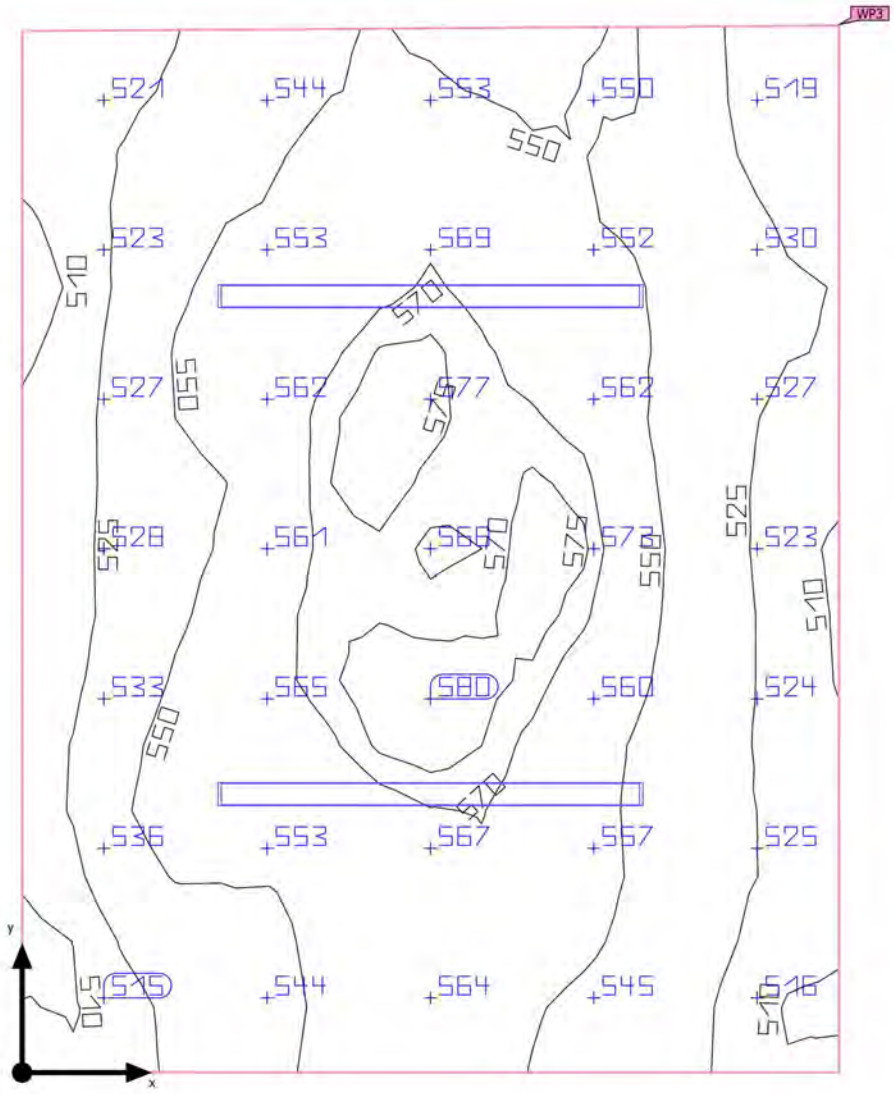
## Working planes

| Properties | Ē (Target) | $E_{min}$ | $E_{max}$ | $U_o$ ($g_1$) (Target) | $g_2$ | Index |
|---|---|---|---|---|---|---|
| Working plane (Room 2)<br>Perpendicular illuminance (adaptive)<br>Height: 0.000 m, Wall zone: 0.000 m | 345 lx<br>(≥ 20.0 lx)<br>✓ | 214 lx | 510 lx | 0.62<br>(≥ 0.40)<br>✓ | 0.42 | WP1 |
| Working plane (Room 3)<br>Perpendicular illuminance (adaptive)<br>Height: 0.000 m, Wall zone: 0.000 m | 372 lx<br>(≥ 20.0 lx)<br>✓ | 264 lx | 437 lx | 0.71<br>(≥ 0.40)<br>✓ | 0.60 | WP2 |
| Working plane (Room 1)<br>Perpendicular illuminance (adaptive)<br>Height: 0.000 m, Wall zone: 0.000 m | 546 lx<br>(≥ 500 lx)<br>✓ | 507 lx | 579 lx | 0.93<br>(≥ 0.60)<br>✓ | 0.88 | WP3 |

DIALux

Building 1 · Storey 1 · Room 1 (Light scene 1)

## Summary




| | | | |
|---|---|---|---|
| Ground area | 6.28 m² | Clearance height | 3.400 m |
| Reflection factors | Ceiling: 70.0 %,<br>Walls: 50.0 %,<br>Floor: 20.0 % | Mounting height | 3.400 m |
| | | Height Working plane | 0.000 m |
| Maintenance factor | 0.80 (fixed) | Wall zone Working plane | 0.000 m |

Building 1 · Storey 1 · Room 1 (Light scene 1)

# Summary

## Results

| | Symbol | Calculated | Target | Check | Index |
|---|---|---|---|---|---|
| Working plane | $\bar{E}_{perpendicular}$ | 546 lx | ≥ 500 lx | ✓ | WP3 |
| | $U_o$ ($g_1$) | 0.93 | ≥ 0.60 | ✓ | WP3 |
| Glare valuation(1) | $R_{UG,max}$ | 26 | ≤ 19 | ✗ | |
| Energy estimation(2) | Consumption | 267 kWh/a | max. 250 kWh/a | ✗ | |
| Room | Lighting power density | 17.20 W/m² | – | | |
| | | 3.15 W/m²/100 lx | – | | |

(1) Based on a rectangular space of 2.216 m x 2.841 m and SHR of 0.25.
(2) Calculated using DIN:18599-4.

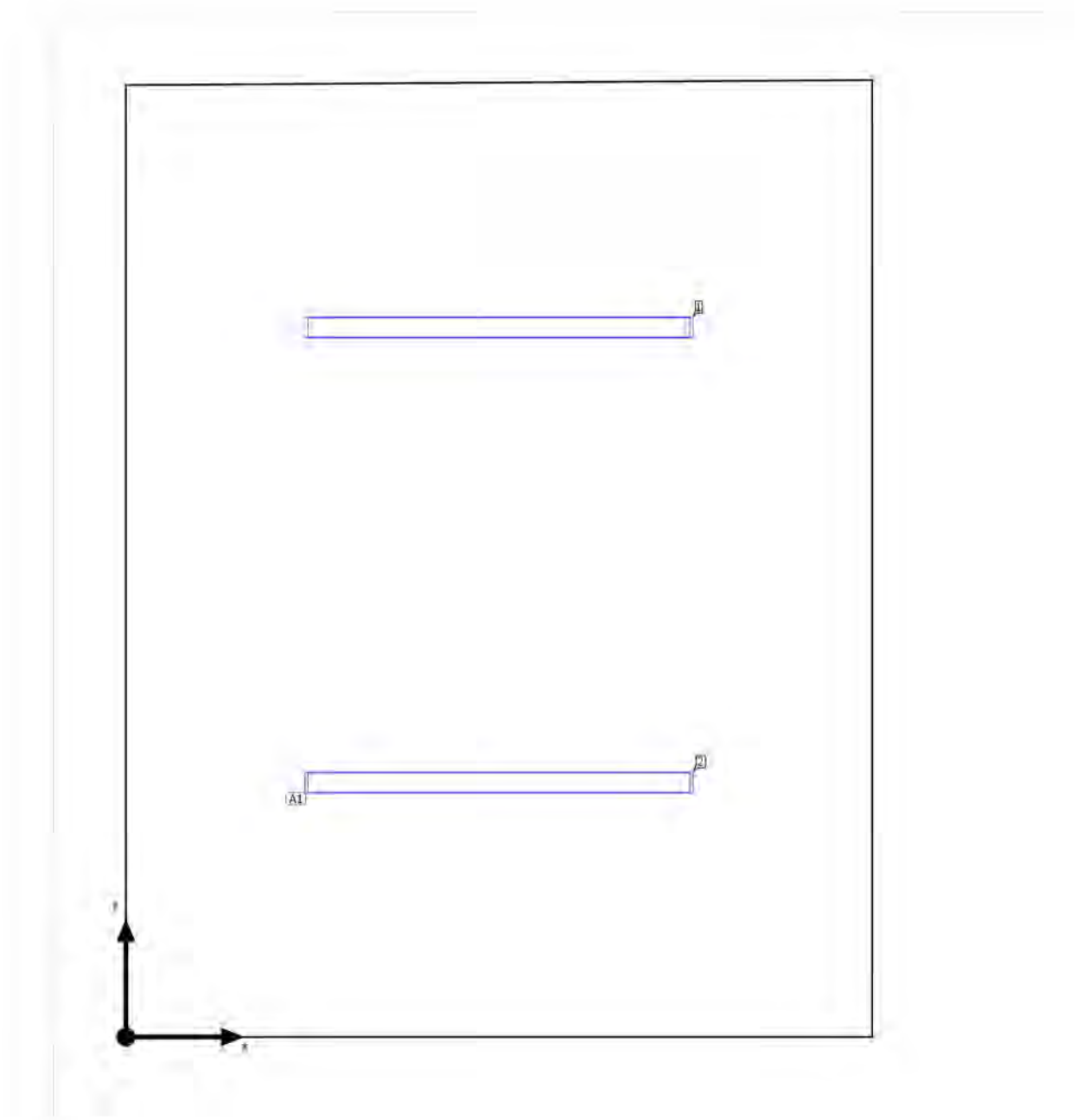
Utilisation profile: DIALux presetting (5.26.2 Standard (office))

## Luminaire list

| pcs. | Manufacturer | Article No. | Article name | $R_{UG}$ | P | Φ | Luminous efficacy |
|---|---|---|---|---|---|---|---|
| 2 | Philips | | SM504T LED80S/840 DA35W | 26 | 54.0 W | 8000 lm | 148.2 lm/W |

Building 1 · Storey 1 · Room 1

## Luminaire layout plan

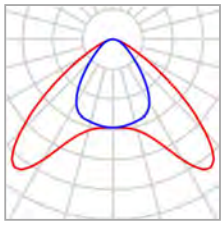


Building 1 · Storey 1 · Room 1

# Luminaire layout plan





| | | | |
|---|---|---|---|
| Manufacturer | Philips | P | 54.0 W |
| Article name | SM504T LED80S/840 DA35W | $\Phi_{Luminaire}$ | 8000 lm |
| Fitting | 1x | | |

## 2 x Philips SM504T LED80S/840 DA35W

| Type | Field Arrangement |
|---|---|
| 1st luminaire (X/Y/Z) | 1.108 m / 0.756 m / 3.400 m |
| X-direction | 1 pcs., Centre - centre, Distances not equal |
| Y-direction | 2 pcs., Centre - centre, Distances not equal |
| Arrangement | A1 |

| X | Y | Mounting height | Luminaire |
|---|---|---|---|
| 1.108 m | 2.106 m | 3.400 m | 1 |
| 1.108 m | 0.756 m | 3.400 m | 2 |

DIALux

Building 1 · Storey 1 · Room 1

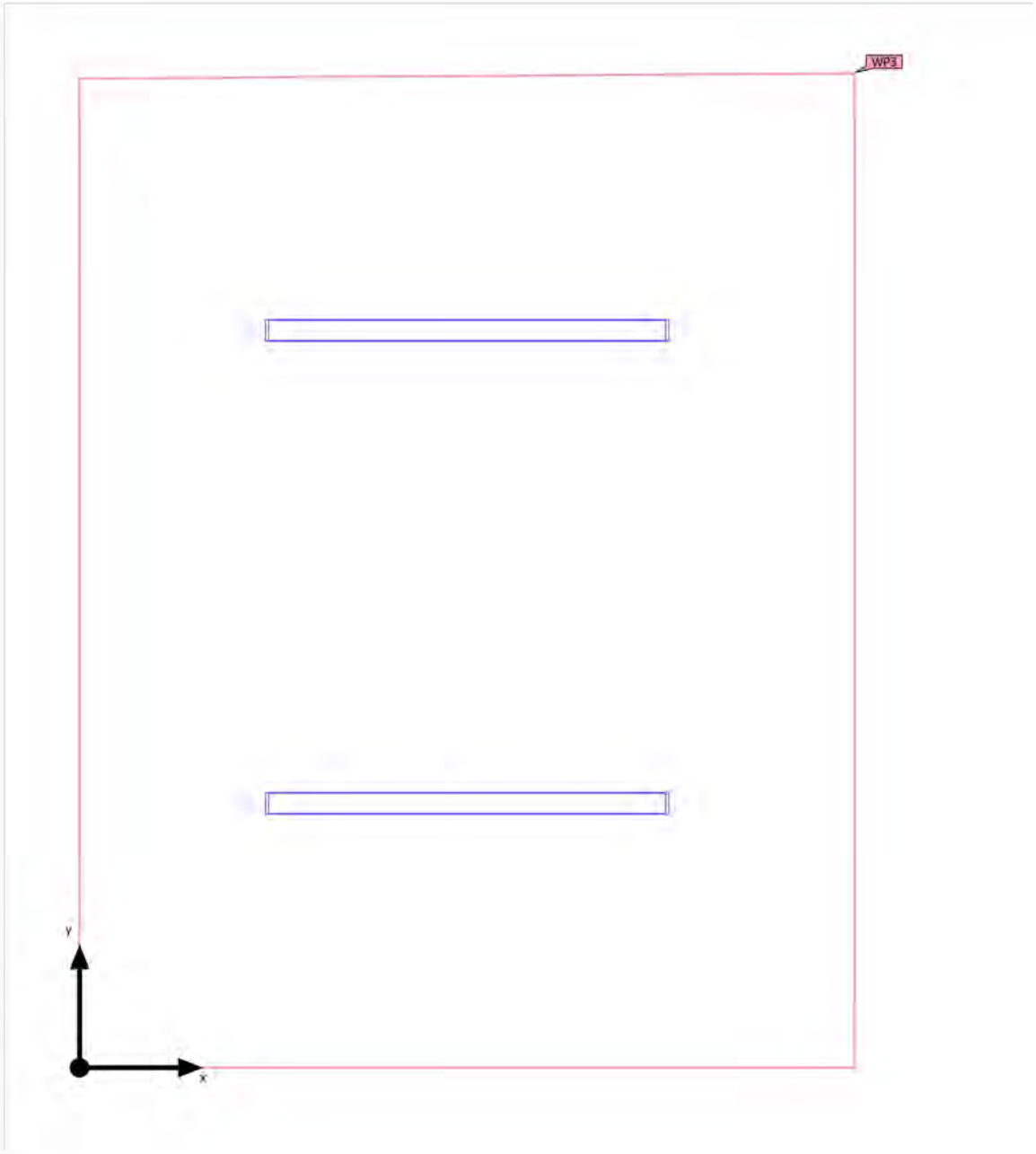
# Luminaire list

| $\Phi_{total}$ | $P_{total}$ | Luminous efficacy |
|---|---|---|
| 16000 lm | 108.0 W | 148.1 lm/W |

| pcs. | Manufacturer | Article No. | Article name | P | Φ | Luminous efficacy |
|---|---|---|---|---|---|---|
| 2 | Philips | | SM504T LED80S/840 DA35W | 54.0 W | 8000 lm | 148.2 lm/W |

Building 1 · Storey 1 · Room 1 (Light scene 1)

## Calculation objects



Building 1 · Storey 1 · Room 1 (Light scene 1)

# Calculation objects

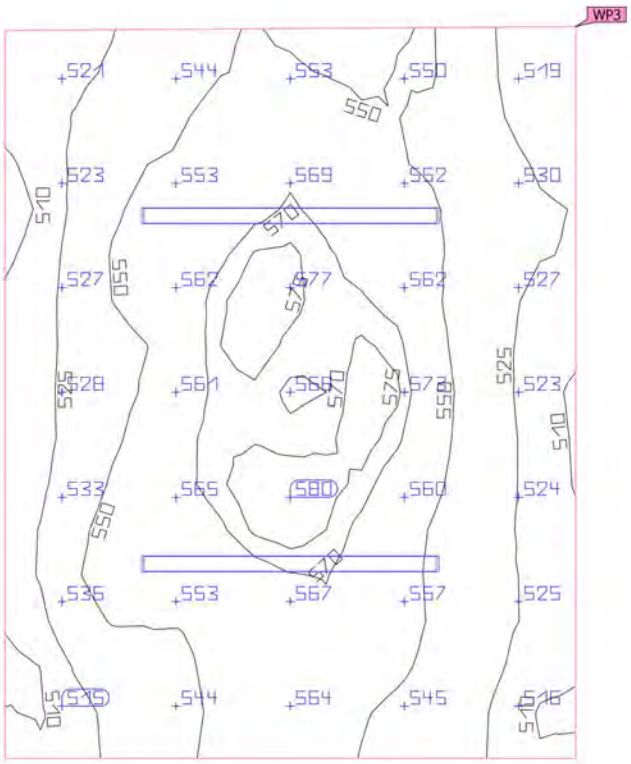
## Working planes

| Properties | Ē (Target) | $E_{min}$ | $E_{max}$ | $U_o$ ($g_1$) (Target) | $g_2$ | Index |
|---|---|---|---|---|---|---|
| Working plane (Room 1)<br>Perpendicular illuminance (adaptive)<br>Height: 0.000 m, Wall zone: 0.000 m | 546 lx<br>(≥ 500 lx)<br>✓ | 507 lx | 579 lx | 0.93<br>(≥ 0.60)<br>✓ | 0.88 | WP3 |

Utilisation profile: DIALux presetting (5.26.2 Standard (office))

Building 1 · Storey 1 · Room 1 (Light scene 1)

## Working plane (Room 1)



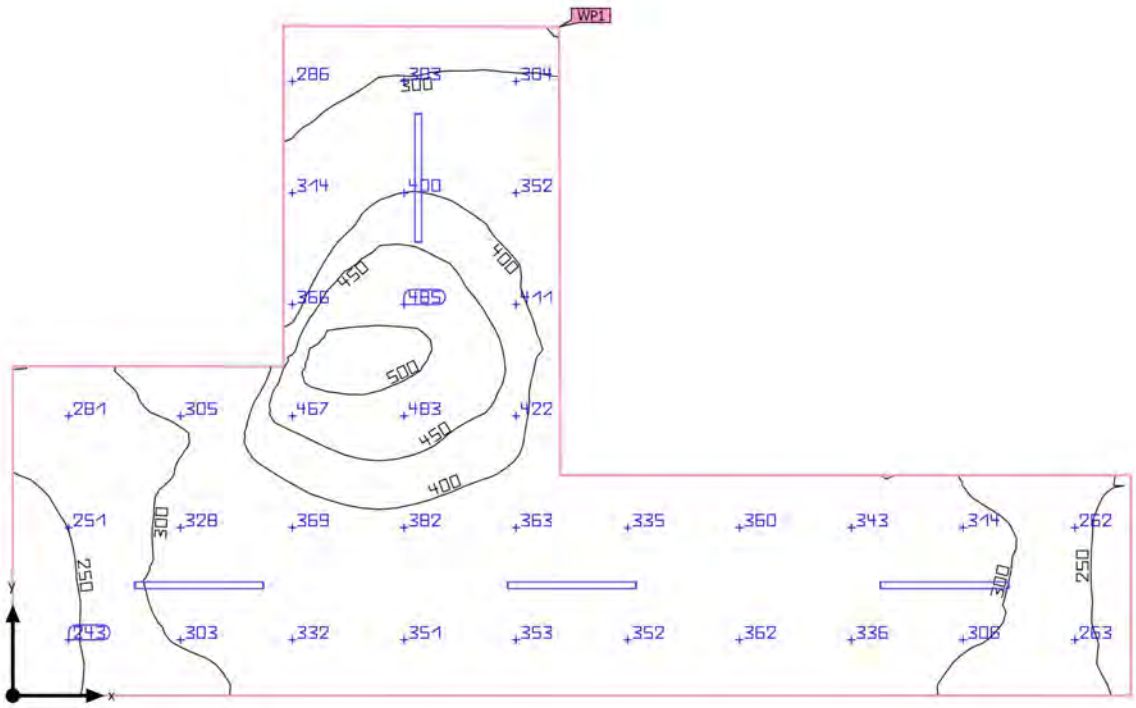

| Properties | Ē (Target) | $E_{min}$ | $E_{max}$ | $U_o$ ($g_1$) (Target) | $g_2$ | Index |
|---|---|---|---|---|---|---|
| Working plane (Room 1)<br>Perpendicular illuminance (adaptive)<br>Height: 0.000 m, Wall zone: 0.000 m | 546 lx<br>(≥ 500 lx)<br>✓ | 507 lx | 579 lx | 0.93<br>(≥ 0.60)<br>✓ | 0.88 | WP3 |

Utilisation profile: DIALux presetting (5.26.2 Standard (office))

DIALux

Building 1 · Storey 1 · Room 2 (Light scene 1)

## Summary




| | | | |
|---|---|---|---|
| Ground area | 31.77 m² | Clearance height | 3.400 m |
| Reflection factors | Ceiling: 70.0 %,<br>Walls: 50.0 %,<br>Floor: 26.9 % | Mounting height | 3.400 m |
| | | Height Working plane | 0.000 m |
| Maintenance factor | 0.80 (fixed) | Wall zone Working plane | 0.000 m |

Building 1 · Storey 1 · Room 2 (Light scene 1)

# Summary

## Results

| | Symbol | Calculated | Target | Check | Index |
|---|---|---|---|---|---|
| Working plane | $\bar{E}_{perpendicular}$ | 345 lx | ≥ 20.0 lx | ✓ | WP1 |
| | $U_o$ ($g_1$) | 0.62 | ≥ 0.40 | ✓ | WP1 |
| Glare valuation(1) | $R_{UG,max}$ | 27 | ≤ 0 | ✗ | |
| Energy estimation(2) | Consumption | 1135 kWh/a | max. 1150 kWh/a | ✓ | |
| Room | Lighting power density | 6.80 W/m² | – | | |
| | | 1.97 W/m²/100 lx | – | | |

(1) Based on a rectangular space of 5.976 m x 9.970 m and SHR of 0.25.
(2) Calculated using DIN:18599-4.

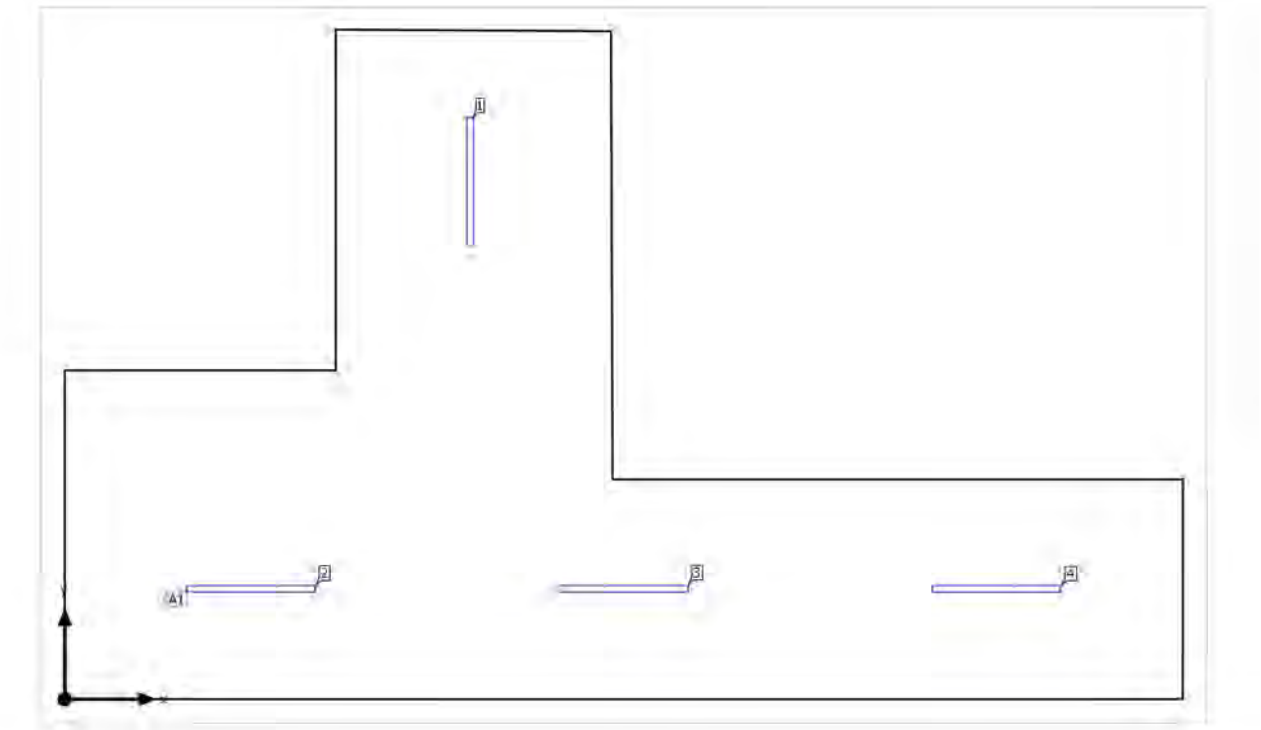
Utilisation profile: General areas inside buildings - Storage rack areas (5.5.1 Gangways: unmanned)

## Luminaire list

| pcs. | Manufacturer | Article No. | Article name | $R_{UG}$ | P | Φ | Luminous efficacy |
|---|---|---|---|---|---|---|---|
| 4 | Philips | | SM504T LED80S/840 DA35W | 27 | 54.0 W | 8000 lm | 148.2 lm/W |

Building 1 · Storey 1 · Room 2

## Luminaire layout plan

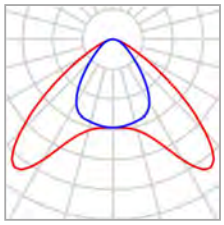


Building 1 · Storey 1 · Room 2

# Luminaire layout plan





| | | | |
|---|---|---|---|
| Manufacturer | Philips | P | 54.0 W |
| Article name | SM504T LED80S/840 DA35W | $\Phi_{Luminaire}$ | 8000 lm |
| Fitting | 1x | | |

## 3 x Philips SM504T LED80S/840 DA35W

| Type | Field Arrangement |
|---|---|
| 1st luminaire (X/Y/Z) | 1.662 m / 0.985 m / 3.400 m |
| X-direction | 3 pcs., Centre - centre, Distances not equal |
| Y-direction | 2 pcs., Centre - centre, Distances not equal |
| Arrangement | A1 |

| X | Y | Mounting height | Luminaire |
|---|---|---|---|
| 1.662 m | 0.985 m | 3.400 m | 2 |
| 4.985 m | 0.985 m | 3.400 m | 3 |
| 8.308 m | 0.985 m | 3.400 m | 4 |

## Individual luminaires

| X | Y | Mounting height | Luminaire |
|---|---|---|---|
| 3.615 m | 4.616 m | 3.400 m | 1 |

DIALux

Building 1 · Storey 1 · Room 2

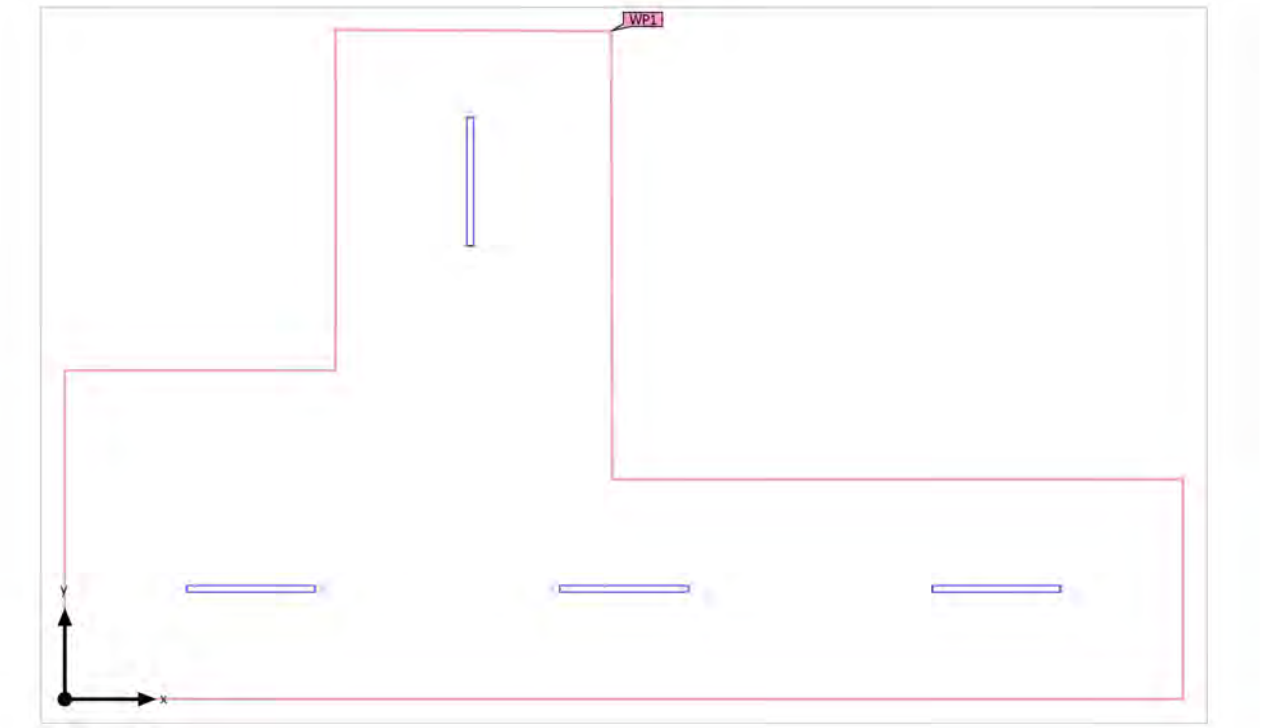
# Luminaire list

| $\Phi_{total}$ | $P_{total}$ | Luminous efficacy |
|---|---|---|
| 32000 lm | 216.0 W | 148.1 lm/W |

| pcs. | Manufacturer | Article No. | Article name | P | Φ | Luminous efficacy |
|---|---|---|---|---|---|---|
| 4 | Philips | | SM504T LED80S/840 DA35W | 54.0 W | 8000 lm | 148.2 lm/W |

Building 1 · Storey 1 · Room 2 (Light scene 1)

## Calculation objects



Building 1 · Storey 1 · Room 2 (Light scene 1)

# Calculation objects

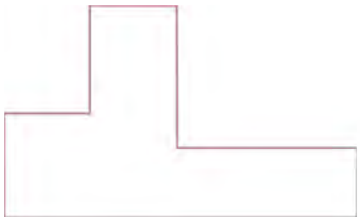
## Working planes

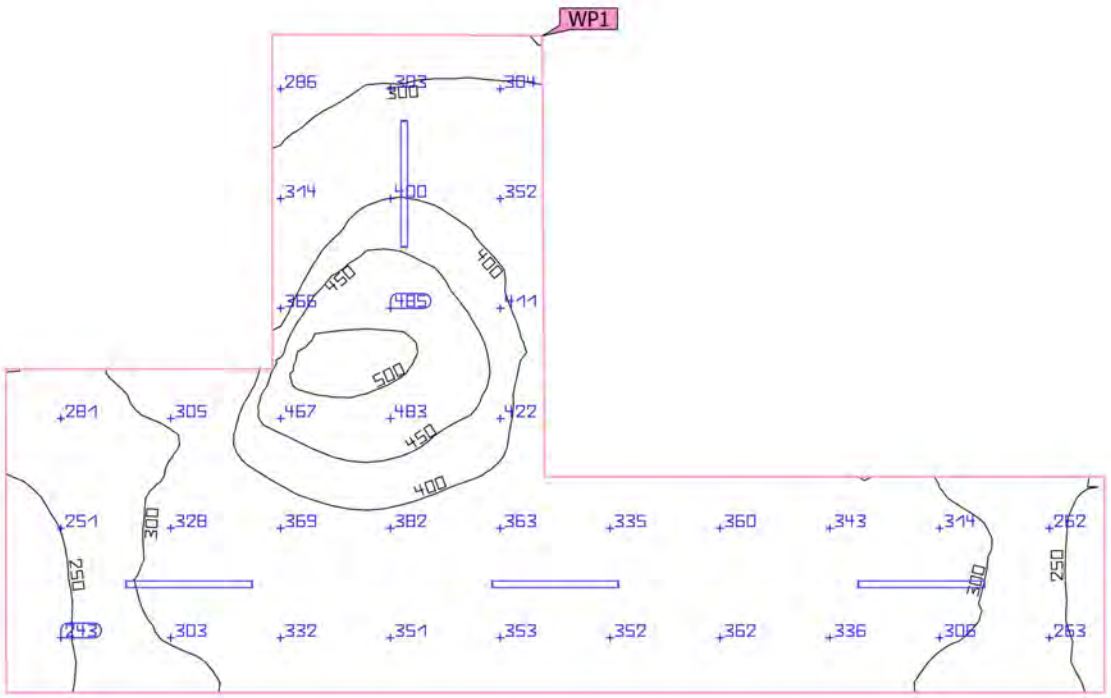
| Properties | Ē (Target) | $E_{min}$ | $E_{max}$ | $U_o$ ($g_1$) (Target) | $g_2$ | Index |
|---|---|---|---|---|---|---|
| Working plane (Room 2)<br>Perpendicular illuminance (adaptive)<br>Height: 0.000 m, Wall zone: 0.000 m | 345 lx<br>(≥ 20.0 lx)<br>✓ | 214 lx | 510 lx | 0.62<br>(≥ 0.40)<br>✓ | 0.42 | WP1 |

Utilisation profile: General areas inside buildings - Storage rack areas (5.5.1 Gangways: unmanned)

Building 1 · Storey 1 · Room 2 (Light scene 1)

## Working plane (Room 2)





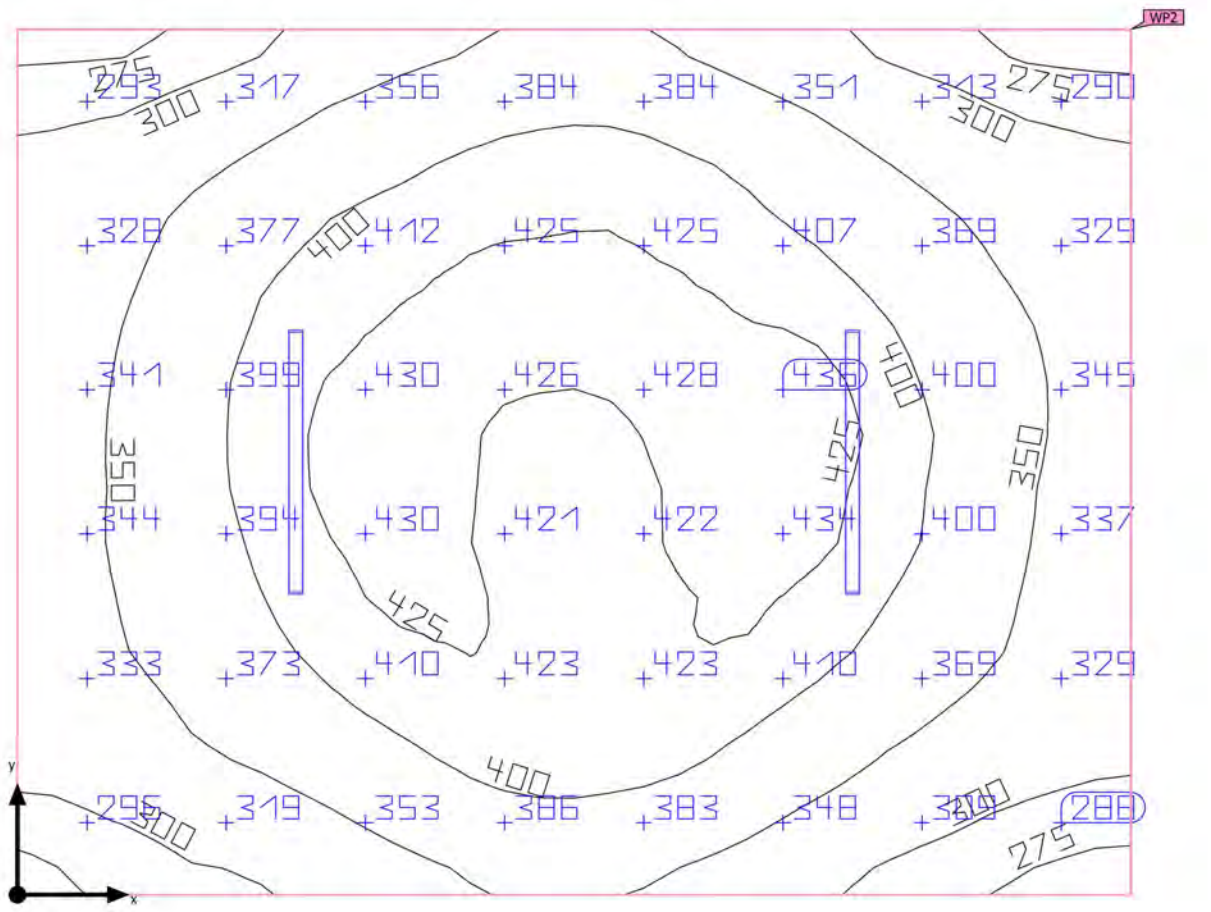

| Properties | Ē (Target) | $E_{min}$ | $E_{max}$ | $U_o$ ($g_1$) (Target) | $g_2$ | Index |
|---|---|---|---|---|---|---|
| Working plane (Room 2)<br>Perpendicular illuminance (adaptive)<br>Height: 0.000 m, Wall zone: 0.000 m | 345 lx<br>(≥ 20.0 lx)<br>✓ | 214 lx | 510 lx | 0.62<br>(≥ 0.40)<br>✓ | 0.42 | WP1 |

Utilisation profile: General areas inside buildings - Storage rack areas (5.5.1 Gangways: unmanned)

DIALux

Building 1 · Storey 1 · Room 3 (Light scene 1)

## Summary




| | | | |
|---|---|---|---|
| Ground area | 18.43 m² | Clearance height | 3.400 m |
| Reflection factors | Ceiling: 70.0 %,<br>Walls: 50.0 %,<br>Floor: 27.8 % | Mounting height | 3.400 m |
| | | Height Working plane | 0.000 m |
| Maintenance factor | 0.80 (fixed) | Wall zone Working plane | 0.000 m |

Building 1 · Storey 1 · Room 3 (Light scene 1)

# Summary

## Results

| | Symbol | Calculated | Target | Check | Index |
|---|---|---|---|---|---|
| Working plane | $\bar{E}_{perpendicular}$ | 372 lx | ≥ 20.0 lx | ✓ | WP2 |
| | $U_o$ ($g_1$) | 0.71 | ≥ 0.40 | ✓ | WP2 |
| Glare valuation(1) | $R_{UG,max}$ | 26 | ≤ 0 | ✗ | |
| Energy estimation(2) | Consumption | 568 kWh/a | max. 650 kWh/a | ✓ | |
| Room | Lighting power density | 5.86 W/m² | – | | |
| | | 1.58 W/m²/100 lx | – | | |

(1) Based on a rectangular space of 3.785 m x 4.870 m and SHR of 0.25.
(2) Calculated using DIN:18599-4.

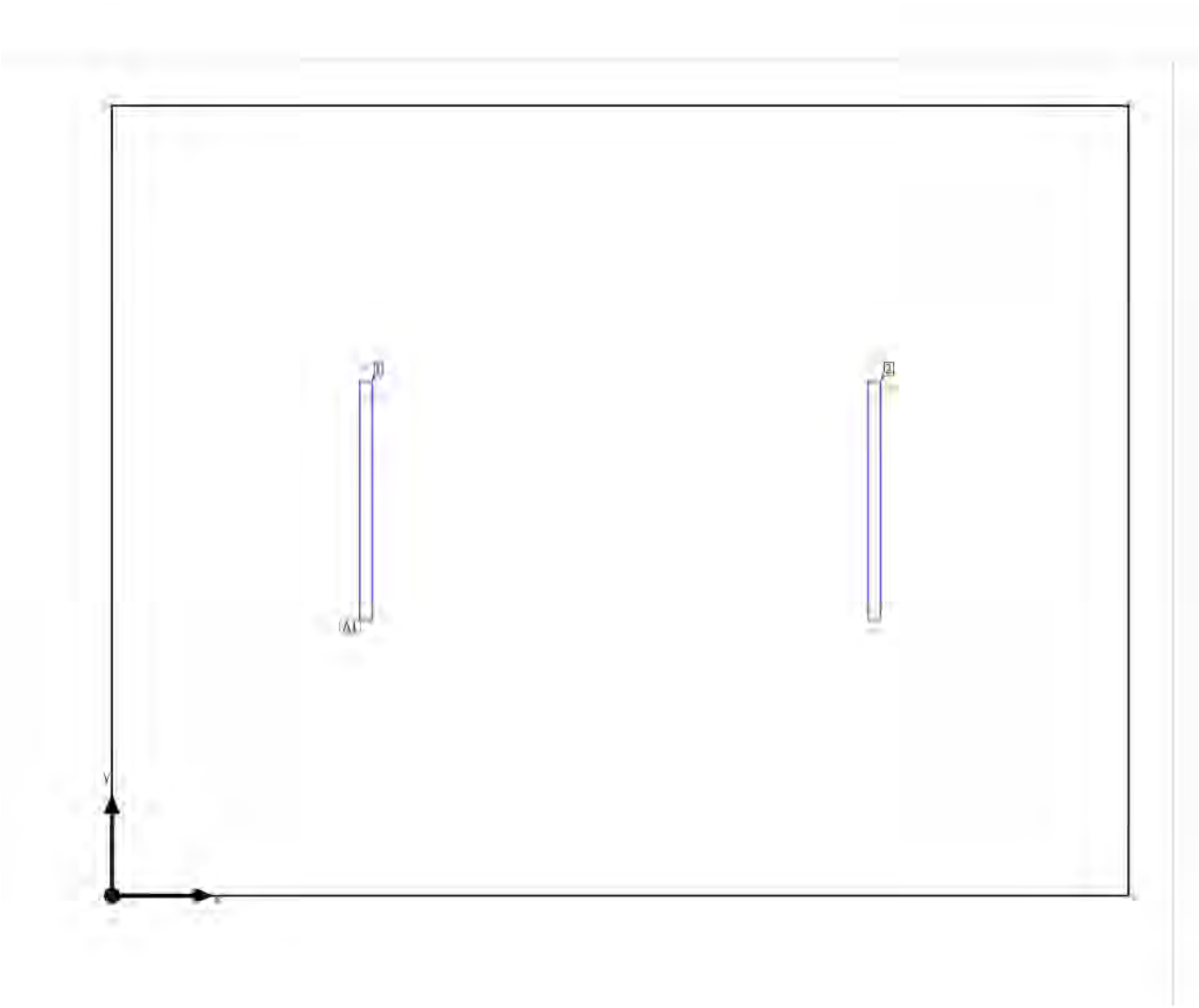
Utilisation profile: General areas inside buildings - Storage rack areas (5.5.1 Gangways: unmanned)

## Luminaire list

| pcs. | Manufacturer | Article No. | Article name | $R_{UG}$ | P | Φ | Luminous efficacy |
|---|---|---|---|---|---|---|---|
| 2 | Philips | | SM504T LED80S/840 DA35W | 26 | 54.0 W | 8000 lm | 148.2 lm/W |

Building 1 · Storey 1 · Room 3

## Luminaire layout plan

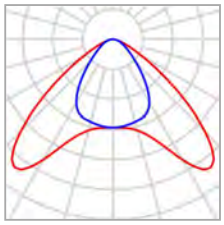


Building 1 · Storey 1 · Room 3

# Luminaire layout plan





| | | | |
|---|---|---|---|
| Manufacturer | Philips | P | 54.0 W |
| Article name | SM504T LED80S/840 DA35W | $\Phi_{Luminaire}$ | 8000 lm |
| Fitting | 1x | | |

## 2 x Philips SM504T LED80S/840 DA35W

| Type | Field Arrangement |
|---|---|
| 1st luminaire (X/Y/Z) | 1.217 m / 1.892 m / 3.400 m |
| X-direction | 2 pcs., Centre - centre, 2.435 m |
| Y-direction | 1 pcs., Centre - centre, 3.785 m |
| Arrangement | A1 |

| X | Y | Mounting height | Luminaire |
|---|---|---|---|
| 1.217 m | 1.892 m | 3.400 m | 1 |
| 3.652 m | 1.892 m | 3.400 m | 2 |

Building 1 · Storey 1 · Room 3

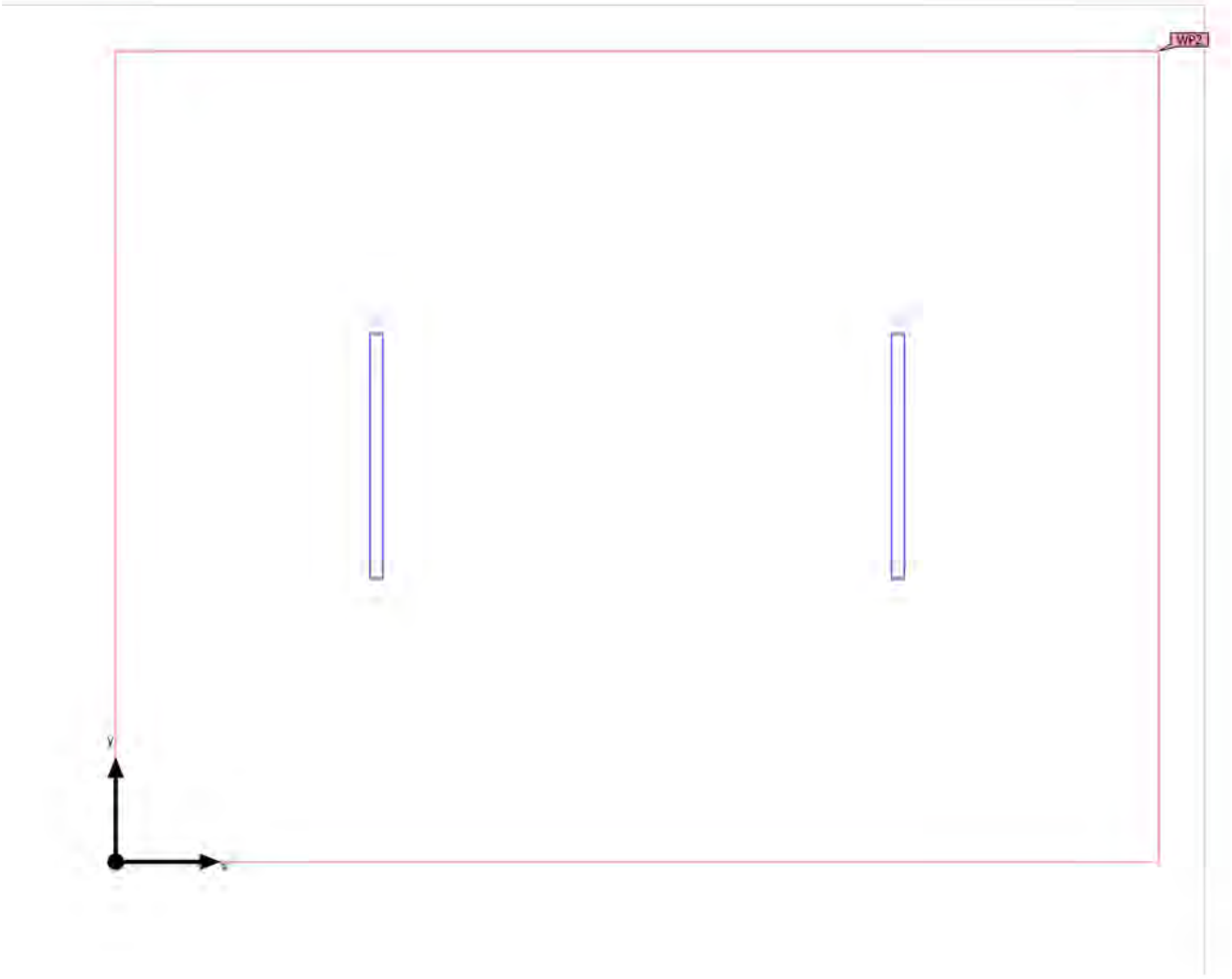
# Luminaire list

| $\Phi_{total}$ | $P_{total}$ | Luminous efficacy |
|---|---|---|
| 16000 lm | 108.0 W | 148.1 lm/W |

| pcs. | Manufacturer | Article No. | Article name | P | Φ | Luminous efficacy |
|---|---|---|---|---|---|---|
| 2 | Philips | | SM504T LED80S/840 DA35W | 54.0 W | 8000 lm | 148.2 lm/W |

Building 1 · Storey 1 · Room 3 (Light scene 1)

## Calculation objects



Building 1 · Storey 1 · Room 3 (Light scene 1)

# Calculation objects

## Working planes

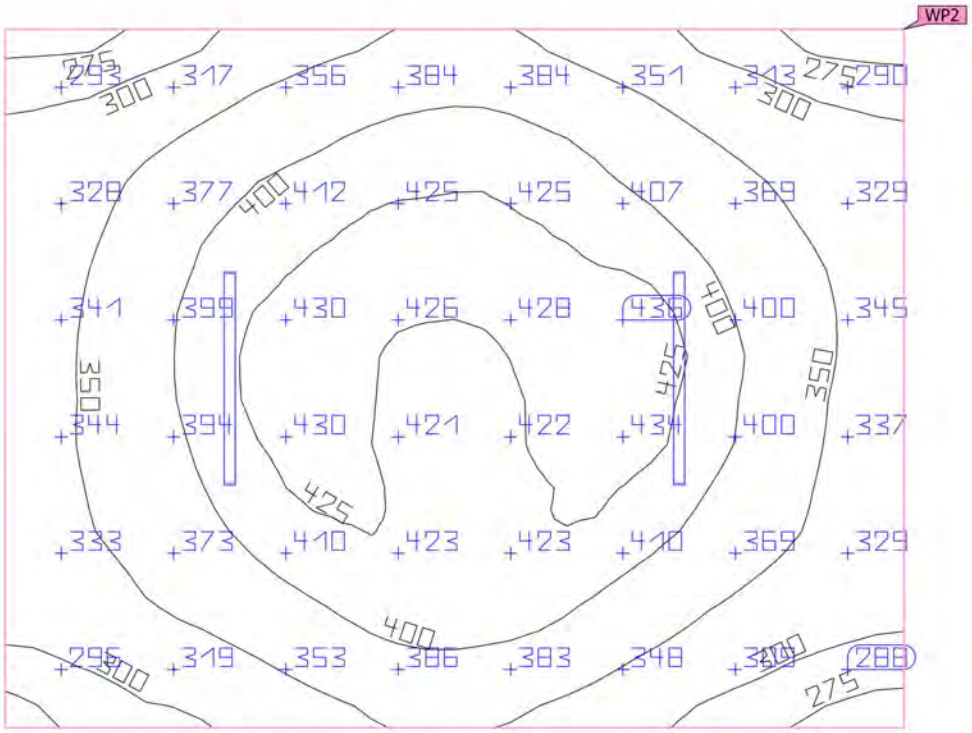
| Properties | $\bar{E}$ (Target) | $E_{min}$ | $E_{max}$ | $U_o$ ($g_1$) (Target) | $g_2$ | Index |
|---|---|---|---|---|---|---|
| Working plane (Room 3)<br>Perpendicular illuminance (adaptive)<br>Height: 0.000 m, Wall zone: 0.000 m | 372 lx<br>(≥ 20.0 lx)<br>✓ | 264 lx | 437 lx | 0.71<br>(≥ 0.40)<br>✓ | 0.60 | WP2 |

Utilisation profile: General areas inside buildings - Storage rack areas (5.5.1 Gangways: unmanned)

DIALux

Building 1 · Storey 1 · Room 3 (Light scene 1)

## Working plane (Room 3)




| Properties | Ē (Target) | $E_{min}$ | $E_{max}$ | $U_o$ ($g_1$) (Target) | $g_2$ | Index |
|---|---|---|---|---|---|---|
| Working plane (Room 3)<br>Perpendicular illuminance (adaptive)<br>Height: 0.000 m, Wall zone: 0.000 m | 372 lx<br>(≥ 20.0 lx)<br>✓ | 264 lx | 437 lx | 0.71<br>(≥ 0.40)<br>✓ | 0.60 | WP2 |

Utilisation profile: General areas inside buildings - Storage rack areas (5.5.1 Gangways: unmanned)

# Glossary

## A

| | |
|---|---|
| A | Formula symbol for a surface in the geometry |

## B

| | |
|---|---|
| Background area | The background area borders the direct ambient area according to DIN EN 12464-1 and reaches up to the borders of the room. In larger rooms, the background area is at least 3 m wide. It is located horizontally at floor level. |

## C

| | |
|---|---|
| CCT | (Engl. correlated colour temperature)<br>Body temperature of a thermal radiator which serves to describe its light colour. Unit: Kelvin [K]. The lesser the numerical value the redder; the greater the numerical value the bluer the light colour. The colour temperature of gas-discharge lamps and semi-conductors are termed "correlated colour temperature" in contrast to the colour temperature of thermal radiators.<br><br>Allocation of the light colours to the colour temperature ranges acc. to EN 12464-1:<br><br>Light colour - colour temperature [K]<br>warm white (ww) < 3,300 K<br>neutral white (nw) ≥ 3,300 – 5,300 K<br>daylight white (dw) > 5,300 K |
| Clearance height | The designation for the distance between upper edge of the floor and bottom edge of the ceiling (in the completely furnished status of room). |
| Control group | A group of luminaires that are dimmed and controlled together. For each lighting scene, a control group provides its own dimming value. All luminaires within a control group share this dimming value. The control groups with their luminaires are automatically determined by DIALux on the basis of the created light scenes and their luminaire groups. |
| CRI | (Engl. colour rendering index)<br>Designation for the colour rendering index of a luminaire or a lamp acc. to DIN 6169: 1976 or CIE 13.3: 1995.<br><br>The general colour rendering index Ra (or CRI) is a dimensionless figure that describes the quality of a white light source in regards to its similarity with the remission spectra of defined 8 test colours (see DIN 6169 or CIE 1974) to a reference light source. |

# Glossary

## D

| | |
|---|---|
| Daylight autonomy | Describes what percentage of the daily working time the required illuminance is met by daylight. The nominal illuminance is used from the room profile, unlike described in EN 17037. The calculation is not done in the centre of the room but at the placed sensor measuring point. A room is considered sufficiently supplied with daylight if it achieves at least 50% daylight autonomy. |
| Daylight factor | Ratio of the illuminance achieved solely by daylight incidence at a point in the inside to the horizontal illuminance in the outer area under an unobstructed sky.<br><br>Formula symbol: D (Engl. daylight factor)<br>Unit: % |
| Daylight quotient effective area | A calculation surface within which the daylight quotient is calculated. |

## E

| | |
|---|---|
| Energy evaluation | Based on an hourly calculation procedure for daylight in indoor spaces, considering the project geometry and any existing daylight control systems. Orientation and location of the project are also considered. The calculation uses the specified system power of the luminaires to determine the energy demand. A linear relationship between power and luminous flux in the dimmed state is assumed for daylight-controlled luminaires. Times of use and nominal illuminance are determined from the usage profiles of the spaces. Switched-on luminaires that are explicitly excluded from control also consider the specified times-of-use. The daylight control systems use a simplified control logic that closes them at an outdoor horizontal illuminance of 27,500lx.<br><br>The calendar year 2022 is used as a reference only. It is not a simulation of this year. The reference year is only used to assign the days of the week to the calculated results. The changeover to summer time is not considered. The reference sky type used is the average sky described in CIE 110 without direct sunlight.<br><br>The method was developed together with the Fraunhofer Institute for Building Physics and is available for review by the Joint Working Group 1 ISO TC 274 as an extension of the previous annual regression-based method. |
| Eta (η) | (light output ratio)<br>The light output ratio describes what percentage of the luminous flux of a free radiating lamp (or LED module) is emitted by the luminaire when installed.<br><br>Unit: % |

# Glossary

## G

| | |
|---|---|
| $g_1$ | Often also $U_o$ (Engl. overall uniformity)<br>Designates the overall uniformity of the illuminance on a surface. It is the quotient from $E_{min}$ to $\bar{E}$ and is required, for instance, in standards for illumination of workstations. |
| $g_2$ | Actually it designates the "non-uniformity" of the illuminance on a surface. It is the quotient of $E_{min}$ to $E_{max}$ and is generally only relevant for certifying the emergency lighting acc. to EN 1838. |

## I

| | |
|---|---|
| Illuminance | Describes the ratio of the luminous flux that strikes a certain surface to the size of this surface ($lm/m^2 = lx$). The illuminance is not tied to an object surface. It can be determined anywhere in space (inside or outside). The illuminance is not a product feature because it is a recipient value. Luxometers are used for measuring.<br><br>Unit: Lux<br>Abbreviation: lx<br>Formula symbol: E |
| Illuminance, adaptive | For the determining of the middle adaptive illuminance on a surface, this is rastered "adaptively". In the area of large illuminance differences within the surface, the raster is subdivided finer; within lesser differences, a rougher classification is made. |
| Illuminance, horizontal | Illuminance that is calculated or measured on a horizontal (level) surface (this can be for example a table top or the floor). The horizontal illuminance is usually identified by the formula letter $E_h$. |
| Illuminance, perpendicular | Illuminance that is calculated or measured plumb-vertical to a surface. This needs to be taken into account for tilted surfaces. If the surface is horizontal or vertical, then there is no difference between the perpendicular and the horizontal or vertical illuminance. |
| Illuminance, vertical | Illuminance that is calculated or measured on a vertical surface (this can be for example the front of some shelves). The vertical illuminance is usually identified by the formula letter $E_v$. |

## L

| | |
|---|---|
| LENI | (Engl. lighting energy numeric indicator)<br>Lighting energy numeric indicator acc. to EN 15193<br><br>Unit: $kWh/(m^2 * a)$ |

# Glossary

| | |
|---|---|
| LLMF | (Engl. lamp lumen maintenance factor)/acc. to CIE 97: 2005<br>Lamp flux maintenance factor that takes the luminous flux reduction into account of a luminaire or an LED module in the course of the operating time. The lamp flux maintenance factor is specified as a decimal digit and can have a maximum value of 1 (no luminous flux reduction existing). |
| LMF | (Engl. luminaire maintenance factor)/acc. to CIE 97: 2005<br>Luminaire maintenance factor that takes the soiling into account of the luminaire in the course of the operating time. The luminaire maintenance factor is specified as a decimal digit and can have a maximum value of 1 (no soiling existing). |
| LSF | (Engl. lamp survival factor)/acc. to CIE 97: 2005<br>Lamp survival factor that takes the total failure into account of a luminaire in the course of the operating time. The lamp survival factor is specified as a decimal digit and can have a maximum value of 1 (no failures existing within the time concerned or prompt replacement after the failure). |
| Luminance | Dimension for the "brightness impression" that the human eye has of a surface. The surface itself can emit light thereby or light striking it can be reflected (emitter value). It is the only photometric value that the human eye can perceive.<br><br>Unit: Candela per square metre<br>Abbreviation: cd/m$^2$<br>Formula symbol: L |
| Luminous efficacy | Ratio of the emitted luminous flux Φ [lm] to the absorbed electrical power P [W] Unit: lm/W.<br><br>This ratio can be formed for the lamp or LED module (lamp or module light output), the lamp or module with control gear (system light output) and the complete luminaire (luminaire light output). |
| Luminous flux | Dimension for the total light output that is emitted from one light source in all directions. It is thus an "emitter value" that specifies the entire emitting output. The luminous flux of a light source can only be determined in a laboratory. A difference is made between the lamp or LED module luminous flux and the luminaire luminous flux.<br><br>Unit: Lumen<br>Abbreviation: lm<br>Formula symbol: Φ |
| Luminous intensity | Describes the intensity of the light in a certain direction (emitter value). The luminous intensity is a matter of the luminous flux Φ that is emitted in a certain spherical angle Ω. The radiation characteristics of a light source are presented graphically in a light distribution curve (LDC). The luminous intensity is an SI base unit.<br><br>Unit: Candela<br>Abbreviation: cd<br>Formula symbol: I |

# Glossary

## M

| | |
|---|---|
| Maintenance factor | See MF |
| MF | (Engl. maintenance factor)/acc. to CIE 97: 2005<br>Maintenance factor as decimal number between 0 and 1 that describes the ratio of the new value of a photometric planning parameter (e.g. of the illuminance) to a maintenance value after a certain time. The maintenance factor takes into account the soiling of luminaires and rooms as well as the luminous flux reduction and the failure of light sources.<br>The maintenance factor is taken into account either overall or determined in detail acc. to CIE 97: 2005 by the formula RMF x LMF x LLMF x LSF. |

## P

| | |
|---|---|
| P | (Engl. power)<br>Electric power consumption<br><br>Unit: watt<br>Abbreviation: W |

## R

| | |
|---|---|
| $R_{(UG)}$ max | Measure of the psychological glare in indoor spaces.<br>In addition to the luminance of luminaires, the level of the $R_{(UG)}$ value also depends on the observer position, the viewing direction and the ambient luminance. The calculation is made according to the table method, see CIE 117. Among other things, EN 12464-1:2021 specifies maximum permissible $R_{(UG)}$- values $R_{(UGL)}$ for various indoor workplaces. |
| Reflection factor | The reflection factor of a surface describes how much of the striking light is reflected back. The reflection factor is defined by the colour of the surface. |
| RMF | (Engl. room maintenance factor)/acc. to CIE 97: 2005<br>Room maintenance factor that takes the soiling into account of the space encompassing surfaces in the course of the operating time. The room maintenance factor is specified as a decimal digit and can have a maximum value of 1 (no soiling existing). |

## S

| | |
|---|---|
| Surrounding area | The ambient area directly borders the area of the visual task and should be planned with a width of at least 0.5 m according to DIN EN 12464-1. It is at the same height as the area of the visual task. |

# Glossary

## U

| | |
|---|---|
| UGR (max) | (unified glare rating)<br>Measure for the psychological glare effect in interiors.<br>In addition to luminaire luminance, the UGR value also depends on the position of the observer, the viewing direction and the ambient luminance. Among other things, EN 12464-1 specifies maximum permissible UGR values for various indoor workplaces. |
| UGR observer | Calculation point in the room, for the DIALux the UGR value is determined. The location and height of the calculation point should correspond to the typical observer position (position and eye level of the user). |

## V

| | |
|---|---|
| Visual task area | The area that is needed for carrying out the visual task in accordance with DIN EN 12464 -1. The height corresponds with the height at which the visual task is executed. |

## W

| | |
|---|---|
| Wall zone | Circumferential area between working plane and walls which is not taken into account for the calculation. |
| Working plane | Virtual measuring or calculation surface at the height of the visual task that generally follows the room geometry. The working plane may also feature a wall zone. |

## 13.8. ANEJO 8. CÁLCULOS LUMINOTÉCNICOS DE LOS DOMOS REFLECTANTES

En el siguiente documento se recogen los cálculos luminotécnicos y diseño de la instalación de luz natural en el interior del depósito del tanque de tormentas, así como los resultados obtenidos.

# Tanque Norte - Valencia - Layout 1

## Layout Summary Report

Spain - Valencia

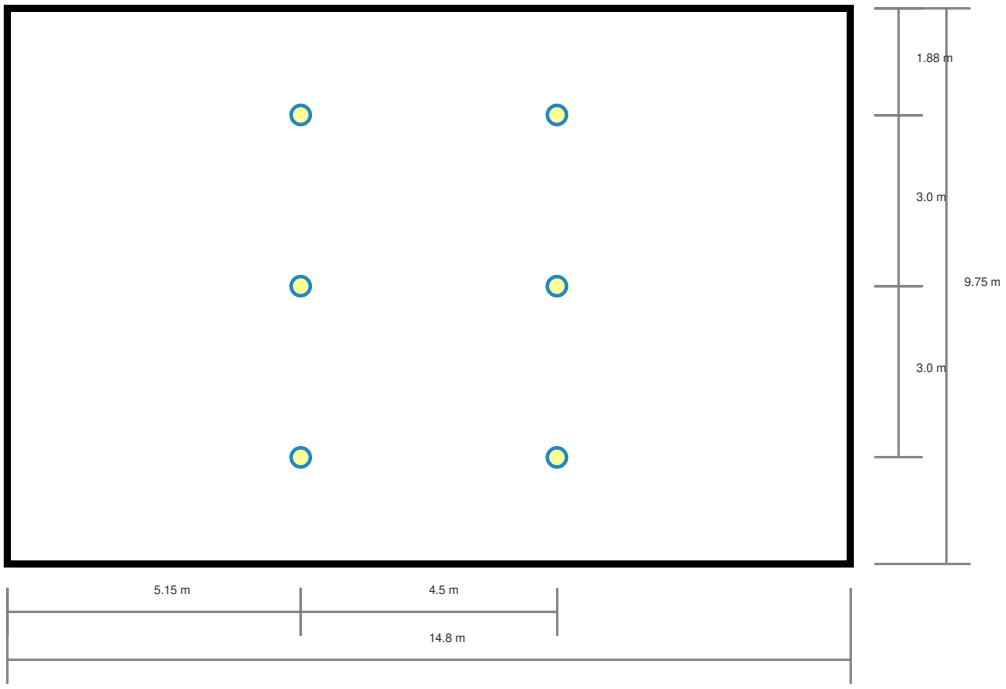
24/7/365

### Light Levels

| | | | |
|---|---|---|---|
| Average Illuminance: | 85 lux | Maximum to Minimum: | 3.5 : 1 |
| Maximum Illuminance: | 136 lux | Average : Minimum: | 2.2 : 1 |
| Minimum Illuminance: | 39 lux | Grid Spacing: | 0.6 m on center |

*6 devices provide 85 lux average on 21 September at 12:00 with 0% cloud cover*

### Reflected Ceiling Plan




### Solution Information

| | | | | | |
|---|---|---|---|---|---|
| Product: | S290DS DA L4 | Rows: | 3 | Date and Time: | 21 September at 12:00 |
| Tube Length: | 1.8 m | Row Spacing: | 3.0 m | Solar Position: | 50.9deg Altitude and -3.4deg Azimuth |
| Elbows: | 0 | Columns: | 2 | Sky Condition: | 0% cloud cover |
| LLF: | 1.03 | Column Spacing: | 4.5 m | IES File Name: | s290ds_da_l4_clr50 |

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# Tanque Norte - Valencia - Layout 1

## Calculation Grid

Spain - Valencia

24/7/365

### Light Levels

| | | | |
|---|---|---|---|
| Average Illuminance: | 85 lux | Maximum to Minimum: | 3.5 : 1 |
| Maximum Illuminance: | 136 lux | Average : Minimum: | 2.2 : 1 |
| Minimum Illuminance: | 39 lux | Grid Spacing: | 0.6 m on center |

*6 devices provide 85 lux average on 21 September at 12:00 with 0% cloud cover*

### Grid Values

North Wall

| | 0.5 | 1.1 | 1.7 | 2.3 | 2.9 | 3.5 | 4.1 | 4.7 | 5.3 | 5.9 | 6.5 | 7.1 | 7.7 | 8.3 | 8.9 | 9.5 | 10.1 | 10.7 | 11.3 | 11.9 | 12.5 | 13.1 | 13.7 | 14.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.38 | 39 | 43 | 48 | 55 | 63 | 70 | 74 | 79 | 82 | 86 | 88 | 92 | 92 | 88 | 86 | 82 | 79 | 74 | 70 | 63 | 55 | 48 | 43 | 39 |
| 0.98 | 41 | 46 | 51 | 61 | 69 | 75 | 82 | 86 | 89 | 94 | 98 | 103 | 103 | 98 | 94 | 89 | 86 | 82 | 75 | 69 | 61 | 51 | 46 | 41 |
| 1.58 | 42 | 48 | 54 | 65 | 74 | 81 | 88 | 97 | 102 | 104 | 107 | 111 | 111 | 107 | 104 | 102 | 97 | 88 | 81 | 74 | 65 | 54 | 48 | 42 |
| 2.18 | 44 | 50 | 57 | 68 | 77 | 86 | 95 | 106 | 112 | 114 | 115 | 118 | 118 | 115 | 114 | 112 | 106 | 95 | 86 | 77 | 68 | 57 | 50 | 44 |
| 2.78 | 45 | 51 | 59 | 69 | 81 | 91 | 99 | 109 | 115 | 118 | 121 | 126 | 126 | 121 | 118 | 115 | 109 | 99 | 91 | 81 | 69 | 59 | 51 | 45 |
| 3.38 | 45 | 52 | 60 | 72 | 85 | 95 | 102 | 109 | 116 | 121 | 125 | 133 | 133 | 125 | 121 | 116 | 109 | 102 | 95 | 85 | 72 | 60 | 52 | 45 |
| 3.98 | 46 | 53 | 61 | 74 | 87 | 97 | 106 | 112 | 118 | 125 | 130 | 136 | 136 | 130 | 125 | 118 | 112 | 106 | 97 | 87 | 74 | 61 | 53 | 46 |
| 4.58 | 46 | 53 | 62 | 75 | 86 | 96 | 107 | 117 | 124 | 128 | 132 | 135 | 135 | 132 | 128 | 124 | 117 | 107 | 96 | 86 | 75 | 62 | 53 | 46 |
| 5.18 | 46 | 53 | 62 | 75 | 86 | 96 | 107 | 118 | 126 | 129 | 131 | 134 | 134 | 131 | 129 | 126 | 118 | 107 | 96 | 86 | 75 | 62 | 53 | 46 |
| 5.78 | 46 | 53 | 61 | 72 | 86 | 96 | 104 | 114 | 122 | 125 | 128 | 134 | 134 | 128 | 125 | 122 | 114 | 104 | 96 | 86 | 72 | 61 | 53 | 46 |
| 6.38 | 45 | 52 | 60 | 71 | 85 | 94 | 101 | 108 | 115 | 120 | 124 | 132 | 132 | 124 | 120 | 115 | 108 | 101 | 94 | 85 | 71 | 60 | 52 | 45 |
| 6.98 | 44 | 51 | 58 | 69 | 81 | 91 | 99 | 105 | 110 | 116 | 121 | 126 | 126 | 121 | 116 | 110 | 105 | 99 | 91 | 81 | 69 | 58 | 51 | 44 |
| 7.58 | 43 | 49 | 56 | 68 | 77 | 85 | 93 | 102 | 107 | 111 | 114 | 117 | 117 | 114 | 111 | 107 | 102 | 93 | 85 | 77 | 68 | 56 | 49 | 43 |
| 8.18 | 42 | 47 | 53 | 64 | 72 | 78 | 85 | 94 | 100 | 101 | 103 | 107 | 107 | 103 | 101 | 100 | 94 | 85 | 78 | 72 | 64 | 53 | 47 | 42 |
| 8.78 | 40 | 45 | 50 | 58 | 66 | 70 | 76 | 83 | 88 | 89 | 91 | 96 | 96 | 91 | 89 | 88 | 83 | 76 | 70 | 66 | 58 | 50 | 45 | 40 |
| 9.38 | 39 | 42 | 47 | 53 | 59 | 64 | 67 | 72 | 75 | 78 | 80 | 84 | 84 | 80 | 78 | 75 | 72 | 67 | 64 | 59 | 53 | 47 | 42 | 39 |

West Wall

East Wall

South Wall

### Daylight Factor and LM-83

| | | | |
|---|---|---|---|
| Exterior Illuminance: | 74933 lux | sDA: | 0 % of points above 300 lux for more than 50% of hours |
| Average Daylight Factor: | 0.11 % | sDA Acceptability: | Not Computed |
| Maximum Daylight Factor: | 0.18 % | ASE: | 0 % of points above 1000 lux for more than 250 hours |
| Minimum Daylight Factor: | 0.05 % | | |

### Solution Information

| | | | | | |
|---|---|---|---|---|---|
| Product: | S290DS DA L4 | Rows: | 3 | Date and Time: | 21 September at 12:00 |
| Tube Length: | 1.8 m | Row Spacing: | 3.0 m | Solar Position: | 50.9deg Altitude and -3.4deg Azimuth |
| Elbows: | 0 | Columns: | 2 | Sky Condition: | 0% cloud cover |
| LLF: | 1.03 | Column Spacing: | 4.5 m | IES File Name: | s290ds_da_l4_clr50 |



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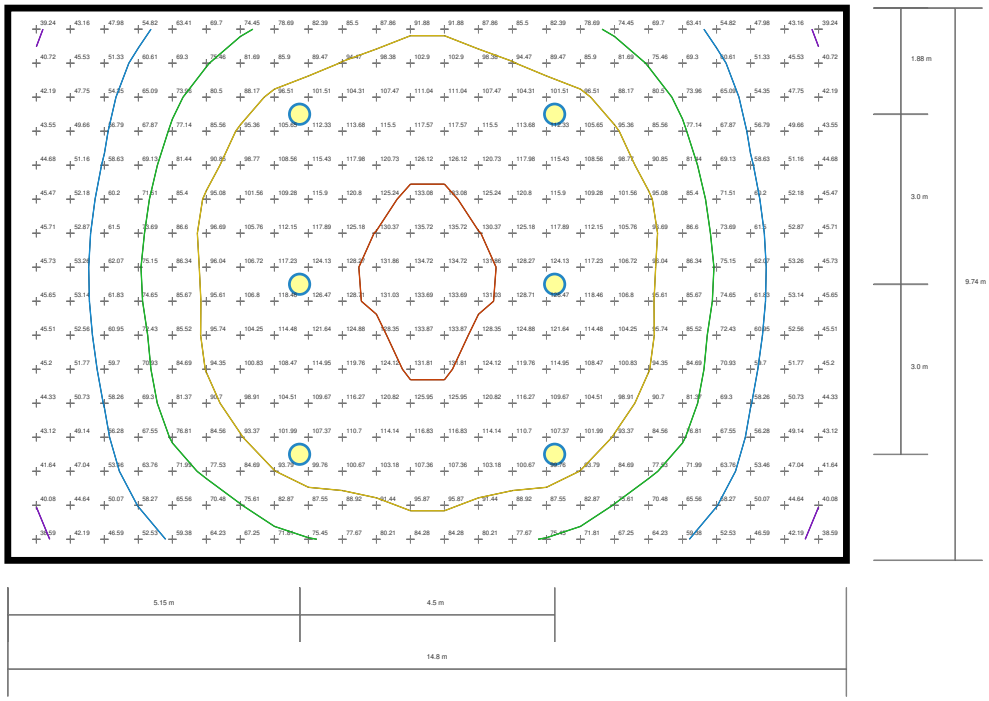
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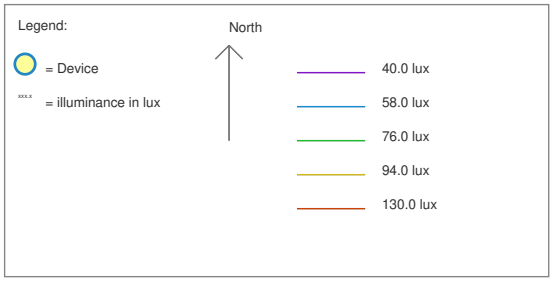
# Tanque Norte - Valencia - Layout 1

## Contour Plot

Spain - Valencia

24/7/365




## Solution Information

| | | | | | |
|---|---|---|---|---|---|
| Product: | S290DS DA L4 | Rows: | 3 | Date and Time: | 21 September at 12:00 |
| Tube Length: | 1.8 m | Row Spacing: | 3.0 m | Solar Position: | 50.9deg Altitude and -3.4deg Azimuth |
| Elbows: | 0 | Columns: | 2 | Sky Condition: | 0% cloud cover |
| LLF: | 1.03 | Column Spacing: | 4.5 m | IES File Name: | s290ds_da_l4_clr50 |

Report generated by the Solatube Design Calculator on Tue Dec 5 11:29:49 2023

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## 13.9. ANEJO 9. CARACTERÍSTICAS REJA AUTOMÁTICA DE DESBASTE DE GRUESOS

En el siguiente documento se recogen las características técnicas y dimensiones de la reja de gruesos seleccionada.

# REJA DE CADENAS

Reja de cadenas Quilton mod. QC100 (10x930x4800) en material AISI-316L



## CARACTERÍSTICAS GENERALES

| | |
|---|---|
| Mod. Reja de cadena | QC100 |
| Material | AISI-316L |
| Tipo (AxW1xH1) | 10x930x4800 |

## DIMENSIONES

| | |
|---|---|
| Luz de paso (A) (mm) | 10 |
| Anchura canal (W) (mm) | 950 |
| Anchura reja (W1) (mm) | 930 |
| Altura canal (H) (mm) | 3250 |
| Altura descarga (H1) (mm) | 4800 |
| Altura total (H2) (mm) | 5700 |
| Inclinación | 80° |
| Nº peines de limpieza | 7 |
| Longitud barrotes (mm) | 1700 |
| Sección barrotes (mm) | 40x10 |

## CADENA DE PANTALLA

| | |
|---|---|
| Modelo | EHP-100 |
| Dureza, roldanas, casquillos, bulones | 48-50HR |
| Resistencia a la tracción | >45.000 N |
| Elongación | 0,45 mm/m |
| Paso | 100 mm |

## ESTRUCTURA

| | |
|---|---|
| Espesor (mm) | 5 |
| Tratamiento superficial | Chorreado SA 2 ½ |
| Protección adicional | Poliuretano RAL 7039 |

## MOTO-REDUCTOR

| | |
|---|---|
| Marca | Nord/Sew/Weg |
| Potencia (kw) | 1,5 |
| Velocidad salida (r.p.m.) | 5-10 |
| Protección | IP-55 |
| Aislamiento | Clase F |
| Eficiencia | IE3 |
| Tensión (V) | 400 |
| Frecuencia (Hz) | 50 |
| Amarre | Brazo de reacción |

## LIMITADOR ELECTRÓNICO DE PAR

| | |
|---|---|
| Marca | Unipower |
| Mod. limitador | HPL-110 |
| Tiempo de reacción (s) | 0,1 |

## CÁLCULOS HIDRÁULICOS

| | |
|---|---|
| Caudal unitario (m3/h) | 2405 |
| Sólidos en suspensión (p.p.m.) | 350 |
| Grado de colmatación_1 (%) | 30 |
| Colmatación_1: Nivel aguas arriba (WL) (mm) | 1500 |
| Colmatación_1: Velocidad acercamiento (V0) (m/s) | 0,47 |
| Colmatación_1: Nivel aguas abajo (WL1) (mm) | 1300 |
| Colmatación_1: Velocidad alejamiento (V2) (m/s) | 0,54 |
| Colmatación_1: Pérdida de carga (ΔH) (mm) | 200 |

## LISTA DE MATERIALES

| | |
|---|---|
| Bastidor | AISI-316L+Poliuretano RAL 7039 |
| Cadenas de pantalla filtrante | AISI-316/630 con tratamiento térmico |
| Rejilla filtrante (barrotes) | AISI-316L |
| Ejes | AISI-316L |
| Guías | AISI-316L |
| Rastrillo de limpieza | AISI-316L |
| Tapas-cubiertas | AISI-316L |
| Tornillería | A4 |

# DESCRIPCIÓN

La reja automática de cadenas Quilton es una reja de desbaste de gruesos que constituye un producto óptimo con un alto rendimiento en funcionamiento continuo e intermitente. Su adaptabilidad a canales existentes y nuevos, y el mínimo mantenimiento que precisa unido a unos bajos costos de operación, hacen de esta reja la solución de multitud de problemas adaptándose a los diversos requisitos y necesidades de cada aplicación.

La reja de cadenas Quilton consta de un bastidor de acero inoxidable construido rígidamente por fuertes perfiles de sujeción y amarre. Sirve de apoyo y fija los barrotes que forman la reja y que marcan, con su separación, la luz o paso de la reja deseado.

El agua residual fluye a través de los barrotes de la reja, mientras que los sólidos quedan retenidos en estos. Estos residuos son recogidos en la parte inferior del canal y trasladados a la zona superior donde tiene lugar la descarga, la cual puede efectuarse en contenedores, tornillos o cintas transportadoras, compactadores, etc.

El sistema de limpieza de la reja está sostenido entre dos cadenas y cuenta con unas guías que conducen los peines de accionamiento automático para que los dientes de los mismos se introduzcan entre las barras de la reja, sin apoyarse en ellas, de forma que realicen una correcta extracción de los sólidos desbastados, asegurando así una limpieza óptima de la reja.

El movimiento ascendente-descendente del sistema de limpieza es eléctrico en el mismo sentido que la corriente.




**REJA DE CADENAS QUILTON**

El funcionamiento del sistema de limpieza puede ser:

- Por medio de un reloj programador.
- Por medio de niveles: máximo de arranque y mínimo de parada. Este sistema se recomienda cuando se trata de aguas muy cargadas de sólido o cuando el caudal puede aumentar notablemente en época de lluvias.

# CARACTERÍSTICAS

***ESTRUCTURALES:***

- Diseño robusto a medida según requerimientos.
- Calidad de materiales: acero inoxidable AISI-304, AISI-316, dúplex 2205, superduplex 2507, etc…
- Adaptabilidad a canales ya existentes.
- Optimización en diseño para evitar el exceso de soldaduras.
- Eliminación del eje inferior para evitar atascamiento de sólidos y refuerzo en la zona para mayor soportación y robustez del equipo.
- Ruedas inferiores dentadas de alto espesor para engrane adecuado con la cadena, reduciendo así los desgastes y estiramientos de la misma, asegurando una mejor alineación y evitando que se salga lateralmente.

***MANTENIMIENTO:***

- Costos de operación y mantenimiento mínimo.
- Guías reforzadas con objeto de aumentar su vida útil y minimizar el coste del mantenimiento.
- Cadenas de pantalla diseñadas especialmente para ofrecer una gran resistencia y una gran precisión en la alineación, y tratadas térmicamente para incrementar su dureza y reducir estiramiento. Aumento de la vida útil de la cadena.
- Barrotes en módulos desmontables e intercambiables para facilitar las labores de montaje en caso de que éste sea efectuado “por partes”, para sustitución de tramos concretos que hayan podido sufrir deformaciones como consecuencia del golpe de sólidos de grandes dimensiones, y para posibilitar variar fácilmente la luz de malla en actuaciones futuras, en caso de requerir un aumento o reducción de la luz de malla actual.
- Peines en tramos desmontables e intercambiables para sustituir un sólo módulo en caso de que algún diente se vea afectado.

***MECÁNICAS:***

- Sistema especial de soportación de barrotes trasladada en la parte trasera para evitar flexiones y deformaciones, dejando un hueco entre los propios barrotes y el soporte para que los sólidos no interfieran en el movimiento de limpieza del peine.
- Estudio del número adecuado de peines para asegurar la alineación de las cadenas y su robustez, garantizando que no haya estiramientos y manteniendo así el paralelismo de sus elementos.
- Diseño de los peines de limpieza para facilitar descarga de sólidos en zona superior y asegurar óptima limpieza, estableciendo una longitud mínima de peine para reducir los momentos que se trasladan al inicio del movimiento.
- Soporte del peine reforzado a ambos lados con mayor espesor en la zona de acoplamiento con las cadenas, para absorber los excesos de esfuerzo y darles mayor robustez y garantía.

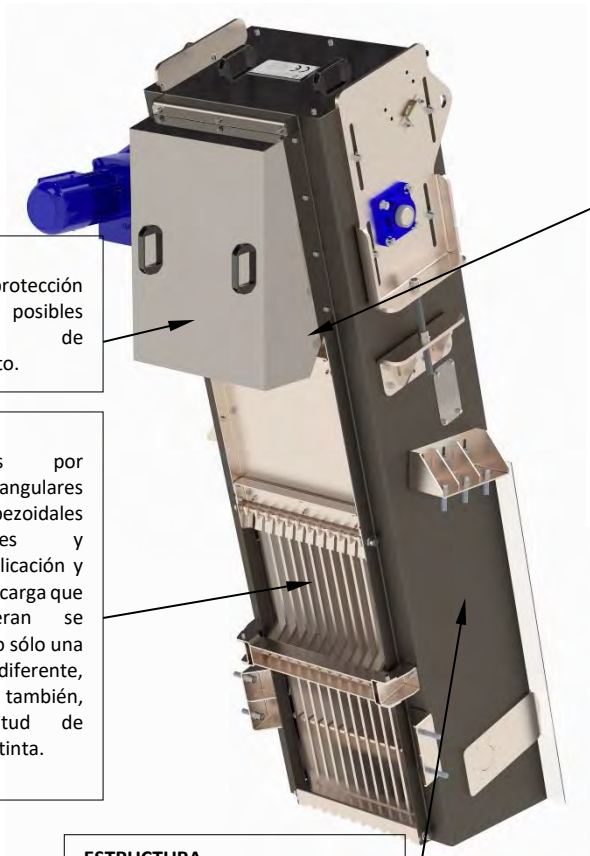
***FUNCIONAMIENTO:***

- Bajo consumo energético.
- Alta retención y extracción de sólidos. Apto para filtración de aguas agresivas.
- Funcionamiento intermitente óptimo.
- Bajas pérdidas de carga.

***MONTAJE:***

- Instalación sencilla.
- Fijación en la coronación del canal mediante soportes laterales.

# PARTES CONSTITUTIVAS



**CUBIERTAS**
Para la protección frente a posibles riesgos de atrapamiento.

**BARROTES**
Constituidos por perfiles rectangulares o trapezoidales longitudinales y según la aplicación y perdidas de carga que se requieran se empleará no sólo una luz de paso diferente, sino que también, una longitud de barrotes distinta.

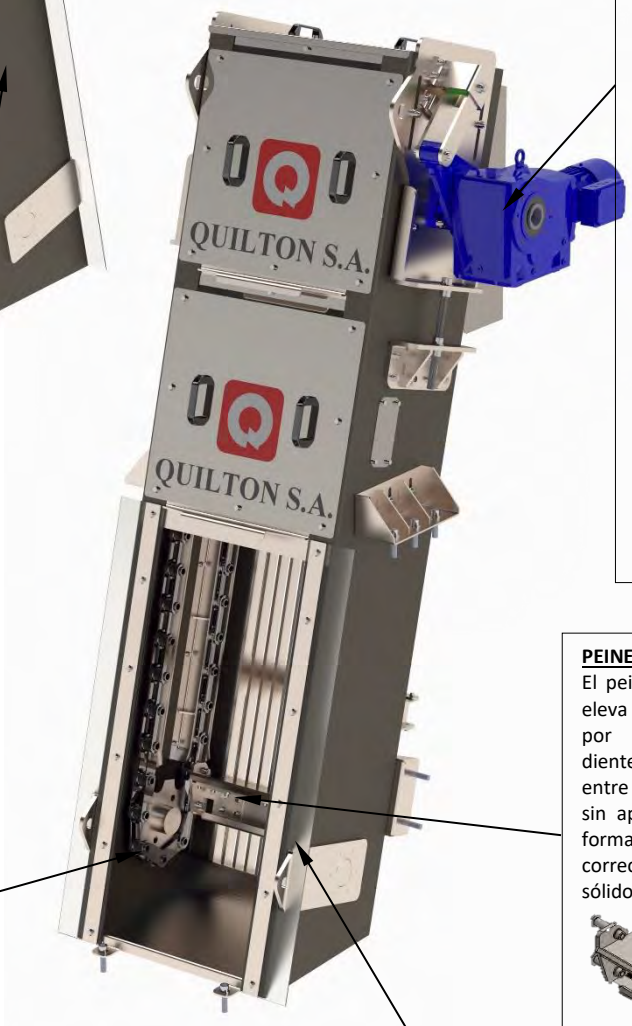
**ESTRUCTURA**
Estructura estable y sólida creada a partir de la unión de 2 laterales entre sí.
Gracias a esta concepción de diseño, podemos adaptarnos a canales nuevos y/o existentes.
Entre las calidades de material que podemos ofrecer a nuestro cliente encontramos:
- AISI-304
- AISI-316
- Dúplex
- Super Dúplex

**CADENAS DE TRANSMISIÓN**
Las cadenas de tracción, situadas en los laterales del equipo, son las encargadas de transformar el movimiento radial en un movimiento lineal y de transmitir dicho movimiento al peine de limpieza.
Para la fabricación de las rejas de cadenas, Quilton emplea una cadena premontada sometida a un tratamiento especial que incrementa su dureza y mejora la resistencia a la corrosión. Gracias a este tratamiento se reducen los desgastes y estiramientos, alargando su vida útil.

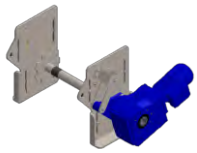


**SISTEMA DE LIMPIEZA / RASQUETA**
Se compone de una rampa de descarga, y una rasqueta de polietileno PEHD 1000 totalmente atornillada.
Su función más relevante es la separación de sólidos de la rampa de descarga, mediante gravedad, para su vertido a un contenedor o recipiente de recogida que disponga la planta.

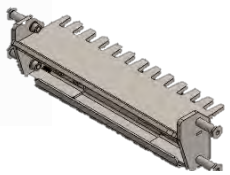




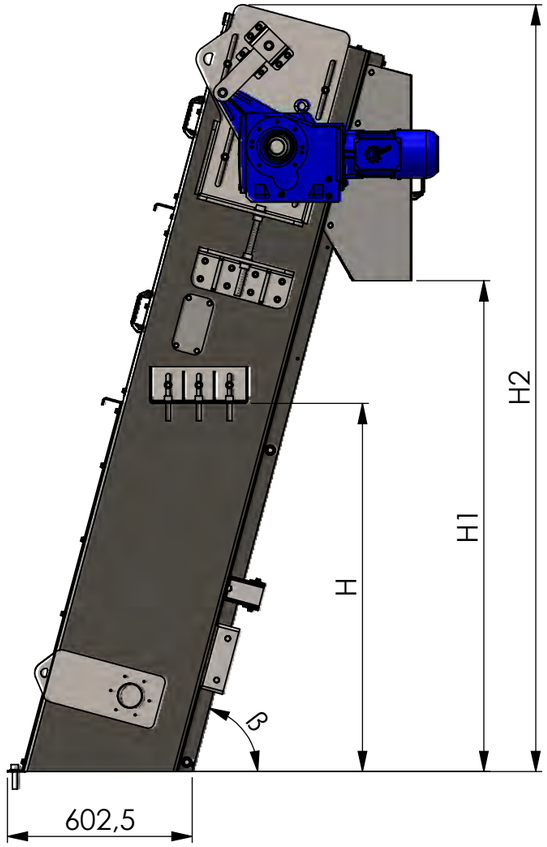

**SISTEMA MOTRIZ**
La elevación de los peines es generada por un motor-reductor aplicado al eje motriz qué a su vez, mediante las ruedas guiadas laterales, transmite su movimiento rotacional a un movimiento guiado a la cadena.
Quilton prevé la colocación, en todas sus rejas, de moto-reductores de primera marca para garantizar el funcionamiento de los equipos con altas prestaciones y un bajo consumo.

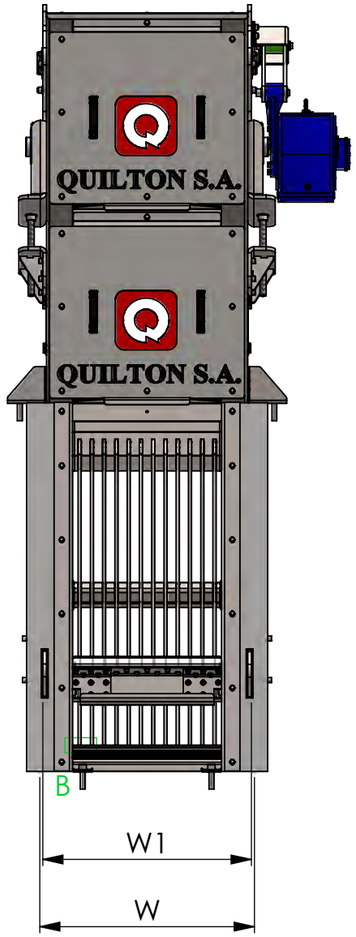


**PEINES DE LIMPIEZA**
El peine rastrillo recoge y eleva los sólidos retenidos por los barrotes. Los dientes se introducen entre las barras de la reja sin apoyarse en ellas, de forma que realicen una correcta extracción de los sólidos desbastados.

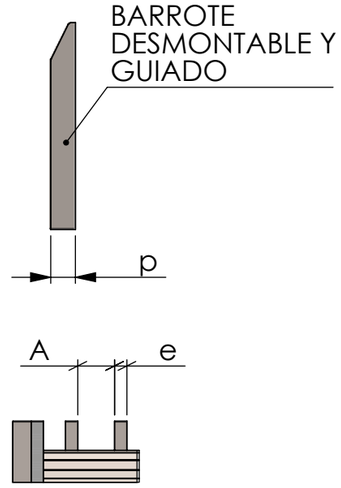


**JUNTAS DE ESTANQUEIDAD**
Estos elementos facilitan el cierre lateral del equipo con el canal.

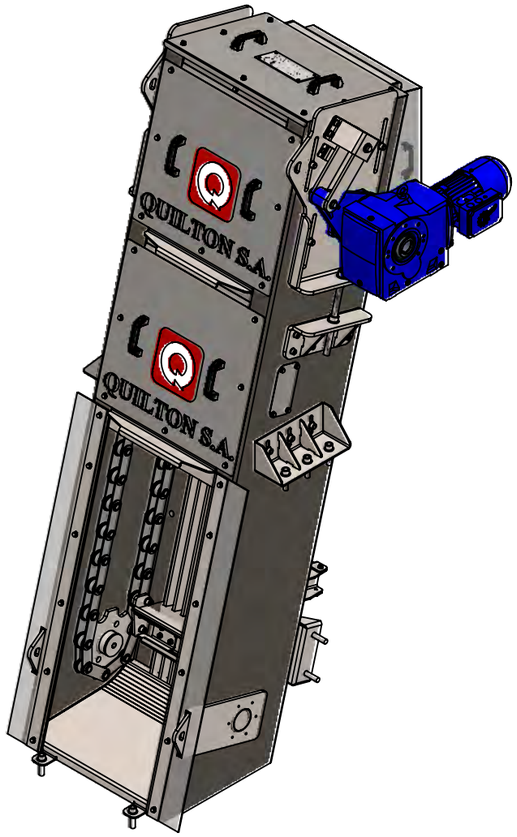



DETALLE BARROTE

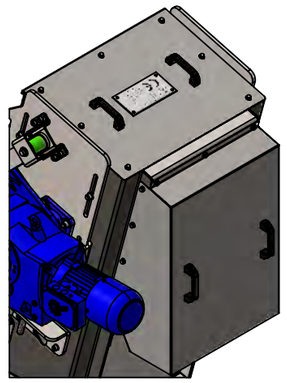



DETALLE B (1 : 5)

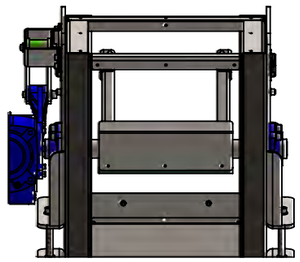



DETALLE COMPONENTES

TOLVA INCORPORADA



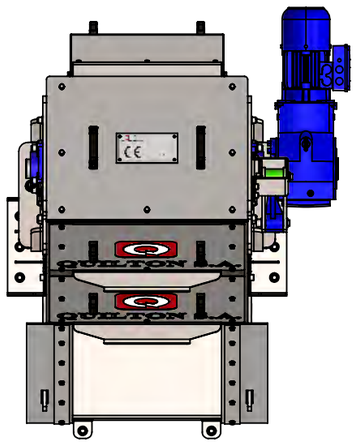
SISTEMA LIMPIEZA DESMONTABLE



CADENA PREMONTADA



| CARACTERISTICAS GENERALES | |
|---|---|
| CANAL | |
| Ancho (W) | s/oferta técnica |
| Alto (H) | s/oferta técnica |
| REJA DE CADENA | |
| Luz de paso (A) | s/oferta técnica |
| Ancho (W1) | s/oferta técnica |
| Altura Descarga solidos (H1) | s/oferta técnica |
| Altura Total (H2) | s/oferta técnica |
| Inclinacion (ß) | s/oferta técnica |
| Sección barrote (pxe) | s/oferta técnica |



NOTA: PLANO SUJETO A POSIBLES MODIFICACIONES

| REV. 0 | DESCRIPCIÓN | FECHA | APROBADO |
|---|---|---|---|
| QUILTON | EQUIPO: REJA DE CADENAS | PROYECTO: OFERTA | |
| | MODELO: QC-V18 | | |
| PROYECCION: | CARACTERISTICAS: | AUTOR: - | FECHA: 26/11/18 |
| TOLERANCIAS: | DESCRIPCION: CONJUNTO EQUIPO | MATERIAL: - | PESO: - Kg |
| 0< t ≤100 ± 1 / 1500<t≤ 3000 ± 6 | | | |
| 100< t ≤ 250 ± 2 / t >3000 ± 12 | Nº DE PLANO: QC-000-01 | FORMATO: A3 | ESCALA: 1:20 |
| 250< t≤ 1500 ± 3 / ÁNGULOS t± 1° | | | |

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# 13.10. ANEJO 10. ESTUDIO DE GESTIÓN DE RESIDUOS

## Introducción y Naturaleza del trabajo

Este Estudio tiene la misión básica de incidir en la cultura del personal de la obra, con el fin de mejorar la gestión de los residuos que genera esta actividad. Una gestión que se ciñe principalmente a los objetivos de minimizar y clasificar en origen.

## Ámbito Legal

El presente plan se redacta para dar cumplimiento al Real Decreto 105/2008 del 1 de Febrero del Ministerio de la Presidencia, por el que se regula la producción y gestión de los residuos de construcción y demolición, y a la Orden 2726/2009, de 16 de Julio, de la Consejería de Medio Ambiente, Vivienda y Ordenación del Territorio por la que se regula la gestión de construcción y demolición en la Comunidad de Madrid.

## Criterios para la reducción de los residuos en obra

Se pretende minimizar los residuos en obra, mediante un conjunto de acciones organizativas, operativas y técnicas, necesarias para disminuir la cantidad de los residuos, mediante la reducción y reutilización de los mismos en origen. Así pues, es imprescindible que la primera acción asociada a la gestión de los residuos sea intentar reducir su volumen en el emplazamiento donde se han generado, para lo cual se asumen los siguientes criterios:

a) En fase de proyecto:

- Prever la cantidad y naturaleza de los residuos que se van a generar.
- Optimizar los recursos a fin de originar menos residuos.
- Limitar y controlar la utilización de materiales potencialmente tóxicos.

b) En fase de programación de la obra:

- Optimizar la cantidad de materiales, ajustándolos a los necesarios para la ejecución de la obra.

- Prever el acopio de los materiales fuera de las zonas de tránsito de la obra, de forma que permanezcan bien embalados y protegidos hasta el momento de su utilización, con el fin de evitar que la rotura de piezas dé lugar a residuos.

c) En fase de ejecución de obra:

- Fomentar el interés por reducir los recursos utilizados y los volúmenes de residuos originados.
- Comprobar que todos cuantos intervienen en la obra, conocen sus obligaciones con respecto a la gestión de los residuos.
- Aplicar en la propia obra las operaciones de reutilización de residuos, para que no constituyan sobrantes que deban ser gestionados.
- Establecer una zona protegida de acopio de materiales, a resguardo de acciones que puedan inutilizarlos.
- Disponer de contenedores adecuados a cada tipo de material sobrante.
- Vigilar que los residuos líquidos y orgánicos no se mezclen fácilmente con otros.
- Impedir malas prácticas, que de forma indirecta originan residuos imprevistos y el derroche de materiales durante la puesta en obra.

**Ficha técnica de la obra**

Tipo de obra: PROYECTO DE CONSTRUCCIÓN DEL TANQUE DE TORMENTAS NORTE DE LA UNIDAD DE EJECUCIÓN UE-VII.1. “SISTEMAS GENERALES P.E. + KODAK” DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

**Situación**

El tanque de tormentas Norte se sitúa en la confluencia de las calles Formentera e Isla del Hierro.

## Identificación y cuantificación de residuos

### Identificación de residuos a generar

En los trabajos de demolición correspondientes a la obra de referencia y durante la ejecución de las obras, se estima que se generarán los siguientes tipos de residuos, identificados según los códigos establecidos en la Lista Europea de Residuos, publicada por Orden MAM/304/2002 del Ministerio de Medio Ambiente, de 8 de febrero, o sus modificaciones posteriores:

| A.1.: RCDs Nivel I | | |
|---|---|---|
| | **1. TIERRAS Y PÉTROS DE LA EXCAVACIÓN** | |
| | 17 05 04 | Tierras y piedras distintas de las especificadas en el código 17 05 03 |
| | 17 05 06 | Lodos de drenaje distintos de los especificados en el código 17 05 06 |
| | 17 05 08 | Balasto de vías férreas distinto del especificado en el código 17 05 07 |

| A.2.: RCDs Nivel II | | |
|---|---|---|
| | **RCD: Naturaleza no pétrea** | |
| | **1. Asfalto** | |
| | 17 03 02 | Mezclas bituminosas distintas a las del código 17 03 01 |
| | **2. Madera** | |
| | 17 02 01 | Madera |
| | **3. Metales** | |
| | 17 04 01 | Cobre, bronce, latón |
| X | 17 04 02 | Aluminio |
| | 17 04 03 | Plomo |
| | 17 04 04 | Zinc |
| x | 17 04 05 | Hierro y Acero |
| | 17 04 06 | Estaño |
| x | 17 04 06 | Metales mezclados |
| | 17 04 11 | Cables distintos de los especificados en el código 17 04 10 |
| | **4. Papel** | |
| X | 20 01 01 | Papel |
| | **5. Plástico** | |
| x | 17 02 03 | Plástico |
| | **6. Vidrio** | |
| X | 17 02 02 | Vidrio |
| | **7. Yeso** | |
| | 17 08 02 | Materiales de construcción a partir de yeso distintos a los del código 17 08 01 |

| | RCD: Naturaleza pétrea | |
|---|---|---|
| | **1. Arena Grava y otros áridos** | |
| | 01 04 08 | Residuos de grava y rocas trituradas distintos de los mencionados en el código 01 04 07 |
| | 01 04 09 | Residuos de arena y arcilla |

| | **2. Hormigón** | |
|---|---|---|
| x | 17 01 01 | Hormigón |

| | **3. Ladrillos , azulejos y otros cerámicos** | |
|---|---|---|
| X | 17 01 02 | Ladrillos |
| | 17 01 03 | Tejas y materiales cerámicos |
| x | 17 01 07 | Mezclas de hormigón, ladrillos, tejas y materiales cerámicos distintas de las especificadas en el código 1 7 01 06. |

| | **4. Piedra** | |
|---|---|---|
| x | 17 09 04 | RDCs mezclados distintos a los de los códigos 17 09 01, 02 y 03 |

| | RCD: Potencialmente peligrosos y otros | |
|---|---|---|
| | **1. Basuras** | |
| | 20 02 01 | Residuos biodegradables |
| x | 20 03 01 | Mezcla de residuos municipales |

| | **2. Potencialmente peligrosos y otros** | |
|---|---|---|
| | 17 01 06 | mezcal de hormigón, ladrillos, tejas y materilaes cerámicos con sustancias peligrosas (SP's) |
| | 17 02 04 | Madera, vidrio o plastico con sustancias peligrosas o contaminadas por ellas |
| | 17 03 01 | Mezclas bituminosas que contienen alquitran de hulla |
| x | 17 03 03 | Alquitrán de hulla y productos alquitranados |
| | 17 04 09 | Residuos metálicos contaminados con sustancias peligrosas |
| | 17 04 10 | Cables que contienen hidrocarburos, alquitran de hulla y otras SP's |
| | 17 06 01 | Materiales de aislamiento que contienen Amianto |
| | 17 06 03 | Otros materiales de aislamiento que contienen sustancias peligrosas |
| | 17 06 05 | Materiales de construcción que contienen Amianto |
| | 17 08 01 | Materiales de construcción a partir de yeso contaminados con SP's |
| | 17 09 01 | Residuos de construcción y demolición que contienen mercúrio |
| | 17 09 02 | Residuos de construcción y demolición que contienen PCB's |
| | 17 09 03 | Otros residuos de construcción y demolición que contienen SP's |
| | 17 06 04 | Materiales de aislamientos distintos de los 17 06 01 y 03 |
| | 17 05 03 | Tierras y piedras que contienen SP's |
| | 17 05 05 | Lodos de drenaje que contienen sustancias peligrosas |
| | 17 05 07 | Balastro de vías férreas que contienen sustancias peligrosas |
| x | 15 02 02 | Absorventes contaminados (trapos,…) |
| | 13 02 05 | Aceites usados (minerales no clorados de motor,…) |
| | 16 01 07 | Filtros de aceite |
| | 20 01 21 | Tubos fluorescentes |
| | 16 06 04 | Pilas alcalinas y salinas |
| | 16 06 03 | Pilas botón |
| x | 15 01 10 | Envases vacíos de metal o plastico contaminado |
| x | 08 01 11 | Sobrantes de pintura o barnices |
| x | 14 06 03 | Sobrantes de disolventes no halogenados |
| x | 07 07 01 | Sobrantes de desencofrantes |
| x | 15 01 11 | Aerosoles vacios |
| | 16 06 01 | Baterías de plomo |
| x | 13 07 03 | Hidrocarburos con agua |
| | 17 09 04 | RDCs mezclados distintos códigos 17 09 01, 02 y 03 |

**Estimación de residuos generados**

Según decreto 189/2005:

No se consideran incluidas dentro del ámbito de aplicación las tierras y piedras limpias procedentes de excavaciones reutilizadas en la obra.

a) Fase de demolición

Incluimos en el presente estudio los restos procedentes de la demolición del pavimento existente, correspondiente al Proyecto del Ámbito de Actuación.

También, deberemos incluir los trabajos de desmontaje de las señales de tráfico existentes, desbroce y arranque de árboles y del cerramiento metálico.

b) Fase de ejecución de las obras

Para poder organizar y optimizar la gestión de los residuos, demolición y desmontaje, es imprescindible realizar una aproximación sobre la cantidad y naturaleza de los materiales sobrantes que se van a generar.

## GESTION DE RESIDUOS DE DEMOLICIÓN (RCD)

| **Estimación de residuos** | | |
|---|---|---|
| | | |
| Superficie Construida total | 186,63 | m² |
| Volumen de resíduos (S x 0,20) | 37,33 | m³ |
| Densidad tipo (entre 1,5 y 0,5 T/m³) | 1,00 | Tn/m³ |
| Toneladas de residuos | 37,33 | Tn |
| | | |
| Estimación de volumen de tierras procedentes de la excavación | 2539,00 | m³ |
| Presupuesto estimado de la obra | 1.109.067,07 | € |
| Presupuesto de movimiento de tierras en proyecto | 156.612,06 | € |

| **A.1.: RCDs Nivel II** | | | | |
|---|---|---|---|---|
| | % | Tn | d | V |
| Evaluación teórica del peso por tipología de RDC | % de peso (según CC.AA Madrid) | Toneladas de cada tipo de RDC | Densidad tipo (entre 1,5 y 0,5) | m³ Volumen de Residuos |
| **1. TIERRAS Y PÉTROS DE LA EXCAVACIÓN** | | | | |
| Tierras y pétreos procedentes de la excavación estimados directamente desde los datos de proyecto | 0,00 | 2285,10 | 0,90 | 2539,00 |

| **A.2.: RCDs Nivel II** | | | | |
|---|---|---|---|---|
| | % | Tn | d | V |
| Evaluación teórica del peso por tipología de RDC | % de peso (según CC.AA Madrid) | Toneladas de cada tipo de RDC | Densidad tipo (entre 1,5 y 0,5) | m³ Volumen de Residuos |
| **RCD: Naturaleza no pétrea** | | | | |
| 1. Asfalto | 0,090 | 3,36 | 0,85 | 3,95 |
| 2. Metales | 0,050 | 1,87 | 0,60 | 3,11 |
| 3. Papel | 0,003 | 0,11 | 0,50 | 0,22 |
| 4. Plástico | 0,020 | 0,75 | 0,50 | 1,49 |
| 5. Vidrio | 0,005 | 0,19 | 0,50 | 0,37 |
| **TOTAL estimación** | 0,168 | **6,27** | | **9,15** |
| | | | | |
| **RCD: Naturaleza pétrea** | | | | |
| 1. Hormigón | 0,100 | 3,73 | 0,85 | 4,39 |
| **TOTAL estimación** | 0,100 | **3,73** | | **4,39** |
| | | | | |
| **RCD: Potencialmente peligrosos y otros** | | | | |
| 1. Basuras | 0,050 | 1,87 | 0,50 | 3,73 |
| 2. Potencialmente peligrosos y otros | 0,030 | 1,12 | 0,50 | 2,24 |
| **TOTAL estimación** | 0,080 | **2,99** | | **5,97** |

A continuación, se detallan los cálculos en la tabla adjunta:

**Gestión interna**

**Medidas de segregación "in situ"**

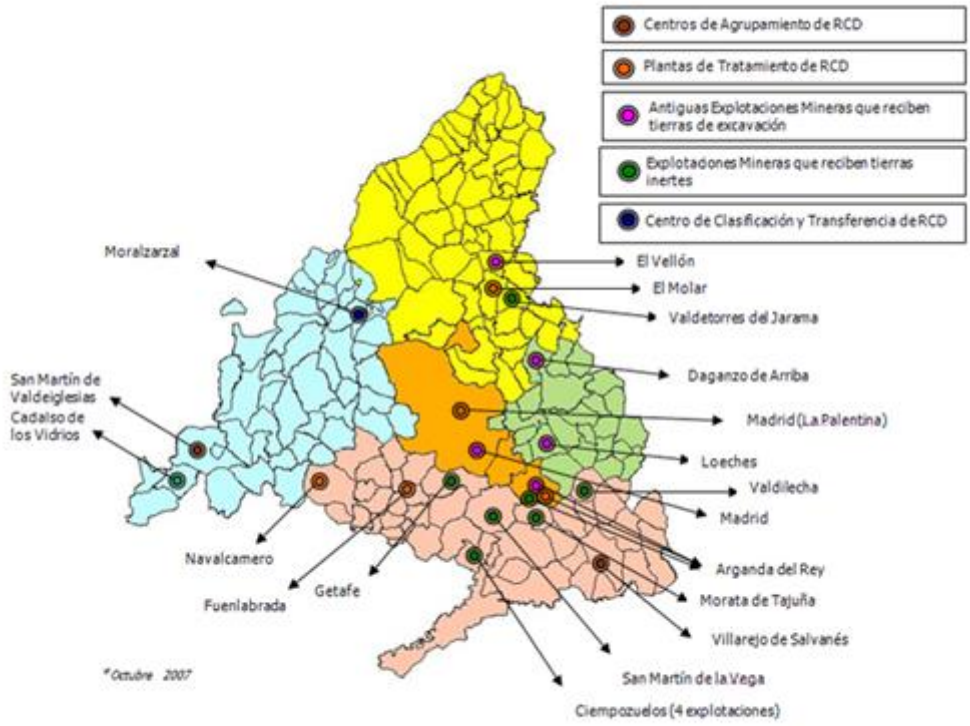
- Los residuos de la misma naturaleza o similares, deben ser almacenados en los mismos contenedores. De esta forma se aprovecha mejor el espacio y se facilita su posterior valoración.
- Se debe prever y optimizar el almacenamiento de los residuos.
- Los contenedores y las zonas donde se almacenarán los residuos deben estar claramente designados.
- En general serán necesarios los siguientes elementos de almacenamiento:
  - Zona de almacenamiento para materiales reutilizables.
  - Contenedor para residuos pétreos.
  - Contenedor para residuos banales.
  - En caso de ser necesario, se empleará contenedor específico para los residuos provenientes de los yesos.

| SISTEMA DE GESTIÓN PREVISTO | | | |
|---|---|---|---|
| MATERIAL | ALMACENAMIENTO | TRATAMIENTO | DESTINO |
| Materiales pétreos | En obra y contenedores | Ninguno | Planta RCD |
| Metales | En obra y contenedores | Ninguno | Planta RCD |
| Otros | En obra y contenedores | Ninguno | Planta RCD |

**Gestión externa**

Una vez valorados los residuos, la gestión de los mismos será competencia de la empresa encargada de la gestión de los contenedores.

El destino final de dichos residuos será la Planta RCD de Fuenlabrada dada su proximidad a la zona de actuación.




**Prescripciones en relación con la gestión de residuos**

El depósito temporal de los escombros se realizará en sacos industriales para acopios iguales o inferiores a 1 metro cúbico y en contenedores metálicos específicos para acopios mayores, con la ubicación y condicionado que establezcan las ordenanzas municipales. Dicho depósito en acopios también deberá estar en lugares debidamente señalizados y segregados del resto de residuos.

El depósito temporal para RC valorizables (papeles, plásticos, chatarra,...), que se realice en contenedores o en acopios, se deberá señalizar y segregar del resto de residuos de un modo adecuado.

Los contenedores deberán estar pintados en colores que destaquen su visibilidad, especialmente durante la noche, y contar con una banda de material reflectante de, al menos, 15 centímetros a lo largo de todo su perímetro. En los mismos debe figurar la

siguiente información: razón social, CIF, teléfono del titular del contenedor / envase, y el número de inscripción en el Registro de Transportistas de Residuos. Dicha información también deberá quedar reflejada en los sacos industriales u otros elementos de contención, a través de adhesivos, placas, etc.

El responsable de la obra a la que prestan servicio los contenedores adoptará las medidas necesarias para evitar el depósito de residuos ajenos a la misma.

Los contenedores permanecerán cerrados o cubiertos, al menos, fuera del horario de trabajo, para evitar el depósito de residuos ajenos a las obras a la que prestan servicio.

En el equipo de obra se deberán establecer los medios humanos, técnicos y procedimientos de separación que se dedicarán a cada tipo de RC.

Se deberán atender los criterios municipales establecidos (ordenanzas, condicionados de la licencia de obras), especialmente si obligan a la separación en origen de determinadas materias objeto de reciclaje o deposición. En este caso se deberá asegurar por parte del contratista realizar una evaluación económica de las condiciones en las que es viable esta operación. También deberá considerar las posibilidades reales de llevarla a cabo: que la obra o construcción lo permita y que se disponga de plantas de reciclaje / gestores adecuados.

La Dirección de Obras será la responsable última de la decisión a tomar y su justificación ante las autoridades locales o autonómicas pertinentes.

Se deberá asegurar en la contratación de la gestión de los RC, que el destino final (Planta de Reciclaje, Vertedero, Cantera, Incineradora, Centro de Reciclaje de Plásticos……) son centros con la autorización autonómica de la Consejería de Medio Ambiente.

Se deberá contratar sólo transportistas o gestores autorizados por dicha Consejería, e inscritos en los registros correspondientes. Se realizará un estricto control documental, de modo que los transportistas y gestores de RC deberán aportar los vales de cada retirada y entrega en destino final.

Para aquellos RC (tierras, pétreos…) que sean reutilizados en otras obras o proyectos de restauración, se deberá aportar evidencia documental del destino final.

La gestión (tanto documental como operativa) de los residuos peligrosos que se hallen en una obra de derribo o se generen en una obra de nueva planta se regirá conforme a la legislación nacional vigente (Ley 10/1998, Real Decreto 833/88, R.D. 952/1997 y Orden MAM/304/2002), la legislación autonómica y los requisitos de las ordenanzas locales. Asimismo, los residuos de carácter urbano generados en las obras (restos de comidas, envases, lodos de fosas sépticas…), serán gestionados acorde con los preceptos marcados por la legislación y autoridad municipales.

Los restos de lavado de canaletas / cubas de hormigón, serán tratados como residuos "escombro".

Se evitará en todo momento la contaminación con productos tóxicos o peligrosos de los plásticos y restos de madera para su adecuada segregación, así como la contaminación de los acopios o contenedores de escombros con componentes peligrosos.

Las tierras superficiales que puedan tener un uso posterior para jardinería o recuperación de suelos degradados, será retirada y almacenada durante el menor tiempo posible, en caballones de altura no superior a 2 metros. Se evitará la humedad excesiva, la manipulación, y la contaminación con otros materiales.

Valoración del coste de la gestión

A continuación, se realiza una estimación de coste para la correcta gestión de residuos, partiendo de un precio m³ de residuo gestionado en planta RCD.

Dicho coste se incorpora dentro del presupuesto de la PROYECTO DE CONSTRUCCIÓN DEL TANQUE DE TORMENTAS NORTE DE LA UNIDAD DE EJECUCIÓN UE-VII.1. "SISTEMAS GENERALES P.E. + KODAK" DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID), en el capítulo correspondiente a DEMOLICIONES, incluyéndose un sobrecoste en aquellas partidas que generan residuos de algún tipo, por lo que, aunque no exista un capítulo específico para la gestión de residuos, el coste del mismo se ha tenido en cuenta a la hora de elaborar el presupuesto.

| A.- ESTIMACIÓN DEL COSTE DE TRATAMIENTO DE LOS RCDs (calculo sin fianza) | | | | |
|---|---|---|---|---|
| Tipología RCDs | Estimación (m³) | Precio gestión en Planta / Vertedero / Cantera / Gestor (€/m³) | Importe (€) | % del presupuesto de Obra |
| **A1 RCDs Nivel I** | | | | |
| Tierras y pétreos de la excavación | 2539,00 | 4,00 | 10.156,00 | 0,9157% |
| Orden 2690/2006 CAM establece límites entre 40 - 60.000 € | | | | **0,9157%** |
| **A2 RCDs Nivel II** | | | | |
| RCDs Naturaleza Pétrea | 4,39 | 10,00 | 43,91 | 0,0040% |
| RCDs Naturaleza no Pétrea | 9,15 | 10,00 | 91,53 | 0,0083% |
| RCDs Potencialmente peligrosos | 5,97 | 10,00 | 59,72 | 0,0054% |
| Orden 2690/2006 CAM establece un límite mínimo del 0,2% del presupuesto de la obra | | | | **0,0176%** |
| **B.- RESTO DE COSTES DE GESTIÓN** | | | | |
| B1.- % Presupuesto hasta cubrir RCD Nivel I | | | 0,00 | 0,0000% |
| B2.- % Presupuesto hasta cubrir RCD Nivel II | | | 1.109,07 | 0,1000% |
| **TOTAL PRESUPUESTO PLAN GESTION RCDs** | | | **11.460,23** | **1,0333%** |

# 13.11. ANEJO 11. INFORME N.º 1 TANQUE DE TORMENTAS DE 04-11-2021

NO REQUIERE FIRMAS

JUNTA DE COMPENSACION UE VV-1
A/A Enrique Claver Espinosa
Camino de la Zarzuela n.º 15, portal A, planta 3ª.
28033 Madrid

Madrid a 4 de noviembre de 2021
**N. R.: CTS1249**

**ASUNTO: Informe n. º 1 sobre conformidad técnica a los tanques de tormentas incluidos en el proyecto específico de saneamiento de la unidad de ejecución UE-VII.1. de Las Rozas de Madrid**

**RESULTADO DEL INFORME N. º 1: REQUERIDA DOCUMENTACIÓN COMPLEMENTARIA**

Este informe se redacta en contestación a la documentación recibida en Canal de Isabel II, S.A., en adelante Canal, el 16/7/2021 y el 13/9/2021 relativa a los tanques de tormentas incluidos en el proyecto específico de saneamiento de la unidad de ejecución UE-VII.1 de Las Rozas de Madrid.

**CONSIDERACIONES PREVIAS**

El Ayuntamiento de Las Rozas de Madrid tiene encomendada la gestión de la conservación del servicio de alcantarillado de este municipio con el Canal de Isabel II, S. A., en virtud del convenio de colaboración firmado el 12/4/2012. En este sentido, Canal tiene competencia para informar sobre conformidades técnicas a las nuevas redes de alcantarillado que sean ejecutadas en el municipio de Las Rozas de Madrid desde la entrada en vigor del citado convenio para la prestación del servicio del alcantarillado.

Los laminadores de aguas pluviales del sector UE VII.1 de Las Rozas de Madrid están siendo tramitados en el expediente de conformidad técnica CTS 1249. La red de alcantarillado incluida en el proyecto específico de saneamiento (excluyendo los laminadores y la fracción 2) de la unidad de ejecución UE-VII.1. de Las Rozas de Madrid, está siendo tramitada de forma separada en el expediente de conformidad técnica CTS 873.

El 31/3/2021 Canal emitió el Informe n. º 1 positivo a proyecto, sobre conformidad técnica a la red de alcantarillado incluida en el proyecto específico de saneamiento (excluyendo los laminadores y la fracción 2) de la unidad de ejecución UE-VII.1. de Las Rozas de Madrid, CTS 873. Cabe destacar, que:

> «La puesta en servicio de red de saneamiento de aguas pluviales estará condicionada a obtener la conformidad técnica de Canal de los laminadores de aguas pluviales y a la puesta en servicio de dichos laminadores.», tal y como se indicaba en el Informe n. º 1 del 31/3/2021 del CTS 873.

Respecto a los tanques de laminación el 3/3/2021 Canal indicó en un correo electrónico relativo al CTS 873 algunos criterios generales para tener en cuenta en el diseño de los tanques de laminación para la entrega futura correspondiente específicamente al expediente CTS1249 de los tanques, ya que el proyecto de la red de saneamiento adelantaba planos de planta y sección de los laminadores y un predimensionamiento hidráulico.

Número de la anotación: 27648, Fecha de entrada: 11/11/2021 8:00:00

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El 16/7/2021 se recibió en Canal un correo electrónico en el que se adjuntaba el cálculo realizado por el proyectista para la estimación de los volúmenes de los tanques (predimensionamiento). El 27/8/2021 Canal solicitó vía correo electrónico la aportación de documentación complementaria relativa a esta entrega, y que se complementó con la documentación recibida actualmente en Canal el 13/9/2021.

**ANÁLISIS DOCUMENTACIÓN APORTADA**

La documentación del 16/7/2021 incluye el cálculo de predimensionamiento realizado por el proyectista para la estimación de los volúmenes de los tanques.

La documentación aportada el 13/9/2021 incluye el "ESTUDIO HIDRÁULICO COMPLEMENTARIO 2 DE LOS CAUCES AFECTADOS POR EL PROYECTO DE URBANIZACIÓN UE VII. 1 "KODAK" LAS ROZAS (MADRID)". El objeto del documento es la legalización del punto de vertido, mediante la ejecución de dos tanques de tormentas, y también la obtención del permiso de obras en la Zona de Servidumbre del DPH y Zona de Policía de los cauces de los arroyos afectados, tanto para llevar a cabo la construcción de los tanques de tormentas (necesarios para efectuar el vertido de las aguas pluviales), como para la ejecución de las obras de urbanización y futuras edificaciones en las parcelas que se sitúen dentro de la franja de afección de la Zona de Policía.

En el correo electrónico remitido por Canal el 27/8/2021 se indicó que los parámetros que puedan influir en el diseño del tanque y su ubicación, así como los caudales de salida de los tanques, requerían ser confirmados y cumplir con los posibles condicionantes que indique la Confederación Hidrográfica del Tajo, en adelante CHT.

Canal ha comprobado que los cálculos remitidos el 16/7/2021 se han realizado en base a los criterios del Estudio hidráulico complementario 2 remitido a Canal el 13/9/2021, sin embargo, no se ha entregado la autorización de la CHT.

Canal a su vez, ha realizado un análisis inicial de los volúmenes propuestos para los tanques, con los caudales de salida que pretenden verterse a cauce desde los tanques de laminación propuestos, bajo el supuesto de que sean los que finalmente autorice la Confederación Hidrográfica del Tajo, observándose que bajo dichos supuestos parecen aceptables. No obstante, el volumen de almacenamiento de los tanques está condicionado por la validación de la Confederación Hidrográfica del Tajo de los caudales de salida de los tanques y que se deberá contemplar en la redacción y entrega posterior del proyecto completo de los laminadores.

Por todo ello:

⇒ **Los posibles condicionantes que requiera la CHT, y en particular, los caudales que autorice para la salida de los tanques de vertido a cauce son base para el dimensionamiento de los tanques y condicionan el diseño que finalmente se disponga (tamaño, funcionamiento, elementos de los que se dote para accesibilidad, limpieza, etc.). Dado que se desconocen los posibles condicionantes que incluya la autorización emitida por la CHT, no es posible evaluar si los tanques se ajustan a lo exigido en la misma, por lo que para continuar con la tramitación del expediente incluyendo el análisis de su diseño (más allá de las indicaciones generales del correo enviado el 3/3/2021), es necesario remitir la autorización de la CHT para la ejecución de obras en dominio público hidráulico en relación con el vertido y las obras de tanques de tormentas y de urbanización y edificación. El promotor debe especificar si en la citada autorización se ha dado validez a los cálculos del Estudio Hidráulico complementario 2 remitido a Canal el 13/9/2021.**

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⇒ **Es necesario remitir el proyecto con el diseño de los tanques que finalmente se proponga y garantizar que se cumplen los posibles condicionantes de la CHT.**

⇒ **En el proyecto que se entregue se deberán tener en cuenta las indicaciones que hizo Canal el 3/3/2021 que se exponen a continuación:**

- Una vez se revisen los tamaños de los tanques en función del cálculo deben dotarse los mismos de los equipos necesarios en cada caso. Debe garantizarse que sean inspeccionables y accesibles para su mantenimiento y debe preverse la forma más adecuada para su limpieza según el caso, debiendo indicarse si se puede garantizar la autolimpieza o si se debe disponer de limpiadores basculantes, en cuyo caso podría ser necesario disponer en el tanque de acometida eléctrica y acometida de agua (regenerada o potable), dotar el mismo de iluminación artificial, etc.
- Las cubiertas deben disponer de un acceso con cobijas desmontables que faciliten las tareas de mantenimiento y limpieza.
- El acceso de cobijas debe tener las dimensiones suficientes para introducir un contenedor para los residuos.
- El acceso al vaso principal según la altura del mismo si finalmente supera los 2,5 m debe disponer de pates con protección circundante.
- El proyecto debe aportar el cálculo estructural de los laminadores aunque éste es responsabilidad del proyectista y no será objeto de conformidad técnica.
- El diseño y cálculo de las cubiertas del tanque debe tener en cuenta las sobrecargas indicadas en las Normas para Redes de Saneamiento de Canal de Isabel II.
- Al haberse diseñado para desaguar por gravedad se debe estudiar, y en caso de ser necesario, diseñarlo de modo que el tanque disponga de un separador de arenas gruesas y grava.
- En el colector desde el laminador norte hasta el punto de vertido existen numerosos resaltos y profundidades en algún tramo superior a los 4,5 m (el límite indicado en las NRSCYII para pasar a secciones visitables en zonas urbanas es 4.5 m y en no urbanas 5 m). Por ello:

    - Es necesario optimizar el perfil longitudinal para minimizar el número de resaltos.
    - En caso de que no se pueda limitar la profundidad y evitar los resaltos por algún condicionante que se debe indicar en el proyecto, es necesario que en los tramos donde se supere el límite indicado emplear secciones visitables.
    - En toda la traza del colector hasta el punto de vertido se ha de garantizar el acceso para las tareas de conservación con un camino por el que puedan circular vehículos y habilitar una zona donde puedan dar la vuelta.
    - Los pozos en tramos no urbanos deben estar sobreelevados 0,75 m sobre el terreno y si están alejados del entorno urbano disponer de tapas de hormigón en vez de fundición.

**CONCLUSIÓN**

Canal queda a la espera de recibir documentación relativa a los tanques de tormentas incluidos en el proyecto específico de saneamiento de la unidad de ejecución UE-VII.1 de Las Rozas de Madrid.

Adjunto a este informe se incluyen planos de planta de las propuestas de tanques y plano de planta de la red de alcantarillado del sector con la ubicación de los tanques, entregados dentro del expediente CTS873 relacionado con este expediente.

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Lo que se comunica para su conocimiento y efectos oportunos.

Fco Javier Pascual Sanz /R:A86488087

Francisco Javier Pascual Sanz
**Coordinador Autorizaciones Técnicas**

Juan Arturo Alonso Parra / A86488087

Firmado digitalmente por Juan Arturo Alonso Parra / A86488087
Fecha: 2021.11.05 09:52:15 +01'00'

Juan Arturo Alonso Parra
**Jefe Área Construcción Redes de Saneamiento**

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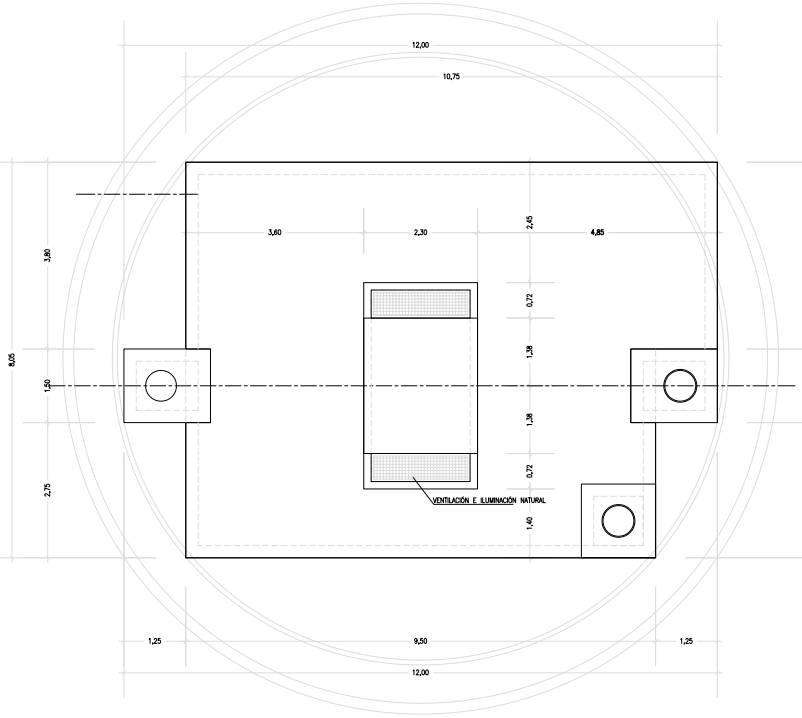
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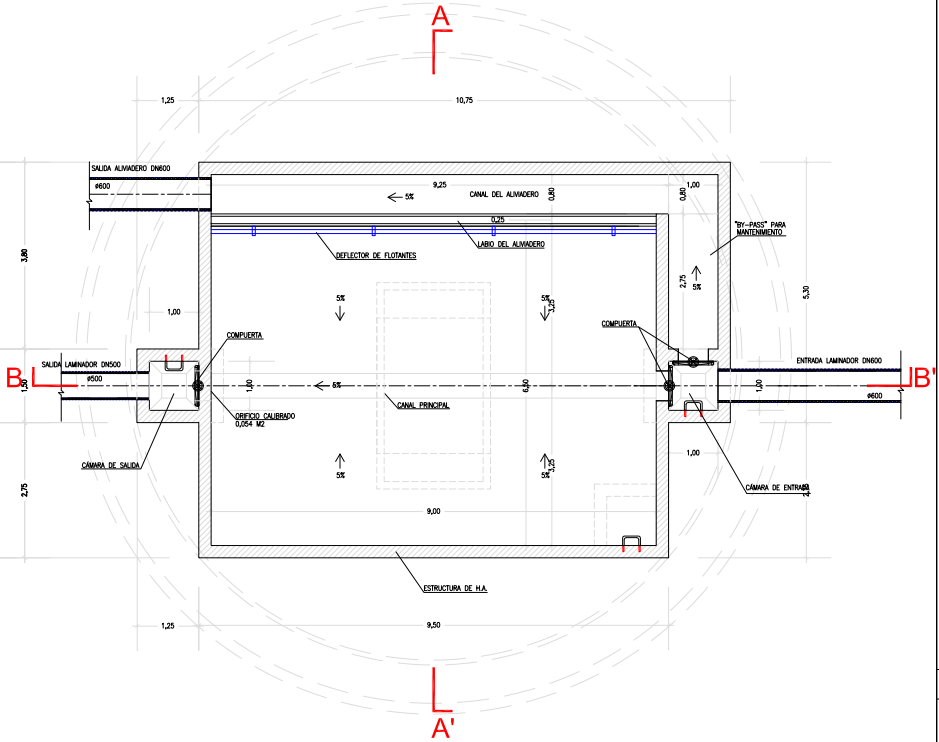
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**ANEJO I: Planos.**

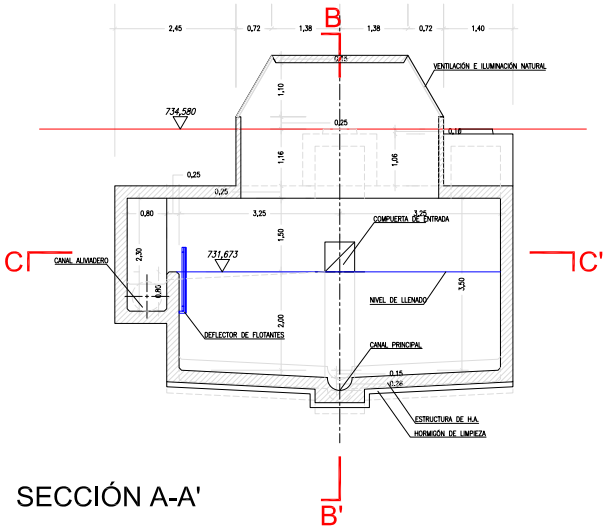
## PLANTA



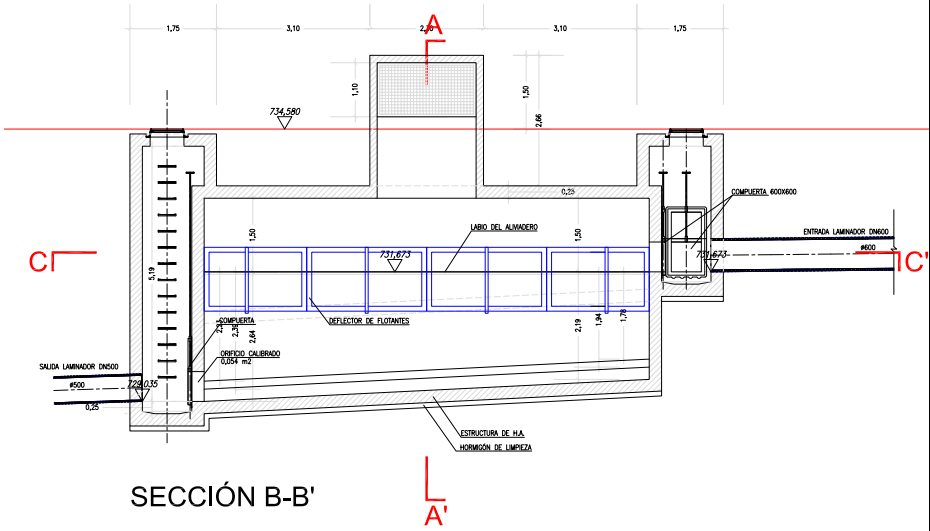

## SECCIÓN C-C'




## SECCIÓN A-A'




## SECCIÓN B-B'




LEYENDA:

TANQUE LAMINADOR NORTE

| | |
|---|---|
| Volúmen útil: | 117 m3. |
| Caudal entrada: | 550,86 l/sg. |
| Diámetro entrada: | DN600 |
| Cota entrada: | 731,673 |
| Caudal salida: | 338 l/sg. |
| Diámetro salida: | Orificio calibrado 0,054 m2 |
| Cota salida: | 729,035 |

NOTAS:
DISTANCIAS EN METROS.
ÁNGULOS EN GRADOS SEXAGESIMALES.

FASE: PROYECTO PARA TRAMITACIÓN.
REF.TRABAJO: 1164/34/18.

TIT. PLANO:
SERIE/Nº. PLANO: SA-08.1.

PROYECTO ESPECÍFICO: RED DE SANEAMIENTO Y DRENAJE. GEOMETRÍA Y DETALLES DEL LAMINADOR NORTE (F. 3).

| FECHAS | |
|---|---|
| MODIFICADO: | ENERO, 2021 |
| MODIFICADO: | ENERO, 2019 |
| MODIFICADO: | MAYO, 2017 |
| MODIFICADO: | JULIO, 2016 |
| MODIFICADO: | NOVIEMBRE, 2015 |
| ORIGINAL: | ABRIL, 2015 |

ESCALA: 1/50.

CARTOGRAFÍA: LEVANTAMIENTO TOPOGRÁFICO: DIC. 2014. SAGURROALLA, S.L.

PROYECTO DE URBANIZACIÓN DEL ÁMBITO DE ACTUACIÓN UE-VII.1. "SISTEMAS GENERALES P.E. + KODAK" DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

PROMOTOR:
JUNTA DE COMPENSACIÓN DE LA UNIDAD DE EJECUCIÓN UE-VII.1 "SISTEMAS GENERALES P.E.+KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID.

Conforme la PROPIEDAD: EL ARQUITECTO:

EQUIPO REDACTOR:
santos lópez colón.
arquitecto y urbanista.
c/ víctor de la serna, 3. 28016-madrid (españa) tel.: +34 915198197
tel. móv.: +34 609111418
e-mail: 6086lopez@coam.es e-mail: santoslc@arquired.es

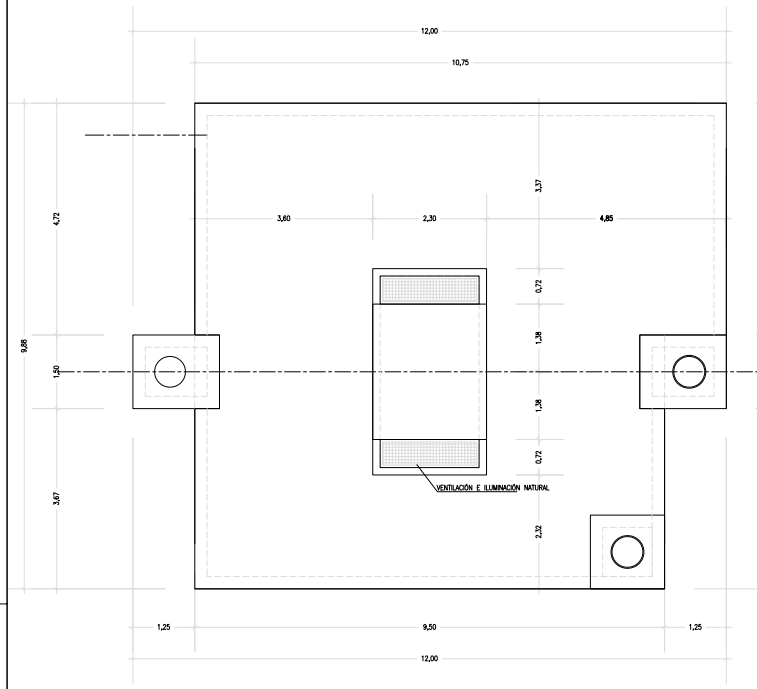
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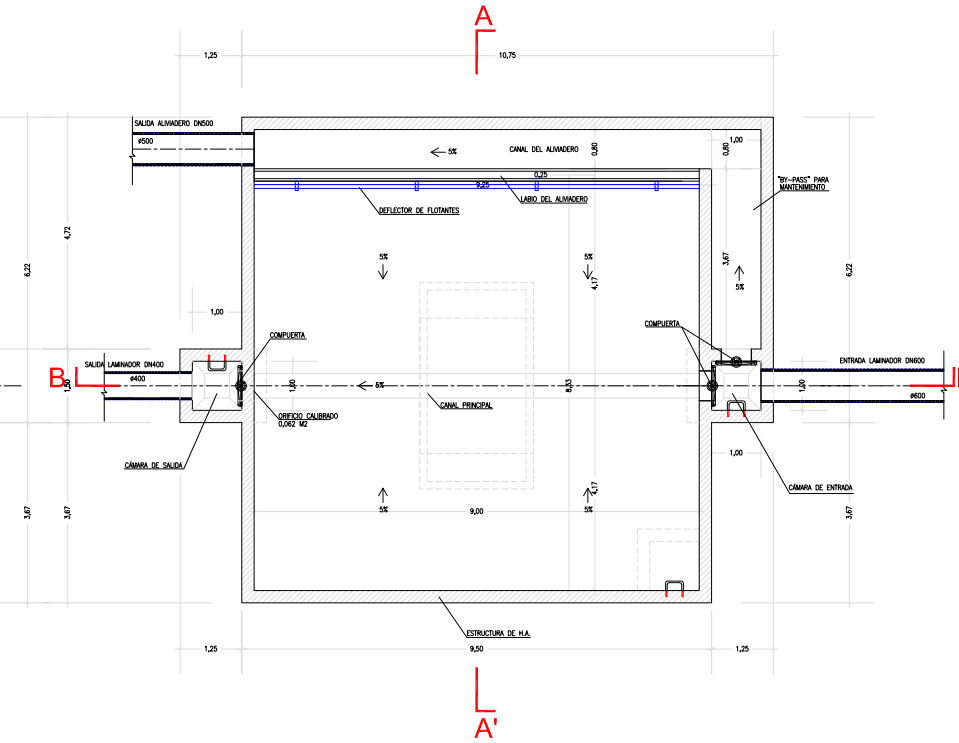
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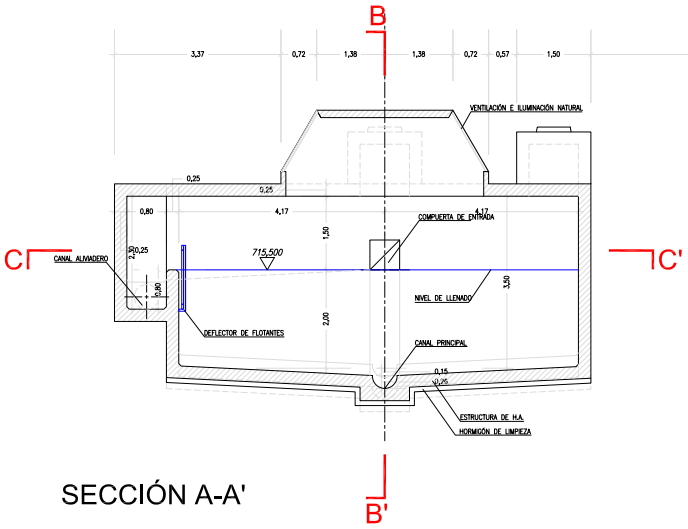
## PLANTA



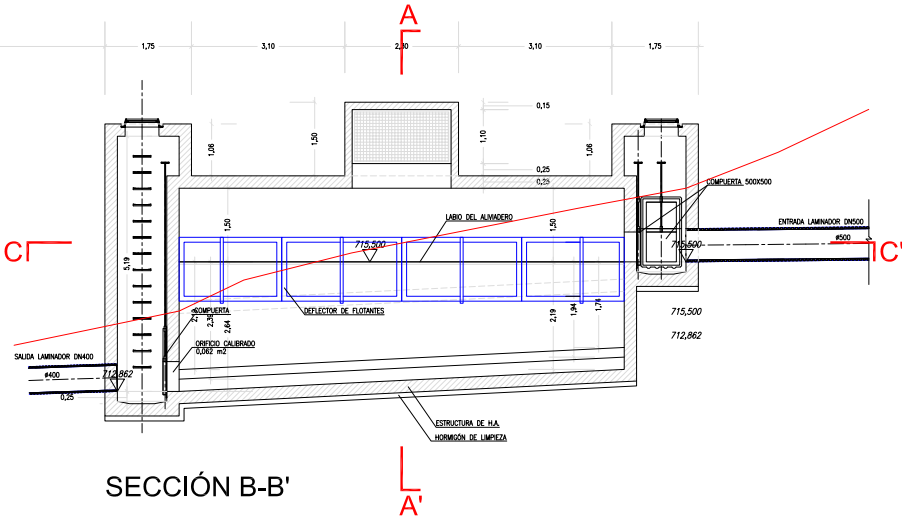

## SECCIÓN C-C'




## SECCIÓN A-A'




## SECCIÓN B-B'




LEYENDA:

TANQUE LAMINADOR SUR

| | |
|---|---|
| Volúmen útil: | 150 m3. |
| Caudal entrada: | 659,72 l/sg. |
| Diámetro entrada: | DN500 |
| Cota entrada: | 715,500 |
| Caudal salida: | 389 l/sg. |
| Diámetro salida: | Orificio calibrado 0,062 m2 |
| Cota salida: | 712,862 |

NOTAS:
DISTANCIAS EN METROS.
ÁNGULOS EN GRADOS SEXAGESIMALES.

FASE: PROYECTO PARA TRAMITACIÓN.
REF.TRABAJO: 1164/34/18.

TIT. PLANO:
SERIE/Nº. PLANO: SA-08.2.

PROYECTO ESPECÍFICO: RED DE SANEAMIENTO Y DRENAJE. GEOMETRÍA Y DETALLES DEL LAMINADOR SUR (F. 3).

| FECHAS | |
|---|---|
| MODIFICADO: | ENERO, 2021 |
| MODIFICADO: | ENERO, 2019 |
| MODIFICADO: | MAYO, 2017 |
| MODIFICADO: | JULIO, 2016 |
| MODIFICADO: | NOVIEMBRE, 2015 |
| ORIGINAL: | ABRIL, 2015 |

ESCALA: 1/50.

CARTOGRAFÍA: LEVANTAMIENTO TOPOGRÁFICO: DIC. 2.014. SAGURRALLA, S.L.

PROYECTO DE URBANIZACIÓN DEL ÁMBITO DE ACTUACIÓN UE-VII.1. "SISTEMAS GENERALES P.E. + KODAK" DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

PROMOTOR:
JUNTA DE COMPENSACIÓN DE LA UNIDAD DE EJECUCIÓN UE-VII.1 "SISTEMAS GENERALES P.E.+KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID.

Conforme la PROPIEDAD: EL ARQUITECTO:

EQUIPO REDACTOR:

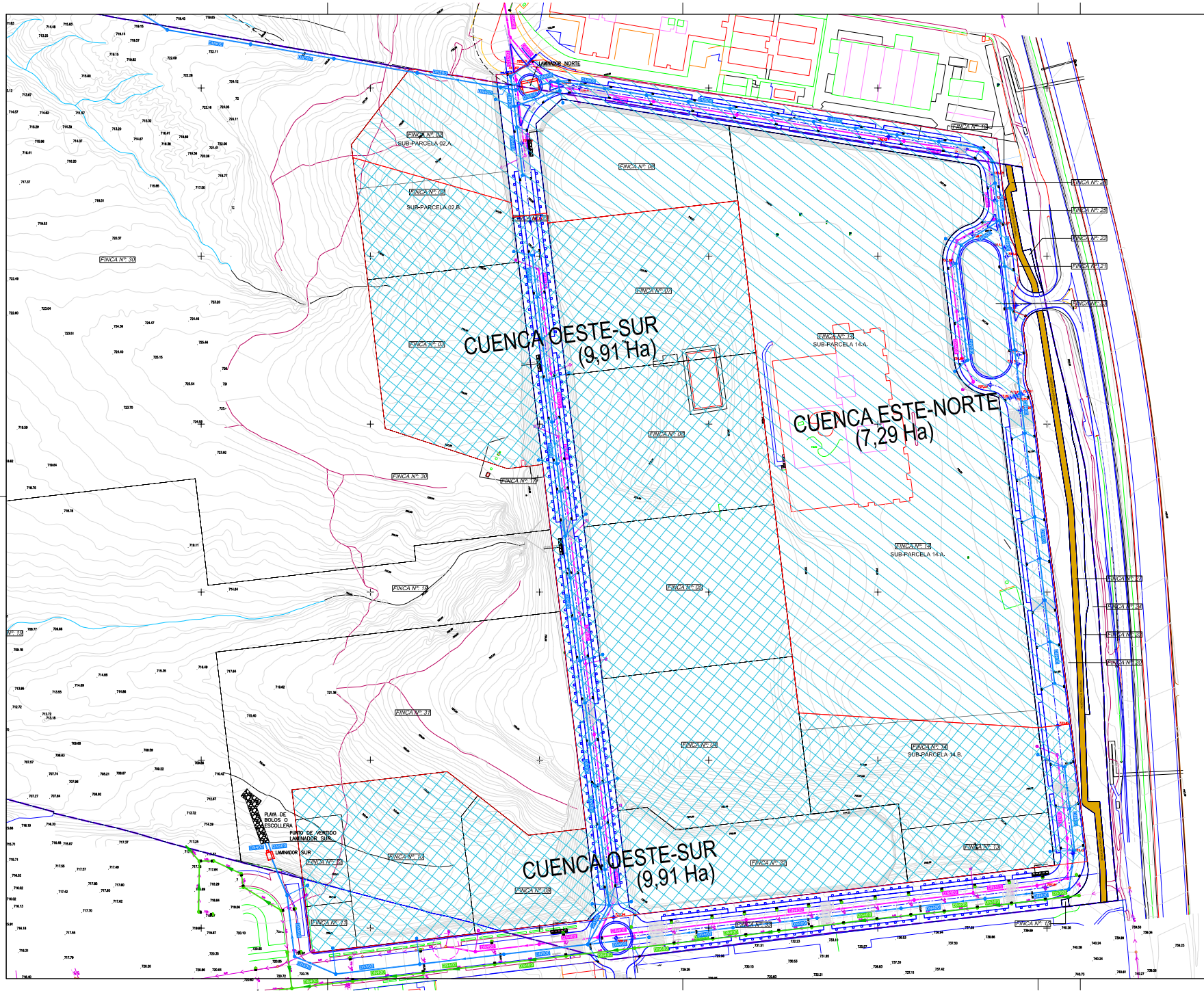
santos lópez colón.
arquitecto y urbanista.
c/ víctor de la serna, 3. 28016-madrid (españa) tel.: +34 915198197
tel. móv.: +34 609111418
e-mail: 6086lopez@coam.es e-mail: santoslc@arquired.es

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LEYENDA:

ÁMBITO DEL PROYECTO DE URBANIZACIÓN (FRACCIÓN 3).

NOTAS:
DISTANCIAS EN METROS.
ÁNGULOS EN GRADOS SEXAGESIMALES.

FASE: PROYECTO PARA TRAMITACIÓN.
REF.TRABAJO: 1164/34/18.

TIT. PLANO:
SERIE/Nº. PLANO: SA-4.1.

PROYECTO ESPECÍFICO: RED DE SANEAMIENTO Y DRENAJE. Áreas vertientes pluviales.Fracción 3. PLANTA GENERAL.

| FECHAS | |
|---|---|
| MODIFICADO: | ENERO. 2021 |
| MODIFICADO: | ENERO. 2019 |
| MODIFICADO: | MAYO. 2017 |
| MODIFICADO: | JULIO. 2016 |
| MODIFICADO: | NOVIEMBRE. 2015 |
| ORIGINAL: | ABRIL. 2015 |

ESCALA: 1/1.000.

CARTOGRAFÍA:
LEVANTAMIENTO TOPOGRÁFICO: DIC. 2.014.
SAGURRALLA, S.L.

PROYECTO DE URBANIZACIÓN DEL ÁMBITO DE ACTUACIÓN UE-VII.1. "SISTEMAS GENERALES P.E. + KODAK" DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

PROMOTOR:
JUNTA DE COMPENSACIÓN DE LA UNIDAD DE EJECUCIÓN UE-VII.1 "SISTEMAS GENERALES P.E.+KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID.

Conforme la PROPIEDAD:
EL ARQUITECTO:

EQUIPO REDACTOR:

santos lópez colón.
arquitecto y urbanista.
c/ víctor de la serna, 3. 28016-madrid (españa) tel.: +34 915198197
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AYUNTAMIENTO DE LAS ROZAS DE MADRID - SOLICITUD
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Documento firmado electrónicamente desde la Plataforma Firmadoc-BPM de Aytos | Página: 8/8.

Número de la anotación: 27648, Fecha de entrada: 11/11/2021 8:00:00

NO REQUIERE FIRMAS

# 13.12. ANEJO 12. JUSTIFICACIÓN DE PRECIOS

Los precios utilizados para la confección del presente Proyecto han sido los correspondientes al Cuadro de Precios aplicable a los presupuestos de los Proyectos de Canal de Isabel II de Mayo del 2022.

**PRECIOS UNITARIOS**

## Listado de materiales

# LISTADO DE MATERIALES (Pres)

## TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS

| CÓDIGO | UD | RESUMEN | PRECIO |
|---|---|---|---|
| CIRLLENADO_1 | ud | CIRCUITO DE LLENADO PARA 4 LIMPIADORES | 4.137,8200 |
| COMPUERTA | ud | REJA DE CADENAS | 38.664,2700 |
| LIMPIADOR_1 | ud | Limpiador Basculante | 9.755,0800 |
| MT0101020 | m3 | Arena de río 0/5 mm | 10,8800 |
| MT0101060 | m3 | Grava tamaño máximo 25 mm, exenta de materia orgánica | 10,9900 |
| MT0101090 | m3 | Gravilla silícea 2/5 machaqueo | 29,3700 |
| MT0101500 | m3 | Arena de material reciclado de hormigones, de 0 a 5 mm | 13,8000 |
| MT0103020 | m3 | Suelo adecuado tamaño máximo 150 mm., proc. excav. | 0,8300 |
| MT0103030 | m3 | Suelo seleccionado tamaño máximo 30 mm., proc. prést. | 4,3800 |
| MT0104010 | ud | Bloque hueco de hormigón, a cara vista, blanco, 40x20x20 cm | 2,8700 |
| MT0105020 | t | Cemento CEM II/A-P 32,5 | 100,4000 |
| MT0105070 | t | Cemento CEM II/B-P 32,5 | 124,4500 |
| MT0105100 | t | Cemento blanco BL-V 22,5 Granel | 239,1200 |
| MT0105150 | m3 | Mortero de cemento gris M-10 | 62,0700 |
| MT0105160 | t | Mortero Enf. Rev. Ext GP-CS-IV-W2 | 151,8000 |
| MT0109010 | l | Desencofrante | 2,9500 |
| MT0109040 | kg | Filmógeno de curado | 4,1300 |
| MT0109050 | kg | Hidrofugante mortero/hormigón | 2,7200 |
| MT0201040 | m2 | Malla galvanizada simple torsión ST-50/16 | 2,6600 |
| MT0201110 | ud | Poste galvanizado D=48 mm h=2,00 m intermedio | 10,7400 |
| MT0201120 | ud | Poste galvanizado D=48 mm h=2,00 m escuadra | 15,4900 |
| MT0201130 | ud | Poste galvanizado D=48 mm h=2,00 m jabalcón | 11,1700 |
| MT0201140 | ud | Poste galvanizado D=48 mm h=2,00 m tornapunta | 11,3000 |
| MT0202010 | m2 | Mallazo de alambre de acero galvanizado de 1x1 cm | 4,2500 |
| MT0202250 | m2 | Panel chapa de acero 400x100 cm | 4,5300 |
| MT0303020 | ud | Tornillería y pequeño material | 0,1200 |
| MT0313110 | m2 | Reposición firme acera | 9,4900 |
| MT0316 | u | Tapa cuadrada HA e=6cm 80x80cm -D200 | 68,6500 |
| MT0335335 | ud | Tapa de registro de fundición dúctil, clase D 400 tráfico medio | 214,3000 |
| MT0353040 | ud | Marco y rejilla de fundición 40x40 cm | 25,7200 |
| MT0360040 | ud | Pate de polipropileno 30x25 | 8,9500 |
| MT0363050 | ud | Arqueta de polipropileno de 300x300 mm con tapa de registro | 83,0800 |
| MT0402020 | m3 | Hormigón HNE-15/B/12 o HNE-15/B/20 central | 72,9000 |
| MT0402050 | m3 | Hormigón HNE-20/B/12 o HNE-20/B/20 central | 80,6500 |
| MT0403030 | m3 | Hormigón HM-20/P/20/X0 o HM-20/P/40/X0 central | 74,6400 |
| MT0407050 | m3 | Hormigón HA-25/P/20/XC1 o HA-25/P/40/XC1 central | 77,4100 |
| MT0407080 | m3 | Hormigón HA-25/P/40/XC2, XC3 central | 79,2900 |
| MT0408060 | m3 | Hormigón HA-30/B/20/XC2,XC3 o HA-30/B/20/XC4 central | 90,0300 |
| MT0701010 | kg | Acero corrugado B 500 S | 1,3800 |
| MT0701060 | kg | Acero al carbono S-275 | 1,6100 |
| MT0704020 | kg | Alambre de atar 1,3 mm | 2,2100 |
| MT0705035 | m2 | Malla 15x30x5; 1,564 kg/m2 | 1,7600 |
| MT0706010 | m2 | Rejilla tipo tramex galvanizada, superantideslizante | 45,4900 |
| MT0708010 | m | Barandilla metálica de tubo de diámetro 50 mm x e=1,5 mm | 137,1000 |
| MT0801010 | m2 | Encofrado con chapas metálicas | 5,4800 |

# LISTADO DE MATERIALES (Pres)

## TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS

| CÓDIGO | UD | RESUMEN | PRECIO |
|---|---|---|---|
| MT0802020 | pp | Molduras y berenjenos, tapes, velas, puntales, cimbras, etc. has | 1,8400 |
| MT0802021 | pp | Molduras y berenjenos, tapes, velas, puntales, cimbras, etc. has | 3,0700 |
| MT1001050 | ud | Ladrillo perforado 24x11,5x7 cm | 0,1400 |
| MT1001060 | ud | Ladrillo perforado tosco 24x11,5x7 cm | 0,2200 |
| MT1001070 | ud | Ladrillo perfora. tosco 25x12x7 cm | 0,1400 |
| MT1102080 | m2 | Geotextil no tejido, de 260 gr/m2 | 2,2700 |
| MT1302020 | m2 | Carpintería metálica con chapa plegada de hierro | 184,9800 |
| MT1302050 | m2 | Carpintería metálica de acero galvanizado, en ventanas o puertas | 237,3200 |
| MT1501030 | ud | Ani.po.ench-camp.circ. HA h=1,00 m D=1000 | 163,8400 |
| MT1502020 | ud | Junta goma base pozo ench.-camp. D=1000 | 28,0600 |
| MT1701010 | kg | Minio electrolítico | 16,7800 |
| MT1701020 | kg | Disolvente universal | 11,4500 |
| MT1701030 | l | Pintura esmalte satinado | 16,8300 |
| MT1702010 | kg | Pasta temple blanco | 0,2600 |
| MT1702030 | kg | Plaste | 2,1100 |
| MT1901010 | m3 | Agua | 1,0000 |
| MT2002020 | m | Suministro e inst. de marco prefabricado visitable de 1.00x1.80 | 503,4800 |
| MT2601010 | m | Tubería de polietileno PE-100, DN 25, PN 16, MRS 10 N/mm2 | 0,5400 |
| MT2605010 | m | Tubo de drenaje de polietileno de alta densidad de 15 cm de diám | 6,7400 |

# LISTADO DE MATERIALES (Pres)

## TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS

| CÓDIGO | UD | RESUMEN | PRECIO |
|---|---|---|---|
| MT2801060 | m | Tubería de chapa de acero para hinca D=800 mm | 258,7900 |
| MT3001040 | m | Tubería de PVC-U, SN>= 8 kN/m2, diámetro nominal DN 500 mm | 153,2100 |
| MT3001050 | m | Tubería de PVC-U, SN>= 8 kN/m2, diámetro nominal DN 630 mm | 167,4100 |
| MT3004010 | m | Tubería de PVC-O 500, DN 110 mm, PN 16, MRS 50 N/mm2 | 9,3300 |
| MT6490010 | m | Banda de señalización | 0,2300 |
| MT7203080 | ud | Caudalímetro electromagnético tub. parcialm. llena PN 10 Ø500 | 16.105,5000 |
| MT7203090 | ud | Caudalímetro electromagnético tub. parcialm. llena PN 10 Ø600 | 18.610,8000 |
| MT7220030 | m | Medidor nivel ultrasonidos | 1.773,3000 |
| MT7220050 | m | Cable 64 fibras Monomodo | 10,1400 |
| MT7220060 | ud | Repartidor 64 FO | 2.089,5900 |
| MT7220100 | ud | Latiguillo FO Multimodo | 14,1800 |
| MT8101010 | m | Cinta señalizadora | 0,2700 |
| MT8101040 | ud | Pequeño material | 1,3600 |
| MT8112010 | m | Cable RZ1-K 0,6/1 KV 1x1,5 mm2 Cu | 0,8900 |
| MT8112020 | m | Cable RZ1-K 0,6/1 KV 1x2,5 mm2 Cu | 1,2000 |
| MT8112770 | m | Cable RV-K 0,6/1 KV 1x1,5 mm2 Cu | 0,5500 |
| MT8114060 | m | Cable AL XZ1 (S), tensión nominal 0,6/1 kV 1x95 mm2 AL | 2,6300 |
| MT8119010 | ud | Saco de 7 kg de sales electrolíticas | 76,3000 |
| MT8120010 | m | Tubo PE-AD corrugado curvable diámetro exterior 160mm. | 5,9800 |
| MT8121030 | m | Tubo Polímero termoplástico libre de halógenos rígido M20 | 2,6400 |
| MT8125060 | ud | Regleta adosable estanca 1x16 W | 188,1500 |
| MT8125100 | ud | Regleta adosable estanca 1x58 W | 213,5700 |
| MT8126010 | ud | Caja estanca poliéster inyectado 80x80x45 mm + accesorios | 8,6900 |
| MT8126020 | ud | Caja estanca poliéster inyectado 105x105x55 mm + accesorios | 12,3200 |
| MT8126050 | ud | Caja estanca poliéster inyectado 220x170x140 mm + accesorios | 67,5700 |
| MT8130010 | ud | Pequeño material tubos | 0,6800 |
| MT8130110 | ud | Arq. de horm. pref. 1x1x1 m | 144,4000 |
| MT8131010 | ud | Pica de t.t. 250/18 Fe+Cu 2,5 m de longitud y 18 mm de diámetro | 34,5000 |
| MT8131020 | m | Conduc cobre desnudo 50 mm2 | 5,9700 |
| MT8131035 | ud | Grapas de conexión | 2,8800 |
| MT8131050 | ud | Puente de prueba | 20,2300 |
| MT8132020 | m2 | Firme rígido para frecuencia alta de tráfico pesado | 27,8800 |
| MT8141230 | ud | Lámpara LED 16 W, RA 80 4000K | 35,6000 |
| MT8141270 | ud | Lámpara LED 58 W, RA 80 4000K | 52,8800 |
| MT8147010 | ud | Base de toma de corriente con contacto de tierra (2P+T) | 11,1600 |
| MT8147020 | ud | Toma corriente 2P+T 16 A IP-55 | 12,0900 |
| MT8147060 | ud | Toma corriente 3P+T 32 A IP-55 | 43,9200 |
| MT8151510 | ud | Aparato Autónomo de Emergencia Estanco | 96,6600 |
| MT9602030 | ud | Bloque hormigón blanco CV 40x20x20 cm | 1,7300 |
| P01AA020 | m3 | Arena de río 0/6 mm | 14,3600 |
| P01CC020 | t | Cemento CEM II/B-P 32,5 N sacos | 98,3300 |
| P01DC030 | l | Desencofrante alta calidad mat. no porosos-metal | 2,3300 |
| P01DW050 | m3 | Agua | 1,0600 |
| P01EB010 | m3 | Tablón pino 2,50/5,50x205x76 cm | 202,7600 |
| P01EM205 | m3 | Tabloncillo pino 2,50/5500x205x55 | 247,3300 |

# LISTADO DE MATERIALES (Pres)

## TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS

| CÓDIGO | UD | RESUMEN | PRECIO |
|---|---|---|---|
| P01EM225 | m3 | Tabla pino 2,00/2,50 m de 26 mm | 245,2000 |
| P01HAV270 | m3 | Hormigón HA-25/B/40/IIa central | 64,0200 |
| P01HAV360 | m3 | Hormigón HA-25/P/20/I central | 67,0200 |
| P01HMV220 | m3 | Hormigón HM-20/P/20/I central | 64,9100 |
| P01HMV250 | m3 | Hormigón HM-20/P/40/I central | 64,9100 |
| P01LT040 | mu | Ladrillo perforado tosco 24x11,5x7 cm | 61,6300 |
| P01UC030 | kg | Puntas de acero 20x100 mm cabeza plana | 1,9500 |
| P02EPH010 | u | Anillo pozo machiembrado circular HM h=0,50 m D=80 cm | 16,2900 |
| P02EPH100 | u | Cono machiembrado circular HM h=0,6 m D=60/80 cm | 29,4700 |
| P02EPW010 | u | Pates PP 30x25 cm | 7,3200 |
| P03AAA020 | kg | Alambre atar 1,30 mm | 0,8800 |
| P03ACD010 | kg | Acero corrugado elab. B 500 SD | 0,9300 |
| P03AMU010 | m2 | Malla electrosoldada B500 SD/T #150x300x5 mm - 1,541 kg/m2 | 1,5000 |
| P04RR070 | kg | Mortero revoco CSIV-W2 | 1,3700 |
| P15AH010 | m | Cinta balizamiento cables eléctricos a=150 mm | 0,1400 |
| P15NAL010 | m | Cable Aluminio 0,6/1kV RV Eca - 1x50 mm2 | 1,9600 |
| P15UDT080 | m | Tubo PEAD flex. doble pared D=160 mm | 6,6700 |
| P31CR150 | u | Gancho montaje red D=10 mm | 0,1700 |
| P31CR220 | m2 | Redes bajo encofrado de forjado | 1,6200 |

# LISTADO DE MATERIALES (Pres)

## TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS

| CÓDIGO | UD | RESUMEN | PRECIO |
|---|---|---|---|
| PBUC.4a | u | Clavo galv c/aran met unn pl | 0,1900 |
| PNIS.9ba | m2 | Lamn PVC e1,5mm | 11,1300 |
| PNIW61a | m | Barra Al p/fj mec impz en muros | 4,9700 |
| SP_CMPT2-20 | u | Ventilador de simple aspiracion anticorrosivos | 1.167,4600 |
| VORTEX_1 | ud | Válvula vortex 142 l/s | 12.365,5700 |
| lamp0001 | u | Proyector LED 130W | 465,5000 |
| mP01AA020 | m3 | Arena de río 0/6 mm. | 13,9700 |
| mP01AF010 | t | Zahorra nat ZN(50)/ZN(20), IP=0 | 4,0700 |
| mP01CC030 | t | Cemento CEM II/B-P 32,5 N sacos | 82,0800 |
| mP01D130 | m3 | Agua | 0,9200 |
| mP01HM080 | m3 | Hormigón HM-12,5/P/40/IIa central | 55,8300 |
| mP02ET | ud | Equipo de sistemas de control | 34.165,7100 |
| mP13VP300 | ud | Puerta met.aba.galv. 300x200 STD | 276,2700 |
| mP15AH120 | ud | Material auxiliar eléctrico | 0,7400 |
| mP15CB150 | ud | Armario APM6 (hasta 6 salidas) | 2.500,0000 |
| mP17PA090 | m | Tubo polietileno ad PE100 (PN-16) 25mm | 0,5400 |
| mP17PP180 | ud | Enlace recto polietileno 25 mm. (PP) | 0,9700 |
| mP17PP260 | ud | Collarin toma PP 32 mm. | 1,3100 |
| mP17YC020 | ud | grifo de1/2" | 450,0000 |
| mt01arg006 | t | Arena de cantera, para hormigón preparado en obra. | 17,5000 |
| mt01arg007b | t | Árido grueso homogeneizado, de tamaño máximo 12 mm. | 16,6400 |
| mt02bhp020f | Ud | Bloque en "U" de hormigón visto, liso, color blanco, 40x20x20 cm | 2,8700 |
| mt07aco010c | kg | Ferralla elaborada en taller industrial con acero en barras corr | 1,7400 |
| mt07ame010l | m² | Malla electrosoldada ME 15x15 Ø 8-8 B 500 T 6x2,20 UNE-EN 10080. | 8,4100 |
| mt07cav010mm | m² | Encofrado perdido de piezas de polipropileno reciclado, C-65 "CÁ | 24,2400 |
| mt08aaa010a | m³ | Agua. | 1,5000 |
| mt08cem011a | kg | Cemento Portland CEM II/B-L 32,5 R, color gris, en sacos, según | 0,1000 |
| mt08var050 | kg | Alambre galvanizado para atar, de 1,30 mm de diámetro. | 1,5000 |
| mt10haf010baf | m³ | Hormigón HA-30/B/12/XC1+XF1+XA1+XM2, fabricado en central, con c | 128,6000 |
| mt11var009 | l | Líquido limpiador para pegado mediante adhesivo de tubos y acces | 37,6000 |
| mt11var010 | l | Adhesivo para tubos y accesorios de PVC. | 47,9200 |
| mt35amc021bb | Ud | Interruptor automático magnetotérmico, de 2 módulos, bipolar (2P | 25,9800 |
| mt35amc021cc | Ud | Interruptor automático magnetotérmico, de 2 módulos, bipolar (2P | 25,9800 |
| mt35amc022bb | Ud | Interruptor automático magnetotérmico, de 3 módulos, tripolar (3 | 56,1600 |
| mt35amc022ff | Ud | Interruptor automático magnetotérmico, de 3 módulos, tripolar (3 | 65,3300 |
| mt35amc950aa | Ud | Armario de distribución metálico, de superficie, con puerta cieg | 433,1900 |
| mt35amc951d | Ud | Placa de montaje interior para armario de distribución metálico | 38,8100 |
| mt35amc952c | Ud | Placa frontal troquelada para elementos modulares en carril DIN, | 17,4500 |
| mt35amc953b | Ud | Carril DIN para fijación de aparamenta modular en cuadro eléctri | 16,2800 |
| mt35cgp010w | Ud | Caja de protección y medida CPM2-E4, de hasta 63 A de intensidad | 252,1600 |
| mt35cgp040f | m | Tubo de PVC liso, serie B, de 110 mm de diámetro exterior y 3,2 | 3,7300 |
| mt35cgp040h | m | Tubo de PVC liso, serie B, de 160 mm de diámetro exterior y 3,2 | 5,4400 |
| mt35www010 | Ud | Material auxiliar para instalaciones eléctricas. | 1,4800 |
| mt42cvp020fe | m | Tubo liso de PVC, de 200 mm de diámetro exterior, con extremo ab | 9,3400 |
| mt42cvp420f | Ud | Material auxiliar para montaje y sujeción a la obra de los condu | 0,3900 |

| CÓDIGO | UD | RESUMEN | PRECIO |
|---|---|---|---|

**PRECIOS UNITARIOS**

## Listado de mano de obra

# LISTADO DE MANO DE OBRA (Pres)

## TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS

| CÓDIGO | UD | RESUMEN | PRECIO |
|---|---|---|---|
| MO0100200 | h | Capataz | 18,3900 |
| MO0100300 | h | Oficial 1ª | 18,0400 |
| MO0100400 | h | Oficial 2ª | 17,1200 |
| MO0100500 | h | Ayudante | 16,7500 |
| MO0100600 | h | Peón especialista | 16,5500 |
| MO0100700 | h | Peón ordinario | 16,5300 |
| O01OA020 | h | Capataz | 20,4700 |
| O01OA030 | h | Oficial primera | 20,8400 |
| O01OA060 | h | Peón especializado | 14,8200 |
| O01OA070 | h | Peón ordinario | 14,0400 |
| O01OB010 | h | Oficial 1ª encofrador | 20,4200 |
| O01OB020 | h | Ayudante encofrador | 19,1600 |
| O01OB030 | h | Oficial 1ª ferralla | 20,4200 |
| O01OB040 | h | Ayudante ferralla | 19,1600 |
| O01OB200 | h | Oficial 1ª electricista | 20,1900 |
| O01OB210 | h | Oficial 2ª electricista | 18,9000 |
| mO01OA020 | h | Capataz | 15,5200 |
| mO01OA060 | h | Peón especializado | 13,6100 |
| mO01OA070 | h | Peón ordinario | 13,5100 |
| mO01OB160 | h | Oficial 1ª cerrajero | 16,1500 |
| mO01OB170 | h | Ayudante cerrajero | 15,1900 |
| mO01OB200 | h | Oficial 1ª fontanero calefactor | 17,0800 |
| mO01OB210 | h | Oficial 2ª fontanero calefactor | 14,6100 |
| mO01OB230 | h | Ayudante fontanero | 14,4200 |
| mO01OB240 | h | Oficial 1ª electricista | 15,4000 |
| mO01OB250 | h | Oficial 2ª electricista | 14,4200 |
| mo003 | h | Oficial 1ª electricista. | 18,0400 |
| mo005 | h | Oficial 1ª instalador de climatización. | 18,0400 |
| mo011 | h | Oficial 1ª montador. | 18,0400 |
| mo020 | h | Oficial 1ª construcción. | 18,0400 |
| mo080 | h | Ayudante montador. | 16,7500 |
| mo102 | h | Ayudante electricista. | 16,7500 |
| mo104 | h | Ayudante instalador de climatización. | 16,7500 |
| mo113 | h | Peón ordinario construcción. | 16,7500 |

**PRECIOS UNITARIOS**

## Listado de maquinaria

# LISTADO DE MAQUINARIA (Pres)

## TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS

| CÓDIGO | UD | RESUMEN | PRECIO |
|---|---|---|---|
| M01DA040 | h | Bomba autoaspirante diesel 32 cv | 9,1600 |
| M01HA010 | h | Autobomba hormigón h.40 m3 pluma <=32 m | 153,2000 |
| M02GAH060 | h | Grúa telescópica autopropulsada 60 t | 121,0000 |
| M02GT250 | mes | Alquiler grúa torre 40 m 1000 kg | 1.064,8700 |
| M02GT320 | u | Montaje/desmontaje grúa torre 40 m flecha | 3.150,1000 |
| M02GT360 | mes | Contrato mantenimiento | 104,2800 |
| M02GT370 | mes | Alquiler telemando | 49,6800 |
| M02GT380 | u | Tramo de empotramiento grúa torre <40 m | 1.436,2400 |
| M03HH020 | h | Hormigonera 200 l gasolina | 2,5400 |
| M05EN020 | h | Excavadora hidráulica neumáticos 84 CV | 39,8300 |
| M05EN030 | h | Retroexcavadora hidráulica neumáticos 100 CV | 41,8500 |
| M06CM030 | h | Compresor portátil diesel media presión 5 m3/min 7 bar | 5,8900 |
| M06MR230 | h | Martillo rompedor hidráulico 600 kg | 11,4100 |
| M07CB030 | h | Camión basculante 6x4 de 20 t | 32,4600 |
| M07N080 | m3 | Canon de tierra a vertedero | 6,0800 |
| M07W110 | m3 | km transporte hormigón | 0,3200 |
| M08RI010 | h | Pisón compactador 70 kg | 2,6900 |
| M08RL020 | h | Rodillo manual lanza tándem 800 kg | 4,9900 |
| M11HV040 | h | Aguja neumática s/compresor D=80 mm | 1,6100 |
| M11HV150 | h | Vibrador hormigón 230V Aguja 50 mm | 1,5000 |
| M13EF020 | m2 | Encofrado panel metálico 5/10 m2 50 posturas | 2,8700 |
| M13EF040 | m | Fleje para encofrado metálico | 0,3200 |
| M13EM030 | m2 | Tablero encofrar 22 mm 4 posturas | 2,2800 |
| M13EQA010 | u | Alq. diario tablero encof. mad. tricapa 970x500x27 mm | 0,2000 |
| M13EQA040 | u | Alquiler diario guía 4,20 m sist. encof. plano | 0,1400 |
| M13EQA060 | u | Alquiler diario guía 2,10 m sist. encof. plano | 0,1000 |
| M13EQA070 | u | Alquiler diario porta-sopanda 4 m sist. encof. plano | 0,1400 |
| M13EQA071 | u | Alquiler diario porta-sopanda 3 m sist. encof. plano | 0,1200 |
| M13EQA080 | u | Alquiler diario porta-sopanda 2 m sist. encof. plano | 0,1000 |
| M13EQA230 | u | Alq. mensual tabica de canto metálica 1000x300 mm | 2,2200 |
| M13MPA010 | u | Alquiler diario puntal metálico telescópico hasta 3 m altura | 0,0400 |
| MQ0309180 | m | Ejecución microtúnel E.A. DN 800 mm acero | 365,3900 |
| MQ0310060 | ud | Implantación, retirada y transporte escudo abierto acero <1500 | 1.538,4700 |
| MQ0400020 | h | Excavadora hidráulica neumáticos 100 CV | 67,2700 |
| MQ0400030 | h | Excavadora hidráulica neumáticos 144 CV | 76,3000 |
| MQ0400080 | h | Retroexcavadora 50 HP | 37,1400 |
| MQ0401040 | h | Pala cargad. s/orugas de 112 CV | 90,9200 |
| MQ0402010 | h | Retrocargadora neumáticos 75 CV | 49,4500 |
| MQ0402020 | h | Retrocargadora neumáticos 100 CV | 60,7700 |
| MQ0406020 | h | Motoniveladora de 149 KW | 93,3700 |
| MQ0500030 | h | Compactador manual | 9,6000 |
| MQ0500040 | h | Pisón vibrante con placa de 60 cm | 9,9000 |
| MQ0500070 | h | Rodillo vibrante manual 800 kg | 7,1100 |
| MQ0500100 | h | Rulo autopropulsado 8/10 t | 59,3100 |

# LISTADO DE MAQUINARIA (Pres)

## TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS

| CÓDIGO | UD | RESUMEN | PRECIO |
|---|---|---|---|
| MQ0501020 | h | Compactador autoprop. de un cilindro vibrante de 8/14 t | 75,6500 |
| MQ0602010 | h | Camión basculante de 8 t | 41,6800 |
| MQ0602100 | h | Camión grúa de 6 t | 55,1200 |
| MQ0602110 | h | Camión grúa de 10 a 12 t | 80,2900 |
| MQ0604010 | h | Camión cisterna de 6 m3 | 49,5600 |
| MQ0604020 | h | Camión con tanque para agua de 10 m3 | 66,8900 |
| MQ0802010 | h | Hormigonera de 250 l | 1,6900 |
| MQ0807010 | h | Bomba de hormigón s/camión 60 CV | 180,9400 |
| MQ0811010 | h | Vibrador de aguja d=45 4 CV | 1,9600 |
| MQ1400010 | h | Grúa automóvil 10 t | 62,7000 |
| MQ1400020 | h | Grúa automotriz 15 t | 75,1800 |
| MQ1702010 | ud | Transporte y recogida de material | 1.259,5700 |
| MQ1900030 | h | Máquina para electrofusión | 5,7900 |
| MT0317 | u | Tapa cuadrada HA e=6cm 80x80cm -D400 | 160,0900 |
| MT0318 | u | Tapa cuadrada HA e=6cm 80x160cm -D400 | 195,2300 |
| MT12DCP010QLQ | m2 | Panel chapa prelacada e=50 mm | 37,0500 |
| mM03HH010 | h | Hormigonera 200 l. gasolina | 2,0100 |
| mM06CM010 | h | Compre.port.diesel m.p. 2 m3/min. 7 bar | 1,8800 |
| mM06MI030 | h | Martillo manual picador neumático | 2,5000 |
| mM07W030 | t | km transporte zahorra | 0,1100 |

# LISTADO DE MAQUINARIA (Pres)

## TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS

| CÓDIGO | UD | RESUMEN | PRECIO |
|---|---|---|---|
| mM08CA010 | h | Camión cisterna de agua 16 t | 31,3500 |
| mM08RN010 | h | Rodillo vibrante autopropuls.mixto 3 t. | 32,1000 |
| mq06cor020 | h | Equipo para corte de juntas en soleras de hormigón. | 10,6400 |
| mq06hor010 | h | Hormigonera eléctrica con una capacidad de amasado de 160 l. | 3,4500 |
| mq06mms010 | h | Mezclador continuo con silo, para mortero industrial en seco, su | 1,9400 |
| mq06vib020 | h | Regla vibrante de 3 m. | 5,2300 |

## PRECIOS DESCOMPUESTOS

# CUADRO DE DESCOMPUESTOS

**TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS**

| CÓDIGO | CANTIDAD | UD | RESUMEN | PRECIO | SUBTOTAL | IMPORTE |
|---|---|---|---|---|---|---|

## CAPÍTULO 01 TANQUE DE TORMENTAS

## SUBCAPÍTULO 01.1 MOVIMIENTO DE TIERRAS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U01021020_1** | | **m3** | **Excavación a cielo abierto, med. mecán. terreno medio** | | | |
| | | | Excavación a cielo abierto, por medios mecánicos, en terreno medio (suelo con golpeo en el ensayo SPT entre 10 y 30 golpes / 30 cm), medido sobre perfil, con carga y transporte a vertedero autorizado o lugar de empleo, sin ca- | | | |
| MO0100700 | 0,0250 | h | Peón ordinario | 16,5300 | 0,4133 | |
| MQ0402010 | 0,0550 | h | Retrocargadora neumáticos 75 CV | 49,4500 | 2,7198 | |
| MQ0602010 | 0,0800 | h | Camión basculante de 8 t | 41,6800 | 3,3344 | |
| | | | **TOTAL PARTIDA** | | | **6,47** |

Asciende el precio total de la partida a la mencionada cantidad de SEIS EUROS con CUARENTA Y SIETE CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U01030340** | | **m3** | **Relleno trasdós muros suelos adecuados de excavación** | | | |
| | | | Relleno localizado en trasdós de muros con suelos adecuados procedentes de la excavación, incluso aportación, extendido, humectación y compactación en capas de 30 cm de espesor, con un grado de compactación del 95% | | | |
| MO0100200 | 0,0600 | h | Capataz | 18,3900 | 1,1034 | |
| MO0100500 | 0,0600 | h | Ayudante | 16,7500 | 1,0050 | |
| MQ0400080 | 0,0200 | h | Retroexcavadora 50 HP | 37,1400 | 0,7428 | |
| MQ0500030 | 0,0400 | h | Compactador manual | 9,6000 | 0,3840 | |
| MQ0604020 | 0,0200 | h | Camión con tanque para agua de 10 m3 | 66,8900 | 1,3378 | |
| MT0103020 | 1,1500 | m3 | Suelo adecuado tamaño máximo 150 mm., proc. excav. | 0,8300 | 0,9545 | |
| | | | **TOTAL PARTIDA** | | | **5,53** |

Asciende el precio total de la partida a la mencionada cantidad de CINCO EUROS con CINCUENTA Y TRES CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **mU02ER050** | | **m3** | **Relleno localizado material filtrante** | | | |
| | | | Relleno localizado con material filtrante de préstamos, en cimientos y trasdoses de muros. | | | |
| mO01OA020 | 0,0130 | h | Capataz | 15,5200 | 0,2018 | |
| mO01OA070 | 0,1350 | h | Peón ordinario | 13,5100 | 1,8239 | |
| mM08RN010 | 0,1250 | h | Rodillo vibrante autopropuls.mixto 3 t. | 32,1000 | 4,0125 | |
| mM08CA010 | 0,0100 | h | Camión cisterna de agua 16 t | 31,3500 | 0,3135 | |
| mP01AF010 | 2,2000 | t | Zahorra nat ZN(50)/ZN(20), IP=0 | 4,0700 | 8,9540 | |
| mM07W030 | 44,0000 | t | km transporte zahorra | 0,1100 | 4,8400 | |
| %CI0300 | 3,0000 | % | Costes Indirectos | 20,1500 | 0,6045 | |
| | | | **TOTAL PARTIDA** | | | **20,75** |

Asciende el precio total de la partida a la mencionada cantidad de VEINTE EUROS con SETENTA Y CINCO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U01025130** | | **m2** | **Entibación cuajada zapatas o pozos con cajones chapa hasta 6 m** | | | |
| | | | Entibación metálica cuajada en zapatas o pozos, hasta 6 m de profundidad, con cajones de paneles de chapa de | | | |
| MO0100300 | 0,1000 | h | Oficial 1ª | 18,0400 | 1,8040 | |
| MO0100500 | 0,1000 | h | Ayudante | 16,7500 | 1,6750 | |
| MT0202250 | 0,5000 | m2 | Panel chapa de acero 400x100 cm | 4,5300 | 2,2650 | |
| MQ0400030 | 0,0900 | h | Excavadora hidráulica neumáticos 144 CV | 76,3000 | 6,8670 | |
| MQ1702010 | 0,0090 | ud | Transporte y recogida de material | 1.259,5700 | 11,3361 | |
| | | | **TOTAL PARTIDA** | | | **23,95** |

Asciende el precio total de la partida a la mencionada cantidad de VEINTITRES EUROS con NOVENTA Y CINCO CÉNTIMOS

## SUBCAPÍTULO 01.2 DRENAJE

| | | | | | | |
|---|---|---|---|---|---|---|
| **U09011080_01** | | **m** | **Tubo de drenaje de polietileno de alta densidad de 15 cm diám.** | | | |
| | | | Suministro y colocación de tubo de drenaje de polietileno de alta densidad corrugado, de doble pared ranurada, de 15 cm de diámetro. Colocado sobre cama de arena de río de 10 cm de espesor, revestido con geotextil de 125 g/m2 y relleno con grava filtrante 25 cm por encima del tubo con cierre de doble solapa del paquete filtrante (realizado con el propio geotextil). Con p.p. de medios auxiliares, incluso conexión a arqueta de evacuación de cáma- | | | |
| MO0100300 | 0,2400 | h | Oficial 1ª | 18,0400 | 4,3296 | |
| MO0100500 | 0,3900 | h | Ayudante | 16,7500 | 6,5325 | |
| MT2605010 | 1,0000 | m | Tubo de drenaje de polietileno de alta densidad de 15 cm de diám | 6,7400 | 6,7400 | |
| MT0101020 | 0,0660 | m3 | Arena de río 0/5 mm | 10,8800 | 0,7181 | |
| MT0101090 | 0,2500 | m3 | Gravilla silícea 2/5 machaqueo | 29,3700 | 7,3425 | |
| MT1102080 | 2,4700 | m2 | Geotextil no tejido, de 260 gr/m2 | 2,2700 | 5,6069 | |
| | | | **TOTAL PARTIDA** | | | **31,27** |

Asciende el precio total de la partida a la mencionada cantidad de TREINTA Y UN EUROS con VEINTISIETE CÉNTIMOS

| CÓDIGO | CANTIDAD | UD | RESUMEN | PRECIO | SUBTOTAL | IMPORTE |
|---|---|---|---|---|---|---|

## SUBCAPÍTULO 01.3 ESTRUCTURA

| | | | | | | |
|---|---|---|---|---|---|---|
| **U07010204** | | **m3** | **HNE-15/B/12 o HNE-15/B/20** | | | |
| | | | Suministro y puesta en obra de hormigón no estructural HNE-15/B/12 o HNE-15/B/20, elaborado en central y vertido desde camión o bomba, para rellenos o elementos no estructurales, colocado a cualquier profundidad, incluso | | | |
| MO0100300 | 0,1000 | h | Oficial 1ª | 18,0400 | 1,8040 | |
| MO0100500 | 0,1000 | h | Ayudante | 16,7500 | 1,6750 | |
| MO0100700 | 0,1000 | h | Peón ordinario | 16,5300 | 1,6530 | |
| MT0402020 | 1,0500 | m3 | Hormigón HNE-15/B/12 o HNE-15/B/20 central | 72,9000 | 76,5450 | |
| MQ0807010 | 0,0400 | h | Bomba de hormigón s/camión 60 CV | 180,9400 | 7,2376 | |
| | | | **TOTAL PARTIDA.....** | | | **88,91** |

Asciende el precio total de la partida a la mencionada cantidad de OCHENTA Y OCHO EUROS con NOVENTA Y UN CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U07010804** | | **m3** | **HA-30/B/20/XC2,XC3 o HA-30/B/20/XC4 eltos horiz., con camión** | | | |
| | | | Suministro y puesta en obra de hormigón HA-30/B/20/XC2,XC3 o HA-30/B/20/XC4, elaborado en central y vertido desde camión en elementos horizontales-verticales de estructura (cimentaciones, soleras, vigas, etc.), incluso | | | |
| MO0100300 | 0,1000 | h | Oficial 1ª | 18,0400 | 1,8040 | |
| MO0100500 | 0,1500 | h | Ayudante | 16,7500 | 2,5125 | |
| MO0100700 | 0,1500 | h | Peón ordinario | 16,5300 | 2,4795 | |
| MQ0811010 | 0,1000 | h | Vibrador de aguja d=45 4 CV | 1,9600 | 0,1960 | |
| MT0109040 | 0,5000 | kg | Filmógeno de curado | 4,1300 | 2,0650 | |
| MT0408060 | 1,0500 | m3 | Hormigón HA-30/B/20/XC2,XC3 o HA-30/B/20/XC4 central | 90,0300 | 94,5315 | |
| | | | **TOTAL PARTIDA.....** | | | **103,59** |

Asciende el precio total de la partida a la mencionada cantidad de CIENTO TRES EUROS con CINCUENTA Y NUEVE CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U07010210** | | **m3** | **HNE-20/B/12 o HNE-20/B/20** | | | |
| | | | Suministro y puesta en obra de hormigón no estructural HNE-20/B/12 o HNE-20/B/20, elaborado en central y vertido desde camión o bomba, para rellenos o elementos no estructurales, colocado a cualquier profundidad, incluso | | | |
| MO0100300 | 0,1000 | h | Oficial 1ª | 18,0400 | 1,8040 | |
| MO0100500 | 0,1000 | h | Ayudante | 16,7500 | 1,6750 | |
| MO0100700 | 0,1000 | h | Peón ordinario | 16,5300 | 1,6530 | |
| MT0402050 | 1,0500 | m3 | Hormigón HNE-20/B/12 o HNE-20/B/20 central | 80,6500 | 84,6825 | |
| MT0109040 | 0,5000 | kg | Filmógeno de curado | 4,1300 | 2,0650 | |
| MQ0807010 | 0,0400 | h | Bomba de hormigón s/camión 60 CV | 180,9400 | 7,2376 | |
| | | | **TOTAL PARTIDA.....** | | | **99,12** |

Asciende el precio total de la partida a la mencionada cantidad de NOVENTA Y NUEVE EUROS con DOCE CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U07030050** | | **kg** | **Suministro y colocación de acero para armaduras en barras B500S** | | | |
| | | | Suministro y colocación de acero para armaduras en barras corrugadas B 500 S, incluso cortado, doblado y recortes, según peso teórico. | | | |
| MO0100300 | 0,0100 | h | Oficial 1ª | 18,0400 | 0,1804 | |
| MO0100500 | 0,0100 | h | Ayudante | 16,7500 | 0,1675 | |
| MQ1400020 | 0,0001 | h | Grúa automotriz 15 t | 75,1800 | 0,0075 | |
| MT0701010 | 1,0000 | kg | Acero corrugado B 500 S | 1,3800 | 1,3800 | |
| MT0704020 | 0,0040 | kg | Alambre de atar 1,3 mm | 2,2100 | 0,0088 | |
| | | | **TOTAL PARTIDA.....** | | | **1,74** |

Asciende el precio total de la partida a la mencionada cantidad de UN EUROS con SETENTA Y CUATRO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U07020081** | | **m2** | **Encofrado plano met. elem. vertical. estru. trabaj. entre 5 y 7** | | | |
| | | | Encofrado plano para elementos verticales de estructura (muros, etc.) con paneles metálicos, con calidad de acabado cara vista, para trabajos a partir de 5 m de altura y hasta 7 m de altura, incluso molduras y berenjenos, ta- | | | |
| MO0100300 | 0,5500 | h | Oficial 1ª | 18,0400 | 9,9220 | |
| MO0100500 | 0,5500 | h | Ayudante | 16,7500 | 9,2125 | |
| MO0100700 | 0,2600 | h | Peón ordinario | 16,5300 | 4,2978 | |
| MT0801010 | 1,0000 | m2 | Encofrado con chapas metálicas | 5,4800 | 5,4800 | |
| MT0802021 | 1,0000 | pp | Molduras y berenjenos, tapes, velas, puntales, cimbras, etc. has | 3,0700 | 3,0700 | |
| MT0109010 | 0,1000 | l | Desencofrante | 2,9500 | 0,2950 | |
| MQ0602100 | 0,0440 | h | Camión grúa de 6 t | 55,1200 | 2,4253 | |
| | | | **TOTAL PARTIDA.....** | | | **34,70** |

Asciende el precio total de la partida a la mencionada cantidad de TREINTA Y CUATRO EUROS con SETENTA CÉNTIMOS

| CÓDIGO | CANTIDAD | UD | RESUMEN | PRECIO | SUBTOTAL | IMPORTE |
|---|---|---|---|---|---|---|
| **U07020040** | | **m2** | **Encofrado plano met. elem. horiz. estru. trabaj. entre 3 y 5 m** | | | |
| | | | Encofrado plano para elementos horizontales de estructura (losas, etc.) con paneles metálicos, con calidad de acabado cara vista, para trabajos a partir de 3 m de altura y hasta 5 m de altura, incluso molduras y berenjenos, ta- | | | |
| MO0100300 | 0,5000 | h | Oficial 1ª | 18,0400 | 9,0200 | |
| MO0100500 | 0,5000 | h | Ayudante | 16,7500 | 8,3750 | |
| MO0100700 | 0,2500 | h | Peón ordinario | 16,5300 | 4,1325 | |
| MT0801010 | 1,0000 | m2 | Encofrado con chapas metálicas | 5,4800 | 5,4800 | |
| MT0802020 | 1,0000 | pp | Molduras y berenjenos, tapes, velas, puntales, cimbras, etc. has | 1,8400 | 1,8400 | |
| MT0109010 | 0,1000 | l | Desencofrante | 2,9500 | 0,2950 | |
| MQ0602100 | 0,0395 | h | Camión grúa de 6 t | 55,1200 | 2,1772 | |
| | | | **TOTAL PARTIDA.....** | | | **31,32** |

Asciende el precio total de la partida a la mencionada cantidad de TREINTA Y UN EUROS con TREINTA Y DOS CÉNTIMOS

## SUBCAPÍTULO 01.4 IMPERMEABILIZACIÓN

| | | | | | | |
|---|---|---|---|---|---|---|
| **08020360_1** | | **m2** | **Impz muro c/lamn PVC e 1,5 mm** | | | |
| | | | Impermeabilización de muro de sótano, mediante membrana impermeabilizante, compuesta por lámina de policloruro de vinilo PVC, de 1,5 mm de espesor, sin armadura, fijada en la parte superior mediante barra de terminación de aluminio anclada mecánicamente al soporte, incluso limpieza previa del soporte, fijaciones, mermas y solapos, | | | |
| MO0100300 | 0,1000 | h | Oficial 1ª | 18,0400 | 1,8040 | |
| MO0100500 | 0,1000 | h | Ayudante | 16,7500 | 1,6750 | |
| PNIS.9ba | 1,0500 | m2 | Lamn PVC e1,5mm | 11,1300 | 11,6865 | |
| PNIW61a | 1,0000 | m | Barra Al p/fj mec impz en muros | 4,9700 | 4,9700 | |
| PBUC.4a | 2,0000 | u | Clavo galv c/aran met unn pl | 0,1900 | 0,3800 | |
| %0200 | 2,0000 | % | Costes directos complementarios | 20,5200 | 0,4104 | |
| | | | **TOTAL PARTIDA.....** | | | **20,93** |

Asciende el precio total de la partida a la mencionada cantidad de VEINTE EUROS con NOVENTA Y TRES CÉNTIMOS

## SUBCAPÍTULO 01.5 OBRA CIVIL-EDIFICACIÓN

| | | | | | | |
|---|---|---|---|---|---|---|
| **808020300_2** | | **ml** | **Zuncho horizontal de bloque "U" de hormigón visto** | | | |
| | | | Zuncho horizontal de 20 cm de espesor, de bloques en "U" de hormigón, lisos, color gris, 40x20x20 cm, resistencia normalizada R10 (10 N/mm²), para revestir, recibidos con mortero de cemento industrial, color gris, M-7,5, suministrado a granel; con refuerzo de hormigón de relleno, HA-25/B/12/XC2, preparado en obra, vertido con medios manuales, y acero UNE-EN 10080 B 500 S, cuantía 4,3 kg/m; para muro de carga de fábrica armada. Incluso alambre de atar y separadores. El precio incluye la elaboración de la ferralla (corte, doblado y conformado de ele- | | | |
| mt02bhp020f | 2,6250 | Ud | Bloque en "U" de hormigón visto, liso, color blanco, 40x20x20 cm | 2,8700 | 7,5338 | |
| mt07aco010c | 4,3000 | kg | Ferralla elaborada en taller industrial con acero en barras corr | 1,7400 | 7,4820 | |
| mt08var050 | 0,0990 | kg | Alambre galvanizado para atar, de 1,30 mm de diámetro. | 1,5000 | 0,1485 | |
| mt08aaa010a | 0,0090 | m³ | Agua. | 1,5000 | 0,0135 | |
| AUX002110 | 0,0060 | m3 | Mortero de cemento blanco BL-V 22,5, amasado a mano | 373,5720 | 2,2414 | |
| mt08cem011a | 11,6780 | kg | Cemento Portland CEM II/B-L 32,5 R, color gris, en sacos, según | 0,1000 | 1,1678 | |
| mt01arg006 | 0,0160 | t | Arena de cantera, para hormigón preparado en obra. | 17,5000 | 0,2800 | |
| mt01arg007b | 0,0320 | t | Árido grueso homogeneizado, de tamaño máximo 12 mm. | 16,6400 | 0,5325 | |
| mq06hor010 | 0,0160 | h | Hormigonera eléctrica con una capacidad de amasado de 160 l. | 3,4500 | 0,0552 | |
| mq06mms010 | 0,0210 | h | Mezclador continuo con silo, para mortero industrial en seco, su | 1,9400 | 0,0407 | |
| MO0100300 | 0,0890 | h | Oficial 1ª | 18,0400 | 1,6056 | |
| MO0100500 | 0,0730 | h | Ayudante | 16,7500 | 1,2228 | |
| | | | **TOTAL PARTIDA.....** | | | **22,32** |

Asciende el precio total de la partida a la mencionada cantidad de VEINTIDOS EUROS con TREINTA Y DOS CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U08020300_1** | | **m2** | **Fábrica bloques hueco hormigón estriado visto 40x20x20 cm** | | | |
| | | | Fábrica de bloque hueco de hormigón estriado a cara vista, color blanco, dimensiones 40x20x20 cm, recibida con mortero M-250 de cemento BL 22,5 incluso rejuntado, limpieza de paños y piezas especiales, según normativa vigente. | | | |
| | | | Reforzado con armadura anclada a forjado existente y hormigón de relleno HA-25/B/112/XC2, en dinteles, zunchos horizontales y zunchos verticales y acero, UNE-EN 10080B, cuantía 0,6 kg/m2, armadura de tendel prefabricada | | | |
| MO0100300 | 0,3800 | h | Oficial 1ª | 18,0400 | 6,8552 | |
| MO0100500 | 0,1900 | h | Ayudante | 16,7500 | 3,1825 | |
| AUX005010 | 1,5000 | kg | Acero B 500 S en armaduras | 1,7367 | 2,6051 | |
| MT0104010 | 13,0000 | ud | Bloque hueco de hormigón, a cara vista, blanco, 40x20x20 cm | 2,8700 | 37,3100 | |
| AUX003090 | 0,0100 | m3 | Hormigón para armar HA-25 | 94,3898 | 0,9439 | |
| AUX002110 | 0,0130 | m3 | Mortero de cemento blanco BL-V 22,5, amasado a mano | 373,5720 | 4,8564 | |
| | | | **TOTAL PARTIDA.....** | | | **55,75** |

Asciende el precio total de la partida a la mencionada cantidad de CINCUENTA Y CINCO EUROS con SETENTA Y CINCO CÉNTIMOS

# CUADRO DE DESCOMPUESTOS

## TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS

| CÓDIGO | CANTIDAD | UD | RESUMEN | PRECIO | SUBTOTAL | IMPORTE |
|---|---|---|---|---|---|---|
| **U08020140** | | **m2** | **Fábrica de ladrillo perforado 24x11,5x7 cm, 1/2 pie de esp.** | | | |
| | | | Fábrica de ladrillo perforado 24x11,5x7 cm, de 1/2 pie de espesor, recibido con mortero de cemento CEM II/B-P 32,5 N y arena tipo M-5, para revestir en alzados, conforme a norma UNE-EN 998-1 y/o según normativa vigente | | | |
| MO0100300 | 0,4500 | h | Oficial 1ª | 18,0400 | 8,1180 | |
| MO0100600 | 0,4500 | h | Peón especialista | 16,5500 | 7,4475 | |
| MT1001050 | 61,0000 | ud | Ladrillo perforado 24x11,5x7 cm | 0,1400 | 8,5400 | |
| AUX002020 | 0,0350 | m3 | Mortero de cemento (1/6) M-250 | 74,4965 | 2,6074 | |
| | | | **TOTAL PARTIDA** | | | **26,71** |

Asciende el precio total de la partida a la mencionada cantidad de VEINTISEIS EUROS con SETENTA Y UN CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U08030030** | | **m2** | **Enfoscado maestreado y fratasado mortero cem. y aditivo hidróf.** | | | |
| | | | Enfoscado maestreado y fratasado con mortero de cemento y aditivo hidrófugo, incluso mallazo de alambre de acero galvanizado de 1x1 cm de cuadrícula, grapado a la viga del forjado con grapas de acero galvanizado, inclu- | | | |
| MO0100300 | 0,6500 | h | Oficial 1ª | 18,0400 | 11,7260 | |
| MO0100500 | 0,6500 | h | Ayudante | 16,7500 | 10,8875 | |
| AUX002060 | 0,0200 | m3 | Mortero de cemento hidrófugo CEM II-BP 32,5 | 88,5494 | 1,7710 | |
| MT0202010 | 1,0000 | m2 | Mallazo de alambre de acero galvanizado de 1x1 cm | 4,2500 | 4,2500 | |
| | | | **TOTAL PARTIDA** | | | **28,63** |

Asciende el precio total de la partida a la mencionada cantidad de VEINTIOCHO EUROS con SESENTA Y TRES CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U08030320** | | **m2** | **Pintura al temple liso en paramentos horizontales y verticales** | | | |
| | | | Pintura al temple liso en paramentos horizontales y verticales, dos manos de color, incluso preparación de base y | | | |
| MO0100300 | 0,1150 | h | Oficial 1ª | 18,0400 | 2,0746 | |
| MO0100500 | 0,1150 | h | Ayudante | 16,7500 | 1,9263 | |
| MT1702010 | 0,4500 | kg | Pasta temple blanco | 0,2600 | 0,1170 | |
| MT1702030 | 0,0500 | kg | Plaste | 2,1100 | 0,1055 | |
| | | | **TOTAL PARTIDA** | | | **4,22** |

Asciende el precio total de la partida a la mencionada cantidad de CUATRO EUROS con VEINTIDOS CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U08010010** | | **kg** | **Acero S-275 JR en estructura soldada** | | | |
| | | | Acero laminado S-275 JR, en perfiles laminados en caliente para vigas, pilares, zunchos y correas, mediante uniones soldadas; incluso p.p. de soldaduras, cortes, piezas especiales, despuntes y dos manos de imprimación con | | | |
| MO0100300 | 0,0100 | h | Oficial 1ª | 18,0400 | 0,1804 | |
| MO0100500 | 0,0200 | h | Ayudante | 16,7500 | 0,3350 | |
| MO0100700 | 0,0200 | h | Peón ordinario | 16,5300 | 0,3306 | |
| MQ1400010 | 0,0020 | h | Grúa automóvil 10 t | 62,7000 | 0,1254 | |
| MT0701060 | 1,0500 | kg | Acero al carbono S-275 | 1,6100 | 1,6905 | |
| MT1701010 | 0,0100 | kg | Minio electrolítico | 16,7800 | 0,1678 | |
| MT1701020 | 0,0100 | kg | Disolvente universal | 11,4500 | 0,1145 | |
| | | | **TOTAL PARTIDA** | | | **2,94** |

Asciende el precio total de la partida a la mencionada cantidad de DOS EUROS con NOVENTA Y CUATRO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U08020680_1** | | **m2** | **Cubierta panel chapa acero perf. comercial prelac. 0,6 mm** | | | |
| | | | Cubierta formada por panel de chapa de acero en perfil comercial, prelacada de 0,6 mm con núcleo de espuma de poliuretano de 40 kg/m3 con un espesor total de 50 mm sobre correas metálicas, i/p.p. de solapes, tapajuntas, accesorios de fijación, limahoyas, cumbrera, remates laterales, encuentros de chapa prelacada de 0,6 mm y 500 mm de desarrollo medio, instalado, incluso medios auxiliares y elementos de seguridad, según normativa vigente. | | | |
| MO0100300 | 0,3000 | h | Oficial 1ª | 18,0400 | 5,4120 | |
| MO0100500 | 0,3000 | h | Ayudante | 16,7500 | 5,0250 | |
| MT12DCP010QLQ | 1,0000 | m2 | Panel chapa prelacada e=50 mm | 37,0500 | 37,0500 | |
| MT0303020 | 1,0000 | ud | Tornillería y pequeño material | 0,1200 | 0,1200 | |
| | | | **TOTAL PARTIDA** | | | **47,61** |

Asciende el precio total de la partida a la mencionada cantidad de CUARENTA Y SIETE EUROS con SESENTA Y UN CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U08020050_1** | | **m2** | **Recrecido aligerado, sistema CÁVITI** | | | |
| | | | Recrecido aligerado de hormigón armado de 65+15 cm de espesor, sobre encofrado perdido de piezas de polipropileno reciclado, C-65 "CÁVITI", de 750x500x650 mm, color negro, realizado con hormigón HA-30/B/12/XC1+XF1+XA1+XM2 fabricado en central, con cemento SR, y malla electrosoldada ME 15x15 Ø 8-8 B 500 T 6x2,20 UNE-EN 10080 como armadura de reparto, colocada sobre separadores homologados en capa de compresión de 8 cm de espesor; apoyado todo ello sobre base de hormigón de limpieza. | | | |
| mt07cav010mm | 1,0500 | m² | Encofrado perdido de piezas de polipropileno reciclado, C-65 "CÁ | 24,2400 | 25,4520 | |
| mt08var050 | 0,0050 | kg | Alambre galvanizado para atar, de 1,30 mm de diámetro. | 1,5000 | 0,0075 | |
| mt07ame010l | 1,1000 | m² | Malla electrosoldada ME 15x15 Ø 8-8 B 500 T 6x2,20 UNE-EN | 8,4100 | 9,2510 | |
| mt10haf010baf | 0,3400 | m³ | Hormigón HA-30/B/12/XC1+XF1+XA1+XM2, fabricado en central, | 128,6000 | 43,7240 | |
| AUX005010 | 0,7100 | kg | Acero B 500 S en armaduras | 1,7367 | 1,2331 | |

# CUADRO DE DESCOMPUESTOS

## TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS

| CÓDIGO | CANTIDAD | UD | RESUMEN | PRECIO | SUBTOTAL | IMPORTE |
|---|---|---|---|---|---|---|
| mq06vib020 | 0,0830 | h | Regla vibrante de 3 m. | 5,2300 | 0,4341 | |
| MO0100300 | 0,0780 | h | Oficial 1ª | 18,0400 | 1,4071 | |
| MO0100600 | 0,3700 | h | Peón especialista | 16,5500 | 6,1235 | |
| MO0100500 | 0,2000 | h | Ayudante | 16,7500 | 3,3500 | |
| | | | **TOTAL PARTIDA** | | | **90,98** |

Asciende el precio total de la partida a la mencionada cantidad de NOVENTA EUROS con NOVENTA Y OCHO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U08010030** | | **m2** | **Plataforma rejilla tramex antidesliz. y seguridad** | | | |
| | | | Plataforma formada por rejilla tipo tramex galvanizada, superantideslizante y de seguridad, (en paneles de 1.000x2.000 mm), formada por doble pletina dentada de cresta biselada, de 30x2 mm y 10x2 mm, respectivamente, en cuadrícula de 30x30 mm, incluido malla de protección por debajo de la pletina separadora, de 1 mm de espesor con taladros cuadrados de 8x8 mm, y p.p. de recercados o bastidor de angular 30x30x3 mm o pletina de | | | |
| MO0100300 | 0,5000 | h | Oficial 1ª | 18,0400 | 9,0200 | |
| MO0100500 | 0,5000 | h | Ayudante | 16,7500 | 8,3750 | |
| MT0706010 | 1,0000 | m2 | Rejilla tipo tramex galvanizada, superantideslizante | 45,4900 | 45,4900 | |
| | | | **TOTAL PARTIDA** | | | **62,89** |

Asciende el precio total de la partida a la mencionada cantidad de SESENTA Y DOS EUROS con OCHENTA Y NUEVE CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U08040040** | | **m2** | **Carpintería metálica con chapa plegada de hierro en puertas** | | | |
| | | | Puerta de chapa plegada (tipo Pegaso o equivalente) practicable o corredera para exteriores de edificaciones, realizada con doble chapa de acero galvanizado de 1 mm de espesor y panel intermedio, rigidizadores con perfiles de acero conformado en frío, herrajes de colgar, cerradura con manillón de nylon, cerco de perfil de acero conformado en frío con garras para recibir a la obra, bastidor y refuerzos de tubo de acero laminado, guías, topes, tiradores, pasadores y demás accesorios necesarios, patillas de fijación a obra, acabado con capa de pintura epoxi polimerizada al horno, elaborada en taller, ajuste y fijación en obra. instalada, i/ recibido de albañilería y precerco. | | | |
| MO0100300 | 0,5000 | h | Oficial 1ª | 18,0400 | 9,0200 | |
| MO0100500 | 0,5000 | h | Ayudante | 16,7500 | 8,3750 | |
| MT1302020 | 1,0000 | m2 | Carpintería metálica con chapa plegada de hierro | 184,9800 | 184,9800 | |
| | | | **TOTAL PARTIDA** | | | **202,38** |

Asciende el precio total de la partida a la mencionada cantidad de DOSCIENTOS DOS EUROS con TREINTA Y OCHO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U08040070** | | **m2** | **Carpintería metálica de acero galvanizado, practicable** | | | |
| | | | Carpintería metálica de acero galvanizado, en ventanas o puertas practicables, con perfiles conformados en frío de acero galvanizado de 1 mm de espesor, formando bastidor con despiece en retícula cuadrada o rectangular, con junquillos a presión de fleje de acero galvanizado de 0,5 mm de espesor con cantoneras en encuentro; patillas para anclaje de 10 cm i/corte, preparación y soldadura de perfiles en taller, ajuste y montaje en obra, pintura, i/ recibido de albañilería. Según NTE-FCA. | | | |
| MO0100300 | 0,2000 | h | Oficial 1ª | 18,0400 | 3,6080 | |
| MO0100500 | 0,2000 | h | Ayudante | 16,7500 | 3,3500 | |
| MT1302050 | 1,0000 | m2 | Carpintería metálica de acero galvanizado, en ventanas o puertas | 237,3200 | 237,3200 | |
| | | | **TOTAL PARTIDA** | | | **244,28** |

Asciende el precio total de la partida a la mencionada cantidad de DOSCIENTOS CUARENTA Y CUATRO EUROS con VEINTIOCHO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U08040100_1** | | **Ud** | **Puerta enrollable para garaje, de aluminio.** | | | |
| mt26pge010gm | 1,0000 | Ud | Puerta enrollable para garaje, formada por lamas de chapa perfor | 1.961,8200 | 1.961,8200 | |
| MO0100300 | 1,0000 | h | Oficial 1ª | 18,0400 | 18,0400 | |
| MO0100500 | 1,0000 | h | Ayudante | 16,7500 | 16,7500 | |
| | | | **TOTAL PARTIDA** | | | **1.996,61** |

Asciende el precio total de la partida a la mencionada cantidad de MIL NOVECIENTOS NOVENTA Y SEIS EUROS con SESENTA Y UN CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U08010100_1** | | **m** | **Barandilla tubo metálico H=1 m, pintada. Desmontable** | | | |
| | | | Barandilla metálica de tubo de diámetro 50 mm x e=1,5 mm y altura 1,00 m, compuesta por montantes separados, pasamanos y travesaño intermedio, y rodapié de pletina de 200 x 5 mm, incluso placas y tornillos de anclaje, pintura al esmalte satinado, dos manos y una mano de minio o antioxidante, previo rascado de los óxidos y limpieza | | | |
| MO0100300 | 0,4000 | h | Oficial 1ª | 18,0400 | 7,2160 | |
| MO0100500 | 0,4000 | h | Ayudante | 16,7500 | 6,7000 | |
| MT0708010 | 1,0000 | m | Barandilla metálica de tubo de diámetro 50 mm x e=1,5 mm | 137,1000 | 137,1000 | |
| MT1701010 | 0,1000 | kg | Minio electrolítico | 16,7800 | 1,6780 | |
| MT1701020 | 0,1000 | kg | Disolvente universal | 11,4500 | 1,1450 | |
| MT1701030 | 0,2000 | l | Pintura esmalte satinado | 16,8300 | 3,3660 | |
| | | | **TOTAL PARTIDA** | | | **157,21** |

Asciende el precio total de la partida a la mencionada cantidad de CIENTO CINCUENTA Y SIETE EUROS con VEINTIUN CÉNTIMOS

| CÓDIGO | CANTIDAD | UD | RESUMEN | PRECIO | SUBTOTAL | IMPORTE |
|---|---|---|---|---|---|---|
| **U05070050_1** | | **ud** | **Tapa de fundición ductil 80x80cm - D200** | | | |
| | | | Tapa de registro de fundicion dúctil 80x80 cm, recibido con mortero de cemento 1:6, sobre solera de hormigón to- | | | |
| MO0100300 | 0,2000 | h | Oficial 1ª | 18,0400 | 3,6080 | |
| MO0100600 | 0,1000 | h | Peón especialista | 16,5500 | 1,6550 | |
| MT0316 | 1,0000 | u | Tapa cuadrada HA e=6cm 80x80cm -D200 | 68,6500 | 68,6500 | |
| MT0105160 | 0,0810 | t | Mortero Enf. Rev. Ext GP-CS-IV-W2 | 151,8000 | 12,2958 | |
| | | | **TOTAL PARTIDA** | | | **86,21** |

Asciende el precio total de la partida a la mencionada cantidad de OCHENTA Y SEIS EUROS con VEINTIUN CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U05070050_2** | | **ud** | **Tapa de fundición ductil 75x100cm - D400** | | | |
| | | | Tapa de registro de fundicion dúctil 75x100 cm, recibido con mortero de cemento 1:6, sobre solera de hormigón | | | |
| MO0100300 | 0,2000 | h | Oficial 1ª | 18,0400 | 3,6080 | |
| MO0100600 | 0,2000 | h | Peón especialista | 16,5500 | 3,3100 | |
| MT0317 | 1,0000 | u | Tapa cuadrada HA e=6cm 80x80cm -D400 | 160,0900 | 160,0900 | |
| MT0105160 | 0,0810 | t | Mortero Enf. Rev. Ext GP-CS-IV-W2 | 151,8000 | 12,2958 | |
| | | | **TOTAL PARTIDA** | | | **179,30** |

Asciende el precio total de la partida a la mencionada cantidad de CIENTO SETENTA Y NUEVE EUROS con TREINTA CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U05070050_3** | | **ud** | **Tapa de fundición ductil 80x160cm - D400 - 4hojas** | | | |
| | | | Tapa de registro de fundicion dúctil 80x160 de 4 hojas D-400 recibido con mortero de cemento 1:6, sobre solera | | | |
| MO0100300 | 0,3000 | h | Oficial 1ª | 18,0400 | 5,4120 | |
| MO0100600 | 0,3000 | h | Peón especialista | 16,5500 | 4,9650 | |
| MT0318 | 1,0000 | u | Tapa cuadrada HA e=6cm 80x160cm -D400 | 195,2300 | 195,2300 | |
| MT0105160 | 0,0810 | t | Mortero Enf. Rev. Ext GP-CS-IV-W2 | 151,8000 | 12,2958 | |
| | | | **TOTAL PARTIDA** | | | **217,90** |

Asciende el precio total de la partida a la mencionada cantidad de DOSCIENTOS DIECISIETE EUROS con NOVENTA CÉNTIMOS

## SUBCAPÍTULO 01.6 EQUIPOS E INSTALACIONES

## APARTADO 01.6.1 ILUMINACIÓN

| | | | | | | |
|---|---|---|---|---|---|---|
| **U10050120** | | **ud** | **Lumi. Adosable. LED Estanca IP-66 1x58 W** | | | |
| | | | Suministro y montaje de luminaria adosable Estanca LED. IP-66, 1x58 W. Factor de potencia >0,9. Eficiencia > 130Lm/W. Vida útil > 50000 horas. Difusor: Policarbonato, extruido. | | | |
| MO0100300 | 0,2000 | h | Oficial 1ª | 18,0400 | 3,6080 | |
| MO0100500 | 0,2500 | h | Ayudante | 16,7500 | 4,1875 | |
| MT8125100 | 1,0000 | ud | Regleta adosable estanca 1x58 W | 213,5700 | 213,5700 | |
| MT8141270 | 1,0000 | ud | Lámpara LED 58 W, RA 80 4000K | 52,8800 | 52,8800 | |
| | | | **TOTAL PARTIDA** | | | **274,25** |

Asciende el precio total de la partida a la mencionada cantidad de DOSCIENTOS SETENTA Y CUATRO EUROS con VEINTICINCO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U10050080** | | **ud** | **Lumi. Adosable. LED Estanca IP-66 1x16 W** | | | |
| | | | Suministro y montaje de luminaria adosable Estanca LED. IP-66, 1x16 W. Factor de potencia >0,9. Eficiencia > 130Lm/W. Vida útil > 50000 horas. Difusor: Policarbonato, extruido. | | | |
| MO0100300 | 0,2000 | h | Oficial 1ª | 18,0400 | 3,6080 | |
| MO0100500 | 0,2500 | h | Ayudante | 16,7500 | 4,1875 | |
| MT8141230 | 1,0000 | ud | Lámpara LED 16 W, RA 80 4000K | 35,6000 | 35,6000 | |
| MT8125060 | 1,0000 | ud | Regleta adosable estanca 1x16 W | 188,1500 | 188,1500 | |
| | | | **TOTAL PARTIDA** | | | **231,55** |

Asciende el precio total de la partida a la mencionada cantidad de DOSCIENTOS TREINTA Y UN EUROS con CINCUENTA Y CINCO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U10050290-1** | | **ud** | **Proyector LED 130W IP-66** | | | |
| | | | Proyector LED SiCompact® 31 mini o equivalente.Flujo luminoso nominal 20000lm. Eficacia lumínica 154lm/W.Temperatura de color 4000K. Reproducción de color CRI > 70. Potencia nominal 130W. Índice de protección IP66. Resistencia contra impacto IK08. Instalada y en funcionamiento. | | | |
| MO0100300 | 0,2000 | h | Oficial 1ª | 18,0400 | 3,6080 | |
| MO0100500 | 0,2500 | h | Ayudante | 16,7500 | 4,1875 | |
| lamp0001 | 1,0000 | u | Proyector LED 130W | 465,5000 | 465,5000 | |
| | | | **TOTAL PARTIDA** | | | **473,30** |

Asciende el precio total de la partida a la mencionada cantidad de CUATROCIENTOS SETENTA Y TRES EUROS con TREINTA CÉNTIMOS

# CUADRO DE DESCOMPUESTOS

## TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS

| CÓDIGO | CANTIDAD | UD | RESUMEN | PRECIO | SUBTOTAL | IMPORTE |
|---|---|---|---|---|---|---|
| **U10050250** | | **ud** | **Aparato Autónomo de Emergencia Estanco** | | | |
| | | | Suministro y montaje de luminaria de emergencia estanco, con cuatro LED, flujo luminoso 375 lúmenes, carcasa de 290x130x70 mm, clase II, protección IP 65, con baterías de Ni-MH, autonomía de 1 h, alimentación a 230 V, | | | |
| MO0100300 | 0,2000 | h | Oficial 1ª | 18,0400 | 3,6080 | |
| MO0100500 | 0,2500 | h | Ayudante | 16,7500 | 4,1875 | |
| MT8151510 | 1,0000 | ud | Aparato Autónomo de Emergencia Estanco | 96,6600 | 96,6600 | |
| | | | **TOTAL PARTIDA.....** | | | **104,46** |

Asciende el precio total de la partida a la mencionada cantidad de CIENTO CUATRO EUROS con CUARENTA Y SEIS CÉNTIMOS

## APARTADO 01.6.2 ELEMENTOS INTERIOR TANQUE

| | | | | | | |
|---|---|---|---|---|---|---|
| **LIMP_BAS** | | **u** | **LIMPIADOR BASCULANTE, L = 4,6 M, AISI 316** | | | |
| | | | Limpiador basculante marca Hidrostank ó similar, referencia LP-2814 , para una longitud entre paredes de 4,6 m. La capacidad viene definida en función de los siguientes parámetros: longitud a limpiar, altura disponible y pendiente de la solera. Fabricado en acero inoxidable AISI 316, acabado final chorreado con microesfera de vidrio. Incluye soportes en acero inoxidable AISI 316, rodamientos, juego de suspensión y demás piezas pequeñas. Tornillería y anclajes en A4. Incluye prueba de volteo con agua en fábrica grabada en vídeo. | | | |
| mO01OA020 | 1,0000 | h | Capataz | 15,5200 | 15,5200 | |
| mO01OA070 | 1,0000 | h | Peón ordinario | 13,5100 | 13,5100 | |
| mO01OB210 | 1,0000 | h | Oficial 2ª fontanero calefactor | 14,6100 | 14,6100 | |
| mO01OB230 | 1,0000 | h | Ayudante fontanero | 14,4200 | 14,4200 | |
| LIMPIADOR_1 | 1,0000 | ud | Limpiador Basculante | 9.755,0800 | 9.755,0800 | |
| %CI | 6,0000 | % | Costes Indirectos | 9.813,1400 | 588,7884 | |
| | | | **TOTAL PARTIDA.....** | | | **10.401,93** |

Asciende el precio total de la partida a la mencionada cantidad de DIEZ MIL CUATROCIENTOS UN EUROS con NOVENTA Y TRES CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **RCV.C.SEMISEC** | | **u** | **REGULADOR DE CAUDAL TIPO VORTEX EN CAMARA** | | | |
| | | | Válvula de Regulación de Caudal tipo vórtice, marca MOSBAEK-HIDROSTANK, modelo CY/DX 1000-PP300-C275-A30 / BCTWL, para regular un caudal de 142 l/s a una altura de lámina de agua de 4,7 metros. Fabricado en acero inoxidable AISI 316, acabado final chorreado con bolas de vidrio. Con brida loca de polipropileno DN 300 PN 10. Incluso con ventana de inspección. Incluye para la instalación de la válvula de regulación:<br>-- Un pasamuros DN 300 L=600 mm. para empotrar a pared, en acero inoxidable AISI 316, acabado final chorreado con bolas de vidrio, con brida loca de polipropileno DN 300 PN 10<br>-- Una válvula de guillotina DN 300 PN 10, cuerpo y tajadera en acero inoxidable AISI 316. Accionamiento mediante volante.<br>Incluye un bypass formado por<br>-- Un pasamuros DN 250 L=600 mm. para empotrar a pared, en acero inoxidable AISI 316, acabado final chorreado con bolas de vidrio, con brida loca de polipropileno DN 250 PN 10.<br>-- Una válvula de guillotina DN 250 PN 10, cuerpo y tajadera en acero inoxidable AISI 316. Accionamiento mediante volante.<br>-- Un codo DN 250 con prolongación, fabricado en acero inoxidable AISI 316, con brida loca de polipropileno DN 250 PN 10.<br>Tornillería y anclajes en A4 | | | |
| mO01OA020 | 1,0000 | h | Capataz | 15,5200 | 15,5200 | |
| mO01OA070 | 1,0000 | h | Peón ordinario | 13,5100 | 13,5100 | |
| mO01OB210 | 1,0000 | h | Oficial 2ª fontanero calefactor | 14,6100 | 14,6100 | |
| mO01OB230 | 1,0000 | h | Ayudante fontanero | 14,4200 | 14,4200 | |
| VORTEX_1 | 1,0000 | ud | Válvula vortex 142 l/s | 12.365,5700 | 12.365,5700 | |
| %CI0300 | 3,0000 | % | Costes Indirectos | 12.423,6300 | 372,7089 | |
| | | | **TOTAL PARTIDA.....** | | | **12.796,34** |

Asciende el precio total de la partida a la mencionada cantidad de DOCE MIL SETECIENTOS NOVENTA Y SEIS EUROS con TREINTA Y CUATRO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **CIR_LLEN** | | **u** | **CIRCUITO DE LLENADO PARA 2 LIMPIADORES** | | | |
| | | | Incluye los siguientes elementos: 2 electroválvulas y 2 llaves de bola de 1.5", para el llenado de los limpiadores y aislamiento de los circuitos. Canalización de agua desde las electroválvulas hasta los limpiadores en acero inoxidable DN 42, con piezas roscadas de 1.5". 2 arquetas de polipropileno marca Hidrostank para alojar las electroválvulas y llaves de bola, preparadas para la realización de la acometida de agua. No incluye: Acometida de agua desde la red general. Canalización incluida siempre que las arquetas se sitúen a menos de 10 metros de distancia de los limpiadores.<br>TOTALMENTE INSTALADO | | | |
| mO01OA020 | 1,0000 | h | Capataz | 15,5200 | 15,5200 | |
| mO01OA070 | 1,0000 | h | Peón ordinario | 13,5100 | 13,5100 | |
| mO01OB210 | 1,0000 | h | Oficial 2ª fontanero calefactor | 14,6100 | 14,6100 | |
| mO01OB230 | 1,0000 | h | Ayudante fontanero | 14,4200 | 14,4200 | |
| CIRLLENADO_1 | 1,0000 | ud | CIRCUITO DE LLENADO PARA 4 LIMPIADORES | 4.137,8200 | 4.137,8200 | |
| %CI0300 | 3,0000 | % | Costes Indirectos | 4.195,8800 | 125,8764 | |

# CUADRO DE DESCOMPUESTOS

## TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS

| CÓDIGO | CANTIDAD | UD | RESUMEN | PRECIO | SUBTOTAL | IMPORTE |
|---|---|---|---|---|---|---|
| | | | **TOTAL PARTIDA.....** | | | **4.321,76** |

Asciende el precio total de la partida a la mencionada cantidad de CUATRO MIL TRESCIENTOS VEINTIUN EUROS con SETENTA Y SEIS CÉNTIMOS

| | | | | | |
|---|---|---|---|---|---|
| **REJA** | | **u** | **REJA DE CADENAS** | | |
| | | | Reja de cadenas Quilton mod. QC100, o equivalente, de dimensiones 10mm de paso y de ancho y alto | | |
| mO01OA020 | 1,0000 | h | Capataz | 15,5200 | 15,5200 |
| mO01OA070 | 1,0000 | h | Peón ordinario | 13,5100 | 13,5100 |
| mO01OB210 | 1,0000 | h | Oficial 2ª fontanero calefactor | 14,6100 | 14,6100 |
| mO01OB230 | 1,0000 | h | Ayudante fontanero | 14,4200 | 14,4200 |
| COMPUERTA | 1,0000 | ud | REJA DE CADENAS | 38.664,2700 | 38.664,2700 |
| %CI0300 | 3,0000 | % | Costes Indirectos | 38.722,3300 | 1.161,6699 |
| | | | **TOTAL PARTIDA.....** | | **39.884,00** |

Asciende el precio total de la partida a la mencionada cantidad de TREINTA Y NUEVE MIL OCHOCIENTOS OCHENTA Y CUATRO EUROS

| | | | | | |
|---|---|---|---|---|---|
| **VENT0001** | | **Ud** | **VENTILADOR** | | |
| | | | Ventilador helicocentrífugo de perfil bajo, de dos velocidades, potencia máxima de 24 W, caudal máximo de 240 m³/h, de 176 mm de diámetro y 303 mm de longitud, nivel de presión sonora de 31 dBA, para conductos de 100 mm de diámetro, formado por cuerpo de polipropileno, hélice de ABS, caja de bornes y motor para alimentación monofásica a 230 V y 50 Hz de frecuencia. Incluye: Replanteo. Colocación. Conexionado y comprobación de su correcto funcionamiento. Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto. Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de | | |
| SP_CMPT2-20 | 1,0000 | u | Ventilador de simple aspiracion anticorrosivos | 1.167,4600 | 1.167,4600 |
| mo005 | 0,2260 | h | Oficial 1ª instalador de climatización. | 18,0400 | 4,0770 |
| mo104 | 0,2260 | h | Ayudante instalador de climatización. | 16,7500 | 3,7855 |
| %0200 | 2,0000 | % | Costes directos complementarios | 1.175,3200 | 23,5064 |
| | | | **TOTAL PARTIDA.....** | | **1.198,83** |

Asciende el precio total de la partida a la mencionada cantidad de MIL CIENTO NOVENTA Y OCHO EUROS con OCHENTA Y TRES CÉNTIMOS

| | | | | | |
|---|---|---|---|---|---|
| **IVV030** | | **m** | **Conducto de PVC.** | | |
| | | | Conducto de ventilación, formado por tubo liso de PVC, de 200 mm de diámetro exterior, pegado mediante adhesivo, colocado en posición horizontal. Incluso material auxiliar para montaje y sujeción a la obra, accesorios y piezas especiales. Criterio de valoración económica: El precio no incluye las compuertas de regulación, las compuertas cortafuego, las rejillas ni los difusores. Incluye: Replanteo del recorrido del conducto y de la situación de los elementos de sujeción. Presentación en seco de tubos y piezas especiales. Fijación del material auxiliar para montaje y sujeción a la obra. Montaje, conexionado y comprobación de su correcto funcionamiento. Criterio de medición de proyecto: Longitud proyectada, según documentación gráfica de Proyecto, medida entre los ejes de los elementos o de los puntos a conectar, sin descontar las piezas especiales. Criterio de medición de obra: Se medirá la longitud realmente ejecutada según especificaciones de Proyecto. | | |
| mt42cvp420f | 1,0000 | Ud | Material auxiliar para montaje y sujeción a la obra de los condu | 0,3900 | 0,3900 |
| mt42cvp020fe | 1,0000 | m | Tubo liso de PVC, de 200 mm de diámetro exterior, con extremo ab | 9,3400 | 9,3400 |
| mt11var009 | 0,0950 | l | Líquido limpiador para pegado mediante adhesivo de tubos y acces | 37,6000 | 3,5720 |
| mt11var010 | 0,0480 | l | Adhesivo para tubos y accesorios de PVC. | 47,9200 | 2,3002 |
| mo011 | 0,1740 | h | Oficial 1ª montador. | 18,0400 | 3,1390 |
| mo080 | 0,0870 | h | Ayudante montador. | 16,7500 | 1,4573 |
| %0200 | 2,0000 | % | Costes directos complementarios | 20,2000 | 0,4040 |
| | | | **TOTAL PARTIDA.....** | | **20,60** |

Asciende el precio total de la partida a la mencionada cantidad de VEINTE EUROS con SESENTA CÉNTIMOS

## APARTADO 01.6.3 PLC + INSTALACIÓN ELÉCTRICA

| | | | | | |
|---|---|---|---|---|---|
| **CONTRL** | | **u** | **CIRCUITO DE CONTROL PARA 2 LIMPIADORES** | | |
| | | | Incluye los siguientes elementos: 2 detectores inductivos para detectar el volteo de los limpiadores. Sensor de nivel por radar tipo Vegapuls C11, para detección en continuo del nivel de agua del tanque, ajustable mediante Bluetooth. Cuadro completo para el control del sistema en modo manual y automático con autómata programado Siemens SIMATIC S7-1500, CPU 1516-3 PN/DP con pantalla táctil SIMATIC HMI MTP1500 UNIFIED COMFORT PANEL, analizador de redes SENTRON PAC3200 22-65V DC, tarjeta de comunicaciones SINAUT ST7, TIM 1531 IRC, router SCALANCE M876-4 LTE (4G) EU y antena ANT 794-4MR GSM CUATRIBANDA UMTS. Incluye también SAI para comunicaciones. Canalización y conexión eléctrica de los diferentes elementos en el cuadro de control. No incluye cuadro de protección eléctrica ni acometida desde la red general. Tensión de alimentación: 400 V, 50 Hz, 3 fases + neutro + tierra. Potencia aproximada: 2 kW. | | |
| mO01OA020 | 0,3500 | h | Capataz | 15,5200 | 5,4320 |
| mO01OA070 | 0,6000 | h | Peón ordinario | 13,5100 | 8,1060 |
| mO01OB210 | 0,8000 | h | Oficial 2ª fontanero calefactor | 14,6100 | 11,6880 |
| mO01OB230 | 1,0000 | h | Ayudante fontanero | 14,4200 | 14,4200 |

# CUADRO DE DESCOMPUESTOS

## TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS

| CÓDIGO | CANTIDAD | UD | RESUMEN | PRECIO | SUBTOTAL | IMPORTE |
|---|---|---|---|---|---|---|
| mP02ET | 1,0000 | ud | Equipo de sistemas de control | 34.165,7100 | 34.165,7100 | |
| %CI0300 | 3,0000 | % | Costes Indirectos | 34.205,3600 | 1.026,1608 | |
| | | | **TOTAL PARTIDA.....** | | | **35.231,52** |

Asciende el precio total de la partida a la mencionada cantidad de TREINTA Y CINCO MIL DOSCIENTOS TREINTA Y UN EUROS con CINCUENTA Y DOS CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U03073090** | | **ud** | **Caudalímetro electromagnético tub. parcialm. llena PN 10 Ø600** | | | |
| | | | Suministro, instalación y puesta en servicio de caudalímetro electromagnético, sobre tubería DN 600 mm, con sección parcialmente llena y principio de medida nivel continuo capacitivo, con electrónica separada del tubo de medida, incluso carrete PN 10, grado de protección IP68, alimentación eléctrica a 24 Vcc, precisión mejor del 1 %, con recubrimiento interno del tubo de medida y certificado de calibración del equipo de laboratorio acreditado, según fi- | | | |
| MO0100300 | 3,7500 | h | Oficial 1ª | 18,0400 | 67,6500 | |
| MO0100500 | 3,7500 | h | Ayudante | 16,7500 | 62,8125 | |
| MT7203090 | 1,0000 | ud | Caudalímetro electromagnético tub. parcialm. llena PN 10 Ø600 | 18.610,8000 | 18.610,8000 | |
| MQ0602100 | 0,5000 | h | Camión grúa de 6 t | 55,1200 | 27,5600 | |
| | | | **TOTAL PARTIDA.....** | | | **18.768,82** |

Asciende el precio total de la partida a la mencionada cantidad de DIECIOCHO MIL SETECIENTOS SESENTA Y OCHO EUROS con OCHENTA Y DOS CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U03073080** | | **ud** | **Caudalímetro electromagnético tub. parcialm. llena PN 10 Ø500** | | | |
| | | | Suministro, instalación y puesta en servicio de caudalímetro electromagnético, sobre tubería DN 500 mm, con sección parcialmente llena y principio de medida nivel continuo capacitivo, con electrónica separada del tubo de medida, incluso carrete PN 10, grado de protección IP68, alimentación eléctrica a 24 Vcc, precisión mejor del 1 %, con recubrimiento interno del tubo de medida y certificado de calibración del equipo de laboratorio acreditado, según fi- | | | |
| MO0100300 | 3,7500 | h | Oficial 1ª | 18,0400 | 67,6500 | |
| MO0100500 | 3,7500 | h | Ayudante | 16,7500 | 62,8125 | |
| MT7203080 | 1,0000 | ud | Caudalímetro electromagnético tub. parcialm. llena PN 10 Ø500 | 16.105,5000 | 16.105,5000 | |
| MQ0602100 | 0,5000 | h | Camión grúa de 6 t | 55,1200 | 27,5600 | |
| | | | **TOTAL PARTIDA.....** | | | **16.263,52** |

Asciende el precio total de la partida a la mencionada cantidad de DIECISEIS MIL DOSCIENTOS SESENTA Y TRES EUROS con CINCUENTA Y DOS CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U03080030** | | **ud** | **Medidor nivel ultrasonidos** | | | |
| | | | Suministro, instalación y puesta en servicio de medidor de nivel ultrasónico, alimentación eléctrica a 24Vcc, con precisión mejor del 0,1%, IP 68, alcance de medida 5 m para líquidos, incluso 15 m de cable de conexión, total- | | | |
| MO0100300 | 1,5000 | h | Oficial 1ª | 18,0400 | 27,0600 | |
| MT7220030 | 1,0000 | m | Medidor nivel ultrasonidos | 1.773,3000 | 1.773,3000 | |
| | | | **TOTAL PARTIDA.....** | | | **1.800,36** |

Asciende el precio total de la partida a la mencionada cantidad de MIL OCHOCIENTOS EUROS con TREINTA Y SEIS CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U03080050** | | **m** | **Cable 64 fibras Monomodo** | | | |
| | | | Suministro e instalación de cable de 64 fibras ópticas en Mono-modo 9/125, con aislamiento PEAP, bajo canalización de tritubo según especificaciones de Canal de Isabel II, incluso parte proporcional de empalmes, fusionado y | | | |
| MO0100300 | 0,0400 | h | Oficial 1ª | 18,0400 | 0,7216 | |
| MO0100400 | 0,0400 | h | Oficial 2ª | 17,1200 | 0,6848 | |
| MT7220050 | 1,0000 | m | Cable 64 fibras Monomodo | 10,1400 | 10,1400 | |
| | | | **TOTAL PARTIDA.....** | | | **11,55** |

Asciende el precio total de la partida a la mencionada cantidad de ONCE EUROS con CINCUENTA Y CINCO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U03080060** | | **ud** | **Repartidor 64 FO** | | | |
| | | | Suministro e instalación de repartidor de 64 fibras ópticas para un total de 64 adaptadores de tipo FC-FC y sus co- | | | |
| MO0100300 | 2,0000 | h | Oficial 1ª | 18,0400 | 36,0800 | |
| MO0100400 | 2,0000 | h | Oficial 2ª | 17,1200 | 34,2400 | |
| MT7220060 | 1,0000 | ud | Repartidor 64 FO | 2.089,5900 | 2.089,5900 | |
| | | | **TOTAL PARTIDA.....** | | | **2.159,91** |

Asciende el precio total de la partida a la mencionada cantidad de DOS MIL CIENTO CINCUENTA Y NUEVE EUROS con NOVENTA Y UN CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U03080100** | | **ud** | **Latiguillo FO Multimodo** | | | |
| | | | Suministro e instalación de latiguillos de fibra óptica multimodo con conectores FC-FC, de una longitud de 1,50 m. | | | |
| MO0100300 | 0,1000 | h | Oficial 1ª | 18,0400 | 1,8040 | |
| MT7220100 | 1,0000 | ud | Latiguillo FO Multimodo | 14,1800 | 14,1800 | |

| CÓDIGO | CANTIDAD | UD | RESUMEN | PRECIO | SUBTOTAL | IMPORTE |
|---|---|---|---|---|---|---|
| | | | **TOTAL PARTIDA** | | | **15,98** |

Asciende el precio total de la partida a la mencionada cantidad de QUINCE EUROS con NOVENTA Y OCHO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U10030780** | | **m** | **Cable RV-K 0,6/1 KV 1x1,5 mm2** | | | |
| | | | Cable de cobre aislado en polietileno reticulado y cubierta de PVC, tipo RV-K 0,6/1 KV de 1x1,5 mm2. Instalado | | | |
| MO0100300 | 0,0050 | h | Oficial 1ª | 18,0400 | 0,0902 | |
| MO0100500 | 0,0100 | h | Ayudante | 16,7500 | 0,1675 | |
| MT8112770 | 1,0000 | m | Cable RV-K 0,6/1 KV 1x1,5 mm2 Cu | 0,5500 | 0,5500 | |
| | | | **TOTAL PARTIDA** | | | **0,81** |

Asciende el precio total de la partida a la mencionada cantidad de CERO EUROS con OCHENTA Y UN CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U10030010** | | **m** | **Cable RZ1-K 0,6/1 KV 1x1,5 mm2** | | | |
| | | | Cable de cobre aislado en polietileno reticulado y cubierta de poliolefina, tipo RZ1-K 0,6/1 KV de 1x1,5 mm2. Instalado bajo tubo o conductos. | | | |
| MO0100300 | 0,0050 | h | Oficial 1ª | 18,0400 | 0,0902 | |
| MO0100500 | 0,0100 | h | Ayudante | 16,7500 | 0,1675 | |
| MT8112010 | 1,0000 | m | Cable RZ1-K 0,6/1 KV 1x1,5 mm2 Cu | 0,8900 | 0,8900 | |
| | | | **TOTAL PARTIDA** | | | **1,15** |

Asciende el precio total de la partida a la mencionada cantidad de UN EUROS con QUINCE CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U10030020** | | **m** | **Cable RZ1-K 0,6/1 KV 1x2,5 mm2** | | | |
| | | | Cable de cobre aislado en polietileno reticulado tipo RZ1-K 0,6/1 KV de 1x2,5 mm2. Instalado bajo tubo o conduc- | | | |
| MO0100300 | 0,0050 | h | Oficial 1ª | 18,0400 | 0,0902 | |
| MO0100500 | 0,0100 | h | Ayudante | 16,7500 | 0,1675 | |
| MT8112020 | 1,0000 | m | Cable RZ1-K 0,6/1 KV 1x2,5 mm2 Cu | 1,2000 | 1,2000 | |
| | | | **TOTAL PARTIDA** | | | **1,46** |

Asciende el precio total de la partida a la mencionada cantidad de UN EUROS con CUARENTA Y SEIS CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U10060010** | | **ud** | **Base de toma de corriente con contacto de tierra (2P+T), tipo Sc** | | | |
| | | | Base de toma de corriente con contacto de tierra (2P+T), tipo Schuko, para empotrar, gama media, intensidad asig- | | | |
| MO0100300 | 0,1000 | h | Oficial 1ª | 18,0400 | 1,8040 | |
| MO0100500 | 0,2000 | h | Ayudante | 16,7500 | 3,3500 | |
| MT8147010 | 1,0000 | ud | Base de toma de corriente con contacto de tierra (2P+T) | 11,1600 | 11,1600 | |
| | | | **TOTAL PARTIDA** | | | **16,31** |

Asciende el precio total de la partida a la mencionada cantidad de DIECISEIS EUROS con TREINTA Y UN CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U10060020** | | **ud** | **Toma corr. 2P+T 16A IP-55** | | | |
| | | | Toma de corriente montaje superficie 2P+T, para 16 A, IP-55, cuerpo aislante en poliamida, tornillería de latón. | | | |
| MO0100300 | 0,1000 | h | Oficial 1ª | 18,0400 | 1,8040 | |
| MO0100500 | 0,2000 | h | Ayudante | 16,7500 | 3,3500 | |
| MT8147020 | 1,0000 | ud | Toma corriente 2P+T 16 A IP-55 | 12,0900 | 12,0900 | |
| | | | **TOTAL PARTIDA** | | | **17,24** |

Asciende el precio total de la partida a la mencionada cantidad de DIECISIETE EUROS con VEINTICUATRO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U10060060** | | **ud** | **Toma corr. 3P+T 32 A IP-55** | | | |
| | | | Toma de corriente montaje superficie 3P+T, para 32 A, IP-55, cuerpo aislante en poliamida, tornillería de latón. | | | |
| MO0100300 | 0,1000 | h | Oficial 1ª | 18,0400 | 1,8040 | |
| MO0100500 | 0,2000 | h | Ayudante | 16,7500 | 3,3500 | |
| MT8147060 | 1,0000 | ud | Toma corriente 3P+T 32 A IP-55 | 43,9200 | 43,9200 | |
| | | | **TOTAL PARTIDA** | | | **49,07** |

Asciende el precio total de la partida a la mencionada cantidad de CUARENTA Y NUEVE EUROS con SIETE CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U10060110_1** | | **Ud** | **Interruptor automático magnetotérmico 10A 2P** | | | |
| | | | Interruptor automático magnetotérmico, de 2 módulos, bipolar (2P), intensidad nominal 10 A, poder de corte 6 kA, curva C, de 36x80x77,8 mm, grado de protección IP20, montaje sobre carril DIN (35 mm) y fijación a carril mediante garras. Totalmente montado, conexionado y probado. | | | |
| | | | Incluye: Montaje y conexionado del elemento. | | | |
| | | | Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto. | | | |
| | | | Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de | | | |
| mt35amc021bb | 1,0000 | Ud | Interruptor automático magnetotérmico, de 2 módulos, bipolar (2P | 25,9800 | 25,9800 | |
| mo003 | 0,2830 | h | Oficial 1ª electricista. | 18,0400 | 5,1053 | |
| %0200 | 2,0000 | % | Costes directos complementarios | 31,0900 | 0,6218 | |

# CUADRO DE DESCOMPUESTOS

**TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS**

| CÓDIGO | CANTIDAD | UD | RESUMEN | PRECIO | SUBTOTAL | IMPORTE |
|---|---|---|---|---|---|---|
| | | | **TOTAL PARTIDA.....** | | | **31,71** |

Asciende el precio total de la partida a la mencionada cantidad de TREINTA Y UN EUROS con SETENTA Y UN CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U10060110_2** | | **Ud** | **Interruptor automático magnetotérmico 16A 2P** | | | |
| | | | Interruptor automático magnetotérmico, de 2 módulos, bipolar (2P), intensidad nominal 16 A, poder de corte 6 kA, curva C, de 36x80x77,8 mm, grado de protección IP20, montaje sobre carril DIN (35 mm) y fijación a carril mediante garras. Totalmente montado, conexionado y probado. | | | |
| | | | Incluye: Montaje y conexionado del elemento. | | | |
| | | | Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto. | | | |
| | | | Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de | | | |
| mt35amc021cc | 1,0000 | Ud | Interruptor automático magnetotérmico, de 2 módulos, bipolar (2P | 25,9800 | 25,9800 | |
| mo003 | 0,2830 | h | Oficial 1ª electricista. | 18,0400 | 5,1053 | |
| %0200 | 2,0000 | % | Costes directos complementarios | 31,0900 | 0,6218 | |
| | | | **TOTAL PARTIDA.....** | | | **31,71** |

Asciende el precio total de la partida a la mencionada cantidad de TREINTA Y UN EUROS con SETENTA Y UN CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U10060110_3** | | **Ud** | **Interruptor automático magnetotérmico 32A 3P** | | | |
| | | | Interruptor automático magnetotérmico, de 3 módulos, tripolar (3P), intensidad nominal 32 A, poder de corte 6 kA, curva C, de 54x80x77,8 mm, grado de protección IP20, montaje sobre carril DIN (35 mm) y fijación a carril mediante garras. Totalmente montado, conexionado y probado. | | | |
| | | | Incluye: Montaje y conexionado del elemento. | | | |
| | | | Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto. | | | |
| | | | Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de | | | |
| mt35amc022ff | 1,0000 | Ud | Interruptor automático magnetotérmico, de 3 módulos, tripolar (3 | 65,3300 | 65,3300 | |
| mo003 | 0,3390 | h | Oficial 1ª electricista. | 18,0400 | 6,1156 | |
| %0200 | 2,0000 | % | Costes directos complementarios | 71,4500 | 1,4290 | |
| | | | **TOTAL PARTIDA.....** | | | **72,87** |

Asciende el precio total de la partida a la mencionada cantidad de SETENTA Y DOS EUROS con OCHENTA Y SIETE CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U10060110_4** | | **Ud** | **Interruptor automático magnetotérmico 10A 3P** | | | |
| | | | Interruptor automático magnetotérmico, de 3 módulos, tripolar (3P), intensidad nominal 10 A, poder de corte 6 kA, curva C, de 54x80x77,8 mm, grado de protección IP20, montaje sobre carril DIN (35 mm) y fijación a carril mediante garras. Totalmente montado, conexionado y probado. | | | |
| | | | Incluye: Montaje y conexionado del elemento. | | | |
| | | | Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto. | | | |
| | | | Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de | | | |
| mt35amc022bb | 1,0000 | Ud | Interruptor automático magnetotérmico, de 3 módulos, tripolar (3 | 56,1600 | 56,1600 | |
| mo003 | 0,3390 | h | Oficial 1ª electricista. | 18,0400 | 6,1156 | |
| %0200 | 2,0000 | % | Costes directos complementarios | 62,2800 | 1,2456 | |
| | | | **TOTAL PARTIDA.....** | | | **63,52** |

Asciende el precio total de la partida a la mencionada cantidad de SESENTA Y TRES EUROS con CINCUENTA Y DOS CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U10031190** | | **m** | **Cable AL XZ1 (S), tensión nominal 0,6/1 kV 1x95 mm2 AL** | | | |
| | | | Cable eléctrico unipolar tipo AL XZ1 (S), tensión nominal 0,6/1 kV, de seguridad en caso de incendio (S), reacción al fuego clase Eca, con conductor de aluminio, rígido (clase 2), de 1x95 mm² cubierta de material libre de halógenos, con las siguientes características: no propagación de la llama, baja emisión de humos opacos, libre de halógenos, nula emisión de gases corrosivos, resistencia a la absorción de agua, resistencia al frío, resistencia a los rayos ultravioleta, resistencia a los agentes químicos, resistencia a las grasas y aceites y resistencia a los golpes. | | | |
| MO0100300 | 0,0260 | h | Oficial 1ª | 18,0400 | 0,4690 | |
| MO0100500 | 0,0260 | h | Ayudante | 16,7500 | 0,4355 | |
| MT8114060 | 1,0000 | m | Cable AL XZ1 (S), tensión nominal 0,6/1 kV 1x95 mm2 AL | 2,6300 | 2,6300 | |
| | | | **TOTAL PARTIDA.....** | | | **3,53** |

Asciende el precio total de la partida a la mencionada cantidad de TRES EUROS con CINCUENTA Y TRES CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U10040080** | | **m** | **Canaliz. eléctrica Polímero termoplástico libre de halógenos ríg** | | | |
| | | | Canalización eléctrica de superficie para conducción de cables a base de tubo de Polímero termoplástico libre de halógenos rígido libre de halógenos, no propagador de llama, M 20, roscable, grapado sobre hormigón, con tres | | | |
| MO0100300 | 0,1500 | h | Oficial 1ª | 18,0400 | 2,7060 | |
| MO0100500 | 0,1500 | h | Ayudante | 16,7500 | 2,5125 | |
| MT8121030 | 1,0000 | m | Tubo Polímero termoplástico libre de halógenos rígido M20 | 2,6400 | 2,6400 | |
| MT8130010 | 1,0000 | ud | Pequeño material tubos | 0,6800 | 0,6800 | |
| | | | **TOTAL PARTIDA.....** | | | **8,54** |

Asciende el precio total de la partida a la mencionada cantidad de OCHO EUROS con CINCUENTA Y CUATRO CÉNTIMOS

# CUADRO DE DESCOMPUESTOS

## TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS

| CÓDIGO | CANTIDAD | UD | RESUMEN | PRECIO | SUBTOTAL | IMPORTE |
|---|---|---|---|---|---|---|
| **U10040510** | | **ud** | **Caja estanca poliéster inyectado 80x80x45 mm** | | | |
| | | | Suministro y montaje de caja estanca en poliéster inyectado de 80x80x45 mm, IP-55, totalmente instalada, incluyendo prensaestopas, fijaciones inoxidables y bornas de conexión. | | | |
| MO0100300 | 0,1000 | h | Oficial 1ª | 18,0400 | 1,8040 | |
| MO0100500 | 0,1000 | h | Ayudante | 16,7500 | 1,6750 | |
| MT8126010 | 1,0000 | ud | Caja estanca poliéster inyectado 80x80x45 mm + accesorios | 8,6900 | 8,6900 | |
| | | | **TOTAL PARTIDA.....** | | | **12,17** |

Asciende el precio total de la partida a la mencionada cantidad de DOCE EUROS con DIECISIETE CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U10040520** | | **ud** | **Caja estanca poliéster inyectado 105x105x55 mm** | | | |
| | | | Suministro y montaje de caja estanca en poliéster inyectado de 105x105x55 mm, IP-55, totalmente instalada, inclu- | | | |
| MO0100300 | 0,1000 | h | Oficial 1ª | 18,0400 | 1,8040 | |
| MO0100500 | 0,1000 | h | Ayudante | 16,7500 | 1,6750 | |
| MT8126020 | 1,0000 | ud | Caja estanca poliéster inyectado 105x105x55 mm + accesorios | 12,3200 | 12,3200 | |
| | | | **TOTAL PARTIDA.....** | | | **15,80** |

Asciende el precio total de la partida a la mencionada cantidad de QUINCE EUROS con OCHENTA CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U10040570** | | **ud** | **Caja estanca poliéster inyectado 220x170x140 mm** | | | |
| | | | Suministro y montaje de caja estanca en poliéster inyectado de 220x170x140 mm, IP-55, totalmente instalada, in- | | | |
| MO0100300 | 0,1000 | h | Oficial 1ª | 18,0400 | 1,8040 | |
| MO0100500 | 0,1000 | h | Ayudante | 16,7500 | 1,6750 | |
| MT8126050 | 1,0000 | ud | Caja estanca poliéster inyectado 220x170x140 mm + accesorios | 67,5700 | 67,5700 | |
| | | | **TOTAL PARTIDA.....** | | | **71,05** |

Asciende el precio total de la partida a la mencionada cantidad de SETENTA Y UN EUROS con CINCO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U10040010** | | **m** | **Canaliz. subterránea aceras** | | | |
| | | | Canalización subterránea en acera, para cables de baja tensión bajo tubo, comprendiendo zanja de 0,60x0,60 m, sobre lecho de hormigón y hormigonado hasta rasante de calzada, con reposición de firme asfáltico, incluyendo excavación y relleno de zanja, cables de acero pasa-guía, cinta de señalización de canalización eléctrica, dos tu- | | | |
| MO0100300 | 0,1500 | h | Oficial 1ª | 18,0400 | 2,7060 | |
| MO0100500 | 0,5000 | h | Ayudante | 16,7500 | 8,3750 | |
| MQ0402010 | 0,2480 | h | Retrocargadora neumáticos 75 CV | 49,4500 | 12,2636 | |
| MQ0500040 | 0,2000 | h | Pisón vibrante con placa de 60 cm | 9,9000 | 1,9800 | |
| MT0101500 | 0,3600 | m3 | Arena de material reciclado de hormigones, de 0 a 5 mm | 13,8000 | 4,9680 | |
| MT8101010 | 2,0000 | m | Cinta señalizadora | 0,2700 | 0,5400 | |
| MT8101040 | 1,0000 | ud | Pequeño material | 1,3600 | 1,3600 | |
| MT0313110 | 0,6000 | m2 | Reposición firme acera | 9,4900 | 5,6940 | |
| MT8120010 | 2,0000 | m | Tubo PE-AD corrugado curvable diámetro exterior 160mm. | 5,9800 | 11,9600 | |
| | | | **TOTAL PARTIDA.....** | | | **49,85** |

Asciende el precio total de la partida a la mencionada cantidad de CUARENTA Y NUEVE EUROS con OCHENTA Y CINCO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U10040020** | | **m** | **Canaliz. subterránea calzada** | | | |
| | | | Canalización subterránea en calzada, para cables de baja tensión bajo tubo, comprendiendo zanja de 0,60x0,60 m, sobre lecho de hormigón y hormigonado hasta rasante de calzada, con reposición de firme asfáltico, incluyendo excavación y relleno de zanja, cables de acero pasa-guía, cinta de señalización de canalización eléctrica, dos tu- | | | |
| MO0100300 | 0,2000 | h | Oficial 1ª | 18,0400 | 3,6080 | |
| MO0100500 | 0,2400 | h | Ayudante | 16,7500 | 4,0200 | |
| MQ0402010 | 0,1230 | h | Retrocargadora neumáticos 75 CV | 49,4500 | 6,0824 | |
| MQ0807010 | 0,0400 | h | Bomba de hormigón s/camión 60 CV | 180,9400 | 7,2376 | |
| MT8101010 | 2,0000 | m | Cinta señalizadora | 0,2700 | 0,5400 | |
| MT8101040 | 1,0000 | ud | Pequeño material | 1,3600 | 1,3600 | |
| MT8120010 | 2,0000 | m | Tubo PE-AD corrugado curvable diámetro exterior 160mm. | 5,9800 | 11,9600 | |
| MT0403030 | 0,3000 | m3 | Hormigón HM-20/P/20/X0 o HM-20/P/40/X0 central | 74,6400 | 22,3920 | |
| MT8132020 | 0,6000 | m2 | Firme rígido para frecuencia alta de tráfico pesado | 27,8800 | 16,7280 | |
| | | | **TOTAL PARTIDA.....** | | | **73,93** |

Asciende el precio total de la partida a la mencionada cantidad de SETENTA Y TRES EUROS con NOVENTA Y TRES CÉNTIMOS

# CUADRO DE DESCOMPUESTOS

## TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS

| CÓDIGO | CANTIDAD | UD | RESUMEN | PRECIO | SUBTOTAL | IMPORTE |
|---|---|---|---|---|---|---|
| **U10040030** | | **m** | **Canaliz. sub. ter. medio hormigonada** | | | |
| | | | Canalización subterránea en terreno medio hormigonada, para cables de baja tensión bajo tubo, comprendiendo zanja de 0,60x0,60 m, embutidos en dado de hormigón de 0,60x0,40 m, incluyendo excavación y relleno de zanja, cables de acero pasa-guía, cinta de señalización de canalización eléctrica, dos tubos de PE-AD corrugado curvable 160 mm y corchetes. | | | |
| MO0100300 | 0,5000 | h | Oficial 1ª | 18,0400 | 9,0200 | |
| MO0100500 | 0,7000 | h | Ayudante | 16,7500 | 11,7250 | |
| MQ0402010 | 0,1830 | h | Retrocargadora neumáticos 75 CV | 49,4500 | 9,0494 | |
| MQ0500040 | 0,2000 | h | Pisón vibrante con placa de 60 cm | 9,9000 | 1,9800 | |
| MQ0807010 | 0,0290 | h | Bomba de hormigón s/camión 60 CV | 180,9400 | 5,2473 | |
| MT0101500 | 0,2000 | m3 | Arena de material reciclado de hormigones, de 0 a 5 mm | 13,8000 | 2,7600 | |
| MT8101010 | 2,0000 | m | Cinta señalizadora | 0,2700 | 0,5400 | |
| MT8101040 | 1,0000 | ud | Pequeño material | 1,3600 | 1,3600 | |
| MT8120010 | 2,0000 | m | Tubo PE-AD corrugado curvable diámetro exterior 160mm. | 5,9800 | 11,9600 | |
| MT0403030 | 0,2000 | m3 | Hormigón HM-20/P/20/X0 o HM-20/P/40/X0 central | 74,6400 | 14,9280 | |
| | | | **TOTAL PARTIDA.....** | | | **68,57** |

Asciende el precio total de la partida a la mencionada cantidad de SESENTA Y OCHO EUROS con CINCUENTA Y SIETE CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U10040060** | | **ud** | **Arq. hormigón pref. 1x1x1 m** | | | |
| | | | Arqueta de hormigón prefabricada para canalización de baja tensión de 1,00x1,00x1,00 m con tapa de hormigón to- | | | |
| MO0100300 | 1,5000 | h | Oficial 1ª | 18,0400 | 27,0600 | |
| MO0100500 | 3,5000 | h | Ayudante | 16,7500 | 58,6250 | |
| MT8130110 | 1,0000 | ud | Arq. de horm. pref. 1x1x1 m | 144,4000 | 144,4000 | |
| | | | **TOTAL PARTIDA.....** | | | **230,09** |

Asciende el precio total de la partida a la mencionada cantidad de DOSCIENTOS TREINTA EUROS con NUEVE CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **IEX405** | | **Ud** | **Armario de distribución, modular.** | | | |
| | | | Armario de distribución metálico, de superficie, con puerta ciega, grado de protección IP40, aislamiento clase II, de 1050x650x250 mm, apilable con otros armarios, con techo, suelo y laterales desmontables por deslizamiento (sin tornillos), cierre de seguridad, escamoteable, con llave, acabado con pintura epoxi, microtexturizado. Totalmente montado.<br>Incluye: Colocación y fijación del elemento.<br>Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto.<br>Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de | | | |
| mt35amc950aa | 1,0000 | Ud | Armario de distribución metálico, de superficie, con puerta cieg | 433,1900 | 433,1900 | |
| mt35amc953b | 2,0000 | Ud | Carril DIN para fijación de aparamenta modular en cuadro eléctri | 16,2800 | 32,5600 | |
| mt35amc952c | 2,0000 | Ud | Placa frontal troquelada para elementos modulares en carril DIN, | 17,4500 | 34,9000 | |
| mt35amc951d | 1,0000 | Ud | Placa de montaje interior para armario de distribución metálico | 38,8100 | 38,8100 | |
| mo003 | 0,2810 | h | Oficial 1ª electricista. | 18,0400 | 5,0692 | |
| %0200 | 2,0000 | % | Costes directos complementarios | 544,5300 | 10,8906 | |
| | | | **TOTAL PARTIDA.....** | | | **555,42** |

Asciende el precio total de la partida a la mencionada cantidad de QUINIENTOS CINCUENTA Y CINCO EUROS con CUARENTA Y DOS CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U10040670_1** | | **Ud** | **Caja de protección y medida.** | | | |
| | | | Suministro e instalación en el interior de hornacina mural, en vivienda unifamiliar o local, de caja de protección y medida CPM2-E4, de hasta 63 A de intensidad, para 1 contador trifásico, formada por una envolvente aislante, precintable, autoventilada y con mirilla de material transparente resistente a la acción de los rayos ultravioletas, para instalación empotrada. Incluso equipo completo de medida, bornes de conexión, bases cortacircuitos y fusibles para protección de la derivación individual. Normalizada por la empresa suministradora y preparada para acometida subterránea. Totalmente montada, conexionada y probada.<br>Incluye: Replanteo de la situación de los conductos y anclajes de la caja. Fijación. Colocación de tubos y piezas especiales. Conexionado.<br>Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto.<br>Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de | | | |
| mt35cgp010w | 1,0000 | Ud | Caja de protección y medida CPM2-E4, de hasta 63 A de intensidad | 252,1600 | 252,1600 | |
| mt35cgp040h | 3,0000 | m | Tubo de PVC liso, serie B, de 160 mm de diámetro exterior y 3,2 | 5,4400 | 16,3200 | |
| mt35cgp040f | 1,0000 | m | Tubo de PVC liso, serie B, de 110 mm de diámetro exterior y 3,2 | 3,7300 | 3,7300 | |
| mt35www010 | 1,0000 | Ud | Material auxiliar para instalaciones eléctricas. | 1,4800 | 1,4800 | |
| mo020 | 0,3390 | h | Oficial 1ª construcción. | 18,0400 | 6,1156 | |
| mo113 | 0,3390 | h | Peón ordinario construcción. | 16,7500 | 5,6783 | |
| mo003 | 0,5660 | h | Oficial 1ª electricista. | 18,0400 | 10,2106 | |
| mo102 | 0,5660 | h | Ayudante electricista. | 16,7500 | 9,4805 | |
| %0200 | 2,0000 | % | Costes directos complementarios | 305,1800 | 6,1036 | |
| | | | **TOTAL PARTIDA.....** | | | **311,28** |

Asciende el precio total de la partida a la mencionada cantidad de TRESCIENTOS ONCE EUROS con VEINTIOCHO CÉNTIMOS

| CÓDIGO | CANTIDAD | UD | RESUMEN | PRECIO | SUBTOTAL | IMPORTE |
|---|---|---|---|---|---|---|
| **U15060060** | | **ud** | **Legalización instalación de baja tensión** | | | |
| | | | Legalización de la instalaciones de Baja Tensión, según la legislación vigente que le sea de aplicación, incluso proyecto técnico, suscrito por técnico titulado competente y visado por el Colegio Oficial correspondiente, Certificado de Dirección de Obra Eléctrica, Certificado de Instalación Eléctrica en Baja Tensión (antiguo Dictamen o Boletín eléctrico), Certificado de Inspección por Organismo de Control, Declaraciones responsables según modelos DGIEM, abono de tasas oficiales y cualquier otra documentación y gestión necesaria ante Organismos competen- | | | |
| | | | Sin descomposición | | | |
| | | | **TOTAL PARTIDA.....** | | | **4.000,00** |

Asciende el precio total de la partida a la mencionada cantidad de CUATRO MIL EUROS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U10070010** | | **ud** | **Toma de tierra normal con una pica** | | | |
| | | | Toma de tierra normal, compuesta de: una pica de acero cobre de 2,5 m de longitud y 18 mm de diámetro, 3 me- | | | |
| MO0100300 | 0,2510 | h | Oficial 1ª | 18,0400 | 4,5280 | |
| MO0100500 | 0,2520 | h | Ayudante | 16,7500 | 4,2210 | |
| MT8131010 | 1,0000 | ud | Pica de t.t. 250/18 Fe+Cu 2,5 m de longitud y 18 mm de diámetro | 34,5000 | 34,5000 | |
| MT8131020 | 0,2500 | m | Conduc cobre desnudo 50 mm2 | 5,9700 | 1,4925 | |
| MT8131035 | 1,0000 | ud | Grapas de conexión | 2,8800 | 2,8800 | |
| MT0363050 | 1,0000 | ud | Arqueta de polipropileno de 300x300 mm con tapa de registro | 83,0800 | 83,0800 | |
| MT8131050 | 1,0000 | ud | Puente de prueba | 20,2300 | 20,2300 | |
| MT8119010 | 0,2300 | ud | Saco de 7 kg de sales electrolíticas | 76,3000 | 17,5490 | |
| MT8101040 | 1,0000 | ud | Pequeño material | 1,3600 | 1,3600 | |
| | | | **TOTAL PARTIDA.....** | | | **169,84** |

Asciende el precio total de la partida a la mencionada cantidad de CIENTO SESENTA Y NUEVE EUROS con OCHENTA Y CUATRO CÉNTIMOS

## APARTADO 01.6.4 INSTALACIÓN SANEAMIENTO

| | | | | | | |
|---|---|---|---|---|---|---|
| **U02090010** | | **m** | **Tubería PVC-O DN 110 PN 16** | | | |
| | | | Suministro e instalación de tubería de PVC-O 500, de diámetro nominal DN 110 mm, presión nominal PN 16, MRS 50 N/mm2, SDR 45,8 y S 22,4, conforme a la norma UNE-ISO 16422 y/o según normativa vigente, color exterior y marcado según Normas de Canal de Isabel II vigentes, incluso parte proporcional de unión por junta elástica, | | | |
| MO0100300 | 0,0100 | h | Oficial 1ª | 18,0400 | 0,1804 | |
| MO0100700 | 0,0200 | h | Peón ordinario | 16,5300 | 0,3306 | |
| MT3004010 | 1,0000 | m | Tubería de PVC-O 500, DN 110 mm, PN 16, MRS 50 N/mm2 | 9,3300 | 9,3300 | |
| MQ0602100 | 0,0100 | h | Camión grúa de 6 t | 55,1200 | 0,5512 | |
| | | | **TOTAL PARTIDA.....** | | | **10,39** |

Asciende el precio total de la partida a la mencionada cantidad de DIEZ EUROS con TREINTA Y NUEVE CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U05090220** | | **ud** | **Sumidero evacuac. aguas 30x30x50 1/2** | | | |
| | | | Sumidero para evacuación de aguas de dimensiones interiores 30x30x50 cm, realizada con fábrica de ladrillo perforado de 1/2 pie de espesor, recibido con mortero de cemento 1:6, sobre solera de hormigón HM 20/P/20/I de 15 | | | |
| MO0100300 | 1,9000 | h | Oficial 1ª | 18,0400 | 34,2760 | |
| MO0100600 | 0,9500 | h | Peón especialista | 16,5500 | 15,7225 | |
| MT1001060 | 36,0000 | ud | Ladrillo perforado tosco 24x11,5x7 cm | 0,2200 | 7,9200 | |
| AUX002020 | 0,0240 | m3 | Mortero de cemento (1/6) M-250 | 74,4965 | 1,7879 | |
| MT0705035 | 0,2270 | m2 | Malla 15x30x5; 1,564 kg/m2 | 1,7600 | 0,3995 | |
| MT0353040 | 1,0000 | ud | Marco y rejilla de fundición 40x40 cm | 25,7200 | 25,7200 | |
| MT0403030 | 0,0250 | m3 | Hormigón HM-20/P/20/X0 o HM-20/P/40/X0 central | 74,6400 | 1,8660 | |
| | | | **TOTAL PARTIDA.....** | | | **87,69** |

Asciende el precio total de la partida a la mencionada cantidad de OCHENTA Y SIETE EUROS con SESENTA Y NUEVE CÉNTIMOS

## SUBCAPÍTULO 01.7 URBANIZACIÓN EXTERIOR

## APARTADO 01.7.1 PAVIMENTACIÓN

| | | | | | | |
|---|---|---|---|---|---|---|
| **U01030160** | | **m3** | **Terraplén suelo seleccionado préstamos** | | | |
| | | | Terraplén formado con suelos seleccionados procedentes de préstamos, incluso aportación, nivelación y compac- | | | |
| MO0100500 | 0,0280 | h | Ayudante | 16,7500 | 0,4690 | |
| MQ0401040 | 0,0020 | h | Pala cargad. s/orugas de 112 CV | 90,9200 | 0,1818 | |
| MQ0604010 | 0,0050 | h | Camión cisterna de 6 m3 | 49,5600 | 0,2478 | |
| MQ0500100 | 0,0130 | h | Rulo autopropulsado 8/10 t | 59,3100 | 0,7710 | |
| MQ0602010 | 0,0060 | h | Camión basculante de 8 t | 41,6800 | 0,2501 | |
| MQ0406020 | 0,0040 | h | Motoniveladora de 149 KW | 93,3700 | 0,3735 | |
| MT1901010 | 0,2000 | m3 | Agua | 1,0000 | 0,2000 | |
| MT0103030 | 1,1500 | m3 | Suelo seleccionado tamaño máximo 30 mm., proc. prést. | 4,3800 | 5,0370 | |
| | | | **TOTAL PARTIDA.....** | | | **7,53** |

| CÓDIGO | CANTIDAD | UD | RESUMEN | PRECIO | SUBTOTAL | IMPORTE |
|---|---|---|---|---|---|---|

Asciende el precio total de la partida a la mencionada cantidad de SIETE EUROS con CINCUENTA Y TRES CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **ANS010** | | **m²** | **Solera de hormigón.** Solera de hormigón con malla electrosoldada de 20 cm de espesor, realizada con hormigón HA-30/F/20/X0+XF2 fabricado en central, con malla electrosoldada superior como armadura de reparto, ME 10x10 Ø 5-5 B 500 T 6x2,20 UNE-EN 10080 y con malla electrosoldada inferior, ME 20x20 Ø 5-5 B 500 T 6x2,20 UNE-EN 10080, extendido y vibrado manual mediante regla vibrante, sin tratamiento de su superficie y posterior aplicación de agente filmógeno, (0,15 l/m²); con juntas de retracción de 5 mm de espesor, mediante corte con disco de diamante. Incluso panel de poliestireno expandido de 3 cm de espesor, para la ejecución de juntas de dilatación. El precio no incluye la base de la solera. | | | |
| mt07aco020o | 2,0000 | Ud | Separador homologado para malla electrosoldada inferior. | 0,4800 | 0,9600 | |
| mt07aco020n | 2,0000 | u | Separador homologado para malla electrosoldada superior. | 1,0600 | 2,1200 | |
| mt07ame010d | 1,2000 | m² | Malla electrosoldada ME 20x20 Ø 5-5 B 500 T 6x2,20 UNE-EN 10080. | 2,5200 | 3,0240 | |
| mt07ame010a | 1,2000 | m² | Malla electrosoldada ME 10x10 Ø 5-5 B 500 T 6x2,20 UNE-EN 10080. | 5,0400 | 6,0480 | |
| mt10haf010ahn | 0,2100 | m³ | Hormigón HA-30/F/20/X0+XF2, fabricado en central. | 100,2000 | 21,0420 | |
| mq06vib020 | 0,0880 | h | Regla vibrante de 3 m. | 5,2300 | 0,4602 | |
| mq06cor020 | 0,1020 | h | Equipo para corte de juntas en soleras de hormigón. | 10,6400 | 1,0853 | |
| MO0100300 | 0,1960 | h | Oficial 1ª | 18,0400 | 3,5358 | |
| MO0100500 | 0,2980 | h | Ayudante | 16,7500 | 4,9915 | |
| MO0100700 | 0,0980 | h | Peón ordinario | 16,5300 | 1,6199 | |
| | | | **TOTAL PARTIDA.....** | | | **44,89** |

Asciende el precio total de la partida a la mencionada cantidad de CUARENTA Y CUATRO EUROS con OCHENTA Y NUEVE CÉNTIMOS

## APARTADO 01.7.2 CERRAMIENTO

| | | | | | | |
|---|---|---|---|---|---|---|
| **U09080010_01** | | **m** | **Cerramiento muro bloques hormigón y malla simple torsión** Cerramiento de muro de 220 cm de altura formado por 120 cm bloques huecos de hormigón visto blanco, de 40x20x20 cm, rellenos de HM-20 y 100 cm de malla de simple torsión galvanizada 50/16, de 50 mm de paso de malla y 2,7 mm de diámetro. Incluso cimentación de 40x40 cm de hormigón HM-20, y p.p. de postes de tubo de acero galvanizado de 48 mm, postes de esquina, jabalcones, tornapuntas, tensores, grupillas y accesorios. Total- | | | |
| MO0100300 | 0,9800 | h | Oficial 1ª | 18,0400 | 17,6792 | |
| MO0100500 | 0,9800 | h | Ayudante | 16,7500 | 16,4150 | |
| MO0100700 | 0,2500 | h | Peón ordinario | 16,5300 | 4,1325 | |
| MT9602030 | 17,0000 | ud | Bloque hormigón blanco CV 40x20x20 cm | 1,7300 | 29,4100 | |
| AUX002020 | 0,0360 | m3 | Mortero de cemento (1/6) M-250 | 74,4965 | 2,6819 | |
| MT0403030 | 0,2800 | m3 | Hormigón HM-20/P/20/X0 o HM-20/P/40/X0 central | 74,6400 | 20,8992 | |
| MT0201110 | 0,0300 | ud | Poste galvanizado D=48 mm h=2,00 m intermedio | 10,7400 | 0,3222 | |
| MT0201120 | 0,0800 | ud | Poste galvanizado D=48 mm h=2,00 m escuadra | 15,4900 | 1,2392 | |
| MT0201130 | 0,0800 | ud | Poste galvanizado D=48 mm h=2,00 m jabalcón | 11,1700 | 0,8936 | |
| MT0201140 | 0,0800 | ud | Poste galvanizado D=48 mm h=2,00 m tornapunta | 11,3000 | 0,9040 | |
| MT0201040 | 1,0000 | m2 | Malla galvanizada simple torsión ST-50/16 | 2,6600 | 2,6600 | |
| | | | **TOTAL PARTIDA.....** | | | **97,24** |

Asciende el precio total de la partida a la mencionada cantidad de NOVENTA Y SIETE EUROS con VEINTICUATRO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **mE15VPM030** | | **ud** | **PUERTA 4,00x2,00 40/14 STD** Puerta de 1 hoja de 4,00x2,00 m. para cerramiento exterior, con bastidor de tubo de acero laminado en frío de 40x40 mm. y malla S/T galvanizada en caliente 40/14 STD, i/herrajes de colgar y seguridad, elaborada en taller, | | | |
| mO01OB160 | 2,0000 | h | Oficial 1ª cerrajero | 16,1500 | 32,3000 | |
| mO01OB170 | 2,0000 | h | Ayudante cerrajero | 15,1900 | 30,3800 | |
| mP13VP300 | 1,0000 | ud | Puerta met.aba.galv. 300x200 STD | 276,2700 | 276,2700 | |
| %CI0300 | 3,0000 | % | Costes Indirectos | 338,9500 | 10,1685 | |
| | | | **TOTAL PARTIDA.....** | | | **349,12** |

Asciende el precio total de la partida a la mencionada cantidad de TRESCIENTOS CUARENTA Y NUEVE EUROS con DOCE CÉNTIMOS

## APARTADO 01.7.3 ACOMETIDAS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U01021010** | | **m3** | **Excavación a cielo abierto, med. mecán. terreno blando** Excavación a cielo abierto, por medios mecánicos, en terreno blando (suelo con golpeo en el ensayo SPT menor | | | |
| MO0100700 | 0,0150 | h | Peón ordinario | 16,5300 | 0,2480 | |
| MQ0402010 | 0,0500 | h | Retrocargadora neumáticos 75 CV | 49,4500 | 2,4725 | |
| | | | **TOTAL PARTIDA.....** | | | **2,72** |

Asciende el precio total de la partida a la mencionada cantidad de DOS EUROS con SETENTA Y DOS CÉNTIMOS

# CUADRO DE DESCOMPUESTOS

## TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS

| CÓDIGO | CANTIDAD | UD | RESUMEN | PRECIO | SUBTOTAL | IMPORTE |
|---|---|---|---|---|---|---|
| **U01030070** | | **m3** | **Relleno zanja propios selec. Tmax 30 mm** | | | |
| | | | Relleno de zanjas con suelos seleccionados, tamaño máximo 30 mm, procedentes de la propia excavación, inclu- | | | |
| MO0100200 | 0,0500 | h | Capataz | 18,3900 | 0,9195 | |
| MO0100500 | 0,1500 | h | Ayudante | 16,7500 | 2,5125 | |
| MQ0604020 | 0,0100 | h | Camión con tanque para agua de 10 m3 | 66,8900 | 0,6689 | |
| MQ0401040 | 0,0300 | h | Pala cargad. s/orugas de 112 CV | 90,9200 | 2,7276 | |
| MQ0500070 | 0,1500 | h | Rodillo vibrante manual 800 kg | 7,1100 | 1,0665 | |
| MT1901010 | 0,0500 | m3 | Agua | 1,0000 | 0,0500 | |
| | | | **TOTAL PARTIDA** | | | **7,95** |

Asciende el precio total de la partida a la mencionada cantidad de SIETE EUROS con NOVENTA Y CINCO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U02050010** | | **m** | **Tubería polietileno PE-100, PN 16, DN 25** | | | |
| | | | Suministro e instalación de tubería de polietileno PE-100, diámetro nominal DN 25 mm, presión nominal PN 16, MRS 10 N/mm2, SDR 11 y S 5, conforme a norma UNE-EN 12201 y/o según normativa vigente, color exterior y marcado según Normas de Canal de Isabel II vigentes, incluso parte proporcional de elementos electrosoldables, | | | |
| MO0100300 | 0,0042 | h | Oficial 1ª | 18,0400 | 0,0758 | |
| MO0100500 | 0,0125 | h | Ayudante | 16,7500 | 0,2094 | |
| MT2601010 | 1,0000 | m | Tubería de polietileno PE-100, DN 25, PN 16, MRS 10 N/mm2 | 0,5400 | 0,5400 | |
| MQ1900030 | 0,0042 | h | Máquina para electrofusión | 5,7900 | 0,0243 | |
| | | | **TOTAL PARTIDA** | | | **0,85** |

Asciende el precio total de la partida a la mencionada cantidad de CERO EUROS con OCHENTA Y CINCO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **E17ABT110** | | **m** | **LÍNEA ACOMETIDA TRIFÁSICA ALUMINIO 4x50 mm2** | | | |
| | | | Línea eléctrica de acometida trifásica de 4x50 mm2 de sección, sobre canalización (no incluida), formada por conductores unipolares aislados de aluminio, con aislamiento en polietileno reticulado (XLPE) y cubierta en PVC, para una tensión nominal de 0,6/1kV, de conductor tipo RV y clase de reacción al fuego Eca, conforme a EN 50575:2014+A1:2016 (CPR CE EU-305/2011). Totalmente instalada; i/p.p. de conexiones y medios auxiliares. | | | |
| O01OB200 | 0,1500 | h | Oficial 1ª electricista | 20,1900 | 3,0285 | |
| O01OB210 | 0,1500 | h | Oficial 2ª electricista | 18,9000 | 2,8350 | |
| P15NAL010 | 4,1200 | m | Cable Aluminio 0,6/1kV RV Eca - 1x50 mm2 | 1,9600 | 8,0752 | |
| %PM0200 | 2,0000 | % | Pequeño Material | 13,9400 | 0,2788 | |
| | | | **TOTAL PARTIDA** | | | **14,22** |

Asciende el precio total de la partida a la mencionada cantidad de CATORCE EUROS con VEINTIDOS CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **E17ABC010** | | **m** | **CANALIZ. ACOMET. ELÉCTR. 50x80 cm ACERA 2x160 mm** | | | |
| | | | Canalización subterránea enterrada bajo acera, en zanja de 50 cm de ancho y 80 cm de profundidad de dimensiones mínimas, para acometida eléctrica en baja tensión; formada por 2 tubos de polietileno corrugado de alta densidad de doble pared (línea + reserva) de 160 mm de diámetro. Incluye apertura y excavación de la zanja por medios mecánicos, formación de cuna de arena de río de 5 cm de espesor, colocación de los tubos, relleno de costados y tapado de tubos con arena de río, colocación de cinta de señalización, y relleno de zanja y compactado con las tierras procedentes de la excavación, hasta el nivel base del pavimento (solera, acera, etc). Totalmente terminada; i/p.p. de limpieza y medios auxiliares. | | | |
| O01OA060 | 0,0500 | h | Peón especializado | 14,8200 | 0,7410 | |
| O01OA070 | 0,0500 | h | Peón ordinario | 14,0400 | 0,7020 | |
| P15UDT080 | 2,0600 | m | Tubo PEAD flex. doble pared D=160 mm | 6,6700 | 13,7402 | |
| P15AH010 | 1,0500 | m | Cinta balizamiento cables eléctricos a=150 mm | 0,1400 | 0,1470 | |
| E02EMA120 | 0,4000 | m3 | EXCAVACIÓN ZANJA A MÁQUINA TERRENOS COMPACTOS ACOPIO OBRA | 16,2800 | 6,5120 | |
| E02SZ040 | 0,1500 | m3 | RELLENO/COMPACTADO ARENA ZANJAS C/RODILLO VIBRATORIO | 24,7200 | 3,7080 | |
| E02SZ070 | 0,2500 | m3 | RELLENO/COMPACTADO ZANJA C/RANA S/APORTE | 21,3300 | 5,3325 | |
| %PM0050 | 0,5000 | % | Pequeño Material | 30,8800 | 0,1544 | |
| | | | **TOTAL PARTIDA** | | | **31,04** |

Asciende el precio total de la partida a la mencionada cantidad de TREINTA Y UN EUROS con CUATRO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **mU13AQ030-M** | | **ud** | **ARMARIO APM-6 PROTECCIÓN CGP + PLC** | | | |
| | | | Armario APM-6, instalado. incluida obra civil y salidas. Para colocación de cuadro CGP y PLC | | | |
| mO01OB240 | 3,0000 | h | Oficial 1ª electricista | 15,4000 | 46,2000 | |
| mO01OB250 | 3,0000 | h | Oficial 2ª electricista | 14,4200 | 43,2600 | |
| mP15CB150 | 1,0000 | ud | Armario APM6 (hasta 6 salidas) | 2.500,0000 | 2.500,0000 | |
| mP15AH120 | 1,0000 | ud | Material auxiliar eléctrico | 0,7400 | 0,7400 | |
| %CI0300 | 3,0000 | % | Costes Indirectos | 2.590,2000 | 77,7060 | |
| | | | **TOTAL PARTIDA** | | | **2.667,91** |

Asciende el precio total de la partida a la mencionada cantidad de DOS MIL SEISCIENTOS SESENTA Y SIETE EUROS con NOVENTA Y UN CÉNTIMOS

# CUADRO DE DESCOMPUESTOS

## TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS

| CÓDIGO | CANTIDAD | UD | RESUMEN | PRECIO | SUBTOTAL | IMPORTE |
|---|---|---|---|---|---|---|
| **mE21CG010** | | **ud** | **PUNTO DE TOMA DE AGUA SOBRE SOPORTE VERTICAL DE 1.50 M DE ALTURA** | | | |
| | | | Suministro y colocación de grifo de1/2" de diámetro, para manguera, colocado roscado, totalmente equipado, instalado y funcionando.inlcuyendo arqueta con válvula de corte en pie de soporte y soporte verticval de acero de su- | | | |
| mO01OB200 | 1,6000 | h | Oficial 1ª fontanero calefactor | 17,0800 | 27,3280 | |
| mO01OB210 | 1,6000 | h | Oficial 2ª fontanero calefactor | 14,6100 | 23,3760 | |
| mP17PA090 | 8,5000 | m | Tubo polietileno ad PE100 (PN-16) 25mm | 0,5400 | 4,5900 | |
| mP17PP180 | 1,0000 | ud | Enlace recto polietileno 25 mm. (PP) | 0,9700 | 0,9700 | |
| mP17PP260 | 1,0000 | ud | Collarin toma PP 32 mm. | 1,3100 | 1,3100 | |
| mP17YC020 | 1,0000 | ud | grifo de1/2" | 450,0000 | 450,0000 | |
| %CI0300 | 3,0000 | % | Costes Indirectos | 507,5700 | 15,2271 | |
| | | | **TOTAL PARTIDA.....** | | | **522,80** |

Asciende el precio total de la partida a la mencionada cantidad de QUINIENTOS VEINTIDOS EUROS con OCHENTA CÉNTIMOS

## CAPÍTULO 02 COLECTORES EXTERIORES

## SUBCAPÍTULO 02.1 ENTRADA PLUVIALES

## APARTADO 02.1.1 MOVIMIENTO DE TIERRAS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U01022020** | | **m3** | **Excavación en zanja, med. mecán. terreno medio** | | | |
| | | | Excavación en zanja, por medios mecánicos, en terreno medio (suelo con golpeo en el ensayo SPT entre 10 y 30 | | | |
| MO0100700 | 0,1200 | h | Peón ordinario | 16,5300 | 1,9836 | |
| MQ0402010 | 0,2200 | h | Retrocargadora neumáticos 75 CV | 49,4500 | 10,8790 | |
| | | | **TOTAL PARTIDA.....** | | | **12,86** |

Asciende el precio total de la partida a la mencionada cantidad de DOCE EUROS con OCHENTA Y SEIS CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U01023020** | | **m3** | **Excavación en pozo, med. mecán. terreno medio** | | | |
| | | | Excavación en pozo, por medios mecánicos, en terreno medio (suelo con golpeo en el ensayo SPT entre 10 y 30 | | | |
| MO0100700 | 0,1300 | h | Peón ordinario | 16,5300 | 2,1489 | |
| MQ0400020 | 0,2450 | h | Excavadora hidráulica neumáticos 100 CV | 67,2700 | 16,4812 | |
| | | | **TOTAL PARTIDA.....** | | | **18,63** |

Asciende el precio total de la partida a la mencionada cantidad de DIECIOCHO EUROS con SESENTA Y TRES CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U01040040** | | **m2** | **Refino nivelación fondo zanjas** | | | |
| | | | Refino, nivelación y apisonado de fondo de zanja para asiento de tubería, por cualquier procedimiento, incluso lim- | | | |
| MO0100500 | 0,0250 | h | Ayudante | 16,7500 | 0,4188 | |
| MQ0406020 | 0,0164 | h | Motoniveladora de 149 KW | 93,3700 | 1,5313 | |
| MQ0501020 | 0,0060 | h | Compactador autoprop. de un cilindro vibrante de 8/14 t | 75,6500 | 0,4539 | |
| MT1901010 | 0,0600 | m3 | Agua | 1,0000 | 0,0600 | |
| | | | **TOTAL PARTIDA.....** | | | **2,46** |

Asciende el precio total de la partida a la mencionada cantidad de DOS EUROS con CUARENTA Y SEIS CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U01030020** | | **m3** | **Grava o gravilla en rellenos o asiento de tubería** | | | |
| | | | Grava o gravilla en rellenos o asiento de tubería, por cualquier procedimiento, de tamaño máximo 25 mm, exenta de materia orgánica, con contenido de sulfatos inferior al 0,3%, expresado en trióxido de azufre, incluso aportación, | | | |
| MO0100300 | 0,1000 | h | Oficial 1ª | 18,0400 | 1,8040 | |
| MO0100500 | 0,1000 | h | Ayudante | 16,7500 | 1,6750 | |
| MT0101060 | 1,0000 | m3 | Grava tamaño máximo 25 mm, exenta de materia orgánica | 10,9900 | 10,9900 | |
| MQ0401040 | 0,0410 | h | Pala cargad. s/orugas de 112 CV | 90,9200 | 3,7277 | |
| MQ0604010 | 0,0100 | h | Camión cisterna de 6 m3 | 49,5600 | 0,4956 | |
| | | | **TOTAL PARTIDA.....** | | | **18,69** |

Asciende el precio total de la partida a la mencionada cantidad de DIECIOCHO EUROS con SESENTA Y NUEVE CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U01030050** | | **m3** | **Relleno zanja propios adecuad. Tmax 150 mm** | | | |
| | | | Relleno de zanjas con suelos adecuados, tamaño máximo 150 mm, procedentes de la propia excavación, incluso | | | |
| MO0100200 | 0,0500 | h | Capataz | 18,3900 | 0,9195 | |
| MO0100500 | 0,1500 | h | Ayudante | 16,7500 | 2,5125 | |
| MQ0604020 | 0,0100 | h | Camión con tanque para agua de 10 m3 | 66,8900 | 0,6689 | |
| MQ0401040 | 0,0300 | h | Pala cargad. s/orugas de 112 CV | 90,9200 | 2,7276 | |
| MQ0500070 | 0,1500 | h | Rodillo vibrante manual 800 kg | 7,1100 | 1,0665 | |
| MT1901010 | 0,0500 | m3 | Agua | 1,0000 | 0,0500 | |
| | | | **TOTAL PARTIDA.....** | | | **7,95** |

| CÓDIGO | CANTIDAD | UD | RESUMEN | PRECIO | SUBTOTAL | IMPORTE |
|---|---|---|---|---|---|---|

Asciende el precio total de la partida a la mencionada cantidad de SIETE EUROS con NOVENTA Y CINCO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U01030340** | | **m3** | **Relleno trasdós muros suelos adecuados de excavación** | | | |
| | | | Relleno localizado en trasdós de muros con suelos adecuados procedentes de la excavación, incluso aportación, extendido, humectación y compactación en capas de 30 cm de espesor, con un grado de compactación del 95% del P.M. | | | |
| MO0100200 | 0,0600 | h | Capataz | 18,3900 | 1,1034 | |
| MO0100500 | 0,0600 | h | Ayudante | 16,7500 | 1,0050 | |
| MQ0400080 | 0,0200 | h | Retroexcavadora 50 HP | 37,1400 | 0,7428 | |
| MQ0500030 | 0,0400 | h | Compactador manual | 9,6000 | 0,3840 | |
| MQ0604020 | 0,0200 | h | Camión con tanque para agua de 10 m3 | 66,8900 | 1,3378 | |
| MT0103020 | 1,1500 | m3 | Suelo adecuado tamaño máximo 150 mm., proc. excav. | 0,8300 | 0,9545 | |
| | | | **TOTAL PARTIDA** | | | **5,53** |

Asciende el precio total de la partida a la mencionada cantidad de CINCO EUROS con CINCUENTA Y TRES CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U01025100** | | **m2** | **Entibación cuajada zanjas o pozos con paneles acero hasta 6 m** | | | |
| | | | Entibación metálica cuajada en zanjas y pozos, hasta 6 m de profundidad, con paneles de chapa de acero, amorti- | | | |
| MO0100300 | 0,1200 | h | Oficial 1ª | 18,0400 | 2,1648 | |
| MO0100500 | 0,1200 | h | Ayudante | 16,7500 | 2,0100 | |
| MT0202250 | 1,0000 | m2 | Panel chapa de acero 400x100 cm | 4,5300 | 4,5300 | |
| MQ0402020 | 0,0833 | h | Retrocargadora neumáticos 100 CV | 60,7700 | 5,0621 | |
| MQ1702010 | 0,0080 | ud | Transporte y recogida de material | 1.259,5700 | 10,0766 | |
| | | | **TOTAL PARTIDA** | | | **23,84** |

Asciende el precio total de la partida a la mencionada cantidad de VEINTITRES EUROS con OCHENTA Y CUATRO CÉNTIMOS

## APARTADO 02.1.2 OBRAS DE FÁBRICA

| | | | | | | |
|---|---|---|---|---|---|---|
| **U05030150** | | **ud** | **Pozo de registro diámetro interior 1100 mm y 1<H<2m profun., enf** | | | |
| | | | Pozo de registro, diámetro interior 1100 mm de entre 1,00 y 2,00 m de profundidad, construido con fábrica de ladrillo macizo de 1 pie de espesor, recibido con mortero M-10, colocado sobre solera de hormigón HA-25/P/40/I de 0,30 m mínimo de espesor, armada con mallazo; enfoscado interior y exterior fratasado con mortero hidrófugo bruñido en toda su altura con mortero CS-IV-Wc2. Incluso colocado, totalmente terminado y p. p. de formación de cuna en el fondo del pozo, formación de brocal asimétrico en la coronación para recibir cerco y tapa y medios auxilia- | | | |
| MO0100300 | 14,0390 | h | Oficial 1ª | 18,0400 | 253,2636 | |
| MO0100600 | 12,2890 | h | Peón especialista | 16,5500 | 203,3830 | |
| MT0407050 | 0,9630 | m3 | Hormigón HA-25/P/20/XC1 o HA-25/P/40/XC1 central | 77,4100 | 74,5458 | |
| MT0705035 | 2,2700 | m2 | Malla 15x30x5; 1,564 kg/m2 | 1,7600 | 3,9952 | |
| MT1001070 | 913,0000 | ud | Ladrillo perfora. tosco 25x12x7 cm | 0,1400 | 127,8200 | |
| MT0105150 | 0,9340 | m3 | Mortero de cemento gris M-10 | 62,0700 | 57,9734 | |
| MT0105160 | 0,4980 | t | Mortero Enf. Rev. Ext GP-CS-IV-W2 | 151,8000 | 75,5964 | |
| MQ0602110 | 0,2000 | h | Camión grúa de 10 a 12 t | 80,2900 | 16,0580 | |
| | | | **TOTAL PARTIDA** | | | **812,64** |

Asciende el precio total de la partida a la mencionada cantidad de OCHOCIENTOS DOCE EUROS con SESENTA Y CUATRO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U05030080** | | **m** | **En exceso para pozo de registro, diámetro interior 100 cm y prof** | | | |
| | | | En exceso para pozo de registro, diámetro interior 1000 mm y profundidad > 3,10 m, formado por piezas prefabricadas de hormigón armado, recibido y sellado de juntas de piezas prefabricadas con M-350, incluso pates total- | | | |
| MO0100300 | 3,0000 | h | Oficial 1ª | 18,0400 | 54,1200 | |
| MO0100600 | 3,0000 | h | Peón especialista | 16,5500 | 49,6500 | |
| MO0100700 | 3,0000 | h | Peón ordinario | 16,5300 | 49,5900 | |
| MQ0602110 | 0,2800 | h | Camión grúa de 10 a 12 t | 80,2900 | 22,4812 | |
| MT1501030 | 1,0000 | ud | Ani.po.ench-camp.circ. HA h=1,00 m D=1000 | 163,8400 | 163,8400 | |
| MT1502020 | 1,0000 | ud | Junta goma base pozo ench.-camp. D=1000 | 28,0600 | 28,0600 | |
| MT0360040 | 2,0000 | ud | Pate de polipropileno 30x25 | 8,9500 | 17,9000 | |
| | | | **TOTAL PARTIDA** | | | **385,64** |

Asciende el precio total de la partida a la mencionada cantidad de TRESCIENTOS OCHENTA Y CINCO EUROS con SESENTA Y CUATRO CÉNTIMOS

| CÓDIGO | CANTIDAD | UD | RESUMEN | PRECIO | SUBTOTAL | IMPORTE |
|---|---|---|---|---|---|---|
| **U05070110** | | **ud** | **Tapa de registro de fundición dúctil, clase D 400 tráfico medio** | | | |
| | | | Tapa de registro de fundición dúctil, clase D 400 para tráfico medio, conforme a norma UNE 124, de 600 mm. de luz libre, con bloqueo automático, tapa articulada, junta anti ruido para asiento estable de la tapa, con dispositivo acerrojado y antirrobo, enrasada con la superficie, marcado con identificación de Canal de Isabel II y servicio co- | | | |
| | | | rrespondiente (Abastecimiento, Saneamiento, Reutilización), incluso marco y anclaje, colocada en obra, totalmente | | | |
| MO0100300 | 0,7500 | h | Oficial 1ª | 18,0400 | 13,5300 | |
| MO0100600 | 1,0000 | h | Peón especialista | 16,5500 | 16,5500 | |
| MT0335335 | 1,0000 | ud | Tapa de registro de fundición dúctil, clase D 400 tráfico medio | 214,3000 | 214,3000 | |
| | | | **TOTAL PARTIDA** | | | **244,38** |

Asciende el precio total de la partida a la mencionada cantidad de DOSCIENTOS CUARENTA Y CUATRO EUROS con TREINTA Y OCHO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U05090240** | | **ud** | **Pate polipropileno con alma de acero** | | | |
| | | | Pate con alma de acero recubierto de polipropileno, conforme a la norma UNE-EN 13101 y/o según normativa vi- | | | |
| MO0100700 | 0,1500 | h | Peón ordinario | 16,5300 | 2,4795 | |
| MO0100600 | 0,1500 | h | Peón especialista | 16,5500 | 2,4825 | |
| MT0360040 | 1,0000 | ud | Pate de polipropileno 30x25 | 8,9500 | 8,9500 | |
| | | | **TOTAL PARTIDA** | | | **13,91** |

Asciende el precio total de la partida a la mencionada cantidad de TRECE EUROS con NOVENTA Y UN CÉNTIMOS

## APARTADO 02.1.3 TUBERÍAS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U02080040** | | **m** | **Tubería PVC-U DN 500, SN 8 kN/m2** | | | |
| | | | Suministro e instalación de tubería de PVC-U de pared estructurada, rigidez nominal SN>= 8 kN/m2, de diámetro nominal DN 500 mm, conforme a norma UNE-EN 13476 y/o según normativa vigente, incluso parte proporcional | | | |
| MO0100300 | 0,0350 | h | Oficial 1ª | 18,0400 | 0,6314 | |
| MO0100700 | 0,0700 | h | Peón ordinario | 16,5300 | 1,1571 | |
| MT3001040 | 1,0000 | m | Tubería de PVC-U, SN>= 8 kN/m2, diámetro nominal DN 500 mm | 153,2100 | 153,2100 | |
| MQ0602100 | 0,0350 | h | Camión grúa de 6 t | 55,1200 | 1,9292 | |
| | | | **TOTAL PARTIDA** | | | **156,93** |

Asciende el precio total de la partida a la mencionada cantidad de CIENTO CINCUENTA Y SEIS EUROS con NOVENTA Y TRES CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **mU09C090** | | **ud** | **ENTRONQUE ACOMET. TUBULAR POZO ALCANTAR. O COLECTOR** | | | |
| | | | Entronque de acometida tubular, a pozo de alcantarillado, o colector existente, inlcuida la demolición de calzada y acera hsta la conexión con el pozo en la calle,la posterior reposición del pavimento y el transporte y gestión de los | | | |
| mO01OA060 | 4,0000 | h | Peón especializado | 13,6100 | 54,4400 | |
| mO01OA070 | 4,0000 | h | Peón ordinario | 13,5100 | 54,0400 | |
| mM06CM010 | 1,0000 | h | Compre.port.diesel m.p. 2 m3/min. 7 bar | 1,8800 | 1,8800 | |
| mM06MI030 | 1,0000 | h | Martillo manual picador neumático | 2,5000 | 2,5000 | |
| mA02A070 | 0,0900 | m3 | MORTERO CEMENTO M-7,5 | 66,8400 | 6,0156 | |
| mP01HM080 | 3,0000 | m3 | Hormigón HM-12,5/P/40/IIa central | 55,8300 | 167,4900 | |
| %CI0300 | 3,0000 | % | Costes Indirectos | 286,3700 | 8,5911 | |
| | | | **TOTAL PARTIDA** | | | **294,96** |

Asciende el precio total de la partida a la mencionada cantidad de DOSCIENTOS NOVENTA Y CUATRO EUROS con NOVENTA Y SEIS CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U01030350** | | **m** | **Banda de señalización** | | | |
| | | | Banda de señalización, según normas o especificaciones técnicas de Canal de Isabel II vigentes. | | | |
| MO0100700 | 0,0030 | h | Peón ordinario | 16,5300 | 0,0496 | |
| MT6490010 | 1,0000 | m | Banda de señalización | 0,2300 | 0,2300 | |
| | | | **TOTAL PARTIDA** | | | **0,28** |

Asciende el precio total de la partida a la mencionada cantidad de CERO EUROS con VEINTIOCHO CÉNTIMOS

| CÓDIGO | CANTIDAD | UD | RESUMEN | PRECIO | SUBTOTAL | IMPORTE |
|---|---|---|---|---|---|---|

## SUBCAPÍTULO 02.2 SALIDA PLUVIALES

## APARTADO 02.2.1 MOVIMIENTO DE TIERRAS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U01022020** | | **m3** | **Excavación en zanja, med. mecán. terreno medio** | | | |
| | | | Excavación en zanja, por medios mecánicos, en terreno medio (suelo con golpeo en el ensayo SPT entre 10 y 30 | | | |
| MO0100700 | 0,1200 | h | Peón ordinario | 16,5300 | 1,9836 | |
| MQ0402010 | 0,2200 | h | Retrocargadora neumáticos 75 CV | 49,4500 | 10,8790 | |
| | | | **TOTAL PARTIDA.....** | | | **12,86** |

Asciende el precio total de la partida a la mencionada cantidad de DOCE EUROS con OCHENTA Y SEIS CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U01023020** | | **m3** | **Excavación en pozo, med. mecán. terreno medio** | | | |
| | | | Excavación en pozo, por medios mecánicos, en terreno medio (suelo con golpeo en el ensayo SPT entre 10 y 30 | | | |
| MO0100700 | 0,1300 | h | Peón ordinario | 16,5300 | 2,1489 | |
| MQ0400020 | 0,2450 | h | Excavadora hidráulica neumáticos 100 CV | 67,2700 | 16,4812 | |
| | | | **TOTAL PARTIDA.....** | | | **18,63** |

Asciende el precio total de la partida a la mencionada cantidad de DIECIOCHO EUROS con SESENTA Y TRES CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U01040040** | | **m2** | **Refino nivelación fondo zanjas** | | | |
| | | | Refino, nivelación y apisonado de fondo de zanja para asiento de tubería, por cualquier procedimiento, incluso lim- | | | |
| MO0100500 | 0,0250 | h | Ayudante | 16,7500 | 0,4188 | |
| MQ0406020 | 0,0164 | h | Motoniveladora de 149 KW | 93,3700 | 1,5313 | |
| MQ0501020 | 0,0060 | h | Compactador autoprop. de un cilindro vibrante de 8/14 t | 75,6500 | 0,4539 | |
| MT1901010 | 0,0600 | m3 | Agua | 1,0000 | 0,0600 | |
| | | | **TOTAL PARTIDA.....** | | | **2,46** |

Asciende el precio total de la partida a la mencionada cantidad de DOS EUROS con CUARENTA Y SEIS CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U01030020** | | **m3** | **Grava o gravilla en rellenos o asiento de tubería** | | | |
| | | | Grava o gravilla en rellenos o asiento de tubería, por cualquier procedimiento, de tamaño máximo 25 mm, exenta de materia orgánica, con contenido de sulfatos inferior al 0,3%, expresado en trióxido de azufre, incluso aportación, | | | |
| MO0100300 | 0,1000 | h | Oficial 1ª | 18,0400 | 1,8040 | |
| MO0100500 | 0,1000 | h | Ayudante | 16,7500 | 1,6750 | |
| MT0101060 | 1,0000 | m3 | Grava tamaño máximo 25 mm, exenta de materia orgánica | 10,9900 | 10,9900 | |
| MQ0401040 | 0,0410 | h | Pala cargad. s/orugas de 112 CV | 90,9200 | 3,7277 | |
| MQ0604010 | 0,0100 | h | Camión cisterna de 6 m3 | 49,5600 | 0,4956 | |
| | | | **TOTAL PARTIDA.....** | | | **18,69** |

Asciende el precio total de la partida a la mencionada cantidad de DIECIOCHO EUROS con SESENTA Y NUEVE CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U07010810** | | **m3** | **HA-30/B/20/XC2,XC3 o HA-30/B/20/XC4 en elementos horizontales ve** | | | |
| | | | Suministro y puesta en obra de hormigón HA-30/B/20/XC2,XC3 o HA-30/B/20/XC4 , elaborado en central y vertido con bomba en elementos horizontales de estructura (cimentaciones, soleras, vigas, etc.), incluso compactación, | | | |
| MO0100300 | 0,1000 | h | Oficial 1ª | 18,0400 | 1,8040 | |
| MO0100500 | 0,1500 | h | Ayudante | 16,7500 | 2,5125 | |
| MO0100700 | 0,1500 | h | Peón ordinario | 16,5300 | 2,4795 | |
| MQ0807010 | 0,1000 | h | Bomba de hormigón s/camión 60 CV | 180,9400 | 18,0940 | |
| MT0109040 | 0,5000 | kg | Filmógeno de curado | 4,1300 | 2,0650 | |
| MT0408060 | 1,0500 | m3 | Hormigón HA-30/B/20/XC2,XC3 o HA-30/B/20/XC4 central | 90,0300 | 94,5315 | |
| MQ0811010 | 0,1500 | h | Vibrador de aguja d=45 4 CV | 1,9600 | 0,2940 | |
| | | | **TOTAL PARTIDA.....** | | | **121,78** |

Asciende el precio total de la partida a la mencionada cantidad de CIENTO VEINTIUN EUROS con SETENTA Y OCHO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U01030050** | | **m3** | **Relleno zanja propios adecuad. Tmax 150 mm** | | | |
| | | | Relleno de zanjas con suelos adecuados, tamaño máximo 150 mm, procedentes de la propia excavación, incluso aportación, extendido y compactación hasta una densidad del 100% P.M., medido sobre perfil. | | | |
| MO0100200 | 0,0500 | h | Capataz | 18,3900 | 0,9195 | |
| MO0100500 | 0,1500 | h | Ayudante | 16,7500 | 2,5125 | |
| MQ0604020 | 0,0100 | h | Camión con tanque para agua de 10 m3 | 66,8900 | 0,6689 | |
| MQ0401040 | 0,0300 | h | Pala cargad. s/orugas de 112 CV | 90,9200 | 2,7276 | |
| MQ0500070 | 0,1500 | h | Rodillo vibrante manual 800 kg | 7,1100 | 1,0665 | |
| MT1901010 | 0,0500 | m3 | Agua | 1,0000 | 0,0500 | |
| | | | **TOTAL PARTIDA.....** | | | **7,95** |

Asciende el precio total de la partida a la mencionada cantidad de SIETE EUROS con NOVENTA Y CINCO CÉNTIMOS

# CUADRO DE DESCOMPUESTOS

## TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS

| CÓDIGO | CANTIDAD | UD | RESUMEN | PRECIO | SUBTOTAL | IMPORTE |
|---|---|---|---|---|---|---|
| **U01030340** | | **m3** | **Relleno trasdós muros suelos adecuados de excavación** | | | |
| | | | Relleno localizado en trasdós de muros con suelos adecuados procedentes de la excavación, incluso aportación, extendido, humectación y compactación en capas de 30 cm de espesor, con un grado de compactación del 95% | | | |
| MO0100200 | 0,0600 | h | Capataz | 18,3900 | 1,1034 | |
| MO0100500 | 0,0600 | h | Ayudante | 16,7500 | 1,0050 | |
| MQ0400080 | 0,0200 | h | Retroexcavadora 50 HP | 37,1400 | 0,7428 | |
| MQ0500030 | 0,0400 | h | Compactador manual | 9,6000 | 0,3840 | |
| MQ0604020 | 0,0200 | h | Camión con tanque para agua de 10 m3 | 66,8900 | 1,3378 | |
| MT0103020 | 1,1500 | m3 | Suelo adecuado tamaño máximo 150 mm., proc. excav. | 0,8300 | 0,9545 | |
| | | | **TOTAL PARTIDA** | | | **5,53** |

Asciende el precio total de la partida a la mencionada cantidad de CINCO EUROS con CINCUENTA Y TRES CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U01025100** | | **m2** | **Entibación cuajada zanjas o pozos con paneles acero hasta 6 m** | | | |
| | | | Entibación metálica cuajada en zanjas y pozos, hasta 6 m de profundidad, con paneles de chapa de acero, amorti- | | | |
| MO0100300 | 0,1200 | h | Oficial 1ª | 18,0400 | 2,1648 | |
| MO0100500 | 0,1200 | h | Ayudante | 16,7500 | 2,0100 | |
| MT0202250 | 1,0000 | m2 | Panel chapa de acero 400x100 cm | 4,5300 | 4,5300 | |
| MQ0402020 | 0,0833 | h | Retrocargadora neumáticos 100 CV | 60,7700 | 5,0621 | |
| MQ1702010 | 0,0080 | ud | Transporte y recogida de material | 1.259,5700 | 10,0766 | |
| | | | **TOTAL PARTIDA** | | | **23,84** |

Asciende el precio total de la partida a la mencionada cantidad de VEINTITRES EUROS con OCHENTA Y CUATRO CÉNTIMOS

## APARTADO 02.2.2 OBRAS DE FÁBRICA

| | | | | | | |
|---|---|---|---|---|---|---|
| **U05030150** | | **ud** | **Pozo de registro diámetro interior 1100 mm y 1<H<2m profun., enf** | | | |
| | | | Pozo de registro, diámetro interior 1100 mm de entre 1,00 y 2,00 m de profundidad, construido con fábrica de ladrillo macizo de 1 pie de espesor, recibido con mortero M-10, colocado sobre solera de hormigón HA-25/P/40/I de 0,30 m mínimo de espesor, armada con mallazo; enfoscado interior y exterior fratasado con mortero hidrófugo bruñido en toda su altura con mortero CS-IV-Wc2. Incluso colocado, totalmente terminado y p. p. de formación de cuna en el fondo del pozo, formación de brocal asimétrico en la coronación para recibir cerco y tapa y medios auxilia- | | | |
| MO0100300 | 14,0390 | h | Oficial 1ª | 18,0400 | 253,2636 | |
| MO0100600 | 12,2890 | h | Peón especialista | 16,5500 | 203,3830 | |
| MT0407050 | 0,9630 | m3 | Hormigón HA-25/P/20/XC1 o HA-25/P/40/XC1 central | 77,4100 | 74,5458 | |
| MT0705035 | 2,2700 | m2 | Malla 15x30x5; 1,564 kg/m2 | 1,7600 | 3,9952 | |
| MT1001070 | 913,0000 | ud | Ladrillo perfora. tosco 25x12x7 cm | 0,1400 | 127,8200 | |
| MT0105150 | 0,9340 | m3 | Mortero de cemento gris M-10 | 62,0700 | 57,9734 | |
| MT0105160 | 0,4980 | t | Mortero Enf. Rev. Ext GP-CS-IV-W2 | 151,8000 | 75,5964 | |
| MQ0602110 | 0,2000 | h | Camión grúa de 10 a 12 t | 80,2900 | 16,0580 | |
| | | | **TOTAL PARTIDA** | | | **812,64** |

Asciende el precio total de la partida a la mencionada cantidad de OCHOCIENTOS DOCE EUROS con SESENTA Y CUATRO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U05030080** | | **m** | **En exceso para pozo de registro, diámetro interior 100 cm y prof** | | | |
| | | | En exceso para pozo de registro, diámetro interior 1000 mm y profundidad > 3,10 m, formado por piezas prefabricadas de hormigón armado, recibido y sellado de juntas de piezas prefabricadas con M-350, incluso pates total- | | | |
| MO0100300 | 3,0000 | h | Oficial 1ª | 18,0400 | 54,1200 | |
| MO0100600 | 3,0000 | h | Peón especialista | 16,5500 | 49,6500 | |
| MO0100700 | 3,0000 | h | Peón ordinario | 16,5300 | 49,5900 | |
| MQ0602110 | 0,2800 | h | Camión grúa de 10 a 12 t | 80,2900 | 22,4812 | |
| MT1501030 | 1,0000 | ud | Ani.po.ench-camp.circ. HA h=1,00 m D=1000 | 163,8400 | 163,8400 | |
| MT1502020 | 1,0000 | ud | Junta goma base pozo ench.-camp. D=1000 | 28,0600 | 28,0600 | |
| MT0360040 | 2,0000 | ud | Pate de polipropileno 30x25 | 8,9500 | 17,9000 | |
| | | | **TOTAL PARTIDA** | | | **385,64** |

Asciende el precio total de la partida a la mencionada cantidad de TRESCIENTOS OCHENTA Y CINCO EUROS con SESENTA Y CUATRO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U05070110** | | **ud** | **Tapa de registro de fundición dúctil, clase D 400 tráfico medio** | | | |
| | | | Tapa de registro de fundición dúctil, clase D 400 para tráfico medio, conforme a norma UNE 124, de 600 mm. de luz libre, con bloqueo automático, tapa articulada, junta anti ruido para asiento estable de la tapa, con dispositivo acerrojado y antirrobo, enrasada con la superficie, marcado con identificación de Canal de Isabel II y servicio correspondiente (Abastecimiento, Saneamiento, Reutilización), incluso marco y anclaje, colocada en obra, totalmente | | | |
| MO0100300 | 0,7500 | h | Oficial 1ª | 18,0400 | 13,5300 | |
| MO0100600 | 1,0000 | h | Peón especialista | 16,5500 | 16,5500 | |
| MT0335335 | 1,0000 | ud | Tapa de registro de fundición dúctil, clase D 400 tráfico medio | 214,3000 | 214,3000 | |
| | | | **TOTAL PARTIDA** | | | **244,38** |

| CÓDIGO | CANTIDAD | UD | RESUMEN | PRECIO | SUBTOTAL | IMPORTE |
|---|---|---|---|---|---|---|

Asciende el precio total de la partida a la mencionada cantidad de DOSCIENTOS CUARENTA Y CUATRO EUROS con TREINTA Y OCHO CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U05090240** | | **ud** | **Pate polipropileno con alma de acero** | | | |
| | | | Pate con alma de acero recubierto de polipropileno, conforme a la norma UNE-EN 13101 y/o según normativa vi- | | | |
| MO0100700 | 0,1500 | h | Peón ordinario | 16,5300 | 2,4795 | |
| MO0100600 | 0,1500 | h | Peón especialista | 16,5500 | 2,4825 | |
| MT0360040 | 1,0000 | ud | Pate de polipropileno 30x25 | 8,9500 | 8,9500 | |
| | | | **TOTAL PARTIDA.....** | | | **13,91** |

Asciende el precio total de la partida a la mencionada cantidad de TRECE EUROS con NOVENTA Y UN CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U07EA160** | | **ud** | **ALIVIADERO OBRA 2,50x2,00+1,70 m** | | | |
| | | | Aliviadero para alcantarillado de dimensiones interiores 2,50x2,00 m y 2,10 m de altura libre interior, realizado so- bre solera de hormigón en masa HM-20/P/40/I de 20 cm de espesor, incluso formación de pendientes, fábrica de ladrillo macizo de 1 pie de espesor, tomados con mortero de cemento, losa armada de 16 cm de canto y viga ar- mada de 40 cm, realizadas con HA-25/P/20/I, enfoscada y bruñida interiormente con mortero CSIV-W2, y conducto de pozo, de 80 cm de diámetro y 1,70 m de altura, realizado con anillos de hormigón en masa, prefabricados, de borde machihembrado, y cono asimétrico para formación de brocal del pozo, con cierre de marco y tapa de fundi- ción, de 62,5 cm de diámetro, i/sellado de juntas con mortero de cemento, recibido de pates y de cerco de tapa, y con medios auxiliares, sin incluir la excavación del pozo y su relleno perimetral posterior. Según UNE-EN | | | |
| O01OA030 | 16,3000 | h | Oficial primera | 20,8400 | 339,6920 | |
| O01OA060 | 8,1000 | h | Peón especializado | 14,8200 | 120,0420 | |
| M05EN020 | 0,6000 | h | Excavadora hidráulica neumáticos 84 CV | 39,8300 | 23,8980 | |
| P03AMU010 | 5,0000 | m2 | Malla electrosoldada B500 SD/T #150x300x5 mm - 1,541 kg/m2 | 1,5000 | 7,5000 | |
| P01HMV250 | 1,1250 | m3 | Hormigón HM-20/P/40/I central | 64,9100 | 73,0238 | |
| P01HAV360 | 1,2580 | m3 | Hormigón HA-25/P/20/I central | 67,0200 | 84,3112 | |
| P01LT040 | 2,2050 | mu | Ladrillo perforado tosco 24x11,5x7 cm | 61,6300 | 135,8942 | |
| E05HLE010 | 5,0000 | m2 | ENCOF. / DESENCOF. LOSA HORMIGÓN HORIZONTAL | 13,3300 | 66,6500 | |
| A02A080 | 2,1200 | m3 | MORTERO CEMENTO M-5 C/HORMIGONERA | 67,3558 | 142,7943 | |
| P04RR070 | 29,2000 | kg | Mortero revoco CSIV-W2 | 1,3700 | 40,0040 | |
| P02EPH010 | 2,0000 | u | Anillo pozo machiembrado circular HM h=0,50 m D=80 cm | 16,2900 | 32,5800 | |
| P02EPH100 | 1,0000 | u | Cono machiembrado circular HM h=0,6 m D=60/80 cm | 29,4700 | 29,4700 | |
| P02EPW010 | 13,0000 | u | Pates PP 30x25 cm | 7,3200 | 95,1600 | |
| | | | **TOTAL PARTIDA.....** | | | **1.191,02** |

Asciende el precio total de la partida a la mencionada cantidad de MIL CIENTO NOVENTA Y UN EUROS con DOS CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U02V010** | | **ud** | **EMBOCADURA PARA CONDUCTO D=600 mm** | | | |
| | | | Embocadura para conducto D=600 mm, formada por imposta de 0,40x0,20 m, aletas de h=0,90 m y espesor 0,30 m, con talud 2/1, cimientos de 0,50x0,50 m, solera entre aletas de espesor 0,25 m, incluyendo excavación, enco- frado, hormigón HM-20 en cimientos y alzados, terminado. | | | |
| U02AE020 | 1,7100 | m3 | EXCAVACIÓN EN EMBOCADURAS EN TERRENO SIN CLASIFICAR | 18,0500 | 30,8655 | |
| U02EC010 | 4,3000 | m2 | ENCOFRADO EN CIMIENTOS DE OBRAS DE FÁBRICA | 19,6900 | 84,6670 | |
| U02HC040 | 1,7100 | m3 | HORMIGÓN HM-20 EN CIMIENTOS DE OBRAS DE FÁBRICA | 89,7900 | 153,5409 | |
| U02EE010 | 1,6200 | m2 | ENCOFRADO OCULTO EN EMBOCADURAS DE OBRAS DE FÁBRICA | 22,0200 | 35,6724 | |
| U02EE020 | 1,6200 | m2 | ENCOFRADO VISTO EN EMBOCADURAS DE OBRAS DE FÁBRICA | 26,0900 | 42,2658 | |
| U02EI010 | 1,2000 | m2 | ENCOFRADO EN IMPOSTAS DE OBRAS DE FÁBRICA | 33,8200 | 40,5840 | |
| U02HE010 | 0,6060 | m3 | HORMIGÓN HM-20 EN EMBOCADURAS DE OBRAS DE FÁBRICA | 90,0000 | 54,5400 | |
| | | | **TOTAL PARTIDA.....** | | | **442,14** |

Asciende el precio total de la partida a la mencionada cantidad de CUATROCIENTOS CUARENTA Y DOS EUROS con CATORCE CÉNTIMOS

## APARTADO 02.2.3 TUBERÍAS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U02080050** | | **m** | **Tubería PVC-U DN 630, SN 8 kN/m2** | | | |
| | | | Suministro e instalación de tubería de PVC-U de pared estructurada, rigidez nominal SN>= 8 kN/m2, de diámetro nominal DN 630 mm, conforme a norma UNE-EN 13476 y/o según normativa vigente, incluso parte proporcional | | | |
| MO0100300 | 0,0400 | h | Oficial 1ª | 18,0400 | 0,7216 | |
| MO0100700 | 0,0800 | h | Peón ordinario | 16,5300 | 1,3224 | |
| MT3001050 | 1,0000 | m | Tubería de PVC-U, SN>= 8 kN/m2, diámetro nominal DN 630 mm | 167,4100 | 167,4100 | |
| MQ0602100 | 0,0400 | h | Camión grúa de 6 t | 55,1200 | 2,2048 | |
| | | | **TOTAL PARTIDA.....** | | | **171,66** |

Asciende el precio total de la partida a la mencionada cantidad de CIENTO SETENTA Y UN EUROS con SESENTA Y SEIS CÉNTIMOS

# CUADRO DE DESCOMPUESTOS

## TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS

| CÓDIGO | CANTIDAD | UD | RESUMEN | PRECIO | SUBTOTAL | IMPORTE |
|---|---|---|---|---|---|---|
| **U02040200** | | **m** | **Marco prefabricado visitable tipo HA30P/12 de 1,00x1,80 m S/R** | | | |
| | | | Suministro y colocación de marco prefabricado visitable de hormigón armado tipo HA-30/P/12, resistente a los sulfatos, de 1,00 x 1,80 m, conforme a norma UNE-EN 14844 y/o incluso normativa vigente, incluso sellado de jun- | | | |
| MO0100200 | 0,0900 | h | Capataz | 18,3900 | 1,6551 | |
| MO0100300 | 0,6000 | h | Oficial 1ª | 18,0400 | 10,8240 | |
| MO0100600 | 0,6000 | h | Peón especialista | 16,5500 | 9,9300 | |
| MQ0602110 | 0,3500 | h | Camión grúa de 10 a 12 t | 80,2900 | 28,1015 | |
| MT2002020 | 1,0000 | m | Suministro e inst. de marco prefabricado visitable de 1.00x1.80 | 503,4800 | 503,4800 | |
| | | | **TOTAL PARTIDA.....** | | | **553,99** |

Asciende el precio total de la partida a la mencionada cantidad de QUINIENTOS CINCUENTA Y TRES EUROS con NOVENTA Y NUEVE CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U01026250** | | **m** | **Tubería hincada chapa de acero DN 800 escudo abierto** | | | |
| | | | Tubería hincada de DN 800 mm de diámetro interior, de chapa de acero de espesor mínimo 0,8% del diámetro, revestida con al menos 300 micras de resina de poliuretano, conforme a la norma UNE-EN 10224 y/o normativa vigente, en cualquier clase de terreno incluso roca, con equipo de escudo abierto, extracción de los productos procedentes de la excavación totalmente colocada, incluso p.p. de juntas de estanquidad, inyecciones bentoníticas, de- | | | |
| MO0100200 | 3,0000 | h | Capataz | 18,3900 | 55,1700 | |
| MO0100300 | 3,0000 | h | Oficial 1ª | 18,0400 | 54,1200 | |
| MO0100600 | 6,0000 | h | Peón especialista | 16,5500 | 99,3000 | |
| MO0100500 | 6,0000 | h | Ayudante | 16,7500 | 100,5000 | |
| MQ0309180 | 1,0000 | m | Ejecución microtúnel E.A. DN 800 mm acero | 365,3900 | 365,3900 | |
| MT2801060 | 1,0000 | m | Tubería de chapa de acero para hinca D=800 mm | 258,7900 | 258,7900 | |
| | | | **TOTAL PARTIDA.....** | | | **933,27** |

Asciende el precio total de la partida a la mencionada cantidad de NOVECIENTOS TREINTA Y TRES EUROS con VEINTISIETE CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U01026330** | | **ud** | **Implantación, retirada y transporte escudo abierto acero <1500** | | | |
| | | | Implantación, retirada y transporte de equipo perforador de escudo abierto para hinca de tubería de chapa de acero | | | |
| MQ0310060 | 1,0000 | ud | Implantación, retirada y transporte escudo abierto acero <1500 | 1.538,4700 | 1.538,4700 | |
| | | | **TOTAL PARTIDA.....** | | | **1.538,47** |

Asciende el precio total de la partida a la mencionada cantidad de MIL QUINIENTOS TREINTA Y OCHO EUROS con CUARENTA Y SIETE CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **mU09C090** | | **ud** | **ENTRONQUE ACOMET. TUBULAR POZO ALCANTAR. O COLECTOR** | | | |
| | | | Entronque de acometida tubular, a pozo de alcantarillado, o colector existente, inlcuida la demolición de calzada y acera hsta la conexión con el pozo en la calle,la posterior reposición del pavimento y el transporte y gestión de los residuos. | | | |
| mO01OA060 | 4,0000 | h | Peón especializado | 13,6100 | 54,4400 | |
| mO01OA070 | 4,0000 | h | Peón ordinario | 13,5100 | 54,0400 | |
| mM06CM010 | 1,0000 | h | Compre.port.diesel m.p. 2 m3/min. 7 bar | 1,8800 | 1,8800 | |
| mM06MI030 | 1,0000 | h | Martillo manual picador neumático | 2,5000 | 2,5000 | |
| mA02A070 | 0,0900 | m3 | MORTERO CEMENTO M-7,5 | 66,8400 | 6,0156 | |
| mP01HM080 | 3,0000 | m3 | Hormigón HM-12,5/P/40/IIa central | 55,8300 | 167,4900 | |
| %CI0300 | 3,0000 | % | Costes Indirectos | 286,3700 | 8,5911 | |
| | | | **TOTAL PARTIDA.....** | | | **294,96** |

Asciende el precio total de la partida a la mencionada cantidad de DOSCIENTOS NOVENTA Y CUATRO EUROS con NOVENTA Y SEIS CÉNTIMOS

| | | | | | | |
|---|---|---|---|---|---|---|
| **U01030350** | | **m** | **Banda de señalización** | | | |
| | | | Banda de señalización, según normas o especificaciones técnicas de Canal de Isabel II vigentes. | | | |
| MO0100700 | 0,0030 | h | Peón ordinario | 16,5300 | 0,0496 | |
| MT6490010 | 1,0000 | m | Banda de señalización | 0,2300 | 0,2300 | |
| | | | **TOTAL PARTIDA.....** | | | **0,28** |

Asciende el precio total de la partida a la mencionada cantidad de CERO EUROS con VEINTIOCHO CÉNTIMOS

# CUADRO DE DESCOMPUESTOS

**TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS**

| CÓDIGO | CANTIDAD | UD | RESUMEN | PRECIO | SUBTOTAL | IMPORTE |
|---|---|---|---|---|---|---|

## CAPÍTULO 03 GESTIÓN DE RESIDUOS

**AABBCC** — **ud** — **Gestión de Residuos de Construcción y Demolición**

Gestión integral de Residuos incluyendo la identificación de los residuos generados y Estimación de la cantidad de cada tipo que se genera en la obra codificados conforme a la Lista Europea de Residuos (Orden MAM/304/2002 del Ministerio de Medio Ambiente de 8 de febrero), medidas de segregación "in situ" previstas por el plan de gestión de residuos, operaciones de valorización "in situ" y de reutilización, destino de los residuos no valorables o reutilizables, según estudio de gestión de residuos incluido en el proyecto, pliego de prescripciones y Orden 2690/2006,

Sin descomposición

**TOTAL PARTIDA.....** **11.460,23**

Asciende el precio total de la partida a la mencionada cantidad de ONCE MIL CUATROCIENTOS SESENTA EUROS con VEINTITRES CÉNTIMOS

## CAPÍTULO 04 SEGURIDAD Y SALUD

**C.19.8.1** — **Ud** — **Seguridad y Salud**

PROTECCIONES INDIVIDUALES Y COLECTIVAS E INSTALACIONES DE HIGIENE Y BIENESTAR s/. Real Decreto 1627/97, de 24 de Octubre, por el que se establecen las disposiciones mínimas necesarias de seguridad y salud en las obras de construcción se han de disponer de las medidas de protección:
- Protecciones individuales con objeto de la prevención de los riesgos laborales, de los riesgos específicos en cada unos de los "tajos" relativos a las obras civiles, tales como cinturones, cascos, guantes, ropa adecuada de obras y equipamiento en general para protección de los trabajadores.
- Protecciones colectivas con objeto de la prevención de los riesgos laborales relativos a las obras civiles, tales como instalaciones provisionales de obra, vallados, señalización, balizado, entibaciones, zanjas y equipamiento en general para protecciones de obras.
- Instalaciones de higiene y bienestar, tales como casetas de obra, aseo, vestuarios, comedor, primeros auxilios y equipamiento en general para higiene y bienestar de obras.

Sin descomposición

**TOTAL PARTIDA.....** **13.980,00**

Asciende el precio total de la partida a la mencionada cantidad de TRECE MIL NOVECIENTOS OCHENTA EUROS

# 13.13. ANEJO 13. NORMATIVA Y LEGISLACIÓN CITADA DE APLICACIÓN

Se ha tenido en cuenta fundamentalmente las Normas para redes de saneamiento del Canal de Isabel II versión 3.2020 (NRSCYII - 2020).

Se ha cumplimentado las siguientes normas, reglamentos y documentación técnica:

Legislación europea

Directiva 2006/42/CE Directiva 2006/42/CE del Parlamento Europeo y del Consejo, de

17 de mayo de 2006, relativa a las máquinas y por la que se modifica la Directiva 95/16/CE (refundición).

Directiva 2006/95/CE Directiva 2006/95/CE del Parlamento Europeo y del Consejo, de

12 de diciembre de 2006, relativa a la aproximación de las legislaciones de los Estados miembros sobre el material eléctrico destinado a utilizarse con determinados límites de tensión (versión codificada).

Directiva 2004/108/CE Relativa a la aproximación de las legislaciones de los Estados

miembros en materia de compatibilidad electromagnética y por la que se deroga la Directiva 89/336/CEE.

Reglamento (UE) 548/2014 REGLAMENTO (UE) No 548/2014 DE LA COMISIÓN de 21 de mayo de 2014 por el que se desarrolla la Directiva 2009/125/CE del Parlamento Europeo y del Consejo en lo que respecta a los transformadores de potencia pequeños, medianos y grandes.

EN 1990:2002/A1:2005 Basis of structural design.

EN 1991 Actions on structures.

EN 1991-1-1:2002 Eurocode 1: Actions on structures - Part 1-1: General actions - Densities, self-weight, imposed loads for buildings.

EN 1991-1-2:2002 Eurocode 1: Actions on structures - Part 1-2: General actions - Actions on structures exposed to fire.

EN 1991-1-3:2003 Eurocode 1: Actions on structures - Part 1-3: General actions - Snow loads.

EN 1991-1-4:2005 Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions.

EN 1991-1-5:2003 Eurocode 1: Actions on structures - Part 1-5: General actions - Thermal actions.

EN 1991-1-6:2005 Eurocode 1: Actions on structures - Part 1-6: General actions - Actions during execution.

EN 1991-1-7:2006 Eurocode 1: Actions on structures - Part 1-7: General actions - Accidental actions.

EN 1991-2:2003 Eurocode 1: Actions on structures - Part 2: Traffic loads on bridges.

EN 1991-3:2006 Eurocode 1: Actions on structures - Part 3: Actions induced by cranes and machinery.

EN 1991-4: 2006 Eurocode 1: Actions on structures - Part 4: Silos and tanks.

EN 1992 Design of concrete structures.

EN 1993 Design of steel structures.

EN 1997 Geotechnical design.

EN 1998 Design of structures for earthquake resistance.

Legislación nacional

Ley 3/1995 Ley de Vías Pecuarias.

Ley 16/1985 Ley del Patrimonio Histórico Español.

Ley 31/1995 Ley de Prevención de Riesgos Laborales.

Ley 37/2015 Ley de Carreteras.

Ley 38/2015 Ley del Sector Ferroviario.

Ley 54/1997 Ley del Sector Eléctrico.

Real Decreto 337/2014 Reglamento sobre condiciones técnicas y garantías de seguridad en instalaciones de alta tensión y sus Instrucciones Técnicas Complementarias ITC-RAT 01 a 23.

Real Decreto 1110/2007 Reglamento unificado de puntos de medida del sistema

eléctrico.

Real Decreto 1890/2008 Reglamento de eficiencia energética en instalaciones de alumbrado exterior y sus Instrucciones técnicas complementarias EA-01 a EA-07.

Real Decreto 1/2016 Por el que se aprueba la revisión de los Planes Hidrológicos de las demarcaciones hidrográficas del Cantábrico Occidental, Guadalquivir, Ceuta, Melilla, Segura y Júcar, y de la parte española de las demarcaciones hidrográficas del Cantábrico Oriental, Miño-Sil, Duero, Tajo, Guadiana y Ebro.

Real Decreto 614/2001 Disposiciones mínimas para la protección de la salud y seguridad de los trabajadores frente al riesgo eléctrico.

Real Decreto 751/2011 Instrucción de Acero Estructural (EAE).

Real Decreto 842/2002 Reglamento electrotécnico para baja tensión e Instrucciones

Técnicas Complementarias (ITC-BT), así como sus posteriores modificaciones.

Real Decreto 849/1986 Reglamento del Dominio Público Hidráulico.

Real Decreto 256/2016 Instrucción para la recepción de cementos (RC-16).

Real Decreto 997/2002 Norma de Construcción Sismorresistente: parte general y

edificación (NCSR-02).

Real Decreto 1664/1998 Planes Hidrológicos de cuenca.

Real Decreto 1812/1994 Reglamento General de Carreteras.

Real Decreto 1290/2012 Real Decreto 1290/2012, de 7 de septiembre, por el que se modifica el Reglamento del Dominio Público Hidráulico, aprobado por el Real Decreto 849/1986, de 11 de abril, y el Real Decreto 509/1996, de 15 de marzo, de desarrollo del Real Decreto-ley 11/1995, de 28 de diciembre, por el que se establecen las normas aplicables al tratamiento de las aguas residuales urbanas.

Real Decreto 2387/2004 Reglamento del Sector Ferroviario.

Real Decreto Legislativo 1/2001 Texto refundido de la Ley de Aguas.

Real Decreto 1247/2008 Instrucción de Hormigón Estructural (EHE-08).

Orden FOM/2842/2011 de 29 de septiembre, por la que se aprueba la Instrucción sobre las acciones a considerar en el proyecto de puentes de carretera (IAP-11).

Reglamentación sobre vehículos pesados, prioritarios, especiales, de transporte de personas y mercancías y tramitación administrativa, de la Dirección General de Tráfico (Ministerio del Interior) de 2013.

Legislación autonómica

Ley 3/1991 Ley de Carreteras de la Comunidad de Madrid.

Ley 6/2013 Medidas Fiscales y Administrativas.

Ley 8/1998 Ley de Vías Pecuarias de la Comunidad de Madrid.

Ley 9/2010 Medidas Fiscales, Administrativas y Racionalización del Sector Público.

Ley 10/1993 Vertidos Líquidos Industriales al Sistema Integral de Saneamiento de la Comunidad de Madrid.

Decreto 29/1993 Reglamento de Carreteras de la Comunidad de Madrid.

Decreto 170/1998 Decreto sobre gestión de las infraestructuras de saneamiento de aguas residuales de la Comunidad de Madrid.

Normas UNE

UNE-HD 603-1:2007 Cables de distribución de tensión asignada 0,6/1 kV. Parte 1: Requisitos generales.

UNE 21089-1:2002 Identificación de los conductores aislados de los cables.

UNE 21123 Cables eléctricos de utilización industrial de tensión asignada 0,6/1 kV.

21123-1:2017 Parte 1: Cables con aislamiento y cubierta de policloruro de vinilo.

21123-2:2017 Parte 2: Cables con aislamiento de polietileno reticulado y cubierta de policloruro de vinilo.

21123-3:2017 Parte 3: Cables con aislamiento de etileno-propileno y cubierta de policloruro de vinilo.

21123-4:2017 Parte 4: Cables con aislamiento de polietileno reticulado y cubierta de poliolefina.

21123-5:2017 Parte 5: Cables con aislamiento de etileno propileno y cubierta de poliolefina.

UNE 7368:1977 Determinación con agua oxigenada del contenido de materia orgánica en los suelos.

UNE 21428-1:2011 Transformadores trifásicos de distribución sumergidos en aceite, 50 Hz, de 50 kVA a 2 500 kVA con tensión más elevada para el material hasta 36 kV.

UNE 53331:2020 Plásticos. Tuberías de Poli (cloruro de vinilo) no plastificado (PVC-U), Poli (cloruro de vinilo) orientado (PVC-O), Polietileno

(PE) y Polipropileno (PP). Criterio para la comprobación de los tubos a utilizar en conducciones con y sin presión sometidos a cargas externas.

UNE 53394:2018 IN Plásticos. Código de instalación y manejo de tubos de polietileno (PE) para conducción de agua a presión. Técnicas recomendadas.

UNE 103109:1995 Método de ensayo para determinar el índice "equivalente de arena" de un suelo.

UNE 103501:1994 Geotecnia. Ensayo de compactación. Próctor modificado.

UNE 103502:1995 Método de ensayo para determinar en laboratorio el índice C.B.R. de un suelo.

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124-1:2015 Parte 1: Definiciones, clasificación, principios generales de diseño, requisitos de comportamiento y métodos de ensayo.

124-2:2015 Parte 2: Dispositivos de cubrimiento y de cierre de fundición.

124-3:2015 Parte 3: Dispositivos de cubrimiento y de cierre de acero o aleación de aluminio.

124-4:2015 Parte 4: Dispositivos de cubrimiento y de cierre de hormigón armado.

124-5:2015 Parte 5: Dispositivos de cubrimiento y de cierre de materiales compuestos.

124-6:2015 Parte 6: Dispositivos de cubrimiento y de cierre de polipropileno (PP), polietileno (PE) o poli (cloruro de vinilo) no plastificado (PVCU).

UNE-EN 295 Sistemas de tuberías de gres para saneamiento.

295-1:2013 Parte 1. Requisitos para tuberías, accesorios y uniones.

295-2:2013 Parte 2: Evaluación de la conformidad y muestreo.

295-3:2012 Parte 3: Métodos de ensayo.

295-4:2013 Parte 4: Requisitos para adaptadores, conectores y uniones flexibles.

295-5:2013 Parte 5: Requisitos para tuberías perforadas y sus accesorios.

295-6:2013 Parte 6: Requisitos para los componentes de las bocas de hombre y cámaras de inspección.

295-7:2013 Parte 7: Requisitos para tuberías de gres y juntas para hinca.

UNE-EN 476:2011 Requisitos generales para componentes empleados en sumideros y alcantarillados.

UNE-EN 545:2011 Tubos, racores y accesorios de fundición dúctil y sus uniones para canalizaciones de agua. Requisitos y métodos de ensayo.

UNE-EN 598:2008+A1:2009 Tuberías, accesorios y piezas especiales de fundición dúctil y sus uniones para aplicaciones de saneamiento. Requisitos y métodos de ensayo.

UNE-EN 736 Válvulas. Terminología.

736-1:2019 Parte 1: Definición de los tipos de válvulas.

736-2:2016 Parte 2: Definición de los componentes de las válvulas.

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993-1:2018 Parte 1. Determinación de la densidad aparente, de la porosidad abierta y de la porosidad total (Ratificada por AENOR en enero de 2019).

UNE-EN 998 Especificaciones de los morteros para albañilería.

998-1:2018 Parte 1. Morteros para revoco y enlucido.

998-2:2018 Parte 2: Morteros para albañilería.

UNE-EN 1401 Sistemas de canalización en materiales plásticos para saneamiento enterrado sin presión. Poli (cloruro de vinilo) no plastificado (PVC-U).

1401-1:2009 Parte 1. Especificaciones para tubos, accesorios y el sistema.

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UNE-EN 1796:2014 Sistemas de canalización en materiales plásticos para suministro de agua con o sin presión. Plásticos termoestables reforzados con fibra de vidrio (PRFV) basados en resina de poliéster insaturada (UP).

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10025-1:2006 Parte 1. Condiciones técnicas generales de suministro.

10025-2:2006 Parte 2. Condiciones técnicas de suministro de los aceros estructurales no aleados.

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12201-2:2012+A1:2020 Parte 2. Tubos.

12201-3:2012+A1:2013 Parte 3. Accesorios.

12201-4:2012 Parte 4. Válvulas.

12201-5:2012 Parte 5. Aptitud al uso del sistema.

UNE-CEN/TS 12201-7:2014 Parte 7: Guía para la evaluación de la conformidad. (Ratificada por AENOR en diciembre de 2014.)

UNE-EN 12889:2000 Puesta en obra sin zanja de redes de saneamiento y ensayos.

UNE-EN 13101:2003 Pates para pozos de registro enterrados. Requisitos, marcado, ensayos y evaluación de conformidad.

UNE-EN 13331:2002 Sistemas de entibación de zanjas.

13331-1:2002 Parte 1. Especificaciones del producto.

13331-2:2002 Parte 2: Evaluación por cálculo o por ensayo.

UNE-EN 13476 Sistemas de canalización en materiales plásticos para evacuación y saneamiento enterrado sin presión. Sistemas de canalización de pared estructurada de poli (cloruro de vinilo) no plastificado (PVC-U), polipropileno (PP) y polietileno (PE).

13476-1:2018 Parte 1. Requisitos generales y características de funcionamiento.

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UNE-EN 13508 Examen y evaluación de los sistemas de desagüe y de alcantarillado en el exterior de edificios.

13508-2:2003+A1:2012 Parte 2: Sistema de codificación de inspecciones visuales.

UNE-EN 13598 Sistemas de canalización en materiales plásticos para saneamientos y evacuación enterrados sin presión. Poli (cloruro de vinilo) no plastificado (PVC-U), polipropileno (PP) y polietileno (PE).

13598-1:2011 Parte 1: Especificaciones para los accesorios auxiliares incluyendo las arquetas de inspección poco profundas.

13598-2:2017 Parte 2: Especificaciones para los pozos de registro y arquetas de inspección en áreas de tráfico y en instalaciones subterráneas profundas.

UNE-EN 14364:2015 Sistemas de canalización en materiales plásticos para evacuación y saneamiento con o sin presión. Plásticos termoendurecibles reforzados con vidrio (PRFV) a base de resina de poliéster insaturado (UP). Especificaciones para tuberías, accesorios y uniones.

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UNE-EN 14636 Sistemas de canalización en materiales plásticos para evacuación y saneamiento sin presión. Hormigón de resina de poliéster (PRC).

14636-1:2010 Parte 1. Tubos y accesorios con uniones flexibles.

14636-2:2010 Parte 2. Pozos de registro y cámaras de inspección.

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UNE-EN 15655 Tuberías, racores y accesorios de fundición dúctil. Requisitos y métodos de ensayo para revestimientos orgánicos de tuberías y racores de fundición dúctil.

15655-1:2019 Parte 1. Revestimientos de poliuretano para tuberías y accesorios.

UNE-EN 17176 Sistemas de canalización en materiales plásticos para suministro de agua, riego, saneamiento y alcantarillado, enterrado o aéreo, con presión. Poli (cloruro de vinilo) no plastificado orientado (PVC-O).

17176-1:2019 Parte 1. Generalidades.

CEN/TS 17176-3:2019 Parte 3: Accesorios.

17176-2: 2019 Parte 2. Tubos.

17176-5: 2019 Parte 5. Aptitud al uso del sistema.

UNE-EN 50085-1:2006/A1:2013 Sistemas de canales para cables y sistemas de conductos cerrados de sección no circular para instalaciones eléctricas.

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UNE-EN 55011:2016/A1:2017 Equipos industriales, científicos y médicos. Características de las perturbaciones radioeléctricas. Límites y métodos de medición.

UNE-EN 60034 Máquinas eléctricas rotativas.

60034-1:2011 Parte 1. Características asignadas y características de funcionamiento.

60034-2-1:2014 Parte 2. Métodos normalizados para la determinación de las pérdidas y del rendimiento a partir de ensayos (excepto las máquinas para vehículos de tracción).

60034-14:2004/A1:2007 Parte 14: Vibraciones mecánicas de determinadas máquinas con altura de eje igual o superior a 56 mm. Medición, evaluación y límites de la intensidad de vibración.

UNE-EN 60076 Transformadores de potencia.

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UNE-EN 60947 Aparamenta de baja tensión.

60947-2:2007/A1:2011 Parte 2. Interruptores automáticos.

UNE-EN 61000 Compatibilidad electromagnética (CEM).

61000-6-1:2007 Parte 6-1: Normas genéricas. Inmunidad en entornos residenciales, comerciales y de industria ligera. (IEC 61000-6-1:2005).

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UNE-EN ISO 12100:2012 Seguridad de las máquinas. Principios generales para el diseño. Evaluación del riesgo y reducción del riesgo. (ISO 12100:2010).

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17892-12:2019 Parte 12: Determinación del límite líquido y del límite plástico.

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# 13.14. ANEJO 14. MEDIDAS DE PREVENCIÓN Y SEGURIDAD EN EBAR, TANQUES DE TORMENTAS Y ALCANTARILLADO

# ANEJO Nº XX
# MEDIDAS DE PREVENCIÓN Y SEGURIDAD EN EBAR, TANQUES DE TORMENTA Y ALCANTARILLADO

Canal de Isabel II, S.A. inscrita en el Registro Mercantil de Madrid al Tomo 29.733, Folio 86, Sección 8, Hoja M-534929 e Inscripción 1ª. Denominación en inscripción 34, NIF A86488087, Domicilio Social: C/ Santa Engracia, 125, 28003 Madrid.

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## 1. OBJETO

El objeto del presente anejo es garantizar que las instalaciones de Canal de Isabel II objeto del proyecto cumplan con todos los requisitos de seguridad y salud establecidos en la normativa vigente y de aplicación interna en materia de prevención de riesgos laborales y de seguridad industrial.Este anejo se desarrolla en colaboración con el Área de Prevención para la identificación de los riesgos e implantación de medidas preventivas y de seguridad en la explotación de las instalaciones.

El presente documento establece las pautas generales de identificación de los principales riesgos que pueden darse en las diversas instalaciones de Canal de Isabel II, así como las medidas de prevención y seguridad frente a los mismos.

El contenido de este anejo comprende dos partes:

**CONSIDERACIONES GENERALES**

Incluye todas las medidas generales que deben cumplirse y tenerse en cuenta para la explotación de las instalaciones de Canal de Isabel II.

**CONSIDERACIONES PARTICULARES**

Comprende el estudio de las medidas de prevención y medidas de seguridad concretas para la explotación de la instalación objeto del proyecto. Se redactan a continuación de las consideraciones generales.

**El autor del proyecto debe identificar los diferentes riesgos según lo expuesto en este anejo para cada caso particular de la instalación diseñada, de forma que lo tenga en cuenta en el desarrollo del proyecto. Las medidas adoptadas en este anejo u otros e deben reflejar en todos los documentos del proyecto (Memoria, Planos, Pliego de Presecripciones y Presupuesto).**

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## 2. LEGISLACIÓN Y NORMATIVA DE APLICACIÓN

Será de aplicación lo contemplado en la Ley 31/1995 de Prevención de riesgos laborales, así como lo contemplado en la Parte I, Capítulo 3, del Real Decreto 314/2006 por el que se aprueba el Código Técnico de la Edificación.

Hay que señalar que conforme a lo establecido en el capítulo III de la Ley 31/1995, Canal de Isabel II tiene la obligación de realizar una evaluación de riesgos, informar y formar a los trabajadores, y ejecutar la vigilancia de la salud, así como la protección de trabajadores especialmente sensibles.

El artículo 41 del capítulo VI de esta ley establece que los fabricantes, importadores y suministradores de maquinaria, equipos, productos y útiles de trabajo, están obligados a asegurar que éstos no constituyan una fuente de peligro para el trabajador, siempre que sean instalados y utilizados en las condiciones, forma y para los fines recomendados por ellos.

Los fabricantes, importadores y suministradores de productos y sustancias químicas de utilización en el trabajo, y dentro de las instalaciones de Canal de Isabel II, están obligados a envasar y etiquetar los mismos de forma que se permita su conservación y manipulación en condiciones de seguridad y se identifique claramente su contenido y los riesgos para la seguridad o la salud de los trabajadores que su almacenamiento o utilización comporten.

Según la Ley 31/95, Canal de Isabel II deberá garantizar que las informaciones de fabricantes, importadores y suministradores sean facilitadas a los trabajadores de las instalaciones.

Se enumeran a continuación las disposiciones legales y normativas que deberán considerarse en la determinación de riesgos y establecimiento de medidas de prevención a establecer en la construcción o reforma de la nueva infraestructura. Si alguna de las disposiciones legales y normas indicadas estuviera derogada, sería de aplicación la disposición o norma en vigor que la sustituya.

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- Ley 21/1992, de 16 de julio, de Industria.
- Ley 30/1992, de 26 de noviembre, de Régimen Jurídico de las Administraciones Públicas y del Procedimiento Administrativo Común.
- Ley 31/1995, de 8 de noviembre, de Prevención de Riesgos Laborales.
- Ley 38/1999, de 5 de noviembre, de Ordenación de la Edificación.
- Ley 39/1999, de 5 de noviembre, para promover la conciliación de la vida familiar y laboral de las personas trabajadoras.
- Real Decreto 171/2004, de 30 de enero, por el que se desarrolla el artículo 24 de la Ley 31/1995, de 8 de noviembre, de Prevención de Riesgos Laborales, en materia de coordinación de actividades empresariales.
- Ley 2/2002, de 19 de junio, de Evaluación Ambiental de la Comunidad de Madrid
- Ley 16/2002, de 1 de julio, de prevención y control integrados de la contaminación.
- Ley 5/2003, de 20 de marzo, de Residuos de la Comunidad de Madrid.
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- Ley 31/2006, de 18 de octubre, sobre implicación de los trabajadores en las sociedades anónimas y cooperativas europeas.
- Ley 32/2006, de 18 de octubre, reguladora de la subcontratación en el Sector de la Construcción.
- Ley 22/2011, de 28 de julio, de residuos y suelos contaminados.
- Ley 5/2013, de 11 de junio, por la que se modifican la Ley 16/2002, de 1 de julio, de prevención y control integrados de la contaminación y la Ley 22/2011, de 28 de julio, de residuos y suelos contaminados.
- Real Decreto 1109/2007, de 24 de agosto, por el que se desarrolla la Ley 32/2006, de 18 de octubre, reguladora de la subcontratación en el Sector de la Construcción.
- Ley Orgánica 3/2007, de 22 de marzo, para la igualdad efectiva de mujeres y hombres.
- Ley 25/2009, de 22 de diciembre, de modificación de diversas Leyes para su adaptación a la Ley sobre el libre acceso a las actividades de servicios y su ejercicio.
- Ley 17/2009, de 23 de noviembre, sobre el libre acceso a las actividades de servicios y su ejercicio.
- Ley 8/2010, de 31 de marzo, por la que se establece el régimen sancionador previsto en los Reglamentos (CE) relativos al registro, a la evaluación, a la autorización y a la restricción de las sustancias y mezclas químicas (REACH) y sobre la clasificación, el etiquetado y el envasado de sustancias y mezclas (CLP), que lo modifica.
- Ley 32/2010, de 5 de agosto, por la que se establece un sistema específico de protección por cese de actividad de los trabajadores autónomos.
- Ley 26/2011, de 1 de agosto, de adaptación normativa a la Convención Internacional sobre los Derechos de las Personas con Discapacidad.

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- Ley 33/2011, de 4 de octubre, General de Salud Pública.
- Ley 11/2012, de 19 de diciembre, de medidas urgentes en materia de medio ambiente.
- Ley 8/2013, de 26 de junio, de rehabilitación, regeneración y renovación urbanas
- Ley 14/2013, de 27 de diciembre, de apoyo a los emprendedores y su internacionalización.
- Ley 20/2013, de 9 de diciembre, de garantía de la unidad de mercado.
- Ley 21/2013, de 9 de diciembre, de evaluación ambiental.
- Ley 24/2013, de 26 de diciembre, del Sector Eléctrico.
- Ley 27/2013, de 27 de diciembre, de racionalización y sostenibilidad de la Administración Local.
- Ley 1/2014, de 28 de febrero, para la protección de los trabajadores a tiempo parcial y otras medidas urgentes en el orden económico y social.
- Ley 9/2014, de 9 de mayo, General de Telecomunicaciones.
- Ley 17/2015, de 9 de julio, del Sistema Nacional de Protección Civil.
- Real Decreto 2135/1980, de 26 de septiembre, sobre liberalización industrial.
- Real Decreto 577/1982, de 17 de marzo, por el que se regulan la estructura y competencias del Instituto Nacional de Seguridad e Higiene en el Trabajo.
- Real Decreto 1314/1997, de 1 de agosto, por el que se dictan las disposiciones de aplicación de la Directiva del Parlamento Europeo y del Consejo 95/16/CE, sobre ascensores.
- Real Decreto 2291/1985, de 8 de noviembre, por el que se aprueba el Reglamento de aparatos de elevación y manutención de los mismos.
- Real Decreto 57/2005, de 21 de enero, por el que se establecen prescripciones para el incremento de la seguridad del parque de ascensores existente.
- Real Decreto 88/2013, de 8 de febrero, por el que se aprueba la Instrucción Técnica Complementaria AEM 1 "Ascensores" del Reglamento de aparatos de elevación y manutención, aprobado por Real Decreto 2291/1985, de 8 de noviembre.
- Orden de 7 de febrero de 2014, de la Consejería de Transportes, Infraestructuras y Vivienda, por la que se establecen los parámetros exigibles a los ascensores en las edificaciones para que reúnan la condición de accesibles en el ámbito de la Comunidad de Madrid.
- Real Decreto 203/2016, de 20 de mayo, por el que se establecen los requisitos esenciales de seguridad para la comercialización de ascensores y componentes de seguridad para ascensores.
- Resolución de 10 de septiembre de 1988 que desarrolla el Reglamento de Aparatos de Elevación y manutención Aprobado por el Real Decreto 2291/1985, de 8 de noviembre.
- Real Decreto 7/1988, de 8 de enero, por el que se establecen las exigencias de seguridad del material eléctrico destinado a ser utilizado en determinados límites de tensión.
- Real Decreto 154/1995, de 3 de febrero, por el que se modifica el Real Decreto 7/1988, de 8 de enero, por el que se regula las exigencias de seguridad del material eléctrico destinado a ser utilizado en determinados límites de tensión.

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- Real Decreto 833/1988, de 20 de julio, por el que se aprueba el Reglamento para la ejecución de la Ley 20/1986, básica de Residuos tóxicos y peligrosos.
- Real Decreto 1406/1989, de 10 de noviembre, por el que se imponen limitaciones a la comercialización y al uso de ciertas sustancias y preparados peligrosos.
- Real Decreto 1114/2006, de 29 de septiembre, por el que se modifica el Real Decreto 1406/1989, de 10 de noviembre, por el que se imponen limitaciones a la comercialización y al uso de ciertas sustancias y preparados peligrosos.
- Real Decreto 108/1991, de 1 de febrero, sobre prevención y reducción de la contaminación del medio ambiente producida por el amianto.
- Real Decreto 1407/1992, de 20 de noviembre, por el que se regulan las condiciones de comercialización y libre circulación intracomunitaria de los equipos de protección individual.
- Real Decreto 159/1995, de 3 de febrero, por el que se modifica el Real Decreto 1407/1992, de 20 de noviembre, por el que se regula las condiciones para la comercialización y libre circulación intracomunitaria de los equipos de protección individual.
- Orden de 20 de febrero de 1997 por la que se modifica el anexo del Real Decreto 159/1995, de 3 de febrero, que modificó a su vez el Real Decreto 1407/1992, de 20 de noviembre, relativo a las condiciones para la comercialización y libre circulación intracomunitaria de los equipos de protección individual.
- Real Decreto 1630/1992, de 29 de diciembre, por el que se dictan disposiciones para la libre circulación de productos de construcción, en aplicación de la Directiva 89/106/CEE.
- Real Decreto 1328/1995, de 28 de julio, por el por el que se modifica, en aplicación de la directiva 93/68/CEE, las disposiciones para la libre circulación de productos de construcción, aprobadas por el Real Decreto 1630/1992, de 29 de diciembre.
- Real Decreto 513/2017, de 22 de mayo, por el que se aprueba el Reglamento de instalaciones de protección contra incendios.
- Real Decreto Ley 8/2015, de 30 de octubre, por el que se aprueba el texto refundido de la Ley General de la Seguridad Social.
- Real Decreto 2085/1994, de 20 de octubre, por el que se aprueba el reglamento de instalaciones petrolíferas.
- Real Decreto 1523/1999, de 1 de octubre, por el que se modifica el Reglamento de instalaciones petrolíferas, aprobado por Real Decreto 2085/1994, de 20 de octubre, y las instrucciones técnicas complementarias MI-IP03, aprobada por el Real Decreto 1427/1997, de 15 de septiembre, y MI-IP04, aprobada por el Real Decreto 2201/1995, de 28 de diciembre.
- Real Decreto Legislativo 2/2015, de 23 de octubre, por el que se aprueba el texto refundido de la Ley del Estatuto de los Trabajadores.
- Real Decreto 363/1995, de 10 de marzo, por el que se aprueba el Reglamento sobre clasificación, envasado y etiquetado de sustancias peligrosas.
- Real Decreto 507/2001, de 11 de mayo, por el que se modifica el reglamento sobre notificación de sustancias nuevas y clasificación, envasado y etiquetado de sustancias peligrosas, aprobado por el RD 363/1995.

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- Real Decreto 255/2003, de 28 de febrero, por el que se aprueba el Reglamento sobre clasificación, envasado y etiquetado de sustancias peligrosas.
- Real Decreto 717/2010, de 28 de mayo, por el que se modifican el Real Decreto 363/1995, de 10 de marzo, por el que se aprueba el Reglamento sobre clasificación, envasado y etiquetado de sustancias peligrosas y el Real Decreto 255/2003, de 28 de febrero, por el que se aprueba el Reglamento sobre clasificación, envasado y etiquetado de preparados peligrosos.
- Real Decreto 1802/2008, de 3 de noviembre, por el que se modifica el Reglamento sobre notificación de sustancias nuevas y clasificación, envasado y etiquetado de sustancias peligrosas, aprobado por Real Decreto 363/1995, de 10 de marzo, con la finalidad de adaptar sus disposiciones al Reglamento (CE) n.º 1907/2006 del Parlamento Europeo y del Consejo (Reglamento REACH).
- Real Decreto 1561/1995, de 21 de septiembre, sobre jornadas especiales de trabajo.
- Real Decreto 902/2007, de 6 de julio, por el que se modifica el Real Decreto 1561/1995, de 21 de septiembre, sobre jornadas especiales de trabajo, en lo relativo al tiempo de trabajo de trabajadores que realizan actividades móviles de transporte por carretera.
- Real Decreto 1635/2011, de 14 de noviembre, por el que se modifica el Real Decreto 1561/1995, de 21 de septiembre, sobre jornadas especiales de trabajo, en materia de tiempo de presencia en los transportes por carretera.
- Real Decreto 311/2016, de 29 de julio, por el que se modifica el Real Decreto 1561/1995, de 21 de septiembre, sobre jornadas especiales de trabajo, en materia de trabajo nocturno.
- Real Decreto 2200/1995, de 28 de diciembre, por el que se aprueba el Reglamento de la infraestructura para la calidad y seguridad industrial.
- Real Decreto 338/2010, de 19 de marzo, por el que se modifica el Reglamento de la Infraestructura para la calidad y seguridad industrial, aprobado por el Real Decreto 2200/1995, de 28 de diciembre.
- Real Decreto 144/2016, de 8 de abril, por el que se establecen los requisitos esenciales de salud y seguridad exigibles a los aparatos y sistemas de protección para su uso en atmósferas potencialmente explosivas y por el que se modifica el Real Decreto 455/2012, de 5 de marzo, por el que se establecen las medidas destinadas a reducir la cantidad de vapores de gasolina emitidos a la atmósfera durante el repostaje de los vehículos de motor en las estaciones de servicio.
- Real Decreto 1879/1996, de 2 de agosto, por el que se regula la composición de la Comisión Nacional de Seguridad y Salud en el Trabajo.
- Real Decreto 882/2012, de 1 de junio, por el que se modifica el Real Decreto 1879/1996, de 2 de agosto, por el que se regula la composición de la Comisión Nacional de Seguridad y Salud en el Trabajo, para su adaptación a la nueva estructura de los departamentos ministeriales de la Administración General del Estado.
- Real Decreto 1429/2009, de 11 de septiembre, por el que se modifica el Real Decreto 1879/1996, de 2 de agosto, por el que se regula la composición de la Comisión Nacional de Seguridad y Salud en el Trabajo, para su adaptación a la nueva estructura de los departamentos ministeriales de la Administración General del Estado.

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- Real Decreto 1470/2008, de 5 de septiembre, por el que se modifica el Real Decreto 1879/1996, de 2 de agosto, por el que se regula la composición de la Comisión Nacional de Seguridad y Salud en el Trabajo, para su adaptación a la nueva estructura de los departamentos ministeriales de la Administración General del Estado.
- Real Decreto 1595/2004, de 2 de julio, por el que se modifica el Real Decreto 1879/1996, de 2 de agosto, por el que se regula la composición de la Comisión Nacional de Seguridad y Salud en el Trabajo.
- Real Decreto 309/2001, de 23 de marzo, por el que se modifica el Real Decreto 1879/1996, de 2 de agosto, por el que se regula la composición de la Comisión Nacional de Seguridad y Salud en el Trabajo.
- Real Decreto 39/1997, de 17 de enero, por el que se aprueba el Reglamento de los servicios de prevención.
- Real Decreto 298/2009, de 6 de marzo, por el que se modifica el Real Decreto 39/1997, de 17 de enero, por el que se aprueba el Reglamento de los Servicios de Prevención, en relación con la aplicación de medidas para promover la mejora de la seguridad y de la salud en el trabajo de la trabajadora embarazada que haya dado a luz o en periodo de lactancia.
- Real Decreto 337/2010, de 19 de marzo, por el que se modifican el Real Decreto 39/1997, de 17 de enero, por el que se aprueba el Reglamento de los Servicios de Prevención; el Real Decreto 1109/2007, de 24 de agosto, por el que se desarrolla la Ley 32/2006, de 18 de octubre, reguladora de la subcontratación en el sector de la construcción y el Real Decreto 1627/1997, de 24 de octubre, por el que se establecen disposiciones mínimas de seguridad y salud en obras de construcción.
- Real Decreto 780/1998, de 30 de abril, por el que se modifica el Real Decreto 39/1997, de 17 de enero, por el que se aprueba el reglamento de los servicios de prevención.
- Real Decreto 604/2006, de 19 de mayo, por el que se modifican el Real Decreto 39/1997, de 17 de enero, por el que se aprueba el Reglamento de los Servicios de Prevención, y el Real Decreto1627/1997, de 24 de octubre, por el que se establecen las disposiciones mínimas de seguridad y salud en las obras de construcción.
- Real Decreto 598/2015, de 3 de julio, por el que se modifican el Real Decreto 39/1997, de 17 de enero, por el que se aprueba el Reglamento de los servicios de prevención; el Real Decreto 485/1997, de 14 de abril, sobre disposiciones mínimas en materia de señalización de seguridad y salud en el trabajo; el Real Decreto 665/1997, de 12 de mayo, sobre la protección de los trabajadores contra los riesgos relacionados con la exposición a agentes cancerígenos durante el trabajo y el Real Decreto 374/2001, de 6 de abril, sobre la protección de la salud y seguridad de los trabajadores contra los riesgos relacionados con los agentes químicos durante el trabajo.
- Real Decreto 899/2015, de 9 de octubre, por el que se modifica el Real Decreto 39/1997, de 17 de enero, por el que se aprueba el Reglamento de los Servicios de Prevención.
- Orden ESS/2259/2015, de 22 de octubre, por la que se modifica la Orden TIN/2054/2010, por la que se desarrolla el RD 39/1997, en lo referido a la acreditación de entidades especializadas como servicios de prevención, memoria de actividades preventivas y…
- Real Decreto 413/1997, de 21 de marzo, sobre protección operacional de los trabajadores externos con riesgo de exposición a radiaciones ionizantes por intervención en zona controlada.

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- Real Decreto 485/1997, de 14 de abril, sobre disposiciones mínimas en materia de señalización de seguridad y salud en el trabajo.
- Real Decreto 486/1997, de 14 de abril, por el que se establecen las disposiciones mínimas de seguridad y salud en los lugares de trabajo.
- Real Decreto 487/1997, de 14 de abril, sobre disposiciones mínimas de seguridad y salud relativas a la manipulación manual de cargas que entrañe riesgos, en particular dorso lumbares, para los trabajadores.
- Real Decreto 488/1997, de 14 de abril, sobre disposiciones mínimas de seguridad y salud relativas al trabajo con equipos que incluyen pantallas de visualización.
- Real Decreto 664/1997, de 12 de mayo, sobre la protección de los trabajadores contra los riesgos relacionados con la exposición a agentes biológicos durante el trabajo.
- Orden de 25 de marzo de 1998, por la que se adopta en función del progreso técnico el RD 664/1997 sobre protección de los trabajadores contra los riesgos relacionados con la exposición a agentes biológicos durante el trabajo.
- Real Decreto 665/1997, de 12 de mayo, sobre la protección de los trabajadores contra los riesgos relacionados con la exposición a agentes cancerígenos durante el trabajo.
- Real Decreto 1124/2000, de 16 de junio, por el que se modifica el Real Decreto 665/1997, de 13 de mayo, sobre la protección de los trabajadores contra los riesgos relacionados con la exposición a agentes cancerígenos durante el trabajo.
- Real Decreto 349/2003, de 21 de marzo, por el que se modifica el Real Decreto 665/1997, de 12 de mayo, sobre la protección de los trabajadores contra los riesgos relacionados con la exposición a agentes cancerígenos durante el trabajo, y por el que se amplía su ámbito de aplicación a los agentes mutágenos.
- Real Decreto 773/1997, de 30 de mayo, sobre disposiciones mínimas de seguridad y salud relativas a la utilización por los trabajadores de equipos de protección individual.
- Real Decreto 949/1997, de 20 de junio, por el que se establece el certificado de profesionalidad de la ocupación de prevencionista de riesgos laborales.
- Real Decreto 1215/1997, de 18 de julio, por el que se establecen las disposiciones mínimas de seguridad y salud para la utilización por los trabajadores de los equipos de trabajo.
- Real Decreto 1627/1997, de 24 de octubre, por el que se establecen disposiciones mínimas de seguridad y salud en las obras de construcción.
- Real Decreto 216/1999, de 5 de febrero, sobre disposiciones mínimas de seguridad y salud en el trabajo en el ámbito de las empresas de trabajo temporal.
- Real Decreto 840/2015, de 21 de septiembre, por el que se aprueban medidas de control de los riesgos inherentes a los accidentes graves en los que intervengan sustancias peligrosas.
- Real Decreto 1566/1999, de 8 de octubre, sobre los consejeros de seguridad para el transporte de mercancías peligrosas por carretera, por ferrocarril o por vía navegable.
- Real Decreto 97/2014, de 14 de febrero, por el que se regulan las operaciones de transporte de mercancías peligrosas por carretera en territorio español.

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- Real Decreto 5/2000, de 4 de agosto, por el que se aprueba el texto refundido de la Ley sobre Infracciones y Sanciones en el Orden Social.
- Real Decreto 1955/2000, de 1 de diciembre, por el que se regulan las actividades de transporte, distribución, comercialización, suministro y procedimientos de autorización de instalaciones de energía eléctrica.
- Real Decreto 374/2001, de 6 de abril, sobre la protección de la salud y seguridad de los trabajadores contra los riesgos relacionados con los agentes químicos durante el trabajo.
- Real Decreto 656/2017, de 23 de junio, por el que se aprueba el Reglamento de Almacenamiento de Productos Químicos y sus Instrucciones Técnicas Complementarias MIE APQ 0 a 10
- Real Decreto 614/2001, de 8 de junio, sobre disposiciones mínimas para la protección de la salud y seguridad de los trabajadores frente al riesgo eléctrico.
- Real Decreto 783/2001, de 6 de julio, por el que se aprueba el Reglamento sobre protección sanitaria contra radiaciones ionizantes.
- Real Decreto 1066/2001, de 28 de septiembre, por el que se aprueba el Reglamento que establece condiciones de protección del dominio público radioeléctrico, restricciones a las emisiones radioeléctricas y medidas de protección sanitaria frente a emisiones radioeléctricas.
- Real Decreto 1161/2001, de 26 de octubre, por el que se establece el título de Técnico superior en Prevención de Riesgos Profesionales y las correspondientes enseñanzas mínimas.
- Real Decreto 212/2002, de 22 de febrero, por el que se regulan las emisiones sonoras en el entorno debidas a determinadas máquinas de uso al aire libre.
- Real Decreto 707/2002, de 19 de julio, por el que se aprueba el Reglamento sobre el procedimiento administrativo especial de actuación de la Inspección de Trabajo y Seguridad Social y para la imposición de medidas correctoras de incumplimientos en materia de prevención de riesgos laborales en el ámbito de la Administración General del Estado.
- Real Decreto 464/2003, de 25 de abril, por el que se modifica el Real Decreto 707/2002, de 19 de julio, por el que se aprueba el Reglamento sobre el procedimiento administrativo especial de actuación de la Inspección de Trabajo y Seguridad Social y para la imposición de medidas correctoras de incumplimientos en materia de prevención de riesgos laborales en el ámbito de la Administración General del Estado.
- Real Decreto 842/2002, de 2 de agosto, por el que se aprueba el Reglamento electrotécnico para baja tensión.
- Real Decreto 1053/2014, de 12 de diciembre, por el que se aprueba una nueva Instrucción Técnica Complementaria (ITC) BT 52 "Instalaciones con fines especiales. Infraestructura para la recarga de vehículos eléctricos", del Reglamento electrotécnico para baja tensión, aprobado por Real Decreto 842/2002, de 2 de agosto, y se modifican otras instrucciones técnicas complementarias del mismo.
- Real Decreto 1054/2002, de 11 de octubre, por el que se regula el proceso de evaluación para el registro, autorización y comercialización de biocidas.
- Real Decreto 1090/2010, de 3 de septiembre, por el que se modifica el Real Decreto 1054/2002, de 11 de octubre, por el que se regula el proceso de evaluación para el registro, autorización y comercialización de biocidas.

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- Real Decreto 681/2003, de 12 de junio, sobre la protección de la salud y la seguridad de los trabajadores expuestos a los riesgos derivados de atmósferas explosivas en el lugar de trabajo.
- Real Decreto 836/2003, de 27 de junio, por el que se aprueba una nueva Instrucción técnica complementaria "MIE-AEM-2" del Reglamento de aparatos de elevación y manutención, referente a grúas torre para obras u otras aplicaciones.
- Real Decreto 837/2003, de 27 de junio, por el que se aprueba el nuevo texto modificado y refundido de la Instrucción técnica complementaria "MIE-AEM-4" del Reglamento de aparatos de elevación y manutención, referente a grúas móviles autopropulsadas.
- Real Decreto 865/2003, de 4 de julio, por el que se establecen los criterios higiénico-sanitarios para la prevención y control de la legionelosis.
- Real Decreto 1196/2003, de 19 de septiembre, por el que se aprueba la directriz básica de Protección Civil para el control y planificación ante el riesgo de accidentes graves en los que intervienen sustancias peligrosas.
- Real Decreto 1277/2003, de 10 de octubre, por el que se establecen las bases generales sobre autorización de centros, servicios y establecimientos sanitarios.
- Real Decreto 1428/2003, de 21 de noviembre, por el que se aprueba el Reglamento General de Circulación para la aplicación y desarrollo del texto articulado de la Ley sobre tráfico, circulación de vehículos a motor y seguridad vial, aprobado por el Real Decreto Legislativo 339/1990, de 2 de marzo.
- Real Decreto 965/2006, de 1 de septiembre, por el que se modifica el Reglamento General de Circulación, aprobado por Real Decreto 1428/2003, de 21 de noviembre.
- Real Decreto 1801/2003, de 26 de diciembre, sobre seguridad general de los productos.
- Real Decreto 2177/2004, de 12 de noviembre, por el que se modifica el Real Decreto 1215/1997, de 18 de julio, por el que se establecen las disposiciones mínimas de seguridad y salud para la utilización por los trabajadores de los equipos de trabajo, en materia de trabajos temporales en altura.
- Real Decreto 2267/2004, de 3 de diciembre, por el que se aprueba el Reglamento de seguridad contra incendios en establecimientos industriales.
- Real Decreto 2351/2004, de 23 de diciembre, por el que se modifica el procedimiento de resolución de restricciones técnicas y otras normas reglamentarias del mercado eléctrico.
- Real Decreto 688/2005, de 10 de junio, por el que se regula el régimen de funcionamiento de las mutuas de accidentes de trabajo y enfermedades profesionales de la Seguridad Social como servicio de prevención ajeno.
- Real Decreto 1311/2005, de 4 de noviembre, sobre la protección de la salud y la seguridad de los trabajadores frente a los riesgos derivados o que puedan derivarse de la exposición a vibraciones mecánicas.
- Real Decreto 330/2009, de 13 de marzo, por el que se modifica el Real Decreto 1311/2005, de 4 de noviembre, sobre la protección de la salud y la seguridad de los trabajadores frente a los riesgos derivados o que puedan derivarse de la exposición a vibraciones mecánicas.
- Real Decreto 286/2006, de 10 de marzo, sobre la protección de la salud y la seguridad de los trabajadores contra los riesgos relacionados con la exposición al ruido.

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- Real Decreto 314/2006, de 17 de marzo, por el que se aprueba el Código Técnico de la edificación.
- Real Decreto 1371/2007, de 19 de octubre, por el que se aprueba el documento básico «DB-HR Protección frente al ruido» del Código Técnico de la Edificación y se modifica el Real Decreto 314/2006, de 17 de marzo, por el que se aprueba el Código Técnico de la Edificación.
- Orden VIV/984/2009, de 15 de abril, por la que se modifican determinados documentos básicos del Código Técnico de la Edificación aprobados por el Real Decreto 314/2006, de 17 de marzo, y el Real Decreto 1371/2007, de 19 de octubre.
- Real Decreto 173/2010, de 19 de febrero, por el que se modifica el Código Técnico de la Edificación, aprobado por el Real Decreto 314/2006, de 17 de marzo, en materia de accesibilidad y no discriminación de las personas con discapacidad.
- Orden FOM/1635/2013, de 10 de septiembre, por la que se actualiza el Documento Básico DB-HE "Ahorro de Energía", del Código Técnico de la Edificación, aprobado por Real Decreto 314/2006, de 17 de marzo.
- Real Decreto 396/2006, de 31 de marzo por el que se establecen las disposiciones mínimas de seguridad y salud aplicables a los trabajos con riesgo de exposición al amianto.
- Real Decreto 524/2006, de 28 de abril, por el que se modifica el Real Decreto 212/2002, de 22 de febrero, por el que se regulan las emisiones sonoras en el entorno debidas a determinadas máquinas de uso al aire libre.
- Real Decreto 919/2006, de 28 de junio, por el que se aprueba el Reglamento técnico de distribución y utilización de combustibles gaseosos y sus instrucciones técnicas complementarias ICG 01 a 11.
- Real Decreto 1299/2006, de 10 de noviembre, por el que se aprueba el cuadro de enfermedades profesionales en el sistema de la Seguridad Social y se establecen criterios para su notificación y registro.
- Real Decreto 1416/2006, de 1 de diciembre, por el que se aprueba la Instrucción Técnica Complementaria MI-IP 06 "Procedimiento para dejar fuera de servicio los tanques de almacenamiento de productos petrolíferos líquidos".
- Real Decreto 393/2007, de 23 de marzo, por el que se aprueba la Norma Básica de Autoprotección de los centros, establecimientos y dependencias dedicados a actividades que puedan dar origen a situaciones de emergencia.
- Real Decreto 1468/2008, de 5 de septiembre, por el que se modifica el Real Decreto 393/2007 y en el que se aprueba la norma básica de autoprotección de los centros, establecimientos y dependencias dedicados a actividades que puedan dar origen a situaciones de emergencia.
- Real Decreto 597/2007, de 4 de mayo, sobre publicación de las sanciones por infracciones muy graves en materia de prevención de riesgos laborales.
- Real Decreto 1027/2007, de 20 de julio, por el que se aprueba el Reglamento de Instalaciones Térmicas en los Edificios.
- Real Decreto 238/2013, de 5 de abril, por el que se modifican determinados artículos e instrucciones técnicas del Reglamento de Instalaciones Térmicas en los Edificios, aprobado por Real Decreto 1027/2007, de 20 de julio.

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- Real Decreto 1826/2009, de 27 de noviembre, por el que se modifica el Reglamento de instalaciones térmicas en los edificios, aprobado por Real Decreto 1027/2007, de 10 de julio.
- Ley 37/2003, de 17 de noviembre, del Ruido.
- Real Decreto 1513/2005, de 16 de diciembre, por el que se desarrolla la Ley 37/2003, de 17 de noviembre, del Ruido, en lo referente a la evaluación y gestión del ruido ambiental.
- Real Decreto 1367/2007, de 19 de octubre, por el que se desarrolla la Ley 37/2003, de 17 de noviembre, del Ruido, en lo referente a zonificación acústica, objetivos de calidad y emisiones acústicas.
- Real Decreto 1038/2012, de 6 de julio, por el que se modifica el Real Decreto1367/2007, de 19 de octubre, por el que se desarrolla la Ley 37/2003, de 17 de noviembre, del ruido, en lo referente a zonificación acústica, objetivos de calidad y emisiones acústica.
- Real Decreto 110/2008, de 1 de febrero, por el que se modifica el Real Decreto 312/2005, de 18 de marzo. por el que se aprueba la clasificación de los productos de construcción y de los elementos constructivos en función de sus propiedades de reacción y de resistencia frente al fuego.
- Real Decreto 223/2008, de 15 de febrero, por el que se aprueban el Reglamento sobre condiciones técnicas y garantías de seguridad en líneas eléctricas de alta tensión y sus instrucciones técnicas complementarias ITC-LAT 01 a 09.
- Real Decreto 1644/2008, de 10 de octubre, por el que se establecen las normas para la comercialización y puesta en servicio de las máquinas.
- Real Decreto 494/2012, de 9 de marzo, por el que se modifica el Real Decreto 1644/2008, de 10 de octubre, por el que se establecen las normas para la comercialización y puesta en servicio de las máquinas, para incluir los riesgos de aplicación de plaguicidas.
- Real Decreto 2060/2008, de 12 de diciembre, por el que se aprueba el reglamento de equipos a presión y sus instrucciones técnicas complementarias.
- Real Decreto 1085/2009, de 3 de julio, por el que se aprueba el Reglamento sobre instalación y utilización de aparatos de rayos X con fines de diagnóstico médico.
- Real Decreto 67/2010, de 29 de enero, de adaptación de la legislación de Prevención de Riesgos Laborales a la Administración General del Estado.
- Real Decreto 249/2010, de 5 de marzo, por el que se adaptan determinadas disposiciones en materia de energía y minas a lo dispuesto en la Ley 17/2009, de 23 de noviembre, sobre el libre acceso a las actividades de servicios y su ejercicio, y la Ley 25/2009, de 22 de diciembre, de modificación de diversas leyes para su adaptación a la Ley sobre el libre acceso a las actividades de servicios y su ejercicio.
- Real Decreto 367/2010, de 26 de marzo, de modificación de diversos reglamentos del área de medio ambiente para su adaptación a la Ley 17/2009, de 23 de noviembre, sobre el libre acceso a las actividades de servicios y su ejercicio, y a la Ley 25/2009, de 22 de diciembre, de modificación de diversas leyes para su adaptación a la Ley de libre acceso a actividades de servicios y su ejercicio.

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- Real Decreto 404/2010, de 31 de marzo, por el que se regula el establecimiento de un sistema de reducción de las cotizaciones por contingencias profesionales a las empresas que hayan contribuido especialmente a la disminución y prevención de la siniestralidad laboral.
- Real Decreto 486/2010, de 23 de abril, sobre la protección de la salud y la seguridad de los trabajadores contra los riesgos relacionados con la exposición a radiaciones ópticas artificiales.
- Real Decreto 559/2010, de 7 de mayo, por el que se aprueba el Reglamento del Registro Integrado Industrial.
- Real Decreto 560/2010, de 7 de mayo, por el que se modifican diversas normas reglamentarias en materia de seguridad industrial para adecuarlas a la Ley 17/2009, de 23 de noviembre, sobre el libre acceso a las actividades de servicios y su ejercicio, y a la Ley 25/2009, de 22 de diciembre, de modificación de diversas leyes para su adaptación a la Ley sobre el libre acceso a las actividades de servicios y su ejercicio.
- Real Decreto 795/2010, de 16 de junio, por el que se regula la comercialización y manipulación de gases fluorados y equipos basados en los mismos, así como la certificación de los profesionales que los utilizan.
- Real Decreto 830/2010, de 25 de junio, por el que se establece la normativa reguladora de la capacitación para realizar tratamientos con biocidas.
- Real Decreto 1436/2010, de 5 de noviembre, por el que se modifican diversos reales decretos para su adaptación a la Directiva 2008/112/CE del Parlamento Europeo y del Consejo, que modifica varias directivas para adaptarlas al Reglamento (CE) n.º 1272/2008, sobre clasificación, etiquetado y envasado de sustancias y mezclas.
- Real Decreto 138/2011, de 4 de febrero, por el que se aprueban el Reglamento de seguridad para instalaciones frigoríficas y sus instrucciones técnicas complementarias.
- Real Decreto 843/2011, de 17 de junio, por el que se establecen los criterios básicos sobre la organización de recursos para desarrollar la actividad sanitaria de los servicios de prevención.
- Real Decreto 901/2015, de 9 de octubre, por el que se modifica el Real Decreto 843/2011 por el que se establecen los criterios básicos sobre la organización de recursos para desarrollar la actividad sanitaria de los servicios de prevención.
- Real Decreto 1388/2011, de 14 de octubre, por el que se dictan las disposiciones de aplicación de la Directiva 2010/35/UE del Parlamento Europeo y del Consejo de 16 de junio de 2010 sobre equipos a presión transportables y por la que se derogan las Directivas 76/767/CEE, 84/525/CEE, 84/526/CEE, 84/527/CEE y 1999/36/CE.
- Real Decreto-ley 17/2012, de 4 de mayo, de medidas urgentes en materia de medio.
- Real Decreto Legislativo 1/2013, de 29 de noviembre, por el que se aprueba el Texto Refundido de la Ley General de derechos de las personas con discapacidad y de su inclusión social.
- Real Decreto-ley 5/2013, de 15 de marzo, de medidas para favorecer la continuidad de la vida laboral de los trabajadores de mayor edad y promover el envejecimiento activo.
- Real Decreto 128/2013, de 22 de febrero, sobre ordenación del tiempo de trabajo para los trabajadores autónomos que realizan actividades móviles de transporte por carretera.
- Real Decreto 156/2013, de 1 de marzo, por el que se regula la suscripción de convenio especial por las personas con discapacidad que tengan especiales dificultades de inserción laboral.

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- Real Decreto 219/2013, de 22 de marzo, sobre restricciones a la utilización de determinadas sustancias peligrosas en aparatos eléctricos y electrónicos.
- Orden PRE/1349/2014, de 25 de julio, por la que se modifican los anexos III y IV del Real Decreto 219/2013, de 22 de marzo, sobre restricciones a la utilización de determinadas sustancias peligrosas en aparatos eléctricos y electrónicos.
- Real Decreto 842/2013, de 31 de octubre, por el que se aprueba la clasificación de los productos de construcción y de los elementos constructivos en función de sus propiedades de reacción y de resistencia frente al fuego.
- Real Decreto 337/2014, de 9 de mayo, por el que se aprueban el Reglamento sobre condiciones técnicas y garantías de seguridad en instalaciones eléctricas de alta tensión y sus instrucciones Técnicas Complementarias ITC-RAT 01 a 23.
- Real Decreto 413/2014, de 6 de junio, por el que se regula la actividad de producción de energía eléctrica a partir de fuentes de energía renovables, cogeneración y residuos.
- Orden de 31 de agosto de 1987, sobre señalización, balizamiento, defensa, limpieza y terminación de obras fijas en vías fuera de poblado.
- Orden de 12 de marzo de 1996, por la que se aprueba el Reglamento técnico sobre seguridad de presas y embalses.
- Orden de 25 de marzo de 1998. Modifica el Real Decreto 664/1997, de 12 de mayo, sobre la protección de los trabajadores contra los riesgos relacionados con la exposición a agentes biológicos durante el trabajo.
- Orden de 16 de abril de 1998 sobre normas de procedimiento y desarrollo del Real Decreto 1942/1993, sobre el Reglamento de Instalaciones de Protección contra Incendios y se revisa el anexo 1 y los apéndices del mismo.
- Orden 2726/2009, de 16 de julio, de la Consejería de Medio Ambiente, Vivienda y Ordenación del Territorio, por la que se regula la gestión de los residuos de construcción y demolición en la Comunidad de Madrid.
- Orden de 19 de noviembre de 2013, de la Consejería de Economía y Hacienda, por la que se establece el procedimiento para la tramitación, puesta en servicio e inspección de las instalacionesfrigoríficas y se adaptan las disposiciones de desarrollo del Decreto 38/2002, de 28 de febrero, a lo establecido en la Directiva 2006/123/CE del Parlamento y del Consejo, de 12 de diciembre de 2006, relativa a los servicios en el mercado interior.
- Decreto 13/2007, de 15 de marzo, de la Comunidad de Madrid, sobre el reglamento técnico de desarrollo en materia de promoción de la accesibilidad y supresión de las barreras arquitectónicas.
- Decreto 38/2002, de 28 de febrero, por el que se regulan las entidades de control reglamentario de las instalaciones industriales en la Comunidad de Madrid.
- Instrucción IS-33, de 21 de diciembre de 2011, del Consejo de Seguridad Nuclear, sobre criterios radiológicos para la protección frente a la exposición a la radiación natural.
- Ley 13/2012, de 26 de diciembre, de lucha contra el empleo irregular y el fraude a la Seguridad Social.
- Real Decreto 2177/1996, de 4 de octubre de 1966, por el que se aprueba la norma básica de edificación "NBE-CPI/96", BOE nº 261 de 29 de octubre.

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- Real Decreto 1488/1998, de 10 de julio, de adaptación de la legislación de prevención de riesgos laborales a la Administración General del Estado.
- Real Decreto Legislativo 5/2000, de 4 de agosto, por el que se aprueba el texto refundido de la ley sobre Infracciones y Sanciones en el Orden Social.
- Real Decreto 1251/2001, de 16 de noviembre, por el que se regulan las prestaciones económicas del régimen de la seguridad social por maternidad y riesgo durante el embarazo.
- Resolución de 26 de noviembre de 2002, por la que se regula el del sistema de declaración electrónica de accidentes de trabajo (Delt@) que posibilita la transmisión por procedimiento electrónico de los nuevos modelos para la notificación de A T.
- Real Decreto 366/2005, de 8 de abril, que aprueba la ITC MIE AP-18 del Reglamento de aparatos a presión, referente a instalaciones de carga e inspección de botellas de equipos respiratorios autónomos para actividades subacuáticas y trabajos de superficie.
- Orden FOM/2924/2006, de 19 de septiembre, por la que se regula el contenido mínimo del informe anual para el transporte de mercancías peligrosas por carretera, por ferrocarril o por vía navegable.
- Ley 16/1987, de 30 de julio, de Ordenación de los Transportes Terrestres.
- Ley 29/2003, de 8 de octubre, sobre mejora de las condiciones de competencia y seguridad en el mercado de transporte por carretera, por la que se modifica, parcialmente, la Ley 16/1987, de 30 de julio, de Ordenación de los Transportes Terrestres.
- Resolución 21 octubre 2009, de la Secretaría de Estado de la Seguridad Social, por la que se dictan instrucciones para compensación de gastos de transporte en los casos de asistencia Sanitaria derivada de riesgos profesionales y de comparecencias para la realización de exámenes o valoraciones medicas.
- Resolución 31 julio 2009 por la que se dictan medidas de actuación en el procedimiento de verificación de instrumentos de medida, ..., en sus fases de verificación después de reparación o modificación y de verificación periódica.
- Ley 25/2009, de 22 de diciembre, de modificación de diversas Leyes para su adaptación a la Ley sobre el libre acceso a las actividades de servicios y su ejercicio.
- Resolución de 25 de noviembre de 2008, de la Inspección de Trabajo y Seguridad Social, sobre el Libro de Visitas electrónico de la Inspección de Trabajo y Seguridad Social.
- Resolución de 11 de abril de 2006, de la Inspección de Trabajo y Seguridad Social, sobre el Libro de Visitas de la Inspección de Trabajo y Seguridad Social.
- Ley 28/2005, de 26 de diciembre, de medidas sanitarias frente al tabaquismo y reguladora de la venta, el suministro, el consumo y la publicidad de los productos del tabaco.
- Orden TAS/1/2007, de 2 de enero, por la que se establece el modelo de parte de enfermedad profesional, se dictan normas para su elaboración y transmisión y se crea el correspondiente fichero de datos personales.
- Orden TAS/2926/2002, de 19 de noviembre, por la que se establecen nuevos modelos para la notificación de los accidentes de trabajo y se posibilita su transmisión por procedimiento electrónico.

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- Orden de 16 de diciembre de 1987, por la que se establecen nuevos modelos para la notificación de accidentes de trabajo y se dan instrucciones para su cumplimentación y tramitación.
- Resolución 27 agosto 2008, por la que se dictan instrucciones para la aplicación de la Orden TAS/2947/2007 por la que se establece el suministro a las empresas de botiquines …. en caso de AT, como parte de la acción protectora del sistema de la SS.
- Orden TAS/2947/2007, de 8 de octubre, por la que se establece el suministro a las empresas de botiquines con material de primeros auxilios en caso de accidente de trabajo, como parte de la acción protectora del sistema de la Seguridad Social.
- Orden de 29 de abril de 1999, por la que se modifica la Orden de 6 de mayo de 1988 sobre los requisitos y datos que deben reunir las comunicaciones de apertura previa o reanudación de actividades en los centros de trabajo.
- Orden 6 de mayo 1988, por la que se modifica la de 6 octubre 1986 sobre los requisitos y datos que deben reunir las comunicaciones de apertura previa o reanudación de actividades en los centros de trabajo, dictada en desarrollo del RDL 1/1986.
- Real Decreto 697/1995, de 28 de abril, por el que se aprueba el Reglamento del Registro de Establecimientos Industriales de ámbito estatal.
- Real Decreto 2526/1998, de 27 noviembre, por el que se modifica el Reglamento del Registro de Establecimientos Industriales de ámbito estatal, aprobado por Real Decreto 697/1995, de 28 de abril.
- Real Decreto 2135/1980, de 26 de septiembre, sobre liberalización industrial.
- Orden de 19 de diciembre de 1980 sobre normas de procedimiento y desarrollo del Real Decreto 2135/1980, de 26 de septiembre, de liberalización industrial.
- Orden de 26 de mayo de 1989, por la que se aprueba la Instrucción Técnica Complementaria MIE-AEM3 del Reglamento de Aparatos de Elevación y Manutención, referente a carretillas automotoras de manutención.
- Orden de 23 de junio de 1988, por la que se actualizan diversas Instrucciones Técnicas Complementarias MIE-RAT del Reglamento de Seguridad en Centrales Eléctricas, Subestaciones y Centros de Transformación.
- Orden de 27 de noviembre de 1987, por la que se actualizan las Instrucciones Técnicas Complementarias MIE-RAT 13 y MIE-RAT 14 del Reglamento sobre condiciones y garantías de seguridad en centrales eléctricas, subestaciones y centros de transformación.
- Real Decreto 275/1995, por el que se dicta las disposiciones de aplicación de la Dir. Consejo 92/42/CEE, relativa a los requisitos de rendimiento para las calderas nuevas de agua caliente alimentadas con combustibles líquidos o gaseosos, modificada por la Dir. 93/68/CEE.
- Orden FOM/605/2004, de 27 de febrero, sobre capacitación profesional de los consejeros de seguridad para el transporte de mercancías peligrosas por carretera, por ferrocarril o por vía navegable.
- Real Decreto 711/2006, por el que se modifican determinados reales decretos relativos a la ITV y a la homologación de vehículos, sus partes y piezas, y se modifica, asimismo, el Reglamento General de Vehículos, aprobado por RD 2822/1998.

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- Ley 19/2001, de 19 de diciembre, de reforma del texto articulado de la Ley sobre Tráfico, Circulación de Vehículos a Motor y Seguridad Vial aprobado por Real Decreto Legislativo 339/1990, de 2 de marzo.
- Real Decreto 2042/1994, de 14 de octubre, por el que se regula la Inspección Técnica de Vehículos.
- Ley 44/2003, de 21 de noviembre, de ordenación de las profesiones sanitarias.
- Ley 41/2002, de 14 de noviembre, básica reguladora de la autonomía del paciente y de derechos y obligaciones en materia de información y documentación clínica.
- Ley 17/2007, de 4 de julio, por la que se modifica la Ley 54/1997, del Sector Eléctrico, para adaptarla a lo dispuesto en la Dir. 2003/54/CE, del Parlamento Europeo, de 26 de junio de 2003, sobre normas comunes para el mercado interior de la electricidad.
- Real Decreto 1454/2005, de 2 de diciembre, por el que se modifican determinadas disposiciones relativas al sector eléctrico.
- Ley 54/1997, de 27 de noviembre, del Sector Eléctrico.
- Decreto 2351/2004, de 23 de diciembre, por el que se modifica el procedimiento de resolución de restricciones técnicas y otras normas reglamentarias del mercado eléctrico.
- Ley 17/2005, de 19 de julio, por la que se regula el permiso y la licencia de conducción por puntos y se modifica el texto articulado de la ley sobre tráfico, circulación de vehículos a motor y seguridad vial.
- Resolución 31 enero 1995, de la Secretaría de Estado de Interior por la que se dispone la publicación del acuerdo del Consejo de Ministros por el que se aprueba la Directriz Básica de Planificación de Protección Civil ante el riesgo de Inundaciones.
- Decreto 110/1997, de 11 de septiembre, de la Consejería de Sanidad y Servicios Sociales de la Comunidad de Madrid, por el que se regula el régimen jurídico de las autorizaciones de centros, servicios y establecimientos sanitarios.
- Real Decreto 505/2007, de 20 de abril, por el que se aprueban las condiciones básicas de accesibilidad y no discriminación de las personas con discapacidad para el acceso y utilización de los espacios públicos urbanizados y edificaciones.
- Real Decreto 312/2005, de 18 de marzo, por el que se aprueba la clasificación de los productos de construcción y de los elementos constructivos en función de sus propiedades de reacción y de resistencia frente al fuego.
- Real Decreto 303/2011, de 4 de marzo, por el que se modifican el Reglamento General de Circulación, y se reduce el límite genérico de velocidad para turismos y motocicletas en autopistas y autovías.
- Resolución de 6 de mayo de 2011, por la que se ordena la publicación de impreso normalizado de "Solicitud de Autorización de Centros y Servicios Sanitarios".
- Real Decreto 1311/2012, de 14 de septiembre, por el que se establece el marco de actuación para conseguir un uso sostenible de los productos fitosanitarios.
- Ley 13/2012, de 26 de diciembre, de lucha contra el empleo irregular y el fraude a la Seguridad Social.

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- Orden ESS/1451/2013, de 29 de julio, por la que se establecen disposiciones para la prevención de lesiones causadas por instrumentos cortantes y punzantes en el sector sanitario y hospitalario.
- Decreto 10/2014, de 6 de febrero, del Consejo de gobierno, por el que se aprueba el procedimiento para llevar a cabo las inspecciones de eficiencia energética de determinadas instalaciones térmicas de edificios.
- Ley 6/2014, de 7 de abril, por la que se modifica el texto articulado de la Ley sobre Tráfico, Circulación de Vehículos a Motor y Seguridad Vial, aprobado por el Real Decreto Legislativo 339/1990, de 2 de marzo.
- Real Decreto, de 18 de julio, por el que se regulan determinados aspectos de la gestión y control de los procesos por incapacidad temporal en los primeros trescientos sesenta y cinco días de su duración.
- Orden ESS/1187/2015, de 15 de junio, por la que se desarrolla el RD 625/2014 por el que se regulan determinados aspectos de la gestión y control de los procesos por incapacidad temporal en los primeros trescientos sesenta y cinco días de su duración.
- Real Decreto 709/2015, de 24 de julio, por el que se establecen los requisitos esenciales de seguridad para la comercialización de los equipos a presión.
- Real Decreto Ley 6/2015, de 30 de octubre, por el que se aprueba el texto refundido de la Ley sobre Tráfico, Circulación de Vehículos a Motor y Seguridad Vial
- Real Decreto 818/2009, de 8 de mayo, por el que se aprueba el Reglamento General de Conductores.
- Orden INT 1407/2012, de 25 de junio, por la que se modifica el anexo I del Reglamento General de Conductores, aprobado por el Real Decreto 818/2009, de 8 de mayo.
- Resolución de 13 de enero de 2016, de la Dirección General de Agricultura y Ganadería, por la que se regula el Programa de Inspecciones de los Equipos de Aplicación de Productos Fitosanitarios.
- Real Decreto 108/2016, de 18 de marzo, por el que se establecen los requisitos esenciales de seguridad para la comercialización de los recipientes a presión simples.
- Real Decreto 244/2016, de 3 de junio, por el que se desarrolla la Ley 32/2014, de 22 de diciembre, de Metrología.
- Real Decreto 299/2016, de 22 de julio, sobre la protección de la salud y la seguridad de los trabajadores contra los riesgos relacionados con la exposición a campos electromagnéticos.
- Orden ESS/1452/2016, de 10 de junio, por la que se regula el modelo de diligencia de actuación de la Inspección de Trabajo y Seguridad Social.
- Acuerdo europeo sobre transporte internacional de mercancías peligrosas por carretera. ADR en vigor (se revisa bienalmente en años impares).
- Acuerdo Multilateral M-271 en aplicación de la sección 1.5.1 del Anexo A del Acuerdo Europeo sobre transporte internacional de mercancías peligrosas por carretera (ADR), relativo a los dispositivos de aditivos como parte del equipamiento de servicio de cisternas, hecho en Madrid el 12 de marzo de 2014. (BOE de 3 de julio de 2014).

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- Directiva 2001/45/CE del Parlamento Europeo y del Consejo, de 27 de junio de 2001, por la que se modifica la Directiva 89/655/CEE del Consejo relativa a las disposiciones mínimas de seguridad y de salud para la utilización por los trabajadores en el trabajo de los equipos de trabajo.
- Directiva 2009/104/CE del Parlamento Europeo y del Consejo, de 16 de septiembre de 2009, relativa a las disposiciones mínimas de seguridad y de salud para la utilización por los trabajadores en el trabajo de los equipos de trabajo (segunda Directiva específica con arreglo al artículo 16, apartado 1, de la Directiva 89/391/CEE).
- Directiva 2010/31/UE del Parlamento Europeo y del Consejo, de 19 de mayo de 2010, relativa a la eficiencia energética de los edificios.
- Directiva 2013/59/Euratom del Consejo, de 5 de diciembre de 2013, por la que se establecen normas de seguridad básicas para la protección contra los peligros derivados de la exposición a radiaciones ionizantes.
- Reglamento (CE) nº 1907/2006 del Parlamento Europeo y del Consejo, de 18 de diciembre de 2006, relativo al registro, la evaluación, la autorización y la restricción de las sustancias y preparados químicos (REACH), por el que se crea la Agencia Europea de Sustancias y Preparados Químicos, se modifica la Directiva 1999/45/CE y se derogan el Reglamento (CEE) nº 793/93 del Consejo y el Reglamento (CE) nº 1488/94 de la Comisión así como la Directiva 76/769/CEE del Consejo y las Directivas 91/155/CEE, 93/67/CEE, 93/105/CE y 2000/21/CE de la Comisión.
- Reglamento (CE) Nº 790/2009 de la Comisión, de 10 de agosto de 2009, que modifica, a efectos de su adaptación al progreso técnico y científico, el Reglamento (CE) nº 1272/2008 del Parlamento Europeo y del Consejo sobre clasificación, etiquetado y envasado de sustancias y mezclas.
- Reglamento (UE) Nº 286/2011 de la Comisión, de 10 de marzo de 2011, que modifica, a efectos de su adaptación al progreso técnico y científico, el Reglamento (CE) nº 1272/2008 del Parlamento Europeo y del Consejo sobre clasificación, etiquetado y envasado de sustancias y mezclas.
- Reglamento (UE) Nº 2016/245 del Parlamento Europeo y del Consejo, de 9 de marzo de 2016, relativo a los equipos de protección individual y por el que se deroga la Directiva 89/686/CEE del Consejo.
- Reglamento (CE) Nº 1272/2008 del PE y Consejo de 16 diciembre 2008 sobre clasificación, etiquetado y envasado de sustancias y mezclas, y por el que se modifican y derogan las Directivas 67/548/CEE y 1999/45/CE y se modifica el Reglamento Nº 1907/2006.
- Reglamento (UE) 2016/1688 de la Comisión, de 20 de septiembre de 2016, que modifica el anexo VII del Reglamento (CE) n.º 1907/2006 del Parlamento Europeo y del Consejo, relativo al registro, la evaluación, la autorización y la restricción de las sustancias y mezclas químicas (REACH), por lo que respecta a la sensibilización cutánea.

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**Normas internacionales (ISO), europeas (EN) y nacionales (UNE-EN Y UNE)**

Todas las referenciadas en la legislación anteriormente detallada y, especialmente:

*Generales*

- **EN ISO 7010:2012**Símbolos gráficos. Colores y señales de seguridad. Señales de seguridad registradas (ISO 7010:2011) (Ratificada por AENOR en septiembre de 2012).
- **EN ISO 7010:2012/A1/A2/A3:2014**Símbolos gráficos. Colores y señales de seguridad. Señales de seguridad registradas (ISO 7010:2011) (Ratificadas por AENOR en marzo de 2014).
- **UNE-EN 12464-1:2012**Iluminación. Iluminación de los lugares de trabajo. Parte 1: Lugares de trabajo en interiores.

*Atmósferas explosivas*

- **UNE-EN 1127-1:2012** Atmósferas explosivas. Prevención y protección contra la explosión. Parte 1: Conceptos básicos y metodología.
- **UNE-EN 13237:2003** Atmósferas potencialmente explosivas. Términos y definiciones para equipos y sistemas de protección destinados a utilizarse en atmósferas potencialmente explosivas.
- **UNE-EN 60079-10-1:2010** Atmósferas explosivas. Parte 10-1: Clasificación de emplazamientos. Atmósferas explosivas gaseosas..
- **UNE-EN 60079-10-2:2010** Atmósferas explosivas. Parte 10-2: Clasificación de emplazamientos. Atmósferas explosivas de polvo.
- **UNE-EN 60079-14:2010** Atmósferas explosivas. Parte 14: Diseño, elección y realización de las instalación eléctricas.
- **UNE-EN 60079-17:2008** Atmósferas explosivas. Parte 17: Verificación y mantenimiento de instalaciones eléctricas.

*Máquinas y herramientas*

- **UNE-EN ISO 12100:2012** Seguridad de las máquinas. Principios generales para el diseño. Evaluación del riesgo y reducción del riesgo.
- **UNE-EN 50144-1:2001** Seguridad de las herramientas manuales portátiles accionadas por motor eléctrico. Parte 1: Requisitos generales.
- **UNE-EN 60204-1:2007** Seguridad de las máquinas. Equipo eléctrico de las máquinas. Parte 1: Requisitos generales. (IEC 60204-1:2005, modificada).
- **UNE 60601:2013** Salas de máquinas y equipos autónomos de generación de calor o frío o para cogeneración, que utilizan combustibles gaseosos.

*Equipos de protección individual*

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- **UNE-EN 353-1:2002** Equipos de protección individual contra caídas de altura. Parte 1: Dispositivos anticaídas deslizantes sobre línea de anclaje rígida.
- **UNE-EN 353-2:2002** Equipos de protección individual contra caídas de altura. Parte 2: Dispositivos anticaídas deslizantes sobre línea de anclaje flexible.
- **UNE-EN 354:2011** Equipos de protección individual contra caídas. Equipos de amarre.
- **UNE-EN 355:2002** Equipos de protección individual contra caídas de altura. Absorbedores de energía.
- **UNE-EN 358:2000** Equipo de protección individual para sujeción en posición de trabajo y prevención de caídas de altura. Cinturones para sujeción y retención y componente de amarre de sujeción.
- **UNE-EN 360:2002** Equipos de protección individual contra caídas de altura. Dispositivos anticaídas retráctiles.
- **UNE-EN 361:2002** Equipos de protección individual contra caídas de altura. Arneses anticaídas.
- **UNE-EN 362:2005** Equipos de protección individual contra caídas de altura. Conectores.
- **UNE-EN 363:2009** Equipos de protección individual contra caídas. Sistemas de protección individual contra caídas.
- **UNE-EN 365:2005** Equipo de protección individual contra las caídas de altura. Requisitos generales para las instrucciones de uso, mantenimiento, revisión periódica, reparación, marcado y embalaje.
- **EN 795:2012** Equipos de protección individual contra caídas. Dispositivos de anclaje (Ratificada por AENOR en octubre de 2012.)
- **UNE-EN 1891:1999** Equipos de protección individual para la prevención de caídas desde una altura. Cuerdas trenzadas con funda, semiestáticas.
- **UNE-EN 50286:2000** Ropa aislante de protección para trabajos en instalaciones de baja tensión.
- **UNE-EN 50321:2000** Calzado aislante de la electricidad para trabajos en instalaciones de baja tensión.

*Instalaciones eléctricas*

- **UNE 20324:1993** Grados de protección proporcionados por las envolventes (Código IP). (CEI 529:1989).

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- **UNE 20324:1993/2M: 2014** Grados de protección proporcionados por las envolventes (Código IP).
- **UNE 20460-4-45:1990** Instalaciones eléctricas en edificios. Protección para garantizar la seguridad. Protección contra las bajadas de tensión.
- **UNE 20460-4-46:2002** Instalaciones eléctricas en edificios. Parte 4: Protección para garantizar la seguridad. Capítulo 46: Seccionamiento y mando.
- **UNE 20460-4-443:2007** Instalaciones eléctricas en edificios. Parte 4-44: Protección para garantizar la seguridad. Protección contra las perturbaciones de tensión y las perturbaciones electromagnéticas. Sección 443: Protección contra sobretensiones de origen atmosférico o debido a maniobras. (IEC 60364-4-44:2001/A1:2003, modificada).
- **UNE 20460-7-714:2001** Instalaciones eléctricas en edificios. Parte 7: Reglas para las instalaciones y emplazamientos especiales. Sección 714: Instalaciones de alumbrado exterior.
- **UNE 21302-195/1M:2004** Vocabulario electrotécnico. Capítulo 195: Puesta a tierra y protección contra choques eléctricos.
- **UNE 21302-195:2001** Vocabulario electrotécnico. Capítulo 195: Puesta a tierra y protección contra choques eléctricos.
- **UNE-EN 50102:1996** Grados de protección proporcionados por las envolventes de materiales eléctricos contra los impactos mecánicos externos (código IK).
- **UNE-EN 50102/A1:1999** Grados de protección proporcionados por las envolventes de materiales eléctricos contra los impactos mecánicos externos (código IK).
- **UNE-IEC 60050-426:2009** Vocabulario electrotécnico. Parte 426: Equipos para atmósferas explosivas.
- **UNE-EN 60903:2005** Trabajos en tensión. Guantes de material aislante
- **UNE-EN 61478:2002** Trabajos en tensión. Escaleras de material aislante.
- **UNE-HD 60364-4-41:2010** Instalaciones eléctricas de baja tensión. Parte 4-41: Protección para garantizar la seguridad. Protección contra los choques eléctricos.
- **UNE 109110:1990** Control de la electricidad estática en atmósferas inflamables. Definiciones.

*Pates:*

- **UNE EN-13101:2003** Pates para pozos de registro enterrados. Requisitos, marcado, ensayos y evaluación de conformidad.

*Tapas:*

- **UNE EN-124:1995 / 2015** Dispositivos de recubrimiento y de cierre para zonas de circulación utilizadas por peatones y vehículos.

*Tramex:*

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- **DIN 24537 Rejillas utilizadas como pavimentos de pisos.**
- **DIN 51130 Ensayo de los pavimentos. Determinación de la resistencia al deslizamiento.**
- **UNE ENV 12633 Método para la determinación del valor de la resistencia al deslizamiento / resbalamiento de los pavimentos pulidos y sin pulir.**
- **UNE-EN 13706** Materiales compuestos de plástico reforzado.
- **UNE 36750 Piezas y peldaños de emparrillado electrofundidos y/o prensados para aplicación en áreas de tránsito de peatones y vehículos.**

*Plafaformas de trabajo, pasarelas, escaleras y escalas fijas:*

- **UNE EN-14396:2004 Escalera fijas para pozos de registro.**
- **UNE EN ISO-14122 (partes 1,2, 3 y 4) Seguridad de las máquinas. Medios: Escaleras fijas.**

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# 3. CONSIDERACIONES GENERALES

## 3.1 *Actividades desarrolladas en las instalaciones*

Para desarrollar el estudio de las medidas de seguridad en las instalaciones de Canal de Isabel II, es necesario conocer el modo de explotación, la tecnología utilizada, los procedimientos de trabajo y organización prevista para la ejecución del servicio, así como el entorno, condiciones físicas y climatológicas del lugar donde se debe realizar dicho servicio y, de esa forma, poder identificar y analizar los posibles riesgos de seguridad y salud en el trabajo en las instalaciones.

Para realizar la identificación de los riesgos es necesario determinar las actividades que pueden desarrollarse dentro de las instalaciones objeto de estudio.

Estas actividades, en función del tamaño del centro de trabajo, pueden variar desde una instalación pequeña donde una única persona puede realizar las funciones de explotación de toda la instalación, hasta una gran instalación donde puede haber diferentes puestos de trabajo. En este último caso, cada trabajador estará especializado según las tareas a realizar demantenimiento eléctrico, mantenimiento mecánico, instrumentación, toma de muestras, laboratorio, retirada y transporte de residuos, administración, personal técnico, vigilancia, recepción de suministros o control de la explotación, entre otras.

En función del desarrollo de estos trabajos se determinan los riesgos más importantes de una instalación.

## *3.2 Principales riesgos y medidas de prevención a tomar en una instalación*

Se detallan a continuación los principales riesgos identificados en las las actividades a desarrollar en las instalaciones objeto del presente Anejo, así como las medidas de prevención y los equipos de protección necesarios para eliminarlos o atenuar sus consecuencias, así como la señalización necesaria para advertir de su existencia a todas las personas afectadas por los mismos.

- Riesgos y medidas a tomar en espacios confinados.
- Riesgos y medidas a tomar en atmósferas explosivas.
- Riesgos contra incendios y medidas a tomar
- Riesgos biológicos y medidas a tomar.
- Riesgos de accidentes causados por animales y medidas a tomar.
- Riesgos eléctricos y medidas a tomar.
- Riesgos mecánicos (atrapamientos, golpes y/o cortes, sobrepresiones, proyecciones, etc.), térmicos y eléctricos derivados de la utilización de equipos de trabajo y medidas a tomar.
- Riesgos de sobreesfuerzos por carga física dinámica o estática y medidas a tomar.
- Riesgos de caídas al mismo nivel, golpes contra objetos inmóviles, caída de objetos y desprendimientos y medidas a tomar.
- Riesgos de caídas a distinto nivel y medidas a tomar
- Riesgos de choques o golpes contra objetos inmóviles y medidas a tomar.

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- Riesgos químicos con la manipulación de reactivos y medidas a tomar.
- Riesgos de ruidos excesivos en las instalaciones y medidas a tomar.
- Riesgos de salubridad, condiciones termo higrométricas, calidad de aire e iluminación y medidas a tomar.

En el *capítulo* 4. *CONSIDERACIONES PARTICULARES* se identifican todos los riesgos específicos que puedan generarse en la explotación de la instalación proyectada, adoptando las medidas de prevención y seguridad adecuadas.

Con carácter general, deberá prestarse atención al estado y mantenimiento de los equipos de protección colectiva e individual, a los efectos de garantizar las medidas mínimas de protección.

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### 3.2.1 Riesgos y medidas a tomar en espacios confinados

En las instalaciones de Canal de Isabel II pueden existir espacios confinados, entendiéndose como tal cualquier espacio con aberturas limitadas de entrada y salida y ventilación natural desfavorable, en el que pueden acumularse contaminantes tóxicos o inflamables, ó tener una atmósfera deficiente en oxígeno, que pueda producirse una inundación repentina, y que no está concebido para una ocupación continuada por parte del trabajador.

Será de aplicación lo establecido en , el Real Decreto 485/1997 sobre disposiciones mínimas en materia de señalización de seguridad y salud en el trabajo y el Real Decreto 2177/2004 por el que se establecen las disposiciones mínimas de seguridad y salud para la utilización por los trabajadores de los equipos de trabajo, en materia de trabajos temporales en altura.

Estos espacios se clasifican en 3 categorías en función de su peligrosidad.

a) **Espacios de Categoría 1ª.**

Con carácter general, se consideran de esta categoría, entre otros los siguientes espacios:

- Recintos visitables donde pueda producirse inundación repentina.
- Pozos de registro que contengan fangos o aguas residuales.
- Colectores, aliviaderos y galerías de alcantarillado visitables.
- Interior de pozos de bombeo, pozos de gruesos o registros de alcantarillado.
- Depósitos y canales de agua residual en Ebar y Tanques de tormenta.
- Cámaras de válvulas subterráneas u otros recintos en las que se ha evidenciado con anterioridad la presencia de gases tóxicos, explosivos o falta de oxígeno.

Los accesos a los espacios confinados de categoría 1ª dispondrán de una señal que indique “Recinto confinado. Prohibido acceso sin autorización”.

Se requerirá autorización de entrada al recinto por escrito, con un Plan de Trabajo diseñado al efecto con supervisión por parte de un Recurso Preventivo, que como responsable de la ejecución material del mismo, tiene la obligación antes de iniciar los trabajos de explicar a los trabajadores implicados los riesgos, fases de actuación, medidas preventivasa adoptar durante la ejecución de los trabajos,los equipos de protección colectiva y personal a emplear y equipos de trabajo a utilizar.

Para acceder a estos espacios se precisa obligatoriamente disponer de equipos dedetección portátil de gases que permitan la medición y evaluación de la atmósfera interior (falta de oxígeno, explosividad y/o gases tóxicos previsibles, sulfhídrico, monóxido de carbono, cloro, amoniaco, ozono, etc., atendiendo a las características del recinto),

b) **Espacios de Categoría 2ª.**

Con carácter general, se consideran de esta categoría, entre otros los siguientes espacios:

- Pozos de saneamiento totalmente secos con una profundidad mayor de 2 metros.
- Colectores, aliviaderos y galerías de alcantarillado visitables en los que se prevea un acceso continuado y frecuente conforme a metodología documentada establecida.

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- Tanques de sustancias químicas sustancias químicas como líquidos corrosivos, etc., utilizados en desodorización.
- Estaciones de bombeo de agua residual (EBAR) con pozo de gruesos, desbaste y/o pozos de bombeo en interior de edificios.
- Tanques de tormentas.

Para realizar actividades en estos lugares es necesario un método de trabajo seguro.

Será requisito obligatorio la existencia de sistema un sistema de detección fija o el uso o de equipo de detección portátil de gases (falta de oxígeno, explosividad y/o gases tóxicos previsibles,sulfhídrico, monóxido de carbono, cloro, amoniaco, ozono..., atendiendo a las características del recinto), así como información previa de los trabajos a un Recurso Preventivo quién conocerá el alcance de los trabajos a realizar.

Si no se dispusiera de un método de trabajo o debido a las especiales características del recinto o si se constata la presencia de atmósferas peligrosas (el detector avisa del peligro), serárequisto la existencia de una autorización de entrada al recinto como si de un espacio de categoría 1ª se tratase.

c) **Espacios de Categoría 3ª.**

Se trata de lugares que, después de inspecciones y basándose en la experiencia, es poco probable que se produzca un problema atmosférico de falta de oxígeno, presencia de gases o inundación inesperada.

Con carácter general, se consideran de esta categoría, entre otros los siguientes espacios:

- Pozos de saneamiento con una profundidad menor de 2 metros.
- Cámaras de válvulas subterráneas.
- Edificios con almacenamientos de productos químicos para desodorización.
- Estaciones de bombeo de agua residual (EBAR).

Cuando se detecte un problema de entrada de fangos o aguas residuales, atmósfera contaminada o avería en la ventilación o se realicen trabajos en los que se prevé que por la actividad a desarrollar se pueden acumular contaminantes peligrosos como puede ser el caso de limpieza de depósitos donde se utilizan productos químicos, así como trabajos de pintura con disolventes o soldadura en cámaras o registros, entre otros, deben tratarse como espacios de 1ª o 2ª categoría hasta que se restablezca el problema.

Estos lugares serán inspeccionados de forma regular para asegurar que siguen funcionando como espacios de 3ª categoría, o que se han pasado a ser considerados espacios de categoría 2ª o 1ª, en cuyo caso deberán tomarse las medidas de dichas categorías. Cuando se tenga duda de la calidad del aire interior, se comprobará la atmósfera con la ayuda de un equipo de detección portátil de gases . Si la atmósfera fuera peligrosa (salta la alarma del detector) no se entrará y se informará de inmediato al Recurso Preventivo para que redacte un permiso de trabajo al efecto.

En cualquier caso, en las estaciones de bombeo de agua residual con pozo de gruesos y desbaste en interior de edificios se instalará detección fija de sulfuro de hidrógeno asociada a una alarma de emergencia. Dichos recintos dispondrán también de sistemas de ventilación y desodorización.

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### 3.2.2 Riesgos y medidas a tomar en atmósferas explosivas

Las atmósferas explosivas en las EBAR, tanques de tormenta e infraestructuras de alcantarillado de Canal de Isabel II pueden darse, como ya se ha indicado con anterioridad, en algunos recintos confinados en su mayoría inundables, donde la acumulación de gases inflamables pueda dar lugar también a la formación de una atmósfera explosiva.

En estas zonas no se considera necesaria la redacción del Documento de Protección contra Explosiones (DPCEX) que contempla el Real Decreto 681/2003, sobre la protección de la salud y la seguridad de los trabajadores expuestos a los riesgos derivados de atmósferas explosivas en el lugar de trabajo, ya que el principal riesgo de estos recintos no es el de explosión sino el de intoxicación o asfixia, estando regulado su acceso mediante la utilización de permisos de trabajo o conforme a lo dispuesto en un método de trabajo, estando limitado el acceso y requiriéndose la utilización de medios de detección de gases -explosividad-, así como la supervisión de un Recurso Preventivo, de acuerdo con la metodología establecida en el apartado 3.2.1 anterior.

Los espacios confinados se han de señalizar como tal, considerándose que no se requiere señalización ATEX complementaria.

A continuación se indican las medidas técnicas mínimas necesarias a tener en cuenta en el diseño y construcción para evitar este riesgo en esta clase de espacios:

- Presencia de medios de extinción próximos y operativos (extintores).
- Limitar el acceso al personal autorizado y convenientemente formado.

En cuanto a las medidas organizativas a tener en cuenta en la construcción y explotación, destacan las siguientes:

- No dejar vehículos en marcha en las proximidades de estas zonas.
- Necesidad de detectores portátiles en explotación de las instalaciones y en la reparación de las mismas.
- Permiso de trabajo y supervisión por un Recurso Preventivo en los trabajos de instalación, explotación, reparación y/o mantenimiento, requiriéndose equipos de respiración autónomos y equipos de trabajo y herramientas antideflagrantes cuando se tenga constancia que la atmósfera interior puede ser explosiva.

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### 3.2.3 Riesgo de incendios y medidas a tomar

El riesgo de incendios en instalaciones industriales y edificios es un factor a tener muy en cuenta de cara al diseño de las instalaciones, así como las medidas a tomar para prevenirlo y extinguirlo en el caso de que se produzca. Las medidas contra incendios deben reducir a límites aceptables el riesgo de que los usuarios de un edificio sufran daños derivados de un incendio de origen accidental, como consecuencia de las características de su proyecto, construcción, uso y mantenimiento.

Será de aplicación la normativa contemplada en este anejo y, en particular, el Real Decreto 2267/2004, por el que se aprueba el Reglamento de seguridad contra incendios en establecimientos industriales, el Real Decreto 314/2006, por el que se aprueba el Código Técnico de la edificación y el Reglamento de instalaciones de protección contra incendios, aprobado por el Real Decreto 513/2017 , por el que se aprueba el Reglamento de instalaciones de protección contra incendios.

Los establecimientos industriales y edificios se proyectarán, construirán, mantendrán y utilizarán de forma que, en caso de incendio, se cumplan las exigencias básicas que se establecen en los apartados siguientes:

- Se especificarán parámetros objetivos y procedimientos cuyo cumplimiento asegura la satisfacción de las exigencias básicas y la superación de los niveles mínimos de calidad indicados en la normativa de seguridad contra incendios.
- Se limitará el riesgo de propagación del incendio por el interior de los edificios.
- Se limitará el riesgo de propagación del incendio por el exterior, tanto en el edificio considerado como a otros edificios.
- El edificio dispondrá de los medios de evacuación adecuados para facilitar que los ocupantes puedan abandonarlo o alcanzar un lugar seguro dentro del mismo en condiciones de seguridad.
- El edificio dispondrá de los equipos e instalaciones adecuados para hacer posible la detección, el control y la extinción del incendio, así como la transmisión de la alarma a los ocupantes.
- Se señalizarán todos los equipos de lucha contra incendios (extintores, bocas de incendio equipadas (BIE), hidrantes, pulsadores de alarma y sirenas de alarma), así como las salidas, salidas de emergencia, recorridos de evacuación y la ubicación de primeros auxilios, según lo contemplado en el Real Decreto 485/1997, sobre disposiciones mínimas en materia de señalización de seguridad y salud en el trabajo.
- Se facilitará la intervención de los equipos de rescate y de extinción de incendios en el caso de que éstos se produzcan.
- Respecto a la resistencia al fuego de la estructura, la estructura portante debe diseñarse para mantener la resistencia al fuego durante el tiempo necesario para que puedan cumplirse las exigencias determinadas por la normativa de seguridad contra incendios.
- Los locales y zonas de riesgo especial integrados en los edificios se clasificarán, en función de su carga de fuego, conforme los grados de riesgo alto, medio y bajo, dotándoles de las instalaciones contra incendios contempladas en la normativa vigente.
- Independientemente de la superficie construida del sector de incendio o superficie ocupada del área de incendio, cuando el nivel de riesgo intrínseco sea medio o alto dada la carga de fuego existente, se dotará a la instalación de un sistema automático de detección de incendio, así

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como rociadores automáticos de agua u otro sistema de extinción equivalente, de acuerdo con las características y cantidad de material combustible que exista.

- Se dotará las instalaciones con los siguientes equipos:
  - Extintores portátiles de CO2 cercanos a paneles de control y cuadros eléctricos y telecomunicaciones.
  - Extintores de polvo ABC para el resto de instalaciones.
  - En el caso de extintores a la intemperie se alojarán en armarios.
  - En el caso de almacenamientos de productos químicos se estará a lo dispuesto en las Fichas de Seguridad (FDS).
  - Carros extintores en los lugares de mayor riesgo.
  - Extinción automática por CO2 o agua nebulizada en centros de transformación y seccionamientopor cuyas características y conforme a la reglamentación vidigente así se exija.
- En las instalaciones dotadas de sistema de extinción fijo, manual o automático, deberá existir un plano detallado del sistema, así como instrucciones de funcionamiento
- La instalación de los aparatos, equipos y sistemas contra incendios, así como sus componentes, se realizará por instaladores debidamente autorizados.
- Los establecimientos, conforme a las especificaciones del Real Decreto 2267/2004 y Real Decreto 314/2006, dispondrán de la preceptiva Autorización de puesta en servicio de la instalación, emitida por órgano competente de la Comunidad Autónoma.

  Se realizarán las operaciones de mantenimiento conforme a lo recogido en el Reglamento de instalaciones de protección contra incendios, aprobado por el Real Decreto 513/2017 en tanto en cuanto las periodicidades establecidas coincidan durante la duración de la obra.

Los **centros de transformación**, **los recintos eléctricos con los cuadros de control y mando (CCM) de las instalaciones, los almacenes, talleres, laboratorios y zonas administrativas** (incluidas el comedor y vestuarios), dispondrán de ventilación y detección de incendios asociados a una centralita con señal y alarma audible en edificio de control; aun cuando no lo contemple la normativa de referencia citada.

Los **almacenamientos de gasóleo** serán conformes a lo dispuesto en el Real Decreto 2085/1994, por el que se aprueba el reglamento de instalaciones petrolíferas, disponiendo de la preceptiva autorización de puesta en servicio o explotación de la instalación emitida por un órgano competente de la Administración cuando así se requiera.

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### 3.2.4 Riesgos biológicos y medidas a tomar

Existe riesgo biológico en las estaciones de bombeo de aguas residuales (EBAR), tanques de tormenta e infraestructuras de alcantarillado.

Será de aplicación la normativa contemplada en el Real Decreto 664/1997, de 12 de mayo, sobre la protección de los trabajadores contra los riesgos relacionados con la exposición a agentes biológicos durante el trabajo

El tratamiento y manipulación de aguas residuales debe realizarse en condiciones de seguridad que salvaguarden la salud de los trabajadores expuestos ya que son un vehículo de transmisión de numerosos microorganismos.

El agua regenerada (también llamada reutilizada) procede de aguas residuales depuradas que ha sido sometidas a un proceso de tratamiento adicional y complementario (tratamiento terciario) que incluye una filtración y una desinfección con sistemas como luz ultravioleta e hipoclorito sódico, permitiendo adecuar su calidad al uso autorizado.

Dichas aguas carecen prácticamente de cualquier tipo de patógeno, incluidos las bacterias, virus, hongos y protozoos, pudiendo afirmar que su riesgo biológico es muy bajo, aún en el caso de una ingestión accidental (escenario más adverso).

En el tratamiento de aguas residuales no existe intención deliberada de manipular agentes biológicos y generalmente no existe contacto físico del operador con el agua y/o sus subproductos (agua residual, fango, residuos del pretratamiento, grasas, etc.) a no ser que sea accidentalmente.Existe la posibilidad del paso de los microorganismos al ambiente en zonas con formación de bioaerosoles, especialmente en zonas de desbaste o trasiego por tornillos de Arquímedes, los tratamientos biológicos o deshidratación.

Deberá señalizarse el riesgo de bioaerosoles y el uso obligatorio de protección respiratoria autofiltrante.

Con carácter general, las zonas con riesgo biológico son las siguientes:

- Infraestructuras de alcantarillado (red alcantarillado, colectores, aliviaderos, etc.).
- Bombeos de aguas residuales, especialmente en zonas de desbaste e interior de pozos de grueso, bombeo u otros espacios confinados existentes.
- Tornillos de Arquímedes por donde trasiega agua residual.
- Toma de muestras, debido a la manipulación directa tanto del agua como de los subproductos de la misma.
- Tanques de tormenta, especialmente en zonas de desbaste, tanques o balsas de almacenamiento, aliviaderos, canales u otros espacios confinados existentes.

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De las medidas técnicas mínimas de prevención a tener en cuenta en el diseño y construcción destacan las siguientes:

- Señalizar riesgo biológico en las zonas afectadas.
- Ventilación adecuada de los locales cerrados con riesgo biológico.
- Instalación de agua potable coan lavabos y tomas de agua para mangueo y limpieza.

También se cumplirán los criterios higiénico-sanitarios para la prevención y control de la legionelosis, contemplados en el Real Decreto 865/2003, previa autorización de puesta en servicio o explotación del órgano competente de la administración. Este Real Decreto establece que las torres de refrigeración, condensadores evaporativos y sistemas análogos, estarán ubicados de tal manera que el riesgo de exposición de las personas a aerosoles sea mínimo. A este efecto, se ubicarán alejados de las zonas de paso de personas y de las tomas de aire acondicionado o de ventilación. Los equipos y aparatos serán fácilmente accesibles para su inspección, limpieza, desinfección y toma de muestras anual. Tendrán superficies interiores lisas y sin obstáculos que dificulten su limpieza. Además, deberán disponer de accesos al material de relleno para su limpieza.

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### 3.2.5 Riesgos de accidentes causados por animales y medidas a tomar

Las infraestructuras quese encuentran ubicadas normalmente fuera de cascos urbanos y en entornos donde es frecuente que haya animales, principalmente insectos, para los que el agua es un foco de atracción importante, pudiendo provocar picaduras a los trabajadores, especialmente dolorosas si se es alérgico a éstas.

Se deberán tapar los huecos en instalaciones donde sea previsible que se formen nidos de insectos (avispas, abejas…) especialmente en las zonas de paso (huecos de barandillas, pasamanos, etc.).

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### 3.2.6 Riesgos eléctricos y medidas a tomar

Las lesiones más frecuentes que se producen por el efecto de la corriente eléctrica en el cuerpo humano debido a un contacto eléctrico directo o indirecto (incluido los efectos de un cortocircuito o arco eléctrico) son quemaduras, interrupción respiratoria, asfixia y paralización muscular, fibrilación ventricular por desincronización del ritmo cardiaco y tetanización por contracción muscular involuntaria.

Serán de aplicación el Real Decreto 337/2014, por el que se aprueban el Reglamento sobre condiciones técnicas y garantías de seguridad en instalaciones eléctricas de alta tensión y sus instrucciones Técnicas Complementarias ITC-RAT 01 a 23, el Real Decreto 223/2008, de 15 de febrero, por el que se aprueban el Reglamento sobre condiciones técnicas y garantías de seguridad en líneas eléctricas de alta tensión y sus instrucciones técnicas complementarias ITC-LAT 01 a 09, el Real Decreto 842/2002 por el que se aprueba el Reglamento electrotécnico para baja tensión y el Real Decreto 614/2001 sobre disposiciones mínimas para la protección de la salud y seguridad de los trabajadores frente al riesgo eléctrico.

En el diseño de las instalaciones, entre las medidas a adoptar para evitar los riesgos en el mantenimiento y explotación de equipos eléctricos destacan:

- El diseño de las instalaciones será conforme a los requerimientos legales aplicables a las instalaciones eléctricas en Baja y Alta Tensión (Centros de transformación, seccionamiento, subestaciones y centrales eléctricas y líneas eléctricas). Dispondrán de la preceptiva autorización de puesta en servicio o explotación de la instalación emitida por el órgano competente de la administración.
- Se evitará la instalación de transformadores, cuadros eléctricos y cabinas de alta tensión bajo rasante en recintos con riesgo de inundación, debiendo estar fácilmente accesibles.
- Las instalaciones eléctricas dispondrán de sus esquemas unifilares, los cuales estarán visibles junto a los cuadros eléctricos principales.
- Igualmente, las protecciones eléctricas estarán debidamente identificadas conforme al esquema unifilar, de manera que permitan localizar fácilmente los equipos eléctricos o electromecánicos a los que alimentan.
- Las instalaciones eléctricas tendrán un grado de protección adecuado IP en función del lugar de instalación, especialmente si se encuentran en locales húmedos, o si están expuestas a proyecciones de agua en operaciones de limpieza, o si se encuentran a intemperie.

  Si fuera necesario se protegerá la instalación y equipos eléctricos para que no se puedan mojar por filtraciones u operaciones de mangueado.
- Las instalaciones de baja tensión ubicadas en recintos húmedos o mojados, se diseñarán conforme a los requerimientos reglamentarios, dotándose de las envolventes y las protecciones eléctricas necesarias para que los equipos allí instalados puedan ser utilizados de forma segura y no exista riesgo de contacto eléctrico.
- Hay que favorecer el uso de tensiones de seguridad (24V).
  - Siempre que sea posible, los cuadros de control de motores se ubicarán en recinto independiente, el cual dispondrá de al menos un extintor de $CO_2$ en el exterior.
  - Los cuadros eléctricos, debidamente señalizados (señal de riesgo eléctrico), y pulsadores, irán instalados en puntos fácilmente accesibles.

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- Se debe separar e interponer obstáculos en las partes activas (barrajes y bornes desprotegidos) estarán debidamente apantallados con metacrilato o similar, de manera que permita realizar maniobras y/o mantenimientos o reparaciones en condiciones de seguridad si riesgo de contacto eléctrico.
- Se diseñarán e instalarán puestas a tierra de los equipos y máquinas.
- Las celdas de los centros de transformación estarán enclavadas, de manera que no se puedan abrir sin haber abierto el interruptor general y el seccionador de alta tensión y haber puesto a tierra la instalación, en cumplimiento de las 5 reglas de oro.
- Los centros de transformación y seccionamiento y subestaciones eléctricas dispondrán de los equipos de protección requeridos reglamentariamente (extintores de CO2, guantes dieléctricos, banqueta, pértiga aislante, etc.).
- Los centros de transformación y seccionamiento, por cuyas características y conforme a la reglamentación vigente así se exija, dispondrán de extinción automática por CO2 o agente extintor gaseoso.
- Todas zonas afectadas por riesgo eléctrico irán debidamente señalizadas:
    - Riesgo eléctrico en todos los cuadros eléctricos y en el exterior de las puertas de acceso a recintos independientes destinados al servicio eléctrico (subestaciones eléctricas, centros de transformación y de seccionamiento y CCM).
    - Prohibición del paso excepto personal autorizado en subestaciones eléctricas y centros de transformación o seccionamiento.
    - 5 Reglas de oro y pautas reanimación respiratoria de salvamento en interior Subestaciones eléctricas y centros de transformación y seccionamiento.
- Cuando los cuadros eléctricos se ubiquen en plataformas con barandillas los huecos de las escaleras o escalas existentes han de estar ubicadas de tal forma que se garantice un apoyo sólido, seguro y estable del trabajador, sin riesgo de caída en altura.
- Los cuadros eléctricos se deberán poder abrir sin obstáculos ni dificultades, disponiendo del espacio suficiente para poder realizar las operaciones de maniobra y/o mantenimientos en condiciones de seguridad.
- Las bandejas de cableado y canaletas de servicio eléctrico estarán debidamente protegidas, discurriendo de tal manera que no entrañen riesgo de tropiezos, caídas o golpes (especialmente en la cabeza).
- Las instalaciones eléctricas que queden fuera de servicio o causen baja se desmantelarán.
- Deben diseñarse e instalarse las tomas de corriente en número suficientes y lo más próximas a los puestos de trabajo, evitando una ubicación tal que facilite que haya cables sueltos por zonas de paso. En su defecto, se canalizarán y protegerán para evitar tropiezos.
- Las bancadas metálicas de los motores estarán puestos a tierra.
- Las baterías eléctricas dispondrán de un cubeto y los bornes estarán debidamente protegidas contra contactos eléctricos directos.
- Las infraestructuras estarán protegidas contra el rayo, disponiendo de pararrayos que aseguren una protección efectiva de la totalidad de las instalaciones.

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### 3.2.7 Riesgos mecánico, térmico y eléctrico derivados de la utilización de equipos de trabajo y medidas a tomar

Los riesgos derivados de la utilización de equipos de trabajo en instalaciones son importantes, especialmente los riesgos mecánicos debido al gran número de maquinaria y equipos de trabajo en movimiento o con partes móviles desprotegidas, especialmente si se concentran en lugares de trabajo con poco espacio; así como contactos térmicos con puntos calientes sin proteger y contactos eléctricos por fallos de aislamiento, puesta a tierra o defectos en protecciones eléctricas.

Los llamados riesgos mecánicos comprenden golpes y/o cortes, proyecciones, sobrepresiones y contactos con partes móviles sin proteger que pueden derivar en atrapamientos.

Conforme a lo establecido en el Real Decreto 1215/1997 sobre disposiciones mínimas de seguridad y salud para la utilización por los trabajadores de equipos de trabajo y el Real Decreto 1644/2008 por el que se establecen las normas para la comercialización y puesta en servicio de las máquinas, se tendrá en cuenta que los equipos de trabajo que se pongan a disposición de los trabajadores deben ser adecuados al trabajo que deba realizarse y convenientemente adaptados al mismo, de forma que garanticen la seguridad y salud de los trabajadores al utilizar dichos equipos de trabajo.

Se deberán diseñar las vías de acceso, las zonas de mantenimiento y conservación y las áreas con alta concentración de equipos electromecánicos.

Se deberá disponer de espacio suficiente para poder comprobar el estado de los equipos de trabajo, así como para la realización de las operaciones de explotación, mantenimiento y/o reparación.

Los equipos de trabajo deben:

- Estar ubicados en un entorno de trabajo adecuado y no peligroso.
- Disponer de órganos de accionamiento fácilmente accesibles, visibles, identificados, sin riesgo de manipulación involuntaria y fuera de zona peligrosa.
- Disponer de parada y puesta en marcha, con prioridad de la parada sobre la puesta en marcha. La puesta en marcha después de una parada del equipo no se deberá producir de manera intempestiva (rearme manual).
- Disponer de parada de emergencia próxima al equipo (visible desde éste), claramente identificada, de color rojo, con enclavamiento mecánico y rearme manual. No requiere si el equipo carece de elementos móviles o el riesgo de lesión es despreciable o son accionados directamente por la fuerza humana.
- Los apoyos de las botoneras de mando y emergencia, en posición vertical, no deberán presentar aristas o superficies cortantes, debiendo mecanizarse de tal manera que no entrañen riesgo de cortes.
- Estar protegidos contra el riesgo de caída al mismo nivel o en altura, desprendimientos o proyección de objetos (virutas, productos incandescentes, fluidos de corte, partículas abrasivas, elementos móviles, contrapesos, etc.)
- Disponer de dispositivos de seguridad que impidan o reduzcan las emisiones de gases, vapores, líquidos o polvo peligrosos, mediante sistemas de captación o extracción, envolventes, etc.
- Disponer de medios de acceso seguros, plataformas y barandillas fácilmente accesibles que protejan al operario contra el riesgo de caída en altura.

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- Disponer de resguardos o dispositivos de seguridad que protejan al operario contra el riesgo de estallido o rotura de los elementos, ya sea por un fallo en los anclajes, exceso de velocidad, presión, golpes de ariete, envejecimiento, etc.
- Disponer de resguardos o dispositivos de seguridad que protejan al operario contra el riesgo de golpes y/o atrapamientos producidos por elementos móviles.
- Disponer de iluminación adecuada.
- Disponer de resguardos o dispositivos de seguridad que protejan los puntos o superficies a elevada temperatura con acceso por parte de los operarios.
- Disponer de dispositivos de alarma ante una situación peligrosa si procede.
- Disponer de interruptores o seccionadores con enclavamiento mecánico cuando el dispositivo de corte no quede accesible para la persona que realiza las operaciones sobre el equipo de trabajo.
- Estar protegidos contra las condiciones ambientales agresivas, ya sea a intemperie o en recintos mojados, húmedos o con altos niveles de corrosión.
- Disponer de resguardos o dispositivos de seguridad que protejan al operario contra el riesgo de incendio y/o explosión.
- Estar protegidos contra los contactos eléctricos directos, por lo que los mandos, cuadros, conexiones y conductores de la instalación eléctrica deberán estar correctamente aislados (IP adecuado) o, en su defecto, alejados o con obstáculos que impidan el contacto accidental.
- Estar protegidos contra los contactos eléctricos indirectos, ya sea mediante empleo de pequeñas tensiones de seguridad, separación entre partes activas y masas mediante aislamientos, recubrimiento de las masas, puesta a tierra o neutro y protección diferencial adecuada.
- Disponer de los resguardos que protejan o minimicen la exposición a niveles de ruido, vibraciones o radiaciones peligrosas.

Definir zonas de seguridad con acceso restringido para máquinas en movimiento.Los equipos de trabajo dispondrán de marcado CE y declaración de conformidad, cumpliendo cuantas disposiciones legales o reglamentarias les sea de aplicación, además se emitirá certificado de adecuación al RD 1215/1997 por empresa habilitada.

Los equipos dispondrán del manual de instrucciones en español para su uso y mantenimiento en condiciones de seguridad.

También dispondrán de accesos seguros habilitados, de manera que se pueda realizar de forma segura las operaciones de mantenimiento, reparación, limpieza, abertura, cierre o ajuste de los mismos (motores, válvulas, equipos de medida, etc.).

De conformidad con lo dispuesto en el RD 485/1997, sobre las disposiciones mínimas en materia de señalización de seguridad y salud en el trabajo, se procederá a señalizar al menos:

- El riesgo eléctrico en los cuadros de los equipos de trabajo.
- El riesgo de atrapamiento junto a los resguardos de protección de las partes móviles en movimiento de equipos de trabajo fijos, así como equipos en movimiento (puentes desarenadores o decantadores, etc.).
- El riesgo de contacto térmico en aquellas partes de los equipos de trabajo muy calientes.

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- El riesgo de entrada en funcionamiento de manera intempestiva de aquellos equipos de trabajo controlados por automatismos.

**Las instalaciones y aparatos a presión**, conforme lo establecido en el Real Decreto 2060/2008, , por el que se aprueba el Reglamento de equipos a presión y sus instrucciones técnicas complementarias, dispondrán de la preceptiva Acreditación previa de las condiciones de seguridad, presentando la documentación correspondientede la instalación emitida por órgano competente de la Administración, debiendo cumplir las especificaciones reglamentarias.

Los calderínes o depósitos a presión dispondrán de las placas correspondientes en la que se detallen los inspecciones (retimbrados) de los mismos.

En relación con el riesgo de atrapamiento que se deriva de los equipos de trabajo instalados, existen dos características que hacen que este riesgo esté potenciado. Una de ellas es que la maquinaria realice un movimiento intermitente controlado por automatismos y otra es la baja velocidad de movimiento de algunas máquinas, tales como puentes desarenadores, tornillos sin fin, bombas de tornillo, etc. En ambos casos, el personal, al no detectar el movimiento, se acerca peligrosamente sin evaluar el potencial riesgo, motivo por el que se han de instalar protecciones que impidan o dificulten el acceso y advertir el riesgo. Dichas protecciones se deberán poder retirar para realizar operaciones de reparación y/o mantenimiento cuando se precisen, siempre con el equipo parado.

Si las partes móviles han de estar visibles en operaciones de mantenimiento o control, se habilitarán protecciones adecuadas que permitan su visualización (metacrilatos, rejillas, etc.).

Las medidas mínimas de prevención a adoptar para evitar este riesgo son:

- Diseñar correctamente las vías de acceso, las zonas de mantenimiento y conservación y las áreas con alta concentración de equipos electromecánicos. Se deberá disponer de espacio suficiente para poder comprobar el estado de los equipos de trabajo, así como para la realización de las operaciones de explotación, mantenimiento y/o reparación.
- Bloquear mecánicamente para impedir desplazamientos en trabajos de mantenimiento.
- Definir zonas de seguridad con acceso restringido para máquinas en movimiento.
- Colocar carenados, barandillas y otras protecciones que impidan el acercamiento a las partes móviles.

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### 3.2.8 Riesgos de sobreesfuerzos por carga física dinámica o estática y medidas a tomar

En las actividades de explotación y mantenimiento de las infraestructuras de Canal de Isabel II los trabajadores están expuestos al riesgo de trastornos de tipo músculo esqueléticos, especialmente de tipo dorsolumbar, provocados por sobreesfuerzos derivados de una manipulación manual de cargas (carga física dinámica) o postural (carga física estática).

El personal que realiza tareas administrativas, aprovisionamiento ó reparación o talleres tampoco es ajeno a este tipo de lesiones, ya que también puede manejar cargas en los despachos, archivos, talleres o almacenes. Tampoco hay que olvidar el uso de pantallas de visualización de datos, que puede derivar también en trastornos de tipo músculo esqueléticos por malas posturas en el puesto de trabajo.

Será de aplicación son el Real Decreto 487/1997, sobre disposiciones mínimas de seguridad y salud relativas a la manipulación manual de cargas que entrañe riesgos, en particular dorsolumbares, para los trabajadores y el Real Decreto 488/1997, sobre disposiciones mínimas de seguridad y salud relativas al trabajo con equipos que incluyen pantallas de visualización.

Las medidas mínimas de prevención a adoptar para evitar este riesgo son:

- Se deberán diseñar los puestos de manera que se adopten las medidas técnicas necesarias (automatización o mecanización de los procesos) para evitar la manipulación manual de las cargas, en especial mediante la utilización de equipos para que el manejo mecánico de las mismas, sea de forma automática o controlada por el trabajador.
- En los lugares de trabajo se instalarán **equipos mecánicos** (puentes grúa, polipastos, trócolas, etc.) que faciliten el mantenimiento y reparación de los equipos pesados instalados (motores, calderines, valvulería y carretes conducciones, filtros, big bag de poli o talleres, entre otros), especialmente donde no es viable la utilización de plumas, transpaletas, carretillas o grúas de taller; al objeto de evitar la manipulación manual de cargas por parte de los trabajadores y minimizar el riesgo de lesión dorso lumbar.
- En cualquier caso, los talleres dispondrán de un polipasto o puente grúa que facilite la manipulación manual de cargas, especialmente cuando se tenga que descargar material o equipos desde vehículos para llevarlos al punto de operación habitual en el taller. La viga del polipasto saldrá fuera del taller para facilitar las operaciones de carga y descarga.
- Igualmente, cuando se instalen bombas sumergidas o agitadores, éstos dispondrán de un medio mecánico de elevación (trócola o similar) fácilmente manejable desde zona accesible y protegida, sin riesgo de caída o necesidad de adoptar posturas forzadas.
- Los topes de la trócola desde la que se suspenden los agitadores sumergidos u otros equipos, se colocarán lo más cerca posible de la manivela, al objeto de facilitar su manipulación por encima de las barandillas de protección.
- Del mismo modo, cuando se instalen sondas de nivel, trócolas u otros equipos de trabajo fijos, se procurará ubicarlos de tal manera que los trabajadores no deban adoptar posturas forzadas para realizar la explotación, los mantenimientos o reparaciones, evitando en lo posible colocarlos al nivel del suelo obligando al trabajador a tumbarse.
- En la medida de lo posible, los equipos mecánicos para el izado de cargas tendrán un accionamiento eléctrico, especialmente cuando se prevea una manipulación frecuente.

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- Los equipos mecánicos para el izado de cargas (el raíl por el que discurra éste), se deberán poder ubicar en la vertical del o los equipos objeto de los trabajos.
- Cuando se instalen equipos de trabajo debajo de plataformas o estructuras elevadas (escaleras incluidas) y se deban realizar trabajos de explotación, mantenimiento o limpieza, se diseñarán de tal manera que la altura mínima libre será de al menos 2 m. al objeto de evitar golpes en la cabeza y la adopción de posturas forzadas especialmente dañinas en la región dorsolumbar.
- Si fuera preciso, se dotará de un muelle de carga que impida que las cargas izadas sean desplazadas manualmente.
- En los equipos de trabajo que se disponga de tolvas para descarga manual, como es el caso de las cubas de mezcla de polielectrolito, el llenado de las mismas se debería poder realizar fácilmente desde el suelo sin necesidad de elevar el saco o envase por encima de los hombros. Si fuera necesario se montaría una pequeña escalerilla con plataforma barandillada (cuando la altura sea superior a 60 cm.) para facilitar el acceso en condiciones de seguridad.
- Cuando se tenga prevista que la dosificación de sustancias sólidas en grandes cantidades (polielectrolito, entre otros), se valorará la instalación de big bag sustentados con un polipasto, habilitando en su caso un acceso fácil y seguro al gancho para la conexión y desconexión de éste.
- Las **tapas de registro** que los operarios deban abrir para acceder a depósitos, galerías, pozos, cámaras de válvulas y otros registros con equipos en su interior, deberán ser conformes a la UNE-EN 124 y en la medida de lo posible, estar fabricadas con materiales lo más livianos y resistentes posibles. Deberán de ser de clase adecuada para soportar las cargas a las que estén sometidas.

  Cuando estos elementos de cierre se encuentren a intemperie en zonas de paso de vehículos o maquinaria, nunca serán de material plástico.
- Las tapas dispondrán de puntos de agarre o asideros en número suficiente que faciliten su apertura manualmente, con la ayuda si fuera necesario de herramientas específicas a tal fin (picos, barras o ganchos).
- Las tapas que deban ser manipuladas manualmente por los trabajadores tendrán un tamaño tal que facilite su apertura y cierre por un trabajador.
- Cuando por el tamaño y peso de la tapa la apertura deba ser realizada por dos trabajadores, se colocarán al menos dos asideros que distribuyan adecuadamente las cargas, ubicando éstos de tal manera que el riesgo de caída al interior del registro sea el menor posible.
- Si fuera necesario realizar comprobaciones del interior del recinto desde el exterior o se tenga que acceder a equipos en el borde del registro (toma muestras, sondas de nivel, etc.) sin necesidad de entrar, se habilitará una pequeña tapa que permita realizar dichos trabajos.
- Igualmente, cuando la apertura del registro se deba hacer manualmente, la tapa dispondrá preferentemente de bisagras y asas en el extremo opuesto que faciliten las operaciones, diseñándose de tal manera que no se requiera la adopción de posturas forzadas y sin riesgo de que se puedan soltar y golpear al trabajador una vez abiertas por su peso, golpe accidental o por empuje del viento.
- La apertura de las tapas abisagradas permitirá una vez abiertas el acceso sin dificultad a las escalas habilitadas si las hubiera, debiendo abrir siempre que se pueda hacia el lado contrario de la zona con riesgo de caída en altura.

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- Las tapas o cobijas que por su peso deban ser manipuladas con la ayuda de medios mecánicos, dispondrán de puntos de agarre que faciliten su izado con la ayuda de equipos de trabajo específicos. También podrán disponerse carriles de desplazamiento para facilitar la maniobra

Además de las medidas mínimas de prevención establecidas con anterioridad, en relación con el diseño de los puestos en los que se utilicen pantallas de visualización de datos o se puedan utilizar éstas, las medidas para evitar trastornos de tipo músculo esquelético son:

- Los puestos de trabajo y el mobiliario deberán cumplir con las disposiciones establecidos en el anexo del Real Decreto 488/1997, sobre disposiciones mínimas de seguridad y salud relativas al trabajo con equipos que incluyen pantallas de visualización de datos.
- Los grandes centros de control y mando eléctricos (CCM) existentes en la instalación dispondrán de al menos una mesa y una silla.

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### 3.2.9 Riesgos de caídas al mismo nivel, golpes contra objetos inmóviles, caída de objetos y desprendimientos y medidas a tomar

Con carácter general, el riesgo de caídas al mismo nivel se provoca por resbalones debido a la existencia de superficies mojadas producidas tanto por reboses como por limpiezas, así como por tropiezos con escalones, irregularidades en el terreno, viales y lugares de trabajo u objetos situados en o junto a zonas de paso, caídas de materiales y derrumbamientos sobre trabajadores.

El diseño y las características constructivas de los lugares de trabajo deberán ofrecer seguridad frente a los riesgos de resbalones, caídas, choques o golpes contra objetos y derrumbamientos o caídas de materiales sobre los trabajadores, siendo conformes con lo dispuesto en el Real Decreto 486/1997, por el que se establecen disposiciones mínimas de seguridad y salud en los lugares de trabajo, así como en lo dispuesto en el Real Decreto 314/2006, por el que se aprueba el Código Técnico de la Edificación:

Con carácter general se seguirán las siguientes prescripciones:

- Se tendrá igualmente en cuenta lo dispuesto en el reglamento técnico de desarrollo en materia de promoción de la accesibilidad y supresión de barreras arquitectónicas.
- Los edificios y los lugares de trabajo deberán poseer la estructura y solidez apropiadas a su tipo de utilización y uso previsto, incluidos todos sus elementos, estructurales o de servicio, incluidas las tapas, cobijas, tramex, plataformas de trabajo, escaleras y rampas.
- Las tuberías y los accesorios a utilizar en la red de agua, aire u otros deberán poder resistir las presiones creadas en ellas. Los soportes de dichas redes deberán resistir las cargas dinámicas y estáticas generadas, así como las que pudieran producirsea efectos térmicos.
- Las escaleras, escalas, tapas, cobijas, tramex y estructuras elevadas deberán igualmente soportar las cargas previstas, permitiendo en su caso el tránsito y/o permanencia sobre éstas de personas, vehículos o maquinaria (carretillas, plataformas u otros) con seguridad, asegurando que no se pueden soltar accidentalmente:
  - Cuando se trate de estructuras o elementos que puedan sustentar personas o que permitan el paso de personal, éstas deberían soportar al menos 500 Kg/m$^2$, seleccionando adecuadamente los materiales, elementos, apoyos y anclajes o fijaciones a utilizar. Se certificará y señalizará la carga máxima a soportar
  - Cuando los elementos de cierre se encuentren a intemperie en zonas de paso de vehículos o maquinaria, nunca serán de material plástico
  - Las tapas y cobijas ubicadas en zonas de paso cumplirán con lo dispuesto en la Norma UNE-EN 124 sobre dispositivos de cubrimiento y de cierre para zonas de circulación utilizadas por peatones y vehículos.
  - Los tramex cumplirán con lo dispuesto en la norma UNE 36750 sobre piezas y peldaños de emparrillado electrofundidos y/o prensados para aplicación en áreas de tránsito de peatones y vehículos. Cuando estén fabricados en PRFV cumplirán la norma UNE-EN 13706 sobre materiales compuestos de plástico reforzado. Especificaciones para perfiles pultruidos y la DIN 24537-3 sobre resistencia al deslizamiento.
  - Las plataformas de trabajo, pasarelas, escaleras fijas metálicas o fabricadas en PFRV (incluidos sus peldaños y guarda cuerpos) cumplirán con lo dispuesto en la norma UNE-EN ISO 14122 sobre Seguridad de las máquinas. Medios de acceso permanente a máquinas e instalaciones industriales.

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- Extremar el orden y limpieza de las instalaciones, habilitando entre otros:
  - Lugares de almacenamiento donde se precisen, señalizando éstos y dotándolos de estanterías y armarios necesarios firmemente sujetos de manera que no puedan desprenderse o derrumbarse.
  - Devanaderas para enrollar mangueras en zonas donde haya puntos de agua y sea necesario el mangueado en las operaciones de explotación (deshidratación principalmente).
  - Las conexiones y cableado de los equipos de trabajo, incluidos los existentes en zonas administrativas del edificio de control, estarán distribuidos de manera que no interfieran en zonas de paso y no supongan un obstáculo.
  - Los falsos suelos que se puedan instalar no presentarán escalones o resaltes o estarán levantados, pudiendo tropezar con éstos.
- En los lugares de trabajo que puedan presentar superficies resbaladizas o deslizantes, se establecerán medidas de protección para evitar que los trabajadores resbalen, como las que a continuación se destacan:
  - Tramex en los puntos de almacenamiento, preparación y dosificación de polielectrolito. Igualmente, y al objeto de evitar que el polielectrolito o la dilución de éste se propague a zonas anexas, se colocará cuando sea preciso un pequeño resalte o rodapié de obra a modo de contención.
  - Tratamientos antideslizantes en vestuarios (especialmente en la zona de duchas), así como escaleras y vestíbulos de acceso al edificio de control.
  - Cubetos de retención para almacenamientos de aceites, grasas y otros líquidos almacenados en bidones, grandes recipientes para almacenamiento a granel (GRG) u otros recipientes análogos.
  - Aliviaderos, desagües y drenajes protegidos en viales y lugares de trabajo bajo rasante con riesgo de inundación.
- Los huecos desprotegidos se taparán para evitar introducir el pié accidentalmente.
- Las dimensiones de los locales de trabajo deberán permitir que los trabajadores realicen su trabajo sin riesgos para su seguridad y salud y en condiciones de seguridad y ergonómicas aceptables:
  - Se prestará especial atención a la altura desde el piso hasta el techo, superior a 3 m o 2,5 m en oficinas, contando con un mínimo de 2 $m^2$ de superficie libre por trabajador y 10 $m^3$ no ocupados por trabajador.
  - Cuando se instalen equipos de trabajo sobre plataformas o estructuras elevadas, ya sean metálicas o de obra, y se deban realizar trabajos de explotación, mantenimiento o limpieza debajo de éstas, se diseñarán de tal manera que la altura mínima libre será de al menos 2 m. Lo mismo ocurre cuando se instalen equipos o se utilice como almacenamiento las zonas debajo de éstas (incluidas escaleras y muelles).
  - Los equipos de trabajo dispondrán de accesos seguros habilitados, de manera que no sea necesario saltar o transitar (altura superior a 0,60 m) sobre conducciones u otros equipos para llegar a éstos.

    Así, cuando existan equipos o elementos fijos ubicados a baja altura en o junto a zonas de paso como conducciones o bandejas con cableado, éstas permitirán el libre tránsito,

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evitando en la medida de lo posible que crucen zonas de paso al objeto de evitar golpes (especialmente en la cabeza), caídas (al pisar sobre éstas) o tropiezos. Se deberá habilitar pasos con escaleras y plataformas al efecto o, en su defecto, se ubicarán a una altura tal que permitan un paso libre de al menos 2 m.

- Los escalones en pasillos, las conducciones, la valvulería y volantes, bandejas y equipos fijos, así como los perfiles de sujeción de éstos, cuando se encuentren próximos a zonas de paso y no se haya podido eliminar el riesgo de golpes/cortes o choques se colocarán en un registro o canaleta protegida o, en su defecto, se mecanizarán de tal manera que no entrañen riesgo o se protegerán convenientemente con un envolvente que amortigüe el posible impacto accidental.

  Además, se señalizarán dichos riesgos, de forma que la envolvente, el precinto o pintura a aplicar para advertir su presencia tenga franjas amarillas y negras de conformidad con lo dispuesto en el Real Decreto 485/1997, sobre disposiciones mínimas en materia de señalización de seguridad y salud en el trabajo.

- Los tabiques o puertas transparentes o translúcidos situados en locales o en proximidades de los puestos de trabajo y vías de circulación, deberán estar claramente señalizados para advertir su presencia, debiendo fabricarse con materiales seguros y resistentes a impactos.
- Las puertas y portones deberán ir provistos de un sistema de seguridad que les impida salirse de los carriles y caer, o que impidan su caída. Si disponen de contrapesos, éstos estarán protegidos.
- Las puertas de acceso a las escaleras no se abrirán directamente sobre sus escalones.
- Las plataformas, escaleras y rampas deberán:
  - Las escaleras tendrán una anchura mínima de 1 metro, excepto en las de servicio, que será de 55 cm.
  - Pasamanos en sus lados cerrados y barandillas de protección en sus lados abiertos cuando tengan una altura de más de 60 cm. La barandilla estará firmemente sujeta y dispondrá de listón intermedio y, cuando exista riesgo que caída de objetos, rodapié.
  - Estar fabricadas con materiales sólidos, asegurándose su seguridad estructural y con pavimentos de materiales no resbaladizos o dispondrán de elementos antideslizantes.
  - No tendrán una pendiente pronunciada. La huella y contrahuella ha de facilitar el tránsito por la escalera, evitando que para subir o bajar el trabajador deba posicionarse de frente a la escalera.

- Las cadenas, eslingas, ganchos, balancines o cualquier otro equipo para utilizar con polipastos, grúas o puentes grúa estará homologado, disponiendo de los certificados y marcados pertinentes.
- La iluminación de los lugares de trabajo deberá permitir que los trabajadores dispongan de condiciones de visibilidad adecuadas para poder circular por los mismos y desarrollar en ellos sus actividades sin riesgo para su seguridad y salud.
- Los niveles de iluminación de los lugares de trabajo atendiendo a las características de la actividad serán conformes a los establecidos en el Real Decreto 486/1997, por el que se establecen disposiciones mínimas de seguridad y salud en los lugares de trabajo.

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- Los lugares de trabajo dispondrán de señalización de advertencia de los riesgos de las construcciones, equipos e instalaciones objeto del proyecto, preferentemente en forma de panel (polipropileno o similar), de conformidad con lo dispuesto en el Real Decreto 485/1997, sobre disposiciones mínimas en materia de señalización de seguridad y salud en el trabajo.

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### 3.2.10 Riesgos de golpes y/o atropellos y medidas a tomar

Las vías de circulación de los lugares de trabajo deberán poder utilizarse conforme a su uso previsto, de forma fácil y con total seguridad para los peatones o vehículos que circulen por ellas y para el personal que trabaje en sus proximidades.

Las vías de circulación de los vehículos deberán estar delimitadas con claridad con franjas continuas de un color bien visible, preferentemente blanco o amarillo. Igualmente, se han de señalizar en el suelo los pasos de peatones y zonas de aparcamiento.

Las vías de circulación destinadas a vehículos deberán pasar a una distancia suficiente de las puertas, portones, zonas de circulación de peatones, pasillos y escaleras, protegiendo y señalizando las mismas. En los portones destinados básicamente a la circulación de vehículos deberán disponer en su proximidad inmediata de puertas destinadas a los peatones, expeditas y claramente señalizadas.

En los viales interiores o de servicio de acceso a la infraestructura donde existan desniveles por los que pueda caer accidentalmente un vehículo se instalarán biondas.

Igualmente, en los viales interiores se instalarán badenes y señalización de limitación de velocidad en los tramos rectos de más de 50 m de longitud al objeto de disuadir a los conductores para que circulen a una velocidad reducida.

Se instalará señalización obligatoria de “Stop” a la salida de la instalación y, cuando se trate de caminos de servicio de Canal de Isabel II en las incorporaciones a la vía pública. Si la visibilidad fuera escasa o reducida, se instalarán espejos convexos para ampliar el campo de visión al conductor.

La zona de aparcamiento estará dimensionada de tal manera que el número de plazas sea adecuado al personal previsto en la instalación. Cuando se trate de instalaciones con personal fijo, dispondrán de pérgolas para proteger los vehículos del sol y evitar que cojan altas temperaturas en verano. Los apoyos de la cubierta se pintarán con franjas amarillas hasta una altura de un metro para advertir su presencia durante el estacionamiento.

Los caminos de servicio propios de acceso a las infraestructuras se asfaltarán u hormigonarán siempre que sea posible, teniendo en cuenta las normativas de aplicación, dotándoles de cunetas para aliviar agua en caso de lluvia y señalización vial.

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### 3.2.11 Riesgos de caídas a distinto nivel y medidas a tomar

Aunque los trabajos a distinto nivel en las instalaciones de Canal de Isabel II son muy variados, hay una serie de labores de mantenimiento y conservación que son muy frecuentes en la explotación de algunas instalaciones y que precisan mención especial ya que tienen mayor probabilidad de originar riesgos de caídas a diferente nivel (cubiertas edificios, registros, pozos, o cualquier otra obra que canalice o trate agua).

Un caso muy especial a tener en cuenta son los espacios con concentraciones de instalaciones (conducciones, válvulas, bombas, calderines, compresores, equipos eléctricos, etc.) como las cámaras de válvulas. En estos lugares, en los que el exceso de equipos genera espacios de tránsito reducidos y a diferente nivel, es necesaria una protección y señalización adecuada, así como zonas de paso antideslizantes protegidas contra resbalones y caídas utilizando suelos de tramex antideslizante y barandillas adecuadas.

En el control de niveles mediante boyas y medidores ultrasónicos de nivel son necesarias, calibraciones y limpiezas frecuentes, lo que obliga a los operarios de mantenimiento a trabajar en diferentes niveles dentro de las instalaciones. Igualmente ocurre con el mantenimiento de las rasquetas de en los decantadores ya que su mantenimiento y conservación normalmente obliga a trabajar en seco y, por tanto, trabajar a distinto nivel. El mantenimiento de los caminos de rodadura de las rasquetas y de las almenas metálicas donde se extrae el agua clarificada de los decantadores también origina situaciones de peligro al ubicarse en el límite de dos zonas a diferente nivel.

Al respecto, se ha de tener en cuenta que en las infraestructuras de Canal de Isabel II, la altura a partir de la cual se considera que hay riesgo de caída en altura es de 0,60 m.

Para evitar riesgos de caídas a diferente altura se protegerán los lugares de trabajo susceptibles de caídas (suelos, aberturas, taludes y desniveles) con protecciones de tipo colectivo (cerramientos, barandillas, tramex o tapas), de conformidad con lo dispuesto en el Real Decreto 486/1997, por el que se establecen disposiciones mínimas de seguridad y salud en los lugares de trabajo.

Cuando dadas las características de los lugares de trabajo no sea posible instalar protecciones colectivas, se instalarán **puntos de anclaje y/o líneas de seguridad** certificadas para su uso con equipos anticaídas, requiriéndose su revisión anual por empresa habilitada. Las normas de aplicación para cada dispositivo fijo se detalla a continuación:

- Puntos de anclaje (PA) conforme EN 795
- Bases fijas para pescantes conforme EN 795.
- Líneas de seguridad horizontales conforme EN 795.
- Líneas de seguridad verticales conforme EN 795 y UNE-EN 353-1.
- Cabestrantes y trípodes conforme UNE-EN 360 y UNE-EN 1496 Clase B.
- Dispositivos anticaída retráctil UNE-EN 360.

En la ***Figura 1***. *Referencias a sistemas de anclaje según norma EN 795:2012. Personal fall protection equipments. Anchor devices.*

Las **luminarias**, ventanas, vanos de iluminación cenital y dispositivos de ventilación estarán ubicadas de forma que se pueda realizar de forma segura las operaciones de mantenimiento, reparación, limpieza, abertura, cierre o ajuste.

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En el caso de las luminarias, se ubicarán preferentemente sobre pared cuando la altura de éstas sea superior a 3,5 m. y no en el techo.

Cuando estén más altas o se interpongan obstáculos que dificulten el acceso de forma segura, se considerará que el uso de escaleras de mano es especialmente peligroso, por lo que atendiendo a la peligrosidad se deberá priorizar:

- La instalación de escaleras con plataformas fijas o dotar de escaleras con plataformas móviles.
- Dotar a la instalación de un sistema de fijación para el uso escaleras de mano con sistema de anclaje anticaíd.Utilizar plataformas elevadoras o cestas.

Con carácter excepcional y siempre que no se puedan utilizar los medios de acceso anteriormente indicados, se podrá contemplar la utilización de andamios en operaciones de explotación y mantenimiento.

Se valorará la posibilidad d e disponer biondas en aqullos desmontes o terraplenes de altura superior a 0,60 m junto a caminos oviales por los que circulen vehículos o maquinaria.

Queda prohibida la utilización de cestas colgadas de polipastos o puentes grúa o elevadas con carretillas elevadoras.

La **valvulería y equipos de medida** se colocarán en puntos accesibles y, en la medida de lo posible, no se ubicarán en altura. Si no fueran accesibles desde el suelo, se dotará a la instalación de escaleras móviles con plataformas (con barandilla si tiene más de 60 cm de alto) que faciliten el acceso con seguridad, teniendo en cuenta los posibles riesgos de golpes en la cabeza.

En el caso de los **polipastos y puentes grúa**, se ha de poder acceder con seguridad a los cuadros eléctricos, motores de los testeros y grupo de elevación para realizar las labores de mantenimiento periódicas de forma segura, utilizándose escaleras móviles con plataformas o plataformas elevadoras. Cuando no sea posible su uso, se habilitarán accesos fijos mediante escaleras o escalas con protección circundante y plataformas con barandillas de 1 m de altura (con rodapié y listón intermedio).

Cuando se prevea el uso de plataformas elevadoras, dumper, carretillas u otros, se tendrá en cuenta si se dispone de **espacio suficiente para maniobrary operar y que las superficies de paso soportan el peso de dichos vehículos,** especialmente en aquellas zonas donde hay cobijas, tapas, tramex u otras, en las que se deberá indicar la clase resistente ó peso máximo autorizado.

Las azoteas o cubiertas de los edificios visitables, depósitos o los lugares de trabajo en altura a los que se deba acceder o en los que se instalen o puedan instalar equipos de trabajo (instalación equipos comunicaciones, pararrayos, climatización, cámaras videovigilancia, luminarias, etc.) o en los que se disponga de registros visitables, deberán protegerse perimetralmente con un muro o barandilla de 1 m de altura. Igualmente, deberán disponer de escaleras o escalas de acceso con protección circundante y punto de desembarco protegido.

Los muros de los decantadores, cámaras de mezcla, filtros, biológicos o cualquier otra obra que canalice o trate agua en depuración y tratamiento, estarán protegidos contra caídas, por lo que tendrán una altura de al menos 1 m o bien, tendrán barandilla perimetral o cubiertos con tramex o similar. La barandilla podrá colocarse directamente sobre el muro siempre que permita el desplazamiento de equipos. En caso contrario, los soportes verticales podrán realizarse en L y anclarse sobre el paramento vertical del muro, según ***Figura 2***. *Esquema barandilla en "L" anclada en muro*.

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Los depósitos, pozos, cámaras de válvulas o cualquier otro registro bajo rasante en los que se deba acceder para limpieza, control, reparación o mantenimiento de equipos, dispondrán de escalas de acceso debidamente protegidas, evitando la utilización de escaleras de mano.

En el diseño de la infraestructura, no se contemplará la instalación de equipos electromecánicos (compresores, bombas, etc.) bajo rasante cuyo acceso se realice por escalas. Siempre se dispondrá de una escalera de obra o metálica.

Cuando existan muelles de carga éstos dispondrán de escalera de acceso barandillada y se señalizará el borde de éstos conforme se establece en el Real Decreto 485/1997, sobre disposiciones mínimas en materia de señalización de seguridad y salud en el trabajo, y se instalará barandillado desmontable que delimite y proteja contra caídas en altura.

En las instalaciones, cuando proceda, se colocacarán escaleras metálicas o de obra como solución constructiva preferente, en contraposición conla instalación de escaleras de servicio fijas o de pates, en detrimento de la utilización de escaleras de mano.

Las escalas verticales prefabricadas cumplirán con lo dispuesto en la norma UNE-EN 14396 sobre escaleras fijas para pozos de registro

Las escalas de servicio están formadas por una serie de escalones fijados y asegurados al edificio, arqueta, cámara, registro, depósito o pozo, entre otros, de manera que sean fácilmente accesibles y estén situadas en la vertical de la boca de registro o acceso, presentando un apoyo seguro y estable; debiendo cumplir lo establecido en el RD 486/1997, por el que se establecen disposiciones mínimas de seguridad y salud en los lugares de trabajo. Las escalas pueden ser del tipo inclinadas (>75º) o verticales, ya sea separadas (escalones encajados en largueros laterales) o de pates (integradas):

- Distancia máxima entre escalones : 30 cm.
- Profundidado diámetro del escalón : 2-5 cm.
- Ancho libremínimo : ≥ 40 cm.
  ≥ 35 cm en pozos que por su tamaño no se pueda de 40 cm.
- Distancia mínima entre la pared posterior de los escalones y el objeto posterior más próximode la pared del escalón : ≥ 16 cm.

Las ***Figura 3***. *Escala fija. Dimensiones y la* ***Figura 4***. *Escala fija. Protecciones* establecen las dimensiones mencionadas.

La huella de los peldaños de apoyo de las escalas será preferentemente plana, disponiendo de estrías o resaltes que eviten el deslizamiento. Cuando estén fabricados con redondos de acero, tendrán en la parte central un mecanizado tal que facilite el agarre del calzado al subir y bajar por la escala, sin aristas vivas que puedan dañar las manos en el agarre. Los extremos no se mecanizarán ya que se trataría de una zona de agarre con las manos.

Las escalas, incluidas las de pates, han de disponer de un pasamanos o asidero fijo en el exterior hasta una altura de 100 cm que facilite el acceso al interior del registro, pozo o arqueta.

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Cuando no se pueda prolongar la escala con un pasamanos o asidero, se colocará preferentemente un asidero regulable en altura extraíble que sobresalgan también 100 cm, conforme se establece en la ***Figura 7**. Asideros de acceso a pozos y cámaras.*

Cuando por causa debidamente justificada sea desaconsejable la instalación de asideros fijos o regulables en altura, se colocará un pate en el exterior (salvo que se trate de registros en calzada o viales donde es probable que puedan provocar tropiezos, debiendo extremar las precauciones en el acceso).

Con carácter general, todas las escalas de servicio verticales (incluidas las de pates) dispondrán de protección circundante cuando tengan una altura superior a 3 m, en lugar de los 4 m que se indican en el Real Decreto 486/1997. La protección se colocará a una altura comprendida entre 2,20 y 2,50 m desde el suelo hasta el borde superior del pasamanos o barandilla, tal y como se aprecia en la imagen adjunta.

La ***Figura 5**. Escala fija con protección* y ***Figura 6**. Escala de pates con protección,* determinan las protecciones circundantes.

Con carácter excepcional y debidamente justificado, no será necesaria la protección circundante en:

- Conductos, pozos angostos y otras instalaciones que, por su configuración, ya proporcionen dicha protección.
- En el interior de los vasos de los depósitos de agua, arquetas, cámaras, registros o pozos inundables, cuando debido al tamaño del recinto y su configuración, se estime que dificulta la evacuación y/o entrada de material.

En estos casos, es preciso que se señalice el riesgo y la obligación de utilizar equipos de protección anticaída.

En las escalas de servicio no verticales con una altura superior a 3 m, situadas sobre una superficie inclinada con más de 75º, se recomienda la instalación de protección circundante.

En los recintos que normalmente están inundados (vasos depósitos u otros) o hay mucha humedad (cámaras de válvulas o pozos, entre otros) o puede haber gases peligrosos (alcantarillado), tanto las escalas como la tornillería o anclajes, asideros extraíbles y la protección circundante han de estar fabricadas en material inoxidableo similar (materiales plásticos, fibra u otros), ya que las condiciones ambientales existentes podrían afectar seriamente resistencia y, en definitiva, su seguridad estructural.

Cuando no se pueda instalar escalas de servicio escalas fijas y las escalas a instalar sean de pates en forma de “U” deberán ser conformes con la norma UNE EN-13101:2003 y Real Decreto 486/1997.

En condiciones normales y de conformidad con lo dispuesto en el Real Decreto 486/1997 sobre las disposiciones mínimas de seguridad y salud en los lugares de trabajo, las escalas de servicio y los pates se colocará respetando las siguientes distancias:

- Distancia máxima entre peldaños de 30 cm.
- Distancia mínima entre el frente del pate y la pared más próxima de 75 cm.
- La separación del pate superior más próximo a la boca de acceso estará comprendida entre 400-500 mm.

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Las plataformas intermedias de descanso son obligatorias en aquellas escalas de más de 9 metros de altura, debiendo instalar ésta como mínimo cada 9 metros o fracción. (***Figura 4***. *Escala fija. Protecciones).* La plataforma intermedia dispondrá de barandilla con listón intermedio.

Las escalas se verificarán periódicamente.

En aquellas instalaciones donde se disponga de espacio suficiente, cuando proceda, se colocarán escaleras metálicas o de obra como solución constructiva preferente, en contraposición con la instalación de escalas de servicio fijas o pates.

Igualmente, en las arquetas, cámaras, registros, pozos, vasos depósitos, plataformas o altillos, entre otros, en el acceso se optará por la instalación de una escala de servicio fija en detrimento de la sola utilización de escaleras de mano.

Los huecos de acceso a las escalas dispondrán de:

- Un portillo o
- Un listón abatible en la parte superior, a modo de barandilla, con otro listón intermedio o, cuando éste no sea viable, cadena.

En zonas de trabajo tales como decantadores, cámaras de mezcla, filtros, biológicos o cualquier otra obra que canalice o trate agua en depuración y tratamiento se dotarán de aros salvavidas provistos de al menos 5 m de cordaje.

Los equipos de medida se instalarán a una altura tal que haga fácil su mantenimiento y lectura a nivel del suelo o desde una plataforma barandillada, sin necesidad de recurrir a escaleras de mano, como puede ser el caso de los equipos a presión.

En los depósitos de almacenamiento de productos químicos con altura superior a 3 metros cuya boca de hombre se encuentre en su parte superior, se instalará un punto de anclaje certificado sobre éste para poder enganchar una línea de seguridad temporal con la ayuda de una pértiga, de manera que cuando se suba con la ayuda de una escalera de mano y se posicione sobre el depósito, el trabajador esté siempre asegurado.

Cuando en el edificio de control se contemple la instalación de un ascensor para facilitar el acceso a personas con discapacidad u otros, éste será conforme con lo dispuesto en el Real Decreto 2291/1985, por el que se aprueba el Reglamento de aparatos de elevación y manutención de los mismos, así como con el Real Decreto 88/2013 por el que se aprueba la Instrucción Técnica Complementaria AEM 1 "Ascensores" del Reglamento de aparatos de elevación y manutención, y con la Orden de 7 de febrero de 2014, de la Consejería de Transportes, Infraestructuras y Vivienda, por la que se establecen los parámetros exigibles a los ascensores en las edificaciones para que reúnan la condición de accesibles en el ámbito de la Comunidad de Madrid.

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### 3.2.12 Riesgos químicos por la manipulación de productos químicos y medidas a tomar

En las EBAR, tanques de tormenta e infraestructuras de alcantarillado no es probable la instalación de almacenamientos de productos químicos y, en especial, de líquidos corrosivos.

Si excepcionalmente se dispusiera de éstos, los reactivos clasificados como corrosivos deberán cumplir con la normativa indicada en este anejo y, en especial, con el Real Decreto 379/2001, por el que se aprueba el Reglamento de almacenamiento de productos químicos (APQ).

También será de aplicación la Instrucción Técnica complementaria MIE-APQ-6 en cuanto a su almacenamiento y dosificación, cubetos de retención, alarmas de nivel máximo, venteos, duchas de emergencia, pantallas antisalpicaduras, etc.

El almacenamiento, carga, descarga y trasiego de productos químicos deberá cumplir con la normativa indicada en este anejo y, en especial, con el Real Decreto 656/2017, por el que se aprueba el Reglamento de Almacenamiento de Productos Químicos y sus Instrucciones Técnicas Complementarias MIE APQ 0 a 10, así como el Real Decreto 840/12015, por el que se aprueban medidas de control de los riesgos inherentes a los accidentes graves en los que intervengan sustancias peligrosas.

Será de aplicación lo establecido en las Instrucciones Técnicas Complementarias MIE APQ 0 a 10 en lo relativo a:

- Situación del almacenamiento y señalización del mismo
- Distancia del almacenamiento al resto de las instalaciones
- Características de construcción del almacenamiento
- Cubetos de retención
- Protección contra incendios
- Sistemas de instrumentación
- Dispositivos de seguridad

En el diseño de los almacenamientos e instalaciones de dosificación se tendrán en cuenta lo dispuesto en las fichas de datos de seguridad (FDS) de los productos químicos a utilizar en la infraestructura, especialmente en lo relativo a los riesgos, señalización y medidas a adoptar relativas a almacenamientos, reactividad e incompatibilidades.

Las zonas de almacenamiento de estos productos se ubicarán obligatoriamente en lugares aislados de la instalación de Canal de Isabel II y fuera de la zona de paso, prohibiéndose el almacenamiento de productos inflamables o explosivos en el interior de los edificios de las instalaciones. No se ubicarán los almacenamientos bajo rasante (arquetas, cámaras, sótanos, etc.).

Cuando en la instalación se almacenen sustancias peligrosas el adjudicatario elaborará antes del comienzo de la explotación un estudio documentado en el que se acredite si le es de aplicación el Real Decreto 840/2015, por el que se aprueban medidas de control de los riesgos inherentes a los accidentes graves en los que intervengan sustancias peligrosas, estableciendo en su caso si se trata de un establecimiento de nivel inferior o de nivel superior. Antes de la explotación se presentará a la Administración competente la notificación informativa de características del almacenamiento conforme el artículo 7 del citado Real Decreto.

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Cuando se trate de establecimientos de nivel superior, antes de la explotación el adjudicatario redactará un Informe de Seguridad conforme el artículo 10 del citado Real Decreto que, acompañado de un certificado de que la instalación cumple con lo establecido por el Real Decreto emitido por Organismo de Control habilitado que se presentará al órgano competente de la Administración Autonómica.

Se señalizarán las áreas de almacenamiento de productos químicos según lo indicado en el Real Decreto 485/1997, sobre las disposiciones mínimas en materia de señalización de seguridad y salud en el trabajo.

Según las indicaciones del Real Decreto 374/2001, sobre la protección de la salud y seguridad de los trabajadores contra los riesgos relacionados con los agentes químicos durante el trabajo:

- En el diseño de los procesos, se tendrá en cuenta la utilización de productos químicos poco peligrosos y en cantidades limitadas cuando sea posible.
- Los riesgos de los productos químicos y las medidas de prevención y protección a tener en cuenta se señalizarán igualmente conforme a lo establecido en la ficha de datos de seguridad (FDS).
- Los locales de trabajo donde se almacenen o utilizan productos químicos con posible emanación de vapores o gases peligrosos, deberán estar debidamente ventilados, instalando, si procede, detección atmosférica asociada a una alarma acústica y óptica, como es el caso de los almacenes de cloro gas, amoniaco anhidro, y la generación del dióxido de cloro u ozono.
- En los bombeos de agua residual con posible riesgo de emanaciones de sulfuro de hidrógeno (bombeos, depósitos de homogenización, etc.), dispondrán de extracción y detección atmosférica.
- Los almacenamientos de productos químicos en bidones, GRG u otros recipientes análogos adecuados al reactivo en cuestión, dispondrán de cubetos de retención.

  El cubeto de retención podrá ser de obra (estanco y pintado) o de material plástico resistente con una capacidad acorde al almacenamiento.
- Las bombas de dosificación y llenado, bocas de carga y puntos críticos estarán apantallados, al objeto de evitar proyecciones, disponiendo de parada de emergencia a las bombas por las que trasieguen productos químicos.
- Las tuberías, recipientes y áreas de almacenamiento de productos químicos estarán claramente identificados y señalizados, especialmente en los puntos de dosificación como pueden ser las cámaras de mezcla u otros similares, de conformidad con lo dispuesto en el Real Decreto 485/1997, sobre disposiciones mínimas en materia de señalización de seguridad y salud en el trabajo.
- Las instalaciones de almacenamiento en las que se prevea realizar trasvases, dispondrán de bombas portátiles habilitadas al efecto.
- Inmediatamente después del llenado de los depósitos de los productos químicos a almacenar, el adjudicatario procederá a realizar una evaluación ambiental por un Técnico de Prevención habilitado, midiendo los contaminantes previsibles. En base al informe realizado, se adoptarán cuantas medidas sean necesarias al objeto de emitir un certificado por el que se acredite que la atmósfera interior de las zonas de almacenamiento son seguras y no entrañan riesgo para los trabajadores, quienes podrán realizar las labores habituales de explotación de la instalación sin necesidad de hacer uso de equipos de protección respiratoria. El certificado se entregará junto con el resto documentación de la obra.Los valores límite en relación con los contaminantes

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químicos se han de referenciar con los "Límites de exposición profesional para agentes químicos" en vigor establecidos por el Instituto Nacional de Seguridad, Salud y Bienestar en el Trabajo (INSSBT).

- Próximo a los almacenamientos se colocará un armario señalizado con guantes de protección química, delantal de protección química y gafas / pantalla antisalpicadura. Los envases o recipientes utilizados para manipular, transvasar, etc. los productos químicos serán adecuados al producto químico a contener, tendrán las dimensiones, forma y características que minimicen el riesgo de salpicadura, proyecciones, incendio y/o explosión.

Se diseñarán los cubetos estancos oportunos, así como pantallas antisalpicaduras necesarias para evitar los riesgos de quemaduras, intoxicación o cualquier otro riesgo contra la salud de los trabajadores.

Las instalaciones de almacenamiento de reactivos se dotarán de absorbentes y neutralizadores adecuados a los productos químicos utilizados, para que en el caso de vertido, se pueda recoger inmediatamente el producto derramado, evitando daños en la instalación y evitando la formación de atmósferas contaminantes.

Los almacenamientos que les sea de aplicación el Real Decreto 656/2017, por el que se aprueba el Reglamento de almacenamiento de productos químicos y sus Instrucciones Técnicas Complementarias MIE APQ 0 a 10, se diseñarán y construirán conforme establece la citada normativa, contando con la preceptiva autorización de puesta en servicio de las instalaciones antes de su explotación, previa certificación por OCA (Organismo de control autorizado)

#### *3.2.12.1 Almacenamiento de líquidos corrosivos en recipientes fijos*

- Las instalaciones deberán: Cumplir los requerimientos de la MIE-APQ-6 "Almacenamiento de líquidos corrosivos en recipientes fijos"
- Los depósitos serán adecuados al reactivo a contener, asegurándose que no presenta fugas ni escapes. Disponer del Certificado de construcción de los depósitos y del Certificado o documento que acredite la realización de la prueba hidráulica.
- Se mantendrán las distancias entre instalaciones y recipientes indicadas en la MIE-APQ-6 .
- Disponer de una zona de descarga amplia, impermeable, resistente, sin pendiente, despejada y libre de obstáculos.
- Disponer de un canal o registro de drenaje o recogida en el punto de descarga.
- Disponer de una toma de agua próxima con devanadera disponible y señalizada.
- Disponer de ventilación a exterior adecuada y suficiente de los recintos cerrados de almacenamiento.
- Disponer de boca de carga del depósito accesible y apantallada (lamas o metacrilato), con conexión rápida, tapa (con candado el clorito sódico) y sumidero en caso de derrame durante la descarga. No se permite compartir cubeto ni depósito de recogida en caso de derrame con bocas de carga de reactivos incompatibles.
- Disponer de una ducha lavaojos disponible próxima, debidamente calorifugada si está a la intemperie con la válvula de llenado lo más próxima al suelo para poder cerrarla si fuera necesario y evitar congelaciones. Junto a la ducha se dispondrá de un desagüe habilitado para recogida del agua vertida.

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- Disponer de señalización de las bocas de llenado, depósito y conducciones, indicando además los riesgos y medidas de prevención/protección a adoptar. Además se señalizará el uso obligatorio de equipos de protección.
- En caso de, disponer de bombas de llenado del depósito. Estarán apantalladas yprovistas de botonera de emergencia.
- Diseñar las conducciones por las que discurra el líquido corrosivo fabricadas con materiales adecuados al líquido a conducir, en buen estado, con uniones estables, sin enterrar (salvo que vayan en un pasa tubos y se justifique), resistentes en su caso a ala luz solar, bien ancladas, protegidas, alejadas de zonas de paso y sin puntos donde se generen sobretensiones o dilataciones, especialmente en codos.
- Los depósitos de almacenamiento se diseñarán teniendo en cuenta el consumo de reactivo previsto en la instalación, de manera que se reduzca en lo posible las descargas a realizar.
- Disponer de válvula de retención en la línea de llenado del depósito.
- Señalizar el depósito, indicando fabricante, tipo, capacidad, fecha fabricación y vida útil máxima del mismo.
- Disponer en los depósitos de una válvula de venteo o alivio de presión, debidamente conducida y sin riesgo de proyecciones, así como un venteo conducido a torre de absorción si el líquido corrosivo almacenado desprende vapores peligrosos (ácido clorhídrico y solución amoniacal, entre otros).
- Los depósitos dispondrán de boca de hombre para su revisión preferentemente a nivel del suelo.
- Colocar el depósito sobre bancada impermeable, bien aplomado y alineado, estando dotado de una columna y sonda de nivel asociada a alarma de sobrellenado.
- En la cubierta sobre los depósitos de más de 3 m de altura, se dispondrá de un punto de anclaje seguro y homologado para conectar una línea de seguridad temporal con la ayuda de una pértiga y permitir el acceso seguro a las sondas de nivel.
- Si el depósito fuera de doble pared, disponer de un sistema de detección de fugas con alarma, así como un bordillo de 10 cm para recogida de posibles derrames, con pendiente a la red de drenajes.
- Disponer de cubeto de retención con capacidad suficiente, sin reactivos incompatibles entre ellos y con separación mínima de 1 m entre los depósitos y la pared del cubeto. El cubeto dispondrá de dos accesos, será estanco y tendrá una pendiente mínima a punto de recogida y posterior tratamiento de efluentes.
- Diseñar el depósito con una válvula manual de salida, purga o vaciado en su parte inferior (preferentemente se instalará doble válvula para evitar errores).
- Diseñar las bombas de dosificación adecuadas a los reactivos a trasegar y provistas de botonera de emergencia junto a éstas. Igualmente, estarán apantalladas y ubicadas en una zona con cimentación estanca, provista de un punto de recogida en previsión de derrames (instalar preferentemente dentro del cubeto del depósito). El punto de recogida no será compartido por reactivos incompatibles.

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Las torres de lavado o neutralización que utilicen productos químicos también dispondrán de cubeto de retención, tubería de llenado y punto de toma de muestras provisto de válvula de salida.

### 3.2.13 Riesgos de exceso de ruidos en las instalaciones y medidas a tomar

Existen zonas dentro de las EBAR y tanques de tormenta de Canal de Isabel II donde los niveles sonoros son excesivos y precisan de una serie de medidas de protección para evitar daños a la salud del personal de mantenimiento. Se trata, principalmente entre otras, de salas de bombeo, desbaste en interior, cámaras de rotura, grupos electrógenos y compresores, entre otros.

Tal y como se contempla en el artículo14 del Código Técnico de la Edificación (Real Decreto 314/2006), el objetivo de este requisito básico, DB HR Protección frente al ruido, consiste en limitar dentro de los edificios, y en condiciones normales de utilización, el riesgo de molestias o enfermedades que el ruido pueda producir a los usuarios, como consecuencia de las características de su proyecto, construcción, uso y mantenimiento.Para satisfacer este objetivo, los edificios se proyectarán, construirán, utilizarán y mantendrán de tal forma que los elementos constructivos que conforman sus recintos tengan unas características acústicas adecuadas para reducir la transmisión del ruido aéreo, del ruido de impactos y del ruido y vibraciones de las instalaciones propias del edificio, y para limitar el ruido reverberante de los recintos.

El Documento Básico DB HR Protección frente al Ruido del Código Técnico de la Edificación especifica parámetros objetivos y sistemas de verificación cuyo cumplimiento asegura la satisfacción de las exigencias básicas y la superación de los niveles mínimos de calidad propios del requisito básico de protección frente al ruido.

Siguiendo las indicaciones del Real Decreto 286/2006 sobre la protección de la salud y la seguridad de los trabajadores contra los riesgos relacionados con la exposición al ruido, los riesgos derivados de la exposición al ruido deberán eliminarse en su origen o reducirse al nivel más bajo posible, teniendo en cuenta los avances técnicos y la disponibilidad de medidas de control del riesgo en su origen.

Se tendrán en consideración los valores límite de exposición y los valores de exposición que dan lugar a una acción, referidos a los niveles de exposición diaria y a los niveles de pico establecidos en el Real Decreto 286/2006.

Los equipos de trabajo que emitan niveles de ruido elevados (motores, compresores, etc.) se instalarán, preferentemente, en recintos aislados. En caso de tener que ubicarlos en zonas donde se desarrollen otras actividades, siempre que sea viable, se deberán apantallar o encapsular. Los centros de control de motores y salas de control se mantendrán en recinto aparte del local con riesgo de ruido, debidamente aislado del ruido.Los equipos de trabajo generadores de ruido y vibraciones se instalarán sobre bancadas debidamente amortiguadas, para minimizar el ruido y evitar que las vibraciones que generen se propaguen al resto del edificio.

En la documentación técnica de los equipos de trabajo generadores de ruido y vibraciones, se especificará los niveles de ruido y vibraciones que emiten.

En los locales donde los niveles de ruido sean elevados debido a los equipos allí instalados, se señalizará el uso obligatorio de protección auditiva, que estará ubicada en las áreas previas al acceso de la zona con elevado ruido. En dichos recintos se dispondrá de un dispensador de tapones junto a la entrada, próximo a la señal de uso obligatorio de protección auditiva.

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### 3.2.14 Riesgos de salubridad, condiciones termo higrométricas, calidad de aire e iluminación y medidas a tomar

En cualquier instalación de trabajo existe el riesgo de que los usuarios, dentro de los edificios y en condiciones normales de utilización, padezcan molestias o enfermedades, así como el riesgo de que los edificios se deterioren y de que deterioren el medio ambiente en su entorno inmediato, como consecuencia de las características de su proyecto, construcción, uso y mantenimiento.

Las edificaciones a las que les sea de aplicación el Real Decreto 314/2006, por el que se aprueba el Código Técnico de la Edificación (), incluidas sus instalaciones, han de satisfacer los requisitos básicos de:

- DB SE Seguridad estructural.
- DB SI Seguridad en caso de incendio.
- DB SU Seguridad de utilización y accesibilidad.
- DB HS Salubridad. Higiene, salud y protección del medio ambiente.
- DB HE Ahorro de energía.

Siguiendo las indicaciones del artículo 13 del Código Técnico de la Edificación, para mantener las condiciones de salubridad los edificios se proyectarán, construirán, mantendrán y utilizarán de tal forma que se cumplan las exigencias básicas que se establecen en los apartados siguientes:

- Se limitará el riesgo previsible de presencia inadecuada de agua o humedad en el interior de los edificios y en sus cerramientos como consecuencia del agua procedente de precipitaciones atmosféricas, de escorrentías, del terreno o de condensaciones, disponiendo medios que impidan su penetración o, en su caso permitan su evacuación sin producción de daños.
- Los edificios dispondrán de espacios y medios para extraer los residuos ordinarios generados en ellos de forma acorde con el sistema público de recogida de tal manera que se facilite la adecuada separación en origen de dichos residuos, la recogida selectiva de los mismos y su posterior gestión.
- Los edificios dispondrán de medios para que sus recintos se puedan ventilar adecuadamente, eliminando los contaminantes que se produzcan de forma habitual durante el uso normal de los edificios, de forma que se aporte un caudal suficiente de aire exterior y se garantice la extracción y expulsión del aire viciado por los contaminantes.

  Para limitar el riesgo de contaminación del aire interior de los edificios y del entorno exterior en fachadas y patios, la evacuación de productos de combustión de las instalaciones térmicas se producirá con carácter general por la cubierta del edificio, con independencia del tipo de combustible y del aparato que se utilice, y de acuerdo con la reglamentación específica sobre instalaciones térmicas.

- Los edificios dispondrán de medios adecuados para suministrar al equipamiento higiénico previsto agua apta para el consumo de forma sostenible, aportando caudales suficientes para su funcionamiento, sin alteración de las propiedades de aptitud para el consumo e impidiendo los posibles retornos que puedan contaminar la red, incorporando medios que permitan el ahorro y el control del caudal del agua.

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Los equipos de producción de agua caliente dotados de sistemas de acumulación y los puntos terminales de utilización tendrán unas características tales que eviten el desarrollo de gérmenes patógenos.

- Los edificios dispondrán de medios adecuados para extraer las aguas residuales generadas en ellos de forma independiente o conjunta con las precipitaciones atmosféricas y con las escorrentías.

  El diseño y las características constructivas de las instalaciones de saneamiento deberán asegurar la ausencia de olores molestos en las instalaciones, especialmente en el edificio de control, disponiendo de los sifones y arquetas necesarias adecuadamente estancos.

- El diseño y las características constructivas de los lugares de trabajo deberán ofrecer unas adecuadas condiciones ambientales, tanto termohigrométricas como de calidad del aire, acordes con lo dispuesto en el Real Decreto 486/1997, por el que se establecen disposiciones mínimas de seguridad y salud en los lugares de trabajo.
- Las condiciones ambientales en los locales donde se realicen trabajos sedentarios propios de oficinas o similares, así como los locales de descanso, servicios higiénicos, comedores y de los locales de primeros auxilios, serán las adecuadas, no suponiendo un riesgo para la seguridad y la salud de los trabajadores. Se trata de instalaciones no industriales que han de cumplir igualmente con lo dispuesto en el Real Decreto 1027/2007, por el que se aprueba el Reglamento de instalaciones térmicas en los edificios (RITE) y el Real Decreto 1826/2009 que lo modifica.

  Así, entre las medidas técnicas mínimas de prevención y protección necesarias a tener en cuenta en el diseño y construcción de los edificios sujetos al RITE destacan las siguientes:

  - Cumplir los requerimientos del RITE, disponiendo de la preceptiva autorización de puesta en servicio de la instalación emitida por órgano competente de la Comunidad Autónoma.
  - Los equipos instalados deberán estar ubicados en lugares accesibles para el personal de mantenimiento y sus accesos estarán protegidos contra el riesgo de caída en altura, habilitando los pasos necesarios mediante escaleras y/o plataformas.
  - Las conducciones de climatización estarán debidamente apoyadas y sujetas, evitando que discurran por zonas de paso en la medida de lo posible.
  - Todas las dependencias administrativas, vestuarios, comedor y local de primeros auxilios estarán climatizados.
  - Se dispondrá de documento de calificación energética.
  - En la instalación de climatización de los edificios se ha de tener en cuenta que se ha de aportar aire primario y extraer el aire viciado.
  - Ha de existir control de humedad relativa con un sistema de aporte de humedad al aire.
  - Las unidades de climatización se dimensionarán adecuadamente para todos los recintos del edificio, especialmente las zonas administrativas, comedor y vestuarios.
  - Las conducciones de climatización que discurran por el exterior se han de aislar convenientemente y han de estar protegidas de la radiación solar.

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- Las ventanas tienen que tener hojas que no permitan desemperniarlas y no han de permitir filtraciones.
- La puerta de acceso al edificio debe cerrarse mediante un muelle.

- Las instalaciones industriales con cámaras frigoríficas o que deban refrigerarse para garantizar un adecuado funcionamiento de los equipos de trabajo instalados, como puede ser los centros de control de motores (CCM) y salas de telecomunicaciones, atendiendo al tamaño de la instalación deberán cumplir con lo establecido en el Real Decreto 138/2011, por el que se aprueban el Reglamento de seguridad para instalaciones frigoríficas y sus instrucciones técnicas complementarias, debiendo diseñarse y construirse conforme establece las citadas normas, contando la con la preceptiva autorización de puesta en servicio de las instalaciones antes de su explotación, previa certificación por OCA o EICI, según proceda.

  Así, entre las medidas técnicas mínimas de prevención y protección necesarias a tener en cuenta en el diseño y construcción de las instalaciones frigoríficas destacan las siguientes:

  - Cumplir los requerimientos del Real Decreto 138/2011 y sus IT.
  - Los equipos instalados deberán estar ubicados en lugares accesibles para el personal de mantenimiento y sus accesos estarán protegidos contra el riesgo de caída en altura.
  - En el caso de cámaras frigoríficas industriales con temperaturas de funcionamiento por debajo de 0ºC, han de poder abrirse desde el interior.

- También, y tal y como se indica en el Real Decreto 486/1997 sobre las disposiciones mínimas de seguridad y salud en los lugares de trabajo, la iluminación en las áreas de trabajo deberá permitir que los trabajadores dispongan de condiciones de visibilidad adecuadas para poder circular por los mismos y desarrollar sus actividades sin riesgo para su seguridad y salud.

  Según la norma UNE-EN 12464-1sobre Iluminación. Ide los lugares de trabajo en interior, Especifica los requisitos de iluminación en lugares de trabajo interiores, que satisfagan las necesidades de confort y rendimiento visual de personas conuna capacidad visual normal.

  Conforme a lo establecido en el Anexo IV. Iluminación en los lugares de trabajo del RD 486/1997, los niveles mínimos de iluminación de los lugares de trabajo serán homogéneos y estarán definidos en función de las exigencias visuales de las zonas de trabajo, siendo:

| **Zona o parte del lugar de trabajo** | **Nivel mínimo de iluminación (lux)** |
|---|---|
| Zonas donde se ejecuten tareas con: | |
| Baja exigencia visual | 100 |
| Exigencia visual moderada | 200 |
| Exigencia visual alta | 500 |
| Exigencia visual muy alta | 1.000 |
| Áreas o locales de uso ocasional | 50 |
| Áreas o locales de uso habitual | 100 |
| Vías de circulación de uso ocasional | 25 |

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| | |
|---|---|
| Vías de circulación de uso habitual | 50 |

El nivel de iluminación de una zona en la que se ejecute una tarea se medirá a la altura donde ésta se realice, que en el caso de zonas de uso general será a 85 cm del suelo y, en el de las vías de circulación, será a nivel de suelo.

Estos niveles mínimos de iluminación deberán duplicarse cuando existan riesgos apreciables de caídas, choques u otros accidentes, o cuando el contraste de luminancias o de color entre el objeto a visualizar y el fondo sobre el que se encuentra sea muy débil. Evitar exceso de iluminación y contrastes pronunciados entre puestos de trabajo próximos.

Las luminarias, ventanas, vanos de iluminación cenital y dispositivos de ventilación estarán ubicadas de forma que se pueda realizar de forma segura las operaciones de mantenimiento, reparación, limpieza, abertura, cierre o ajuste.

En el caso de las luminarias, se ubicarán preferentemente sobre pared cuando la altura de éstas sea superior a 3,5 m y no en el techo. Cuando estén más altas o se interpongan obstáculos que dificulten el acceso de forma segura, se deberá prever el sistema de mantenimiento. Considerando que el uso de escaleras de mano es especialmente peligroso, por lo que atendiendo a la peligrosidad se deberá priorizar:

- La instalación de escaleras con plataformas fijas o dotar de escaleras con plataformas móviles.
- Dotar a la instalación de un sistema de fijación para el uso escaleras de mano con sistema de ancla je anticaida
- Utilizar plataformas elevadoras o cestas.

En el edificio de control, se han de instalar detectores de presencia en aseos enclavados con el alumbrado y extractor, y en las zonas administrativas un sistema de control de la iluminación en función de la luz solar mediante sensor foto sensible en la primera línea de alumbrado junto a las ventanas.

El alumbrado exterior se ha de legalizar conforme a la normativa electrotécnica de baja tensión y normativa de eficiencia energética en vigor.

Las ventanas o aberturas que pudieran provocar reflejos o deslumbramientos en los puestos de trabajo, dispondrán de una cobertura adecuada y regulable (preferentemente un estor con lamas regulables) que permita atenuar la luz del día que ilumine el puesto de trabajo y eliminar deslumbramientos.

- Las infraestructuras de depuración de aguas residuales y tratamiento de agua potable han de disponer de servicios higiénicos, locales de descanso y de primeros auxilios, ajustándose a lo dispuesto en el Real Decreto 486/1997 sobre las disposiciones mínimas de seguridad y salud en los lugares de trabajo y su Guía Técnica (INSHT), con las siguientes particularidades:
- Todas las instalaciones, independientemente de su tamaño y número de trabajadores previstos para su explotación y mantenimiento, dispondrán de:

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a) Aseos diferenciados por sexo con una ducha, lavabos y retretes de descarga automática de agua en cabinas provistas de puerta con cierre interior y percha, estando provistos de agua potable y agua caliente sanitaria (ACS). Los aseos dispondrán de espejos, dosificador de jabón y dispensador de papel para secado de manos con garantías higiénicas.

   Las duchas dispondrán de un cerramiento o mampara con cierre interior y percha.

b) Local de primeros auxilios

   - Se ubicará en un lugar fácilmente accesible y próximo a la entrada del edificio en planta baja.
   - Dispondrá de una toma de agua potable y lavabo, así como un dispensador de papel.
   - Se le dotará de una camilla con ruedas, camilla de emergencia plegable, silla, percha y un armario para el botiquín de primeros auxilios y botiquín portátil.

c) Comedor. El comedor dispondrá de las instalciones y dispositivos siguientes

   - Armarios, mesas y sillas con respaldo en número suficiente.
   - Fregadero y escurreplatos.
   - Microondas
   - Frigorífico
   - Placa eléctrica para cocinar y campana extractora al exterior.
   - Ventilación suficiente y adecuada.

d) Vestuarios segregados por sexo provistos de taquillas y duchas, estando fácilmente comunicados con los aseos, sin necesidad de cruzar pasillos ajenos a éstos.

   Los vestuarios dispondrán de:

   - Taquillas con llave dobles, con capacidad suficiente para guardar la ropa y el calzado, permitiendo separar la ropa de trabajo de la ropa de calle.
   - Bancos para poder cambiarse.
   - Lavadora y secadora.

- Cuando sea exigible el aseo para discapacitados deberá cumplir con lo dispuesto en en el Real Decreto 314/2003, por el que se aprueba el Código Técnico Edificación, en el Documento Básico DB SUA 9. Accesibilidad.
- Los locales, instalaciones y equipos mencionados serán de fácil acceso, adecuados a su uso y de características constructivas que faciliten su limpieza, dimensionándose de manera que permitan la utilización de éstos sin dificultades o molestias, teniendo en cuenta en cada caso el número de trabajadores que vayan a utilizarlos simultáneamente.
- Cuando se realiza una obra de remodelación o ampliación de una infraestructura en funcionamiento y se de la circunstancia que los aseos y vestuarios del personal propio existentes se vean afectados, se dotará a la instalación de casetas habilitadas al efecto próximas al edificio de control.

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# 4. CONSIDERACIONES PARTICULARES

## *4.1 Consideraciones necesarias respecto a la adecuación de los equipos de trabajo*

Se deberán emitir certificados de adecuación con lo dispuesto en el Real Decreto 1215/1997, modificado por el Real Decreto 2177/2004, por el que se establecen las disposiciones mínimas de seguridad y salud para la utilización por los trabajadores de los equipos de trabajo, por equipos o conjunto de equipos que formen parte de un mismo proceso.

Como se ha indicado, cuando se instalen un conjunto de equipos de trabajo operando como un sistema integrado, aún cuando los equipos dispongan de marcado CE o certificado de adecuación individual al Real Decreto 1215/1997, se precisa un certificado de conformidad del conjunto respecto a la citada norma.

Estos certificados serán entregados tras ser los equipos de trabajo sometidos a las condiciones normales de operación, orden de marcha y maniobra, además de examinarse los elementos susceptibles de producir daño, y los elementos de seguridad, regulación y control de los mismos.

Éstos se adjuntarán como parte de la documentación a aportar por el adjudicatario a Canal de Isabel II previamente a la recepción de las obras.

Esta inspección será necesariamente realizada por un técnico competente o en su defecto por un Organismo de Control Autorizado.

En el presupuesto de Medidas de Prevención y Seguridad en las Instalaciones tras la finalización de los obras se incluirán las unidades correspondientes de ***Certificados de Adecuación de equipos al RD 1215/1997***.

## *4.2*

(A redactar por el autor del proyecto)

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# 5 PLAN DE AUTOPROTECCIÓN Y MEDIOS DISPONIBLES DE INTERVENCIÓN Y PRIMEROS AUXILIOS

El diseño y las características constructivas de los lugares de trabajo deberán facilitar el control de las situaciones de emergencia, en especial en caso de incendio y posibilitar, cuando sea necesario, la rápida y segura evacuación de los trabajadores.

Atendiendo al número, situación, dimensiones, condiciones constructivas de las instalaciones y requerimientos normativos, se habilitarán salidas de emergencia con apertura al exterior y barra antipánico para facilitar su apertura. Nunca han de estar cerradas con llave.

Las vías y salidas de evacuación, así como las vías de circulación y las puertas que den acceso a ellas, se ajustarán a lo dispuesto en la normativa en vigor.

Los portones de accionamiento electromecánico que no permitan su apertura manual, no se consideran salidas de emergencia.

El artículo 20 de la Ley 31/1995 de Prevención de Riesgos Laborales obliga a Canal de Isabel II a analizar las posibles situaciones de emergencia y a la adopción de las medidas necesarias en materia de primeros auxilios, contaminación química, incendios y evacuación de de los trabajadores.

Conforme a lo establecido en el Real Decreto 656/2017, por el que se aprueba el Reglamento de Almacenamiento de Productos Químicos y sus Instrucciones Técnicas Complementarias MIE APQ 0 a 10, cuando se almacenen productos químicos en cantidades tales que sea de aplicación, la instalación deberá disponer de un Plan de Autoprotección. El Plan de autoprotección se redactará de acuerdo a las directrices establecidas en el Real Decreto 393/2007, por el que se aprueba la Norma Básica de Autoprotección de los centros, establecimientos y dependencias dedicados a actividades que puedan dar origen a situaciones de emergencia, aún cuando éste último no le fuera de aplicación.

Cuando en la instalación se almacenen sustancias peligrosas el adjudicatario elaborará antes del comienzo de la explotación un estudio documentado en el que se acredite si le es de aplicación el RD 840/2015, por el que se aprueban medidas de control de los riesgos inherentes a los accidentes graves en los que intervengan sustancias peligrosas, estableciendo en su caso en la notificación a elaborar si se trata de un establecimiento de nivel inferior o de nivel superior; procediendo a continuación a la redacción de un Plan de emergencia interior, conforme a las directrices establecidas en el Real Decreto 1196/2003, por el que se aprueba la directriz básica de Protección Civil para el control y planificación ante el riesgo de accidentes graves en los que intervienen sustancias peligrosas.

Antes de la explotación se presentará a la Administración competente el Plan de Autoprotección de conformidad con lo dispuesto en el RD 840/2015, previa certificación por un Organismo de Control si así se estableciese.

Las instalaciones dispondrán de los medios necesarios para intervenir en caso de emergencia y/o restar los primeros auxilios conforme a lo establecido en el Plan de autoprotección, entre los que se contarán al menos:

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- Alarma acústica y óptica en caso de emergencia, diferenciando éstas, así como alarma de evacuación también diferenciada. En los locales con elevados niveles de ruido se dispondrá de paneles de alarma ópticos que adviertan al personal de la emergencia.
- Medios de extinción de incendios conforme a lo indicado en el apartado de riesgo de incendio y medidas a tomar del presente anejo.
- Local de primeros auxilios con toma de agua y lavabo, camilla con ruedas, camilla de emergencia plegable, silla, percha y un armario para el botiquín de primeros auxilios y botiquín portátil.
- Duchas y lavaojos de emergencia, así como diphoterine, junto a los almacenamientos de productos químicos y en el laboratorio.
- Equipos de respiración autónomos (2 Ud.) de Drager y botellas de repuesto (2 Ud.) en edificio de control para intervención y rescate en caso de incendio o emergencia química.
- Trípodes y/o pescantes anticaídas (1 Ud.) para rescate en registros conforme UNE-EN 360 y UNE-EN 1496 Clase B.

Los lugares de trabajo dispondrán de la señalización de emergencia y evacuación (salidas, salidas de emergencia, recorridos de evacuación y puntos de encuentro), lucha contra incendios (extintores, BIE, pulsadores de emergencia, entre otros) y primeros auxilios (Local de primeros auxilios, botiquín y duchas lavaojos) de conformidad con lo establecido en el Real Decreto 485/1997, sobre disposiciones mínimas en materia de señalización de seguridad y salud en el trabajo.

Antes de que pase un año desde su puesta en explotación y mantenimiento, se realizará un simulacro de emergencia que contemple incendio y fuga o derrame de agentes químicos, así como evacuación general, repitiéndose con una periodicidad anual.

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*Figura 1. Referencias a sistemas de anclaje según norma EN 795:2012. Personal fall protection equipments. Anchor devices.*

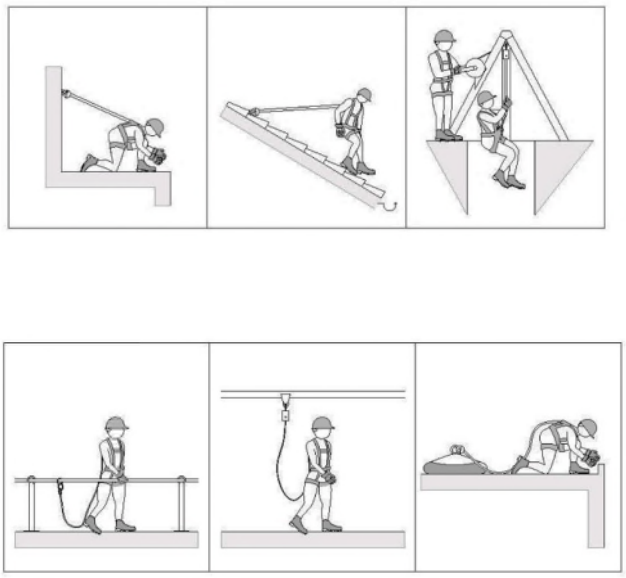
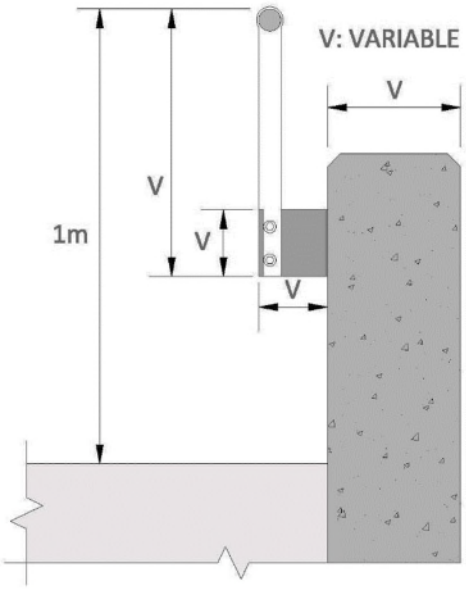


*Figura 2. Esquema barandilla en "L" anclada en muro*




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*Figura 3. Escala fija. Dimensiones*

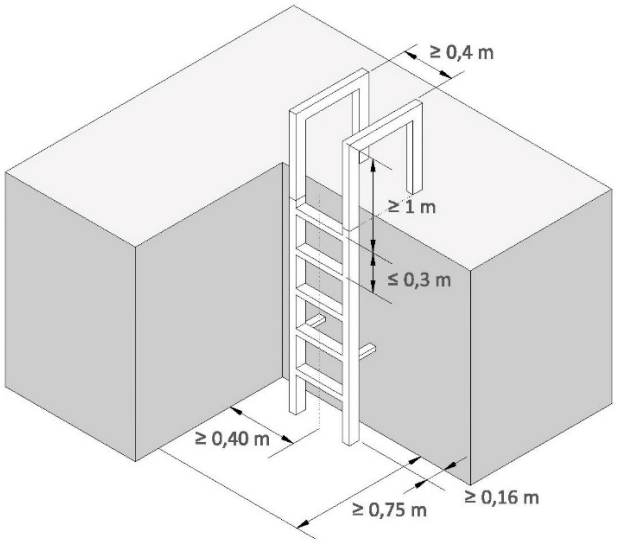
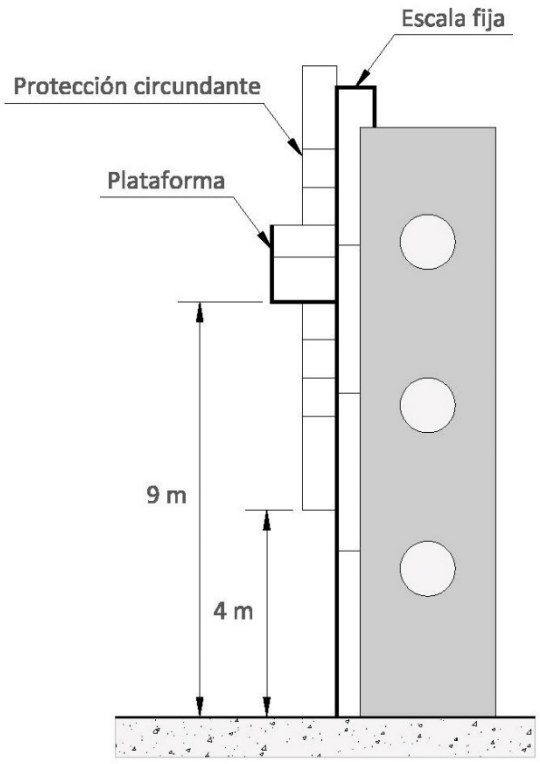



*Figura 4. Escala fija. Protecciones*




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*Figura 5. Escala fija con protección*

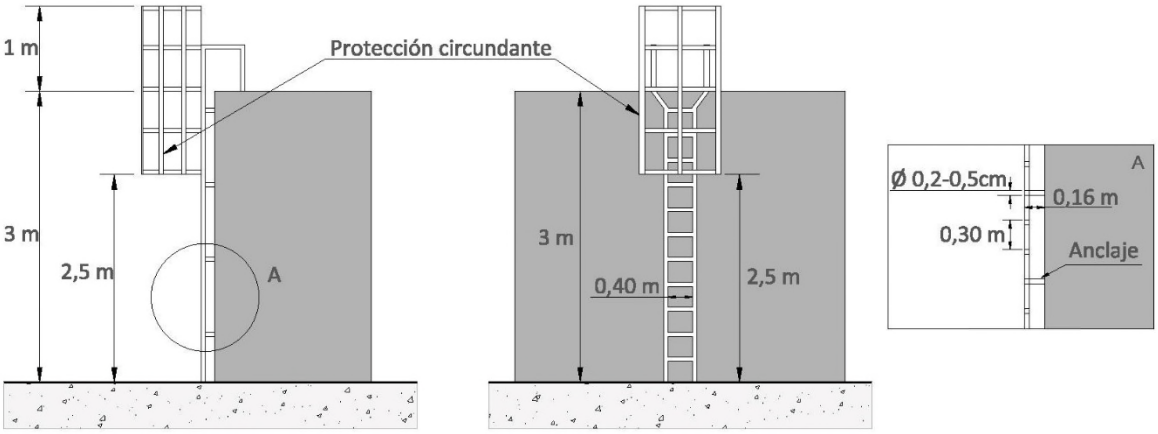
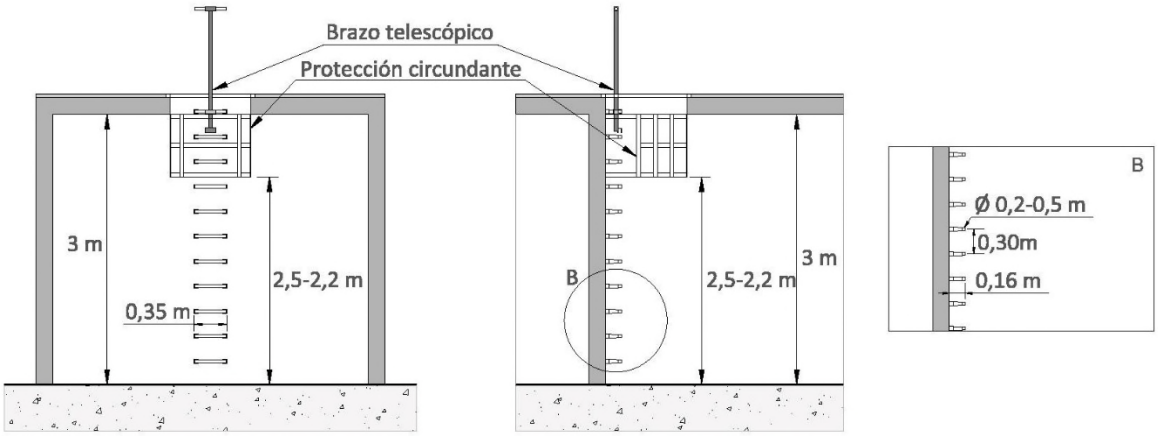
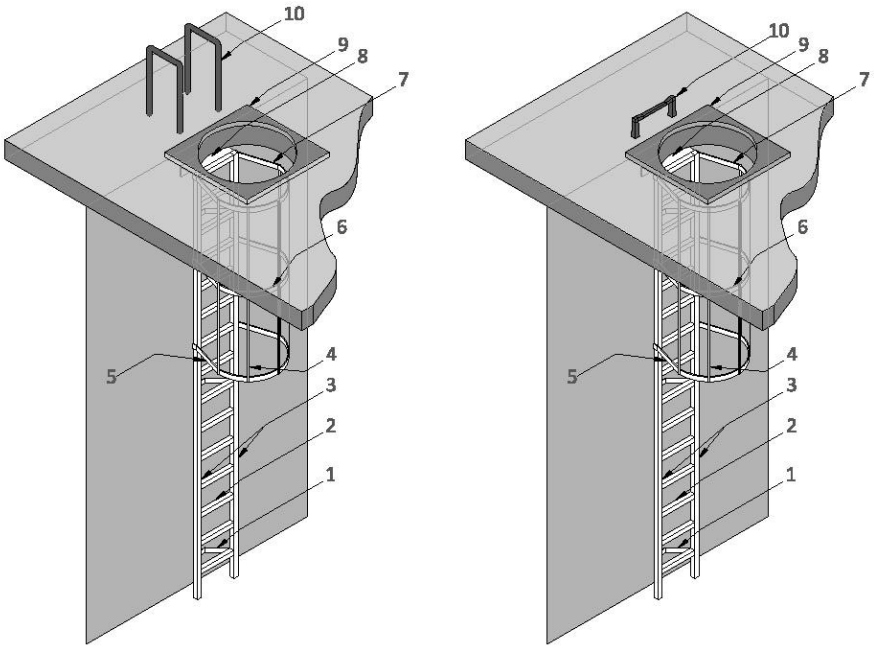



*Figura 6. Escala de pates con protección*

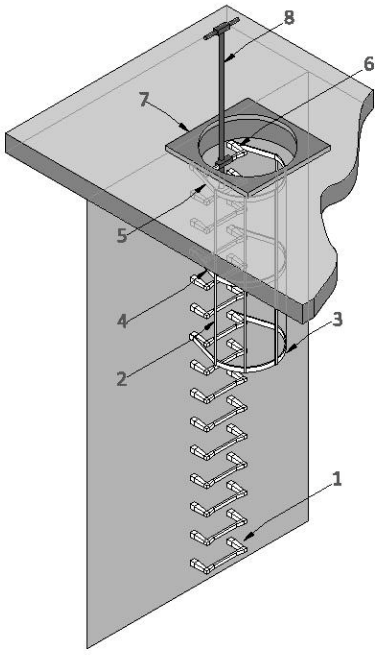



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*Figura 7. Asideros de acceso a pozos y cámaras.*




1- Anclaje
2- Peldaño
3- Montante de escalera
4- Elementos verticales de la protección circundante
5- Aro inferior
6- Aro intermedio
7- Aro superior
8- Plataforma
9- Acceso al pozo / cámara
10- Barandilla o pate




1- Pate
2- Elementos verticales de la protección circundante
3- Aro inferior
4- Aro intermedio
5- Aro superior
6- Pate con soporte para brazo telescópico
7- Acceso al pozo / cámara
8- Brazo telescópico

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# DOCUMENTO II.- PLANOS

## 14. Planos

Índice de Planos **Tanque Norte**:

1.- S-1. Situación y Emplazamiento.

2.- S-2. Zonificación.

3.- A-1. Arquitectura. Plano de Implantación.

4.- A-2. Arquitectura. Fondo Tanque.

5.- A-3. Arquitectura. Tapa Tanque.

6.- A-4. Arquitectura. Planta Caseta.

7.- A-5. Arquitectura. Sección Transversal.

8.- A-5. Arquitectura. Sección Transversal.

9.- E-1. Geometría. Losa Cimentación.

10.- E-2. Geometría. Losa Cubierta.

11.- E-3. Geometría. Secciones.

12.- E-4. Geometría. Secciones.

13.- E-5. Geometría. Secciones.

14.- E-6. Estructura. Losa Cimentación.

15.- E-7. Estructura. Losa Cubierta.

16.- E-8. Estructura. Secciones.

17.- E-9. Estructura. Secciones.

18.- E-10. Estructura. Secciones.

19.- E-11. Estructura. Secciones.

20.- E-12. Estructura. Secciones.

21.- E-13. Estructura. Secciones.

22.- E-14. Estructura. Cuadro de Pilares.

23.- E-15. Estructura. Detalles.

24.- AC-1. Planta. Acometidas.

25.- I-1. Instalaciones. Fuerza Caseta.

26.- I-2. Instalaciones. Alumbrado Caseta.

27.- I-3. Instalaciones. Alumbrado Tanque.

28.- I-4. Instalaciones. Unifilar.

29.- I-5. Instalaciones. Saneamiento.

30.- I-6. Instalaciones. Ventilación Caseta.

31.- I-7. Instalaciones. Ventilación Tanque.

31.- C-1. Colector Salida. Planta.

32.- C-2. Colector Salida. Perfil longitudinal.

32.- D-1. Colector Salida. Detalles.

## SITUACIÓN

ESCALA 1/1000

NORTE




| REDACTOR | LA PROPIEDAD | | | | |
|---|---|---|---|---|---|
| D.JOSÉ ANTONIO SEGURA SÁNCHEZ<br>INGENIERO REDACTOR | JUNTA DE COMPENSACIÓN<br>UE-VII.1 "SIST. GRLES PE+KODAK" | PROCAVER<br>SOLUCIONES URBANAS S.L.<br>PROCAVER@PROCAVER.COM | PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID). | FECHA<br>FEBRERO 2024<br>ESCALA<br>1/200 | PLANO<br>SITUACIÓN<br>PLANO DE SITUACIÓN | HOJA 1/1<br>S1 |

# SITUACIÓN

ESCALA 1/1000

ÁMBITO DE GESTIÓN (Coincidente con el ámbito de ordenación).
Superficie: 531.785,60 m2.

TERCIARIO.
ZONA 04 GRADO 2º NIVEL c.

EDIFICACIÓN EN BLOQUE ABIERTO EN PLANEAMIENTO REMITIDO.
ZONA 02 GRADO 0º.
ZONA 02 GRADO 1º.

EQ. DEPORTIVO PRIVADO.
EN PLANEAMIENTO REMITIDO.
ZONA 06 DEPORTIVO PRIVADO.

EQUIPAMIENTO GENÉRICO.
ZONA 06.

ESPACIOS LIBRES / ZONAS VERDES
ZONA 07.

RED VIARIA.
(LOCAL).

EQUIPAMIENTO.
SISTEMA INFRAESTRUCTURAL.
(CENTROS DE TRANSFORMACIÓN)

OTRAS DETERMINACIONES

ESPACIOS LIBRES DE TRANSICIÓN
PROTECCIÓN DE INFRAESTRUCTURAS
NO COMPUTABLES A EFECTOS DE REDES.
ZONA 07.

ZONA AFECTADA POR LA AMPLIACIÓN DE LA VÍA DE SERVICIO DE LA A-6.

RESERVA VÍA PECUARIA
EN ZONA BORDE A.6.
ZONA 07.

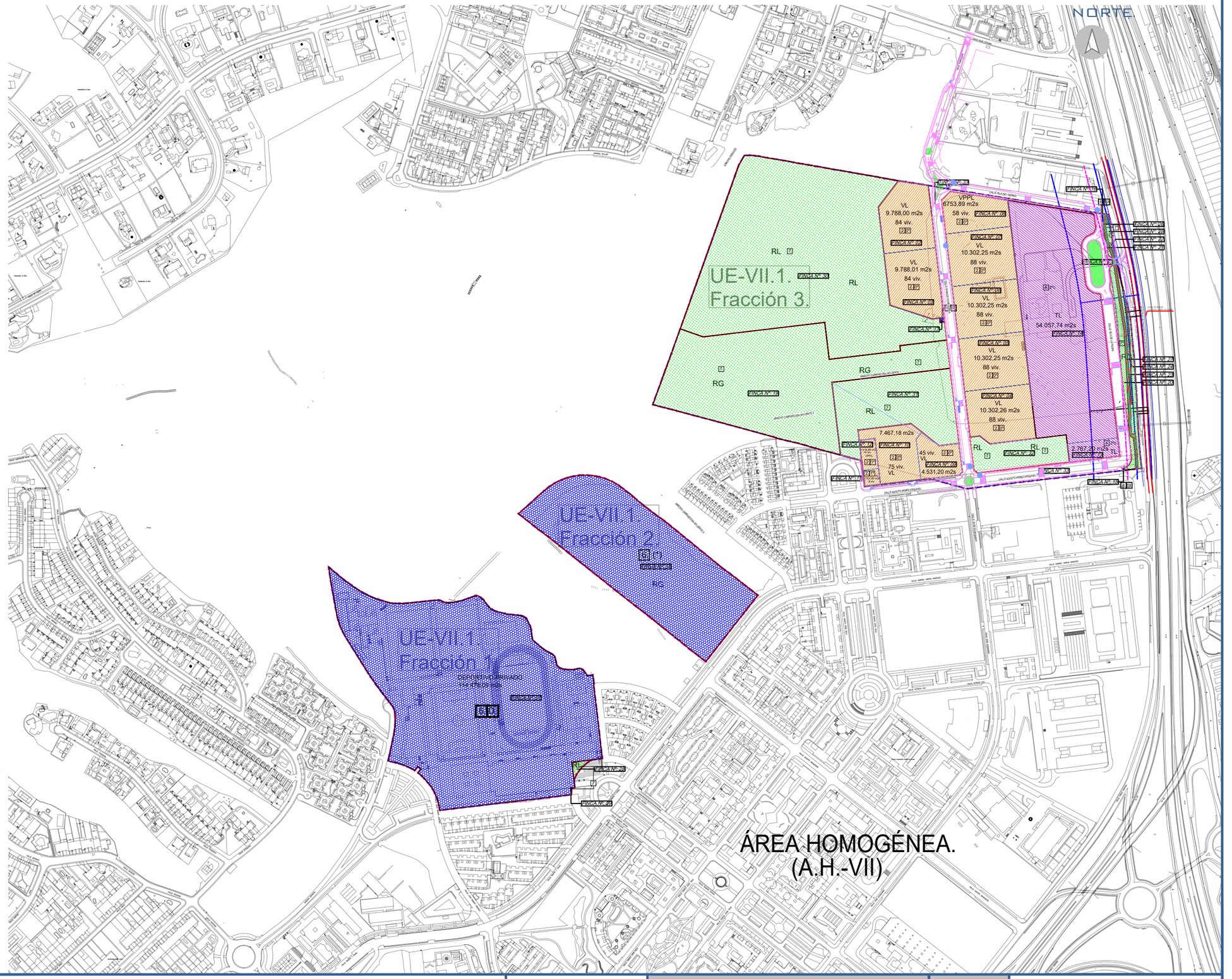
PARCELACIÓN ORIENTATIVA
EN USO RESIDENCIAL.

SUELO A REGENERAR.

En la parcela de R.G. así señalada se mantendrán e integrarán en su desarrollo las especies de piúretanos existentes.

CALIFICACIÓN DE REDES

RL RED LOCAL.
RG RED GENERAL.




| REDACTOR | LA PROPIEDAD | | | | |
|---|---|---|---|---|---|
| D.JOSÉ ANTONIO SEGURA SÁNCHEZ<br>INGENIERO REDACTOR | JUNTA DE COMPENSACIÓN<br>UE-VII.1 "SIST. GRLES PE+KODAK" | PROCAVER<br>SOLUCIONES URBANAS S.L.<br>PROCAVER@PROCAVER.COM | PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID). | FECHA<br>FEBRERO 2024<br>ESCALA<br>1/200 | PLANO<br>SITUACIÓN<br>PLANO DE ZONIFICACIÓN<br>HOJA 1/1<br>S2 |

# SITUACIÓN

ESCALA 1/200

NORTE

PN 4.25

IMB_PN4.25_2

COTA FONDO: 731.86

DN500

PN 4

DN400

IMB_PN4.24

COTA ENTRADA AC_PN2.4: 732.474

COTA FONDO: 731.955

CALLE FO

PN 2.4

PL 10

DN400

BP

IMB_PN4.25_1

DN315

IMB_

PN 2.3

IMB_2.3

COTA TAPA: 734.80

COTA FONDO: 732.70

AC_PN2.4

COTA FONDO: 732.17

DN400

CAL

PN 2.2

0+325

0+030

0+020

0+030

0+020

0+040

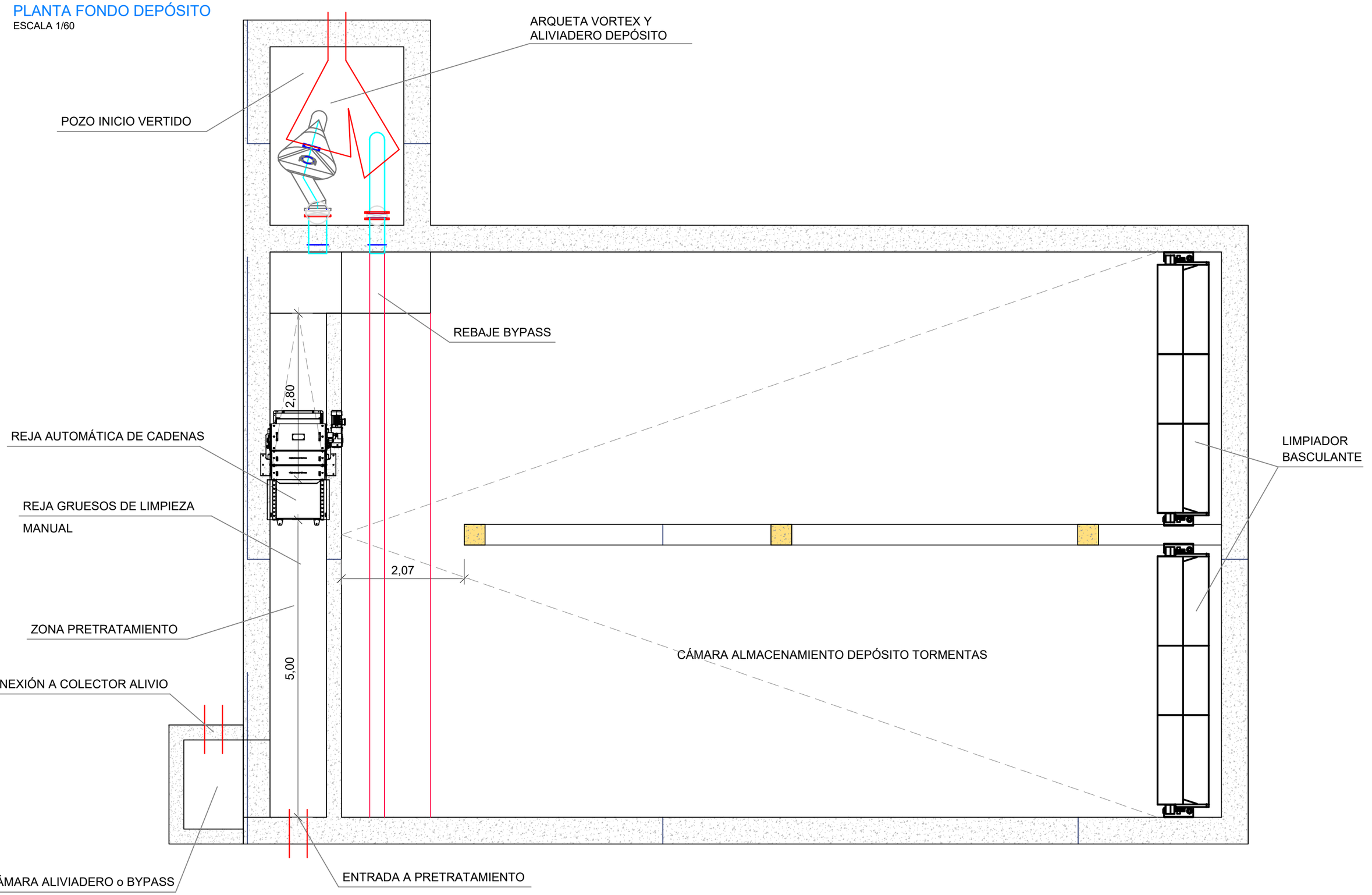
RECTA

RECTA 0+382.694

| | | | | | |
|---|---|---|---|---|---|
| REDACTOR<br>D.JOSÉ ANTONIO SEGURA SÁNCHEZ<br>INGENIERO REDACTOR | LA PROPIEDAD<br>JUNTA DE COMPENSACIÓN<br>UE-VII.1 "SIST. GRLES PE+KODAK" | PROCAVER<br>SOLUCIONES URBANAS S.L.<br>PROCAVER@PROCAVER.COM | PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID). | FECHA<br>FEBRERO 2024<br>ESCALA<br>1/200 | PLANO<br>ARQUITECTURA<br>PLANO DE IMPLANTACIÓN | HOJA 1/1<br>A1 |

# PLANTA FONDO DEPÓSITO

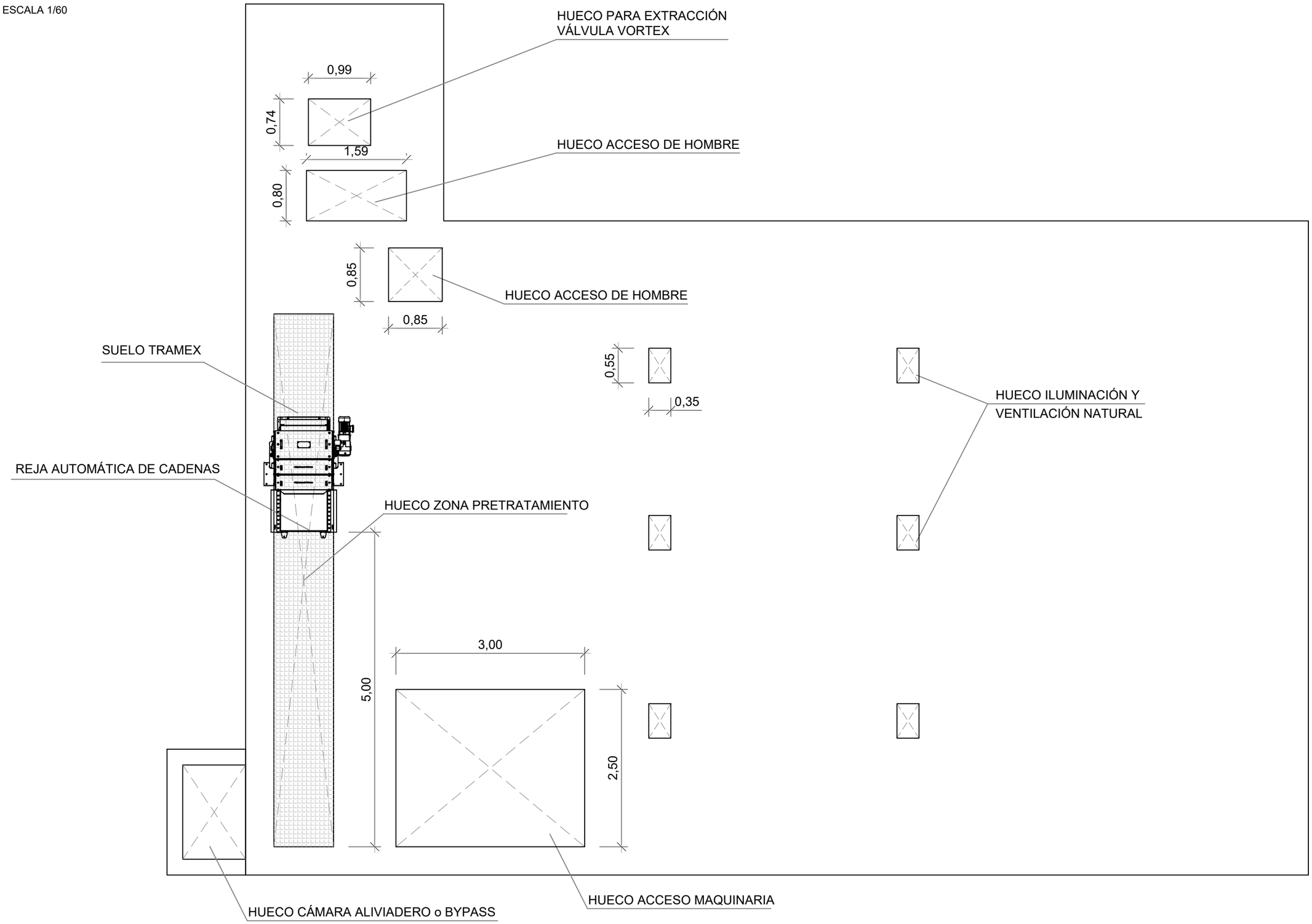
ESCALA 1/60




| REDACTOR | LA PROPIEDAD | | | | |
|---|---|---|---|---|---|
| D.JOSÉ ANTONIO SEGURA SÁNCHEZ<br>INGENIERO REDACTOR | JUNTA DE COMPENSACIÓN<br>UE-VII.1 "SIST. GRLES PE+KODAK" | PROCAVER<br>SOLUCIONES URBANAS S.L.<br>PROCAVER@PROCAVER.COM | PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID). | FECHA<br>FEBRERO 2024<br>ESCALA<br>1/60 | PLANO<br>ARQUITECTURA<br>FONDO TANQUE<br>HOJA 1/1<br>A2 |

# PLANTA TAPA DEPÓSITO

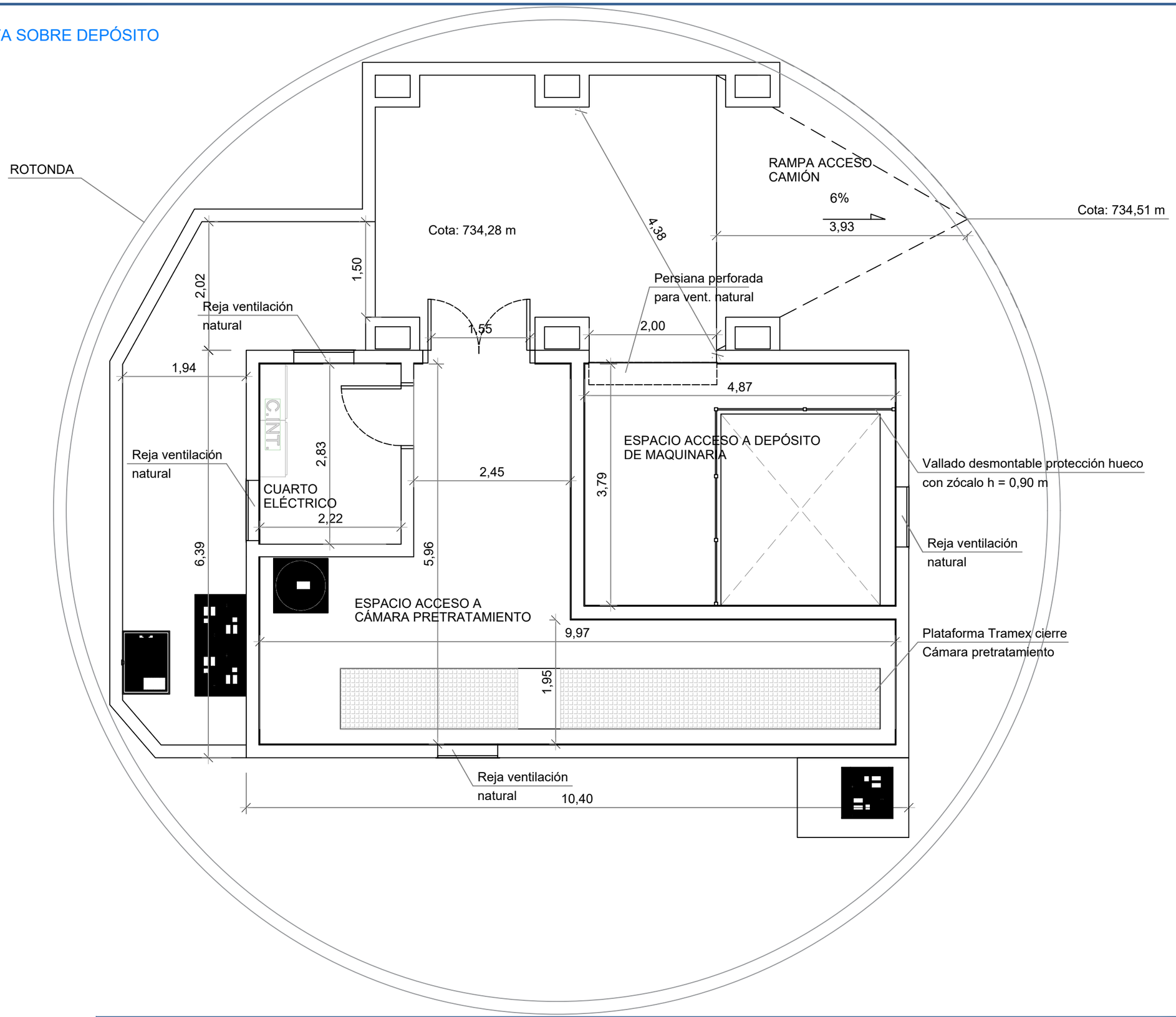
ESCALA 1/60




| | | | | | |
|---|---|---|---|---|---|
| REDACTOR<br>D.JOSÉ ANTONIO SEGURA SÁNCHEZ<br>INGENIERO REDACTOR | LA PROPIEDAD<br>JUNTA DE COMPENSACIÓN<br>UE-VII.1 "SIST. GRLES PE+KODAK" | PROCAVER<br>SOLUCIONES URBANAS S.L.<br>PROCAVER@PROCAVER.COM | PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID). | FECHA<br>FEBRERO 2024<br>ESCALA<br>1/60 | PLANO<br>ARQUITECTURA<br>TAPA TANQUE<br>HOJA 1/1<br>A3 |

# PLANTA CASETA SOBRE DEPÓSITO

ESCALA 1/60




| ACCIONES GRAVITATORIAS CONSIDERADAS | |
|---|---|
| MODULO DE BALASTO (k30x30) | 22 kg/cm³ |
| TENSIÓN ADMISIBLE DEL TERRENO (σ) | 0,30 MPa |

REDACTOR

D.JOSÉ ANTONIO SEGURA SÁNCHEZ
INGENIERO REDACTOR

LA PROPIEDAD

JUNTA DE COMPENSACIÓN
UE-VII.1 "SIST. GRLES PE+KODAK"

PROCAVER
SOLUCIONES URBANAS S.L.
PROCAVER@PROCAVER.COM

PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

FECHA
FEBRERO 2024

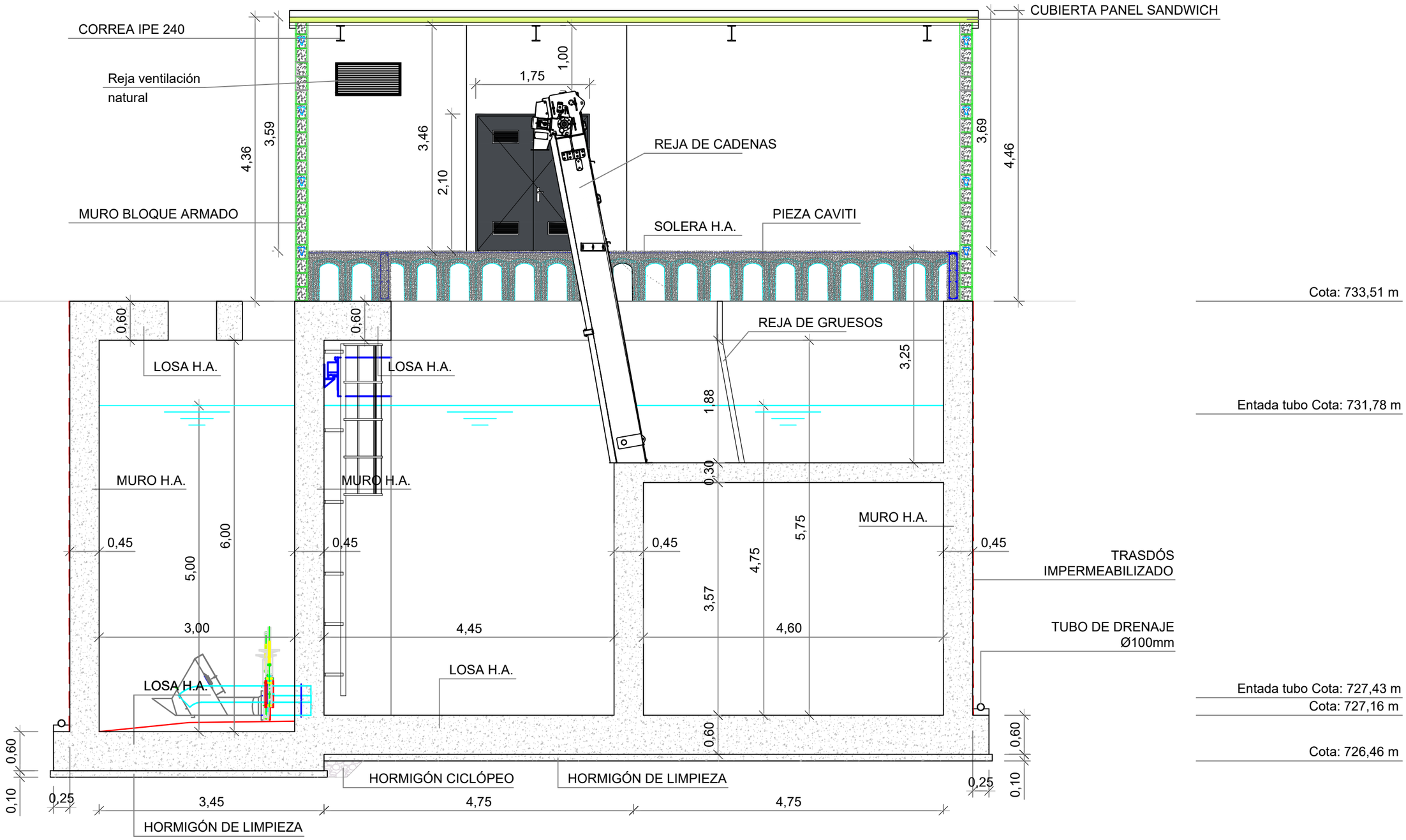
ESCALA
1/60

PLANO
ARQUITECTURA
PLANTA
CASETA

HOJA 1/1
A4

## SECCIÓN TRANSVERSAL

ESCALA 1/60




| ACCIONES GRAVITATORIAS CONSIDERADAS | |
|---|---|
| MODULO DE BALASTO ($k_{30x30}$) | 22 kg/cm³ |
| TENSIÓN ADMISIBLE DEL TERRENO (σ) | 0,30 MPa |


REDACTOR

D.JOSÉ ANTONIO SEGURA SÁNCHEZ
INGENIERO REDACTOR

LA PROPIEDAD

JUNTA DE COMPENSACIÓN
UE-VII.1 "SIST. GRLES PE+KODAK"

PROCAVER
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PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

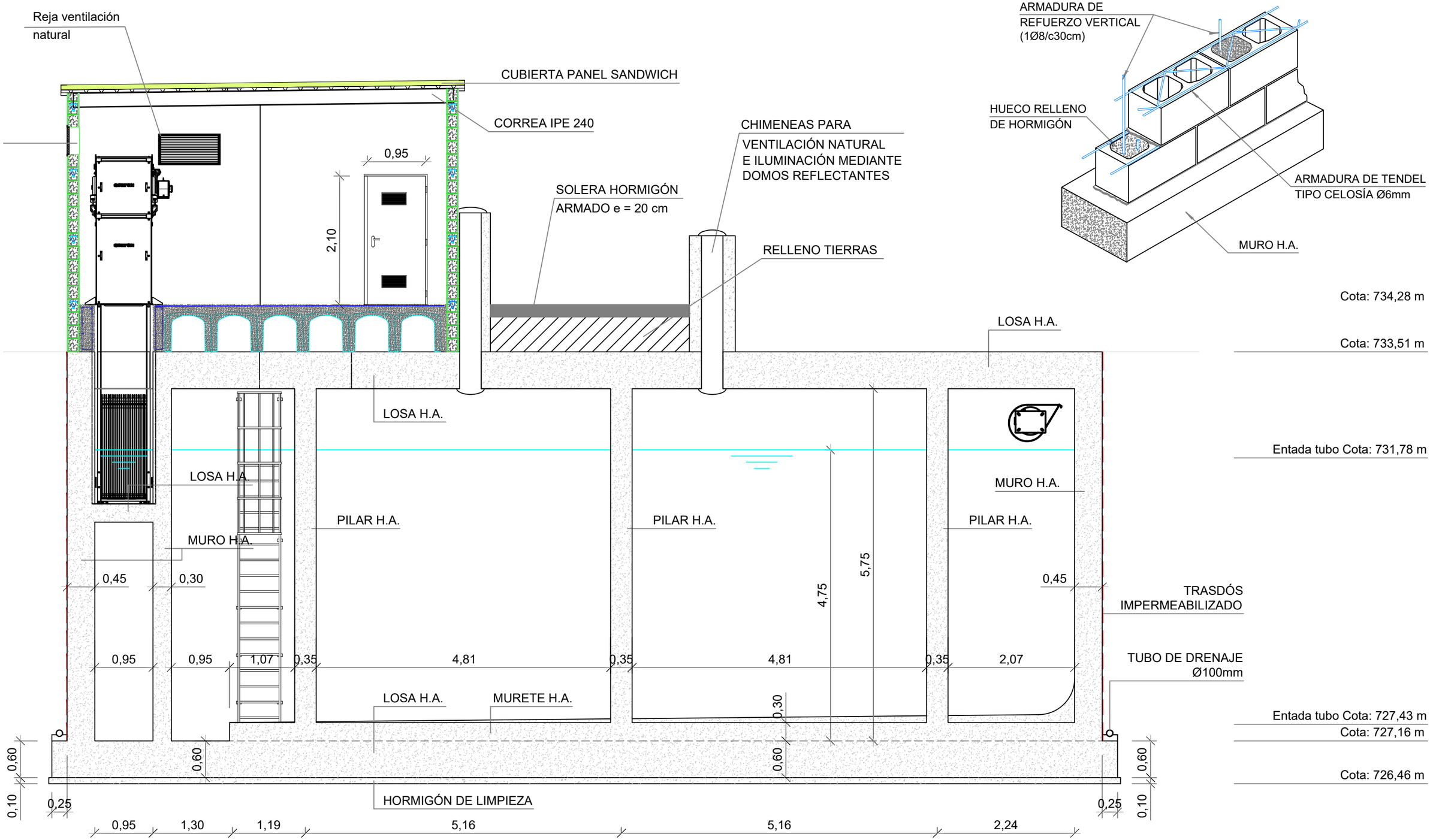
FECHA
FEBRERO 2024

ESCALA
1/60

PLANO
ARQUITECTURA
SECCIÓN TRANSVERSAL

HOJA 1/1
A5

## SECCIÓN LONGITUDINAL
ESCALA 1/60




## ESQUEMA MURO DE FÁBRICA DE BLOQUES DE HORMIGÓN
SIN ESCALA




| ACCIONES GRAVITATORIAS CONSIDERADAS | |
|---|---|
| MODULO DE BALASTO (k30x30) | 22 kg/cm³ |
| TENSIÓN ADMISIBLE DEL TERRENO (σ) | 0,30 MPa |

REDACTOR
D.JOSÉ ANTONIO SEGURA SÁNCHEZ
INGENIERO REDACTOR

LA PROPIEDAD
JUNTA DE COMPENSACIÓN
UE-VII.1 "SIST. GRLES PE+KODAK"

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FECHA
FEBRERO 2024

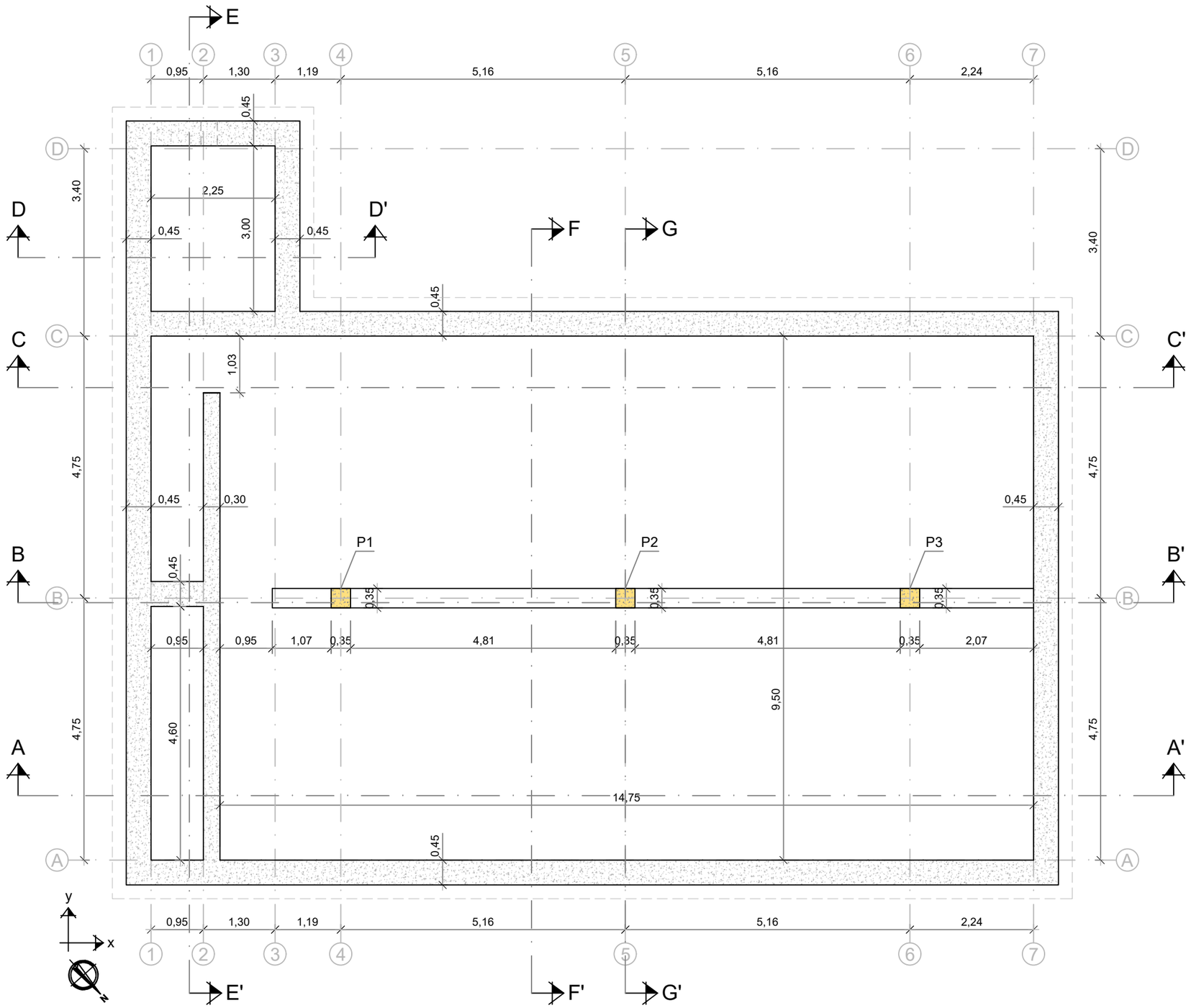
ESCALA
1/60

PLANO
ARQUITECTURA
SECCIÓN LONGITUDINAL

HOJA 1/1
A6

# GEOMETRÍA. PLANTA

ESCALA 1/80




CARACTERISTICAS DE LOS MATERIALES Y NIVELES DE CONTROL
(S/ CÓDIGO ESTRUCTURAL)

| MATERIAL | DESIGNACIÓN | NIVEL DE CONTROL | COEF. SEGUR. MATERIALES | | |
|---|---|---|---|---|---|
| | | | E.L.U. | | E.L.S. |
| | | | SIT.PERS O TRANS | SIT.ACCIDENTAL | |
| HORMIGON LIMPIEZA Y REGULARIZACIÓN | HL-150/B/20 | ESTADÍSTICO | 1.50 | 1.30 | 1.00 |
| HORMIGONES | HA-30/B/20/XC2 | | | | |
| ARMADURAS PASIVAS | B 500 S | NORMAL | 1.15 | 1.00 | 1.00 |
| MALLAZO | B 500 T | NORMAL | 1.15 | 1.00 | 1.00 |

COEFICIENTES PARCIALES DE SEGURIDAD. ACCIONES (S/ CÓDIGO ESTRUCTURAL)

| TIPO DE ACCIÓN | | | ESTADO LÍMITE ÚLTIMO (E.L.U.) | | | | ESTADO LÍMITE SERVICIO (E.L.S.) | |
|---|---|---|---|---|---|---|---|---|
| | | | SIT.PERS O TRANS | | SIT.ACCIDENTAL | | | |
| | | | FAVOR. | DESFAV. | FAVOR. | DESFAV. | FAVOR. | DESFAV. |
| ESTRUCTURAS HORMIGÓN ARMADO | PERMANENTE | | 1.00 | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 |
| | PERMANENTE DE VALOR NO CONSTANTE | | 1.00 | 1.50 | 1.00 | 1.00 | 1.00 | 1.00 |
| | VARIABLE | S.C.U. | 0.00 | 1.50 | 0.00 | 1.00 | 0.00 | 1.00 |
| | | TRÁFICO | 0.00 | 1.35 | 0.00 | 0.00 | 0.00 | 1.00 |
| | ACCIDENTAL | | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |

| | |
|---|---|
| MODULO DE BALASTO ($k_{30x30}$) | 22 kg/cm³ |
| TENSIÓN ADMISIBLE DEL TERRENO (σ) | 0,30 MPa |

| *HA-30 (B-500S) | SOLAPO (Ls) (cm) | | ANCLAJE (Lb) prolong. recta (cm) | | ANCLAJE (Lb) patilla (**) (cm) | |
|---|---|---|---|---|---|---|
| Ø (mm) | Ls I | Ls II | Lb I | Lb II | Lb I | Lb II |
| 10 | 70 | 92 | 35 | 46 | 27 | 35 |
| 12 | 84 | 110 | 42 | 55 | 33 | 42 |
| 16 | 112 | 146 | 56 | 73 | 44 | 56 |
| 20 | 144 | 186 | 72 | 93 | 56 | 71 |
| 25 | 212 | 278 | 106 | 139 | 82 | 105 |
| 32 | 330 | 436 | 165 | 218 | 125 | 162 |

(*) EN EL CÁLCULO DE LAS LONGITUDES DE ANCLAJE Y SOLAPE SE HA TENIDO EN CUENTA QUE SE TRATE DE ZONA SÍSMICA, AUMENTANDO EN 10Ø LA LONGITUD DE ANCLAJE SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.
LOS SUBINDICES I Y II EN LAS LONGITUDES DE SOLAPO Y ANCLAJE DE LAS TABLAS SE REFIEREN A LA POSICIÓN DE LA BARRA A ANCLAR O SOLAPAR, RESPECTO A LA DIRECCIÓN DEL HORMIGONADO, SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.

| REQUISITOS GENERALES DE DURABILIDAD (S/CE) (ELEMENTOS DE HORMIGÓN ARMADO. CONTROL NORMAL) | |
|---|---|
| CLASE GENERAL DE EXPOSICION | XC2 |
| CLASE ESPECIFICA DE EXPOSICION | – |
| RECUBRIMIENTO MINIMO | 25 (1) |
| RECUBRIMIENTO NOMINAL | 35 (1) |
| MAXIMA RELACIÓN AGUA/CEMENTO | 0.60 |
| MINIMO CONTENIDO DE CEMENTO | 275 Kg/m³ |
| - ELEMENTOS ENCOFRADOS CONTRA EL TERRENO: RECUBRIMIENTO MÍNIMO 70 mm. | |

NOTAS:
(1) - UTILIZANDO CEMENTOS DISTINTOS A CEM-I EN LA CONFECCIÓN DE HORMIGONES.
(2) - UTILIZANDO CEM-II/A, CEM-II/B, CEM-IV, CEM-II/B-S, B-P, B-V, A-D U HORMIGÓN CON ADICIÓN DE MICROSILICE SUPERIOR AL 6% O DE CENIZAS VOLANTES SUPERIOR AL 20%

NOTAS:
- TODOS LOS DATOS RELATIVOS A LA GEOMETRÍA DE ESTE PROYECTO (COTAS, HUECOS, PENDIENTES, ETC...) SE VERIFICARÁN CON LOS PLANOS DE ARQUITECTURA.
- DEBERÁ COMPROBARSE QUE LAS CARGAS DE LOS ELEMENTOS ARQUITECTÓNICOS A EJECUTAR NO SOBREPASEN LOS VALORES DE LAS ACCIONES Y CARGAS CONSIDERADAS EN EL PRESENTE CÁLCULO ESTRUCTURAL.
- LAS SOLDADURAS EN ÁNGULO TENDRÁN UNA GARGANTA DE 0,7 VECES EL MINIMO ESPESOR DE LAS CHAPAS A UNIR CUANDO LA SOLDADURA SE EJECUTA POR UN SOLO LADO, Y DE 0,5 VECES SI ESTA SE EJECUTA POR AMBOS LADOS, SALVO ESPECIFICACION EN CONTRA EN LOS DETALLES CORRESPONDIENTES.
- LAS SOLDADURAS A TOPE SERÁN CONTINUAS CON PREPARACION DE BORDES Y PENETRACION COMPLETA.
- LOS ELECTRODOS PARA SOLDADURA MANUAL SERÁN CON REVESTIMIENTO BÁSICO.

REDACTOR

D.JOSÉ ANTONIO SEGURA SÁNCHEZ
INGENIERO REDACTOR

LA PROPIEDAD

JUNTA DE COMPENSACIÓN
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FECHA
FEBRERO 2024

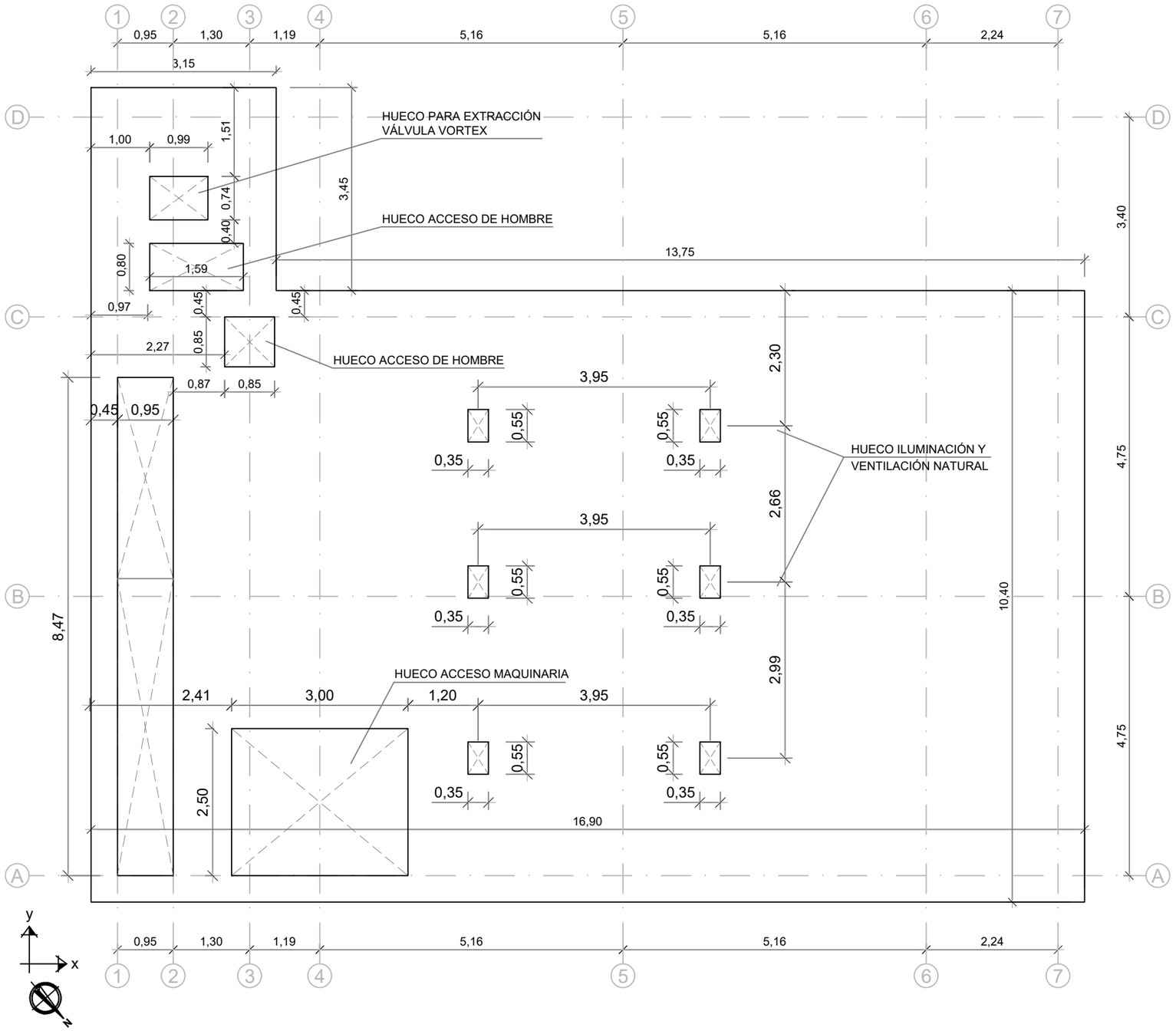
ESCALA
1/80

PLANO
GEOMETRÍA. LOSA DE CIMENTACIÓN.

HOJA 1/1
E1

# GEOMETRÍA. CUBIERTA

ESCALA 1/80




| CARACTERISTICAS DE LOS MATERIALES Y NIVELES DE CONTROL (S/ CÓDIGO ESTRUCTURAL) | | | | | |
|---|---|---|---|---|---|
| MATERIAL | DESIGNACIÓN | NIVEL DE CONTROL | COEF. SEGUR. MATERIALES | | |
| | | | E.L.U. | | E.L.S. |
| | | | SIT.PERS O TRANS | SIT.ACCIDENTAL | |
| HORMIGON LIMPIEZA Y REGULARIZACIÓN | HL-150/B/20 | ESTADÍSTICO | 1.50 | 1.30 | 1.00 |
| HORMIGONES | HA-30/B/20/XC2 | | | | |
| ARMADURAS PASIVAS | B 500 S | NORMAL | 1.15 | 1.00 | 1.00 |
| MALLAZO | B 500 T | NORMAL | 1.15 | 1.00 | 1.00 |

| COEFICIENTES PARCIALES DE SEGURIDAD. ACCIONES (S/ CÓDIGO ESTRUCTURAL) | | | | | | | |
|---|---|---|---|---|---|---|---|
| TIPO DE ACCIÓN | | | ESTADO LÍMITE ÚLTIMO (E.L.U.) | | | | ESTADO LÍMITE SERVICIO (E.L.S.) |
| | | | SIT.PERS O TRANS | | SIT.ACCIDENTAL | | |
| | | | FAVOR. | DESFAV. | FAVOR. | DESFAV. | FAVOR. / DESFAV. |
| ESTRUCTURAS HORMIGÓN ARMADO | PERMANENTE | | 1.00 | 1.35 | 1.00 | 1.00 | 1.00 / 1.00 |
| | PERMANENTE DE VALOR NO CONSTANTE | | 1.00 | 1.50 | 1.00 | 1.00 | 1.00 / 1.00 |
| | VARIABLE | S.C.U. | 0.00 | 1.50 | 0.00 | 1.00 | 0.00 / 1.00 |
| | | TRÁFICO | 0.00 | 1.35 | 0.00 | 0.00 | 0.00 / 1.00 |
| | ACCIDENTAL | | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 / 0.00 |

| | |
|---|---|
| MODULO DE BALASTO ($k_{30x30}$) | 22 kg/cm³ |
| TENSIÓN ADMISIBLE DEL TERRENO (σ) | 0,30 MPa |

| *HA-30 (B-500S) | SOLAPO (Ls) (cm) | | ANCLAJE (Lb) prolong. recta (cm) | | ANCLAJE (Lb) patilla (**) (cm) | |
|---|---|---|---|---|---|---|
| Ø (mm) | Ls I | Ls II | Lb I | Lb II | Lb I | Lb II |
| 10 | 70 | 92 | 35 | 46 | 27 | 35 |
| 12 | 84 | 110 | 42 | 55 | 33 | 42 |
| 16 | 112 | 146 | 56 | 73 | 44 | 56 |
| 20 | 144 | 186 | 72 | 93 | 56 | 71 |
| 25 | 212 | 278 | 106 | 139 | 82 | 105 |
| 32 | 330 | 436 | 165 | 218 | 125 | 162 |

(*) EN EL CÁLCULO DE LAS LONGITUDES DE ANCLAJE Y SOLAPE SE HA TENIDO EN CUENTA QUE SE TRATE DE ZONA SÍSMICA, AUMENTANDO EN 10Ø LA LONGITUD DE ANCLAJE SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.
LOS SUBINDICES I Y II EN LAS LONGITUDES DE SOLAPO Y ANCLAJE DE LAS TABLAS SE REFIEREN A LA POSICIÓN DE LA BARRA A ANCLAR O SOLAPAR, RESPECTO A LA DIRECCIÓN DEL HORMIGONADO, SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.

| REQUISITOS GENERALES DE DURABILIDAD (S/CE) (ELEMENTOS DE HORMIGÓN ARMADO. CONTROL NORMAL) | |
|---|---|
| CLASE GENERAL DE EXPOSICION | XC2 |
| CLASE ESPECIFICA DE EXPOSICION | – |
| RECUBRIMIENTO MINIMO | 25 (1) |
| RECUBRIMIENTO NOMINAL | 35 (1) |
| MAXIMA RELACIÓN AGUA/CEMENTO | 0.60 |
| MINIMO CONTENIDO DE CEMENTO | 275 Kg/m³ |
| - ELEMENTOS ENCOFRADOS CONTRA EL TERRENO: RECUBRIMIENTO MÍNIMO 70 mm. | |

NOTAS:
(1) - UTILIZANDO CEMENTOS DISTINTOS A CEM-I EN LA CONFECCIÓN DE HORMIGONES.
(2) - UTILIZANDO CEM-II/A, CEM-II/B, CEM-IV, CEM-II/B-S, B-P, B-V, A-D U HORMIGÓN CON ADICIÓN DE MICROSÍLICE SUPERIOR AL 6% O DE CENIZAS VOLANTES SUPERIOR AL 20%

NOTAS:
- TODOS LOS DATOS RELATIVOS A LA GEOMETRÍA DE ESTE PROYECTO (COTAS, HUECOS, PENDIENTES, ETC...) SE VERIFICARÁN CON LOS PLANOS DE ARQUITECTURA.
- DEBERÁ COMPROBARSE QUE LAS CARGAS DE LOS ELEMENTOS ARQUITECTÓNICOS A EJECUTAR NO SOBREPASEN LOS VALORES DE LAS ACCIONES Y CARGAS CONSIDERADAS EN EL PRESENTE CÁLCULO ESTRUCTURAL.
- LAS SOLDADURAS EN ÁNGULO TENDRÁN UNA GARGANTA DE 0,7 VECES EL MINIMO ESPESOR DE LAS CHAPAS A UNIR CUANDO LA SOLDADURA SE EJECUTA POR UN SOLO LADO, Y DE 0,5 VECES SI ESTA SE EJECUTA POR AMBOS LADOS, SALVO ESPECIFICACION EN CONTRA EN LOS DETALLES CORRESPONDIENTES.
- LAS SOLDADURAS A TOPE SERÁN CONTINUAS CON PREPARACION DE BORDES Y PENETRACION COMPLETA.
- LOS ELECTRODOS PARA SOLDADURA MANUAL SERÁN CON REVESTIMIENTO BÁSICO.


REDACTOR
D.JOSÉ ANTONIO SEGURA SÁNCHEZ
INGENIERO REDACTOR

LA PROPIEDAD
JUNTA DE COMPENSACIÓN
UE-VII.1 "SIST. GRLES PE+KODAK"

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FECHA: FEBRERO 2024

ESCALA: 1/80

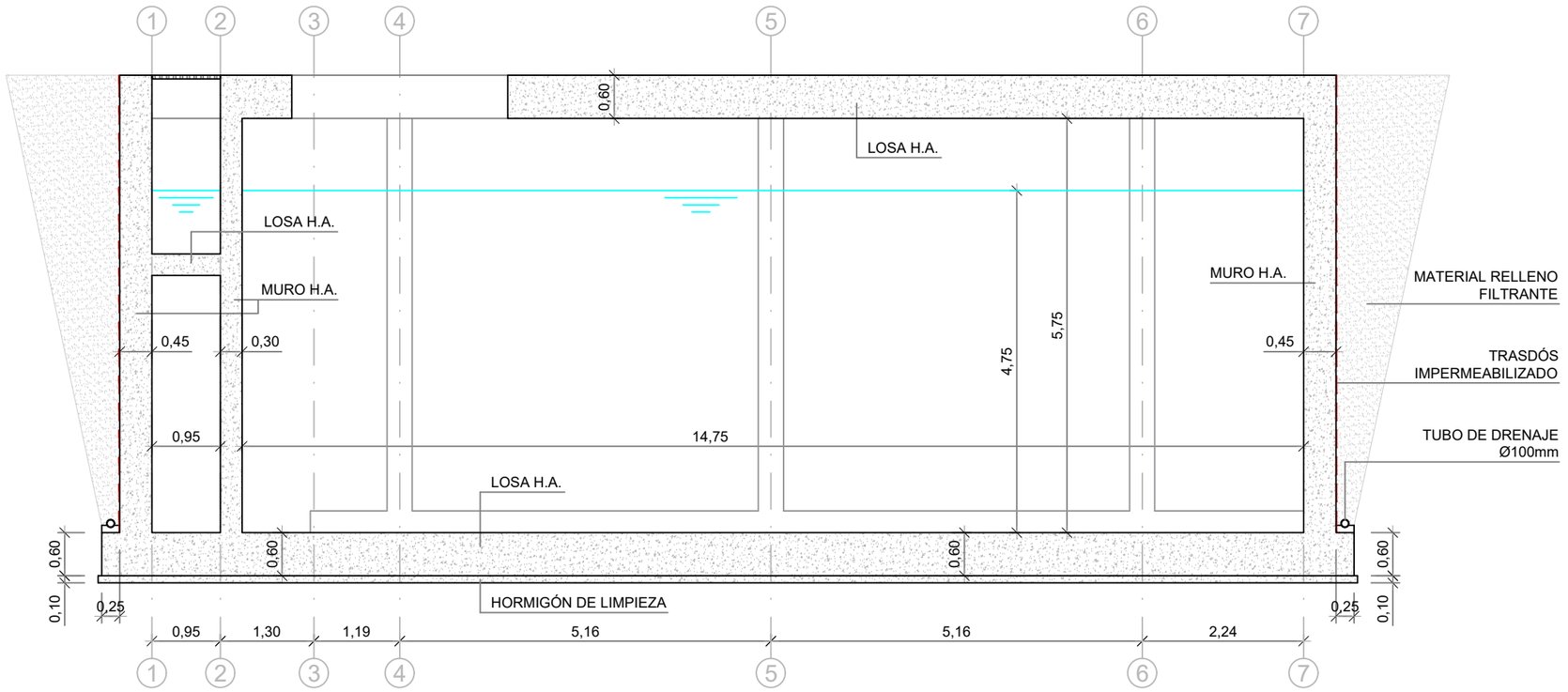
PLANO: GEOMETRÍA. LOSA DE CUBIERTA.

HOJA 1/1

E2

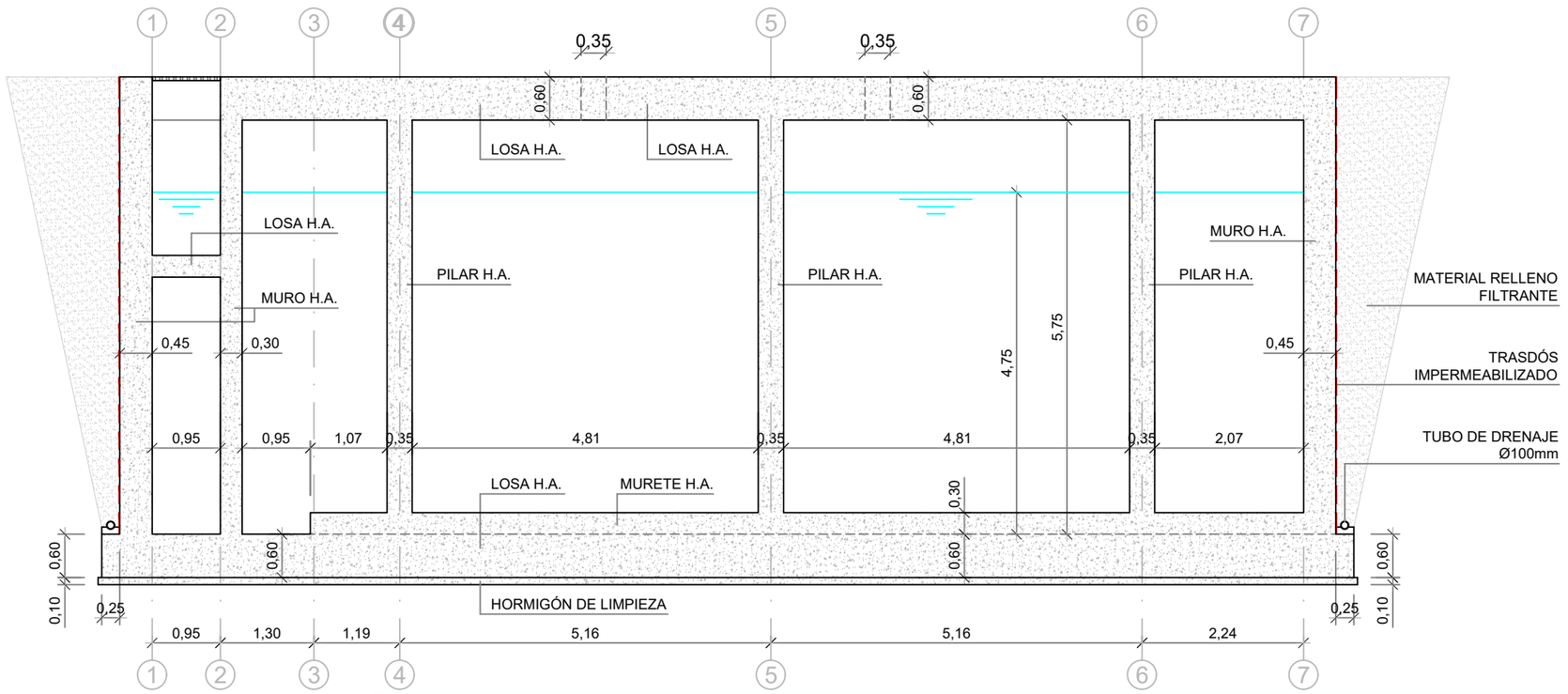
## SECCIÓN A-A'

ESCALA 1/80




## SECCIÓN B-B'

ESCALA 1/80




CARACTERISTICAS DE LOS MATERIALES Y NIVELES DE CONTROL (S/ CÓDIGO ESTRUCTURAL)

| MATERIAL | DESIGNACIÓN | NIVEL DE CONTROL | COEF. SEGUR. MATERIALES E.L.U. SIT.PERS O TRANS | E.L.U. SIT.ACCIDENTAL | E.L.S. |
|---|---|---|---|---|---|
| HORMIGON LIMPIEZA Y REGULARIZACIÓN | HL-150/B/20 | ESTADÍSTICO | 1.50 | 1.30 | 1.00 |
| HORMIGONES | HA-30/B/20/XC2 | | | | |
| ARMADURAS PASIVAS | B 500 S | NORMAL | 1.15 | 1.00 | 1.00 |
| MALLAZO | B 500 T | NORMAL | 1.15 | 1.00 | 1.00 |

COEFICIENTES PARCIALES DE SEGURIDAD. ACCIONES (S/ CÓDIGO ESTRUCTURAL)

| TIPO DE ACCIÓN | | | ESTADO LÍMITE ÚLTIMO (E.L.U.) SIT.PERS O TRANS FAVOR. | SIT.PERS O TRANS DESFAV. | SIT.ACCIDENTAL FAVOR. | SIT.ACCIDENTAL DESFAV. | ESTADO LÍMITE SERVICIO (E.L.S.) FAVOR. | ESTADO LÍMITE SERVICIO (E.L.S.) DESFAV. |
|---|---|---|---|---|---|---|---|---|
| ESTRUCTURAS HORMIGÓN ARMADO | PERMANENTE | | 1.00 | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 |
| | PERMANENTE DE VALOR NO CONSTANTE | | 1.00 | 1.50 | 1.00 | 1.00 | 1.00 | 1.00 |
| | VARIABLE | S.C.U. | 0.00 | 1.50 | 0.00 | 1.00 | 0.00 | 1.00 |
| | | TRÁFICO | 0.00 | 1.35 | 0.00 | 0.00 | 0.00 | 1.00 |
| | ACCIDENTAL | | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |

| | |
|---|---|
| MODULO DE BALASTO ($k_{30x30}$) | 22 kg/cm³ |
| TENSIÓN ADMISIBLE DEL TERRENO (σ) | 0,30 MPa |

| *HA-30 (B-500S) | SOLAPO (Ls) (cm) | | ANCLAJE (Lb) prolong. recta (cm) | | ANCLAJE (Lb) patilla (**) (cm) | |
|---|---|---|---|---|---|---|
| Ø (mm) | Ls I | Ls II | Lb I | Lb II | Lb I | Lb II |
| 10 | 70 | 92 | 35 | 46 | 27 | 35 |
| 12 | 84 | 110 | 42 | 55 | 33 | 42 |
| 16 | 112 | 146 | 56 | 73 | 44 | 56 |
| 20 | 144 | 186 | 72 | 93 | 56 | 71 |
| 25 | 212 | 278 | 106 | 139 | 82 | 105 |
| 32 | 330 | 436 | 165 | 218 | 125 | 162 |

(*) EN EL CÁLCULO DE LAS LONGITUDES DE ANCLAJE Y SOLAPE SE HA TENIDO EN CUENTA QUE SE TRATE DE ZONA SÍSMICA, AUMENTANDO EN 10Ø LA LONGITUD DE ANCLAJE SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.
LOS SUBINDICES I Y II EN LAS LONGITUDES DE SOLAPO Y ANCLAJE DE LAS TABLAS SE REFIEREN A LA POSICIÓN DE LA BARRA A ANCLAR O SOLAPAR, RESPECTO A LA DIRECCIÓN DEL HORMIGONADO, SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.

| REQUISITOS GENERALES DE DURABILIDAD (S/CE) (ELEMENTOS DE HORMIGÓN ARMADO. CONTROL NORMAL) | |
|---|---|
| CLASE GENERAL DE EXPOSICION | XC2 |
| CLASE ESPECIFICA DE EXPOSICION | – |
| RECUBRIMIENTO MINIMO | 25 (1) |
| RECUBRIMIENTO NOMINAL | 35 (1) |
| MAXIMA RELACIÓN AGUA/CEMENTO | 0.60 |
| MINIMO CONTENIDO DE CEMENTO | 275 Kg/m³ |
| - ELEMENTOS ENCOFRADOS CONTRA EL TERRENO: RECUBRIMIENTO MÍNIMO 70 mm. | |

NOTAS:
(1) - UTILIZANDO CEMENTOS DISTINTOS A CEM-I EN LA CONFECCIÓN DE HORMIGONES.
(2) - UTILIZANDO CEM-II/A, CEM-II/B, CEM-IV, CEM-II/B-S, B-P, B-V, A-D U HORMIGÓN CON ADICIÓN DE MICROSILICE SUPERIOR AL 6% O DE CENIZAS VOLANTES SUPERIOR AL 20%

NOTAS:
- TODOS LOS DATOS RELATIVOS A LA GEOMETRÍA DE ESTE PROYECTO (COTAS, HUECOS, PENDIENTES, ETC...) SE VERIFICARÁN CON LOS PLANOS DE ARQUITECTURA.
- DEBERÁ COMPROBARSE QUE LAS CARGAS DE LOS ELEMENTOS ARQUITECTÓNICOS A EJECUTAR NO SOBREPASEN LOS VALORES DE LAS ACCIONES Y CARGAS CONSIDERADAS EN EL PRESENTE CÁLCULO ESTRUCTURAL.
- LAS SOLDADURAS EN ÁNGULO TENDRÁN UNA GARGANTA DE 0,7 VECES EL MINIMO ESPESOR DE LAS CHAPAS A UNIR CUANDO LA SOLDADURA SE EJECUTA POR UN SOLO LADO, Y DE 0,5 VECES SI ESTA SE EJECUTA POR AMBOS LADOS, SALVO ESPECIFICACION EN CONTRA EN LOS DETALLES CORRESPONDIENTES.
- LAS SOLDADURAS A TOPE SERÁN CONTINUAS CON PREPARACION DE BORDES Y PENETRACION COMPLETA.
- LOS ELECTRODOS PARA SOLDADURA MANUAL SERÁN CON REVESTIMIENTO BÁSICO.

REDACTOR
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INGENIERO REDACTOR

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FECHA
FEBRERO 2024

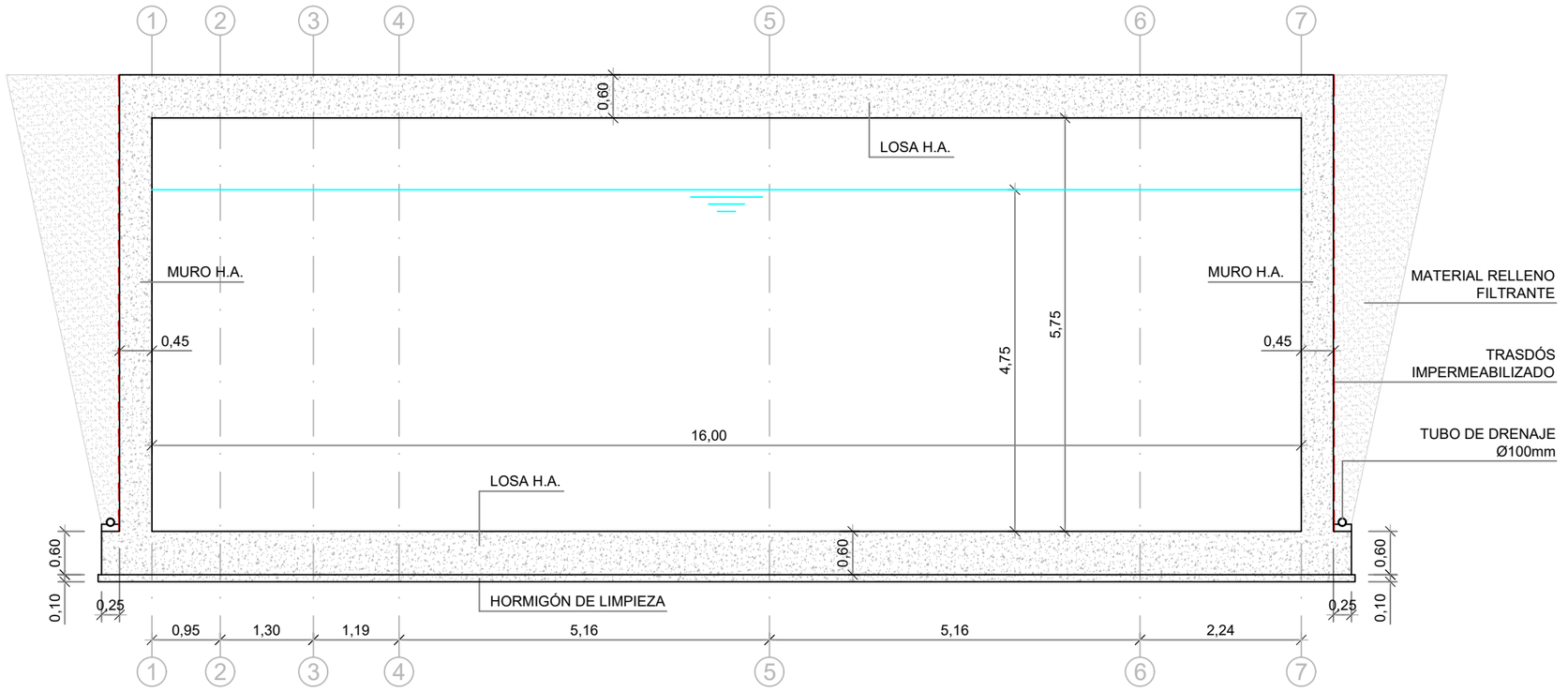
ESCALA
1/80

PLANO
GEOMETRÍA. SECCIONES A-A' Y B-B'.

HOJA 1/1
E3

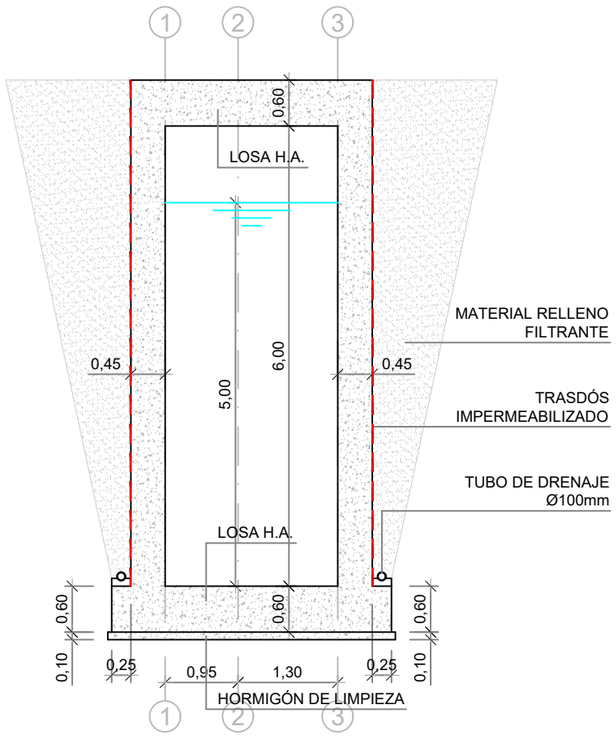
## SECCIÓN C-C'

ESCALA 1/80




## SECCIÓN D-D'

ESCALA 1/80




### CARACTERISTICAS DE LOS MATERIALES Y NIVELES DE CONTROL (S/ CÓDIGO ESTRUCTURAL)

| MATERIAL | DESIGNACIÓN | NIVEL DE CONTROL | COEF. SEGUR. MATERIALES E.L.U. SIT.PERS O TRANS | E.L.U. SIT.ACCIDENTAL | E.L.S. |
|---|---|---|---|---|---|
| HORMIGON LIMPIEZA Y REGULARIZACIÓN | HL-150/B/20 | ESTADÍSTICO | 1.50 | 1.30 | 1.00 |
| HORMIGONES | HA-30/B/20/XC2 | | | | |
| ARMADURAS PASIVAS | B 500 S | NORMAL | 1.15 | 1.00 | 1.00 |
| MALLAZO | B 500 T | NORMAL | 1.15 | 1.00 | 1.00 |

| | |
|---|---|
| MODULO DE BALASTO ($k_{30x30}$) | 22 kg/cm³ |
| TENSIÓN ADMISIBLE DEL TERRENO (σ) | 0,30 MPa |

### COEFICIENTES PARCIALES DE SEGURIDAD. ACCIONES (S/ CÓDIGO ESTRUCTURAL)

| TIPO DE ACCIÓN | | | ESTADO LÍMITE ÚLTIMO (E.L.U.) SIT.PERS O TRANS FAVOR. | SIT.PERS O TRANS DESFAV. | SIT.ACCIDENTAL FAVOR. | SIT.ACCIDENTAL DESFAV. | ESTADO LÍMITE SERVICIO (E.L.S.) FAVOR. | ESTADO LÍMITE SERVICIO (E.L.S.) DESFAV. |
|---|---|---|---|---|---|---|---|---|
| ESTRUCTURAS HORMIGÓN ARMADO | PERMANENTE | | 1.00 | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 |
| | PERMANENTE DE VALOR NO CONSTANTE | | 1.00 | 1.50 | 1.00 | 1.00 | 1.00 | 1.00 |
| | VARIABLE | S.C.U. | 0.00 | 1.50 | 0.00 | 1.00 | 0.00 | 1.00 |
| | | TRÁFICO | 0.00 | 1.35 | 0.00 | 0.00 | 0.00 | 1.00 |
| | ACCIDENTAL | | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |

| *HA-30 (B-500S) Ø (mm) | SOLAPO (Ls) (cm) Ls I | Ls II | ANCLAJE (Lb) prolong. recta (cm) Lb I | Lb II | ANCLAJE (Lb) patilla (**) (cm) Lb I | Lb II |
|---|---|---|---|---|---|---|
| 10 | 70 | 92 | 35 | 46 | 27 | 35 |
| 12 | 84 | 110 | 42 | 55 | 33 | 42 |
| 16 | 112 | 146 | 56 | 73 | 44 | 56 |
| 20 | 144 | 186 | 72 | 93 | 56 | 71 |
| 25 | 212 | 278 | 106 | 139 | 82 | 105 |
| 32 | 330 | 436 | 165 | 218 | 125 | 162 |

(*) EN EL CÁLCULO DE LAS LONGITUDES DE ANCLAJE Y SOLAPE SE HA TENIDO EN CUENTA QUE SE TRATE DE ZONA SÍSMICA, AUMENTANDO EN 10Ø LA LONGITUD DE ANCLAJE SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.
LOS SUBINDICES I Y II EN LAS LONGITUDES DE SOLAPO Y ANCLAJE DE LAS TABLAS SE REFIEREN A LA POSICIÓN DE LA BARRA A ANCLAR O SOLAPAR, RESPECTO A LA DIRECCIÓN DEL HORMIGONADO, SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.

| REQUISITOS GENERALES DE DURABILIDAD (S/CE) (ELEMENTOS DE HORMIGÓN ARMADO CONTROL NORMAL) | |
|---|---|
| CLASE GENERAL DE EXPOSICION | XC2 |
| CLASE ESPECIFICA DE EXPOSICION | – |
| RECUBRIMIENTO MINIMO | 25 (1) |
| RECUBRIMIENTO NOMINAL | 35 (1) |
| MAXIMA RELACION AGUA/CEMENTO | 0.60 |
| MINIMO CONTENIDO DE CEMENTO | 275 Kg/m³ |
| - ELEMENTOS ENCOFRADOS CONTRA EL TERRENO: RECUBRIMIENTO MINIMO 70 mm. | |

NOTAS:
(1) - UTILIZANDO CEMENTOS DISTINTOS A CEM-I EN LA CONFECCIÓN DE HORMIGONES.
(2) - UTILIZANDO CEM-III/A, CEM-III/B, CEM-IV, CEM-II/B-S, B-P, B-V, A-D U HORMIGÓN CON ADICIÓN DE MICROSÍLICE SUPERIOR AL 6% O DE CENIZAS VOLANTES SUPERIOR AL 20%

NOTAS:
- TODOS LOS DATOS RELATIVOS A LA GEOMETRÍA DE ESTE PROYECTO (COTAS, HUECOS, PENDIENTES, ETC...) SE VERIFICARÁN CON LOS PLANOS DE ARQUITECTURA.
- DEBERÁ COMPROBARSE QUE LAS CARGAS DE LOS ELEMENTOS ARQUITECTÓNICOS A EJECUTAR NO SOBREPASEN LOS VALORES DE LAS ACCIONES Y CARGAS CONSIDERADAS EN EL PRESENTE CÁLCULO ESTRUCTURAL.
- LAS SOLDADURAS EN ÁNGULO TENDRÁN UNA GARGANTA DE 0,7 VECES EL MINIMO ESPESOR DE LAS CHAPAS A UNIR CUANDO LA SOLDADURA SE EJECUTA POR UN SOLO LADO, Y DE 0,5 VECES SI ESTA SE EJECUTA POR AMBOS LADOS, SALVO ESPECIFICACION EN CONTRA EN LOS DETALLES CORRESPONDIENTES.
- LAS SOLDADURAS A TOPE SERÁN CONTINUAS CON PREPARACION DE BORDES Y PENETRACION COMPLETA.
- LOS ELECTRODOS PARA SOLDADURA MANUAL SERÁN CON REVESTIMIENTO BÁSICO.


REDACTOR
D.JOSÉ ANTONIO SEGURA SÁNCHEZ
INGENIERO REDACTOR


LA PROPIEDAD
JUNTA DE COMPENSACIÓN UE-VII.1 "SIST. GRLES PE+KODAK"


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PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

FECHA FEBRERO 2024

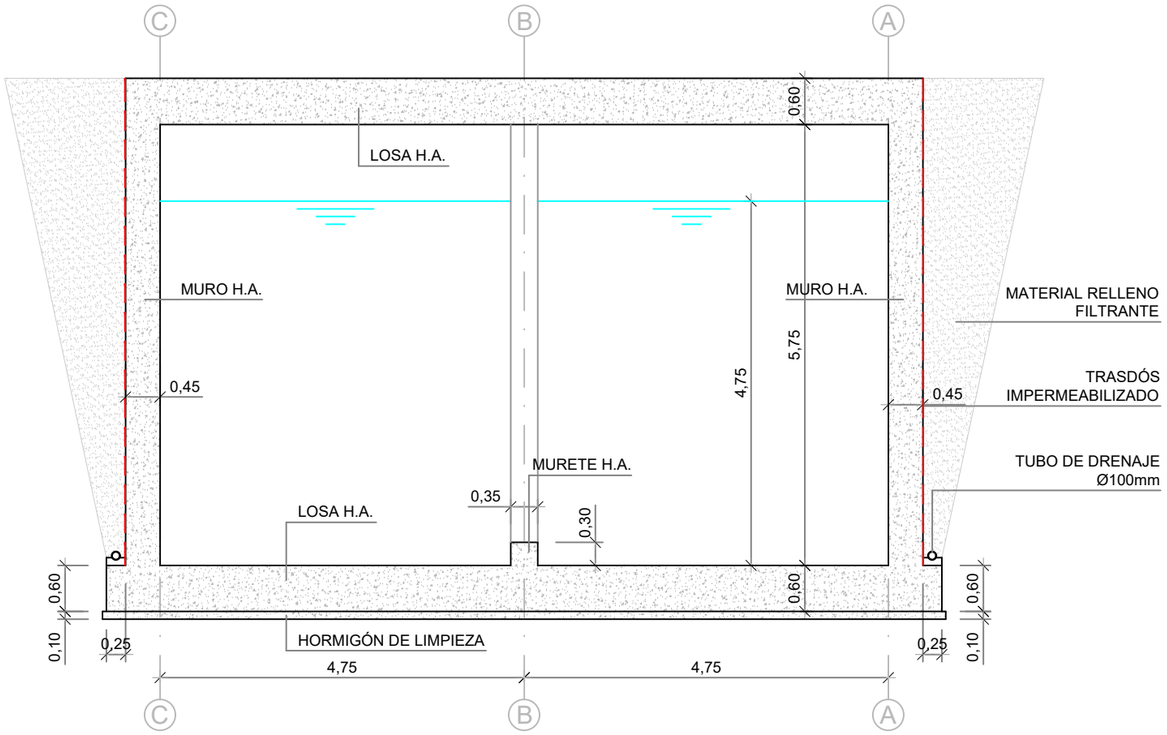
ESCALA 1/80

PLANO GEOMETRÍA. SECCIONES C-C' Y D-D'.

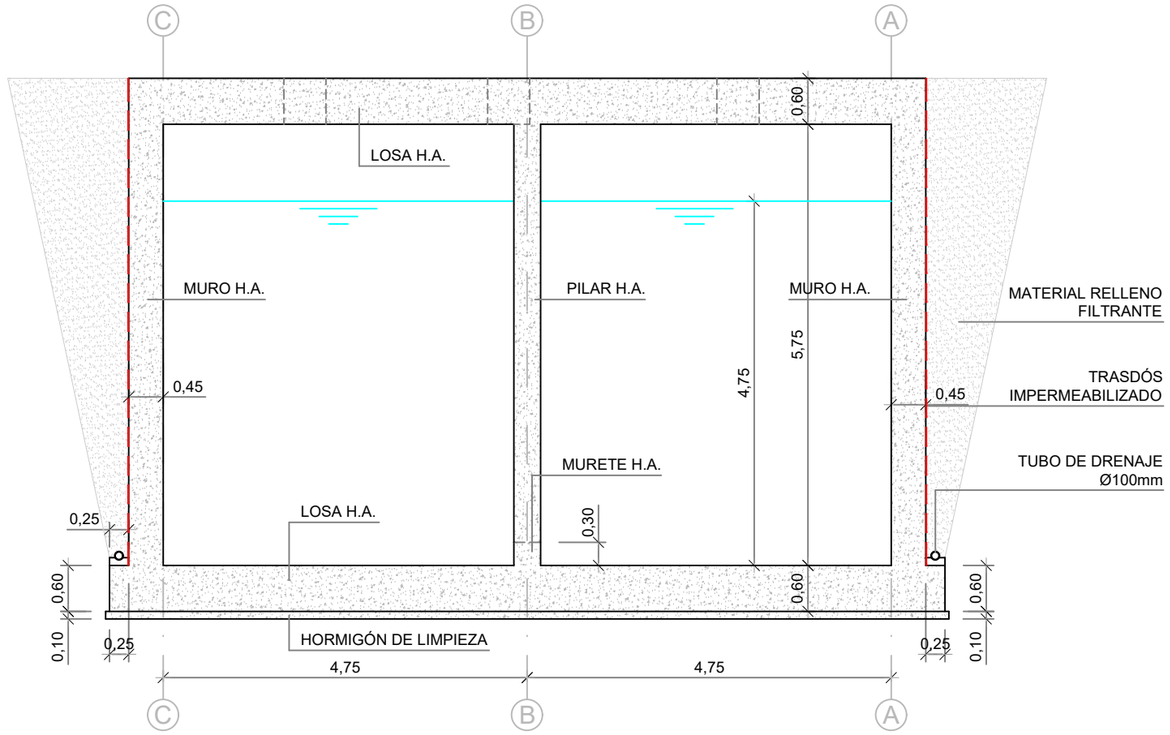
HOJA 1/1

E4

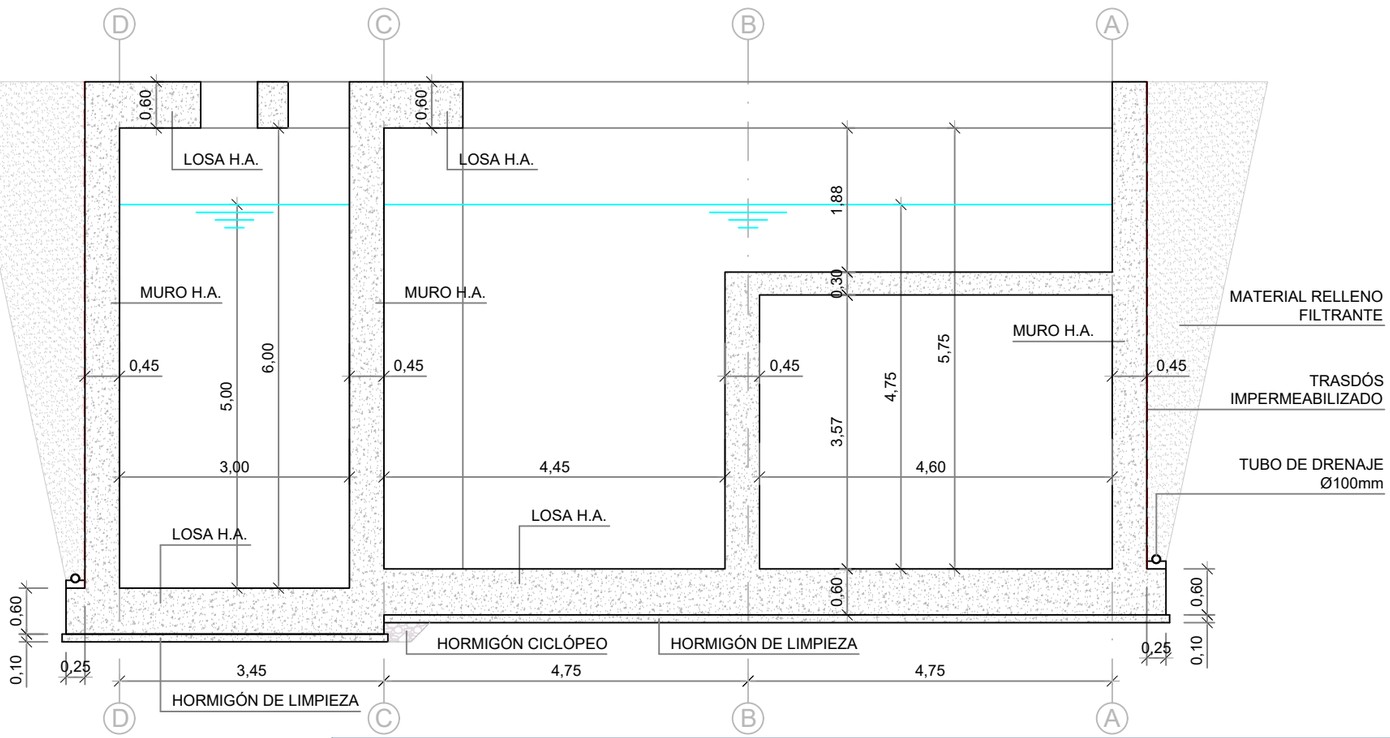
## SECCIÓN F-F'
ESCALA 1/80




## SECCIÓN G-G'
ESCALA 1/80




## SECCIÓN E-E'
ESCALA 1/80




| CARACTERISTICAS DE LOS MATERIALES Y NIVELES DE CONTROL (S/ CÓDIGO ESTRUCTURAL) | | | | | |
|---|---|---|---|---|---|
| MATERIAL | DESIGNACIÓN | NIVEL DE CONTROL | COEF. SEGUR. MATERIALES E.L.U. SIT.PERS O TRANS | COEF. SEGUR. MATERIALES E.L.U. SIT.ACCIDENTAL | COEF. SEGUR. MATERIALES E.L.S. |
| HORMIGON LIMPIEZA Y REGULARIZACIÓN | HL-150/B/20 | ESTADÍSTICO | 1.50 | 1.30 | 1.00 |
| HORMIGONES | HA-30/B/20/XC2 | | | | |
| ARMADURAS PASIVAS | B 500 S | NORMAL | 1.15 | 1.00 | 1.00 |
| MALLAZO | B 500 T | NORMAL | 1.15 | 1.00 | 1.00 |

| REQUISITOS GENERALES DE DURABILIDAD (S/CE) (ELEMENTOS DE HORMIGÓN ARMADO, CONTROL NORMAL) | |
|---|---|
| CLASE GENERAL DE EXPOSICION | XC2 |
| CLASE ESPECIFICA DE EXPOSICION | – |
| RECUBRIMIENTO MINIMO | 25 (1) |
| RECUBRIMIENTO NOMINAL | 35 (1) |
| MAXIMA RELACION AGUA/CEMENTO | 0.60 |
| MINIMO CONTENIDO DE CEMENTO | 275 Kg/m³ |
| - ELEMENTOS ENCOFRADOS CONTRA EL TERRENO: RECUBRIMIENTO MINIMO 70 mm. | |

NOTAS:
(1) - UTILIZANDO CEMENTOS DISTINTOS A CEM-I EN LA CONFECCIÓN DE HORMIGONES.
(2) - UTILIZANDO CEM-II/A, CEM-II/B, CEM-IV, CEM-II/B-S, B-P, B-V, A-D U HORMIGÓN CON ADICIÓN DE MICROSÍLICE, SUPERIOR AL 6% O DE CENIZAS VOLANTES SUPERIOR AL 20%

| COEFICIENTES PARCIALES DE SEGURIDAD. ACCIONES (S/ CÓDIGO ESTRUCTURAL) | | | | | | | |
|---|---|---|---|---|---|---|---|
| TIPO DE ACCIÓN | | | ESTADO LÍMITE ÚLTIMO (E.L.U.) SIT.PERS O TRANS FAVOR. | ESTADO LÍMITE ÚLTIMO (E.L.U.) SIT.PERS O TRANS DESFAV. | ESTADO LÍMITE ÚLTIMO (E.L.U.) SIT.ACCIDENTAL FAVOR. | ESTADO LÍMITE ÚLTIMO (E.L.U.) SIT.ACCIDENTAL DESFAV. | ESTADO LÍMITE SERVICIO (E.L.S.) FAVOR. | ESTADO LÍMITE SERVICIO (E.L.S.) DESFAV. |
| ESTRUCTURAS HORMIGÓN ARMADO | PERMANENTE | | 1.00 | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 |
| | PERMANENTE DE VALOR NO CONSTANTE | | 1.00 | 1.50 | 1.00 | 1.00 | 1.00 | 1.00 |
| | VARIABLE | S.C.U. | 0.00 | 1.50 | 0.00 | 1.00 | 0.00 | 1.00 |
| | | TRÁFICO | 0.00 | 1.35 | 0.00 | 0.00 | 0.00 | 1.00 |
| | ACCIDENTAL | | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |

| *HA-30 (B-500S) | SOLAPO (Ls) (cm) | | ANCLAJE (Lb) prolong. recta (cm) | | ANCLAJE (Lb) patilla (**) (cm) | |
|---|---|---|---|---|---|---|
| Ø (mm) | Ls I | Ls II | Lb I | Lb II | Lb I | Lb II |
| 10 | 70 | 92 | 35 | 46 | 27 | 35 |
| 12 | 84 | 110 | 42 | 55 | 33 | 42 |
| 16 | 112 | 146 | 56 | 73 | 44 | 56 |
| 20 | 144 | 186 | 72 | 93 | 56 | 71 |
| 25 | 212 | 278 | 106 | 139 | 82 | 105 |
| 32 | 330 | 436 | 165 | 218 | 125 | 162 |

(*) EN EL CÁLCULO DE LAS LONGITUDES DE ANCLAJE Y SOLAPE SE HA TENIDO EN CUENTA QUE SE TRATE DE ZONA SÍSMICA, AUMENTANDO EN 10Ø LA LONGITUD DE ANCLAJE SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.
LOS SUBINDICES I Y II EN LAS LONGITUDES DE SOLAPO Y ANCLAJE DE LAS TABLAS SE REFIEREN A LA POSICIÓN DE LA BARRA A ANCLAR O SOLAPAR, RESPECTO A LA DIRECCIÓN DEL HORMIGONADO, SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.

| | |
|---|---|
| MODULO DE BALASTO (k30x30) | 22 kg/cm³ |
| TENSIÓN ADMISIBLE DEL TERRENO (σ) | 0,30 MPa |

| | |
|---|---|
| MODULO DE BALASTO (k30x30) | 22 kg/cm³ |
| TENSIÓN ADMISIBLE DEL TERRENO (σ) | 0,30 MPa |

NOTAS:
- TODOS LOS DATOS RELATIVOS A LA GEOMETRÍA DE ESTE PROYECTO (COTAS, HUECOS, PENDIENTES, ETC...) SE VERIFICARÁN CON LOS PLANOS DE ARQUITECTURA.
- DEBERÁ COMPROBARSE QUE LAS CARGAS DE LOS ELEMENTOS ARQUITECTÓNICOS A EJECUTAR NO SOBREPASEN LOS VALORES DE LAS ACCIONES Y CARGAS CONSIDERADAS EN EL PRESENTE CÁLCULO ESTRUCTURAL.
- LAS SOLDADURAS EN ÁNGULO TENDRÁN UNA GARGANTA DE 0,7 VECES EL MINIMO ESPESOR DE LAS CHAPAS A UNIR CUANDO LA SOLDADURA SE EJECUTA POR UN SOLO LADO, Y DE 0,5 VECES SI ESTA SE EJECUTA POR AMBOS LADOS, SALVO ESPECIFICACION EN CONTRA EN LOS DETALLES CORRESPONDIENTES.
- LAS SOLDADURAS A TOPE SERÁN CONTINUAS CON PREPARACION DE BORDES Y PENETRACION COMPLETA.
- LOS ELECTRODOS PARA SOLDADURA MANUAL SERÁN CON REVESTIMIENTO BÁSICO.


REDACTOR
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FECHA
FEBRERO 2024

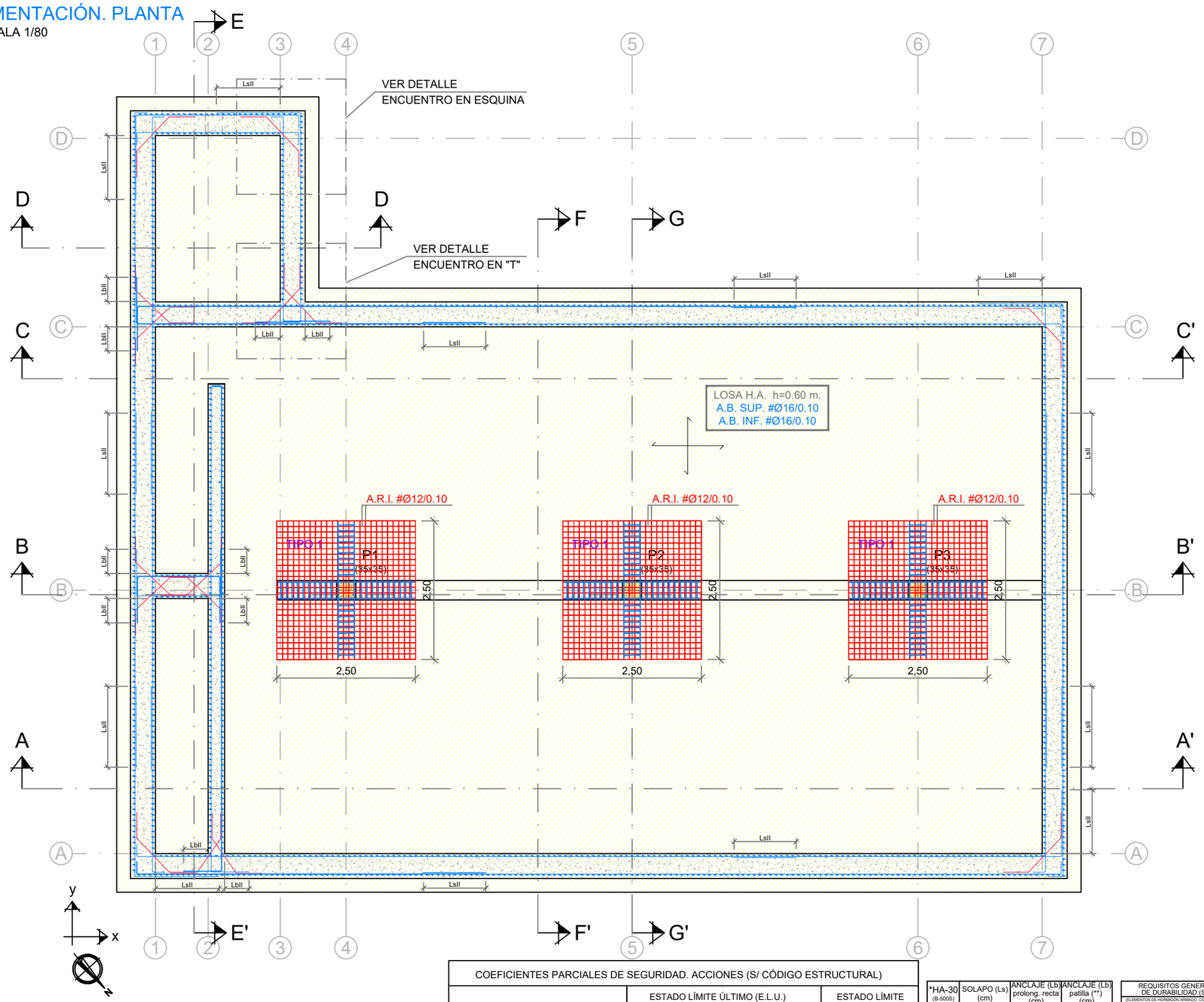
ESCALA
1/80

PLANO
GEOMETRÍA. SECCIONES E-E', F-F' Y G-G'.

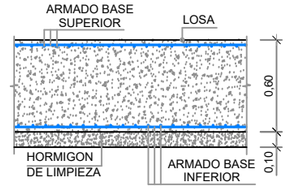
HOJA 1/1
E5

# CIMENTACIÓN. PLANTA

ESCALA 1/80




## CARACTERISTICAS LOSA H.A.



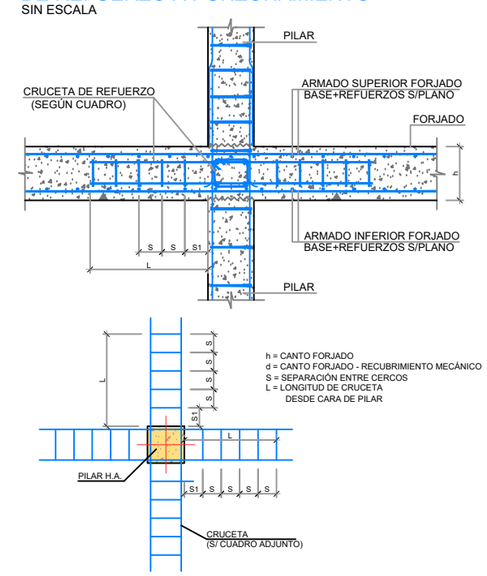

## SECCIÓN TIPO

ESCALA 1:40

| | |
|---|---|
| CANTO: 0.60 m | (PP =15.00kN/m²) |
| ARMADO BASE | |
| SUPERIOR | #Ø16/0.10 |
| INFERIOR | #Ø16/0.10 |

## ESQUEMA GENERAL DE CRUCETAS DE REFUERZO A PUNZONAMIENTO

SIN ESCALA




| TIPO | ESQUEMA | ARMADURA TRANSVERSAL | ARMADURA LONG. MONTAJE | S1 (m) | S (m) | L (m) |
|---|---|---|---|---|---|---|
| TIPO 1 | | 1cØ12/0.10 m | 2+2Ø12 (2 RAMAS) | 0.10 | 0.10 | 1.00 |

## CARACTERISTICAS DE LOS MATERIALES Y NIVELES DE CONTROL (S/ CÓDIGO ESTRUCTURAL)

| MATERIAL | DESIGNACIÓN | NIVEL DE CONTROL | COEF. SEGUR. MATERIALES E.L.U. SIT.PERS O TRANS | E.L.U. SIT.ACCIDENTAL | E.L.S. |
|---|---|---|---|---|---|
| HORMIGON LIMPIEZA Y REGULARIZACIÓN | HL-150/B/20 | ESTADÍSTICO | 1.50 | 1.30 | 1.00 |
| HORMIGONES | HA-30/B/20/XC2 | | | | |
| ARMADURAS PASIVAS | B 500 S | NORMAL | 1.15 | 1.00 | 1.00 |
| MALLAZO | B 500 T | NORMAL | 1.15 | 1.00 | 1.00 |

## COEFICIENTES PARCIALES DE SEGURIDAD. ACCIONES (S/ CÓDIGO ESTRUCTURAL)

| TIPO DE ACCIÓN | | | ESTADO LÍMITE ÚLTIMO (E.L.U.) SIT.PERS O TRANS FAVOR. | SIT.PERS O TRANS DESFAV. | SIT.ACCIDENTAL FAVOR. | SIT.ACCIDENTAL DESFAV. | ESTADO LÍMITE SERVICIO (E.L.S.) FAVOR. | ESTADO LÍMITE SERVICIO (E.L.S.) DESFAV. |
|---|---|---|---|---|---|---|---|---|
| ESTRUCTURAS HORMIGÓN ARMADO | PERMANENTE | | 1.00 | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 |
| | PERMANENTE DE VALOR NO CONSTANTE | | 1.00 | 1.50 | 1.00 | 1.00 | 1.00 | 1.00 |
| | VARIABLE | S.C.U. | 0.00 | 1.50 | 0.00 | 1.00 | 0.00 | 1.00 |
| | | TRÁFICO | 0.00 | 1.35 | 0.00 | 0.00 | 0.00 | 1.00 |
| | ACCIDENTAL | | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |

| *HA-30 (B-500S) Ø (mm) | SOLAPO (Ls) (cm) Ls I | Ls II | ANCLAJE (Lb) prolong. recta (cm) Lb I | Lb II | ANCLAJE (Lb) patilla (**) (cm) Lb I | Lb II |
|---|---|---|---|---|---|---|
| 10 | 70 | 92 | 35 | 46 | 27 | 35 |
| 12 | 84 | 110 | 42 | 55 | 33 | 42 |
| 16 | 112 | 146 | 56 | 73 | 44 | 56 |
| 20 | 144 | 186 | 72 | 93 | 56 | 71 |
| 25 | 212 | 278 | 106 | 139 | 82 | 105 |
| 32 | 330 | 436 | 165 | 218 | 125 | 162 |

(*) EN EL CÁLCULO DE LAS LONGITUDES DE ANCLAJE Y SOLAPE SE HA TENIDO EN CUENTA QUE SE TRATE DE ZONA SÍSMICA, AUMENTANDO EN 10Ø LA LONGITUD DE ANCLAJE SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.
LOS SUBINDICES I Y II EN LAS LONGITUDES DE SOLAPO Y ANCLAJE DE LAS TABLAS SE REFIEREN A LA POSICIÓN DE LA BARRA A ANCLAR O SOLAPAR, RESPECTO A LA DIRECCIÓN DEL HORMIGONADO, SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.

| REQUISITOS GENERALES DE DURABILIDAD (S/CE) (ELEMENTOS DE HORMIGÓN ARMADO. CONTROL NORMAL) | |
|---|---|
| CLASE GENERAL DE EXPOSICION | XC2 |
| CLASE ESPECÍFICA DE EXPOSICION | – |
| RECUBRIMIENTO MINIMO | 25 (1) |
| RECUBRIMIENTO NOMINAL | 35 (1) |
| MAXIMA RELACION AGUA/CEMENTO | 0.60 |
| MINIMO CONTENIDO DE CEMENTO | 275 Kg/m³ |

- ELEMENTOS ENCOFRADOS CONTRA EL TERRENO: RECUBRIMIENTO MÍNIMO 70 mm.

NOTAS:
(1) - UTILIZANDO CEMENTOS DISTINTOS A CEM-I EN LA CONFECCIÓN DE HORMIGONES.
(2) - UTILIZANDO CEM-III/A, CEM-III/B, CEM-IV, CEM-II/B-S, B-P, B-V, A-D U HORMIGÓN CON ADICIÓN DE MICROSÍLICE SUPERIOR AL 6% O DE CENIZAS VOLANTES SUPERIOR AL 20%

NOTAS:

- TODOS LOS DATOS RELATIVOS A LA GEOMETRÍA DE ESTE PROYECTO (COTAS, HUECOS, PENDIENTES, ETC...) SE VERIFICARÁN CON LOS PLANOS DE ARQUITECTURA.
- DEBERÁ COMPROBARSE QUE LAS CARGAS DE LOS ELEMENTOS ARQUITECTÓNICOS A EJECUTAR NO SOBREPASEN LOS VALORES DE LAS ACCIONES Y CARGAS CONSIDERADAS EN EL PRESENTE CÁLCULO ESTRUCTURAL.
- LAS SOLDADURAS EN ÁNGULO TENDRÁN UNA GARGANTA DE 0,7 VECES EL MINIMO ESPESOR DE LAS CHAPAS A UNIR CUANDO LA SOLDADURA SE EJECUTA POR UN SOLO LADO, Y DE 0,5 VECES SI ESTA SE EJECUTA POR AMBOS LADOS, SALVO ESPECIFICACION EN CONTRA EN LOS DETALLES CORRESPONDIENTES.
- LAS SOLDADURAS A TOPE SERÁN CONTINUAS CON PREPARACION DE BORDES Y PENETRACION COMPLETA.
- LOS ELECTRODOS PARA SOLDADURA MANUAL SERÁN CON REVESTIMIENTO BÁSICO.

| | |
|---|---|
| MODULO DE BALASTO (k30x30) | 22 kg/cm³ |
| TENSIÓN ADMISIBLE DEL TERRENO (σ) | 0,30 MPa |


REDACTOR

D.JOSÉ ANTONIO SEGURA SÁNCHEZ
INGENIERO REDACTOR

LA PROPIEDAD

JUNTA DE COMPENSACIÓN
UE-VII.1 "SIST. GRLES PE+KODAK"

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FECHA
FEBRERO 2024

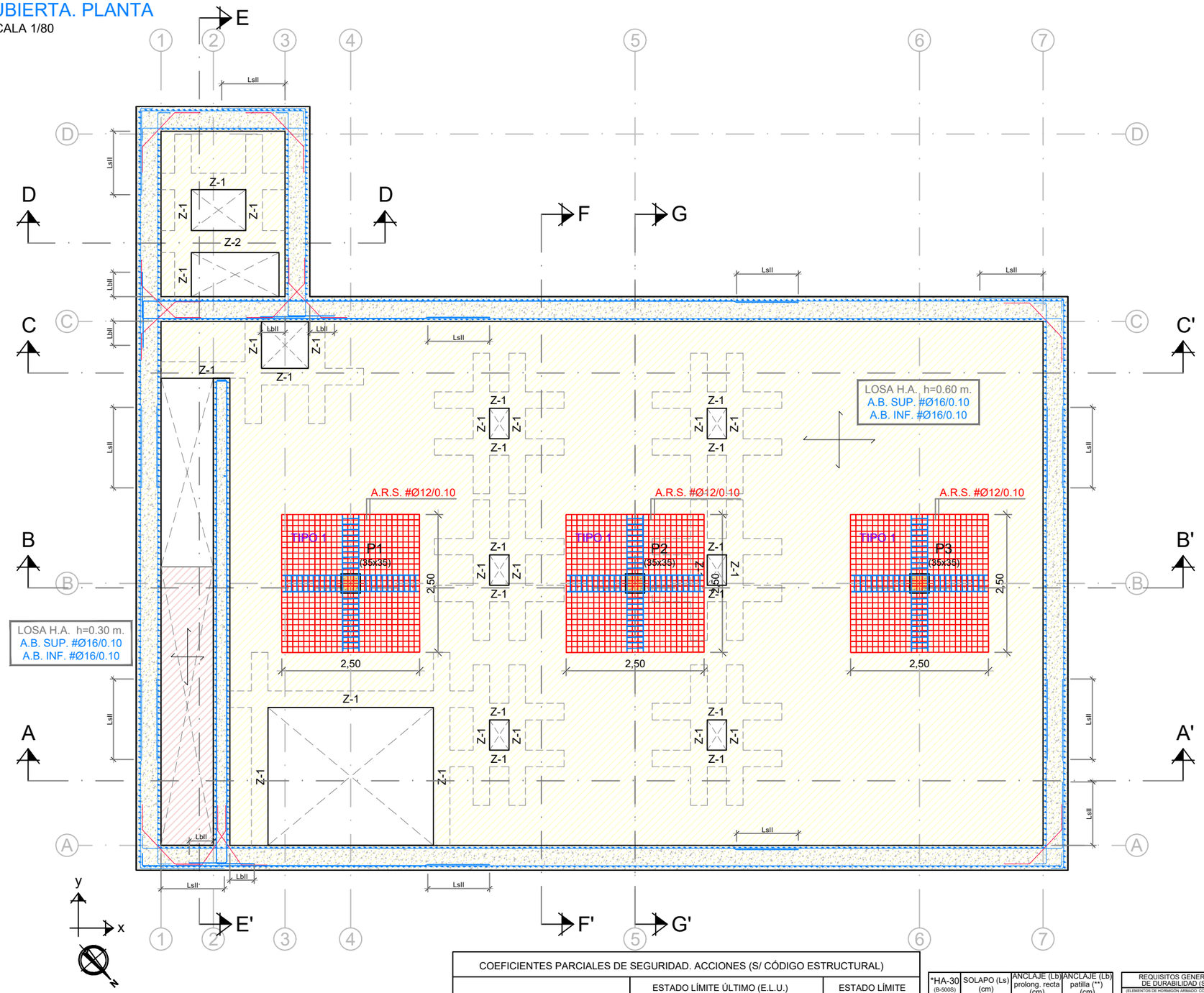
ESCALA
1/80

PLANO
ESTRUCTURA. LOSA DE CIMENTACIÓN.

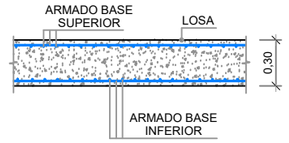
HOJA 1/1
E6

# CUBIERTA. PLANTA

ESCALA 1/80




## CARACTERISTICAS LOSA H.A.

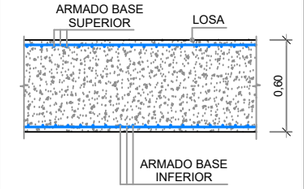



### SECCIÓN TIPO

ESCALA 1:40

| | |
|---|---|
| CANTO: 0.30 m | (PP =7.50kN/m²) |
| ARMADO BASE | |
| SUPERIOR | #Ø16/0.10 |
| INFERIOR | #Ø16/0.10 |

## CARACTERISTICAS LOSA H.A.



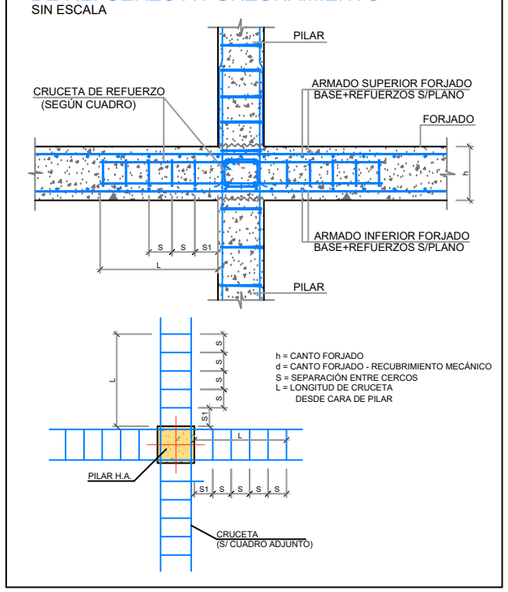

### SECCIÓN TIPO

ESCALA 1:40

| | |
|---|---|
| CANTO: 0.60 m | (PP =15.00kN/m²) |
| ARMADO BASE | |
| SUPERIOR | #Ø16/0.10 |
| INFERIOR | #Ø16/0.10 |

## ESQUEMA GENERAL DE CRUCETAS DE REFUERZO A PUNZONAMIENTO

SIN ESCALA




| TIPO | ESQUEMA | ARMADURA (TRANSVERSAL / LONG. MONTAJE) | S1 (m) | S (m) | L (m) |
|---|---|---|---|---|---|
| TIPO 1 | | 1cØ12/0.10 m / 2+2Ø12 (2 RAMAS) | 0.10 | 0.10 | 1.00 |

### CARACTERISTICAS DE LOS MATERIALES Y NIVELES DE CONTROL (S/ CÓDIGO ESTRUCTURAL)

| MATERIAL | DESIGNACIÓN | NIVEL DE CONTROL | COEF. SEGUR. MATERIALES E.L.U. SIT.PERS O TRANS | E.L.U. SIT.ACCIDENTAL | E.L.S. |
|---|---|---|---|---|---|
| HORMIGON LIMPIEZA Y REGULARIZACIÓN | HL-150/B/20 | ESTADÍSTICO | 1.50 | 1.30 | 1.00 |
| HORMIGONES | HA-30/B/20/XC2 | | | | |
| ARMADURAS PASIVAS | B 500 S | NORMAL | 1.15 | 1.00 | 1.00 |
| MALLAZO | B 500 T | NORMAL | 1.15 | 1.00 | 1.00 |

### COEFICIENTES PARCIALES DE SEGURIDAD. ACCIONES (S/ CÓDIGO ESTRUCTURAL)

| TIPO DE ACCIÓN | | | ESTADO LÍMITE ÚLTIMO (E.L.U.) SIT.PERS O TRANS FAVOR. | SIT.PERS O TRANS DESFAV. | SIT.ACCIDENTAL FAVOR. | SIT.ACCIDENTAL DESFAV. | ESTADO LÍMITE SERVICIO (E.L.S.) FAVOR. | ESTADO LÍMITE SERVICIO (E.L.S.) DESFAV. |
|---|---|---|---|---|---|---|---|---|
| ESTRUCTURAS HORMIGÓN ARMADO | PERMANENTE | | 1.00 | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 |
| | PERMANENTE DE VALOR NO CONSTANTE | | 1.00 | 1.50 | 1.00 | 1.00 | 1.00 | 1.00 |
| | VARIABLE | S.C.U. | 0.00 | 1.50 | 0.00 | 1.00 | 0.00 | 1.00 |
| | | TRÁFICO | 0.00 | 1.35 | 0.00 | 0.00 | 0.00 | 1.00 |
| | ACCIDENTAL | | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |

| *HA-30 (B-500S) | SOLAPO (Ls) (cm) Ls I | Ls II | ANCLAJE (Lb) prolong. recta (cm) Lb I | Lb II | ANCLAJE (Lb) patilla (**) (cm) Lb I | Lb II |
|---|---|---|---|---|---|---|
| Ø (mm) | | | | | | |
| 10 | 70 | 92 | 35 | 46 | 27 | 35 |
| 12 | 84 | 110 | 42 | 55 | 33 | 42 |
| 16 | 112 | 146 | 56 | 73 | 44 | 56 |
| 20 | 144 | 186 | 72 | 93 | 56 | 71 |
| 25 | 212 | 278 | 106 | 139 | 82 | 105 |
| 32 | 330 | 436 | 165 | 218 | 125 | 162 |

(*) EN EL CÁLCULO DE LAS LONGITUDES DE ANCLAJE Y SOLAPE SE HA TENIDO EN CUENTA QUE SE TRATE DE ZONA SÍSMICA, AUMENTANDO EN 10Ø LA LONGITUD DE ANCLAJE SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.
LOS SUBINDICES I Y II EN LAS LONGITUDES DE SOLAPO Y ANCLAJE DE LAS TABLAS SE REFIEREN A LA POSICIÓN DE LA BARRA A ANCLAR O SOLAPAR, RESPECTO A LA DIRECCIÓN DEL HORMIGONADO, SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.

| REQUISITOS GENERALES DE DURABILIDAD (S/CE) (ELEMENTOS DE HORMIGÓN ARMADO. CONTROL NORMAL) | |
|---|---|
| CLASE GENERAL DE EXPOSICION | XC2 |
| CLASE ESPECIFICA DE EXPOSICION | – |
| RECUBRIMIENTO MINIMO | 25 (1) |
| RECUBRIMIENTO NOMINAL | 35 (1) |
| MAXIMA RELACION AGUA/CEMENTO | 0.60 |
| MINIMO CONTENIDO DE CEMENTO | 275 Kg/m³ |

- ELEMENTOS ENCOFRADOS CONTRA EL TERRENO: RECUBRIMIENTO MÍNIMO 70 mm.

NOTAS:
(1) - UTILIZANDO CEMENTOS DISTINTOS A CEM-I EN LA CONFECCIÓN DE HORMIGONES.
(2) - UTILIZANDO CEM-III/A, CEM-II/B, CEM-IV, CEM-II/B-S, B-P, B-V, A-D U HORMIGÓN CON ADICIÓN DE MICROSILICE SUPERIOR AL 6% O DE CENIZAS VOLANTES SUPERIOR AL 20%

NOTAS:

- TODOS LOS DATOS RELATIVOS A LA GEOMETRÍA DE ESTE PROYECTO (COTAS, HUECOS, PENDIENTES, ETC...) SE VERIFICARÁN CON LOS PLANOS DE ARQUITECTURA.
- DEBERÁ COMPROBARSE QUE LAS CARGAS DE LOS ELEMENTOS ARQUITECTÓNICOS A EJECUTAR NO SOBREPASEN LOS VALORES DE LAS ACCIONES Y CARGAS CONSIDERADAS EN EL PRESENTE CÁLCULO ESTRUCTURAL.
- LAS SOLDADURAS EN ÁNGULO TENDRÁN UNA GARGANTA DE 0,7 VECES EL MINIMO ESPESOR DE LAS CHAPAS A UNIR CUANDO LA SOLDADURA SE EJECUTA POR UN SOLO LADO, Y DE 0,5 VECES SI ESTA SE EJECUTA POR AMBOS LADOS, SALVO ESPECIFICACION EN CONTRA EN LOS DETALLES CORRESPONDIENTES.
- LAS SOLDADURAS A TOPE SERÁN CONTINUAS CON PREPARACION DE BORDES Y PENETRACION COMPLETA.
- LOS ELECTRODOS PARA SOLDADURA MANUAL SERÁN CON REVESTIMIENTO BÁSICO.

| | |
|---|---|
| MODULO DE BALASTO (k30x30) | 22 kg/cm³ |
| TENSIÓN ADMISIBLE DEL TERRENO (σ) | 0,30 MPa |


REDACTOR
D.JOSÉ ANTONIO SEGURA SÁNCHEZ
INGENIERO REDACTOR

LA PROPIEDAD
JUNTA DE COMPENSACIÓN
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PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

FECHA FEBRERO 2024

ESCALA 1/80

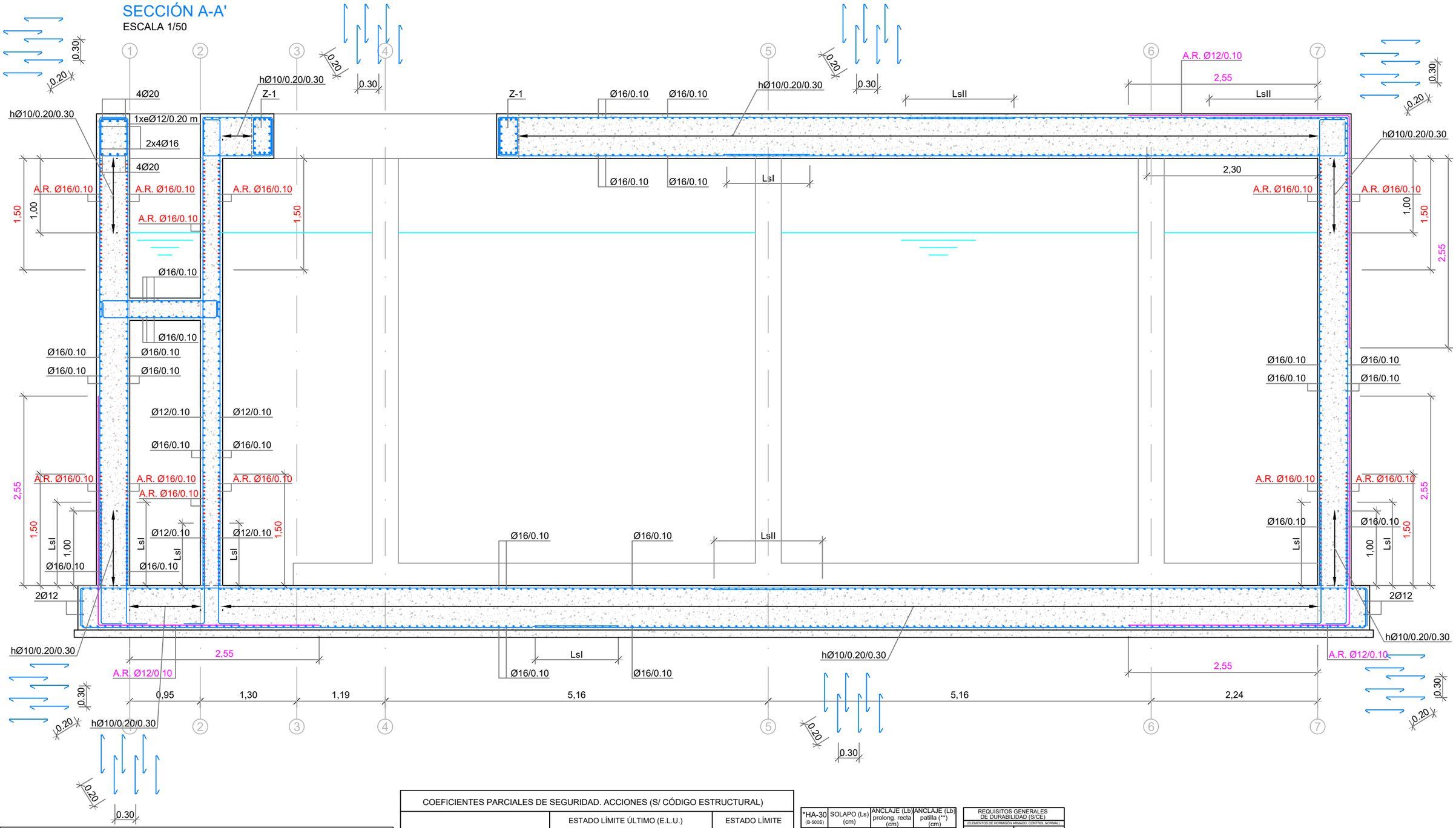
PLANO ESTRUCTURA. LOSA DE CUBIERTA.

HOJA 1/1

E7

# SECCIÓN A-A'

ESCALA 1/50




## CARACTERISTICAS DE LOS MATERIALES Y NIVELES DE CONTROL (S/ CÓDIGO ESTRUCTURAL)

| MATERIAL | DESIGNACIÓN | NIVEL DE CONTROL | COEF. SEGUR. MATERIALES E.L.U. SIT.PERS O TRANS | E.L.U. SIT.ACCIDENTAL | E.L.S. |
|---|---|---|---|---|---|
| HORMIGON LIMPIEZA Y REGULARIZACIÓN | HL-150/B/20 | ESTADÍSTICO | 1.50 | 1.30 | 1.00 |
| HORMIGONES | HA-30/B/20/XC2 | | | | |
| ARMADURAS PASIVAS | B 500 S | NORMAL | 1.15 | 1.00 | 1.00 |
| MALLAZO | B 500 T | NORMAL | 1.15 | 1.00 | 1.00 |

| | |
|---|---|
| MODULO DE BALASTO ($k_{30x30}$) | 22 kg/cm³ |
| TENSIÓN ADMISIBLE DEL TERRENO (σ) | 0,30 MPa |

## COEFICIENTES PARCIALES DE SEGURIDAD. ACCIONES (S/ CÓDIGO ESTRUCTURAL)

| TIPO DE ACCIÓN | | | ESTADO LÍMITE ÚLTIMO (E.L.U.) SIT.PERS O TRANS FAVOR. | SIT.PERS O TRANS DESFAV. | SIT.ACCIDENTAL FAVOR. | SIT.ACCIDENTAL DESFAV. | ESTADO LÍMITE SERVICIO (E.L.S.) FAVOR. | ESTADO LÍMITE SERVICIO (E.L.S.) DESFAV. |
|---|---|---|---|---|---|---|---|---|
| ESTRUCTURAS HORMIGÓN ARMADO | PERMANENTE | | 1.00 | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 |
| | PERMANENTE DE VALOR NO CONSTANTE | | 1.00 | 1.50 | 1.00 | 1.00 | 1.00 | 1.00 |
| | VARIABLE | S.C.U. | 0.00 | 1.50 | 0.00 | 1.00 | 0.00 | 1.00 |
| | | TRÁFICO | 0.00 | 1.35 | 0.00 | 0.00 | 0.00 | 1.00 |
| | ACCIDENTAL | | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |

| *HA-30 (B-500S) | SOLAPO (Ls) (cm) Ls I | Ls II | ANCLAJE (Lb) prolong. recta (cm) Lb I | Lb II | ANCLAJE (Lb) patilla (**) (cm) Lb I | Lb II |
|---|---|---|---|---|---|---|
| Ø (mm) | | | | | | |
| 10 | 70 | 92 | 35 | 46 | 27 | 35 |
| 12 | 84 | 110 | 42 | 55 | 33 | 42 |
| 16 | 112 | 146 | 56 | 73 | 44 | 56 |
| 20 | 144 | 186 | 72 | 93 | 56 | 71 |
| 25 | 212 | 278 | 106 | 139 | 82 | 105 |
| 32 | 330 | 436 | 165 | 218 | 125 | 162 |

(*) EN EL CÁLCULO DE LAS LONGITUDES DE ANCLAJE Y SOLAPE SE HA TENIDO EN CUENTA QUE SE TRATE DE ZONA SÍSMICA, AUMENTANDO EN 10Ø LA LONGITUD DE ANCLAJE SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.
LOS SUBINDICES I Y II EN LAS LONGITUDES DE SOLAPO Y ANCLAJE DE LAS TABLAS SE REFIEREN A LA POSICIÓN DE LA BARRA A ANCLAR O SOLAPAR, RESPECTO A LA DIRECCIÓN DEL HORMIGONADO, SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.

| REQUISITOS GENERALES DE DURABILIDAD (S/CE) (ELEMENTOS DE HORMIGÓN ARMADO CONTROL NORMAL) | |
|---|---|
| CLASE GENERAL DE EXPOSICION | XC2 |
| CLASE ESPECIFICA DE EXPOSICION | – |
| RECUBRIMIENTO MINIMO | 25 (1) |
| RECUBRIMIENTO NOMINAL | 35 (1) |
| MAXIMA RELACION AGUA/CEMENTO | 0.60 |
| MINIMO CONTENIDO DE CEMENTO | 275 Kg/m³ |
| - ELEMENTOS ENCOFRADOS CONTRA EL TERRENO: RECUBRIMIENTO MÍNIMO 70 mm. | |

NOTAS:
(1) - UTILIZANDO CEMENTOS DISTINTOS A CEM-I EN LA CONFECCIÓN DE HORMIGONES.
(2) - UTILIZANDO CEM-III/A, CEM-III/B, CEM-IV, CEM-II/B-S, B-P, B-V, A-D U HORMIGÓN CON ADICIÓN DE MICROSÍLICE SUPERIOR AL 6% O DE CENIZAS VOLANTES SUPERIOR AL 20%

NOTAS:
- TODOS LOS DATOS RELATIVOS A LA GEOMETRÍA DE ESTE PROYECTO (COTAS, HUECOS, PENDIENTES, ETC...) SE VERIFICARÁN CON LOS PLANOS DE ARQUITECTURA.
- DEBERÁ COMPROBARSE QUE LAS CARGAS DE LOS ELEMENTOS ARQUITECTÓNICOS A EJECUTAR NO SOBREPASEN LOS VALORES DE LAS ACCIONES Y CARGAS CONSIDERADAS EN EL PRESENTE CÁLCULO ESTRUCTURAL.
- LAS SOLDADURAS EN ÁNGULO TENDRÁN UNA GARGANTA DE 0,7 VECES EL MINIMO ESPESOR DE LAS CHAPAS A UNIR CUANDO LA SOLDADURA SE EJECUTA POR UN SOLO LADO, Y DE 0,5 VECES SI ESTA SE EJECUTA POR AMBOS LADOS, SALVO ESPECIFICACION EN CONTRA EN LOS DETALLES CORRESPONDIENTES.
- LAS SOLDADURAS A TOPE SERÁN CONTINUAS CON PREPARACION DE BORDES Y PENETRACION COMPLETA.
- LOS ELECTRODOS PARA SOLDADURA MANUAL SERÁN CON REVESTIMIENTO BÁSICO.


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FECHA FEBRERO 2024

ESCALA 1/50

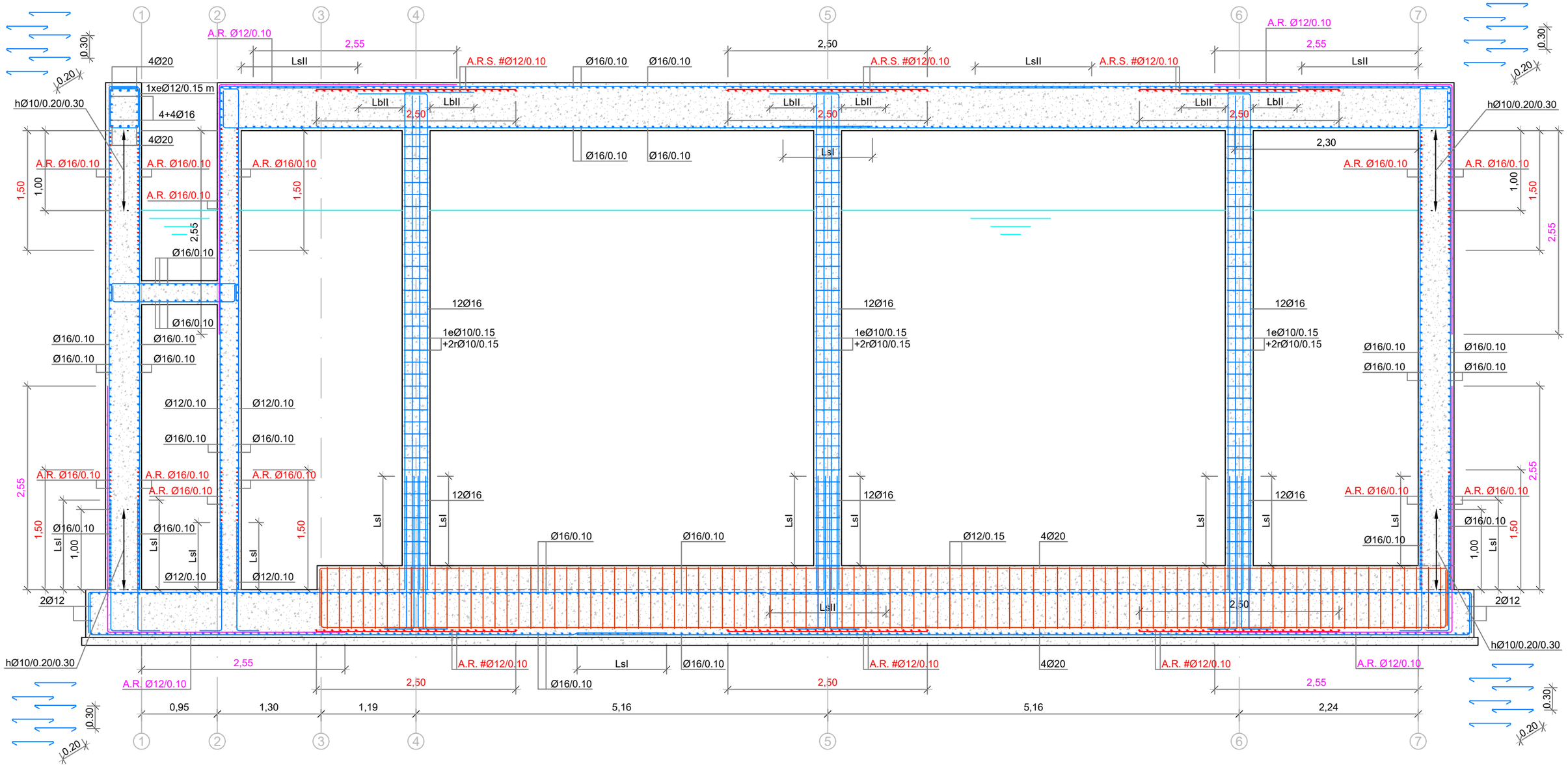
PLANO ESTRUCTURA. SECCIÓN A-A'.

HOJA 1/1

E8

## SECCIÓN B-B'

ESCALA 1/50




### CARACTERISTICAS DE LOS MATERIALES Y NIVELES DE CONTROL (S/ CÓDIGO ESTRUCTURAL)

| MATERIAL | DESIGNACIÓN | NIVEL DE CONTROL | COEF. SEGUR. MATERIALES E.L.U. SIT.PERS O TRANS | COEF. SEGUR. MATERIALES E.L.U. SIT.ACCIDENTAL | COEF. SEGUR. MATERIALES E.L.S. |
|---|---|---|---|---|---|
| HORMIGON LIMPIEZA Y REGULARIZACIÓN | HL-150/B/20 | ESTADÍSTICO | 1.50 | 1.30 | 1.00 |
| HORMIGONES | HA-30/B/20/XC2 | | | | |
| ARMADURAS PASIVAS | B 500 S | NORMAL | 1.15 | 1.00 | 1.00 |
| MALLAZO | B 500 T | NORMAL | 1.15 | 1.00 | 1.00 |

### COEFICIENTES PARCIALES DE SEGURIDAD. ACCIONES (S/ CÓDIGO ESTRUCTURAL)

| TIPO DE ACCIÓN | | | ESTADO LÍMITE ÚLTIMO (E.L.U.) SIT.PERS O TRANS FAVOR. | ESTADO LÍMITE ÚLTIMO (E.L.U.) SIT.PERS O TRANS DESFAV. | ESTADO LÍMITE ÚLTIMO (E.L.U.) SIT.ACCIDENTAL FAVOR. | ESTADO LÍMITE ÚLTIMO (E.L.U.) SIT.ACCIDENTAL DESFAV. | ESTADO LÍMITE SERVICIO (E.L.S.) FAVOR. | ESTADO LÍMITE SERVICIO (E.L.S.) DESFAV. |
|---|---|---|---|---|---|---|---|---|
| ESTRUCTURAS HORMIGÓN ARMADO | PERMANENTE | | 1.00 | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 |
| | PERMANENTE DE VALOR NO CONSTANTE | | 1.00 | 1.50 | 1.00 | 1.00 | 1.00 | 1.00 |
| | VARIABLE | S.C.U. | 0.00 | 1.50 | 0.00 | 1.00 | 0.00 | 1.00 |
| | | TRÁFICO | 0.00 | 1.35 | 0.00 | 0.00 | 0.00 | 1.00 |
| | ACCIDENTAL | | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |

| *HA-30 (B-500S) | SOLAPO (Ls) (cm) | | ANCLAJE (Lb) prolong. recta (cm) | | ANCLAJE (Lb) patilla (**) (cm) | |
|---|---|---|---|---|---|---|
| Ø (mm) | Ls I | Ls II | Lb I | Lb II | Lb I | Lb II |
| 10 | 70 | 92 | 35 | 46 | 27 | 35 |
| 12 | 84 | 110 | 42 | 55 | 33 | 42 |
| 16 | 112 | 146 | 56 | 73 | 44 | 56 |
| 20 | 144 | 186 | 72 | 93 | 56 | 71 |
| 25 | 212 | 278 | 106 | 139 | 82 | 105 |
| 32 | 330 | 436 | 165 | 218 | 125 | 162 |

(*) EN EL CÁLCULO DE LAS LONGITUDES DE ANCLAJE Y SOLAPE SE HA TENIDO EN CUENTA QUE SE TRATE DE ZONA SÍSMICA, AUMENTANDO EN 10Ø LA LONGITUD DE ANCLAJE SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.
LOS SUBINDICES I Y II EN LAS LONGITUDES DE SOLAPO Y ANCLAJE DE LAS TABLAS SE REFIEREN A LA POSICIÓN DE LA BARRA A ANCLAR O SOLAPAR, RESPECTO A LA DIRECCIÓN DEL HORMIGONADO, SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.

| REQUISITOS GENERALES DE DURABILIDAD (S/CE) (ELEMENTOS DE HORMIGÓN ARMADO. CONTROL NORMAL) | |
|---|---|
| CLASE GENERAL DE EXPOSICION | XC2 |
| CLASE ESPECIFICA DE EXPOSICION | – |
| RECUBRIMIENTO MINIMO | 25 (1) |
| RECUBRIMIENTO NOMINAL | 35 (1) |
| MAXIMA RELACION AGUA/CEMENTO | 0.60 |
| MINIMO CONTENIDO DE CEMENTO | 275 Kg/m³ |
| - ELEMENTOS ENCOFRADOS CONTRA EL TERRENO: RECUBRIMIENTO MÍNIMO 70 mm. | |

NOTAS:
(1) - UTILIZANDO CEMENTOS DISTINTOS A CEM-I EN LA CONFECCIÓN DE HORMIGONES.
(2) - UTILIZANDO CEM-III/A, CEM-III/B, CEM-IV, CEM-II/B-S, B-P, B-V, A-D U HORMIGÓN CON ADICIÓN DE MICROSÍLICE SUPERIOR AL 6% O DE CENIZAS VOLANTES SUPERIOR AL 20%

NOTAS:
- TODOS LOS DATOS RELATIVOS A LA GEOMETRÍA DE ESTE PROYECTO (COTAS, HUECOS, PENDIENTES, ETC...) SE VERIFICARÁN CON LOS PLANOS DE ARQUITECTURA.
- DEBERÁ COMPROBARSE QUE LAS CARGAS DE LOS ELEMENTOS ARQUITECTÓNICOS A EJECUTAR NO SOBREPASEN LOS VALORES DE LAS ACCIONES Y CARGAS CONSIDERADAS EN EL PRESENTE CÁLCULO ESTRUCTURAL.
- LAS SOLDADURAS EN ÁNGULO TENDRÁN UNA GARGANTA DE 0,7 VECES EL MINIMO ESPESOR DE LAS CHAPAS A UNIR CUANDO LA SOLDADURA SE EJECUTA POR UN SOLO LADO, Y DE 0,5 VECES SI ESTA SE EJECUTA POR AMBOS LADOS, SALVO ESPECIFICACION EN CONTRA EN LOS DETALLES CORRESPONDIENTES.
- LAS SOLDADURAS A TOPE SERÁN CONTINUAS CON PREPARACION DE BORDES Y PENETRACION COMPLETA.
- LOS ELECTRODOS PARA SOLDADURA MANUAL SERÁN CON REVESTIMIENTO BÁSICO.

| | |
|---|---|
| MODULO DE BALASTO ($k_{30x30}$) | 22 kg/cm³ |
| TENSIÓN ADMISIBLE DEL TERRENO (σ) | 0,30 MPa |


REDACTOR
D.JOSÉ ANTONIO SEGURA SÁNCHEZ
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FECHA
FEBRERO 2024

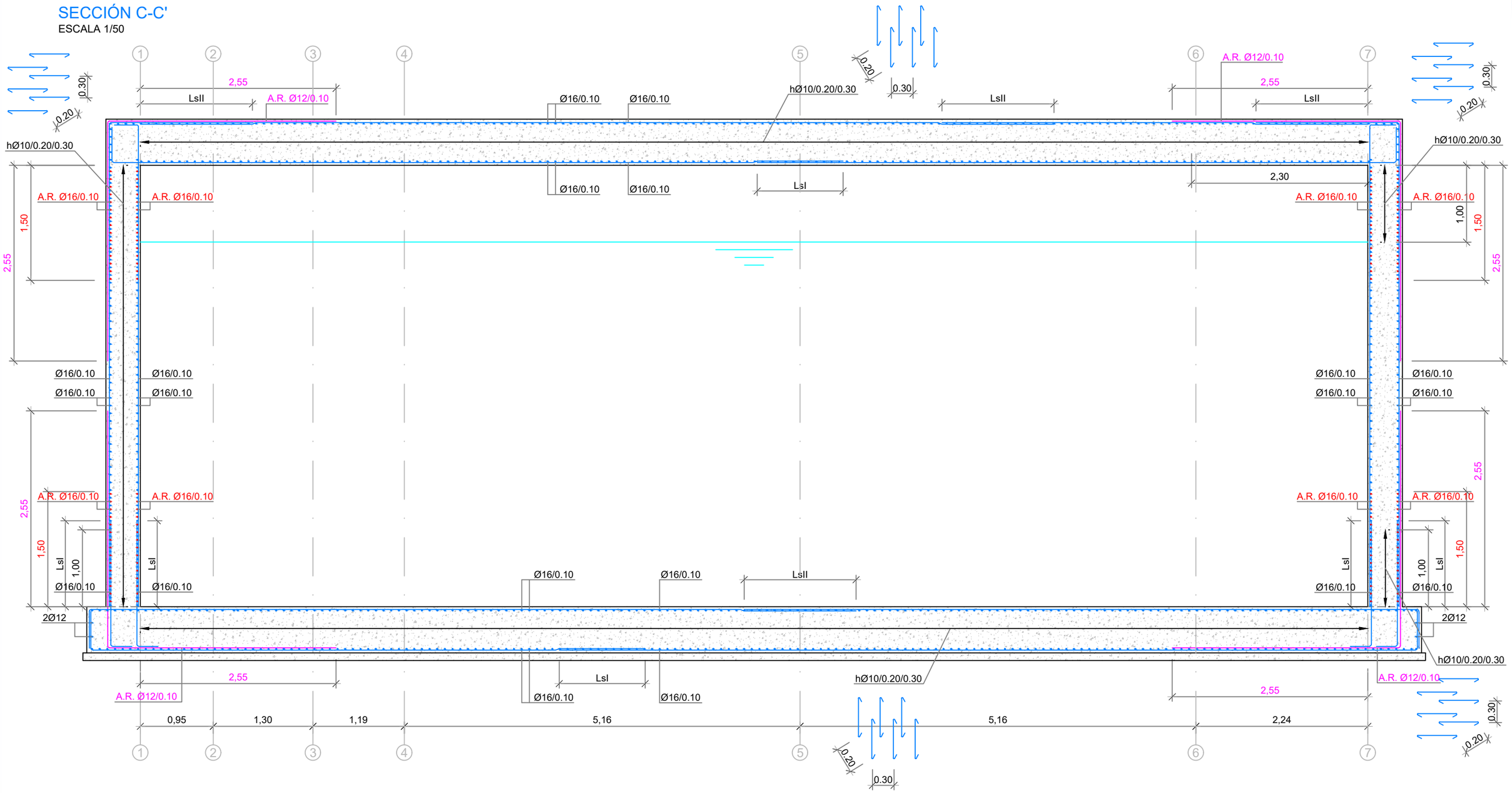
ESCALA
1/50

PLANO
ESTRUCTURA. SECCIÓN B-B'.

HOJA 1/1
E9

# SECCIÓN C-C'

ESCALA 1/50




| CARACTERISTICAS DE LOS MATERIALES Y NIVELES DE CONTROL (S/ CÓDIGO ESTRUCTURAL) | | | | | |
|---|---|---|---|---|---|
| MATERIAL | DESIGNACIÓN | NIVEL DE CONTROL | COEF. SEGUR. MATERIALES | | |
| | | | E.L.U. | | E.L.S. |
| | | | SIT.PERS O TRANS | SIT.ACCIDENTAL | |
| HORMIGON LIMPIEZA Y REGULARIZACIÓN | HL-150/B/20 | ESTADÍSTICO | 1.50 | 1.30 | 1.00 |
| HORMIGONES | HA-30/B/20/XC2 | | | | |
| ARMADURAS PASIVAS | B 500 S | NORMAL | 1.15 | 1.00 | 1.00 |
| MALLAZO | B 500 T | NORMAL | 1.15 | 1.00 | 1.00 |

| COEFICIENTES PARCIALES DE SEGURIDAD. ACCIONES (S/ CÓDIGO ESTRUCTURAL) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| TIPO DE ACCIÓN | | | ESTADO LÍMITE ÚLTIMO (E.L.U.) | | | | ESTADO LÍMITE SERVICIO (E.L.S.) | |
| | | | SIT.PERS O TRANS | | SIT.ACCIDENTAL | | | |
| | | | FAVOR. | DESFAV. | FAVOR. | DESFAV. | FAVOR. | DESFAV. |
| ESTRUCTURAS HORMIGÓN ARMADO | PERMANENTE | | 1.00 | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 |
| | PERMANENTE DE VALOR NO CONSTANTE | | 1.00 | 1.50 | 1.00 | 1.00 | 1.00 | 1.00 |
| | VARIABLE | S.C.U. | 0.00 | 1.50 | 0.00 | 1.00 | 0.00 | 1.00 |
| | | TRÁFICO | 0.00 | 1.35 | 0.00 | 0.00 | 0.00 | 1.00 |
| | ACCIDENTAL | | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |

| *HA-30 (B-500S) | SOLAPO (Ls) (cm) | | ANCLAJE (Lb) prolong. recta (cm) | | ANCLAJE (Lb) patilla (**) (cm) | |
|---|---|---|---|---|---|---|
| Ø (mm) | Ls I | Ls II | Lb I | Lb II | Lb I | Lb II |
| 10 | 70 | 92 | 35 | 46 | 27 | 35 |
| 12 | 84 | 110 | 42 | 55 | 33 | 42 |
| 16 | 112 | 146 | 56 | 73 | 44 | 56 |
| 20 | 144 | 186 | 72 | 93 | 56 | 71 |
| 25 | 212 | 278 | 106 | 139 | 82 | 105 |
| 32 | 330 | 436 | 165 | 218 | 125 | 162 |

(*) EN EL CÁLCULO DE LAS LONGITUDES DE ANCLAJE Y SOLAPE SE HA TENIDO EN CUENTA QUE SE TRATE DE ZONA SÍSMICA, AUMENTANDO EN 10Ø LA LONGITUD DE ANCLAJE SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.
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| REQUISITOS GENERALES DE DURABILIDAD (S/CE) (ELEMENTOS DE HORMIGÓN ARMADO. CONTROL NORMAL) | |
|---|---|
| CLASE GENERAL DE EXPOSICION | XC2 |
| CLASE ESPECÍFICA DE EXPOSICION | – |
| RECUBRIMIENTO MINIMO | 25 (1) |
| RECUBRIMIENTO NOMINAL | 35 (1) |
| MAXIMA RELACION AGUA/CEMENTO | 0.60 |
| MINIMO CONTENIDO DE CEMENTO | 275 Kg/m³ |
| - ELEMENTOS ENCOFRADOS CONTRA EL TERRENO: RECUBRIMIENTO MÍNIMO 70 mm. | |

NOTAS:
(1) - UTILIZANDO CEMENTOS DISTINTOS A CEM-I EN LA CONFECCIÓN DE HORMIGONES.
(2) - UTILIZANDO CEM-III/A, CEM-III/B, CEM-IV, CEM-II/B-S, B-P, B-V, A-D U HORMIGÓN CON ADICIÓN DE MICROSILICE SUPERIOR AL 6% O DE CENIZAS VOLANTES SUPERIOR AL 20%

NOTAS:

- TODOS LOS DATOS RELATIVOS A LA GEOMETRÍA DE ESTE PROYECTO (COTAS, HUECOS, PENDIENTES, ETC...) SE VERIFICARÁN CON LOS PLANOS DE ARQUITECTURA.
- DEBERÁ COMPROBARSE QUE LAS CARGAS DE LOS ELEMENTOS ARQUITECTÓNICOS A EJECUTAR NO SOBREPASEN LOS VALORES DE LAS ACCIONES Y CARGAS CONSIDERADAS EN EL PRESENTE CÁLCULO ESTRUCTURAL.
- LAS SOLDADURAS EN ÁNGULO TENDRÁN UNA GARGANTA DE 0,7 VECES EL MINIMO ESPESOR DE LAS CHAPAS A UNIR CUANDO LA SOLDADURA SE EJECUTA POR UN SOLO LADO, Y DE 0,5 VECES SI ESTA SE EJECUTA POR AMBOS LADOS, SALVO ESPECIFICACION EN CONTRA EN LOS DETALLES CORRESPONDIENTES.
- LAS SOLDADURAS A TOPE SERÁN CONTINUAS CON PREPARACION DE BORDES Y PENETRACION COMPLETA.
- LOS ELECTRODOS PARA SOLDADURA MANUAL SERÁN CON REVESTIMIENTO BÁSICO.

| | |
|---|---|
| MODULO DE BALASTO ($k_{30x30}$) | 22 kg/cm³ |
| TENSIÓN ADMISIBLE DEL TERRENO (σ) | 0,30 MPa |


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LA PROPIEDAD

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PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

FECHA
FEBRERO 2024

ESCALA
1/50

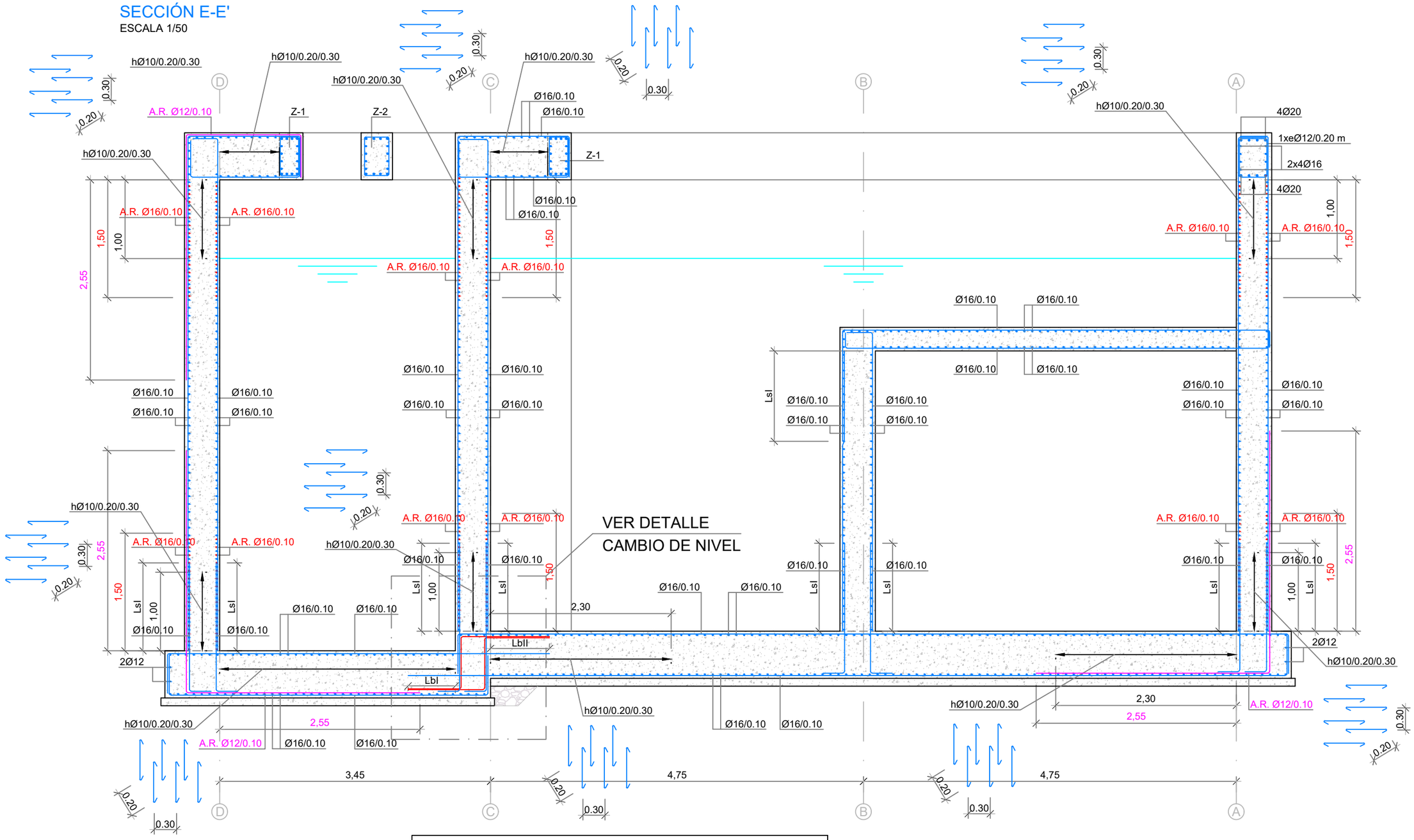
PLANO HOJA 1/1

ESTRUCTURA.
SECCIÓN C-C'

E10

## SECCIÓN E-E'

ESCALA 1/50




| CARACTERISTICAS DE LOS MATERIALES Y NIVELES DE CONTROL (S/ CÓDIGO ESTRUCTURAL) | | | | | |
|---|---|---|---|---|---|
| MATERIAL | DESIGNACIÓN | NIVEL DE CONTROL | COEF. SEGUR. MATERIALES E.L.U. SIT.PERS O TRANS | COEF. SEGUR. MATERIALES E.L.U. SIT.ACCIDENTAL | COEF. SEGUR. MATERIALES E.L.S. |
| HORMIGON LIMPIEZA Y REGULARIZACIÓN | HL-150/B/20 | ESTADÍSTICO | 1.50 | 1.30 | 1.00 |
| HORMIGONES | HA-30/B/20/XC2 | | | | |
| ARMADURAS PASIVAS | B 500 S | NORMAL | 1.15 | 1.00 | 1.00 |
| MALLAZO | B 500 T | NORMAL | 1.15 | 1.00 | 1.00 |

| COEFICIENTES PARCIALES DE SEGURIDAD. ACCIONES (S/ CÓDIGO ESTRUCTURAL) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| TIPO DE ACCIÓN | | | ESTADO LÍMITE ÚLTIMO (E.L.U.) SIT.PERS O TRANS FAVOR. | SIT.PERS O TRANS DESFAV. | SIT.ACCIDENTAL FAVOR. | SIT.ACCIDENTAL DESFAV. | ESTADO LÍMITE SERVICIO (E.L.S.) FAVOR. | ESTADO LÍMITE SERVICIO (E.L.S.) DESFAV. |
| ESTRUCTURAS HORMIGÓN ARMADO | PERMANENTE | | 1.00 | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 |
| | PERMANENTE DE VALOR NO CONSTANTE | | 1.00 | 1.50 | 1.00 | 1.00 | 1.00 | 1.00 |
| | VARIABLE | S.C.U. | 0.00 | 1.50 | 0.00 | 1.00 | 0.00 | 1.00 |
| | | TRÁFICO | 0.00 | 1.35 | 0.00 | 0.00 | 0.00 | 1.00 |
| | ACCIDENTAL | | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |

| *HA-30 (B-500S) | SOLAPO (Ls) (cm) | | ANCLAJE (Lb) prolong. recta (cm) | | ANCLAJE (Lb) patilla (**) (cm) | |
|---|---|---|---|---|---|---|
| Ø (mm) | Ls I | Ls II | Lb I | Lb II | Lb I | Lb II |
| 10 | 70 | 92 | 35 | 46 | 27 | 35 |
| 12 | 84 | 110 | 42 | 55 | 33 | 42 |
| 16 | 112 | 146 | 56 | 73 | 44 | 56 |
| 20 | 144 | 186 | 72 | 93 | 56 | 71 |
| 25 | 212 | 278 | 106 | 139 | 82 | 105 |
| 32 | 330 | 436 | 165 | 218 | 125 | 162 |

(*) EN EL CÁLCULO DE LAS LONGITUDES DE ANCLAJE Y SOLAPE SE HA TENIDO EN CUENTA QUE SE TRATE DE ZONA SÍSMICA, AUMENTANDO EN 10Ø LA LONGITUD DE ANCLAJE SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.
LOS SUBÍNDICES I Y II EN LAS LONGITUDES DE SOLAPO Y ANCLAJE DE LAS TABLAS SE REFIEREN A LA POSICIÓN DE LA BARRA A ANCLAR O SOLAPAR, RESPECTO A LA DIRECCIÓN DEL HORMIGONADO, SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.

| REQUISITOS GENERALES DE DURABILIDAD (S/CE) (ELEMENTOS DE HORMIGÓN ARMADO. CONTROL NORMAL) | |
|---|---|
| CLASE GENERAL DE EXPOSICION | XC2 |
| CLASE ESPECIFICA DE EXPOSICION | – |
| RECUBRIMIENTO MINIMO | 25 (1) |
| RECUBRIMIENTO NOMINAL | 35 (1) |
| MAXIMA RELACION AGUA/CEMENTO | 0.60 |
| MINIMO CONTENIDO DE CEMENTO | 275 Kg/m³ |
| - ELEMENTOS ENCOFRADOS CONTRA EL TERRENO: RECUBRIMIENTO MÍNIMO 70 mm. | |

NOTAS:
(1) - UTILIZANDO CEMENTOS DISTINTOS A CEM-I EN LA CONFECCIÓN DE HORMIGONES.
(2) - UTILIZANDO CEM-III/A, CEM-III/B, CEM-IV, CEM-II/B-S, B-P, B-V, A-D U HORMIGÓN CON ADICIÓN DE MICROSÍLICE SUPERIOR AL 6% O DE CENIZAS VOLANTES SUPERIOR AL 20%

NOTAS:
- TODOS LOS DATOS RELATIVOS A LA GEOMETRÍA DE ESTE PROYECTO (COTAS, HUECOS, PENDIENTES, ETC...) SE VERIFICARÁN CON LOS PLANOS DE ARQUITECTURA.
- DEBERÁ COMPROBARSE QUE LAS CARGAS DE LOS ELEMENTOS ARQUITECTÓNICOS A EJECUTAR NO SOBREPASEN LOS VALORES DE LAS ACCIONES Y CARGAS CONSIDERADAS EN EL PRESENTE CÁLCULO ESTRUCTURAL.
- LAS SOLDADURAS EN ÁNGULO TENDRÁN UNA GARGANTA DE 0,7 VECES EL MINIMO ESPESOR DE LAS CHAPAS A UNIR CUANDO LA SOLDADURA SE EJECUTA POR UN SOLO LADO, Y DE 0,5 VECES SI ESTA SE EJECUTA POR AMBOS LADOS, SALVO ESPECIFICACION EN CONTRA EN LOS DETALLES CORRESPONDIENTES.
- LAS SOLDADURAS A TOPE SERÁN CONTINUAS CON PREPARACION DE BORDES Y PENETRACION COMPLETA.
- LOS ELECTRODOS PARA SOLDADURA MANUAL SERÁN CON REVESTIMIENTO BÁSICO.

| | |
|---|---|
| MODULO DE BALASTO (k30x30) | 22 kg/cm³ |
| TENSIÓN ADMISIBLE DEL TERRENO (σ) | 0,30 MPa |

REDACTOR
D.JOSÉ ANTONIO SEGURA SÁNCHEZ
INGENIERO REDACTOR

LA PROPIEDAD
JUNTA DE COMPENSACIÓN
UE-VII.1 "SIST. GRLES PE+KODAK"

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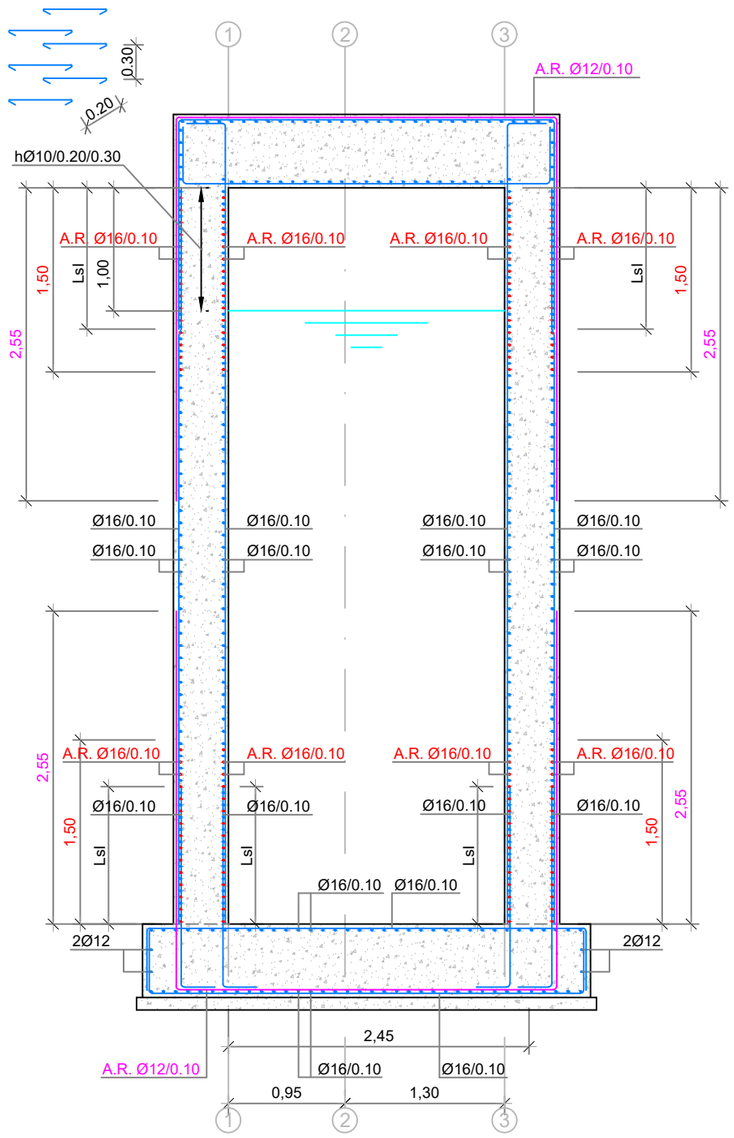
FECHA
FEBRERO 2024

ESCALA
1/50

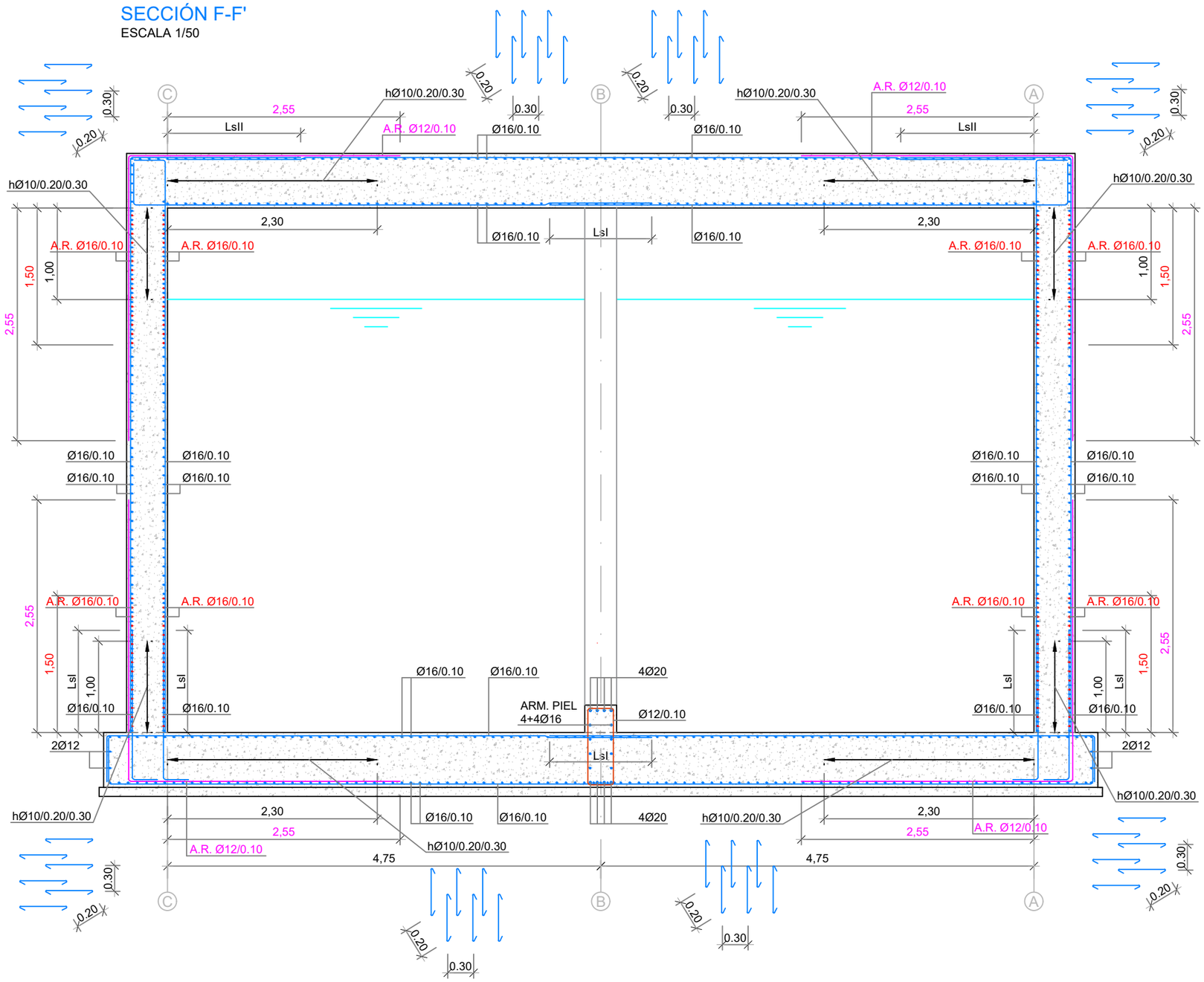
PLANO
ESTRUCTURA. SECCIÓN E-E'.

HOJA 1/1
E11

## SECCIÓN D-D'
ESCALA 1/50




## SECCIÓN F-F'
ESCALA 1/50




### CARACTERISTICAS DE LOS MATERIALES Y NIVELES DE CONTROL (S/ CÓDIGO ESTRUCTURAL)

| MATERIAL | DESIGNACIÓN | NIVEL DE CONTROL | COEF. SEGUR. MATERIALES E.L.U. SIT.PERS O TRANS | E.L.U. SIT.ACCIDENTAL | E.L.S. |
|---|---|---|---|---|---|
| HORMIGON LIMPIEZA Y REGULARIZACIÓN | HL-150/B/20 | ESTADÍSTICO | 1.50 | 1.30 | 1.00 |
| HORMIGONES | HA-30/B/20/XC2 | | | | |
| ARMADURAS PASIVAS | B 500 S | NORMAL | 1.15 | 1.00 | 1.00 |
| MALLAZO | B 500 T | NORMAL | 1.15 | 1.00 | 1.00 |

### COEFICIENTES PARCIALES DE SEGURIDAD. ACCIONES (S/ CÓDIGO ESTRUCTURAL)

| TIPO DE ACCIÓN | | | ESTADO LÍMITE ÚLTIMO (E.L.U.) SIT.PERS O TRANS FAVOR. | SIT.PERS O TRANS DESFAV. | SIT.ACCIDENTAL FAVOR. | SIT.ACCIDENTAL DESFAV. | ESTADO LÍMITE SERVICIO (E.L.S.) FAVOR. | ESTADO LÍMITE SERVICIO (E.L.S.) DESFAV. |
|---|---|---|---|---|---|---|---|---|
| ESTRUCTURAS HORMIGÓN ARMADO | PERMANENTE | | 1.00 | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 |
| | PERMANENTE DE VALOR NO CONSTANTE | | 1.00 | 1.50 | 1.00 | 1.00 | 1.00 | 1.00 |
| | VARIABLE | S.C.U. | 0.00 | 1.50 | 0.00 | 1.00 | 0.00 | 1.00 |
| | | TRÁFICO | 0.00 | 1.35 | 0.00 | 0.00 | 0.00 | 1.00 |
| | ACCIDENTAL | | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |

| MODULO DE BALASTO (k30x30) | 22 kg/cm³ |
|---|---|
| TENSIÓN ADMISIBLE DEL TERRENO (σ) | 0,30 MPa |

| *HA-30 (B-500S) | SOLAPO (Ls) (cm) | | ANCLAJE (Lb) prolong. recta (cm) | | ANCLAJE (Lb) patilla (**) (cm) | |
|---|---|---|---|---|---|---|
| Ø (mm) | Ls I | Ls II | Lb I | Lb II | Lb I | Lb II |
| 10 | 70 | 92 | 35 | 46 | 27 | 35 |
| 12 | 84 | 110 | 42 | 55 | 33 | 42 |
| 16 | 112 | 146 | 56 | 73 | 44 | 56 |
| 20 | 144 | 186 | 72 | 93 | 56 | 71 |
| 25 | 212 | 278 | 106 | 139 | 82 | 105 |
| 32 | 330 | 436 | 165 | 218 | 125 | 162 |

(*) EN EL CÁLCULO DE LAS LONGITUDES DE ANCLAJE Y SOLAPE SE HA TENIDO EN CUENTA QUE SE TRATE DE ZONA SÍSMICA, AUMENTANDO EN 10Ø LA LONGITUD DE ANCLAJE SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.
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| REQUISITOS GENERALES DE DURABILIDAD (S/CE) (ELEMENTOS DE HORMIGÓN ARMADO CONTROL NORMAL) | |
|---|---|
| CLASE GENERAL DE EXPOSICION | XC2 |
| CLASE ESPECIFICA DE EXPOSICION | – |
| RECUBRIMIENTO MINIMO | 25 (1) |
| RECUBRIMIENTO NOMINAL | 35 (1) |
| MAXIMA RELACION AGUA/CEMENTO | 0.60 |
| MINIMO CONTENIDO DE CEMENTO | 275 Kg/m³ |
| - ELEMENTOS ENCOFRADOS CONTRA EL TERRENO: RECUBRIMIENTO MÍNIMO 70 mm. | |

NOTAS:
(1) - UTILIZANDO CEMENTOS DISTINTOS A CEM-I EN LA CONFECCIÓN DE HORMIGONES.
(2) - UTILIZANDO CEM-III/A, CEM-III/B, CEM-IV, CEM-II/B-S, B-P, B-V, A-D U HORMIGÓN CON ADICIÓN DE MICROSÍLICE SUPERIOR AL 6% O DE CENIZAS VOLANTES SUPERIOR AL 20%

NOTAS:
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- LOS ELECTRODOS PARA SOLDADURA MANUAL SERÁN CON REVESTIMIENTO BÁSICO.


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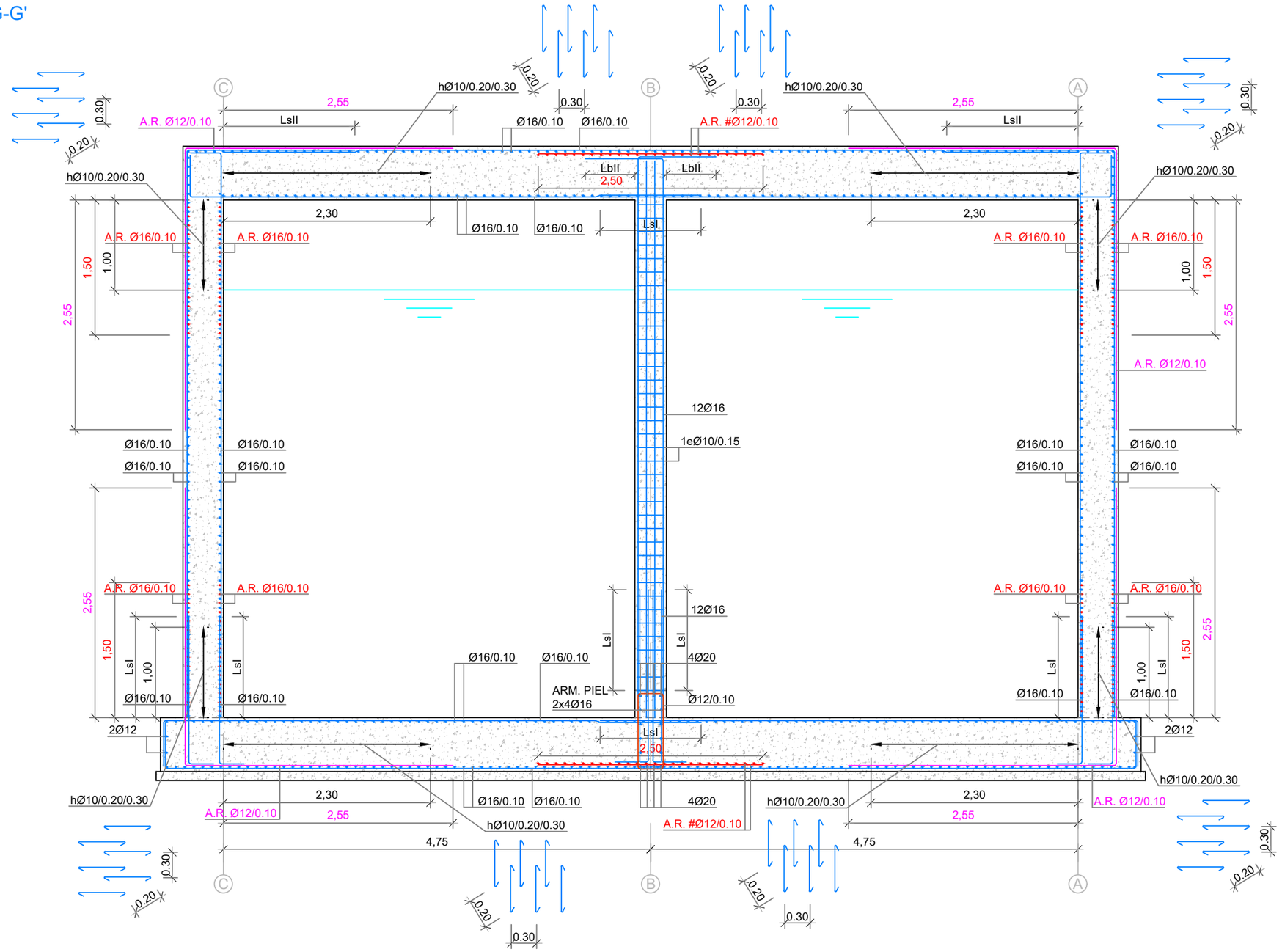
ESCALA
1/50

PLANO
ESTRUCTURA. SECCIONES D-D' Y F-F'.

HOJA 1/1
E12

# SECCIÓN G-G'

ESCALA 1/50




| CARACTERISTICAS DE LOS MATERIALES Y NIVELES DE CONTROL (S/ CÓDIGO ESTRUCTURAL) | | | | | |
|---|---|---|---|---|---|
| MATERIAL | DESIGNACIÓN | NIVEL DE CONTROL | COEF. SEGUR. MATERIALES E.L.U. SIT.PERS O TRANS | COEF. SEGUR. MATERIALES E.L.U. SIT.ACCIDENTAL | COEF. SEGUR. MATERIALES E.L.S. |
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| HORMIGONES | HA-30/B/20/XC2 | | | | |
| ARMADURAS PASIVAS | B 500 S | NORMAL | 1.15 | 1.00 | 1.00 |
| MALLAZO | B 500 T | NORMAL | 1.15 | 1.00 | 1.00 |

| COEFICIENTES PARCIALES DE SEGURIDAD. ACCIONES (S/ CÓDIGO ESTRUCTURAL) | | | | | | | | |
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| TIPO DE ACCIÓN | | | ESTADO LÍMITE ÚLTIMO (E.L.U.) SIT.PERS O TRANS FAVOR. | SIT.PERS O TRANS DESFAV. | SIT.ACCIDENTAL FAVOR. | SIT.ACCIDENTAL DESFAV. | ESTADO LÍMITE SERVICIO (E.L.S.) FAVOR. | ESTADO LÍMITE SERVICIO (E.L.S.) DESFAV. |
| ESTRUCTURAS HORMIGÓN ARMADO | PERMANENTE | | 1.00 | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 |
| | PERMANENTE DE VALOR NO CONSTANTE | | 1.00 | 1.50 | 1.00 | 1.00 | 1.00 | 1.00 |
| | VARIABLE | S.C.U. | 0.00 | 1.50 | 0.00 | 1.00 | 0.00 | 1.00 |
| | | TRÁFICO | 0.00 | 1.35 | 0.00 | 0.00 | 0.00 | 1.00 |
| | ACCIDENTAL | | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |

| *HA-30 (B-500S) | SOLAPO (Ls) (cm) | | ANCLAJE (Lb) prolong. recta (cm) | | ANCLAJE (Lb) patilla (**) (cm) | |
|---|---|---|---|---|---|---|
| Ø (mm) | Ls I | Ls II | Lb I | Lb II | Lb I | Lb II |
| 10 | 70 | 92 | 35 | 46 | 27 | 35 |
| 12 | 84 | 110 | 42 | 55 | 33 | 42 |
| 16 | 112 | 146 | 56 | 73 | 44 | 56 |
| 20 | 144 | 186 | 72 | 93 | 56 | 71 |
| 25 | 212 | 278 | 106 | 139 | 82 | 105 |
| 32 | 330 | 436 | 165 | 218 | 125 | 162 |

(*) EN EL CÁLCULO DE LAS LONGITUDES DE ANCLAJE Y SOLAPE SE HA TENIDO EN CUENTA QUE SE TRATE DE ZONA SÍSMICA, AUMENTANDO EN 10Ø LA LONGITUD DE ANCLAJE SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.
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| REQUISITOS GENERALES DE DURABILIDAD (S/CE) (ELEMENTOS DE HORMIGÓN ARMADO CONTROL NORMAL) | |
|---|---|
| CLASE GENERAL DE EXPOSICION | XC2 |
| CLASE ESPECIFICA DE EXPOSICION | – |
| RECUBRIMIENTO MINIMO | 25 (1) |
| RECUBRIMIENTO NOMINAL | 35 (1) |
| MAXIMA RELACION AGUA/CEMENTO | 0.60 |
| MINIMO CONTENIDO DE CEMENTO | 275 Kg/m³ |
| - ELEMENTOS ENCOFRADOS CONTRA EL TERRENO: RECUBRIMIENTO MINIMO 70 mm. | |

NOTAS:
(1) - UTILIZANDO CEMENTOS DISTINTOS A CEM-I EN LA CONFECCIÓN DE HORMIGONES.
(2) - UTILIZANDO CEM-III/A, CEM-III/B, CEM-IV, CEM-II/B-S, B-P, B-V, A-D U HORMIGÓN CON ADICIÓN DE MICROSÍLICE SUPERIOR AL 6% O DE CENIZAS VOLANTES SUPERIOR AL 20%

NOTAS:
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| | |
|---|---|
| MODULO DE BALASTO (k30x30) | 22 kg/cm³ |
| TENSIÓN ADMISIBLE DEL TERRENO (σ) | 0,30 MPa |


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FECHA FEBRERO 2024

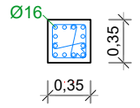
ESCALA 1/50

PLANO ESTRUCTURA. SECCIÓN G-G' E13

HOJA 1/1

# CUADRO DE PILARES

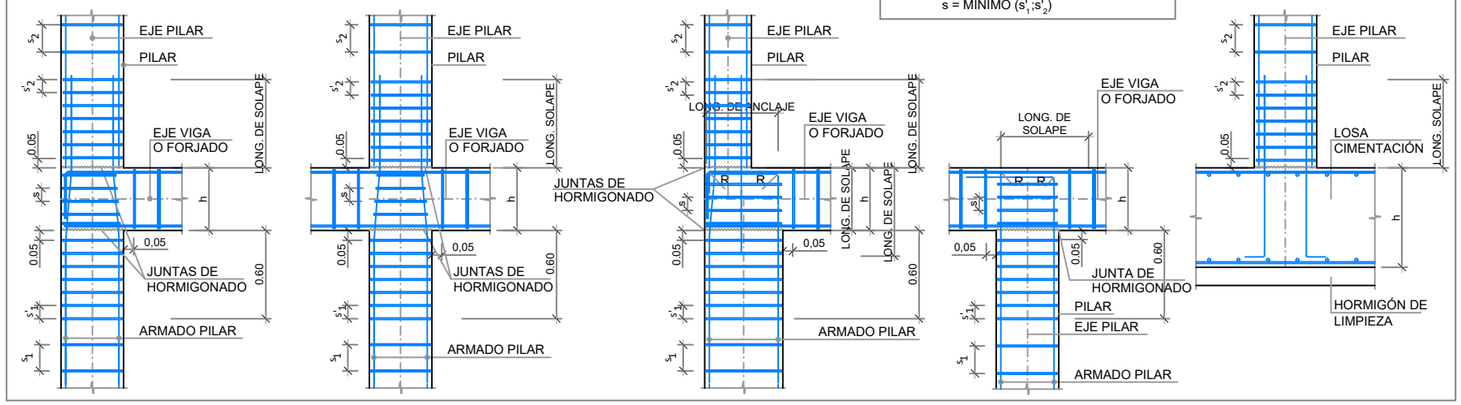
ESCALA 1/50

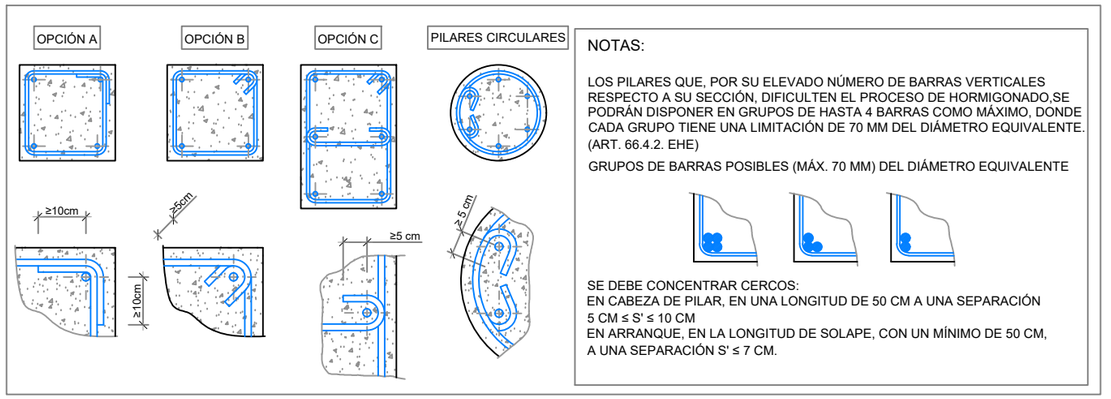
| P1=P2=P3 | CUBIERTA |
|---|---|
|   | |
| Arm. Long.: 12Ø16<br>Arranque: 12Ø16 | |
| Estribos: Ø10 c/15<br>+ 2rØ10 c/15 | |
| | CIMENTACIÓN |

## DETALLES CONEXION FORJADO CON ACCIONES DINAMICAS

SIN ESCALA. COTAS EN m.

NOTA: $s'_1 = s_1/2$ EN LA LONGITUD INDICADA
$s'_2 = s_2/2$ EN LA LONGITUD INDICADA
$s$ = MINIMO ($s'_1$;$s'_2$)




NOTAS:

LOS PILARES QUE, POR SU ELEVADO NÚMERO DE BARRAS VERTICALES RESPECTO A SU SECCIÓN, DIFICULTEN EL PROCESO DE HORMIGONADO,SE PODRÁN DISPONER EN GRUPOS DE HASTA 4 BARRAS COMO MÁXIMO, DONDE CADA GRUPO TIENE UNA LIMITACIÓN DE 70 MM DEL DIÁMETRO EQUIVALENTE. (ART. 66.4.2. EHE)

GRUPOS DE BARRAS POSIBLES (MÁX. 70 MM) DEL DIÁMETRO EQUIVALENTE



SE DEBE CONCENTRAR CERCOS:
EN CABEZA DE PILAR, EN UNA LONGITUD DE 50 CM A UNA SEPARACIÓN
5 CM ≤ S' ≤ 10 CM
EN ARRANQUE, EN LA LONGITUD DE SOLAPE, CON UN MÍNIMO DE 50 CM,
A UNA SEPARACIÓN S' ≤ 7 CM.

| CARACTERISTICAS DE LOS MATERIALES Y NIVELES DE CONTROL (S/ CÓDIGO ESTRUCTURAL) | | | | | |
|---|---|---|---|---|---|
| MATERIAL | DESIGNACIÓN | NIVEL DE CONTROL | COEF. SEGUR. MATERIALES | | |
| | | | E.L.U. | | E.L.S. |
| | | | SIT.PERS O TRANS | SIT.ACCIDENTAL | |
| HORMIGON LIMPIEZA Y REGULARIZACIÓN | HL-150/B/20 | ESTADÍSTICO | 1.50 | 1.30 | 1.00 |
| HORMIGONES | HA-30/B/20/XC2 | | | | |
| ARMADURAS PASIVAS | B 500 S | NORMAL | 1.15 | 1.00 | 1.00 |
| MALLAZO | B 500 T | NORMAL | 1.15 | 1.00 | 1.00 |

| MODULO DE BALASTO (k30x30) | 22 kg/cm³ |
|---|---|
| TENSIÓN ADMISIBLE DEL TERRENO (σ) | 0,30 MPa |

| COEFICIENTES PARCIALES DE SEGURIDAD. ACCIONES (S/ CÓDIGO ESTRUCTURAL) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| TIPO DE ACCIÓN | | | ESTADO LÍMITE ÚLTIMO (E.L.U.) | | | | ESTADO LÍMITE SERVICIO (E.L.S.) | |
| | | | SIT.PERS O TRANS | | SIT.ACCIDENTAL | | | |
| | | | FAVOR. | DESFAV. | FAVOR. | DESFAV. | FAVOR. | DESFAV. |
| ESTRUCTURAS HORMIGÓN ARMADO | PERMANENTE | | 1.00 | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 |
| | PERMANENTE DE VALOR NO CONSTANTE | | 1.00 | 1.50 | 1.00 | 1.00 | 1.00 | 1.00 |
| | VARIABLE | S.C.U. | 0.00 | 1.50 | 0.00 | 1.00 | 0.00 | 1.00 |
| | | TRÁFICO | 0.00 | 1.35 | 0.00 | 0.00 | 0.00 | 1.00 |
| | ACCIDENTAL | | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |

| *HA-30 (B-500S) | SOLAPO (Ls) (cm) | | ANCLAJE (Lb) prolong. recta (cm) | | ANCLAJE (Lb) patilla (**) (cm) | |
|---|---|---|---|---|---|---|
| Ø (mm) | Ls I | Ls II | Lb I | Lb II | Lb I | Lb II |
| 10 | 70 | 92 | 35 | 46 | 27 | 35 |
| 12 | 84 | 110 | 42 | 55 | 33 | 42 |
| 16 | 112 | 146 | 56 | 73 | 44 | 56 |
| 20 | 144 | 186 | 72 | 93 | 56 | 71 |
| 25 | 212 | 278 | 106 | 139 | 82 | 105 |
| 32 | 330 | 436 | 165 | 218 | 125 | 162 |

(*) EN EL CÁLCULO DE LAS LONGITUDES DE ANCLAJE Y SOLAPE SE HA TENIDO EN CUENTA QUE SE TRATE DE ZONA SÍSMICA, AUMENTANDO EN 10Ø LA LONGITUD DE ANCLAJE SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.
LOS SUBINDICES I Y II EN LAS LONGITUDES DE SOLAPO Y ANCLAJE DE LAS TABLAS SE REFIEREN A LA POSICIÓN DE LA BARRA A ANCLAR O SOLAPAR, RESPECTO A LA DIRECCIÓN DEL HORMIGONADO, SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.

| REQUISITOS GENERALES DE DURABILIDAD (S/CE) (ELEMENTOS DE HORMIGÓN ARMADO. CONTROL NORMAL) | |
|---|---|
| CLASE GENERAL DE EXPOSICION | XC2 |
| CLASE ESPECIFICA DE EXPOSICION | – |
| RECUBRIMIENTO MINIMO | 25 (1) |
| RECUBRIMIENTO NOMINAL | 35 (1) |
| MAXIMA RELACION AGUA/CEMENTO | 0.60 |
| MINIMO CONTENIDO DE CEMENTO | 275 Kg/m³ |
| - ELEMENTOS ENCOFRADOS CONTRA EL TERRENO: RECUBRIMIENTO MÍNIMO 70 mm. | |

NOTAS:
(1) - UTILIZANDO CEMENTOS DISTINTOS A CEM-I EN LA CONFECCIÓN DE HORMIGONES.
(2) - UTILIZANDO CEM-III/A, CEM-III/B, CEM-IV, CEM-II/B-S, B-P, B-V, A-D U HORMIGÓN CON ADICIÓN DE MICROSÍLICE SUPERIOR AL 6% O DE CENIZAS VOLANTES SUPERIOR AL 20%

NOTAS:
- TODOS LOS DATOS RELATIVOS A LA GEOMETRÍA DE ESTE PROYECTO (COTAS, HUECOS, PENDIENTES, ETC...) SE VERIFICARÁN CON LOS PLANOS DE ARQUITECTURA.
- DEBERÁ COMPROBARSE QUE LAS CARGAS DE LOS ELEMENTOS ARQUITECTÓNICOS A EJECUTAR NO SOBREPASEN LOS VALORES DE LAS ACCIONES Y CARGAS CONSIDERADAS EN EL PRESENTE CÁLCULO ESTRUCTURAL.
- LAS SOLDADURAS EN ÁNGULO TENDRÁN UNA GARGANTA DE 0,7 VECES EL MINIMO ESPESOR DE LAS CHAPAS A UNIR CUANDO LA SOLDADURA SE EJECUTA POR UN SOLO LADO, Y DE 0,5 VECES SI ESTA SE EJECUTA POR AMBOS LADOS, SALVO ESPECIFICACION EN CONTRA EN LOS DETALLES CORRESPONDIENTES.
- LAS SOLDADURAS A TOPE SERÁN CONTINUAS CON PREPARACION DE BORDES Y PENETRACION COMPLETA.
- LOS ELECTRODOS PARA SOLDADURA MANUAL SERÁN CON REVESTIMIENTO BÁSICO.


REDACTOR
D.JOSÉ ANTONIO SEGURA SÁNCHEZ
INGENIERO REDACTOR

LA PROPIEDAD
JUNTA DE COMPENSACIÓN
UE-VII.1 "SIST. GRLES PE+KODAK"

PROCAVER
SOLUCIONES URBANAS S.L.
PROCAVER@PROCAVER.COM


PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

FECHA
FEBRERO 2024

ESCALA
1/50

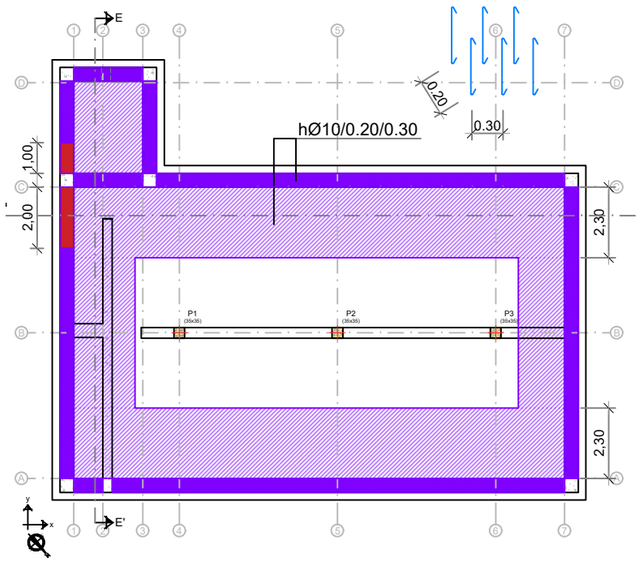
PLANO
ESTRUCTURA. CUADRO DE PILARES.

HOJA 1/1
E14

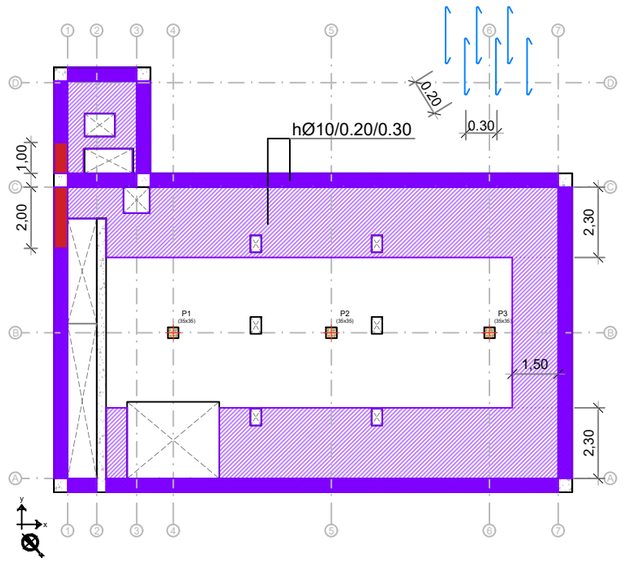
# ESQUEMAS HORQUILLAS

ESCALA 1/200

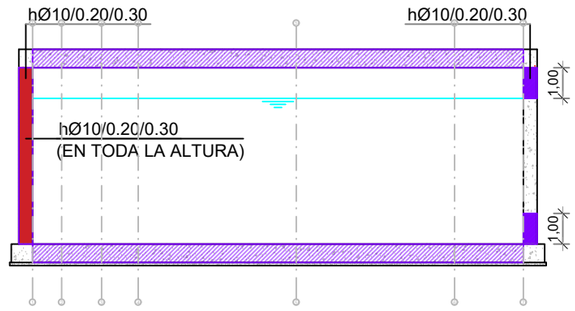
PLANTA CIMENTACIÓN



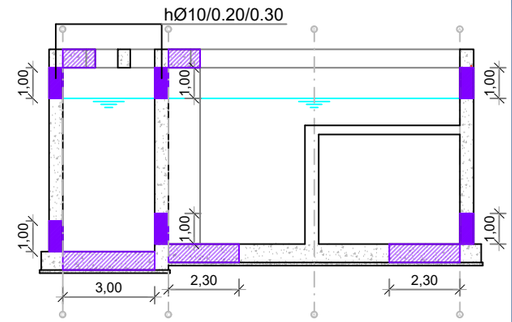

PLANTA CUBIERTA




SECCIÓN C-C'

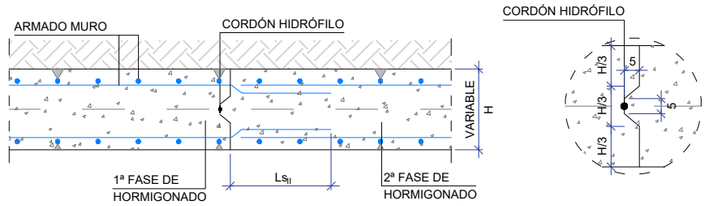



SECCIÓN E-E'



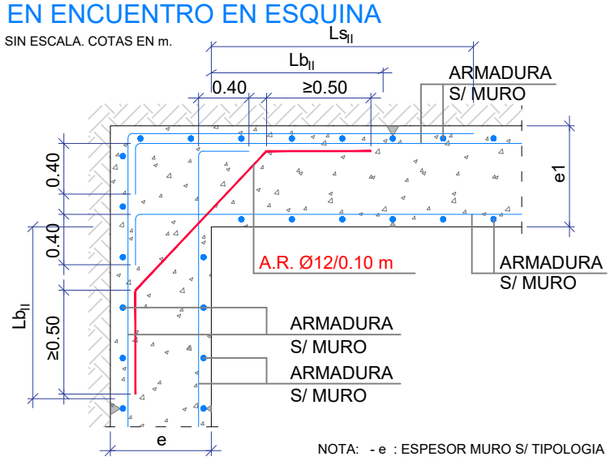

# JUNTA DE HORMIGONADO VERTICAL EN MURO

SIN ESCALA. COTAS EN m.




# DETALLE DE LAS ARMADURAS HORIZONTALES, EN ENCUENTRO EN ESQUINA

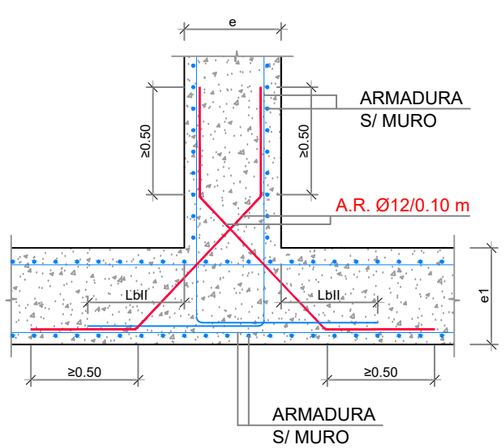
SIN ESCALA. COTAS EN m.




NOTA: - e : ESPESOR MURO S/ TIPOLOGIA
- e1: ESPESOR MURO S/ TIPOLOGIA

# DETALLE DE LAS ARMADURAS HORIZONTALES, EN ENCUENTRO EN "T"

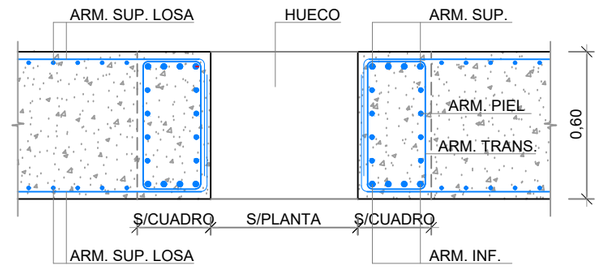
SIN ESCALA. COTAS EN m.




NOTA: - e : ESPESOR MURO S/ TIPOLOGIA
- e1: ESPESOR MURO S/ TIPOLOGIA

# DETALLE DE ZUNCHO EN HUECOS

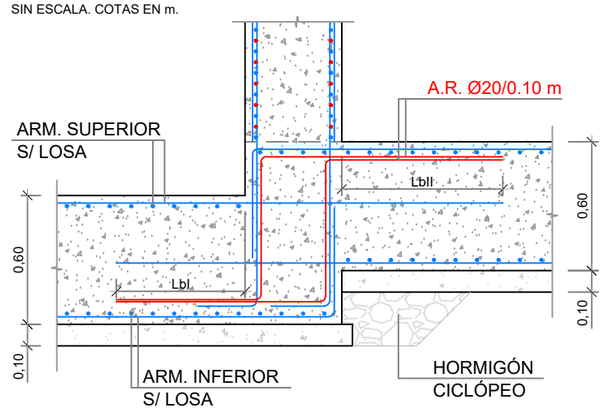
ESCALA 1:25. COTAS EN m.




| CUADRO DE ZUNCHOS | | | | | |
|---|---|---|---|---|---|
| | Dim. (m) | Arm. Sup. | Arm. Inf. | Piel | Arm. Trans. |
| Z-1 | 0.30x0.60 | 4Ø20 | 4Ø20 | 4Ø16 | 1xeØ12/0.20 m |
| Z-2 | 0.40x0.60 | 4Ø20 | 4Ø20 | 4Ø16 | 1xeØ12/0.20 m |

# DETALLE CAMBIO DE NIVEL CIMENTACIÓN

SIN ESCALA. COTAS EN m.




NOTAS:

- TODOS LOS DATOS RELATIVOS A LA GEOMETRÍA DE ESTE PROYECTO (COTAS, HUECOS, PENDIENTES, ETC...) SE VERIFICARÁN CON LOS PLANOS DE ARQUITECTURA.
- DEBERÁ COMPROBARSE QUE LAS CARGAS DE LOS ELEMENTOS ARQUITECTÓNICOS A EJECUTAR NO SOBREPASEN LOS VALORES DE LAS ACCIONES Y CARGAS CONSIDERADAS EN EL PRESENTE CÁLCULO ESTRUCTURAL.
- LAS SOLDADURAS EN ÁNGULO TENDRÁN UNA GARGANTA DE 0,7 VECES EL MINIMO ESPESOR DE LAS CHAPAS A UNIR CUANDO LA SOLDADURA SE EJECUTA POR UN SOLO LADO, Y DE 0,5 VECES SI ESTA SE EJECUTA POR AMBOS LADOS, SALVO ESPECIFICACION EN CONTRA EN LOS DETALLES CORRESPONDIENTES.
- LAS SOLDADURAS A TOPE SERÁN CONTINUAS CON PREPARACION DE BORDES Y PENETRACION COMPLETA.
- LOS ELECTRODOS PARA SOLDADURA MANUAL SERÁN CON REVESTIMIENTO BÁSICO.

| CARACTERISTICAS DE LOS MATERIALES Y NIVELES DE CONTROL (S/ CÓDIGO ESTRUCTURAL) | | | | | |
|---|---|---|---|---|---|
| MATERIAL | DESIGNACIÓN | NIVEL DE CONTROL | COEF. SEGUR. MATERIALES | | |
| | | | E.L.U. | | E.L.S. |
| | | | SIT.PERS O TRANS | SIT.ACCIDENTAL | |
| HORMIGON LIMPIEZA Y REGULARIZACIÓN | HL-150/B/20 | ESTADÍSTICO | 1.50 | 1.30 | 1.00 |
| HORMIGONES | HA-30/B/20/XC2 | | | | |
| ARMADURAS PASIVAS | B 500 S | NORMAL | 1.15 | 1.00 | 1.00 |
| MALLAZO | B 500 T | NORMAL | 1.15 | 1.00 | 1.00 |

| COEFICIENTES PARCIALES DE SEGURIDAD. ACCIONES (S/ CÓDIGO ESTRUCTURAL) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| TIPO DE ACCIÓN | | | ESTADO LÍMITE ÚLTIMO (E.L.U.) | | | | ESTADO LÍMITE SERVICIO (E.L.S.) | |
| | | | SIT.PERS O TRANS | | SIT.ACCIDENTAL | | | |
| | | | FAVOR. | DESFAV. | FAVOR. | DESFAV. | FAVOR. | DESFAV. |
| ESTRUCTURAS HORMIGÓN ARMADO | PERMANENTE | | 1.00 | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 |
| | PERMANENTE DE VALOR NO CONSTANTE | | 1.00 | 1.50 | 1.00 | 1.00 | 1.00 | 1.00 |
| | VARIABLE | S.C.U. | 0.00 | 1.50 | 0.00 | 1.00 | 0.00 | 1.00 |
| | | TRÁFICO | 0.00 | 1.35 | 0.00 | 0.00 | 0.00 | 1.00 |
| | ACCIDENTAL | | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |

| REQUISITOS GENERALES DE DURABILIDAD (S/CE) (ELEMENTOS DE HORMIGÓN ARMADO. CONTROL NORMAL) | |
|---|---|
| CLASE GENERAL DE EXPOSICION | XC2 |
| CLASE ESPECIFICA DE EXPOSICION | – |
| RECUBRIMIENTO MINIMO | 25 (1) |
| RECUBRIMIENTO NOMINAL | 35 (1) |
| MAXIMA RELACION AGUA/CEMENTO | 0.60 |
| MINIMO CONTENIDO DE CEMENTO | 275 Kg/m³ |
| - ELEMENTOS ENCOFRADOS CONTRA EL TERRENO: RECUBRIMIENTO MÍNIMO 70 mm. | |

NOTAS:
(1) - UTILIZANDO CEMENTOS DISTINTOS A CEM-I EN LA CONFECCIÓN DE HORMIGONES.
(2) - UTILIZANDO CEM-II/A, CEM-II/B, CEM-IV, CEM-II/B-S, B-P, B-V, A-D U HORMIGÓN CON ADICIÓN DE MICROSÍLICE SUPERIOR AL 6% O DE CENIZAS VOLANTES SUPERIOR AL 20%

| *HA-30 (B-500S) | SOLAPO (Ls) (cm) | | ANCLAJE (Lb) prolong. recta (cm) | | ANCLAJE (Lb) patilla (**) (cm) | |
|---|---|---|---|---|---|---|
| Ø (mm) | Ls I | Ls II | Lb I | Lb II | Lb I | Lb II |
| 10 | 70 | 92 | 35 | 46 | 27 | 35 |
| 12 | 84 | 110 | 42 | 55 | 33 | 42 |
| 16 | 112 | 146 | 56 | 73 | 44 | 56 |
| 20 | 144 | 186 | 72 | 93 | 56 | 71 |
| 25 | 212 | 278 | 106 | 139 | 82 | 105 |
| 32 | 330 | 436 | 165 | 218 | 125 | 162 |

(*) EN EL CÁLCULO DE LAS LONGITUDES DE ANCLAJE Y SOLAPE SE HA TENIDO EN CUENTA QUE SE TRATE DE ZONA SÍSMICA, AUMENTANDO EN 10Ø LA LONGITUD DE ANCLAJE SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.
LOS SUBÍNDICES I Y II EN LAS LONGITUDES DE SOLAPO Y ANCLAJE DE LAS TABLAS SE REFIEREN A LA POSICIÓN DE LA BARRA A ANCLAR O SOLAPAR, RESPECTO A LA DIRECCIÓN DEL HORMIGONADO, SEGÚN EL ART. 49.5 DEL CÓDIGO ESTRUCTURAL.

| | |
|---|---|
| MODULO DE BALASTO (k30x30) | 22 kg/cm³ |
| TENSIÓN ADMISIBLE DEL TERRENO (σ) | 0,30 MPa |


| | |
|---|---|
| MODULO DE BALASTO (k30x30) | 22 kg/cm³ |
| TENSIÓN ADMISIBLE DEL TERRENO (σ) | 0,30 MPa |



REDACTOR

D.JOSÉ ANTONIO SEGURA SÁNCHEZ
INGENIERO REDACTOR


LA PROPIEDAD

JUNTA DE COMPENSACIÓN
UE-VII.1 "SIST. GRLES PE+KODAK"


PROCAVER
SOLUCIONES URBANAS S.L.
PROCAVER@PROCAVER.COM


PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

FECHA
FEBRERO 2024

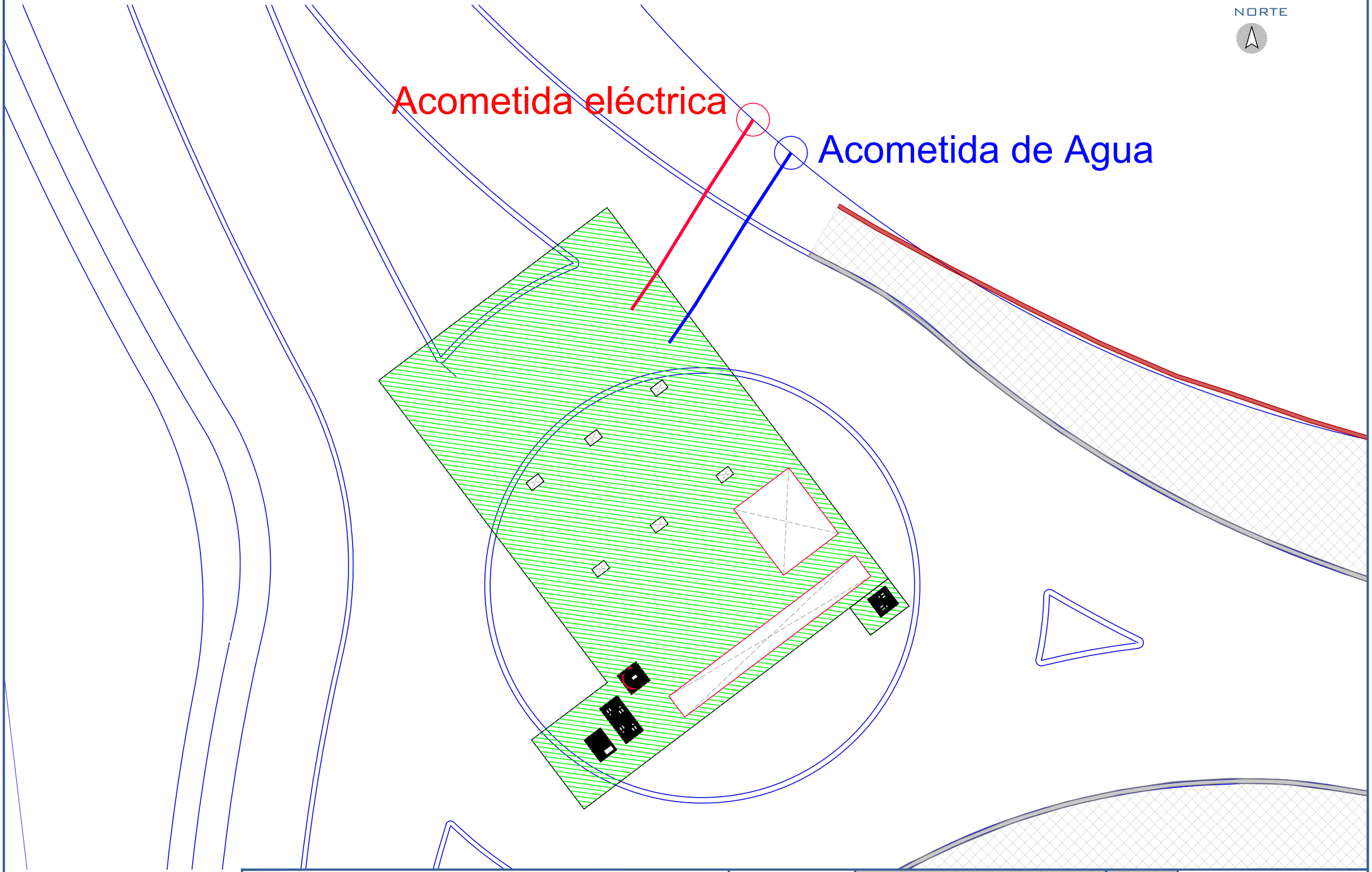
ESCALA
1/50

PLANO HOJA 1/1

ESTRUCTURA. DETALLES. E15

SITUACIÓN
ESCALA 1/200

NORTE




REDACTOR
D.JOSÉ ANTONIO SEGURA SÁNCHEZ
INGENIERO REDACTOR

LA PROPIEDAD
JUNTA DE COMPENSACIÓN
UE-VII.1 "SIST. GRLES PE+KODAK"

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PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

FECHA
FEBRERO 2024

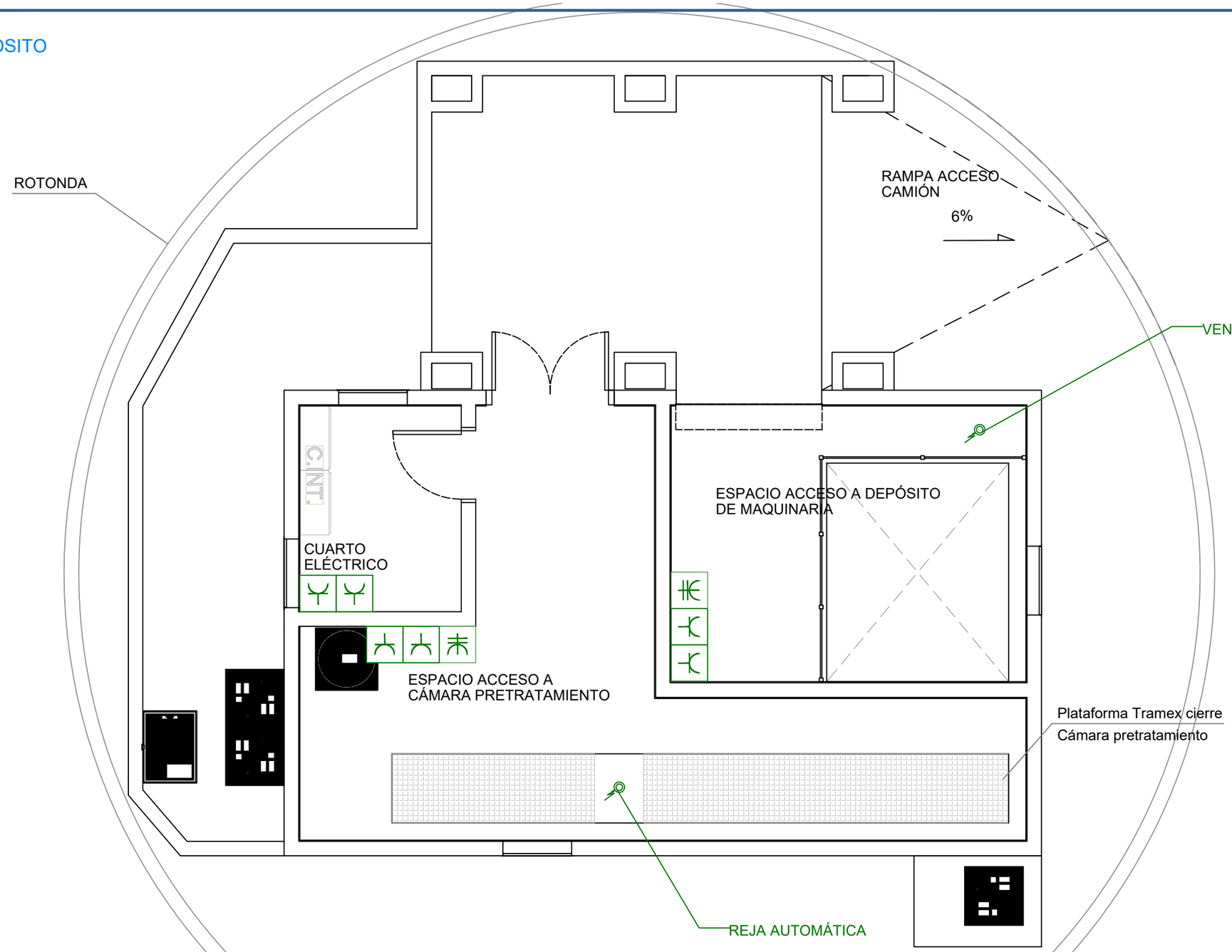
ESCALA
1/200

PLANO
PLANTA
ACOMETIDAS

HOJA 1/1
AC1

# PLANTA CASETA SOBRE DEPÓSITO

ESCALA 1/60




BASE DE TOMAS SCHUKO DOBLE 16A

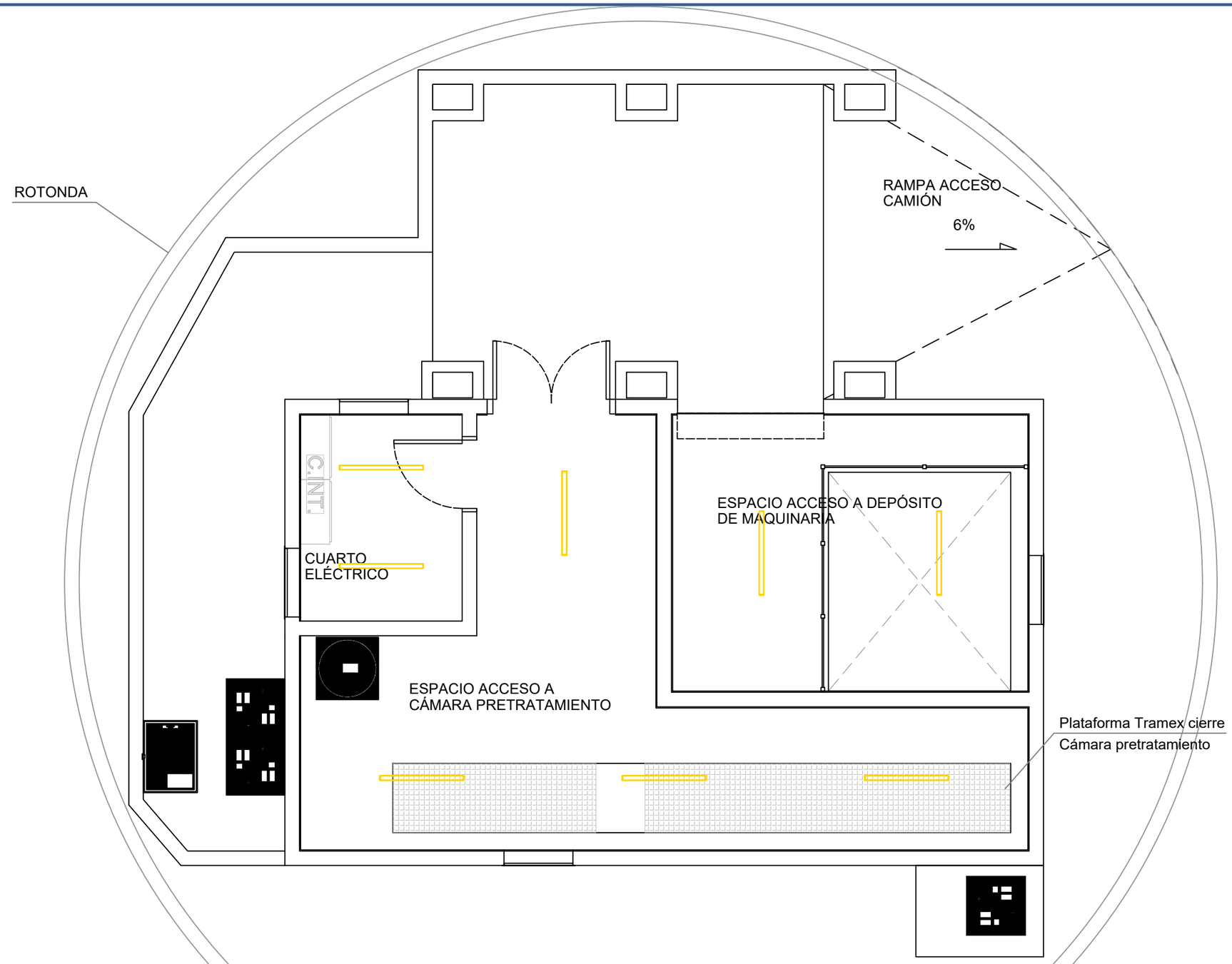
BASE DE TOMAS 3F 32A +2F 16A + SCHUKO 16A

PUNTO DE SUMINISTRO

| | | | | | |
|---|---|---|---|---|---|
| REDACTOR<br>D.JOSÉ ANTONIO SEGURA SÁNCHEZ<br>INGENIERO REDACTOR | LA PROPIEDAD<br>JUNTA DE COMPENSACIÓN<br>UE-VII.1 "SIST. GRLES PE+KODAK" | PROCAVER<br>SOLUCIONES URBANAS S.L.<br>PROCAVER@PROCAVER.COM | PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID). | FECHA<br>FEBRERO 2024<br>ESCALA<br>1/60 | PLANO<br>INSTALACIONES<br>FUERZA<br>CASETA | HOJA 1/1<br>11 |

# PLANTA CASETA SOBRE DEPÓSITO

ESCALA 1/60



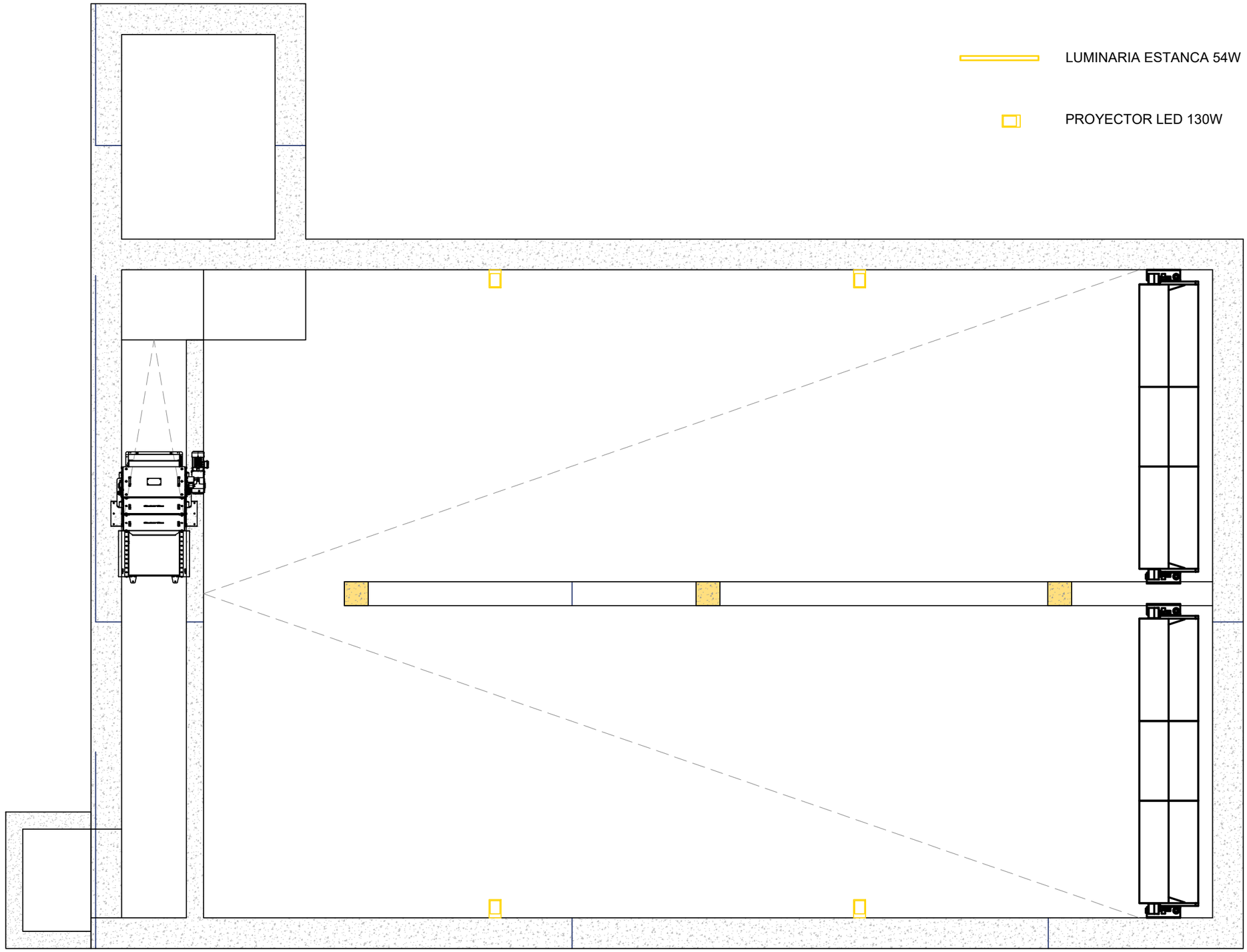

LUMINARIA ESTANCA 54W

PROYECTOR LED 130W

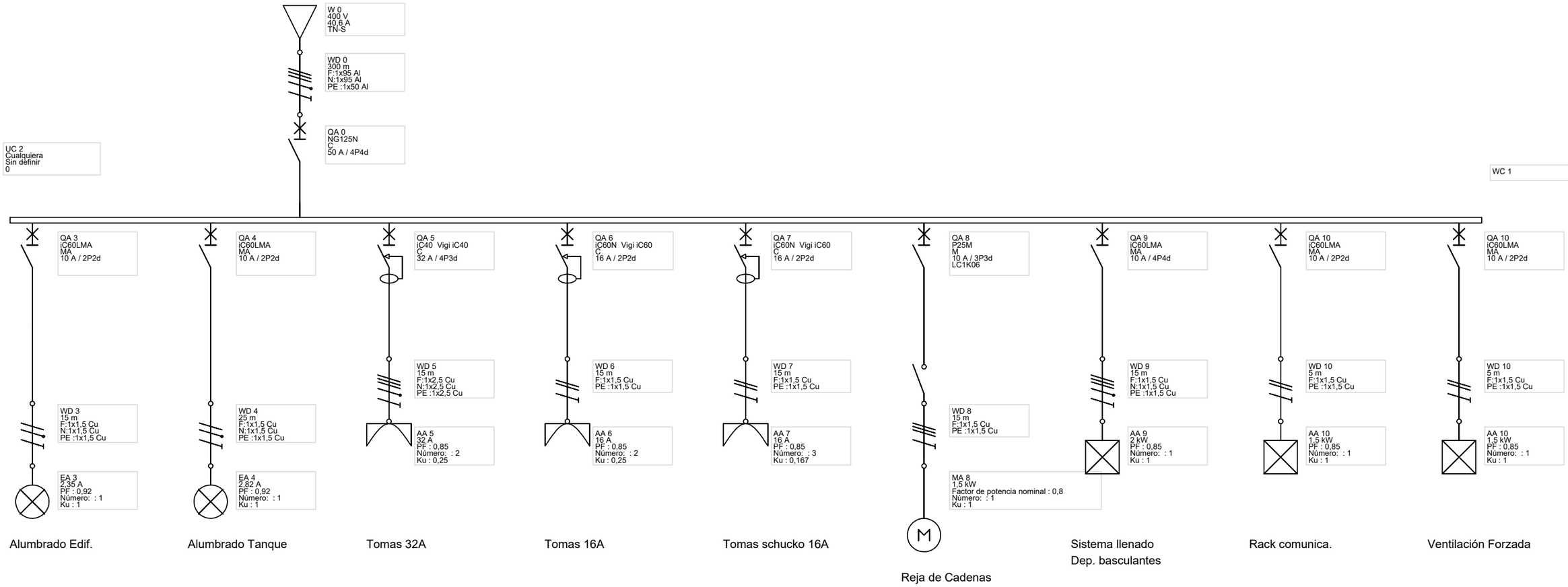
| REDACTOR | LA PROPIEDAD | | | | |
|---|---|---|---|---|---|
| D.JOSÉ ANTONIO SEGURA SÁNCHEZ<br>INGENIERO REDACTOR | JUNTA DE COMPENSACIÓN<br>UE-VII.1 "SIST. GRLES PE+KODAK" | PROCAVER<br>SOLUCIONES URBANAS S.L.<br>PROCAVER@PROCAVER.COM | PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID). | FECHA<br>FEBRERO 2024<br>ESCALA<br>1/60 | PLANO<br>INSTALACIONES<br>ALUMBRADO<br>CASETA | HOJA 1/1<br>12 |

## PLANTA TAPA DEPÓSITO

ESCALA 1/60




| | | | | |
|---|---|---|---|---|
| REDACTOR<br>D.JOSÉ ANTONIO SEGURA SÁNCHEZ<br>INGENIERO REDACTOR | LA PROPIEDAD<br>JUNTA DE COMPENSACIÓN<br>UE-VII.1 "SIST. GRLES PE+KODAK" | PROCAVER<br>SOLUCIONES URBANAS S.L.<br>PROCAVER@PROCAVER.COM | PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID). | FECHA<br>FEBRERO 2024<br>ESCALA<br>1/60 | PLANO<br>INSTALACIONES. ALUMBRADO TANQUE<br>HOJA 1/1<br>13 |




REDACTOR

D.JOSÉ ANTONIO SEGURA SÁNCHEZ
INGENIERO REDACTOR

LA PROPIEDAD

JUNTA DE COMPENSACIÓN
UE-VII.1 "SIST. GRLES PE+KODAK"

PROCAVER
SOLUCIONES URBANAS S.L.
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PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

FECHA
FEBRERO 2024

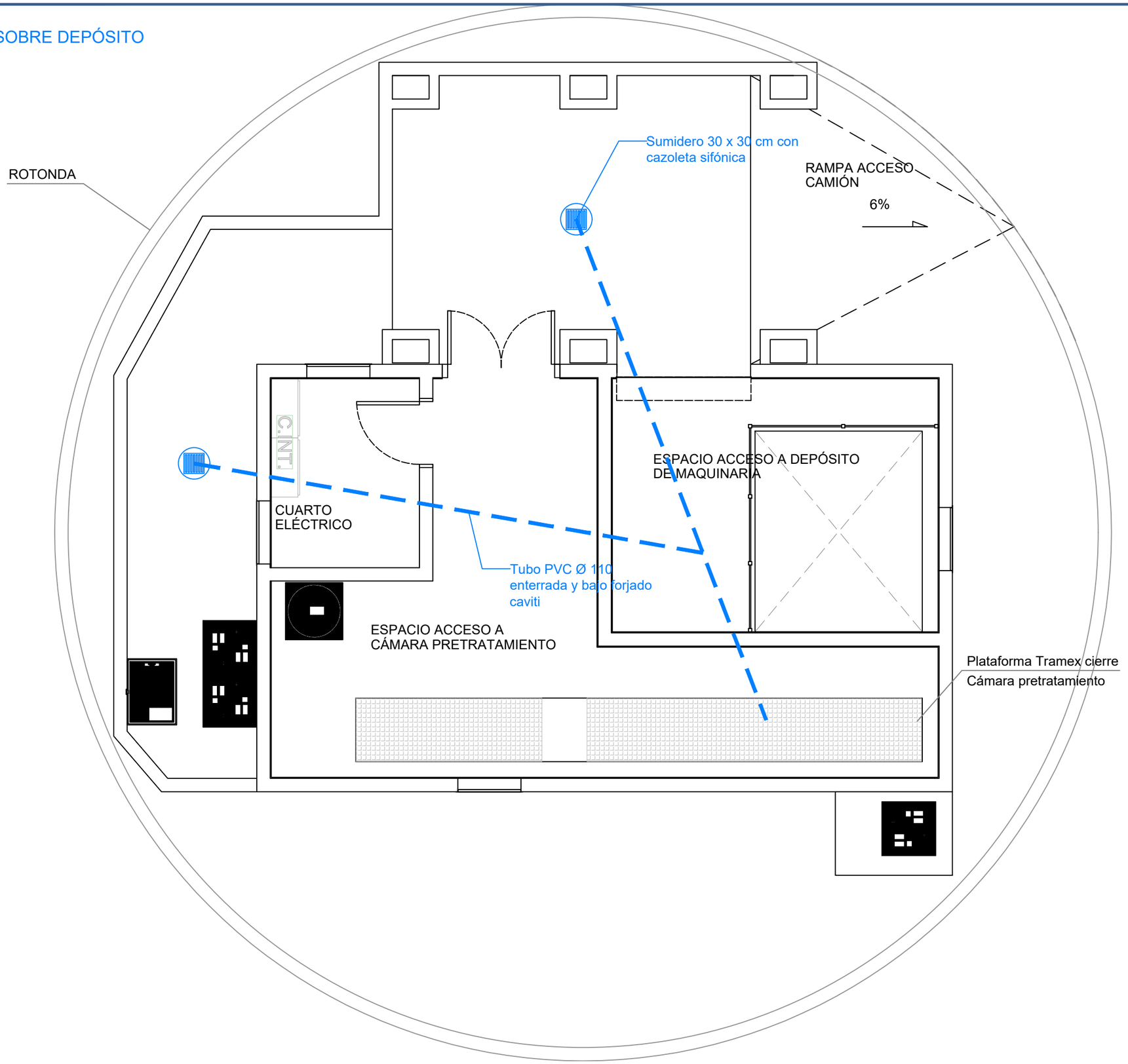
ESCALA
1/60

PLANO
INSTALACIONES UNIFILAR

HOJA 1/1
14

# PLANTA CASETA SOBRE DEPÓSITO

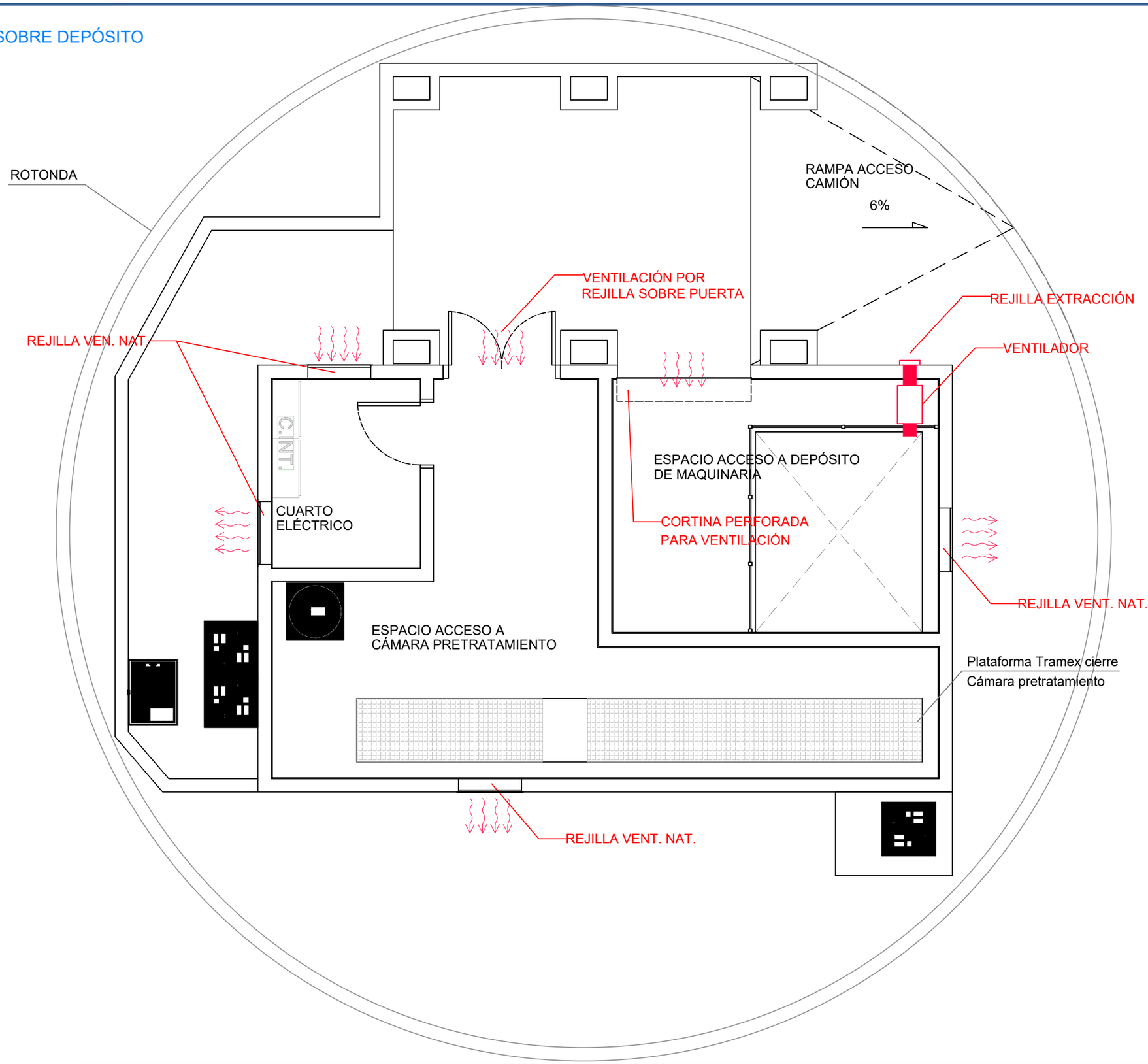
ESCALA 1/60




| | | | | | |
|---|---|---|---|---|---|
| REDACTOR<br>D.JOSÉ ANTONIO SEGURA SÁNCHEZ<br>INGENIERO REDACTOR | LA PROPIEDAD<br>JUNTA DE COMPENSACIÓN<br>UE-VII.1 "SIST. GRLES PE+KODAK" | PROCAVER<br>SOLUCIONES URBANAS S.L.<br>PROCAVER@PROCAVER.COM | PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID). | FECHA<br>FEBRERO 2024<br>ESCALA<br>1/60 | PLANO<br>INSTALACIONES SANEAMIENTO<br>HOJA 1/1<br>15 |

## PLANTA CASETA SOBRE DEPÓSITO

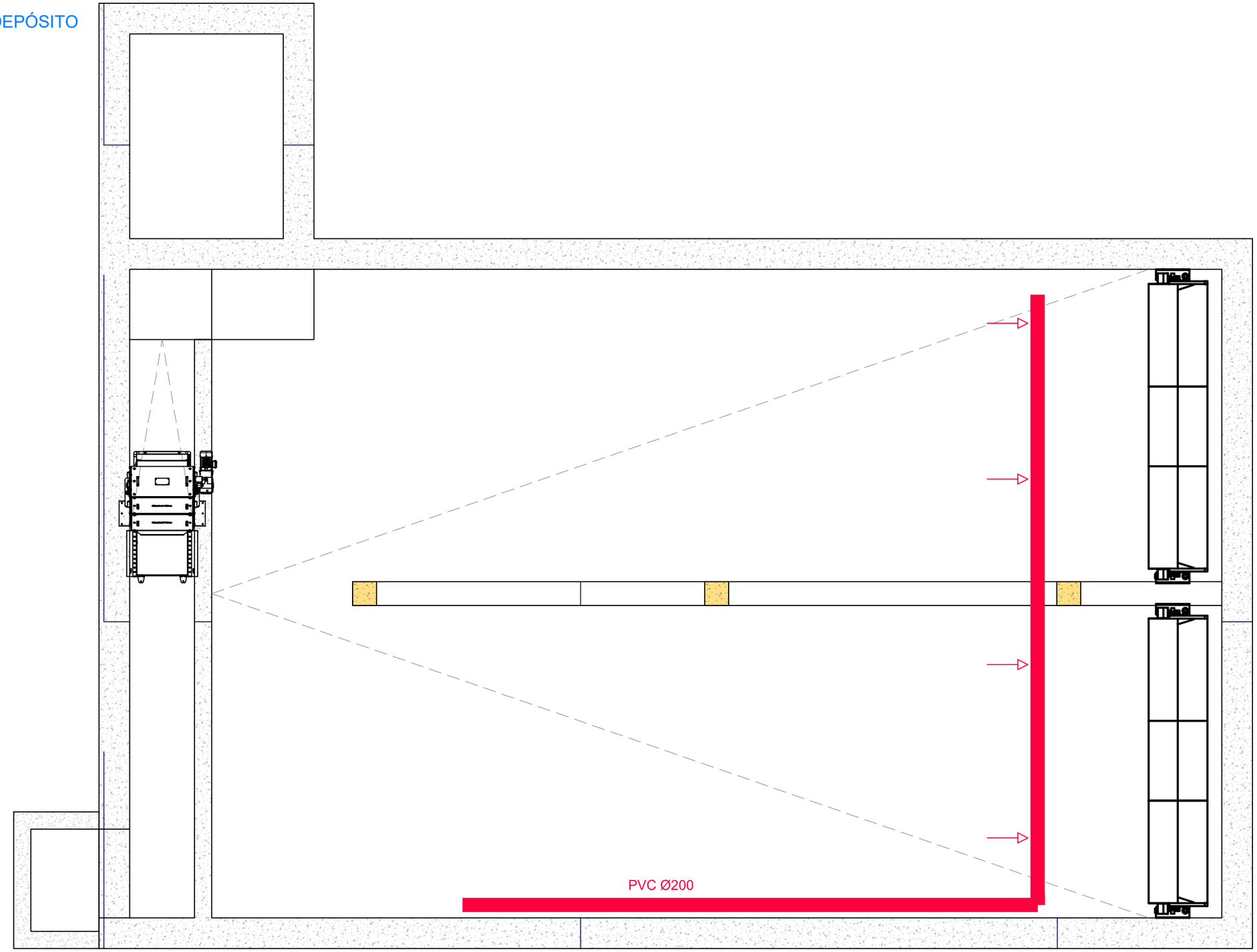
ESCALA 1/60




| | | | | | |
|---|---|---|---|---|---|
| REDACTOR<br>D.JOSÉ ANTONIO SEGURA SÁNCHEZ<br>INGENIERO REDACTOR | LA PROPIEDAD<br>JUNTA DE COMPENSACIÓN<br>UE-VII.1 "SIST. GRLES PE+KODAK" | PROCAVER<br>SOLUCIONES URBANAS S.L.<br>PROCAVER@PROCAVER.COM | PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID). | FECHA<br>FEBRERO 2024<br>ESCALA<br>1/60 | PLANO<br>INSTALACIONES VENTILACIÓN CASETA<br>HOJA 1/1<br>16 |

# PLANTA TAPA DEPÓSITO

ESCALA 1/60




REDACTOR

D.JOSÉ ANTONIO SEGURA SÁNCHEZ
INGENIERO REDACTOR

LA PROPIEDAD

JUNTA DE COMPENSACIÓN
UE-VII.1 "SIST. GRLES PE+KODAK"

PROCAVER
SOLUCIONES URBANAS S.L.
PROCAVER@PROCAVER.COM

PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

FECHA
FEBRERO 2024

ESCALA
1/60

PLANO
INSTALACIONES VENTILACIÓN TANQUE

HOJA 1/1
17

COLECTOR SALIDA NORTE

PUNTO DE VERTIDO NORTE

TANQUE DE TORMENTAS NORTE

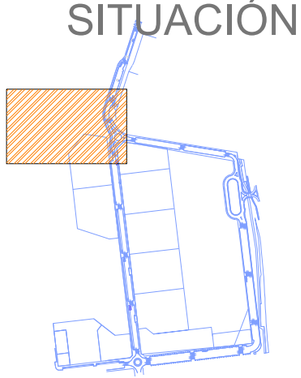
HINCA

4487121,59
4487131,2 PL 2
4487133,98 PL 3
4487135,77 PL 4
4487141,06 PL 4bis
4487135,77 PL 5
4487130,26 PL 6
4487121,6 PL 7
4487146,01 PL 8
4487106,56 PL 9
4487098,14 PL 10

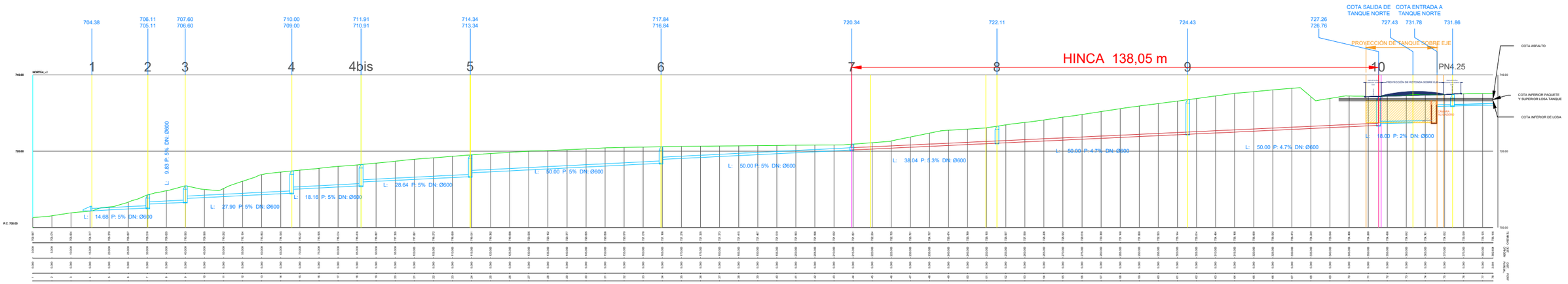
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424172,61
424182,03
424209,87
424227,08
424255,22
424304,9
424354,15
424391,61
424440,89
424497,75

PN 4.25
PN 2.4
PN 2.3
PN 2.2
PN 2.1
DN400
DN600
DN500
IMB_PN4.25_1
IMB_2.3
IMB_2.2_1
IMB_2.2_2
IMB_2.1_1
IMB_2.1_2
AC_PN2.4
CAMARA DE RECHEGRNY

## SITUACIÓN




| | | | | | |
|---|---|---|---|---|---|
| REDACTOR<br>D.JOSÉ ANTONIO SEGURA SÁNCHEZ<br>INGENIERO REDACTOR | LA PROPIEDAD<br>JUNTA DE COMPENSACIÓN<br>UE-VII.1 "SIST. GRLES PE+KODAK" | PROCAVER<br>SOLUCIONES URBANAS S.L.<br>PROCAVER@PROCAVER.COM | PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID). | FECHA<br>FEBRERO 2024<br>ESCALA<br>1/200 | PLANO<br>COLECTOR SALIDA<br>PLANO DE PLANTA<br>HOJA 1/1<br>C1 |




REDACTOR

D.JOSÉ ANTONIO SEGURA SÁNCHEZ
INGENIERO REDACTOR

LA PROPIEDAD

JUNTA DE COMPENSACIÓN
UE-VII.1 "SIST. GRLES PE+KODAK"

PROCAVER
SOLUCIONES URBANAS S.L.
PROCAVER@PROCAVER.COM

PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

FECHA
FEBRERO 2024

ESCALA
1/200

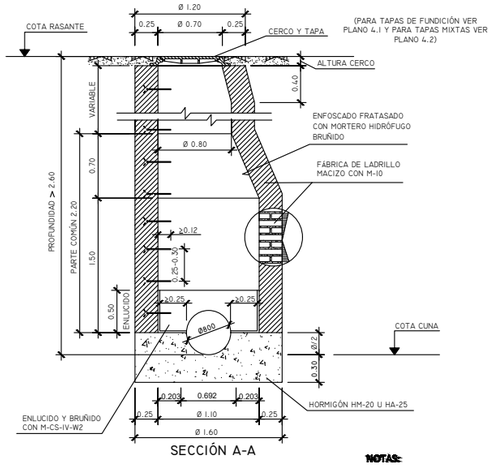
PLANO HOJA 1/1

COLECTOR SALIDA
PERFIL
LONGITUDINAL

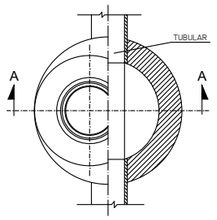
C2

POZO DE REGISTRO PARA ALCANTARILLADO TUBULAR
(Profundidad>2,60 m)

POZOS: PN-2.1, PN-2.5




SECCIÓN A-A



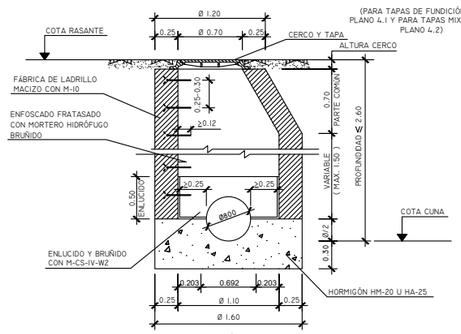

PLANTA - SECCIÓN

**NOTAS:**

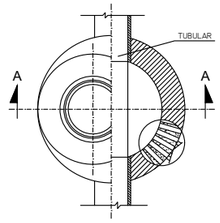
1. **PARA REGISTROS CON PROFUNDIDAD MAYOR DE 2 m, SE INSTALARÁ UN ASIDERO O PATE EN EL EXTERIOR QUE FACILITE EL ACCESO. SE COLOCARÁ EN FORMA DE "U" INVERTIDA (GIRADO 90º RESPECTO A LOS INTERIORES DEL POZO). SU UBICACIÓN NO SUPONDRÁ RIESGO DE TROPIEZO PARA TERCEROS.**
2. **EN LOS REGISTROS Y CÁMARAS CUYO ACCESO EXTERIOR SE ENCUENTRE SOBRE EL NIVEL DEL TERRENO, CON RIESGO DE CAÍDA SUPERIOR A 2 m, SE DEBERÁ HABILITAR ACCESO SEGURO Y PROTEGER ADECUADAMENTE MEDIANTE BARANDILLAS U OTROS SISTEMAS DE PROTECCIÓN DE SEGURIDAD EQUIVALENTE.**

POZO DE REGISTRO PARA ALCANTARILLADO TUBULAR
(Profundidad ⩽ 2,60 m)

POZOS: PN-2.2, PN-2.3, PN-2.4, PN-2.6, PN-2.7




SECCIÓN A-A

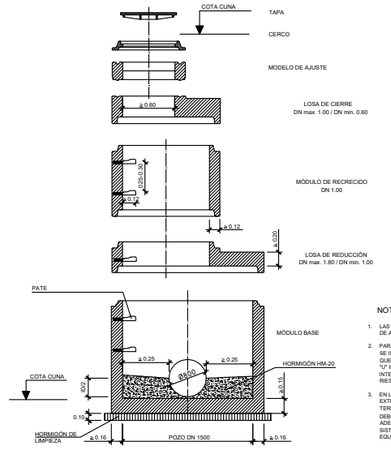



PLANTA - SECCIÓN

CARGAS DE FISURACIÓN Y ROTURA
kN/ m

| DN. POZO (mm) | CLASE RESISTENTE | | | |
|---|---|---|---|---|
| | CLASE 30 SERIE NORMAL | | CLASE 60 SERIE REFORZADA | |
| | FISURAC. | ROTURA | FISURAC. | ROTURA |
| 1.500 | 30 | 45 | 60 | 90 |

POZOS PREFABRICADOS CIRCULARES DE HORMIGÓN
POZOS: DEL PN-2.2 AL POZO PN-2.7



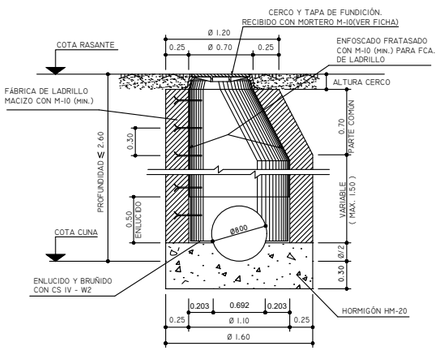

NOTAS:

1. LAS PIEZAS IRÁN RECIBIDAS Y SUS JUNTAS SELLADAS DE ACUERDO CON UNE-EN1917.
2. PARA REGISTROS CON PROFUNDIDAD MAYOR DE 2 m, SE INSTALARÁ UN ASIDERO O PATE EN EL EXTERIOR QUE FACILITE EL ACCESO. SE COLOCARÁ EN FORMA DE "U" INVERTIDA (GIRADO 90º RESPECTO A LOS INTERIORES DEL POZO). SU UBICACIÓN NO SUPONDRÁ RIESGO DE TROPIEZO PARA TERCEROS.
3. EN LOS REGISTROS Y CÁMARAS CUYO ACCESO EXTERIOR SE ENCUENTRE SOBRE EL NIVEL DEL TERRENO, CON RIESGO DE CAÍDA SUPERIOR A 2 m, SE DEBERÁ HABILITAR ACCESO SEGURO Y PROTEGER ADECUADAMENTE MEDIANTE BARANDILLAS U OTROS SISTEMAS DE PROTECCIÓN DE SEGURIDAD EQUIVALENTE.

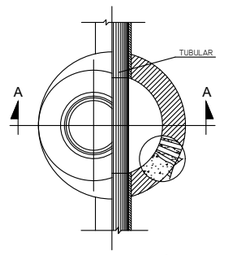
MATERIALES:
TODAS LAS PIEZAS SERÁN ARMADAS.
SERIE REFORZADA SEGÚN UNE 127917

POZO DE REGISTRO PARA ALCANTARILLADO TUBULAR
(Profundidad ⩽ 2,60 m)

POZOS: PN-2.2, PN-2.3, PN-2.4, PN-2.6, PN-2.7




SECCIÓN A-A



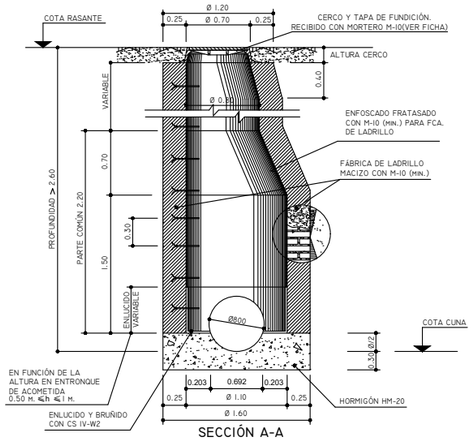

PLANTA - SECCIÓN

**DIMENSIONES SOLERA**

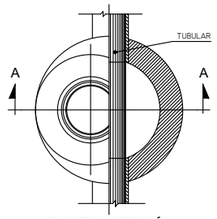
| DIAMETRO TUBULAR Ø (mm) | a (m) | b (m) |
|---|---|---|
| 35 | 0,30 | 0,40 |
| 40 | 0,40 | 0,35 |
| 50 | 0,50 | 0,30 |
| 60 | 0,60 | 0,25 |

POZO DE REGISTRO PARA ALCANTARILLADO TUBULAR
(Profundidad>2,60 m)

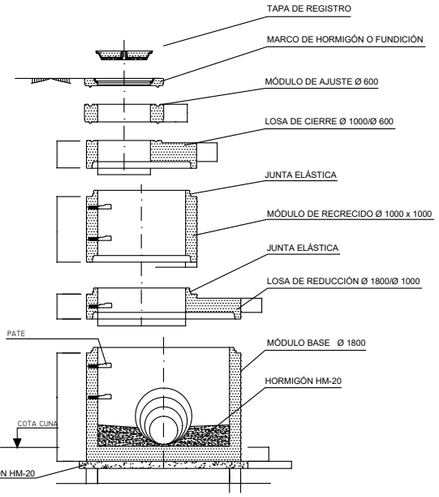
POZOS: PN-2.1, PN-2.5




SECCIÓN A-A




PLANTA - SECCIÓN




HORMIGÓN HA-40

MATERIALES
TODAS LAS PIEZAS SERÁN ARMADAS.
SERIE REFORZADA SEGÚN UNE 127917

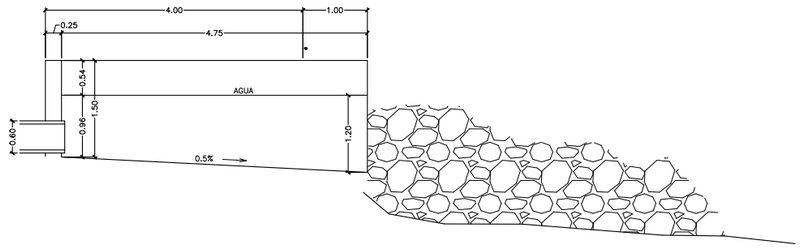
CARGAS DE FISURACIÓN Y ROTURA
KN/M

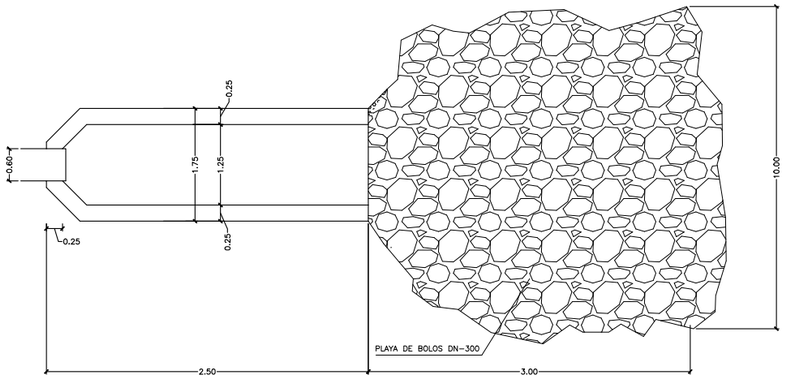
| DN POZO | CLASE 30 SERIE NORMAL | | CLASE 60 SERIE REFORZADA | |
|---|---|---|---|---|
| | FISURAC. | ROTURA | FISURAC. | ROTURA |
| 1.000 | 20 | 30 | 40 | 60 |
| 1.200 | 24 | 36 | 38 | 72 |
| 1.500 | 30 | 45 | 60 | 90 |
| 1.800 | 36 | 54 | 72 | 108 |

| | | | | |
|---|---|---|---|---|
| REDACTOR<br>D.JOSÉ ANTONIO SEGURA SÁNCHEZ<br>INGENIERO REDACTOR | LA PROPIEDAD<br>JUNTA DE COMPENSACIÓN<br>UE-VII.1 "SIST. GRLES PE+KODAK" | PROCAVER<br>SOLUCIONES URBANAS S.L.<br>PROCAVER@PROCAVER.COM | PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID). | FECHA<br>FEBRERO 2024<br>ESCALA<br>1/200 | PLANO<br>PLANO DE DETALLES<br>HOJA 1/3<br>D1 |

## DETALLE VERTIDO Y PLAYA DE BOLOS

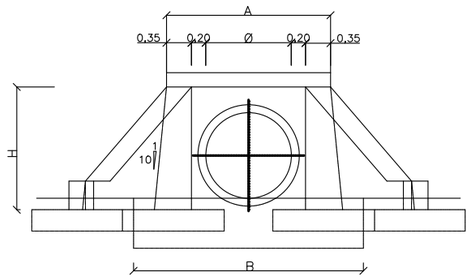
SIN ESCALA — COTAS en Milímetros

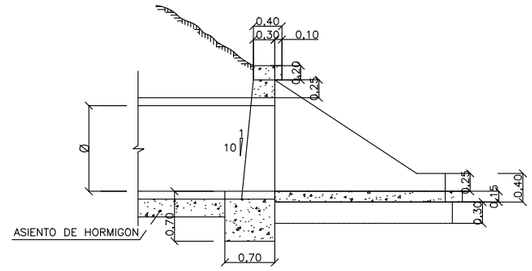


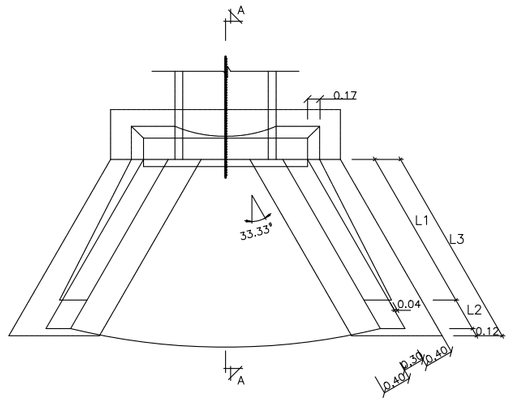




## DETALLE OBRA DE FABRICA EN PUNTO DE VERTIDO

SIN ESCALA — COTAS en Milímetros



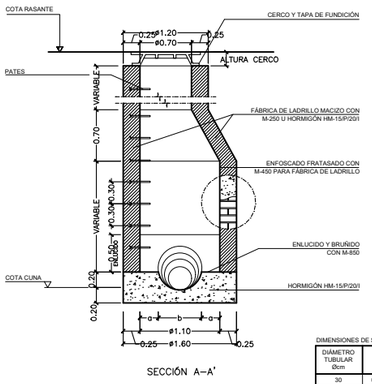




| | Ø600 |
|---|---|
| A | 1,70 |
| B | 1,75 |
| H | 1,10 |
| L1 | 1,50 |
| L2 | 0,30 |
| L3 | 2,50 |

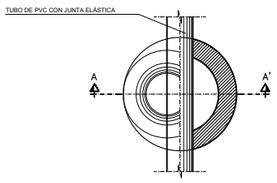
## POZO DE REGISTRO

SIN ESCALA — COTAS en Metros




SECCIÓN A–A'

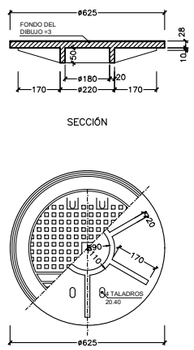
| DIMENSIONES DE SOLERA | | |
|---|---|---|
| DIÁMETRO TUBULAR Ø/cm | a m | b m |
| 30 | 0.30 | 0.40 |
| 40 | 0.40 | 0.35 |
| 50 | 0.49 | 0.305 |
| 60 | 0.57 | 0.265 |




PLANTA–SECCIÓN

## CERCO PARA POZO DE REGISTRO O ABSORBEDERO

SIN ESCALA — COTAS en Milímetros




SECCIÓN

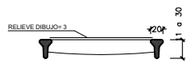



PLANTA

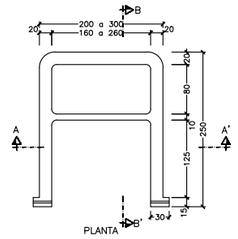
MATERIAL:
FUNDICION CON GRAFITO ESFEROIDAL TIPOS EN-GJS-500-7 ó EN-GJS-600-3 (UNE-EN-1563-97)

## PATE DE ACCESO A POZOS

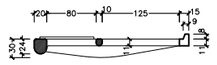
SIN ESCALA — COTAS en Milímetros




SECCIÓN A–A'




PLANTA

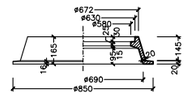



SECCIÓN B–B'

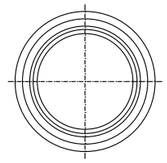
MATERIAL:
FUNDICIÓN PERLÍTICO-ALEADA

## CERCO PARA POZO DE REGISTRO EN CALZADA

SIN ESCALA — COTAS en Milímetros




ALZADO–SECCIÓN

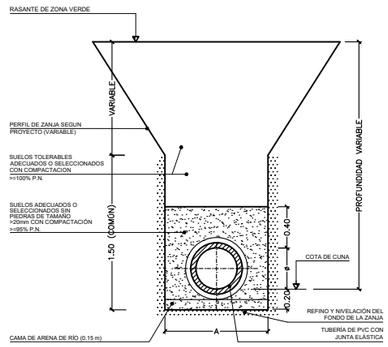


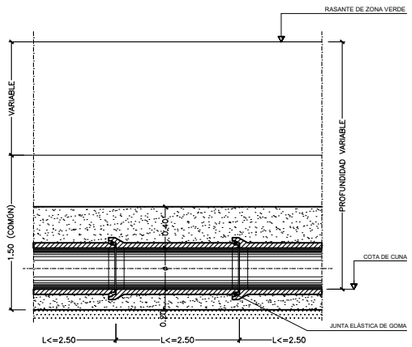
PLANTA

MATERIAL:
HIERRO FUNDIDO CON GRAFITO ESFEROIDAL TIPO EN-GJS-500-7 ó EN-GJS-600-3 (UNE- EN-1563-97)

## SECCIÓN TIPO DE ZANJA PARA TUBOS DE SANEAMIENTO (P.V.C./PP) EN TERRENOS ESTABLES

SIN ESCALA — COTAS en Metros

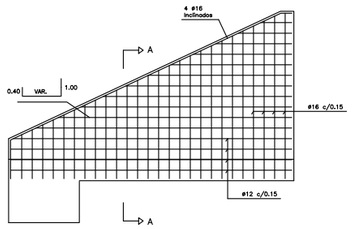


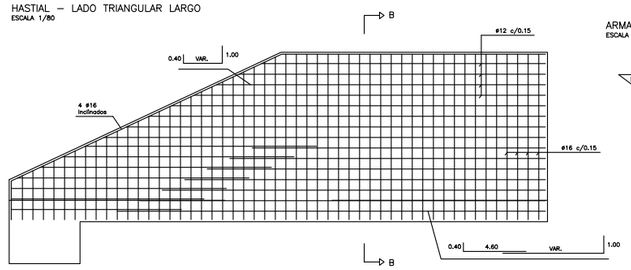

| ANCHO DE ZANJA | | | | | | |
|---|---|---|---|---|---|---|
| Ø cm | 40 | 50 | 60 | 80 | 100 | |
| A | 1.40 | 1.50 | 1.70 | 1.90 | 2.10 | |

| | | | | | |
|---|---|---|---|---|---|
| REDACTOR<br>D.JOSÉ ANTONIO SEGURA SÁNCHEZ<br>INGENIERO REDACTOR | LA PROPIEDAD<br>JUNTA DE COMPENSACIÓN<br>UE-VII.1 "SIST. GRLES PE+KODAK" | PROCAVER<br>SOLUCIONES URBANAS S.L.<br>PROCAVER@PROCAVER.COM | PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID). | FECHA<br>FEBRERO 2024<br>ESCALA<br>1/200 | PLANO HOJA 2/3<br>PLANO DE DETALLES<br>D1 |

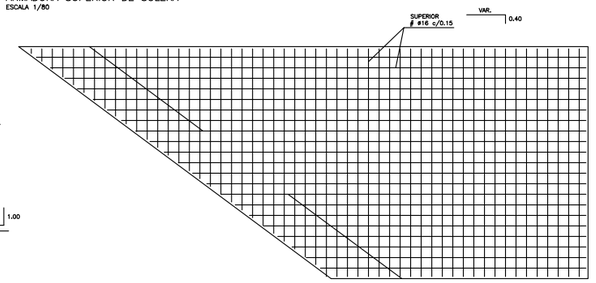
HASTIAL – LADO TRIANGULAR CORTO
ESCALA 1/80



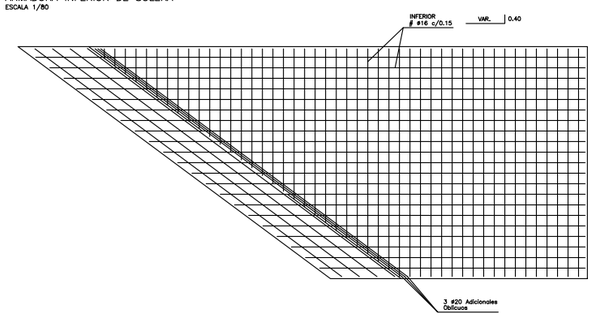

HASTIAL – LADO TRIANGULAR LARGO
ESCALA 1/80



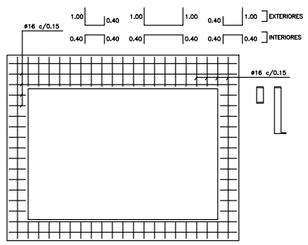

ARMADURA SUPERIOR DE SOLERA
ESCALA 1/80



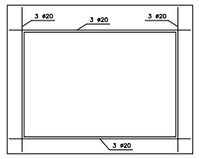

ARMADURA INFERIOR DE SOLERA
ESCALA 1/80



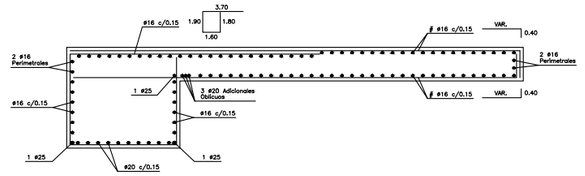

HASTIAL – LADO HUECO
ESCALA 1/80




ARMADURA DE REFUERZO EN HUECOS DE HASTIALES
ESCALA 1/100

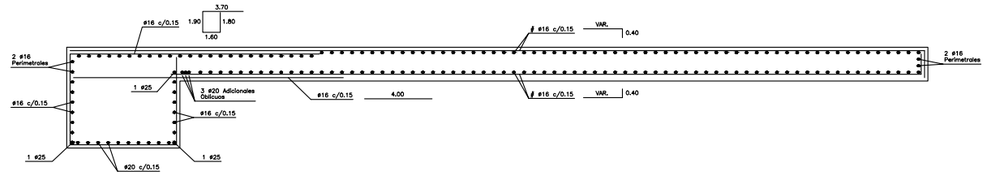



SECCIÓN – LADO CORTO
ESCALA 1/50

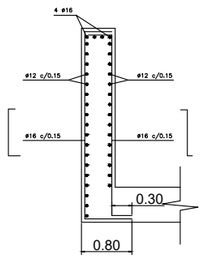



| CUADRO DE MATERIALES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ELEMENTOS | LOCALIZACION | NORMA | CALIDAD | NIVEL DE CONTROL | COEF $\gamma_m/\gamma_t$ | RECUB mm. | a/c | C Kg/m3 |
| HORMIGON | LOSA, SOLERA Y HASTIALES | EHE | HA-30/B/20/IIb+Qb | MODALIDAD 3 | 1,50 | 30 | 0.55 | 300 |
| | LIMPIEZA | EHE | HM-15 | NO ESTRUCTURAL | | | | |
| ARMADURAS | PASIVAS | EHE | B 500 S | NORMAL | 1,15 | RECUB = Recubrimiento Nominal | | |
| EJECUCION | TODOS | EHE | | INTENSO | $\frac{\gamma_m}{\gamma_t}$=1,35 a/c<br>$\frac{\gamma_m}{\gamma_t}$=1,50 C<br>$\frac{\gamma_m}{\gamma_t}$=1,50 | a/c = Máx. Relación Agua/Cemento<br>C = Contenido Mínimo De Cemento | | |
| NOTAS | LA DISTANCIA ENTRE CUALQUIER ARMADURA PASIVA Y EL PARAMETRO MAS PROXIMO NO SERA INFERIOR AL VALOR INDICADO. PARA GARANTIZARLO, SE EMPLEARAN LOS OPORTUNOS SEPARADORES, DE ACUERDO CON EHE. | | | | | | | |

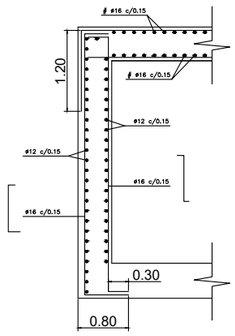
SECCIÓN – LADO LARGO
ESCALA 1/50



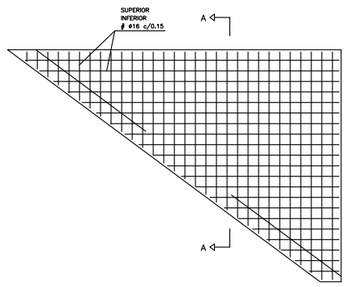

SECCIÓN A–A
ESCALA 1/50




SECCIÓN B–B
ESCALA 1/50

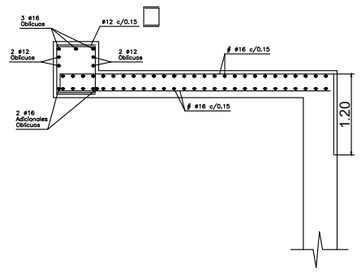


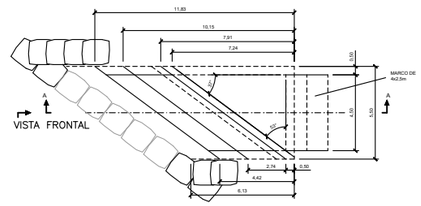

ARMADURA DE LOSA
ESCALA 1/80

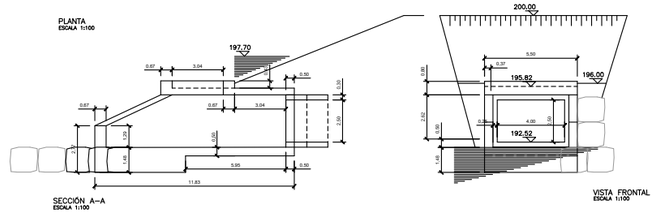



| CUADRO DE MATERIALES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ELEMENTOS | LOCALIZACION | NORMA | CALIDAD | NIVEL DE CONTROL | COEF $\gamma_m/\gamma_t$ | RECUB mm. | a/c | C Kg/m3 |
| HORMIGON | LOSA, SOLERA Y HASTIALES | EHE | HA-30/B/20/IIb+Qb | MODALIDAD 3 | 1,50 | 30 | 0.55 | 300 |
| | LIMPIEZA | EHE | HM-15 | NO ESTRUCTURAL | | | | |
| ARMADURAS | PASIVAS | EHE | B 500 S | NORMAL | 1,15 | RECUB = Recubrimiento Nominal | | |
| EJECUCION | TODOS | EHE | | INTENSO | $\frac{\gamma_m}{\gamma_t}$=1,35 a/c<br>$\frac{\gamma_m}{\gamma_t}$=1,50 C<br>$\frac{\gamma_m}{\gamma_t}$=1,50 | a/c = Máx. Relación Agua/Cemento<br>C = Contenido Mínimo De Cemento | | |
| NOTAS | LA DISTANCIA ENTRE CUALQUIER ARMADURA PASIVA Y EL PARAMETRO MAS PROXIMO NO SERA INFERIOR AL VALOR INDICADO. PARA GARANTIZARLO, SE EMPLEARAN LOS OPORTUNOS SEPARADORES, DE ACUERDO CON EHE. | | | | | | | |

SECCIÓN A–A
ESCALA 1/50




| | | | |
|---|---|---|---|
| REDACTOR<br>D.JOSÉ ANTONIO SEGURA SÁNCHEZ<br>INGENIERO REDACTOR | LA PROPIEDAD<br>JUNTA DE COMPENSACIÓN<br>UE-VII.1 "SIST. GRLES PE+KODAK" | PROCAVER<br>SOLUCIONES URBANAS S.L.<br>PROCAVER@PROCAVER.COM | PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID). | FECHA<br>FEBRERO 2024<br>ESCALA<br>1/200 | PLANO HOJA 3/3<br>PLANO DE DETALLES<br>D1 |

# DOCUMENTO III.- PLIEGO DE CONDICIONES

## CAPÍTULO 1 PRESCRIPCIONES GENERALES

### SUBCAPÍTULO 1.1 ÁMBITO DE APLICACIÓN

El presente Pliego será aplicable a las obras englobadas en este proyecto.

### SUBCAPÍTULO 1.2 ASPECTOS GENERALES

#### Artículo 1.2.1 Documentos que regirán en las obras afectadas

La ejecución de una obra determinada se regirá por los siguientes documentos:

- El Pliego de Cláusulas Administrativas Particulares, en lo sucesivo “PCAP”, que rija la licitación, junto con uno de los siguientes documentos,
- el Proyecto de construcción en el caso de licitación de obra o,
- el Pliego de bases en el caso de licitación de proyecto y obra.

#### Artículo 1.2.2 Definiciones

Para facilitar la comprensión del presente Pliego de Prescripciones Técnicas Generales se acompañan definiciones auxiliares de algunos términos utilizados en el mismo.

- "Proyecto" es el documento técnico que describe, justifica y presupuesta una obra sirviendo de base para licitación. Estará constituido por los siguientes documentos:
  - Documento N.° 1: Memoria.
  - Documento N.° 2: Planos.
  - Documento N.° 3: Pliego de Prescripciones Técnicas, que incluye a su vez el Pliego de Prescripciones Técnicas Generales, en lo sucesivo “PPTG” y el Pliego de Prescripciones Técnicas Particulares en lo sucesivo “PPTP”.
  - Documento N.° 4: Presupuesto.
- “Pliego de Bases” es el documento técnico que describe, justifica y valora una obra, así como las condiciones del proyecto constructivo a redactar en las licitaciones de proyecto y obra. Estará constituido por los siguientes documentos:

- Documento N.° 1: Pliego de Prescripciones Técnicas Generales, en lo sucesivo “PPTG”.
- Documento N.° 2: Pliego de Prescripciones Técnicas Particulares. Integrado por la Memoria, Anejos y Planos.

- "Obras" o "Trabajos" son las tareas necesarias para realizar la construcción definida, incluyendo todos los suministros, servicios e instalaciones que se requieren para el fin previsto.
- "Oferta" es el conjunto de documentos que el Licitador presenta a la Licitación, en tiempo y forma, y de acuerdo con lo establecido en el anuncio de la misma.
- "Adjudicatario" es la persona o personas, naturales o jurídicas con quiénes el promotor formalice el Contrato para la ejecución de las obras.
- "Dirección de Obra" son los facultativos nombrados por el promotor como responsables de la comprobación y vigilancia de la correcta realización de las obras o trabajos contratados.
- "Documentos de Detalle" son el conjunto de:
  1) Planos de detalle.
  2) Copias de pedidos.
  3) Informes de progreso.
  4) Certificados de prueba.
  5) Hojas de envío de materiales y elementos que aclaran, complementan y definen totalmente el Proyecto durante el periodo de ejecución de las Obras y Trabajos.
  6) Especificaciones Técnicas de los equipos mecánicos, eléctricos y de instrumentación y control.
- "Planos de Detalle" son los que definen en toda su extensión las características físicas y geométricas de cada uno de los elementos y sistemas contenidos en el Proyecto de Construcción.
- "Copias de Pedidos" son las correspondientes a los pedidos oficiales del Adjudicatario a sus suministradores, en los cuales deben figurar todas las condiciones técnicas del suministro.
- "Informes de Progreso" son los que reflejan el avance de las fabricaciones y montajes que se realizan en taller y en obra.
- "Certificados de Pruebas" son los documentos que recogen los resultados de las pruebas efectuadas en taller o en obra como antecedente para la recepción de las obras.
- "Hojas de envío de materiales y elementos" son las emitidas por un suministrador como anuncio de la salida de tales materiales o elementos, desde el lugar de donde procede el suministro en dirección al lugar de las obras.

- “Especificaciones Técnicas de los equipos” son las especificaciones emitidas por el Adjudicatario para aprobación de la Dirección de Obra con el objeto de definir el pedido de un equipo concreto.
- "Fase de Construcción" es el que comienza el día siguiente a la fecha de la firma del Acta de Comprobación del Replanteo o Acta de Orden de Inicio y termina cuando todos los elementos que forman parte de las obras han sido instalados y están en condiciones de iniciar su funcionamiento.
- “Pruebas de funcionamiento” son las que se realicen durante la Fase de Construcción, antes de que proceda la Recepción de las Obras.
- “Prueba General de Funcionamiento” es la prueba de funcionamiento para comprobar que las instalaciones funcionan de un modo continuo, ininterrumpido y satisfactorio durante un tiempo mínimo exigido en el PPTP.
- "Pruebas de Reconocimiento" son las que hayan de realizarse en taller o en obra sobre elementos o sistemas parciales antes de la Prueba General de Funcionamiento.
- "Pruebas de Rendimiento" son las que se realicen durante el Periodo de Garantía para comprobar que las prestaciones de las instalaciones cumplen lo exigido por la Licitación y lo ofertado por el Adjudicatario.
- “Proyecto As Built” es el documento que, con la definición de un proyecto constructivo, recoge la totalidad de la obra realmente ejecutada y que debe presentar el Adjudicatario al final de la obra. Incluirá memoria, anejos de cálculos, planos y presupuesto.
- “Documento de liquidación” es el documento que contiene los planos y presupuesto que permite la medición completa de la obra ejecutada.

### Artículo 1.2.3 Afecciones

Se tendrán en consideración todas las limitaciones por afecciones al Dominio Público Hidráulico, carreteras, infraestructuras ferroviarias, vías pecuarias, patrimonio histórico, medioambientales o a cualquier otro servicio o infraestructura de energía eléctrica, telecomunicaciones, gaseoductos, oleoductos, etc. Se deberán aplicar las medidas derivadas de las tramitaciones o consultas emitidas por los órganos competentes o gestores en las materias anteriores y que se vean afectadas por la ejecución de las obras.

El Adjudicatario de las obras será el responsable de la aplicación de estas medidas, no teniendo, en ningún caso, derecho a realizar reclamación alguna sobre las mismas al promotor.

### Artículo 1.2.4 Productos de construcción

Será de aplicación lo dispuesto en el Reglamento 305/2011 de la Unión Europea por el que se establecen las condiciones armonizadas para la comercialización de productos de construcción, para aquellos materiales o componentes que formen parte de la red.

El Reglamento fija condiciones para la introducción en el mercado o comercialización de los productos de construcción, estableciendo reglas armonizadas sobre cómo expresar las prestaciones de los productos de construcción en relación con sus características esenciales y sobre el uso del marcado CE en dichos productos.

### Artículo 1.2.5 Registro de productos homologados de Canal de Isabel II

La relación de productos homologados, para los que se exige la homologación, está reflejada en el Registro de productos homologados de Canal de Isabel II, S.A. En dicho registro se detallan los datos relativos al tipo de elemento, modelo, fabricante, DN y PN, después de haber sido aprobados por Canal de Isabell II.

### Artículo 1.2.6 Seguridad y Salud en las obras

El Adjudicatario queda obligado al cumplimiento de la legislación vigente en materia de Seguridad y Salud en el trabajo en lo que le sea de aplicación. En particular la Ley 31/1995 de 8 de noviembre, de Prevención de Riesgos Laborales, el Real Decreto 1627/1997, de 24 de octubre, por el que se establecen las disposiciones mínimas de seguridad y salud en las obras de construcción, y el Real Decreto 337/2010, de 19 de marzo, por el que se modifican el Real Decreto 39/1997, de 17 de enero, por el que se aprueba el Reglamento de los Servicios de Prevención y el Real Decreto 1109/2007, de 24 de agosto, por el que se desarrolla la Ley 32/2006, de 18 de octubre, reguladora de la subcontratación en el sector de la construcción.

La Dirección de Obra podrá ordenar la paralización de las obras por incumplimiento de dicha normativa, imputando al Adjudicatario los retrasos que por ello se ocasionen, con las penalizaciones correspondientes.

### Artículo 1.2.7 Gestión de residuos durante las obras

Según el Real Decreto 105/2008, de 1 de febrero, por el que se regula la producción y gestión de los residuos de construcción y demolición (RCD) con arreglo a la orden MAM/304/2002 de 8 de febrero y sus modificaciones posteriores, el productor de los residuos debe incluir un estudio de gestión de residuos de construcción y demolición con los contenidos mínimos que indica el citado Real Decreto.

Asimismo, para la gestión de los residuos generados durante la construcción de las obras, se tendrán en cuenta las especificaciones establecidas en el Real Decreto mencionado, así como en la Ley 5/2003, de 20 de marzo, de Residuos de la Comunidad de Madrid y la Orden 2726/2009, de 16 de julio, por la que se regula la gestión de los residuos de construcción y demolición en la Comunidad de Madrid.

De igual modo, para aquellos casos en los que se planifique la utilización de materiales naturales excavados en obras distintas a aquéllas en las que se generaron y en operaciones de relleno, se tendrá en consideración lo establecido en la Orden APM/1007/2017.

## SUBCAPÍTULO 1.3 CONDICIONES ADMINISTRATIVAS QUE REGIRÁN EN LA EJECUCIÓN DE LAS OBRAS

### Artículo 1.3.1 Forma de ejecutar las obras

Las obras se construirán con estricta sujeción al Proyecto de Construcción aprobado y en todo aquello que no especifique el citado Proyecto, se estará a la interpretación de la Dirección de Obra. En los casos de licitaciones de Proyecto y Obra, en los que el Proyecto de Construcción es responsabilidad del Adjudicatario, éste no podrá reclamar contra esta interpretación ni solicitar indemnización económica alguna, cuando esa interpretación haya sido necesaria por la indefinición de dicho Proyecto.

Ninguna obra o instalación podrá realizarse sin que hayan sido aprobados por la Dirección de Obra los documentos de detalle correspondientes. Consecuentemente, la Dirección de Obra podrá rechazar cualquier obra o instalación que a su juicio sea inadecuada, si la característica que provoca el rechazo no se encuentra especificada en

algún documento de detalle aprobado, sin que el Adjudicatario tenga derecho a su abono ni a indemnización económica alguna.

En el caso de que la Dirección de Obra decida rechazar una obra o instalación contenida en un documento de detalle aprobado, por considerar que es necesario para el desarrollo adecuado del Proyecto, la demolición y sustitución deberán ser abonadas al Adjudicatario.

La Dirección de Obra determinará el horario y lugar en que el Adjudicatario puede entregarle para su examen y aprobación los documentos de detalle. Con el objetivo de reducir los tiempos necesarios para la comunicación entre las partes, se dispondrá de correo electrónico en obra y en oficina técnica. El mecanismo de aprobación será el siguiente:

- El Adjudicatario recibirá una copia de los documentos de detalle que entrega, firmada por persona autorizada de la Dirección de Obra y en la que conste la fecha en la que hace entrega de dichos documentos.
- Si en el plazo de CINCO (5) DIAS hábiles a partir del siguiente a la entrega, el Adjudicatario no recibe respuesta alguna sobre los documentos de detalle presentados, se considerarán aprobados.
- La Dirección de Obra podrá prorrogar el plazo de respuesta, comunicándolo por escrito al Adjudicatario dentro del plazo habilitado para contestar, en los casos en que el plazo de CINCO (5) DÍAS hábiles no sea suficiente a juicio de la Dirección de Obra.
- En el plazo de respuesta habilitado, la Dirección de Obra podrá devolver los documentos de detalle:
  - Aprobados.
  - Aprobados con modificaciones.
  - Para modificación y nueva presentación.

Si el Adjudicatario no está de acuerdo con alguna modificación deberá manifestarlo por escrito a la Dirección de Obra, en el plazo de CINCO (5) DÍAS hábiles a partir de la recepción del Documento correspondiente y la Dirección de Obra deberá estudiar la discrepancia con el Adjudicatario a la mayor brevedad posible. La decisión final de la Dirección de Obra será ejecutiva, sin perjuicio de que el Adjudicatario ejerza sus derechos en la forma que estime oportuna.

El Adjudicatario podrá proponer, siempre por escrito, a la Dirección de Obra, la sustitución de una unidad de obra por otra que reúna mejores condiciones, el empleo de materiales de más esmerada preparación o calidad que los contratados, la ejecución con mayores dimensiones de cualquier parte de la obra o, cualquier otra mejora de análoga naturaleza que juzgue beneficiosa para ella.

Si la Dirección de Obra estimase conveniente, aun cuando no sea necesaria, la mejora propuesta, podrá autorizarla por escrito, pero el Adjudicatario no tendrá derecho e indemnización de ninguna clase, sino sólo al abono de lo que correspondería si hubiese construido la obra con estricta sujeción a lo contratado.

### Artículo 1.3.2 Aportación de equipo y maquinaria

El Adjudicatario queda obligado a aportar a las obras el equipo de maquinaria y medios auxiliares que sea preciso para la buena ejecución de aquellas, en los plazos parciales y total convenidos en el Contrato.

En el caso de que para la adjudicación del Contrato hubiese sido condición necesaria la aportación por el Adjudicatario de un equipo de maquinaria y medios auxiliares concretos y detallados, la Dirección de Obra exigirá aquella aportación en los mismos términos y detalles que se fijaron en tal ocasión.

El equipo quedará adscrito a la obra en tanto se hallen en ejecución las unidades en que se ha de utilizar, y no podrá retirarse sin consentimiento expreso de la Dirección de Obra. Los elementos averiados o inutilizados deberán ser sustituidos por otros en condiciones y no reparados, cuando la Dirección de Obra estime que su reparación exige plazos que han de alterar el programa de trabajo.

Cada elemento de los que constituyen el equipo será reconocido por la Dirección de Obra, anotándose sus altas y bajas de puesta en obra en el inventario del equipo, y pudiendo también rechazar cualquier elemento que considere inadecuado para el trabajo en la obra.

### Artículo 1.3.3 Fase de construcción

La fase de construcción comienza al día siguiente a la fecha del Acta de Comprobación del Replanteo de las Obras o a la fecha del Acta de Orden de Inicio, y comprende la construcción de las obras civiles, la fabricación y adquisición de los equipos industriales necesarios y el montaje completo de los mismos.

Durante este periodo el Adjudicatario irá aportando todos los documentos de detalle necesarios para ejecución de las obras: planos, copias de pedidos, especificaciones, informes de progreso de fabricación, prueba y montaje de equipos, manuales de montaje y funcionamiento, protocolos de pruebas, instrucciones de mantenimiento, etc., según el programa al efecto incluido en el Proyecto de Construcción. En particular, el Adjudicatario entregará a la Dirección de Obra dos ejemplares, en papel y en soporte digital, de todos los libros, manuales y folletos de instrucciones de operación y mantenimiento de las instalaciones, en cuanto sea posible y siempre antes de la Recepción de las Obras.

### Artículo 1.3.4 Pruebas y ensayos previos a la recepción

Previamente a la Recepción de las Obras se realizarán las Pruebas de Reconocimiento establecidas en el programa de pruebas incluido en el Proyecto de Construcción. Las Pruebas de Reconocimiento se realizarán, salvo estipulación en contrario del PPTP, de acuerdo con el establecido en el presente Pliego y, en su defecto, en función de las normas relacionadas en el CAPÍTULO 3 del mismo. El programa de pruebas incluido en el Proyecto de Construcción estipulará cuales deben realizarse en taller, en obra o en laboratorio, así como las pruebas de sistemas que comprendan varios equipos y que deban realizarse después de la instalación de los mismos.

Los gastos originados por el desarrollo de las pruebas y ensayos previos a la recepción correrán a cargo del Adjudicatario.

Las Pruebas de Reconocimiento verificadas durante la ejecución de los trabajos, no tienen otro carácter que el simple antecedente para la Recepción de las Obras. Por lo tanto, la admisión de materiales, elementos o unidades, que de cualquier forma se realice en el curso de las obras y antes de su Recepción, no atenúa la obligación de

subsanar o reponer deficiencias, si las instalaciones resultasen inaceptables, parcial o totalmente, en el acto de la Recepción.

En el caso de obras que incluyan instalación de equipos mecánicos, eléctricos y/o de automatización y control se desarrollará un periodo de pruebas de funcionamiento. Las pruebas de funcionamiento comenzarán cuando todos los equipos que forman parte de las obras estén instalados y en condiciones de iniciar su funcionamiento y finalizará cuando las instalaciones puedan funcionar en modo continuo, ininterrumpido y satisfactorio. Durante esta fase podrán realizarse comprobaciones de cotas de lámina de agua, pruebas de señales, pruebas de secuencias parciales, así como una prueba general de funcionamiento de la totalidad de las instalaciones construidas.

La Prueba General de Funcionamiento se realizará antes de la Recepción de las obras y se considerará satisfactoria cuando todos los sistemas mecánicos, eléctricos, instrumentación, automatización y supervisión funcionen correctamente en condiciones de trabajo reales durante el periodo estipulado.

El Adjudicatario deberá avisar la fecha de la realización de las pruebas a la Dirección de Obra con antelación suficiente para que pueda estar presente en todas las pruebas y ensayos de materiales, mecanismos y obra ejecutada, establecidas en el programa de pruebas. Las pruebas especializadas deberán confiarse a laboratorios acreditados, independientes del Adjudicatario, salvo decisión en contra de la Dirección de Obra.

No se procederá al empleo de los materiales sin que estos sean examinados y aceptados por la Dirección de Obra, previa realización de las pruebas y ensayos previstos.

El resultado negativo de las pruebas a que se refiere el presente apartado dará lugar a la reiteración de las mismas tantas veces cuantas considere necesarias la Dirección de Obra y en los lugares elegidos por ésta, hasta comprobar si la prueba negativa afecta a una zona parcial susceptible de reparación o refleja defecto de conjunto que motive la no admisión en su totalidad de la obra comprobada.

### Artículo 1.3.5 Actas de Pruebas

De los ensayos y pruebas de materiales, aparatos, obras ejecutadas, y de puesta a punto de los diferentes sistemas y subsistemas, se levantarán Actas que servirán de antecedentes para la recepción de las obras.

### Artículo 1.3.6 Materiales y unidades no incluidos en el presente Pliego

Los materiales y unidades cuyas condiciones no estén especificadas en este Pliego cumplirán las prescripciones de los Pliegos, Instrucciones o Normas aprobadas con carácter oficial, en los casos en que dichos documentos sean aplicables.

La Dirección de Obra podrá rechazar dichos materiales si no reúnen, a su juicio, las condiciones exigibles para conseguir debidamente el objeto que motivará su empleo y sin que el Adjudicatario tenga derecho, en tal caso, a reclamación alguna.

## CAPÍTULO 2 PROTECCIONES MEDIOAMBIENTALES

Se procederá a la identificación de riesgos y al establecimiento de las medidas y condiciones de ejecución necesarias con el objeto de asegurar la protección medioambiental del entorno de las obras.

Se deberá evitar la contaminación del aire, cursos de agua, cultivos, montes y en general, cualquier clase de bien público o privado, que pudiera producir la ejecución de las obras, explotación de canteras, talleres y demás instalaciones auxiliares, aunque estuvieran localizados en terrenos de la propiedad. Los límites de contaminación admisibles serán los definidos como tolerables por las disposiciones vigentes o por la Autoridad competente.

En general, se seguirá lo marcado como medidas protectoras y correctoras del impacto ambiental en el Estudio de Impacto Ambiental, documento que además contendrá los aspectos referentes a descripción general del proyecto, alternativas estudiadas, justificación de la solución adoptada, evaluación de los efectos ambientales, programa de vigilancia ambiental y un resumen comprensible del mismo.

Además, en el caso de que exista Declaración de Impacto Ambiental, o Condicionado Ambiental, el Adjudicatario estará obligado a ejecutar su contenido.

En particular se procederá a tomar las medidas necesarias para:

- Evitar la contaminación atmosférica por la emisión de polvo en las operaciones de movimiento de tierras, transporte, manipulación y ensilado de cemento, en el proceso de producción de los áridos, en las plantas de mezclas bituminosas y en la perforación en seco de las rocas.
- Evitar la contaminación acústica derivada de la utilización de maquinaria de forma que no resulten nocivos para las personas ajenas a la obra ni para las personas afectas a las mismas.
- Proteger la calidad de las aguas continentales evitando los derrames accidentales de sustancias potencialmente contaminantes y aguas residuales.
- Proteger el suelo, la fauna y flora.
- Reducir la generación y peligrosidad de residuos y proceder a la gestión correcta de los mismos.

# CAPÍTULO 3 LEGISLACIÓN Y NORMATIVA DE APLICACIÓN

Además de lo especificado en el presente Pliego, serán de aplicación, en las obras regidas por este PPT, las siguientes disposiciones, normas y reglamentos en lo que resulte aplicable. Para la aplicación y cumplimiento de las mismas, así como para la interpretación de errores u omisiones contenidos en ellas, se seguirá el orden de mayor a menor rango legal de las disposiciones que haya servido para su aplicación.

Se consideran de obligado cumplimiento las normas técnicas que se encuentren incluidas en reglamentos e instrucciones técnicas nacionales. En el caso de que las normas no estén incluidas en reglamentos e instrucciones nacionales, podrán considerarse normas equivalentes a las aquí mencionadas.

**Legislación Administrativa y de Contratación**

- Reglamento (UE) nº 305/2011 del Parlamento Europeo y del Consejo, de 9 de marzo de 2011, por el que se establecen las condiciones armonizadas para la comercialización de productos de construcción y se deroga le Directiva 89/106/CEE del Consejo (DOUE núm. 88, de 4 de abril de 2011) y sus posteriores modificaciones.
- Ley 1/2020, de 8 de octubre, por la que se modifica la Ley 9/2001, de 17 de julio, del Suelo de la Comunidad de Madrid, para el impulso y reactivación de la actividad urbanística (BOCM núm. 251, de 15 de octubre de 2020 y BOE núm. 56, de 6 de marzo de 2021).
- Real Decreto-Ley 3/2020, de 4 de febrero, de medidas urgentes por el que se incorporan al ordenamiento jurídico español diversas directivas de la Unión Europea en el ámbito de la contratación pública en determinados sectores; de seguros privados; de planes y fondos de pensiones; del ámbito tributario y de litigios fiscales. Libro Primero: Transposición de la Directiva 2014/25/UE del Parlamento Europeo y del Consejo, de 26 de febrero de 2014, relativa a la contratación por entidades que operan en los sectores del agua, la energía, los transportes y los servicios postales, y la Directiva 2014/23/UE, del Parlamento Europeo y del Consejo, de 26 de febrero de 2014, relativa a la adjudicación de contratos de concesión (BOE núm. 31, de 5 de febrero de 2020).
- Ley 9/2017, de 8 de noviembre, de Contratos del Sector Público, por la que se transponen al ordenamiento jurídico español las Directivas del Parlamento Europeo y

del Consejo 2014/23/UE y 2014/24/UE, de 26 de febrero de 2014 (BOE núm. 272, de 9 de noviembre de 2017).

- Ley 6/2013, de 23 de diciembre, de Medidas Fiscales, Administrativas de la Comunidad de Madrid (BOCM núm. 309, de 30 de diciembre de 2013 y BOE núm. 74, de 26 de marzo de 2014).
- Ley 9/2010, de 23 de diciembre, de Medidas Fiscales, Administrativas y Racionalización del Sector Público (BOCM núm. 310, de 29 de diciembre de 2010. Corrección de errores: BOCM núm. 47, de 25 de febrero y núm. 89, de 15 de abril de 2011 y BOE núm. 118, de 18 de mayo de 2011).
- Ley 3/2008, de 29 de diciembre, de Medidas Fiscales y Administrativas de la Comunidad de Madrid (BOCM núm. 310, de 30 de diciembre de 2008 y BOE núm. 66, de 18 de marzo de 2009, excepto los artículos 1, 2, 3, 4 y 5 y la disposición transitoria tercera derogados por la Ley 10/2009 de 29 de diciembre (BOCM núm. 308, de 29 de diciembre de 2009).
- Ley 2/2004, de 31 de mayo de Medidas Fiscales y Administrativas de la Comunidad de Madrid (BOCM núm. 129, de 1 de junio de 2004 y BOE núm. 162, de 06 de julio de 2004), incluyendo las modificaciones efectuadas por la Ley 5/2004 de 28 de diciembre (BOCM núm. 310, de 30 de diciembre de 2004) y la Ley 10/2009 de 23 de diciembre (BOCM núm. 308, de 29 de diciembre de 2009).
- Ley 9/2001, de 17 de julio, del Suelo de la Comunidad de Madrid (BOCM núm. 177, de 27 de julio de 2001 y BOE núm. 245, de 12 de octubre de 2001).

**Legislación Medioambiental**

- Real Decreto 902/2018, de 20 de julio, por el que se modifican el Real Decreto 140/2003, de 7 de febrero, por el que se establecen los criterios sanitarios de la calidad del agua de consumo humano, y las especificaciones de los métodos de análisis del Real Decreto 1798/2010, de 30 de diciembre, por el que se regula la explotación y comercialización de aguas minerales naturales y aguas de manantial envasadas para consumo humano, y del Real Decreto 1799/2010, de 30 de diciembre, por el que se regula el proceso de elaboración y comercialización de aguas preparadas envasadas para el consumo humano (BOE núm. 185, de 1 de agosto de 2018).
- Decreto 59/2017, de 6 de junio, del Consejo de Gobierno, por el que se aprueba el Plan Especial de Protección Civil de Emergencia por Incendios Forestales en la Comunidad de Madrid (INFOMA) (BOCM núm. 136, de 9 de junio de 2017).
- Real Decreto 1/2016, de 8 de enero, por el que se aprueba la revisión de los Planes Hidrológicos de las demarcaciones hidrográficas del Cantábrico Occidental,

Guadalquivir, Ceuta, Melilla, Segura y Júcar, y de la parte española de las demarcaciones hidrográficas del Cantábrico Oriental, Miño-Sil, Duero, Tajo, Guadiana y Ebro (BOE núm. 16, de 19 de enero de 2016).

- Ley 21/2013, de 9 de diciembre, de Evaluación ambiental (BOE núm. 296, de 11 de diciembre de 2013).
- Decreto 55/2012, de 15 de marzo, por el que se establece el régimen legal de protección contra la contaminación acústica en la Comunidad de Madrid (BOCM núm. 70, de 22 de mayo de 2012).
- Real Decreto 866/2008, de 23 de mayo, por el que se aprueba la lista de sustancias permitidas para la fabricación de materiales y objetos plásticos destinados a entrar en contacto con los alimentos y se regulan determinadas condiciones de ensayo (BOE núm. 131, de 30 de mayo de 2008).
- Real Decreto 105/2008, de 1 de febrero, por el que se regula la producción y gestión de los residuos de construcción y demolición (BOE núm. 38, de 13 de febrero de 2008).
- Real Decreto 1620/2007 de 7 de diciembre por el que se establece el régimen jurídico de la reutilización de las aguas depuradas (BOE núm. 294, de 8 de diciembre de 2007).
- Ley 34/2007, de 15 de noviembre, de calidad del aire y protección de la atmósfera (BOE núm. 275, de 16 de noviembre de 2007).
- Ley 8/2005, de 26 de diciembre de Protección y Fomento del Arbolado Urbano de la Comunidad de Madrid (BOCM núm. 312, de 31 de diciembre de 2005 y BOE núm. 52 de 2 de marzo de 2006).
- Real Decreto 865/2003, de 4 de julio, por el que se establecen los criterios higiénico-sanitarios para la prevención y control de la legionelosis, excepto el artículo 13 que es modificado en el Real Decreto 830/2010, de 25 de junio (BOE núm. 171, de 18 de julio de 2003).
- Ley 5/2003, de 20 de marzo, de Residuos de la Comunidad de Madrid (BOCM núm. 76, de 31 de marzo de 2003 y BOE núm. 128, de 29 de mayo de 2003).
- Real Decreto 140/2003, de 7 de febrero, por el que se establecen los criterios sanitarios de la calidad del agua de consumo humano (BOE núm. 45, de 21 de febrero de 2003), excepto la disposición transitoria cuarta y los anexos II, III, VIII y IX, derogados por el Real Decreto 902/2018, de 20 de julio (BOE núm. 185, de 1 de agosto de 2018).
- Ley 2/2002, de 19 de junio, de Evaluación Ambiental de la Comunidad de Madrid (BOCM núm. 154, de 1 de julio de 2002 y BOE núm. 176, de 24 de julio de 2002).

- Orden MAM/304/2002, de 8 de febrero, por la que se publican las operaciones de valorización y eliminación de residuos y la lista europea de residuos (BOE núm. 43, de 19 de febrero de 2002).
- Real Decreto 1/2001, del 20 de julio, por el que se aprueba el Texto Refundido de la Ley de Aguas, y posteriores modificaciones (BOE núm. 176, de 24 de julio de 2001).
- Directiva 98/83/CE del Consejo, de 3 de noviembre de 1998, relativa a la calidad de las aguas destinadas al consumo humano (DOUE núm. 330, de 5 de diciembre de 1998).
- Ley 8/1998 de 15 de junio de Vías Pecuarias de la Comunidad de Madrid (BOCM núm. 147 de 23 de junio de 1998 y BOE núm. 206, de 28 de agosto de 1998) y todas las leyes y reglamentos vigentes sobre vías pecuarias.
- Ley 3/1995, de 23 de marzo, de Vías Pecuarias (BOE núm. 71, de 24 de marzo de 1995).

**Legislación de Obras Hidráulicas**

- Orden de 15 de septiembre de 1986 por la que se aprueba el Pliego de Prescripciones Técnicas Generales para Tuberías de Saneamiento de Poblaciones (BOE núm. 228, de 23 de septiembre de 1986).
- Orden de 28 de julio de 1974 por la que se aprueba el Pliego de Prescripciones Técnicas Generales para Tuberías de abastecimiento de agua (BOE núm. 236, de 2 de octubre de 1974).

**Legislación de estructuras, edificación e instalaciones industriales**

- Real Decreto 178/2021, de 23 de marzo, por el que se modifica el Real Decreto 1027/2007, de 20 de julio, por el que se aprueba el Reglamento de Instalaciones Térmicas en los Edificios (BOE núm. 71, de 24 de marzo de 2021).
- Resolución de 15 de marzo de 2021, de la Dirección General de Industria y de la Pequeña y Mediana Empresa, por la que se amplía la relación de refrigerantes autorizados por el Reglamento de seguridad para instalaciones frigoríficas (BOE núm. 71, de 24 de marzo de 2021).
- Real Decreto 552/2019, de 27 de septiembre, por el que se aprueban el Reglamento de seguridad para instalaciones frigoríficas y sus instrucciones técnicas complementarias (BOE núm. 256, de 24 de octubre de 2019).
- Real Decreto 656/2017, de 23 de junio, por el que se aprueba el Reglamento de Almacenamiento de Productos Químicos y sus Instrucciones Técnicas Complementarias MIE APQ 0 a 10 (BOE núm. 176, de 25 de julio de 2017).

- Real Decreto 513/2017, de 22 de mayo, por el que se aprueba el Reglamento de instalaciones de protección contra incendios (BOE núm. 139, de 12 de junio de 2017).
- Real Decreto 130/2017, de 24 de febrero, por el que se aprueba el Reglamento de Explosivos (BOE núm. 54, de 4 de marzo de 2017).
- Orden de 23 de marzo de 2016, de la Consejería de Economía, Empleo y Hacienda de la Comunidad de Madrid, por la que se establece el procedimiento para la puesta en servicio e inspección de las instalaciones de Equipos a Presión (BOCM núm. 101, de 29 de abril de 2016 y corrección de errores en BOCM núm. 20, de 24 de enero de 2017).Real Decreto 108/2016, de 18 de marzo, por el que se establecen los requisitos esenciales de seguridad para la comercialización de los recipientes a presión simples (BOE núm. 70, de 22 de marzo de 2016).
- Real Decreto 256/2016, de 10 de junio, por el que se aprueba la Instrucción para la recepción de cementos (RC-16) (BOE núm. 153, de 25 de junio de 2016).
- Real Decreto 709/2015, de 24 de julio, por el que se establecen los requisitos esenciales de seguridad para la comercialización de los equipos a presión (BOE núm. 210, de 2 de septiembre de 2015).
- Real Decreto 337/2014, de 9 de mayo, por el que se aprueban el Reglamento sobre condiciones técnicas y garantías de seguridad en instalaciones eléctricas de alta tensión y sus Instrucciones Técnicas Complementarias ITC-RAT 01 a 23 (BOE núm. 139, de 9 de junio de 2014).
- Orden de 12 de marzo de 2014, de la Consejería de Economía y Hacienda, por la que se establece el procedimiento para el registro de puesta en servicio de las instalaciones de protección contra incendios en establecimientos no industriales en la Comunidad de Madrid (BOCM núm. 120, de 22 de mayo de 2014).
- Orden de 19 de noviembre de 2013, de la Consejería de Economía y Hacienda, por la que se establece el procedimiento para la tramitación, puesta en servicio e inspección de las instalaciones frigoríficas y se adaptan las disposiciones de desarrollo del Decreto 38/2002, de 28 de febrero, a lo establecido en la Directiva 2006/123/CE del Parlamento y del Consejo, de 12 de diciembre de 2006, relativa a los servicios en el mercado interior (BOCM núm. 307, de 27 de diciembre de 2013).
- Real Decreto 238/2013, de 5 de abril, por el que se modifican determinados artículos e instrucciones técnicas del Reglamento de Instalaciones Térmicas en los Edificios, aprobado por Real Decreto 1027/2007, de 20 de julio (BOE núm. 89, de 13 de abril de 2013).

- Real Decreto 751/2011, de 27 de mayo, por el que se aprueba la Instrucción de Acero Estructural (EAE) (BOE núm. 149, de 23 de junio de 2011).
- Real Decreto 249/2010, de 5 de marzo, por el que se adaptan determinadas disposiciones en materia de energía y minas a lo dispuesto en la Ley 17/2009, de 23 de noviembre, sobre el libre acceso a las actividades de servicios y su ejercicio, y la Ley 25/2009, de 22 de diciembre, de modificación de diversas leyes para su adaptación a la Ley sobre el libre acceso a las actividades de servicios y su ejercicio (BOE núm. 67, de 18 de marzo de 2010).
- Real Decreto 1826/2009, de 27 de noviembre, por el que se modifica el Reglamento de instalaciones térmicas en los edificios, aprobado por Real Decreto 1027/2007, de 20 de julio (BOE núm. 298, de 11 de diciembre de 2009).
- Real Decreto 2060/2008, de 12 de diciembre, por el que se aprueba el Reglamento de equipos a presión y sus instrucciones técnicas complementarias (BOE núm. 31, de 5 de febrero de 2009) y las modificaciones incluidas en el Real Decreto 1388/2011, de 14 de octubre (BOE núm. 249, de 15 de octubre de 2011) y en el Real Decreto 560/2010, de 7 de mayo (BOE núm. 125, de 22 de mayo de 2010).
- Real Decreto 1644/2008, de 10 de octubre, por el que se establecen las normas para la comercialización y puesta en servicio de las máquinas (BOE núm. 246, de 11 de octubre de 2008).
- Real Decreto 1247/2008, de 18 de julio, por el que se aprueba la instrucción de hormigón estructural (EHE) (BOE núm. 203, de 22 de agosto de 2008).
- Orden 688/2008, de 29 de febrero, de la Consejería de Economía y Consumo, por la que se modifica la Orden 9343/2003, de 1 de octubre, por la que se establece el procedimiento para el registro, puesta en servicio e inspección de instalaciones térmicas no industriales en los edificios, conforme a lo establecido en el Decreto 38/2002, de 28 de febrero (BOCM núm. 66, de 18 de marzo de 2008).
- Real Decreto 1027/2007, de 20 de julio, por el que se aprueba el Reglamento de Instalaciones Térmicas en los edificios (BOE núm. 207, de 29 de agosto de 2007).
- Orden 1415/2007, de 16 de mayo, de la Consejería de Economía e Innovación Tecnológica, por la que se modifica la Orden 639/2006, de 22 de marzo, por la que se establece el procedimiento para el registro de puesta en servicio de las instalaciones interiores de suministro de agua (BOCM núm. 169, de 18 de julio de 2007).
- Real Decreto 919/2006, de 28 de julio, por el que se aprueba el Reglamento técnico de distribución y utilización de combustibles gaseosos y sus instrucciones técnicas complementarias ICG 01 a 11 (BOE núm. 211, de 4 de septiembre de 2006) y

modificaciones incluidas en el Real Decreto 560/2010, de 7 de mayo (BOE núm. 125, de 22 de mayo de 2010).

- Orden 639/2006, de 22 de marzo, de la Consejería de Economía e Innovación Tecnológica, por la que se establece el procedimiento para el registro de puesta en servicio de las instalaciones interiores de suministro de agua (BOCM núm. 97, de 25 de abril de 2006).
- Real Decreto 314/2006, de 17 de marzo, por el que se aprueba Código Técnico de la Edificación y posteriores modificaciones y ampliaciones (BOE núm. 74, de 28 de marzo de 2006).
- Orden 3619/2005, de 24 de junio, de la Consejería de Economía e Innovación Tecnológica, por la que se establece el procedimiento para el Registro de Instalaciones de Prevención y Extinción contra Incendios (BOCM núm. 226, de 22 de septiembre de 2005).
- Real Decreto 2267/2004, de 3 de diciembre, por el que se aprueba el Reglamento de Seguridad contra Incendios en Establecimientos Industriales (BOE núm. 303, de 17 de diciembre de 2004), y las modificaciones incluidas en el Real Decreto 560/2010 de 7 de mayo (BOE núm. 125, de 22 de mayo de 2010).
- Real Decreto 1434/2002, de 27 de diciembre, por el que se regulan las actividades de transporte, distribución, comercialización, suministro y procedimientos de autorización de instalaciones de gas natural (BOE núm. 313, de 31 de diciembre de 2002).
- Real Decreto 997/2002 de 27 de septiembre, por el que se aprueba la Norma de Construcción Sismorresistente: parte general y edificación (NCSR-02) (BOE núm. 244, de 11 de octubre de 2002).
- Ley 34/1998, de 7 de octubre, del sector de hidrocarburos (BOE de 8 de octubre de 1998).
- Ley 8/1993, de 22 de junio, de Promoción de la Accesibilidad y Supresión de Barreras Arquitectónicas (BOCM núm. 152, de 29 de junio de 1993 y BOE núm. 203, de 25 de agosto de 1993).
- Real Decreto 1085/1992, de 11 de septiembre, por el que se aprueba el Reglamento de la actividad de distribución de gases licuados del petróleo, en desarrollo de la Ley 15/1992, de 5 de junio, sobre medidas urgentes para la progresiva adaptación del sector petrolero al marco comunitario (BOE núm. 243, de 9 de octubre de 1992).
- Ley 21/1992, de 16 de julio, de Industria (BOE de 23 de julio de 1992).
- Decreto 3565/1972, de 23 de diciembre, por el que se establecen las Normas Tecnológicas de la edificación, NTE (BOE núm. 13, de 15 de enero de 1973).

**Legislación de carreteras y viales**

- Orden FOM/510/2018, de 8 de mayo, por la que se modifica la Orden FOM/2523/2014, de 12 de diciembre, por la que se actualizan determinados artículos del pliego de prescripciones técnicas generales para obras de carreteras y puentes, relativos a materiales básicos, a firmes y pavimentos, y a señalización, balizamiento y sistemas de contención de vehículos (BOE núm. 124, de 22 de mayo de 2018).
- Ley 37/2015, de 29 de septiembre, de carreteras (BOE núm. 234, de 30 de septiembre de 2015).
- Ley 38/2015, de 29 de septiembre, del Sector Ferroviario (BOE núm. 234, de 30 de septiembre de 2015).
- Real Decreto 2387/2004, de 30 de diciembre, por el que se aprueba el Reglamento del Sector Ferroviario (BOE núm. 315, de 31 de diciembre de 2004).
- Real Decreto 1812/1994, de 2 de septiembre, por el que se aprueba el Reglamento General de Carreteras (BOE núm. 228, de 23 de septiembre de 1994).
- Decreto 29/1993, de 11 de marzo, por el que se aprueba el Reglamento de la Ley de Carreteras de la Comunidad de Madrid (BOCM núm. 87, 14 de abril de 1993).
- Ley 3/1991, de 7 de marzo, de Carreteras de la Comunidad de Madrid (BOCM núm. 68, de 21 de marzo de 1991 y BOE núm. 127, de 28 de mayo de 1991).
- Orden Ministerial de 6 de febrero de 1976, por la que se aprueba el Pliego de Prescripciones Técnicas Generales para Obras de Carreteras y Puentes (PG-3/1975), con las modificaciones posteriores y sus modificaciones posteriores.
- Instrucción de Carreteras, y sus diferentes normas. Concretamente:
    - Orden FOM/273/2016, de 19 de febrero, por la que se aprueba la Norma 3.1-IC Trazado, de la Instrucción de Carreteras. (BOE núm. 55, de 4 de marzo de 2016).
    - Orden FOM/3460/2003, de 28 de noviembre, por la que se aprueba la Norma instrucción 6.1-IC Secciones de Firme, de la Instrucción de Carreteras (BOE núm. 297, de 12 de diciembre de 2003).
    - Orden de 31 de agosto de 1987 por la que se aprueba la instrucción 8.3-IC Señalización, balizamiento, defensa, limpieza y terminación de obras fijas fuera de poblado (BOE núm. 224, de 18 de septiembre de 1987).

**Legislación eléctrica**

- Resolución de 5 de diciembre de 2014, de la Dirección General de Industria, Energía y Minas, por la que se actualizan los formularios para la tramitación de los procedimientos de autorización de instalaciones eléctricas de alta tensión en la Comunidad de Madrid (BOCM núm. 65, de 18 de marzo de 2015).

- Real Decreto 337/2014, de 9 de mayo, por el que se aprueban el Reglamento sobre condiciones técnicas y garantías de seguridad en instalaciones eléctricas de alta tensión y sus Instrucciones Técnicas Complementarias ITC-RAT 01 a 23 (BOE núm. 139, de 9 de junio de 2014).

- Ley 24/2013, de 26 de diciembre, del Sector Eléctrico. (BOE núm. 310, de 27 de diciembre de 2013).

- Real Decreto 1048/2013, de 27 de diciembre, por el que se establece la metodología para el cálculo de la retribución de la actividad de distribución de energía eléctrica. (BOE núm. 312, de 30 de diciembre de 2013) (Deroga al Real Decreto 222/2008, de 15 de febrero, excepto la disposición adicional 4).

- Resolución de 12 de noviembre de 2013, de la Dirección General de Industria, Energía y Minas, por la que se publica modelos de impresos correspondientes a los procedimientos: "Inscripción en el Registro Integrado industrial de empresas y establecimientos", "Inscripción de talleres de reparación de vehículos", "Inscripción de almacenamientos de productos químicos" y "Tramitación de instalaciones eléctricas industriales conectadas a una alimentación en baja tensión" (BOCM núm. 283, de 28 de noviembre de 2013).

- Orden de 31 de enero de 2011, de la Consejería de Economía y Hacienda, por la que se establecen los formularios y modelos de presentación de solicitudes en los procedimientos de autorización de instalaciones de alta tensión en la Comunidad de Madrid (BOCM núm. 49, de 28 de febrero de 2011).

- Real Decreto 1699/2011, de 18 de noviembre, por el que se regula la conexión a red de instalaciones de producción de energía eléctrica de pequeña potencia. (BOE núm. 295 de 08 de diciembre de 2011).

- Decreto 70/2010, de 7 de octubre, del Consejo de Gobierno, para la simplificación de los procedimientos de autorización, verificación e inspección, responsabilidades y régimen sancionador en materia de instalaciones de energía eléctrica de alta tensión en la Comunidad de Madrid (BOCM núm. 243, de 11 de octubre de 2010 y corrección de errores en BOCM núm. 247, de 15 de octubre de 2010).

- Real Decreto 1890/2008 de 14 de noviembre por el que se aprueba el Reglamento de Eficiencia Energética en instalaciones de alumbrado exterior, y sus instrucciones

técnicas complementarias EA-01 a EA-07 (BOE núm. 279, de 19 de noviembre de 2008).

- Real Decreto 223/2008 de 15 de febrero por el que se aprueba el Reglamento sobre Condiciones Técnicas y Garantía de Seguridad en Líneas Eléctricas de Alta Tensión y sus Instrucciones Técnicas Complementarias ITC-LAT 01 a 09 (BOE núm. 68, de 19 de marzo de 2008), (El Real Decreto 560/2010 de 7 de mayo modifica los artículos 13.1, 16, 19 y la ITC-LAT 03 y añade las disposiciones adicionales 1 a 4).
- Real Decreto 1110/2007, de 24 de agosto, por el que se aprueba el Reglamento unificado de puntos de medida del sistema eléctrico (BOE núm. 224, de 18 de septiembre de 2007).
- Orden 9344/2003, de 1 de octubre, de la Consejería de Economía e Innovación Tecnológica, por la que se establece el procedimiento para la tramitación, puesta en servicio e inspección de las instalaciones eléctricas no industriales conectadas a una alimentación en baja tensión (BOCM núm. 249, de 18 de octubre de 2003).
- Real Decreto 842/2002, de 2 de agosto, por el que se aprueba el Reglamento Electrotécnico para Baja Tensión y sus instrucciones técnicas complementarias. (BOE núm. 224, de 18 de septiembre de 2002) y modificaciones posteriores recogidas en el Real Decreto 560/2010, de 7 de mayo.
- Decreto 38/2002, de 28 de febrero, por el que se regulan las entidades de control reglamentario de las instalaciones industriales de la Comunidad de Madrid (BOCM núm. 61, de 13 de marzo de 2002).
- Real Decreto 1955/2000, de 1 de diciembre, por el que se regula las actividades de transporte, distribución, comercialización, suministros y procedimientos de autorización de instalaciones de energía eléctrica (BOE núm. 310, de 27 de diciembre de 2000) y Reales Decretos posteriores que complementan, modifican y/o derogan sus artículos.
- Orden 12 de abril de 1999, por la que se dictan las instrucciones técnicas complementarias al Reglamento de Puntos de Medida de los Consumos y Tránsitos de Energía Eléctrica (BOE núm. 95, de 21 de abril de 1999).
- Decreto 40/1998, de 5 de marzo, por el que se establecen normas técnicas en instalaciones eléctricas para la protección de la avifauna (BOCM núm. 71, de 25 de marzo de 1998).
- Decreto 131/1997, de 16 de octubre, por el que se fijan los requisitos que se han de cumplir las actuaciones urbanísticas en relación con las infraestructuras eléctricas. (BOCM núm. 255, de 27 de octubre de 1997).

- Normas UNESA sobre dimensionamiento de redes de tierra de centros de transformación de tercera categoría.
- Normativa y especificaciones particulares de las compañías suministradoras de energía eléctrica.

**Legislación de Seguridad y Salud**

- Real Decreto 840/2015, de 21 de septiembre, por el que se aprueban medidas de control de los riesgos inherentes a los accidentes graves en los que intervengan sustancias peligrosas (BOE núm. 251, de 20 de octubre de 2015).
- Real Decreto 337/2010, de 19 de marzo, por el que se modifican el Real Decreto 39/1997, de 17 de enero, por el que se aprueba el Reglamento de los Servicios de Prevención; el Real Decreto 1109/2007, de 24 de agosto, por el que se desarrolla la Ley 32/2006, de 18 de octubre, reguladora de la subcontratación en el sector de la construcción y el Real Decreto 1627/1997, de 24 de octubre, por el que se establecen disposiciones mínimas de seguridad y salud en obras de construcción (BOE núm. 71, de 23 de marzo de 2010).
- Real Decreto 286/2006, de 10 de marzo, sobre la protección de la salud y la seguridad de los trabajadores contra los riesgos relacionados con la exposición al ruido (BOE núm. 60, de 11 de marzo de 2006).
- Ley 54/2003, de 12 de diciembre, de reforma del marco normativo de la prevención de riesgos laborales (BOE núm. 298, del 13 de diciembre de 2003).
- Real Decreto 681/2003, de 12 de junio, sobre la protección de la salud y la seguridad de los trabajadores expuestos a los riesgos derivados de atmósferas explosivas en el lugar de trabajo (BOE núm. 145, de 18 de junio de 2003).
- Real Decreto 614/2001, de 8 de junio, sobre disposiciones mínimas para la protección de la salud y seguridad de los trabajadores frente al riesgo eléctrico (BOE núm. 148, de 21 de junio de 2001).
- Real Decreto 374/2001, de 6 de abril, sobre la protección de la salud y seguridad de los trabajadores contra los riesgos relacionados con los agentes químicos durante el trabajo (BOE núm. 104, de 1 de mayo de 2001).
- Real Decreto 1627/1997, de 24 de octubre, por el que se establecen las disposiciones mínimas de seguridad y salud en las obras de construcción (BOE núm. 256, de 25 de octubre de 1997) y Reales Decretos posteriores que modifican, añaden y/o derogan alguno de sus artículos.

- Real Decreto 1215/1997, de 18 de julio, por el que se establecen las disposiciones mínimas de seguridad y salud para la utilización por los trabajadores de los equipos de trabajo (BOE núm. 188, de 7 de agosto de 1997).
- Real Decreto 664/1997, de 12 de mayo, sobre la protección de los trabajadores contra los riesgos relacionados con la exposición a agentes biológicos durante el trabajo (BOE núm. 124, de 24 de mayo de 1997).
- Real Decreto 485/1997, de 14 de abril, sobre disposiciones mínimas en materia de señalización de seguridad y salud en el trabajo (BOE núm. 97, de 23 de abril de 1997).
- Real Decreto 486/1997, de 14 de abril, por el que se establecen las disposiciones mínimas de seguridad y salud en los lugares de trabajo (BOE núm. 97, de 23 de abril de 1997).
- Ley 31/1995, de 8 de noviembre, de Prevención de Riesgos Laborales (BOE núm. 269, de 10 de noviembre de 1995), y los Reales Decretos que la complementan.

**Normativa de Canal Isabel II**

- Normas para Redes de Abastecimiento de Canal de Isabel II. Versión 2012 Modificación 2020 o aquella por la que sea sustituida en un futuro.
- Normas para Redes de Reutilización del Canal de Isabel II. Versión 2. 2020 o aquella por la que sea sustituida en un futuro.
- Normas para Redes de Saneamiento del Canal de Isabel II. Versión 3. 2020 o aquella por la que sea sustituida en un futuro.
- Especificación Técnica de Acometidas de Agua para Consumo Humano. Versión 4. 2018.
- Especificación técnica de elementos de maniobra y control. Válvulas de compuerta. Versión 2012.
- Especificación técnica de elementos de maniobra y control. Válvulas de mariposa. Versión 2013.
- Especificación técnica de elementos de maniobra y control. Válvulas de aeración. Versión 2. 2015.
- Normas Técnicas de elementos de maniobra y control. Válvulas de regulación y seguridad. Versión 1996.
- Especificación técnica de tubos de fundición dúctil para agua de consumo humano. Criterios de homologación. Versión 2015.

- Especificación técnica de dispositivos de cierre. Versión 2013.
- Normas Técnicas para la instalación de tritubo de polietileno en conducciones enterradas de comunicaciones. Versión 2003.

**Otra documentación de referencia**

- Guía técnica sobre Depósitos para Abastecimiento de agua potable. CEDEX. 2009.
- Guía técnica sobre Redes de Saneamiento y Drenaje Urbano. CEDEX. 2007.
- Guía técnica sobre tuberías para el transporte de agua a presión. CEDEX 2006.
- Instrucción del Instituto Eduardo Torroja para tubos de hormigón armado o pretensado (IET). Instituto de Ciencias de la Construcción Eduardo Torroja. Madrid 2007.
- Recomendaciones del I.E.T.C.C. para la fabricación, transporte y montaje de tubos de hormigón en masa.
- Manual de ATHA sobre cálculo, diseño e instalación de tubos de hormigón armado.

**Normas técnicas**

- **Normas UNE**

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| UNE 7074:1954 | Determinación de la adherencia y de la coherencia de los materiales bituminosos. |
| UNE 21123-2:2017 | Cables eléctricos de utilización industrial de tensión asignada 0,6/1 kV.<br>Parte 2: Cables con aislamiento de polietileno reticulado y cubierta de policloruro de vinilo. |
| UNE 21428-1:2017 | Transformadores trifásicos de distribución sumergidos en aceite, 50 Hz, de 25 kVA a 3150 kVA con tensión más elevada para el material hasta 36 kV.<br>Parte 1: Requisitos generales. Complemento nacional. |
| UNE 36094:1997 | Alambres y cordones de acero para armaduras de hormigón pretensado. |

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| UNE 36831:1997 | Armaduras pasivas de acero para hormigón estructural. Corte, doblado y colocación de barras y mallas. Tolerancias. Formas preferentes de armado. |
| UNE 38001:2019 | Clasificación y designación de las aleaciones ligeras. |
| UNE 38002:2016 | Definición y designación de los estados de tratamiento de las aleaciones ligeras. |
| UNE 53394:2018 IN | Plásticos. Código de instalación y manejo de tubos de polietileno (PE) para conducción de agua a presión. Técnicas recomendadas. |
| UNE 56801:2008 | Unidad de hueco de puerta de madera. Terminología, definiciones y clasificación. |
| UNE 56803:2000 | Hojas de puerta. Especificaciones complementarias. |
| UNE 80305:2012 | Cementos blancos. |
| UNE 83951:2008 | Durabilidad del hormigón. Aguas de amasado y aguas agresivas. Toma de muestras. |
| UNE 102042:2014 | Yesos y escayolas de construcción. Otros métodos de ensayo. |
| UNE 103105:1993 | Determinación de la densidad mínima de una arena. |
| UNE 103106:1993 | Determinación de la densidad máxima de una arena por el método del apisonado. |
| UNE 103109:1995 | Método de ensayo para determinar el índice "equivalente de arena" de un suelo. |
| UNE 103201:2019 | Determinación cuantitativa del contenido de sulfatos solubles en agua que hay en un suelo. |
| UNE 103202:2019 | Determinación cualitativa del contenido de sulfatos solubles |

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| | en agua que hay en un suelo. |
| UNE 103204:2019 | Determinación del contenido de materia orgánica oxidable de un suelo por el método del permanganato potásico. |
| UNE 103500:1994 | Geotecnia. Ensayo de compactación. Proctor normal. |
| UNE 103501:1994 | Geotecnia. Ensayo de compactación. Proctor modificado. |
| UNE 103502:1995 | Método de ensayo para determinar en laboratorio el índice C.B.R. de un suelo. |
| UNE 103503:1995 | Determinación "in situ" de la densidad de un suelo por el método de la arena. |
| UNE 103900:2013 | Determinación in situ de la densidad y de la humedad de suelos y materiales granulares por métodos nucleares: pequeñas profundidades. |
| UNE 104281-3-2:1986 | Materiales bituminosos y bituminosos modificados. Emulsiones bituminosas. Métodos de ensayo. Contenido de agua. |
| UNE 104281-3-3:1986 | Materiales bituminosos y bituminosos modificados. Emulsiones bituminosas. Métodos de ensayo. Viscosidad saybolt furol. |

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| UNE 127339:2012 | Propiedades y condiciones de suministro y recepción de las baldosas de hormigón. |
| UNE 127340:2006 | Bordillos prefabricados de hormigón. Especificaciones y métodos de ensayo. Complemento nacional a la Norma UNE-EN 1340. |
| UNE 127916:2020 | Tubos y piezas complementarias de hormigón en masa, de hormigón armado y hormigón con fibra de acero. Complemento nacional a la Norma UNE-EN 1916:2008. |
| UNE 127917:2015 | Pozos de registro y cámaras de inspección de hormigón en masa, de hormigón armado y de hormigón con fibra de acero. Complemento nacional a la Norma UNE-EN 1917. |
| UNE 136029:2019 | Piezas de arcilla cocida para fábrica de albañilería. Ensayo de eflorescencia. |
| UNE 146403:2018 | Determinación de los terrones de arcilla y otras partículas deleznables en los áridos para la fabricación de morteros y hormigones. |
| UNE 211006:2010 | Ensayos previos a la puesta en servicio de sistemas de cables eléctricos de alta tensión en corriente alterna. |
| UNE 318001:2017 | Equipos para riego. Aspersores. Requisitos generales y métodos de ensayo. |

- **Normas UNE-EN**

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| UNE-EN 124-1:2015 | Dispositivos de cubrimiento y de cierre para zonas de circulación utilizadas por peatones y vehículos.<br>Parte 1. Definiciones, clasificación, principios generales de diseño, requisitos de comportamiento y métodos de ensayo. |

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| UNE-EN 124-2:2015 | Dispositivos de cubrimiento y de cierre para zonas de circulación utilizadas por peatones y vehículos.<br>Parte 2: Dispositivos de cubrimiento y de cierre de fundición. |
| UNE-EN 124-3:2015 | Dispositivos de cubrimiento y de cierre para zonas de circulación utilizadas por peatones y vehículos.<br>Parte 3: Dispositivos de cubrimiento y de cierre de acero o aleación de aluminio. |
| UNE-EN 124-4:2015 | Dispositivos de cubrimiento y de cierre para zonas de circulación utilizadas por peatones y vehículos.<br>Parte 4: Dispositivos de cubrimiento y de cierre de hormigón armado. |
| UNE-EN 124-5:2015 | Dispositivos de cubrimiento y de cierre para zonas de circulación utilizadas por peatones y vehículos.<br>Parte 5: Dispositivos de cubrimiento y de cierre de materiales compuestos. |
| UNE-EN 124-6:2015 | Dispositivos de cubrimiento y de cierre para zonas de circulación utilizadas por peatones y vehículos.<br>Parte 6: Dispositivos de cubrimiento y de cierre de polipropileno (PP), polietileno (PE) o poli (cloruro de vinilo) no plastificado (PVC-U). |
| UNE-EN 295-1:2013 | Sistemas de tuberías de gres para saneamiento.<br>Parte 1: Requisitos para tuberías, accesorios y uniones. |
| UNE-EN 295-2:2013 | Sistemas de tuberías de gres para saneamiento.<br>Parte 2: Evaluación de la conformidad y muestreo. |
| UNE-EN 295-3:2012 | Sistemas de tuberías de gres para saneamiento. |

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| | Parte 3: Métodos de ensayo. |
| UNE-EN 295-4:2013 | Sistemas de tuberías de gres para saneamiento.<br>Parte 4: Requisitos para adaptadores, conectores y uniones flexibles. |
| UNE-EN 295-5:2013 | Sistemas de tuberías de gres para saneamiento.<br>Parte 5: Requisitos para tuberías perforadas y sus accesorios. |
| UNE-EN 295-6:2013 | Sistemas de tuberías de gres para saneamiento.<br>Parte 6: Requisitos para los componentes de las bocas de hombre y cámaras de inspección. |
| UNE-EN 295-7:2013 | Sistemas de tuberías de gres para saneamiento.<br>Parte 7: Requisitos para tuberías de gres y juntas para hinca. |
| UNE-EN 459-1:2016 | Cales para la construcción.<br>Parte 1: Definiciones, especificaciones y criterios de conformidad. |
| UNE-EN 459-2:2011 | Cales para la construcción.<br>Parte 2: Métodos de ensayo. |
| UNE-EN 459-3:2016 | Cales para la construcción.<br>Parte 3: Evaluación de la conformidad. |
| UNE-EN 520:2005+A1:2010 | Placas de yeso laminado. Definiciones, especificaciones y métodos de ensayo. |

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| UNE-EN 545:2011 | Tubos, racores y accesorios de fundición dúctil y sus uniones para canalizaciones de agua. Requisitos y métodos de ensayo. |
| UNE-EN 598:2008+A1:2009 | Tuberías, accesorios y piezas especiales de fundición dúctil y sus uniones para aplicaciones de saneamiento. Requisitos y métodos de ensayo. |
| UNE-EN 639:1995 | Prescripciones comunes para tubos de presión de hormigón incluyendo juntas y accesorios. |
| UNE-EN 641:1995 | Tubos de presión de hormigón armado, con camisa de chapa, incluyendo juntas y accesorios. |
| UNE-EN 642:1995 | Tubos de presión de hormigón pretensado, con y sin camisa de chapa, incluyendo juntas, accesorios y prescripciones particulares relativas al acero de pretensar para tubos. |
| UNE-EN 681-1:1996<br>UNE-EN 681-1/A1:1999<br>UNE-EN 681-1/AC:2002<br>UNE-EN 681-1/A2:2002<br>UNE-EN 681-1:1996/A3:2006 | Juntas elastoméricas. Requisitos de los materiales para juntas de estanquidad de tuberías empleadas en canalizaciones de agua y en drenaje.<br>Parte 1: Caucho vulcanizado. |
| UNE-EN 681-2:2001<br>UNE-EN 681-2/A1:2002<br>UNE-EN 681-2:2001/A2:2006 | Juntas elastoméricas. Requisitos de los materiales para juntas de estanquidad de tuberías empleadas en canalizaciones de agua y en drenaje.<br>Parte 2: Elastómeros termoplásticos. |
| UNE-EN 681-4:2001<br>UNE-EN 681-4/A1:2002<br>UNE-EN 681-4:2001/A2:2006 | Juntas elastoméricas. Requisitos de los materiales para juntas de estanquidad de tuberías empleadas en canalizaciones de agua y en drenaje.<br>Parte 4: Elementos de estanqueidad de poliuretano |

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| | moldeado. |
| UNE-EN 736-1:2019 | Válvulas. Terminología.<br>Parte 1: Definición de los tipos de válvulas. |
| UNE-EN 746-2:2011 | Equipos de tratamiento térmico industrial.<br>Parte 2: Requisitos de seguridad para la combustión y los sistemas de manejo de combustibles. |
| UNE-EN 771-3:2011+A1:2016 | Especificaciones de piezas para fábrica de albañilería.<br>Parte 3: Bloques de hormigón (áridos densos y ligeros). |
| UNE-EN 772-1:2011+A1:2016 | Métodos de ensayo de piezas para fábrica de albañilería.<br>Parte 1: Determinación de la resistencia a compresión. |
| UNE-EN 772-11:2011 | Métodos de ensayo de piezas para fábrica de albañilería.<br>Parte 11: Determinación de la absorción de agua por capilaridad de piezas para fábrica de albañilería, de hormigón, hormigón celular curado en autoclave, piedra natural y artificial, y de la tasa de absorción de agua inicial de las piezas de arcilla cocida para fábrica de albañilería. |
| UNE-EN 772-22:2021 | Métodos de ensayo de piezas para fábrica de albañilería.<br>Parte 22: Determinación de la resistencia al hielo/deshielo de las piezas para fábrica de albañilería de arcilla. |
| UNE-EN 805:2000 | Abastecimiento de agua. Especificaciones para redes exteriores a los edificios y sus componentes. |
| UNE-EN 809:1999+A1:2010 | Bombas y grupos motobombas para líquidos. Requisitos comunes de seguridad. |
| UNE-EN 933-1:2012 | Ensayos para determinar las propiedades geométricas de los áridos.<br>Parte 1: Determinación de la granulometría de las |

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| | partículas. Método del tamizado. |
| UNE-EN 933-5:1999/A1:2005 | Ensayos para determinar las propiedades geométricas de los áridos.<br>Parte 5: Determinación del porcentaje de caras de fractura de las partículas de árido grueso. |
| UNE-EN 951:1999 | Hojas de puerta. Método de medida de la altura, anchura, espesor y escuadría. |
| UNE-EN 952:2000 | Hojas de puerta. Planitud general y local. Método de medida. |
| UNE-EN 993-1:2018 | Métodos de ensayo para productos refractarios conformados densos.<br>Parte 1: Determinación de la densidad aparente, de la porosidad abierta y de la porosidad total. (Ratificada por la Asociación Española de Normalización en enero de 2019). |
| UNE-EN 993-5:2018 | Métodos de ensayo para productos refractarios conformados densos.<br>Parte 5: Determinación de la resistencia a la compresión en frío. (Ratificada por la Asociación Española de Normalización en enero de 2019). |
| UNE-EN 998-1:2018 | Especificaciones de los morteros para albañilería.<br>Parte 1: Morteros para revoco y enlucido. |
| UNE-EN 1074-1:2001 | Válvulas para el suministro de agua. Requisitos de aptitud al uso y ensayos de verificación apropiados.<br>Parte 1: Requisitos generales. |
| UNE-EN 1074-2:2001 | Válvulas para el suministro de agua. Requisitos de aptitud al uso y ensayos de verificación apropiados. |

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| | Parte 2: Válvulas de seccionamiento. |
| UNE-EN 1074-3:2001 | Válvulas para el suministro de agua. Requisitos de aptitud al uso y ensayos de verificación.<br>Parte 3: Válvulas antirretorno. |
| UNE-EN 1074-4:2001 | Válvulas para el suministro de agua. Requisitos de aptitud al uso y ensayos de verificación.<br>Parte 4: Purgadoras y ventosas. |
| UNE-EN 1074-5:2001 | Válvulas para el suministro de agua. Requisitos de aptitud al uso y ensayos de verificación apropiados.<br>Parte 5: Válvulas de control. |
| UNE-EN 1092-1:2019 | Bridas y sus uniones. Bridas circulares para tuberías, grifería, accesorios y piezas especiales, designación PN.<br>Parte 1: Bridas de acero. |
| UNE-EN 1097-2:2010 | Ensayos para determinar las propiedades mecánicas y físicas de los áridos.<br>Parte 2: Métodos para la determinación de la resistencia a la fragmentación. |
| UNE-EN 1097-7:2009 | Ensayos para determinar las propiedades mecánicas y físicas de los áridos.<br>Parte 7: Determinación de la densidad real del filler. Método del picnómetro. |
| UNE-EN 1097-8:2010<br>UNE-EN 1097-8:2010/1M:2012 | Ensayos para determinar las propiedades mecánicas y físicas de los áridos.<br>Parte 8: Determinación del coeficiente de pulimento acelerado. |
| UNE-EN 1121:2000 | Puertas. Comportamiento entre dos climas diferentes. |

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| | Método de ensayo. |
| UNE-EN 1338:2004<br>UNE-EN 1338:2004/AC:2006 | Adoquines de hormigón. Especificaciones y métodos de ensayo. |
| UNE-EN 1339:2004<br>UNE-EN 1339:2004/AC:2006 | Baldosas de hormigón. Especificaciones y métodos de ensayo. |
| UNE-EN 1340:2004<br>UNE-EN 1340:2004 ERRATUM:2007 | Bordillos prefabricados de hormigón. Especificaciones y métodos de ensayo. |
| UNE-EN 1341:2013 | Baldosas de piedra natural para uso como pavimento exterior. Requisitos y métodos de ensayo. |
| UNE-EN 1342:2013 | Adoquines de piedra natural para uso como pavimento exterior. Requisitos y métodos de ensayo. |
| UNE-EN 1343:2013 | Bordillos de piedra natural para uso como pavimento exterior. Requisitos y métodos de ensayo. |
| UNE-EN 1363-2:2000 | Ensayos de resistencia al fuego.<br>Parte 2: Procedimientos alternativos y adicionales. |
| UNE-EN 1412:2017 | Cobre y aleaciones de cobre. Sistema europeo de designación numérica. |
| UNE-EN 1536:2011+A1:2016 | Ejecución de trabajos geotécnicos especiales. Pilotes perforados. |
| UNE-EN 1538:2011+A1:2016 | Ejecución de trabajos geotécnicos especiales. Muros-pantalla. |
| UNE-EN 1563:2019 | Fundición. Fundición de grafito esferoidal. |
| UNE-EN 1610:2016 | Construcción y ensayos de desagües y redes de alcantarillado. |

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| UNE-EN 1796:2014 | Sistemas de canalización en materiales plásticos para suministro de agua con o sin presión. Plásticos termoestables reforzados con fibra de vidrio (PRFV) basados en resina de poliéster insaturada (UP). |
| UNE-EN 1916:2008 | Tubos y piezas complementarias de hormigón en masa, hormigón armado y hormigón con fibra de acero. |
| UNE-EN 1917:2008 | Pozos de registro y cámaras de inspección de hormigón en masa, hormigón armado y hormigón con fibras de acero. |
| UNE-EN 1925:1999 | Métodos de ensayo para piedra natural. Determinación del coeficiente de absorción de agua por capilaridad. |
| UNE-EN 1926:2007 | Métodos de ensayo para la piedra natural. Determinación de la resistencia a la compresión uniaxial. |
| UNE-EN 1982:2018 | Cobre y aleaciones de cobre. Lingotes y piezas fundidas. |
| UNE-EN 10020:2001 | Definición y clasificación de los tipos de acero. |
| UNE-EN 10025-1:2006 | Productos laminados en caliente de aceros para estructuras.<br>Parte 1: Condiciones técnicas generales de suministro. |
| UNE-EN 10025-2:2020 | Productos laminados en caliente de aceros para estructuras.<br>Parte 2: Condiciones técnicas de suministro de los aceros estructurales no aleados. |
| UNE-EN 10028-1:2017 | Productos planos de acero para aplicaciones a presión.<br>Parte 1: Prescripciones generales. |
| UNE-EN 10028-2:2017 | Productos planos de acero para aplicaciones a presión.<br>Parte 2: Aceros no aleados y aleados con propiedades especificadas a altas temperaturas. |

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| UNE-EN 10080:2006 | Acero para el armado del hormigón. Acero soldable para armaduras de hormigón armado. Generalidades. |
| UNE-EN 10088-1:2015 | Aceros inoxidables.<br>Parte 1: Relación de aceros inoxidables. |
| UNE-EN 10210-1:2007 | Perfiles huecos para construcción, acabados en caliente, de acero no aleado y de grano fino.<br>Parte 1: Condiciones técnicas de suministro. |
| UNE-EN 10210-2:2020 | Perfiles huecos de acero acabados en caliente para construcción.<br>Parte 2: Tolerancias, dimensiones y características del perfil. |
| UNE-EN 10217-7:2015 | Tubos de acero soldados para usos a presión. Condiciones técnicas de suministro.<br>Parte 7: Tubos de acero inoxidable. |
| UNE-EN 10219-1:2007 | Perfiles huecos para construcción soldados, conformados en frío, de acero no aleado y de grano fino.<br>Parte 1: Condiciones técnicas de suministro. |
| UNE-EN 10219-2:2019 | Perfiles huecos de acero soldados conformados en frío para construcción.<br>Parte 2: Tolerancias, dimensiones y características del perfil. |
| UNE-EN 10224:2003 | Tubos y accesorios en acero no aleado para el transporte de líquidos acuosos, incluido agua para consumo humano. Condiciones técnicas de suministro. |
| UNE-EN 10311:2006 | Uniones para la conexión de tubos de acero y sus accesorios para la conducción de agua y otros líquidos acuosos. |
| UNE-EN 12165:2017 | Cobre y aleaciones de cobre. Semiproductos de forja. |

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| UNE-EN 12201-1:2012 | Sistemas de canalización en materiales plásticos para conducción de agua y saneamiento con presión. Polietileno (PE).<br>Parte 1: Generalidades. |
| UNE-EN 12201-2:2012+A1:2020 | Sistemas de canalización en materiales plásticos para conducción de agua y saneamiento con presión. Polietileno (PE).<br>Parte 2: Tubos. |
| UNE-EN 12350-2:2020 | Ensayos de hormigón fresco.<br>Parte 2: Ensayo de asentamiento. |
| UNE-EN 12371:2011 | Métodos de ensayo para piedra natural. Determinación de la resistencia a la heladicidad. |
| UNE-EN 12372:2007 | Métodos de ensayo para piedra natural. Determinación de la resistencia a la flexión bajo carga concentrada. |
| UNE-EN 12390-1:2013 | Ensayos de hormigón endurecido.<br>Parte 1: Forma, dimensiones y otras características de las probetas y moldes. |
| UNE-EN 12390-3:2020 | Ensayos de hormigón endurecido.<br>Parte 3: Determinación de la resistencia a compresión de probetas. |
| UNE-EN 12407:2020 | Métodos de ensayo para piedra natural. Estudio petrográfico. |
| UNE-EN 12592:2015 | Betunes y ligantes bituminosos. Determinación de la solubilidad. |

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| UNE-EN 12608-1:2016 | Perfiles de poli (cloruro de vinilo) no plastificado (PVC-U) para la fabricación de ventanas y de puertas. Clasificación, requisitos y métodos de ensayo.<br>Parte 1: Perfiles de PVC-U sin revestimiento con superficies de colores claros. |
| UNE-EN 12697-34:2013 | Mezclas bituminosas. Métodos de ensayo para mezclas bituminosas en caliente.<br>Parte 34: Ensayo Marshall. |
| UNE-EN 12699:2016 | Ejecución de trabajos geotécnicos especiales. Pilotes de desplazamiento. |
| UNE-EN 12794:2006+A1:2008 | Productos prefabricados de hormigón. Pilotes de cimentación. |
| UNE-EN 12842:2013 | Racores de fundición dúctil para sistemas de tuberías de PVC-U o PE. Requisitos y métodos de ensayo. |
| UNE-EN 12849:2009 | Betunes y ligantes bituminosos. Determinación del poder de penetración de las emulsiones bituminosas. |
| UNE-EN 13043:2003 | Áridos para mezclas bituminosas y tratamientos superficiales de carreteras, aeropuertos y otras zonas pavimentadas. |
| UNE-EN 13101:2003 | Pates para pozos de registro enterrados. Requisitos, marcado, ensayos y evaluación de conformidad. |
| UNE-EN 13286-2:2011 | Mezclas de áridos sin ligante y con conglomerante hidráulico. Parte 2: Métodos de ensayo para la determinación en laboratorio de la densidad de referencia y el contenido en agua. Compactación Proctor. |
| UNE-EN 13286-41:2003 | Mezclas de áridos sin ligante y con conglomerante |

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| | hidráulico. Parte 41: Método de ensayo para la determinación de la resistencia a la compresión de las mezclas de áridos con conglomerante hidráulico. |
| UNE-EN 13279-1:2009 | Yesos de construcción y conglomerantes a base de yeso para la construcción.<br>Parte 1: Definiciones y especificaciones. |
| UNE-EN 13279-2:2014 | Yesos de construcción y conglomerantes a base de yeso para la construcción. Parte 2: Métodos de ensayo. |
| UNE-EN 13331-1:2002 | Sistemas de entibación de zanjas.<br>Parte 1. Especificaciones de producto. |
| UNE-EN 13331-2:2002 | Sistemas de entibación de zanjas.<br>Parte 2: Evaluación por cálculo o por ensayo. |
| UNE-EN 13369:2018 | Reglas comunes para productos prefabricados de hormigón. |
| UNE-EN 13476-1:2018 | Sistemas de canalización en materiales plásticos para evacuación y saneamiento enterrado sin presión. Sistemas de canalización de pared estructurada de poli (cloruro de vinilo) no plastificado (PVC-U), polipropileno (PP) y polietileno (PE).<br>Parte 1: Requisitos generales y características de funcionamiento. |
| UNE-EN 13589:2019 | Betunes y ligantes bituminosos. Determinación de las propiedades de tracción de betunes modificados por el método de fuerza-ductilidad. |
| UNE-EN 13598-1:2011 | Sistemas de canalización en materiales plásticos para saneamiento y evacuación enterrados sin presión. Poli (cloruro de vinilo) no plastificado (PVC-U), polipropileno |

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| | (PP) y polietileno (PE).<br>Parte 1: Especificaciones para los accesorios auxiliares incluyendo las arquetas de inspección poco profundas. |
| UNE-EN 13706-1:2003 | Materiales compuestos de plástico reforzado. Especificaciones para perfiles pultruidos.<br>Parte 1: Designación. |
| UNE-EN 13706-2:2003 | Materiales compuestos de plástico reforzado. Especificaciones para perfiles pultruidos.<br>Parte 2: Métodos de ensayo y requisitos generales. |
| UNE-EN 13706-3:2003 | Materiales compuestos de plástico reforzado. Especificaciones para perfiles pultruidos.<br>Parte 3: Requisitos específicos. |
| UNE-EN 13748-1:2005 | Baldosas de terrazo.<br>Parte 1: Baldosas de terrazo para uso interior. |
| UNE-EN 14157:2018 | Métodos de ensayo para piedra natural. Determinación de la resistencia a la abrasión. |
| UNE-EN 14199:2019 | Ejecución de trabajos geotécnicos especiales. Micropilotes. |
| UNE-EN 14231:2004 | Métodos de ensayo para piedra natural. Determinación de la resistencia al deslizamiento mediante el péndulo de fricción. |
| UNE-EN 14246:2007 | Placas de escayola para techos suspendidos. Definiciones, especificaciones y métodos de ensayo. |
| UNE-EN 14364:2015 | Sistemas de canalización en materiales plásticos para evacuación y saneamiento con o sin presión. Plásticos termoendurecibles reforzados con vidrio (PRFV) a base de resina de poliéster insaturado (UP). Especificaciones para |

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| | tuberías, accesorios y uniones. |
| UNE-EN 14396:2004 | Escaleras fijas para pozos de registro. |
| UNE-EN 14411:2016 | Baldosas cerámicas. Definiciones, clasificación, características, evaluación y verificación de la constancia de las prestaciones, y marcado. |
| UNE-EN 14844:2007+A2:2012 | Productos prefabricados de hormigón. Marcos. |
| UNE-EN 15189:2008 | Tuberías, accesorios y piezas especiales de fundición dúctil. Recubrimientos exteriores de poliuretano para tuberías. Requisitos y métodos de ensayo. |
| UNE-EN 17176-1:2019 | Sistemas de canalización en materiales plásticos para suministro de agua, riego, saneamiento y alcantarillado, enterrado o aéreo, con presión. Poli(cloruro de vinilo) no plastificado orientado (PVC-O).<br>Parte 1: Generalidades. |
| UNE-EN 17176-2:2019 | Sistemas de canalización en materiales plásticos para suministro de agua, riego, saneamiento y alcantarillado, enterrado o aéreo, con presión. Poli(cloruro de vinilo) no plastificado orientado (PVC-O).<br>Parte 2: Tubos. |
| UNE-CEN/TS 17176-3:2019 | Sistemas de canalización en materiales plásticos para suministro de agua, riego, saneamiento y alcantarillado, enterrado o aéreo, con presión. Poli(cloruro de vinilo) no plastificado orientado (PVC-O).<br>Parte 3: Accesorios. |
| UNE-EN 17176-5:2019 | Sistemas de canalización en materiales plásticos para suministro de agua, riego, saneamiento y alcantarillado, |

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| | enterrado o aéreo, con presión. Poli(cloruro de vinilo) no plastificado orientado (PVC-O).<br>Parte 5: Aptitud al uso del sistema. |
| UNE-CEN/TS 17176-7:2020 (Ratificada) | Sistemas de canalización en materiales plásticos para suministro de agua, riego, saneamiento y alcantarillado, enterrado o aéreo, con presión. Poli(cloruro de vinilo) no plastificado orientado (PVC-O).<br>Parte 7: Evaluación de la conformidad. (Ratificada por AENOR en septiembre de 2020). |
| UNE-EN 50575:2015 | Cables de energía, control y comunicación. Cables para aplicaciones generales en construcciones sujetos a requisitos de reacción al fuego. |
| UNE-EN 60034-1:2011 | Máquinas eléctricas rotativas.<br>Parte 1: Características asignadas y características de funcionamiento. |
| UNE-EN 60034-14:2004 +A1:2007 | Máquinas eléctricas rotativas.<br>Parte 14: Vibraciones mecánicas de determinadas máquinas con altura de eje igual o superior a 56 mm. Medición, evaluación y límites de la intensidad de vibración. (IEC 60034-14:2003/A1:2007). |
| UNE-EN 60034-30-1:2014 | Máquinas eléctricas rotativas.<br>Parte 30-1: Clases de rendimiento para los motores trifásicos de inducción de jaula de velocidad única (código IE). (Ratificada por AENOR en agosto de 2014). |
| UNE-EN 60076 | Transformadores de potencia. |
| UNE-EN 60931-1:1997 | Condensadores de potencia no autorregenerables a instalar en paralelo en redes de corriente alterna de tensión |

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| | nominal inferior o igual a 1 kV.<br>Parte 1: Generalidades. Características de funcionamiento, ensayos y valores nominales. Requisitos de seguridad. Guía de instalación y explotación. |
| UNE-EN 60931-2:1997 | Condensadores de potencia no autorregenerables a instalar en paralelo en redes de corriente alterna de tensión nominal inferior o igual a 1 kV.<br>Parte 2: Ensayos de envejecimientoy destrucción. |
| UNE-EN 61000-6-1:2007 | Compatibilidad electromagnética (CEM).<br>Parte 6-1: Normas genéricas. Inmunidad en entornos residenciales, comerciales y de industria ligera. (IEC 61000-6-1:2005). |
| UNE-EN 61439-1:2012 | Conjuntos de aparamenta de baja tensión.<br>Parte 1: Reglas Generales. |
| UNE-EN 62271-200:2012 | Aparamenta de alta tensión. Parte 200: Aparamenta bajo envolvente metálica de corriente alterna para tensiones asignadas superiores a 1 kV e inferiores o iguales a 52 kV. |

- **Normas UNE-EN ISO**

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| UNE-EN ISO 527-1:2020 | Plásticos. Determinación de las propiedades en tracción.<br>Parte 1: Principios generales. (ISO 527-1:2019). |
| UNE-EN ISO 898-1:2015 | Características mecánicas de los elementos de fijación de acero al carbono y acero aleado.<br>Parte 1: Pernos, tornillos y bulones con clases de calidad especificadas. Rosca de paso grueso y rosca de paso fino (ISO 898-1:2013). |
| UNE-EN ISO 1183-2:2019 | Plásticos. Métodos para determinar la densidad de plásticos |

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| | no celulares.<br>Parte 2: Método de la columna por gradiente de densidades (ISO 1183-2:2019). |
| UNE-EN ISO 1461:2010 | Recubrimientos de galvanización en caliente sobre piezas de hierro y acero. Especificaciones y métodos de ensayo. (ISO 1461:2009). |
| UNE-EN ISO 2409:2013 | Pinturas y barnices. Ensayo de corte con enrejado. (ISO 2409:2013). |
| UNE-EN ISO 3452-1:2013 | Ensayos no destructivos. Ensayo por líquidos penetrantes.<br>Parte 1: Principios generales. (ISO 3452-1:2013, versión corregida 2014-05-01). |
| UNE-EN ISO 3452-2:2014 | Ensayos no destructivos. Ensayo por líquidos penetrantes.<br>Parte 2: Ensayo de productos penetrantes. (ISO 3452-2:2013). |
| UNE-EN ISO 4892-2:2014 | Plásticos. Métodos de exposición a fuentes luminosas de laboratorio.<br>Parte 2: Lámparas de arco de xenón. (ISO 4892-2:2013). |
| UNE-EN ISO 7010:2020 | Símbolos gráficos. Colores y señales de seguridad. Señales de seguridad registradas. (ISO 7010:2019, Versión corregida 2020-06) (Ratificada por AENOR en mayo de 2020). |
| UNE-EN ISO 8501-1:2008 | Preparación de substratos de acero previa a la aplicación de pinturas y productos relacionados. Evaluación visual de la limpieza de las superficies.<br>Parte 1: Grados de óxido y de preparación de substratos de acero no pintados después de eliminar totalmente los recubrimientos anteriores. (ISO 8501-1:2007). |
| UNE-EN ISO 9606-1:2017 | Cualificación de soldadores. Soldeo por fusión. |

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| | Parte 1: Aceros (ISO 9606-1:2012 incluido Cor 1:2012 y Cor 2:2013). |
| UNE-EN ISO 9906:2012 | Bombas rotodinámicas. Ensayos de rendimiento hidráulico de aceptación. Niveles 1, 2 y 3 (ISO 9906:2012) (Ratificada por AENOR en junio de 2012). |
| UNE-EN ISO 10077-1:2020 | Comportamiento térmico de ventanas, puertas y persianas. Cálculo de la transmitancia térmica.<br>Parte 1: Generalidades (ISO 10077-1:2017, Versión corregida 2020-02). |
| UNE-EN ISO 10077-2:2020 | Comportamiento térmico de ventanas, puertas y persianas. Cálculo de la transmitancia térmica.<br>Parte 2: Método numérico para los marcos (ISO 10077-2:2017). |
| UNE-EN ISO 10675-1:2017 | Ensayo no destructivo de uniones soldadas. Niveles de aceptación para los ensayos radiográficos.<br>Parte 1: Acero, níquel, titanio y sus aleaciones (ISO 10675-1:2016). |
| UNE-EN ISO 10684:2006 | Elementos de fijación. Recubrimientos por galvanización en caliente (ISO 10684:2004) |
| UNE-EN ISO 12100:2012 | Seguridad de las máquinas. Principios generales para el diseño. Evaluación del riesgo y reducción del riesgo (ISO 12100:2010). |
| UNE-EN ISO 12944-5:2020 | Pinturas y barnices. Protección de estructuras de acero frente a la corrosión mediante sistemas de pintura protectores.<br>Parte 5: Sistemas de pintura protectores. (ISO 12944-5:2019). |

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| UNE-EN ISO 15607:2020 | Especificación y cualificación de los procedimientos de soldeo para los materiales metálicos. Reglas generales (ISO 15607:2019). |
| UNE-EN ISO 17892-1:2015 | Investigación y ensayos geotécnicos. Ensayos de laboratorio de suelos.<br>Parte 1: Determinación de la humedad (ISO 17892-1:2014). |
| UNE-EN ISO 17892-4:2019 | Investigación y ensayos geotécnicos. Ensayos de laboratorio de suelos. Parte 4: Determinación de la distribución granulométrica. |
| UNE-EN ISO 17892-7:2019 | Investigación y ensayos geotécnicos. Ensayos de laboratorio de suelos. Parte 7: Ensayo de compresión no confinada. |
| UNE-EN ISO 17892-12:2019 | Investigación y ensayos geotécnicos. Ensayos de laboratorio de suelos. Parte 12: Determinación del límite líquido y del límite plástico. |

- **Normas UNE-ISO**

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| UNE-ISO 8026:2012 | Materiales de riego. Difusores. Especificaciones y métodos de ensayo. |

- Normas ISO

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| ISO 161-1:2018 | Thermoplastics pipes for the conveyance of fluids. Nominal outside diameters and nominal pressures.<br>Part 1: Metric series. |
| ISO 2531:2009 | Ductile iron pipes, fittings, accessories and their joints for |

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| | water applications. |
| ISO 4200:1991 | Plain end steel tubes, welded and seamless - General tables of dimensions and masses per unit length. |
| ISO 8180:2020 | Ductile iron pipelines - Polyethylene sleeving for site application. |

- Otras normas técnicas

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| AWWA C210 | Liquid-Epoxy Coatings and Linings for Steel Water Pipe and Fittings. |
| AWWA C222 | Polyurethane Coatings and Linings for Steel Water Pipe and Fittings. |
| AWWA M45 | Fiberglass pipe design. |
| DIN 30670 | Polyethylene coatings on steel pipes and fittings. Requirements and testing. |
| BS 8007 | Design of concrete structures for retaining aqueous liquids. |

# CAPÍTULO 4 OBRA CIVIL

## SUBCAPÍTULO 4.1 Movimientos de tierras y drenajes

### Artículo 4.1.1 Excavaciones de explanación, vaciado y emplazamiento de obras (excavaciones a cielo abierto)

Consiste en el conjunto de operaciones para excavar y nivelar las zonas donde han de asentarse las obras, así como las zonas de préstamos.

#### i) Ejecución

La ejecución de este tipo de excavación deberá ajustarse a las prescripciones exigidas en el artículo 320.3 del Pliego de Prescripciones Técnicas Generales para Obras de Carreteras y Puentes (PG-3). Se ajustarán a las dimensiones y perfiles que constan en el Proyecto, así como a los datos fijados en el replanteo y en su defecto a las normas que dicte la Dirección de Obra.

#### ii) Control de calidad

Las obras de excavación se ajustarán a las alineaciones, pendientes y dimensiones indicadas en los planos de Proyecto, con las modificaciones debidas a los excesos inevitables autorizados y deberán refinarse hasta conseguir una diferencia inferior a diez centímetros (10 cm) respecto de las superficies teóricas. La superficie deberá quedar perfectamente saneada.

Las sobreexcavaciones no autorizadas deberán rellenarse de acuerdo con las especificaciones establecidas por la Dirección de Obra.

En ningún caso se admitirán tolerancias por defecto en las excavaciones para la explanación y emplazamiento de las obras.

#### iii) Medición y abono

En el caso de explanaciones, la excavación se abonará por metros cúbicos ($m^3$) medidos sobre perfil.

En el precio se incluyen los procesos de formación de los posibles caballeros y todas las operaciones necesarias, excepto agotamientos, y costos asociados para la completa ejecución de la unidad.

La Dirección de Obra podrá obligar al Adjudicatario a rellenar las sobreexcavaciones realizadas, con las especificaciones que aquél estime oportunas, no siendo esta operación de abono.

Todas las excavaciones se medirán una vez realizadas y antes de que sobre ellas se efectúe ningún tipo de relleno. En el caso de que el Adjudicatario cerrase la excavación antes de

conformada la medición se entenderá que se aviene a lo que unilateralmente determine la Dirección de Obra.

Las excavaciones a cielo abierto se abonarán, en función los medios de ejecución empleados y del tipo de terreno, aplicando el precio que corresponda de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

En dichos precios no se considerará incluida la carga, el transporte a lugar de empleo, centro de clasificación y tratamiento o vertedero autorizado, la descarga, ni el canon de gestión o vertido, los cuales se medirán y abonarán mediante las unidades que figuren en el capítulo del Presupuesto correspondiente a la gestión de residuos de construcción y demolición.

Tampoco se considera incluido en el precio, el refino, nivelación y apisonado de explanada, aspectos que se medirán por metro cuadrado ($m^2$) de explanada y se abonarán al precio que corresponda de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

### Artículo 4.1.2 Excavaciones en zanjas y pozos

#### i) Ejecución

La ejecución de excavaciones en zanjas y pozos se ajustará a las prescripciones establecidas en el artículo 321.3 del Pliego de Prescripciones Técnicas Generales para Obras de Carreteras y Puentes (PG-3).

La excavación se hará de manera que se minimicen las líneas quebradas, procurando tramos de pendiente uniforme de la mayor longitud posible. La pendiente de la zanja será, la indicada en el Proyecto.

El fondo de las zanjas deberá tener una capacidad portante superior a cinco Newton por centímetro cuadrado (5 $N/cm^2$). En caso contrario, la Dirección de Obra podrá solicitar la mejora del terreno mediante técnicas de sustitución o modificación. Para la sustitución, se procederá a retirar el material inadecuado y a la colocación de material seleccionado, como arena, grava o zahorra, de tamaño máximo treinta milímetros (30 mm).

Para la modificación o consolidación del terreno se añadirá material seleccionado al suelo original, tales como zahorras, arenas y otros materiales inertes con un tamaño máximo de árido de treinta milímetros (30 mm) y se procederá a su compactación.

El Adjudicatario deberá proteger en su caso las paredes de las zanjas mediante las entibaciones y acodamientos que garanticen su permanencia inalterable hasta el relleno total de la excavación o pozo, siendo de su plena responsabilidad la retirada de los desprendimientos que pudieran originarse y los rellenos consiguientes.

Las excavaciones se ejecutarán ajustándose a las dimensiones y perfilado que consten en el Proyecto o que indique la Dirección de Obra. Los sobreanchos de excavación necesarios para la ejecución de la obra deberán estar contemplados en el Proyecto o, en su defecto, deberán ser aprobados, en cada caso, por la Dirección de Obra.

Los productos de excavación aprovechables para el relleno posterior de la excavación se depositarán en caballeros situados a un solo lado de la zanja, dejando una banqueta de ancho igual o superior a un metro y medio (1,5 m).

No se procederá al relleno de zanjas o excavaciones, sin el previo reconocimiento de las mismas y la autorización de la Dirección de Obra.

### ii) Control de calidad

Las zanjas y pozos terminados tendrán la forma y dimensiones exigidas en los planos del Proyecto, con las modificaciones debidas a los excesos inevitables autorizados, y deberán refinarse hasta conseguir una diferencia inferior a cinco centímetros (5 cm) respecto de las superficies teóricas.

Las sobreexcavaciones no autorizadas deberán rellenarse de acuerdo con las especificaciones definidas por la Dirección de Obra.

### iii) Medición y abono

La excavación en zanjas o pozos se abonará por metros cúbicos ($m^3$) medidos sobre perfil. Se abonarán los excesos autorizados e inevitables.

No serán de abono los excesos de excavación no autorizados, ni el relleno necesario para reconstruir la sección tipo teórica, por defectos imputables al Adjudicatario, ni las excavaciones y movimientos de tierra considerados en otras unidades de obra.

Las excavaciones en zanja se abonarán, en función de los medios empleados y del tipo de terreno, aplicando el precio que corresponda de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

Las excavaciones en pozo se abonarán, en función de los medios empleados y del tipo de terreno, aplicando el precio que corresponda de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

En estos precios no se considerará incluida la carga, el transporte a lugar de empleo, centro de clasificación y tratamiento o vertedero autorizado, la descarga, ni el canon de gestión o vertido los cuales se medirán y abonarán mediante las unidades que figuren en el capítulo del Presupuesto correspondiente a la gestión de residuos de construcción y demolición.

Igualmente, en el precio no se consideran incluidos el refino, la nivelación, apisonado, protección y estabilización de taludes, las entibaciones, los agotamientos necesarios, ni la compactación del fondo de la zanja. Estos aspectos se medirán por metro cuadrado ($m^2$) de superficie y se abonarán mediante la aplicación del precio correspondiente de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

El empleo de maquinaria zanjadora con la autorización de la Dirección de Obra y cuyo mecanismo activo de lugar a una anchura de zanja superior a la proyectada, si bien no dará

lugar a sanción por exceso de excavación, tampoco supondrá incremento de medición a favor del Adjudicatario por el mayor volumen excavado ni por el subsiguiente relleno.

Los excesos no justificados de anchura de la excavación en los que están incluidos los desprendimientos que pudieran producirse y su relleno, sobre las medidas fijadas por la Dirección de Obra, no supondrá en ningún caso un incremento de medición a favor del Adjudicatario sin perjuicio de la sanción en que ésta pueda haber incurrido por desobediencia a las órdenes superiores.

### Artículo 4.1.3 Entibaciones

#### i) Ejecución

En aquellos casos en los que por razones de seguridad se considere necesaria la entibación a juicio de la Dirección de Obra, o en bien en aquellos propuestos por el Adjudicatario y aceptados por la Dirección de Obra, las paredes de las zanjas se deberán proteger en su caso mediante las entibaciones y acodalamientos que garanticen su permanencia inalterable hasta el total relleno de la excavación. La entibación se realizará conforme a las recomendaciones que figuren en el Anejo Geotécnico.

El diseño, dimensionamiento y cálculo de la entibación será responsabilidad del Adjudicatario, quién deberá presentar los planos y cálculos justificativos de la misma. En cualquier caso, la resistencia del sistema de entibación deberá ser de al menos treinta kilo Newton por metro cuadrado (30 kN/$m^2$).

Las entibaciones y apeos deberán ser ejecutados por personal especializado (entibadores), no admitiéndose, en ningún caso, salvo en las ayudas al mismo, otro personal no clasificado como tal. Asimismo, el sistema de entibación será conforme con las Normas UNE-EN 13331 “Sistemas de entibación de zanjas”, partes 1 y 2.

Será de rigurosa aplicación lo establecido en la vigente legislación sobre seguridad y salud del trabajo relacionado con el contenido del presente artículo y muy especialmente en lo que se refiere a la vigilancia diaria y permanente a cargo del personal especializado, del estado de las entibaciones y apeos, exigiéndose particularmente la constante atención de los elementos de sostenimiento y la unión del travesaño al panel, a fin de que, en ningún caso, quede mermada su efectividad en ningún punto de la zona protegida.

#### ii) Medición y abono

Las entibaciones se medirán por metros cuadrados ($m^2$) de superficie entibada.

La superficie entibada a efectos de medición será la realmente realizada. Si entre dos paneles entibados existe una distancia inferior a medio metro, se considerará dicha superficie como realmente entibada.

El abono de las correspondientes unidades se realizará mediante la aplicación, en función del tipo de entibación y del material empleado, incluso desentibado, del precio que corresponda de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II

### Artículo 4.1.4 Transporte a destino final

#### i) Ejecución

Los productos resultantes de los movimientos de tierra (RCD Nivel I) que no sea posible reutilizar en la ejecución de la propia obra se transportarán a otra obra, cantera, centro de clasificación y tratamiento o vertedero autorizado.

Los productos resultantes de construcción o demolición (RCD Nivel II) se transportarán, dependiendo de su naturaleza a:

- Naturaleza pétrea: cantera, centro de clasificación y tratamiento o vertedero autorizado.
- Naturaleza no pétrea: centro de clasificación y tratamiento o vertedero.

El centro de clasificación y tratamiento o vertedero autorizado estarán localizados lo más próximo posible a la zona de actuación.

#### ii) Medición y abono

El transporte a otra obra, cantera, centro de clasificación y tratamiento o vertedero autorizado de estos productos se medirá por metros cúbicos ($m^3$) de material transportado medido sobre perfil y se abonará mediante la aplicación del precio que corresponda, de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

En dicho precio se considera incluida la carga y la descarga, pero no el canon de vertido, que se medirá y abonará mediante unidad independiente.

En ningún caso se considerará factor de esponjamiento salvo en aquellos que existan dificultades de medición, en cuyo caso la Dirección de Obra determinará la conveniencia o no de aplicación y el valor del mismo.

### Artículo 4.1.5 Camas de apoyo

#### i) Materiales

Las camas de apoyo serán de material granular o de hormigón.

El material granular a emplear como cama de apoyo será no plástico, exento de materias orgánicas y de tamaño máximo veinticinco milímetros (25 mm), pudiendo utilizarse arenas

gruesas o gravas rodadas. No podrán contener más del cero con tres por ciento (0,3 %) de sulfato.

El espesor mínimo será de quince centímetros (15 cm) para asegurar el perfecto asiento de la tubería.

En el caso de emplear camas de hormigón, el material empleado deberá cumplir las siguientes especificaciones:

- Espesor bajo la generatriz inferior del tubo de quince centímetros (15 cm).
- Resistencia característica no inferior a veinte kilos Newton por metro cuadrado (20 $kN/m^2$).
- Tamaño máximo del árido no mayor de la cuarta parte del espesor de la cama bajo el tubo.

Para la elección del tipo de cama de apoyo se tendrán en cuenta aspectos tales como el tipo de tubo y sus dimensiones, la clase de uniones, la naturaleza del terreno, etc.

### ii) Ejecución

Las camas granulares se realizarán en dos etapas. En la primera parte se ejecutará la parte inferior de la cama, con superficie plana, sobre la que se colocan los tubos, acoplados y acuñados. En una segunda etapa se realizará el resto de la cama rellenando a ambos lados del tubo hasta alcanzar el ángulo de apoyo exigido.

En ambas etapas los rellenos se efectuarán por capas del orden de siete a diez centímetros (7 a 10 cm) compactadas mecánicamente. Los grados de compactación serán tales que la densidad resulte como mínimo el noventa y cinco por ciento (95 %) de la máxima del ensayo Próctor modificado o bien, el setenta por ciento (70 %) de la densidad relativa si se tratara de material granular libremente drenante, de acuerdo con las Normas UNE 103501:1994 "Geotecnia. Ensayo de compactación. Proctor modificado", UNE 103105:1993 "Determinación de la densidad mínima de una arena" y UNE 103106:1993 "Determinación de la densidad máxima de una arena por el método de apisonado".

En ningún caso se realizarán camas granulares mediante el vertido del material. Además, deberá comprobarse que se han eliminado del interior de la zanja todas las estacas de rasanteo colocadas y prestar especial cuidado en las operaciones de extensión y compactación para no producir movimientos ni daños en la tubería.

En el caso de realizar la cama de apoyo con hormigón, ésta se construirá con los tubos colocados en su posición definitiva, apoyados sobre calzos que impidan movimientos en la tubería y debiendo asegurar el contacto del tubo con el hormigón en toda la superficie de apoyo.

En las zonas de uniones, la cama se interrumpirá en un tramo de ochenta centímetros (80 cm) como mínimo, y se deberá profundizar la excavación del fondo de la zanja para dejar espacio suficiente para ejecutar las uniones.

### iii) Control de la calidad

Los ensayos, a efectuar en los materiales utilizados en las camas de apoyo y rellenos, así como el control de la ejecución de los mismos, serán los siguientes, previa autorización de la Dirección de Obra.

Control de calidad de los materiales

- Análisis granulométrico de suelos, según UNE-EN ISO 17892-4:2019.
- Determinación de los Límites de Atterberg, según UNE-EN ISO 17892-12:2019.
- Contenido en materia orgánica, según UNE 103204:2019.
- Contenido de sulfatos en suelos, según UNE 103202:2019 y UNE 103201:2019.
- Equivalente de arena, según UNE 103109:1995.
- Resistencia al desgaste de Los Ángeles, según UNE-EN 1097-2:2010.
- Ensayo de compactación. Proctor Modificado, según UNE 103501:1994.

Control de calidad de la ejecución

- Densidad y humedad in situ de suelos, en cada una de las tongadas en las que se realice el relleno, según UNE 103900:2013 y UNE-EN ISO 17892-1:2015.

### iv) Medición y abono

Los materiales a emplear como camas de apoyo se medirán por metros cúbicos ($m^3$) medidos sobre perfil y se abonarán, en función del material utilizado, mediante la aplicación del precio que corresponda, de los que figuran en el Cuadro de Precios vigente de Canal de Isabel II.

## Artículo 4.1.6 Terraplenes, pedraplenes y rellenos

### i) Materiales

Los materiales para terraplenes cumplirán las condiciones que establece el artículo 330.3 del Pliego de Prescripciones Técnicas Generales para Obras de Carreteras y Puentes (PG-3) para “suelos seleccionados” o “suelos adecuados". El Proyecto definirá el tipo de suelo a utilizar en función de la misión resistente del terraplén.

Los materiales para pedraplenes cumplirán las condiciones que para "rocas adecuadas" establece el artículo 331.4 del PG-3.

Los materiales para rellenos localizados cumplirán las condiciones que para "suelos adecuados y seleccionados" se establecen en el apartado 330.3 del PG-3. No se consideran incluidos dentro de esta unidad los rellenos localizados de material con misión específica drenante, a los que hace referencia el artículo 421, "Rellenos localizados de material drenante" del PG-3 y que se realizarán de acuerdo con este último.

En la zona baja de la zanja se empleará relleno seleccionado, con un tamaño máximo de tres centímetros (3 cm), mientras que en la zona alta se empelará relleno adecuado con un tamaño máximo de quince centímetros (15 cm).

Para los tubos de materiales plásticos (PP, PE, PVC-O, PVC-U y PRFV) se rellenará la zanja con gravilla de canto rodado de tamaño máximo veinticinco milímetros (25 mm), hasta quince centímetros (15 cm) por encima de la clave de la tubería.

### ii) Ejecución

Los terraplenes se ejecutarán según se especifica en el artículo 330.6 del PG-3. El Proyecto definirá la compactación que se debe alcanzar, que en ningún caso será inferior al 95 % de la densidad máxima obtenida en el ensayo de Proctor Modificado, según la Norma UNE 103501:1994 *"Geotecnia. Ensayo de compactación. Proctor modificado".*

Las limitaciones de la ejecución de los terraplenes serán las contenidas en el PG-3 en su artículo 330.7.

Los pedraplenes se ejecutarán según se especifica en el artículo 331.7 del PG-3 y las limitaciones de ejecución serán las contenidas en el citado Pliego.

Los rellenos localizados se ejecutarán cumpliendo las especificaciones del artículo 332.5, con las limitaciones contenidas en el artículo 332.6 del PG-3. La compactación exigida vendrá definida en el Proyecto presentado por el Adjudicatario y no será inferior al noventa y cinco por ciento (95 %) de la densidad máxima obtenida en el ensayo Próctor modificado en el caso de emplear suelos seleccionados y del cien por cien (100 %) en el caso de la utilización de suelos adecuados, de acuerdo con la Norma UNE 103501:1994.

La terminación y refino de la explanada y taludes se ejecutará según se especifica en los artículos 340.2 y 341.2 del PG-3, con las tolerancias del acabado indicadas en el citado Pliego.

### iii) Control de calidad

<u>Control de calidad de los materiales</u>

Las características de los materiales se comprobarán antes de su utilización mediante la ejecución de los siguientes ensayos, previa autorización de la Dirección de Obra.

- Rellenos y terraplenes
  - Análisis granulométrico de suelos, según UNE-EN ISO 17892-4:2019.
  - Determinación de los Límites de Atterberg, según UNE-EN ISO 17892-12:2019.
  - Determinación en laboratorio del índice C.B.R., según UNE 103502:1995.
  - Contenido en materia orgánica, según UNE 103204:2019.
  - Contenido de sulfatos en suelos, según UNE 103202:2019 y UNE 103201:2019.
  - Ensayo de compactación. Proctor Modificado, según UNE 103501:1994.

- Pedraplenes
  - Granulometría por tamizado según UNE-EN ISO 17892-4:2019.
- Rellenos de material filtrante
  - Análisis granulométrico de suelos, según UNE-EN ISO 17892-4:2019.
  - Determinación de los Límites de Atterberg, según UNE-EN ISO 17892-12:2019.
  - Contenido en materia orgánica, según UNE 103204:2019.
  - Contenido de sulfatos en suelos, según UNE 103202:2019 y UNE 103201:2019.
  - Equivalente de arena, según UNE 103109:1995.
  - Resistencia al desgaste de Los Ángeles, según UNE-EN 1097-2:2010.
  - Ensayo de compactación. Proctor Modificado, según UNE 103501:1994.

Control de calidad de la ejecución

- Rellenos y terraplenes
  - Densidad y humedad in situ de suelos, en cada una de las tongadas en las que se realice el relleno, según UNE 103900:2013 y UNE-EN ISO 17892-1:2015.
- Pedraplén
  - Densidad "in situ" según UNE 103503:1995.
- Rellenos de material filtrante
  - Densidad y humedad in situ de suelos, en cada una de las tongadas en las que se realice el relleno, según UNE 103900:2013 y UNE-EN ISO 17892-1:2015.

Para los pedraplenes, las tolerancias de las superficies acabadas serán las contenidas en el artículo 331.9 del PG-3.

### iv) Medición y abono

Se medirán por los metros cúbicos ($m^3$) empleados y compactados, medidos sobre perfil y se abonarán al precio que corresponda, de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

El refino, la nivelación y apisonado de superficies y taludes se medirá y abonará al precio que corresponda, de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

En el caso de que los materiales sean procedentes de préstamo, se considera incluido en el precio la extracción, la carga, el transporte a obra y todos los permisos y tasas necesarias para su obtención.

### Artículo 4.1.7 Relleno localizado en trasdós de muros

Esta unidad consiste en el relleno con materiales procedentes de la excavación o de préstamos del trasdós de obras de fábrica y estructuras (arquetas, casetas, fosos, muros, etc.), que, por su reducida extensión, compromiso estructural u otra causa, no permita la utilización de los mismos equipos de maquinaria con que se lleva a cabo la ejecución del resto del relleno, o bien exija unos cuidados especiales en su construcción.

#### i) Materiales

Los materiales para rellenos localizados en trasdós de muros cumplirán las especificaciones que para "suelos adecuados" establece el Pliego de Prescripciones Técnicas Generales para Obras de Carreteras y Puentes (PG-3) en su artículo 330.3.

#### ii) Ejecución

La ejecución de esta unidad de obra deberá ajustarse a las prescripciones exigidas en el artículo 332.5 del Pliego de Prescripciones Técnicas Generales para Obras de Carreteras y Puentes (PG-3).

Los materiales de relleno se extenderán en tongadas sucesivas de treinta centímetros (30 cm) de espesor y compactadas al noventa y cinco por ciento (95 %) del ensayo Proctor Modificado.

La terminación y refino de la explanada se ejecutará según se especifica en el artículo 340 del PG-3.

#### iii) Control de calidad

Control de calidad de los materiales

Se realizarán los mismos ensayos y con la misma frecuencia que para los materiales utilizados como terraplenes.

Control de calidad de la ejecución

Se realizarán los mismos ensayos y con la misma frecuencia que para los materiales utilizados como terraplenes.

Las tolerancias de acabado serán las indicadas en el artículo 340.3 del PG-3.

#### iv) Medición y abono

Los volúmenes de abono correspondientes se determinarán por diferencia entre perfiles transversales tomados antes y después de realizar las operaciones. No se considerarán de abono los volúmenes de relleno que sean consecuencia de excavaciones no abonables según las normas del presente Pliego.

La medición se realizará por metros cúbicos ($m^3$) realmente colocados y serán abonados, dependiendo de la procedencia del material, según el precio que corresponda de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

El precio incluye la carga y transporte del material a usar como relleno localizado desde cualquier punto de la obra, cantera o préstamo, el vertido extendido en capas, la humectación y la compactación al grado exigido.

### Artículo 4.1.8 Geotextiles

#### i) Materiales

Los materiales a emplear como geotextiles deberán cumplir las especificaciones indicadas en el Pliego de Prescripciones Técnicas Generales para Obras de Carreteras y Puentes (PG-3) en sus artículos 290 y 422.

#### ii) Ejecución

La ejecución de esta unidad de obra deberá ajustarse a las prescripciones exigidas en el artículo 422.3 del Pliego de Prescripciones Técnicas Generales para Obras de Carreteras y Puentes (PG-3), con las limitaciones de ejecución contenidas en su artículo 422.4.

#### iii) Medición y abono

Los geotextiles se medirán y abonarán por metro cuadrado ($m^2$) de superficie recubierta o envuelta, mediante la aplicación del precio que corresponda de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

El precio incluye todos los elementos necesarios para la colocación y puesta en obra del geotextil, así como su transporte a obra y la parte proporcional de solapes.

### Artículo 4.1.9 Banda de señalización

#### i) Materiales

El material a utilizar en las bandas de señalización será plástico y deberá ser resistente e insensible a los microorganismos.

El color de la banda dependerá del uso para el que esté destinada la conducción. Además, dicho uso queda reflejado mediante una leyenda impresa en la propia banda.

#### ii) Ejecución

Se colocará a una distancia de medio metro (0,50 m) sobre la generatriz superior de la conducción.

### iii) Medición y abono

La banda de señalización se medirá por metros (m) realmente colocados y se abonará al precio que figure en el Cuadro de Precios vigente de Canal de Isabel II.

## SUBCAPÍTULO 4.2 ESTRUCTURAS DE HORMIGÓN

### Artículo 4.2.1 Cimbras, encofrados y moldes

### i) Materiales

Las cimbras, encofrados y moldes deberán cumplir las exigencias contenidas en la Instrucción de Hormigón Estructural (EHE).

### ii) Ejecución

Las cimbras, encofrados y moldes se ejecutarán de acuerdo con lo dispuesto en el artículo 68.° la Instrucción de Hormigón Estructural (EHE).

El desencofrado, desmoldeo y descimbrado se ejecutarán de acuerdo con los artículos 73.° y 74.° de la Instrucción de Hormigón Estructural (EHE).

### iii) Control de calidad

Para el control de calidad de atenderá a lo especificado en los artículos 94.3 y 94.4 de la Instrucción de Hormigón Estructural (EHE).

### iv) Medición y abono

Los encofrados se medirán por metro cuadrado ($m^2$) de superficie de hormigón realmente ejecutada, y medida sobre planos. A tal efecto, los forjados se considerarán encofrados por la cara inferior y bordes laterales, y las vigas por sus laterales y fondos.

Las unidades incluyen el desencofrado y la limpieza, así como los apuntalamientos, tensores y todas las piezas necesarias (molduras, berenjenos, tapes, velas, cimbras y andamiaje, etc.) para la correcta realización de las mismas.

Los encofrados se abonarán aplicando el precio que corresponda de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

El cimbrado de elementos estructurales se medirá por metros cúbicos ($m^3$) medidos entre el paramento inferior de la obra y la proyección en planta de la misma, y se abonará mediante la aplicación del precio que corresponda de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

### Artículo 4.2.2 Acero para armaduras

#### i) Materiales

Los aceros para armaduras de hormigón armado cumplirán las exigencias contenidas en los artículos, 32.° y 33.° de la Instrucción de Hormigón Estructural (EHE). Asimismo, las barras corrugadas, mallas electrosoldadas y las armaduras básicas electrosoldadas en celosía se regirán por la Norma UNE-EN 10080:2006 "*Acero para el armado del hormigón. Acero soldable para armaduras de hormigón armado. Generalidades."*

Los aceros para armaduras de hormigón pretensado cumplirán las exigencias contenidas en el artículo 34.° de la Instrucción de Hormigón Estructural (EHE).

Las vainas y accesorios, así como los productos de inyección se regirán por lo estipulado en el artículo 35.° de la Instrucción de Hormigón Estructural (EHE).

Los alambres, barras y cordones para armaduras de hormigón pretensado se regirán por la Norma UNE 36094:1997 "*Alambres y cordones de acero para armaduras de hormigón pretensado."*

#### ii) Ejecución

La elaboración de la ferralla y colocación de armaduras pasivas se realizará como dispone el artículo 69.° de la Instrucción de Hormigón Estructural (EHE) y siguiendo las indicaciones de la UNE 36831:1997 "*Armaduras pasivas de acero para hormigón estructural. Corte, doblado y colocación de barras y mallas. Tolerancias. Formas preferentes de armado."*

La colocación y el tesado de las armaduras activas se realizarán según se especifica en el artículo 70.° de la EHE, así como la Norma UNE 36094:1997.

#### iii) Control de calidad

Se atenderá a lo indicado en los artículos, 87.°, 88.°, 89.°, 90.°, 95.° y 96.° de la Instrucción de Hormigón Estructural (EHE).

#### iv) Medición y abono

Las armaduras de hormigón armado se medirán por su peso en kilogramos (kg), aplicando para cada tipo de acero los precios unitarios correspondientes a las longitudes realmente ejecutadas. Cuando el peso se deduce a partir de las secciones transversales, el peso unitario será de siete mil ochocientos cincuenta kilogramos por metro cúbico (7850 kg/$m^3$).

En el precio se incluyen el suministro y colocación del acero, así como el cortado, doblado y recortes que sean necesarios para la correcta ejecución de la unidad.

Las armaduras se abonarán aplicando el precio que corresponda de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

### Artículo 4.2.3 Hormigones y morteros

Los hormigones a utilizar se tipificarán de acuerdo con lo establecido en el artículo 39.2 de la EHE.

Las clases específicas de los hormigones que se empleen en las obras se recogerán en una tabla similar a la adjunta, la cual deberá reflejarse en los planos de Proyecto:

| Hormigón | Localización | Tipificación | Control | Cemento |
|---|---|---|---|---|
| No estructural | Rasanteo y limpieza | HL-150/P/30 | No aplica | CEM I 32,5 N |
| Estructural | Pilares | HA/30/B/20/IIa | Normal | CEM II 32,5 R |

Tabla 1. Ejemplo de clases de hormigones a emplear

#### i) Materiales

*A) Áridos*

Se seguirán las prescripciones de los artículos 28 y 85.2 de la Instrucción de Hormigón Estructural (EHE).

*B) Cementos*

El cemento empleado en hormigones en masa, armados o pretensados, y en morteros deberá cumplir las exigencias establecidas en la Instrucción para la Recepción de Cementos (RC-16), así como lo estipulado en el artículo 26. ° de la Instrucción de Hormigón Estructural (EHE).

En todos los hormigones estructurales, el cemento será de categoría 32,5 o superior salvo justificación del Adjudicatario y autorización expresa de la Dirección de Obra.

Deberá razonarse la utilización de cementos distintos al Cemento CEM II, en función de las características específicas de la obra y siempre dentro de los tipos contemplados en la Instrucción para la Recepción de Cementos RC-16.

*C) Morteros*

Se utilizarán los materiales adecuados a los diferentes usos teniendo en cuenta la compatibilidad de los aglomerantes.

*D) Agua*

Cumplirá todas las especificaciones incluidas en los artículos 27 y 85.5 de la Instrucción de Hormigón Estructural (EHE).

*E) Adiciones para el hormigón*

Las adiciones al hormigón cumplirán lo prescrito en los artículos 30 y 85.4 de la Instrucción de Hormigón Estructural (EHE).

### ii) Ejecución

La dosificación, fabricación, transporte a obra y puesta en obra del hormigón, así como la realización de juntas de hormigonado, el hormigonado en tiempo frío o en tiempo caluroso y el curado del hormigón, se realizarán de acuerdo con las especificaciones contenidas en sus correspondientes artículos de la Instrucción de Hormigón Estructural (EHE).

Para las obras de hormigón, tanto en masa como armado o pretensado, las bases de cálculo, acciones, etc., seguirán las especificaciones establecidas en los capítulos 2 y 3 de la Instrucción de Hormigón Estructural (EHE), siendo imprescindible en todos los casos la comprobación de las condiciones de fisuración de los elementos estructurales.

No se efectuará el hormigonado de ningún elemento estructural sin la conformidad expresa de la Dirección de Obra, una vez que hayan revisado las armaduras y se considere correcta su colocación.

Salvo indicación expresa de lo contrario por parte del Dirección de Obra, los elementos estructurales horizontales no se hormigonarán contra el terreno directamente, sino que se adoptará siempre una capa intermedia de limpieza y regularización de diez centímetros (10 cm).

### iii) Control de calidad

<u>Control de calidad de los materiales</u>

- Cemento

La toma de muestras y los ensayos aplicables en función del tipo de cemento empleado se realizarán según se especifica en la Instrucción para la Recepción de Cementos (RC-16).

Se realizarán antes de comenzar el hormigonado o si varían las condiciones de suministro.

Durante la ejecución de las obras, se realizarán ensayos una vez cada tres meses y como mínimo tres veces durante la ejecución de la obra.

La Dirección de Obra podrá sustituir estos ensayos previos por el certificado de ensayos enviado por el fabricante y correspondiente a la partida que se va a utilizar. Los cementos deberán disponer del marcado CE con un sistema de evaluación de la conformidad 1+.

- Agua de amasado

La toma de muestras de agua de amasado se realizará según la UNE 83951:2008 *"Durabilidad del hormigón. Aguas de amasado y aguas agresivas. Toma de muestras".* Los ensayos se realizarán antes de comenzar las obras, si no se tienen antecedentes del agua que se va a emplear y cuando varíen las condiciones de suministro y se harán conforme a las prescripciones de la Instrucción de Hormigón Estructural (EHE).

Se podrá eximir de la realización de los ensayos cuando se utilice agua para consumo humano de la red de suministro.

- Áridos

Antes de comenzar el hormigonado, cuando varíen las condiciones de suministro, y como mínimo cada quinientos metros cúbicos (500 $m^3$) de hormigón puesto en obra, deberán realizarse los siguientes ensayos:

- Granulometría de los distintos tipos de áridos utilizados en la mezcla según UNE-EN 933-1:2012 "*Ensayos para determinar las propiedades geométricas de los áridos. Parte 1: Determinación de la granulometría de las partículas. Método del tamizado".*
- Ensayos previstos en la Instrucción de Hormigón Estructural (EHE).

La Dirección de Obra podrá sustituir estos ensayos previos por el certificado de ensayos enviado por el fabricante y correspondiente a la partida que se va a utilizar. Los áridos para hormigones deberán disponer del marcado CE con un sistema de evaluación de la conformidad 2+.

- Aceros para armaduras de hormigón armado

Se realizarán los ensayos especificados en la Instrucción de Hormigón Estructural (EHE).

A juicio de la Dirección de Obra, se podrán sustituir parcial o totalmente los ensayos por los correspondientes certificados presentados por el fabricante. Los aceros para armaduras, suministrados a obra desde fábrica, deberán disponer del marcado CE con un sistema de evaluación de la conformidad 1+.

<u>Control de calidad de la ejecución</u>

Se atenderá a lo especificado en al artículo 86.° "*Control del hormigón*", 97.° "*Control de los procesos de hormigonado*", 98.° "*Control de procesos posteriores al hormigonado*", 100.° "*Control del elemento construido*" y 101.° "*Controles de la estructura mediante ensayos de información complementaria*" de la Instrucción de Hormigón Estructural (EHE).

Los ensayos de control se realizarán sobre probetas tomadas en obra, conservadas y rotas según la Norma UNE-EN 12390 "*Ensayos de hormigón endurecido*", partes 1 y 3.

En ambientes de hormigón IV se realizarán los obligatorios ensayos de permeabilidad del hormigón tal y como indica la Instrucción de Hormigón Estructural (EHE).

Los ensayos a realizar en los hormigones serán:

- Control documental:

Marcado CE y documentos que acompañan al marcado CE, Hojas de suministro, Certificado firmado, de garantía final del producto suministrado, según el Anejo nº 21 de la EHE-08.

- Hormigón no estructural (HNE):

A criterio de la Dirección de Obra se considerarán, asimismo, ensayos de resistencia a compresión simple.

- Asiento del cono de Abrams de 5 probetas de hormigón fresco tomadas en obra, según UNE-EN 12350-2:2020.

- Hormigón en masa (HM) y hormigón armado (HA):

Para cada obra realizada con HM (zanjas, bases, etc.) y en cada obra realizada con HA en instalaciones (cimentación, soleras, muros arquetas, losas, muros, anclajes, zanjas, etc.), se realizarán los siguientes ensayos:

- Asiento del cono de Abrams y resistencia a rotura a compresión simple de 5 probetas de hormigón fresco tomadas en obra. De ellas, 2 ensayos a los 7 días y 3 ensayos a los 28 días, según UNE-EN 12350-1:2020, UNE-EN 12350-2:2020, UNE-EN 12390-1:2013, UNE-EN 12390-2:2020 y UNE-EN 12390-3:2020.

- Hormigón armado (HA):

Para cada obra realizada con HA en instalaciones (cimentación, soleras, muros arquetas, losas, muros, anclajes, zanjas, etc.), se realizarán los siguientes ensayos:

- Asiento del cono de Abrams y resistencia a rotura a compresión simple de 6 probetas de hormigón fresco tomadas en obra, para estudiar la evolución de la resistencia obtenida. De ellas, 2 ensayos a los 7 días, 2 ensayos a los 28 días y 2 ensayos a los 60 días, según UNE-EN 12350-1:2020, UNE-EN 12350-2:2020, UNE-EN 12390-1:2013, UNE-EN 12390-2:2020 y UNE-EN 12390-3:2020.

Cuando la clase general de exposición relativa a la corrosión de las armaduras sea IV, según la tabla 8.2.2 de EHE-08, se realizarán los siguientes ensayos:

- Ensayo de durabilidad mediante profundidad de penetración de agua bajo presión en probeta de hormigón endurecido, según UNE-EN 12390-8:2020.

Tolerancias

Las tolerancias admisibles en los elementos de hormigón se ajustarán a lo establecido en el Anejo N.º 11 de la Instrucción de Hormigón Estructural (EHE).

### iv) Medición y abono

Los hormigones se medirán por metros cúbicos ($m^3$) realmente ejecutados, medidos con arreglo a lo señalado en los planos del proyecto de ejecución, incluyendo el bombeo, la compactación, el vibrado, la ejecución de juntas de construcción (incluso de estanquidad en caso necesario), el curado y el acabado de los mismos.

El precio al que se abonará cada hormigón será el que corresponda a su resistencia característica y ubicación, aplicando el precio que corresponda de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

### Artículo 4.2.4 Juntas en estructuras de hormigón

#### i) Materiales

Las bandas elastoméricas para estanqueidad de juntas son tiras o bandas de material elastomérico, caucho sintético o natural, de sección transversal adecuada para formar un cierre que impida el paso del agua a través de las juntas de las obras de hormigón. Se colocan embebidas en el hormigón según una superficie ortogonal a la de la junta y centrada con ella.

El material elastómero a emplear será: caucho butilo (IIR), caucho termopolímero Etileno-Propileno-Dieno-Monómero (EPDM), caucho de policloporeno (CR) o de Polietileno Clorosulfonado (CSM).

En Proyecto se establecerá la forma y dimensiones de la sección transversal de las bandas, especificando:

- Ancho total.
- Espesor (sin considerar nervios y bulbos).
- Altura y espesor de los nervios, en su caso.
- Dimensiones de los bulbos de anclaje.
- Diámetros interior y exterior del bulbo central, en su caso.

La sección transversal de las bandas será compacta, homogénea y exenta de porosidad, burbujas y otros defectos.

Cuando la junta sea susceptible de movimiento transversal, será obligatorio el empleo de bandas provistas de núcleo central hueco.

El material de anclaje a utilizar será adhesivo (masilla) de resina rígida.

Para el sellado de las juntas podrá utilizarse mástic asfáltico, mástic de poliuretano, relleno de poliestireno o resina de poliuretano bicomponente.

En el caso de utilizarse perfiles hidroexpansivos, estos estarán compuestos por resinas hidrofílicas sobre caucho natural, de dimensiones mínimas 20 x 5 mm.

#### ii) Ejecución

- Juntas de dilatación en muros y soleras

Las juntas de dilatación de dos centímetros (2 cm) de anchura se impermeabilizarán mediante un sistema de consistente en:

  - Junta de PVC con perfil en laberinto embebida en el hormigón entre las dos paredes de la junta de dilatación. Tendrá núcleo central hueco y deberá ser estanca (colocada y deformada). A continuación, se rellenaría la junta con poliestirenos expandido.

- Sellado superficial mediante masilla de poliuretano apta para colocación en contacto con agua potable y en situación de inmersión permanente en agua. Deberá tener una capacidad de movimiento permanente del veinticinco por ciento (25 %) o superior de su anchura de junta. Se deberá disponer el correspondiente fondo de junta y los labios de la misma deberán ser limpiados y tratados con la correspondiente imprimación de adherencia.
- Junta EPDM sobre el hormigón entre las dos paredes de la junta de dilatación. Esta junta consiste en:
  - Imprimación en un ancho de 50-60 cm, (30 cm a cada lado del eje de la junta) con resina de poliuretano bicomponente a razón de 0,2-0,3 kg/ml.
  - Aplicación a quince centímetros (15 cm) de la junta masilla rígida de poliuretano bicomponente.
  - Colocación de una banda de EPDM agujereada en los extremos de treinta centímetros (30 cm) de anchura.
  - Enmasillado de los bordes de la junta con masilla rígida de poliuretano bicomponente.
  - Revestimiento elástico de la junta con resina de poliuretano bicomponente con un consumo de 0,2-0,3 kg/ml aplicado en una sola capa.

Se colocarán juntas de dilatación:

- Cada 20 m como máximo.
- Donde cambie la altura del muro.
- Donde cambie la profundidad del plano de cimentación.
- En todo cambio de dirección en planta.

Se deberá proyectar las juntas de tal manera que coincidan las de solera con muros.

- Juntas de construcción con perfiles hidroexpansivos

En los arranques de muros se dispondrán perfiles hidroexpansivos compuestos por resinas hidrofílicas sobre caucho natural de 20 x 5 mm de tamaño mínimo situados en el centro del muro. Los perfiles se fijarán según las indicaciones del suministrador, en general clavados o pegados mediante masillas de poliuretano. Se podrá sustituir esta junta hidroexpansiva por junta de PVC, a juicio de la Dirección de Obra.

### iii) Control de calidad

Se controlarán todos los materiales que intervienen en la ejecución de la junta, y la comprobación de las prescripciones concernientes a las dimensiones, aspecto general y acabado. Los materiales que no satisfagan las características sometidas a inspección serán rechazados.

### iv) Medición y abono

Las juntas se mediarán por metros (m) realmente colocados y se abonarán al precio que corresponda de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

La unidad incluye todos los materiales y medios auxiliares necesarios para la correcta ejecución de la misma.

Para las juntas de construcción (incluso de estanquidad en caso necesario) se seguirá lo establecido en el Artículo 4.2.3.

## Artículo 4.2.5 Acabados de superficies

### i) Ejecución

Una vez sean retirados los encofrados, todas las zonas defectuosas se resanarán y todos los agujeros producidos por las barras de acoplamiento se rellenarán con un mortero de cemento de la misma composición que el usado en el hormigón, excepto para las caras vistas en las que una parte del cemento será BL I 42,5 UNE 80305:2012, con objeto de obtener un color de acabado que iguale el del hormigón circundante. Las zonas defectuosas se repicarán hasta encontrar hormigón macizo y hasta una profundidad no inferior a dos centímetros y medio (2,50 cm). Los bordes de los cortes serán perpendiculares a la superficie del hormigón. Todas las zonas a resanar y como mínimo quince centímetros (15 cm) de la superficie circundante se saturarán de agua antes de tender el mortero.

El mortero se amasará, aproximadamente, una hora antes de su tendido y, ocasionalmente, durante este tiempo se volverá a amasar con una paleta sin añadir agua. Se consolidará en su posición y se enrasará hasta dejarlo ligeramente elevado sobre la superficie circundante.

El resanado en superficies vistas se acabará, haciendo juego con las superficies adyacentes, después de que haya fraguado durante una hora o más. Los resanados se curarán tal como se ha especificado para el hormigón. Los agujeros de las barras de acoplamiento se humedecerán con agua y se rellenarán totalmente con mortero. Los agujeros que se prolonguen a través del hormigón se rellenarán por medio de una pistola de inyección o por otro sistema adecuado desde la cara no vista. El exceso de mortero en la cara vista se quitará con un trapo.

<u>Acabado tipo</u>

Si no se pide un acabado especial en los planos del Proyecto, todas las superficies vistas llevarán un acabado tipo.

- Superficies no correspondientes a los encofrados

  Pavimentos de hormigón:

  La superficie del hormigón se enrasará por medio de una plantilla que avanzará con un movimiento combinado longitudinal y transversal. Durante el transcurso de esta operación se mantendrá un ligero exceso de hormigón por delante de la plantilla.

Después del enrasado, el hormigón se fratasará longitudinalmente en un fratás de madera; efectuado esto, la superficie se comprobará con un escantillón, corrigiendo y volviendo a fratasar si fuera necesario. El acabado final se obtendrá con un fratás de correa. El fratás se colocará de plano sobre la superficie del hormigón y se adelantará con un movimiento de sierra, que se prolongará hasta obtener una superficie lisa, pero arenosa y no resbaladiza. Los cantos y juntas se redondearán con un descantillador de doce milímetros (12 mm) de radio.

Aceras:

La superficie se enrasará tal como se ha especificado para los pavimentos. Después se acabará a mano con un fratás de madera hasta obtener una superficie lisa y arenosa. Los cantos y juntas se redondearán con un descantillador hasta un radio de seis milímetros (6 mm).

Las superficies sin acabado específico se terminarán con fratases de madera hasta alisarlas.

- Superficies correspondientes al encofrado

Además del resanado de las zonas defectuosas y relleno de los orificios de las barras, se eliminarán cuidadosamente todas las rebabas y otras protuberancias, nivelando todas las irregularidades.

Acabados especiales

Estos se emplearán en las superficies de hormigón vistas, solamente cuando así se requiera en el Proyecto. Para acabados especialmente lisos, se construirá, de acuerdo con los requisitos establecidos a este fin, una sección de la parte no vista de la estructura, tal como un muro de cimentación. Si el acabado de esta sección se ajusta al especificado, se empleará como lienzo de muestra; en otro caso, se prepararán otras secciones hasta obtener el acabado especificado. Cuando así se pida en el Proyecto, los acabados especialmente lisos recibirán la lechada de limpieza especificada en este artículo.

a) Acabado especial liso

Las superficies serán de aspecto uniforme, liso y exento de rebabas, depresiones y abombamientos.

b) Acabado frotado (apomazado)

Cuando sea factible se retirarán los encofrados antes de que el hormigón haya llegado a un fraguado duro, poniendo el debido cuidado para garantizar la seguridad de la estructura. Inmediatamente después de retirados los encofrados, la superficie se humedecerá totalmente con agua frotándola con carborundo, u otro abrasivo, hasta obtener un acabado continuo, liso y de aspecto uniforme. A la terminación de esta operación la superficie se lavará perfectamente con agua limpia.

c) Acabado cepillado

Se retirarán los encofrados estando aún fresco el hormigón y la superficie se cepillará con cepillos de cerdas duras o de fibra de alambre, haciendo uso libremente del agua, hasta que el árido quede uniformemente descubierto en la extensión apropiada. Después se lavará la superficie con agua limpia.

Al cepillar se pondrá cuidado en no producir hoyos en la superficie arrancando partículas de árido. Si algunas partes de dicha superficie se hubieran endurecido demasiado para cepillarlo con igual relieve, o si la capa de cemento no se desprende del árido descubierto, a fin de facilitar el cepillado puede hacerse uso de una solución de ácido clorhídrico en las proporciones siguientes: una parte de ácido por cuatro partes de agua. Se eliminará totalmente con agua limpia todo vestigio de ácido.

d) Acabado con fratasado mecánico

En las soleras de hormigón se podrá optar por el acabado con fratasado mecánico, consistente en compactar y alisar la superficie del hormigón mediante la acción mecánica de las fratasadoras mecánicas, también llamadas helicópteros. Estas constan de unas paletas metálicas que forman una especie de hélice y que tomando distintos grados de inclinación hunden los áridos gruesos, aíslan la superficie y compactan el mortero superficial que forma la capa de rodadura.

La fratasadora realiza tres acciones Hunde los áridos gruesos, por lo que la capa superficial consiste en un mortero de cemento; si lleva la capa de rodadura adecuada formada por arena de sílice y cemento se adquirirá una gran dureza. También se puede pigmentar para alcanzar un mayor efecto decorativo. Alisa la superficie eliminando defectos y pequeñas irregularidades. Por último, compacta la superficie.

Para realizar todo el proceso, primero debe ser vertido el hormigón y correctamente extendido. Posteriormente se realizarán las pasadas con una regla vibrante, que alisara la superficie. Más tarde, cuando en el hormigón no se marque huella de más de cinco centímetros (5 cm) y el agua de exudación haya desaparecido se procederá a trabajar con la fratasadora mecánica.

Primero se deberán fratasar manualmente las esquinas y los bordes. El fratasado mecánico primero debe realizarse con las paletas paralelas al pavimento. Según se realicen las sucesivas pasadas, se cambiará la inclinación de las paletas hasta obtener el acabado deseado.

e) Lechada de limpieza

Cuando se pida en el Proyecto, los acabados lisos especiales recibirán una lechada de limpieza en la forma siguiente: La lechada consistirá en una parte de cemento CEM I, por una y media de arena fina, amasadas con el agua suficiente para producir una consistencia de pintura espesa como cemento. En su totalidad o en parte, según se ordene, se empleará cemento BL I. Se mojará la superficie del hormigón y se aplicará la lechada uniformemente, a brocha o pistola, hasta rellenar completamente todos los

huecos debidos a burbujas de aire. Inmediatamente después de aplicada la lechada, las superficies se frotarán vigorosamente con un fratás de madera o de esponja de goma en los acabados especiales lisos. Durante una o dos horas, según las condiciones atmosféricas, se dejará que la lechada fragüe parcialmente. Con tiempo seco y caluroso se mantendrá húmeda la superficie de la lechada por medio de un rociado pulverizado. Cuando haya endurecido, se raspará toda aquella que pueda desprenderse con el canto de una llana de acero, sin extraer la lechada de los agujeros dejados por las burbujas de aire, La superficie se dejará secar perfectamente y después se frotará vigorosamente con una arpillera seca para arrancar totalmente la lechada. Después de esto no quedará película alguna visible de lechada.

La operación de limpieza para cualquier zona se completará el mismo día que se comience. Después de revocado todo el trabajo, todos aquellos puntos oscuros o vetas que se observen, se limpiarán frotando suavemente con una piedra fina de esmeril; el frotado con la piedra no cambiará la textura del hormigón.

### Artículo 4.2.6 Impermeabilización

Este artículo hace referencia a la impermeabilización de elementos de hormigón armado, no siendo de aplicación para las cubiertas de edificación.

#### i) Materiales

Se efectuará la impermeabilización del conjunto del vaso mediante dos capas de resinas de poliuretano bicomponente específico para dicha función:

- Debe ser apto para contacto con agua para consumo humano.
- Debe ser flexible con capacidad para puentear microfisuras y sufrir elongaciones de un 20 % sin aparición de fisuras.

#### ii) Ejecución

Previamente a la aplicación del material de impermeabilización, se limpiarán con agua a presión y se repararán, si fuese necesario, las superficies del vaso que deben quedar libres de coqueras, zonas mal hormigonadas, lechadas superficiales, partículas mal adheridas productos desencofrantes o de curado, etc.

En los encuentros entre elementos, por ejemplo, solera y muros se ejecutarán medias cañas para suavizar las esquinas. Estas medias cañas se ejecutarán picando previamente dicho encuentro. No es admisible la colocación de la resina directamente sobre las esquinas sin picar. Las medias cañas deben tener un tamaño mínimo de 5 x 5 cm. Las medias cañas se ejecutarán con morteros aditivados sin retracción.

Igualmente, se sellarán previamente los espadines del encofrado.

La imprimación consistirá en la aplicación de una mano de resina de poliuretano bicomponente con un consumo estimado de 0,4-0,6 kg/$m^2$ (dependiendo del soporte), que penetrando en la red capilar del hormigón sirva de anclaje del revestimiento posterior.

El revestimiento consistirá en la aplicación de una capa de una resina de poliuretano, bicomponente, sin disolventes, perfectamente compatible, con un consumo estimado de 0,4-0,5 kg/$m^2$ de características elastoplásticas y tixotrópicas, y debe cumplir toda la normativa sobre potabilidad.

La parte interior de la cubierta llevará una protección anticarbonatación.

En el caso de los depósitos de almacenamiento de agua, dado el ambiente húmedo y algo clorado de su interior, las condensaciones en cubierta pueden producir la corrosión acelerada de las armaduras del forjado. Para evitar este fenómeno se adoptarán dos medidas:

- Colocación de chimeneas de aireación en cubierta, rejillas de ventilación en la galería del aliviadero e incluso extractores de aire en la misma.
- Protección del interior del forjado mediante pintura acrílica anticarbonatación aplicada en al menos 2 manos. Previamente se procederá a la limpieza mediante agua a presión del forjado para que la superficie quede completamente limpia y libre de partículas mal adheridas. Se seguirán las especificaciones del suministrador de la pintura de protección.

#### iii) Medición y abono

La impermeabilización se realizará por metros cuadrados ($m^2$) realmente ejecutados y se abonará al precio que corresponda de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

### Artículo 4.2.7 Prueba de estanqueidad de muros y solera de las estructuras de hormigón

#### i) Ejecución

El Adjudicatario deberá garantizar la estanqueidad de los depósitos y tanques de hormigón para lo cual, ante la no existencia de normativa española, se seguirán las especificaciones indicadas en la Norma inglesa BS 8007.

Previamente a la realización del ensayo se deberá:

- Asegurar que los dispositivos de evacuación de agua están disponibles y que funcionan correctamente.
- Limpiar las superficies interiores de los tanques de hormigón.
- Aislar y asegurar todas las conducciones de entrada y de salida.

El procedimiento de ensayo será el siguiente:

- Llenar lentamente el depósito o tanque de agua hasta el nivel total de llenado. La velocidad de llenado no será superior a los dos metros (2 m) de lámina de agua cada veinticuatro horas. Durante la fase de llenado y posteriores, se registrarán detalladamente la eventual aparición de humedades y flujos de agua a través de fisuras, debiendo detenerse el ensayo si las filtraciones resultasen peligrosas para la integridad de la estructura.
- Antes de comenzar a controlar el nivel de la lámina de agua, se mantendrá lleno el tanque un periodo de tiempo, para poder distinguir las pérdidas debidas a la absorción inicial del hormigón, de las fisuras autosellantes del resto de las filtraciones existentes. En caso de ser necesario, se restituirá el líquido que por absorción inicial de los paramentos se consuma. Este período de absorción tendrá una duración comprendida entre una semana, para aquellas estructuras calculadas con una anchura máxima de fisura inferior a una décima de milímetro (0,1 mm) y tres semanas, para una anchura máxima de fisura mayor o igual a dos décimas de milímetro (0,2 mm).
- Durante esta fase de estabilización, si procede, se registrarán los caudales filtrados recogidos por la red de drenaje bajo solera. También se verificará si las fisuras registradas durante la fase de llenado y la fase de estabilización se han sellado o si siguen provocando filtraciones.
- Una vez terminada la fase de estabilización y absorción inicial se deberá mantener el depósito o tanque lleno, sin aportación adicional de agua durante al menos siete días, durante los cuales se controlará el nivel de la lámina de agua, como mínimo, cada veinticuatro horas durante la ejecución del ensayo. Para realizar esto se establecerá un punto de referencia fijo. También se registrarán las filtraciones recogidas por la red de drenaje.
- Se calcularán las pérdidas de agua. Salvo indicación contraria del Pliego de Prescripciones Técnicas Particulares, las pérdidas admisibles no pueden superar los siguientes límites:
  - El dos por mil (2 ‰) del volumen total.
  - 10 mm de descenso absoluto de la lámina de agua.

  En esta disminución no se tiene en cuenta las pérdidas por evaporación y por aporte de lluvia que se corregirán aparte.
- Se realizará un informe del ensayo recogiendo las conclusiones obtenidas y las posibles propuestas de actuación, en el caso que las pérdidas obtenidas sean superiores a las admisibles.

Las reparaciones de fisuras, juntas, etc. deberán efectuarse desde la cara en contacto con el agua. El material empleado deberá tener la flexibilidad adecuada, no reaccionar con el agua y ser compatible con el posterior uso del agua almacenada.

Una vez realizados los trabajos de impermeabilización se realizará otro ensayo de estanqueidad, que igualmente requerirá una primera fase de estabilización.

### Artículo 4.2.8 Prueba de estanqueidad cubiertas de depósitos

#### i) Ejecución

Previamente a la realización del ensayo se deberá:

- Asegurar que el compartimento está vacío de agua.
- En el caso de cubiertas planas, realizar previsiones temporales para sellar cualquier pérdida en la cubierta.
- Realizar los ajustes temporales para conseguir la profundidad de agua necesaria en la cubierta.

El procedimiento de ensayo será el siguiente:

- En cubiertas planas, se inundará la cubierta con una lámina de al menos veinticinco centímetros (25 cm) de agua durante no menos de veinticuatro horas (24 h).
- Cuando la geometría de la cubierta impida su inundación, se procederá al regado por aspersión durante al menos seis horas (6 h).
- Se observará la parte inferior de la cubierta para detectar las pérdidas.
- Se redactará un informe con las condiciones del ensayo y sus resultados.

Si aparecieran filtraciones, goteras o manchas de humedad en la cara inferior de la cubierta o en el contacto de ésta con los muros perimetrales durante el ensayo de estanqueidad o inmediatamente después, el Adjudicatario deberá proponer una solución de impermeabilización de la cubierta y repetir el ensayo de estanqueidad una vez efectuada la reparación.

La cubierta del depósito deberá ser impermeable para evitar la contaminación del agua almacenada por la lluvia y los arrastres de la suciedad acumulada en la misma.

## SUBCAPÍTULO 4.3 ESTRUCTURAS DE ACERO

### Artículo 4.3.1 Estructuras de acero

#### i) Materiales

El tipo de acero a emplear en perfiles laminados y placas será en general S275JR excepto indicación en contra en planos, según clasificación de la Norma UNE-EN 10025-1:2006 *"Productos laminados en caliente de aceros para estructuras. Parte 1: Condiciones técnicas generales de suministro"*.

Serán de aplicación las especificaciones que sobre los aceros para perfiles y placas conformados se prescriben en el Real Decreto 751/2011, de 27 de mayo, por el que se aprueba la Instrucción de Acero Estructural (EAE).

El almacenamiento se realizará de forma que no están expuestos a una oxidación directa, a la acción de atmósferas agresivas, ni se manchan de grasa, ligantes o aceites.

### ii) Ejecución

Serán de aplicación los artículos del título 6 de la EAE.

### iii) Control de calidad

Serán de aplicación los artículos del título 7 de la EAE.

### iv) Medición y abono

Se abonarán por kilogramo (kg) realmente colocado de perfiles laminados en caliente para vigas, pilares, zunchos y correas, mediante uniones soldadas atendiendo a los planos aprobados, con la aplicación del precio que corresponda del Cuadro de Precios vigente de Canal de Isabel II. En el precio correspondiente se considera incluido el suministro y montaje, la parte proporcional de soldaduras, cortes, piezas especiales, despuntes y dos manos de imprimación con pintura de minio de plomo, totalmente montado y colocado, según normativa vigente.

La protección contra la oxidación de los elementos metálicos mediante galvanización con cinc se medirá por kilogramo (kg) de peso teórico del material tratado y se abonará mediante la aplicación del precio que corresponda del Cuadro de Precios vigente de Canal de Isabel II.

En dicho precio se considera incluido:

- El transporte, la carga y descarga a taller de galvanización.
- La preparación del material.
- El desengrase eliminando mediante tratamientos preliminares restos de pinturas, manchas de grasa, etc.
- El decapado superficial de óxidos por inmersión en ácido sulfúrico o clorhídrico diluido.
- El tratamiento con flujo e inmersión en baño de zinc fundido a través de la cubierta de flujo que flota sobre el material fundido, a temperatura de 445-465 °C.
- Nueva carga y transporte sobre camión a obra.

## SUBCAPÍTULO 4.4 TUBERÍAS

### Artículo 4.4.1 Consideraciones constructivas

- Transporte, almacenamiento y manipulación

Estas operaciones deberán realizarse sin que ninguno de los elementos sufra golpes o rozaduras, teniendo que depositarlos en el suelo sin brusquedades y sin dejarlos caer en ningún momento. En el caso de los tubos, estará prohibido rodarlos sobre piedras.

El transporte desde fábrica se realizará con medios adecuados a las dimensiones de los tubos, solicitándose si es el caso los permisos pertinentes para el transporte por carretera. En cualquier caso, el transporte, deberá hacerse siempre conforme a las vigentes normas de seguridad vial y de tráfico.

Si el transporte incluye tubos de distinto diámetro, será preciso colocarlos en sentido decreciente del mismo desde la hilera de la base hacia arriba, no admitiéndose cargas adicionales sobre los tubos que puedan producir deformaciones excesivas en los mismos. Además, se garantizará la inmovilidad de los tubos, apilándolos de forma que no queden en contacto unos con otros, disponiendo para ello cuñas de madera o elementos elásticos. Especial atención deberá prestarse a estos aspectos en el caso de los tubos flexibles y más cuidadosamente para tubos de PRFV.

Los tubos con uniones de enchufe y extremo liso deberán colocarse con los extremos alternados, de modo que los enchufes no queden en contacto con los tubos inferiores.

Cuando los tubos se almacenen sobre el terreno deberá comprobarse que éste será lo suficientemente resistente para soportar las cargas que se le transmitan y lo suficientemente liso para que éstos se apoyen en toda su longitud, sin riesgo de que piedras y otros salientes puedan dañarlos. Las precauciones serán máximas cuando se almacenen tubos de PRFV.

El acopio de los tubos en obra se hará en posición horizontal, sujetos mediante calzos de madera u otros dispositivos que garanticen su inmovilidad. Los tubos de hormigón, si disponen de una solera rígida y se garantizan las debidas condiciones de seguridad, pueden almacenarse en posición vertical, siempre que no se ocasionen daños en sus boquillas al colocarlos en esta posición.

El tiempo de almacenamiento deberá restringirse al mínimo posible, no debiendo prolongarse innecesariamente y, en cualquier caso, habrá que procurar la adecuada protección frente a posibles daños externos, especialmente en los anillos elastoméricos y las válvulas, los cuales deberán situarse en lugar cerrado y protegidos de la luz solar y de temperaturas elevadas. En los tubos de hormigón, en particular, deberá evitarse que sufran secados excesivos o fríos intensos, por lo que se almacenarán en lugares cerrados y protegidos de la luz solar y de temperaturas extremas.

Los tubos de materiales plásticos no deberán estar en contacto con combustibles o disolventes, estarán protegidos de luz solar y su superficie no podrá alcanzar temperaturas superiores a cuarenta y cinco grados centígrados (45 °C).

El acopio de las juntas elastoméricas se realizará en locales cerrados y se tendrán en cuenta las siguientes precauciones:

- Las juntas se mantendrán limpias y no se expondrán a la intemperie hasta el momento de su utilización.
- Se almacenarán libres de tensión, compresión u otra deformación. Tampoco podrán almacenarse en locales con equipos capaces de generar ozono, gases de combustión y vapores orgánicos, ni deberán estar en contacto con materiales líquidos o semisólidos, en especial disolventes, aceites y grasas, ni con metales.
- La temperatura de almacenaje estará comprendida entre diez y veinticinco grados centígrados (10 °C y 25 °C).
- Los anillos elastoméricos se protegerán de la luz, en especial de la radicación solar directa. Se almacenarán en contenedores opacos.
- Estos anillos también se protegerán del aire en circulación, envolviéndolos y almacenándolos en envases cerrados.

Las operaciones de carga y descarga deberán realizarse de tal manera que los distintos elementos no se golpeen entre sí o contra el suelo.

Se procurará que el movimiento de los tubos, una vez descargados, sea mínimo, por lo que la descarga se hará, en la medida de lo posible, cerca del lugar donde vayan a ser colocados, evitando que el tubo quede apoyado sobre puntos aislados.

Si la zanja no estuviera abierta en el momento de la descarga de los tubos, estos deberán colocarse en el lado opuesto a aquél en que piensen depositar los productos de la excavación, de tal forma que queden protegidos del tránsito de vehículos, explosivos, etc.

Las operaciones de carga y descarga de los tubos habrá que realizarlas mediante equipos mecánicos, si bien, para diámetros reducidos, podrán emplearse medios manuales. Nunca se suspenderá el tubo por un extremo ni se descargará por lanzamiento. Sí es admisible la descarga mediante estrobos, enganchando para ello las bocas del tubo.

En cualquier caso, no se admitirán dispositivos formados por cables desnudos ni cadenas en contacto con el tubo, siendo recomendable, por el contrario, el uso de bandas de cinta ancha, eslingas recubiertas de caucho o procedimientos de suspensión a base de ventosas.

Cuando se empleen cables metálicos deberán protegerse con un recubrimiento adecuado.

No será admisible la rodadura o el arrastre de los tubos sobre el terreno, máxime si los tubos tienen revestimientos exteriores.

Si los tubos de materiales plásticos se transportan unos dentro de otros, la descarga de los mismos deberá comenzarse por los del interior. En los tubos de PVC-O, cuando se manejen con temperaturas inferiores a cero grados centígrados (0 °C), deberá prestarse especial atención a todas estas operaciones, evitando que sufran golpes.

- Instalación de tuberías enterradas

Una vez ejecutada la excavación en zanja y previamente a la instalación de la tubería, el Adjudicatario realizará el replanteo previo de toda la traza de la conducción, señalando sus vértices y fijando puntos de referencia, de alineación y de nivel, a partir de los cuales se colocarán los tubos. Se replanteará también la posición de todas las piezas especiales y elementos singulares (valvulería, tomas, etc.). Este replanteo deberá ser aprobado por la Dirección de Obra, antes de iniciarse los trabajos.

Todos los elementos, tuberías, revestimientos de protección interior o exterior, en su caso, accesorios y material de juntas, se inspeccionarán antes del descenso a la zanja para su instalación.

Una vez los tubos en el fondo de la zanja, deberán examinarse de nuevo para cerciorarse de que su interior esté libre de tierra, piedras, suciedad, etc., para a continuación realizar su centrado y alineación. Posteriormente deberán ser calzados y acodalados con un poco de material de relleno para impedir su movimiento.

Las tuberías no podrán instalarse de forma tal que el contacto o apoyo sea puntual o una línea de soporte. No podrán apoyarse directamente en el fondo de la zanja, sino que deberán hacerlo en una cama de apoyo, cuya misión es asegurar una distribución uniforme de las presiones exteriores sobre la conducción.

Para tuberías con protección exterior, el material de la cama de apoyo y la ejecución de ésta deberá ser tal que el recubrimiento protector no sufra daños.

Las conducciones podrán reforzarse con recubrimiento de hormigón si tuvieran que soportar cargas superiores a las de diseño de la tubería, evitar erosiones y/o descalces, si hubiera que proteger la tubería de agresividades externas o añadir peso para evitar su flotabilidad bajo el nivel freático. Las características del hormigón y dimensiones de las secciones reforzadas deberán ser aprobadas por la Dirección de Obra.

En general, no se colocarán más de cien metros (100 m) de tubería sin proceder al relleno parcial de la zanja.

Se deberán tomar las medidas necesarias para evitar la posible flotación de la tubería.

El Adjudicatario adoptará precauciones para evitar que las tierras puedan penetrar en la tubería por sus extremos libres, siendo responsable de la posterior limpieza de la conducción instalada. En el caso de que alguno de dichos extremos o ramales vaya a quedar durante algún tiempo expuesto, se dispondrá un cierre estanco al agua suficientemente asegurado para que no pueda ser retirado accidentalmente.

Cada tubo deberá centrarse perfectamente con los adyacentes, en el caso de zanjas con pendientes superiores al diez por ciento (10 %), la tubería se colocará en sentido ascendente. En el caso de que esto no sea posible, se tomarán las debidas precauciones para evitar el deslizamiento de los tubos.

Las partes de la tubería correspondiente a las juntas se mantendrán limpias y protegidas.

En las uniones de enchufe y extremo liso, el empuje para el enchufe coaxial de los diferentes tramos será controlado, pudiendo utilizarse gatos mecánicos o hidráulicos, palancas manuales y otros dispositivos, cuidando que durante la fase de empuje no se produzcan daños.

En este tipo de unión deberá cuidarse especialmente que las superficies del tubo en contacto con el anillo elastomérico estén limpias y exentas de defectos superficiales, tales como coqueras o aristas que puedan afectar a la estanquidad o dañar al anillo.

Durante el montaje de la unión se efectúa el encaje correcto del anillo, comprobándose que los paramentos verticales del enchufe y del extremo liso están separados lo suficiente, para poder absorber los movimientos de la unión.

En las conducciones de fundición dúctil, de hormigón, de acero y de gres, la zona baja de la zanja se rellenará con material seleccionado, con un tamaño máximo de tres centímetros (3 cm), colocado en capas de pequeño espesor hasta alcanzar un grado de compactación igual o superior al noventa y cinco (95 %) del Proctor modificado. Se rellenará con este tipo de material treinta centímetros (30 cm) por encima de la generatriz superior del tubo.

En el caso de tubos de material plástico (PVC-O, PRFV, PE, PVC-U y PP estructurados), la zona baja de la zanja de excavación se rellenará con gravilla de canto rodado de tamaño máximo 25 mm hasta quince centímetros (15 cm) por encima de la clave de la tubería. Se prestará especial atención a la colocación en obra sobre los tubos de PRFV; el manual AWWA M45 recomienda un tamaño máximo de partícula de 25, 32 o 38 mm en función de que su DN sea menor o igual a 900, esté comprendido entre 900 y 1200 o sea superior a este valor respectivamente.

En la zona alta se empleará relleno adecuado con un tamaño máximo recomendado de quince centímetros (15 cm), que se colocará en tongadas horizontales hasta alcanzar un grado de compactación no menor del cien por cien (100 %) del Próctor Modificado.

El material de relleno, tanto para la zona alta como para la baja, podrá ser procedente de la excavación de la zanja a menos que sea inadecuado.

- Instalación de tuberías aéreas

En la instalación de tuberías aéreas, los tubos se colocarán sobre apoyos aislados, que podrán ser de hormigón o metálicos y en número tal que se asegure un funcionamiento sin vibraciones. Los apoyos de hormigón se dispondrán con una cuna de asiento de la tubería, la cual abarca al tubo en un arco de entre ciento veinte y ciento ochenta grados (120° y 180°). Cuando se empleen zunchos metálicos, estos serán pletinas de cincuenta milímetros (50 mm), las cuales estarán protegidas contra la erosión y no deberán provocar, en ningún caso, el aplastamiento local del tubo.

En el caso de tubos de materiales plásticos el apoyo deber realizarse mediante pinzas o abrazaderas de material plástico o metálico, las cuales no deben comprimir al tubo.

La flecha máxima admisible en el centro de vanos entre apoyos será de 1/1000 de la longitud entre soportes, medida con la tubería en funcionamiento.

No se colocarán en ningún caso, tuberías al nivel del suelo ni a menos de uno con noventa metros (1,90 m) del piso en los lugares de paso, salvo en galerías donde, debidamente señalizadas se admitirá el cruce de tuberías cuya generatriz inferior distará del suelo una distancia mínima de uno con setenta metros (1,70 m).

Las uniones de los tubos y de las piezas especiales quedarán al descubierto para permitir el montaje y desmontaje de las mismas.

Se preverán dispositivos para compensar las dilataciones debidas a las variaciones de temperatura, circunstancia de especial importancia en las tuberías de acero y polietileno.

No se emplearán tubos de PE en instalaciones aéreas y si excepcionalmente, la Dirección de Obra autoriza su uso, las distancias máximas entre apoyos serán las contempladas en la Norma UNE 53394:2018 IN "*Plásticos. Código de instalación y manejo de tubos de polietileno (PE) para conducción de agua a presión. Técnicas recomendadas".*

Los tubos de PVC-O se protegerán especialmente contra la acción de los rayos solares, no debiendo alcanzar la superficie exterior del tubo los cuarenta y cinco grados centígrados (45 °C).

- Control de calidad. Aspectos generales

El fabricante deberá asegurar la calidad de sus productos durante la fabricación mediante un sistema de control de las materias primas y del proceso de fabricación, que garantice el cumplimiento de las prescripciones técnicas de la norma base utilizada para la producción de los componentes de las redes.

El Adjudicatario deberá facilitar la documentación necesaria para conocer las características técnicas, materias primas, proceso de fabricación, control de calidad durante el mismo, certificaciones de producto y recomendaciones de instalación y manipulación de los mismos.

Todos los componentes, con independencia del tipo de material, deberán ser sometidos a una inspección visual al finalizar el proceso de fabricación, de forma que se verifique la uniformidad en el color y el aspecto de los mismos, de forma que tanto la superficie exterior como la interior estén libres de irregularidades que puedan afectar negativamente a la hora de cumplir los requisitos previstos.

Cuando alguna directiva o reglamento de la Unión Europea obligue a que determinados componentes a instalar en las redes vayan identificados con el distintivo "CE", se atenderá a lo dispuesto en ella.

A la llegada a obra se observará el cargamento con detenimiento, apreciando si los tubos han sufrido algún deterioro. Serán objeto de revisión visual los siguientes aspectos:

- Deterioros, desgastes o pérdidas del revestimiento exterior o interior de los tubos, en los tipos de tuberías que los llevan.
- Golpes, abolladuras o señales superficiales en cualquier parte de la superficie del tubo.
- Alteraciones de cualquier tipo producidas en los extremos de los tubos.

Cualquier anomalía que pudiera detectarse será responsabilidad del Adjudicatario, quedando obligado a la ejecución, si ello fuera posible, de todas las labores necesarias para la reparación de los desperfectos ocasionados en el tubo hasta cumplir todas las especificaciones incluidas en el presente Pliego.

Todos los tubos reparados en obra por este concepto serán sometidos a las correspondientes verificaciones por la Dirección de Obra o tercero que ésta designe, antes de su aceptación final.

En caso de que los tubos dañados o reparados por el Adjudicatario ofrezcan alguna duda sobre su utilización en la obra, éstos serán definitivamente rechazados, pudiendo la propiedad reclamar la indemnización por daños y perjuicios que a tal efecto se establezca en el Contrato entre las partes.

Adicionalmente, la Dirección de Obra podrá proceder a la toma de muestras de tubos, accesorios y piezas especiales y a la ejecución de los ensayos previstos en la norma de referencia de producto conforme a lo que se determine en el Anejo de Control de Calidad.

Durante la ejecución de las obras, se realizarán ensayos mediante la utilización de líquidos penetrantes en un 10% de las soldaduras realizadas en obra en los tubos de acero y en los de hormigón armado o pretensado con camisa de chapa, de acuerdo con lo especificado en la Norma UNE-EN ISO 3452-1:2013 "*Ensayos no destructivos. Ensayo por líquidos penetrantes. Parte 1: Principios generales*", no debiendo detectarse ningún poro durante el ensayo.

Además, se deberá, sobre el diez por ciento (10 %) de las mismas, realizar ensayos por otros procedimientos, tales como radiografías o partículas magnéticas, de forma, que si los fallos detectados exceden porcentajes de más del cinco por ciento (5 %), este control radiográfico podría extenderse al cincuenta por ciento (50 %) de las soldaduras. Los ensayos por radiografías se ajustarán a las especificaciones establecidas en la Norma UNE-EN ISO 10675-1:2017 "*Ensayo no destructivo de uniones soldadas. Niveles de aceptación para los ensayos radiográficos. Parte 1: Acero, níquel, titanio y sus aleaciones. (ISO 10675-1:2008).*"

En estos tubos se establecerán, además, como mínimo los siguientes puntos de control:

- Homologación de procedimiento de soldadura.
- Homologación de soldadores.
- Preparación de bordes para soldaduras a tope, si fueran necesarias, éstas deben realizarse en taller.
- Separación mínima/máxima entre chapas solapadas para soldar (boquillas entre tubos).
- Electrodos a utilizar y tipo.
- Otros tipos de soldadura en otros materiales.
- Alineación y nivelación de tuberías.
- Control de calidad soldaduras.

- Inspección visual.
- Control de calidad de la protección de las tuberías.

### Artículo 4.4.2 Tuberías de polietileno (PE)

Este artículo es de aplicación para todas las tuberías de polietileno que se utilicen en las redes de abastecimiento, saneamiento, redes de reutilización y acometidas.

Los tubos de polietileno deberán cumplir con lo especificado para los mismos en la Norma UNE-EN 12201-1:2012 "*Sistemas de canalización en materiales plásticos para conducción de agua y saneamiento con presión. Polietileno (PE). Parte 1: Generalidades"* y UNE-EN 12201-2:2012+A1:2020 *"Sistemas de canalización en materiales plásticos para conducción de agua y saneamiento con presión. Polietileno (PE). Parte 2: Tubos".*

Las tuberías de polietileno podrán usarse en conducciones de diámetros igual o superior a 25 mm hasta los 315 mm. La serie de diámetros normalizados a utilizar será:

25, 40, 50, 63, 75, 90, 110, 125, 140, 160, 180, 200, 225, 250, 280, 315

Se clasificarán por su diámetro nominal (DN), refiriéndose éste al diámetro exterior (OD), por su presión nominal (PN) y por la Resistencia Mínima Requerida (MRS) del material.

#### i) Materiales

Los materiales empleados en la fabricación de los tubos de polietileno deberán cumplir las especificaciones que figuran en la Norma UNE-EN 12201, en sus partes 1 y 2.

Los tubos deberán cumplir, además, con las siguientes características mecánicas de forma específica:

- Únicamente se podrán emplear tubos de polietileno PE-100, presión nominal 1,6 MPa (PN 16) y MRS 10 N/mm$^2$ (PE 100) y, por lo tanto, SDR = 11 y S= 5.
- El coeficiente de seguridad C adoptado será de 1,25.
- La tensión de diseño ($\sigma_s$) tendrá un valor de 8 N/mm$^2$.
- El valor de la presión de funcionamiento admisible (PFA) de los tubos para una temperatura de 20 °C, será de 1,6 N/mm$^2$.
- El módulo de elasticidad del material a corto plazo, $E_o$, será como mínimo, de 1000 N/mm$^2$ y a largo plazo $E_{50}$ de 160 N/mm$^2$. La resistencia mínima a flexotracción a corto o a largo plazo será, respectivamente 30 o 14,40 N/mm$^2$.

Todos los tubos deberán ir marcados, de forma fácilmente legible y durable, con las siguientes identificaciones como mínimo:

- Referencia a la Norma EN 12201.
- Nombre o marca del fabricante.

- Dimensiones (DN x e, siendo e el espesor nominal).
- Serie SDR.
- Uso previsto.
- Material y designación (PE 100).
- Clasificación de presión, en bar (PN 16).
- Información del fabricante sobre la trazabilidad (periodo y, en su caso, lugar de producción).
- Identificación del certificado de producto emitido por tercera parte, si procede.

Los colores de los tubos empleados, en función de su uso, serán los siguientes:

| | |
|---|---|
| Redes de abastecimiento y acometidas: | Negro con bandas azules |
| Redes de saneamiento: | Negro con bandas marrones |
| Redes de reutilización: | Negro con bandas moradas |

### ii) Ejecución

Para la instalación de conducciones de polietileno, además de las normas citadas, se tendrá en cuenta lo indicado en la Norma UNE 53394:2018 IN "*Plásticos. Código de instalación y manejo de tubos de polietileno (PE) para conducción de agua a presión. Técnicas recomendadas".*

Las uniones entre tubos de polietileno se realizarán mediante electrofusión. La unión mediante accesorios mecánicos se podrá emplear en reparaciones de tuberías y la unión mediante bridas sólo se utilizará con piezas especiales y elementos de maniobra y control. La soldada térmicamente a tope sólo será aplicable a tubos de DN mayor o igual a 200 mm y con la autorización expresa de la Dirección de Obra.

### iii) Control de calidad

<u>Control de calidad de la fabricación</u>

Para el control de calidad de la fabricación de las tuberías de polietileno será de aplicación lo especificado en la Norma UNE-EN 12201.

No está normalizada la longitud nominal de los tubos suministrados en barras rectas, debiendo acordarse en cada caso con la Dirección de Obra.

En el caso de tubos que se suministren enrollados, el diámetro interior de la bobina no debe ser inferior a 18·DN.

Control de calidad de la instalación

Cada tubo a conectar debe centrarse perfectamente con los adyacentes, con una desviación máxima respecto al trazado en planta y alzado de Proyecto de más o menos diez milímetros (±10 mm).

Se comprobará que la conducción está convenientemente colocada sobre el lecho de asiento, que no haya sufrido ningún desperfecto durante la manipulación.

#### iv) Medición y abono

Las tuberías de polietileno se medirán por metros (m) de conducción totalmente terminada y probada en obra y se abonarán al precio que corresponda, en función del diámetro nominal y de la presión nominal, de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

En el precio se consideran incluidos, la parte proporcional de elementos de unión, los medios auxiliares y las pruebas necesarias para el correcto funcionamiento de la tubería.

La medición y abono de la obra ejecutada en un momento dado será:

a) El 90 % del total de la unidad cuando esté totalmente instalada.

b) El 10 % del total de la unidad cuando haya sido probada satisfactoriamente.

### Artículo 4.4.3 Tubería de materiales termoplásticos de pared estructurada

Los tubos de materiales termoplásticos de pared estructurada objeto de este artículo sólo podrán emplearse en redes de saneamiento y deberán cumplir con lo especificado para los mismos en la Norma UNE-EN 13476 "*Sistemas de canalización en materiales plásticos para evacuación y saneamiento enterrado sin presión. Sistemas de canalización de pared estructurada de poli de (cloruro de vinilo) no plastificado (PVC-U), polipropileno (PP) y polietileno (PE).*

La serie de diámetros normalizados a utilizar será:

250, 315, 400, 500, 630, 800, 1000, 1200

Los tubos de PVC-U de pared estructurada se clasificarán por su diámetro nominal (DN), expresado como diámetro exterior (OD) o diámetro interior (ID) según proceda, y por su rigidez nominal (SN).

#### i) Materiales

Estos tubos podrán ser fabricados con diversos materiales, PVC-U, PE o PP, y bajo muchos posibles diseños, los cuales se clasifican de la siguiente manera:

- Tipo A: Tubos y accesorios con la superficies interna y externa lisas.

- Tipo B: Tubos y accesorios con la superficie interna lisa y la superficie externa perfilada.

El material de los tubos y accesorios tendrá las características que figuran en la tabla adjunta:

| CARACTERISTICAS | PVC-U | PP | PE | Unidad |
|---|---|---|---|---|
| Módulo de elasticidad | ≥ 3200 | ≥ 1250 | ≥ 800 | MPa |
| Densidad media | ≈ 1400 | ≈ 900 | ≈ 940 | $kg/m^3$ |
| Coeficiente medio de dilatación térmica lineal | $\approx 8 \times 10^{-5}$ | $\approx 14 \times 10^{-5}$ | $\approx 17 \times 10^{-5}$ | $K^{-1}$ |
| Conductividad térmica | ≈ 0,16 | ≈ 0,20 | ≈ 0,36 a 0,50 | $WK^{-1}m^{-1}$ |
| Coeficiente de Poisson | 0,40 | 0,42 | 0,45 | (-) |

Tabla 2. Características tuberías de materiales termoplásticos de pared estructurada

En el caso de tubos de PVC-U y de PE de pared estructurada sólo se admiten rigideces nominales iguales o superiores a ocho kilo Newton por metro cuadrado (8 $kN/m^2$), mientras que para los tubos de PP, la rigidez nominal será de dieciséis kilo newton por metro cuadrado (16 $kN/m^2$).

La serie de diámetros de las tuberías de PE y PP de pared estructurada se limita a los 400, y 500 mm.

La utilización de tubos de PE y de PP de pared estructurada se restringirá a los casos en los que la altura de tierras por encima de la generatriz superior del tubo sea menor de tres metros, y además, para los tubos de PP no deberán existir cargas de tráfico sobre los mismos.

La capa interior y exterior de los tubos y accesorios serán de color teja (aproximadamente RAL 8023).

Todos los tubos deberán ir marcados, de forma fácilmente legible y durable, con las siguientes identificaciones como mínimo:

- Nombre y/o marca del fabricante.
- Material: PVC-U, PE o PP.
- Referencia a la Norma EN 13476.
- Diámetro nominal (DN), expresado como diámetro exterior o interior, según el caso.
- Tolerancia en el diámetro: sólo para tubos de PP y PE, la designación CT si requiere tolerancia.
- Tipo de conducción, A o B.
- Rigidez nominal (SN).

- Flexibilidad anular.
- Área de aplicación, aplicación prevista designada con una U si se encuentra a cierta distancia de un edificio y con una UD, si está destinada a usar bajo o cerca de un edificio.
- Marca de calidad.

### ii) Ejecución

Los sistemas de unión de los tubos de materiales termoplásticos de pared estructurada podrán ser:

- Unión flexible de enchufe y extremo liso con anillo elastomérico.
- Unión flexible mediante manguito soldado a uno de los extremos de la conducción con anillo elastomérico.

De acuerdo con la UNE-EN 13476, se permiten juntas de estanqueidad realizadas con otros polímeros distintos al PVC-U, PP o PE. El material utilizado deberá ser conforme a las Normas UNE-EN 681-1:1996, UNE-EN 681-2:2001 o UNE-EN 681-4:2001, según proceda.

La junta de estanqueidad no tendrá efectos perjudiciales sobre el material de la tubería.

### iii) Control de calidad

Control de calidad de la fabricación

Será de aplicación lo especificado en la Norma UNE-EN 13476.

Control de calidad de la ejecución

Será de aplicación lo especificado en la Norma UNE-EN 13476, en su parte quinta.

### iv) Medición y abono

Las tuberías de materiales termoplásticos de pared estructurada se medirán por metros (m) de conducción totalmente terminada y probada en obra y se abonarán, al precio que corresponda, en función del diámetro nominal y de la rigidez anular, de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

En los precios están incluidos, la parte proporcional de junta elástica, los medios auxiliares y todas las pruebas necesarias para asegurar el correcto funcionamiento de la tubería.

La medición y abono de la obra ejecutada en un momento dado será:

a) El 90 % del total de la unidad cuando esté totalmente instalada.

b) El 10 % del total de la unidad cuando haya sido probada satisfactoriamente.

### Artículo 4.4.4 Tubería de fundición dúctil para abastecimiento/reutilización

Los tubos de fundición dúctil objeto del presente artículo deberán cumplir con lo especificado para los mismos en la Norma UNE-EN 545:2011 "*Tubos, racores y accesorios de fundición dúctil y sus uniones para canalizaciones de agua. Requisitos y métodos de ensayo"*.

En redes nuevas de aducción o de distribución de agua para consumo humano, las tuberías de fundición dúctil serán de uso preferente dentro de su rango de aplicación, el cual comprende desde el diámetro nominal 80 mm al 1000 mm.

Para las redes de agua regenerada, los diámetros de las conducciones también estarán comprendidos entre los 80 mm y los 1000 mm.

Los tubos unidos mediante junta flexible se clasificarán por su diámetro nominal (DN), refiriéndose éste a su diámetro interior (ID) y su clase de presión (C), mientras que los tubos que se unen mediante bridas se clasifican por su diámetro nominal (DN) y por su presión nominal (PN).

La serie de diámetros nominales y clases de presiones a utilizar serán:

| TUBOS CON UNIÓN FLEXIBLE | | | | | |
|---|---|---|---|---|---|
| **DN (mm)** | ***Clase 30*** | ***Clase 40*** | ***Clase 50*** | ***Clase 64*** | ***Clase 100*** |
| | PFA 30 | PFA 40 | PFA 50 | PFA 64 | PFA 100 |
| | PMA 36 | PMA 48 | PMA 60 | PMA 76,8 | PMA 120 |
| | PEA 41 | PEA 53 | PEA 65 | PEA 81,8 | PEA 125 |
| 80 | | | | | |
| 100 | | | | | |
| 125 | | | | | |
| 150 | | | | | |
| 200 | | | | | |
| 250 | | | | | |
| 300 | | | | | |
| 350 | | | | | |
| 400 | | | | | |
| 450 | | | | | |
| 500 | | | | | |
| 600 | | | | | |
| 700 | | | | | |
| 800 | | | | | |
| 900 | | | | | |
| 1000 | | | | | |

Tabla 3. Diámetros y presiones de los tubos de fundición dúctil a emplear

### i) Materiales

Las características mecánicas de la fundición dúctil empleada en las tuberías deberán cumplir con lo especificado en la siguiente tabla:

| Tipo de pieza | Resistencia mínima a tracción, Rm ($N/mm^2$) | Alargamiento mínimo en rotura, $A_{min,r}$ (%) | Dureza Brinell Máxima, HB |
|---|---|---|---|
| Tubos centrifugados | 420 | 10 | 230 |
| Tubos no centrifugados | 420 | 5 | 230 |
| Piezas especiales | 420 | 5 | 250 |

Tabla 4. Características mecánicas de la fundición dúctil a emplear

Para la densidad del material se adopta el valor de 7050 $kg/m^3$ y para el módulo de elasticidad 1,7 x $10^5$ $N/mm^2$.

Las dimensiones normalizadas de los tubos de fundición con junta flexible serás las indicadas en la tabla adjunta:

| Diámetros (mm) | | Espesor mínimo (mm) | | | | |
|---|---|---|---|---|---|---|
| Valor nominal | | *Clase 30* | *Clase 40* | *Clase 50* | *Clase 64* | *Clase 100* |
| DN | OD | | | | | |
| 80 | 98 | | | | | 4,70 |
| 100 | 118 | | | | | 4,70 |
| 125 | 144 | | | | 4,00 | 5,00 |
| 150 | 170 | | | | 4,00 | 5,90 |
| 200 | 222 | | | 3,90 | 5,00 | 7,70 |
| 250 | 274 | | | 4,80 | 6,10 | 9,50 |
| 300 | 326 | | 4,60 | 5,70 | 7,30 | 11,20 |
| 350 | 378 | | 5,30 | 6,60 | 8,50 | 13,00 |
| 400 | 429 | | 6,00 | 7,50 | 9,60 | 14,80 |
| 450 | 480 | | 6,80 | 8,40 | 10,70 | 16,60 |
| 500 | 532 | 5,60 | 7,50 | 9,30 | 11,90 | 18,30 |
| 600 | 635 | 6,70 | 8,90 | 11,10 | 14,20 | 21,90 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 700 | 738 | 7,80 | 10,40 | 13,00 | 16,50 | |
| 800 | 842 | 8,90 | 11,90 | 14,80 | 18,80 | |
| 900 | 945 | 10,00 | 13,30 | 16,60 | | |
| 1000 | 1048 | 11,10 | 14,80 | 18,40 | | |

Tabla 5. Diámetros y espesores de los tubos de fundición dúctil a emplear

Los tubos, uniones y piezas especiales deberán ser sanos y exentos de defectos de superficie y de cualquier otro tipo que pueda tener influencia en su resistencia y comportamiento.

Todos los tubos se protegerán contra la corrosión mediante revestimientos adecuados, los cuales recubrirán uniformemente la totalidad de sus contornos, constituyendo superficies lisas y regulares, exentas de defectos tales como cavidades o burbujas.

Conforme a la Norma UNE-EN 545:2011, el revestimiento interior de los tubos de fundición dúctil deberá ser de mortero de cemento y los revestimientos exteriores podrán ser:

- Zn (200 g/m$^2$ masa mínima) con capa de acabado de barniz bituminoso o resina sintética compatible con Zn.
- ZnAl con o sin otros metales (400 g/m$^2$ masa mínima) con capa de acabado de barniz bituminoso o resina sintética compatible con Zn.

La elección del revestimiento exterior se realizará en función de la agresividad del suelo que rodee la conducción, por este motivo, antes de su instalación, el Adjudicatario deberá realizar un estudio de las características electroquímicas de los terrenos por donde discurrirá, por si fuera preciso prever en algún tramo una protección adicional.

Los tubos para redes de abastecimiento serán de color negro en el caso de tubos con capa de acabado de barniz bituminoso o azul en el caso de tubos con capa de acabado con resina sintética, mientras que los tubos para redes de agua regenerada deberán ir pintados exteriormente de color morado (RAL 4001 o 4005 o PANTONE 2577 U).

Todos los tubos deberán ir marcados, de forma fácilmente legible y durable, con la siguiente identificación como mínimo:

- Nombre o marca del fabricante.
- Identificación del año de fabricación.
- Identificación como fundición dúctil.
- Diámetro nominal, DN.
- PN (rating) de las bridas para componentes bridados.
- Referencia a la Norma EN 545.
- Clase de presión de los tubos centrifugados.

- Identificación del certificado de producto emitido por tercera parte.

### ii) Ejecución

Con carácter general, los sistemas de unión de los tubos de fundición serán del tipo flexible automática sin acerrojar. Adicionalmente y siempre y cuando lo apruebe la Dirección de Obra, se podrán emplear los siguientes tipos:

- Unión flexible
  - Automática (acerrojada)
  - Mecánica (sin acerrojar o acerrojada)
- Unión rígida (embridada)

### iii) Control de calidad

Para el control de calidad de la fabricación de las tuberías de fundición dúctil será de aplicación lo especificado en la Norma UNE-EN 545:2011.

Tolerancias

Los valores mínimos de la desviación angular admisible en las uniones flexibles serán:

| **DN (mm)** | ***Tipo de unión*** | |
|---|---|---|
| | ***Sin acerrojar*** | ***Acerrojadas*** |
| DN ≤ 300 | 3° 30´ | 1° 45´ |
| 350 ≤ DN ≤ 600 | 2° 30´ | 1° 15´ |
| 700 ≤ DN ≤ 1000 | 1° 30´ | 45° |

Tabla 6. Desviación angular en uniones flexibles (UNE-EN 545:2011)

### iv) Medición y abono

Las tuberías de fundición dúctil se medirán por metros (m) de conducción totalmente terminada y probada en obra, según los precios que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

El precio al que se abonará cada tubería será el que corresponda a su diámetro, clase, revestimiento interior y exterior y tipología de junta.

En los precios se consideran incluidos los medios auxiliares y las pruebas necesarias para el correcto funcionamiento de la tubería.

La medición y abono de la obra ejecutada en un momento dado será:

a) El 90 % del total de la unidad cuando esté totalmente instalada.

b) El 10 % del total de la unidad cuando haya sido probada satisfactoriamente.

### Artículo 4.4.5 Tubería de fundición dúctil para redes de saneamiento

#### i) Materiales

Los tubos de fundición dúctil objeto del presente artículo se emplearán en redes de saneamiento y deberán cumplir con lo especificado para los mismos en la Norma UNE-EN 598:2008+A1:2009 "*Tuberías, accesorios y piezas especiales de fundición dúctil y sus uniones para aplicaciones de saneamiento. Requisitos y métodos de ensayo.*"

La serie de diámetros, en milímetros, a utilizar será:

150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1.000, 1100, 1200, 1400, 1500, 1600, 1800, 2000

Los tubos de fundición dúctil se clasificarán por su diámetro nominal (DN), refiriéndose éste aproximadamente a su diámetro interior (ID), estando normalizado el espesor de la pared del tubo para cada diámetro nominal.

Las características mecánicas de la fundición dúctil empleada en las tuberías deberán cumplir con lo especificado en la siguiente tabla:

| **Tipo de pieza** | **Resistencia mínima a la tracción $R_m$ ($N/mm^2$)** | **Alargamiento mínimo en rotura $A_{min,r}$ (%)** | | **Dureza Brinell máxima, HB** |
|---|---|---|---|---|
| | | DN ≤ 1000 | DN > 1000 | |
| Tubos centrifugados | 420 | 10 | 7 | 230 |
| Tubos no centrifugados | 420 | 5 | 5 | 230 |
| Piezas especiales | 420 | 5 | 5 | 250 |

Tabla 7. Características mecánicas de la fundición dúctil

Los tubos deberán identificarse exteriormente por uno de los siguientes colores: marrón, rojo o gris. En ningún caso se admitirá el color azul.

Todos los tubos se protegerán contra la corrosión mediante la aplicación de revestimientos, los cuales recubrirán uniformemente la totalidad de los contornos de los tubos, constituyendo superficies lisas y regulares, exentas de defectos tales como cavidades o burbujas. Deberán

estar bien adheridos a la fundición, no descascarillándose, ni exfoliándose y secando en un tiempo rápido. Los revestimientos se aplicarán siempre en fábrica, excepto la manga de polietileno que se colocará en la propia obra.

Salvo indicación expresa de la Dirección de Obra, todos los tubos de fundición dúctil deberán suministrarse con las siguientes protecciones:

- Revestimiento exterior de zinc con una capa de acabado.
- Revestimiento interior de mortero de cemento con alto contenido en alúmina (como mínimo de un 40 %).
- Recubrimiento a base de resina sintética (epoxi, poliuretano…) sobre las superficies de los extremos que puedan entrar en contacto con el efluente.

Todos estos revestimientos deberán cumplir las especificaciones para los mismos de la Norma UNE-EN 598:2008+A1:2009.

Excepcionalmente, y si así lo acepta la Dirección de Obra, podrán ser admisibles los revestimientos alternativos que figuran en el Anexo B de la citada norma.

Todos los tubos deberán ir marcados, de forma fácilmente legible y durable, con la siguiente identificación como mínimo:

- Nombre o marca del fabricante.
- Fecha de fabricación.
- Identificación como fundición dúctil.
- Diámetro nominal, DN.
- Presión nominal, PN, en el caso de unión con bridas.
- Referencia a la Norma EN 598.
- Marcado CE.
- Identificación del certificado de producto emitido por tercera parte.

### ii) Ejecución

Los sistemas de unión de los tubos de fundición deberán ser conformes con lo especificado para los mismos en la Norma UNE-EN 598:2008+A1:2009 y podrán ser alguno de estos tipos:

- Unión flexible de enchufe y extremo liso.
- Unión flexible acerrojada resistente a las tracciones.
- Unión flexible mecánica.
- Unión rígida con bridas.

### iii) Control de calidad

Para el control de calidad de la fabricación de las tuberías de fundición dúctil será de aplicación lo especificado en la Norma UNE-EN 598:2008+A1:2009.

Tolerancias

Los valores mínimos de la desviación angular admisible en las uniones flexibles serán:

| DN | Tipo de unión | |
|---|---|---|
| | Sin acerrojar | Flexibles restringidas |
| DN < 300 | 3º 30´ | 1º 45´ |
| 350 < DN < 600 | 2º 30´ | 1º 15´ |
| 700 < DN < 2000 | 1º 30´ | 45´ |

Tabla 8. Desviación angular en uniones flexibles (UNE-EN 598:2008+A1:2009)

### iv) Medición y abono

El precio al que se abonará cada tubería será el que corresponda a su diámetro nominal, según los precios que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

En los precios se consideran incluidos el revestimiento interior y exterior, así como la parte proporcional de junta automática flexible, medios auxiliares y pruebas necesarias para el correcto funcionamiento de la tubería.

La medición y abono de la obra ejecutada en un momento dado será:

a) El 90 % del total de la unidad cuando esté totalmente instalada.

b) El 10 % del total de la unidad cuando haya sido probada satisfactoriamente.

## Artículo 4.4.6 Tubería de acero inoxidable

Los tubos de acero inoxidable se clasifican por su diámetro nominal (DN), refiriéndose éste a su diámetro exterior (OD) y por el espesor nominal (e).

### i) Materiales

Se utilizarán tuberías de acero inoxidable AISI- 316 L y deberán cumplir las especificaciones establecidas en la UNE-EN 10217-7:2015 "*Tubos de acero soldados para usos a presión. Condiciones técnicas de suministro. Parte 7: Tubos de acero inoxidable".*

### ii) Control de calidad

Control de calidad de la fabricación

El Adjudicatario presentará las correspondientes certificaciones de composición química y características mecánicas de las tuberías de acero inoxidable y controlará la calidad del acero inoxidable para que el material suministrado se ajuste a lo indicado en la normativa vigente.

### iii) Medición y abono

Las tuberías de acero inoxidable se medirán por metros (m) de conducción totalmente terminada y probada en obra y se abonarán, al precio que corresponda, en función del diámetro exterior y del espesor nominal del tubo, de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

En los precios están incluidos, la parte proporcional de junta soldada, los codos y piezas especiales, y todas las pruebas necesarias para asegurar el correcto funcionamiento de la tubería.

La medición y abono de la obra ejecutada en un momento dado será:

a) El 90 % del total de la unidad cuando esté totalmente instalada.

b) El 10 % del total de la unidad cuando haya sido probada satisfactoriamente.

## Artículo 4.4.7 Pruebas de la tubería instalada en redes de saneamiento

Para la realización de las pruebas de la tubería instalada en redes de saneamiento, la metodología a emplear será diferente según se trate de conducciones cuyo funcionamiento hidráulico sea en gravedad o en impulsión.

Con carácter general, se deberá probar la longitud total de la red instalada, salvo que el respectivo proyecto especifique otra distinta, en cuyo caso, la Dirección de Obra determinará los tramos que deben probarse.

Conducciones enterradas en gravedad

Cuando el funcionamiento hidráulico de la conducción sea en gravedad la prueba de la tubería instalada se realizará conforme a la metodología de la Norma UNE-EN 1610:2016 *"Instalación y pruebas de acometidas y redes de saneamiento",* según la cual la prueba podrá hacerse bien con aire o con agua.

Podrá realizarse la prueba por separado de entronques, registros y cámaras de inspección, por ejemplo, la de tuberías con aire, y la de registros con agua. En el caso de un fallo aislado o continuo en la prueba de aire, se permite el recurso a la prueba de agua y el resultado de la misma por sí sola deberá ser decisivo.

En cualquier caso, la prueba se realizará una vez se hayan colocado los tubos, los pozos y previo al relleno de la zanja, para lo que se obturará la entrada de la tubería en el pozo aguas abajo del tramo en prueba, así como cualquier otro punto por el que pudiera salirse el agua, llenándose completamente de agua la tubería y el pozo situado aguas arriba del tramo a probar.

- Prueba con aire (método L)

La prueba con aire podrá hacerse conforme a cuatro metodologías diferentes (LA, LB, LC o LD), basadas en que a medida que aumenta la presión del ensayo disminuye la duración de la prueba. La Dirección de Obra establecerá cuál es de aplicación en cada caso.

Los valores de la presión de prueba (STP), la duración del ensayo (t) y el descenso de presión admisible ($\Delta$P) serán los establecidos en la tabla siguiente, según cual sea el material de la conducción, el diámetro nominal y el método de prueba seleccionado.

| Material | Método prueba | STP | ΔP | Duración de la prueba t (minutos) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | (mbar) | | DN 100 | DN 200 | DN 300 | DN 400 | DN 600 | DN 800 | DN 1000 |
| Tubería de hormigón seca | LA | 10 | 2,5 | 5 | 5 | 5 | 7 | 11 | 14 | 18 |
| | LB | 50 | 10 | 4 | 4 | 4 | 6 | 8 | 11 | 14 |
| | LC | 100 | 15 | 3 | 3 | 3 | 4 | 6 | 8 | 10 |
| | LD | 200 | 15 | 1,5 | 1,5 | 1,5 | 2 | 3 | 4 | 5 |
| Tubería de hormigón y de otros materiales mojada | LA | 10 | 2,5 | 5 | 5 | 7 | 10 | 14 | 19 | 24 |
| | LB | 50 | 10 | 4 | 4 | 6 | 7 | 11 | 15 | 19 |
| | LC | 100 | 15 | 3 | 3 | 4 | 5 | 8 | 11 | 14 |
| | LD | 200 | 15 | 1,5 | 1,5 | 2 | 2,5 | 4 | 5 | 7 |

Tabla 9. Presión de prueba, indicador de presión y tiempo para ensayos con aire

- Prueba con agua (método W)

La prueba con agua consistirá en someter al tramo en prueba a una presión de prueba que no deberá ser superior a 50 kPa ni inferior a 10 kPa.

Transcurrido un tiempo de acondicionamiento posterior al llenado de las tuberías, 60 minutos suele ser suficiente, aunque puede ser necesario un periodo más largo para condiciones climáticas secas en el caso de tubos de hormigón, se inspeccionarán los tubos, las juntas y los pozos, comprobándose que no haya pérdidas de agua significativas ni movimientos aparentes en la tubería.

A continuación, se procederá a medir y a anotar la cantidad de agua ($\Delta V$) que es necesario inyectar para mantener la presión de prueba (± 1kPa) durante un periodo no inferior a treinta minutos, debiendo ser esta inferior a los siguientes valores:

- 0,15 l/m$^2$ para las tuberías.
- 0,20 l/m$^2$ para tuberías incluyendo los pozos de registro.
- 0,40 l/m$^2$ para los pozos de registro.

Conducciones enterradas en impulsión

Cuando el funcionamiento hidráulico de la conducción sea en impulsión, la prueba de la tubería instalada se realizará conforme a la metodología general de la Norma UNE-EN 805:2000.

Dicha metodología general es de aplicación para las conducciones de cualquiera de los materiales incluidos en este Pliego excepto para las de comportamiento viscoelástico, como las de PE, en cuyo caso el procedimiento de verificación a seguir será el descrito en el Anexo A.27 de dicha norma.

Para todas las conducciones, la presión de prueba, STP, se calculará a partir de la presión máxima de diseño, MDP, considerando los siguientes dos casos:

-Golpe de ariete calculado en detalle:

$$STP = MDPc + 0,1 \quad (MPa)$$

-Golpe de ariete estimado o no calculado en detalle, el menor valor de los siguientes:

$$STP = MDPa + 0,5 \quad (MPa)$$

$$STP = 1,5\ MDPa \quad (MPa)$$

Siendo:

MDPc Presión máxima de diseño con golpe de ariete calculado en detalle (MPa).

MDPa Presión máxima de diseño con golpe de ariete estimado o no calculado en detalle (MPa).

En los casos de impulsiones y grandes diámetros, deberá calcularse en detalle el valor del golpe de ariete. Sólo en caso de redes por gravedad puede ser estimado como MDPa = 1,2 DP, debiendo cumplir MDPa ≥ DP + 0,2 MPa.

El procedimiento de prueba, conforme a la metodología general indicada en la Norma UNE-EN 805:2000, puede llevarse a cabo en tres fases:

- Prueba preliminar.
- Prueba de purga.
- Prueba principal o de puesta en carga.

Prueba de purga

La presencia de aire en la conducción produce datos erróneos y reduce la precisión de la prueba principal de presión. La Dirección de Obra especificará si dicha prueba debe llevarse a cabo. En caso afirmativo, se procederá para realizar el ensayo según se describe en el Anexo A.26 de la Norma UNE-EN 805:2000, que es el desarrollado en este apartado en los siguientes pasos:

- Se presuriza la conducción hasta alcanzar la presión de prueba de la red (STP), prestando atención a que la purga del equipo de prueba se complete.
- Se extrae un volumen de agua a contabilizar ΔV de la conducción midiéndose la caída de presión correspondiente ΔP.
- Se compara el volumen de agua extraído con el volumen de la pérdida de agua admisible $\Delta V_{max}$ correspondiente a la caída de presión medida ΔP, calculada según la siguiente fórmula:

$$\Delta V_{máx} = 1{,}5 \cdot V \cdot \Delta P \cdot \left(\frac{1}{Ew}\right) + \frac{ID}{e \cdot E}$$

Siendo:

$\Delta V_{máx}$: Pérdida de agua admisible (l)

V: Volumen del tramo de conducción en prueba (l)

ΔP: Caída de presión medida durante la prueba (MPa)

E: Módulo de elasticidad del material de la conducción (MPa)

$E_W$: Módulo de compresibilidad del agua ($2{,}1 \times 10^3$ MPa)

ID: Diámetro interior de la conducción (mm)

e: Espesor nominal de la conducción (mm)

1,5: Factor de corrección que considera la cantidad de aire restante admisible antes de la prueba principal de presión.

| ***Material*** | ***E (MPa)*** |
|---|---|
| Fundición | $1{,}70 \times 10^5$ |
| Acero | $2{,}10 \times 10^5$ |
| Hormigón | $2{,}00 \times 10^4 – 4{,}00 \times 10^4$ |
| PVC-O | 3500 |
| PE | 1.000 (corto plazo) 150 (largo plazo) |
| PRFV | $1{,}0 \times 10^4 – 3{,}9 \times 10^4$ |

Prueba principal o de puesta en carga

La prueba principal de presión no debe comenzar hasta que hayan sido completadas satisfactoriamente la prueba preliminar y la prueba de purga especificada.

Se admiten dos métodos de prueba básicos:

- El método de prueba de caída o pérdida de presión.
- El método de prueba de pérdida de agua.

La Dirección de Obra determinará el método a utilizar, cuyo desarrollo se deberá ajustar a lo siguiente:

- Método de prueba de caída o pérdida de presión

  Para evaluar la pérdida de presión, la presión hidráulica interior se aumentará de forma constante y gradual mediante bombeo, de forma que el incremento de presión no supere 0,1 MPa por minuto, hasta alcanzar el valor de STP.

  Alcanzado dicho valor, se desconectará el bombeo y no se admitirá la entrada de agua en al menos una hora. Transcurrido este tiempo, se medirá con un manómetro el descenso de presión durante dicho intervalo, que deberá ser inferior a 0,02 MPa.

- Método de prueba de pérdida de agua

  Para medir la pérdida de agua se pueden emplear dos métodos equivalentes: medida del volumen evacuado o medida del volumen bombeado.

  En ambos métodos se incrementará la presión regularmente mediante bombeo hasta alcanzar el valor de STP en la conducción. Posteriormente se mantendrá la STP mediante bombeo, si es necesario, durante un periodo no inferior a una hora.

  Para el método de medida del volumen evacuado, se desconectará la bomba y no se permitirá que entre más agua en la conducción durante un periodo de prueba de al menos una hora. Al final de este periodo se medirá la presión reducida y se procederá a recuperar la STP bombeando. Se medirá la pérdida, evacuando agua hasta que se alcance nuevamente la anterior presión reducida.

  Para el método de medida del volumen bombeado, se medirá la cantidad de agua que es necesario inyectar para mantener la presión de prueba de la red durante el periodo de tiempo indicado anteriormente.

  El volumen final evacuado o suministrado durante la primera hora de prueba no deberá exceder el valor dado por la siguiente expresión:

$$\Delta V_{máx} = 1{,}2 \cdot V \cdot \Delta P \cdot \left[\left(\frac{1}{Ew}\right) + \frac{ID}{e \cdot D}\right]$$

  Siendo:

  $\Delta V_{máx}$: Pérdida de agua admisible (l)

V: Volumen del tramo de conducción en prueba (l)

ΔP: Caída de presión medida durante la prueba (0,02 MPa)

E: Módulo de elasticidad del material de la conducción (MPa)

$E_W$: Módulo de compresibilidad del agua ($2{,}1 \times 10^3$ MPa)

ID: Diámetro interior de la conducción (mm)

e: Espesor nominal de la conducción (mm)

1,2: Factor de corrección que, entre otros aspectos, tiene en cuenta el efecto del aire residual existente en la conducción

Cuando, durante la realización de esta prueba principal o de puesta en carga, el descenso de presión o las pérdidas de agua sean superiores a los valores admisibles, el Adjudicatario estará obligado a corregir los defectos observados, repasando las juntas que pierdan agua, cambiando si es preciso algún tubo, de forma que al final se consiga que el resultado de la prueba sea satisfactorio, repitiéndose ésta las veces que sea necesario para conseguirlo.

Todos los gastos ocasionados por las pruebas y ensayos de las tuberías instaladas en redes de abastecimiento o agua regenerada serán de cuenta del Adjudicatario, estando incluidos en los precios de los distintos tipos de tubos.

### Artículo 4.4.8 Accesorios y piezas especiales en acero

Los accesorios y piezas especiales de acero deberán cumplir lo especificado para los mismos en la UNE-EN 10224:2003 *"Tubos y accesorios en acero no aleado para el transporte de líquidos acuosos, incluido agua para consumo humano. Condiciones técnicas de suministro".*

#### i) Materiales

Los materiales empleados en la fabricación los accesorios y piezas especiales de acero serán con carácter general de calidad mínima S 275 JR y deberán cumplir lo especificado en la Norma UNE-EN 10025.

#### ii) Medición y abono

Los carretes pasamuros de acero de calidad mínima S 275 JR se medirán por metros (m) realmente colocados en obra y se abonarán al precio que corresponda, en función del diámetro exterior y del espesor, de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

En dichos precios se considera incluido el revestimiento interior de cuatrocientas micras (400 µm) de pintura epoxi alimentaria, el revestimiento exterior de tres milímetros (3 mm) de polietileno, la preparación previa de ambas superficies a grado SA 2 ½, la parte proporcional de junta soldada, la colocación, así como los medios auxiliares y pruebas necesarias para su correcto funcionamiento.

Los accesorios y piezas especiales de acero se medirán por kilogramos (kg) realmente colocados y se abonarán al precio correspondiente, en función del tipo de acero empleado, de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

## SUBCAPÍTULO 4.5 EDIFICACIÓN

### Artículo 4.5.1 Albañilería

#### i) Materiales

- **Forjados unidireccionales**

Los forjados unidireccionales estarán formados por dobles viguetas autorresistentes de hormigón pretensado, separadas entre sí sesenta centímetros (60 cm), con entrevigado de bloque de hormigón y con capa de compresión de cinco centímetros (5 cm) de HA-25/P/20/I.

Deberán cumplir las prescripciones establecidas en la Instrucción de Hormigón Estructural (EHE).

Las viguetas que se reciban en obra llevarán marcado el nombre del sistema, la designación de su tipo, que corresponde a las características mecánicas garantizadas en su ficha de características, y la fecha de fabricación.

- **Forjado reticular**

Los forjados serán con nervios de hormigón armado dispuestos en dos direcciones perpendiculares entre sí, y con capa de compresión de HA-25/P/20/I.

Las piezas de entrevigado serán bloques de hormigón o cerámicas sin alabeos, roturas ni fisuraciones, los cuales deberán resistir, apoyado en sus bordes, una carga vertical de veinticinco newton por milímetro cuadrado (25 $N/mm^2$).

Deberán cumplir las prescripciones establecidas en la Instrucción de Hormigón Estructural (EHE) y en el Código Técnico de la Edificación (CTE).

- **Forjado placas alveolares**

Los forjados de placas alveoladas prefabricadas de hormigón deberán cumplir las prescripciones establecidas en la Instrucción de Hormigón Estructural (EHE).

Sobre las placas se dispondrá una capa de compresión de cinco centímetros (5 cm) de HA/35/P/I.

- **Fábrica de ladrillos**

Los materiales empleados deberán cumplir las especificaciones del Código Técnico de la Edificación, Documento Básico: Seguridad Estructural-Fábrica.

- **Fábrica de bloques de hormigón**

Los materiales empleados en la fabricación de los bloques de hormigón cumplirán con la Norma UNE-EN 771-3:2011+A1:2016 "*Especificaciones de piezas para fábrica de albañilería. Parte 3: Bloques de hormigón (áridos densos y ligeros)",* sin perjuicio de lo establecido en la Instrucción de Hormigón Estructural (EHE) y en la Instrucción para la Recepción de Cementos (RC-16).

- **Mampostería**

Se define como mampostería a la obra de fábrica realizada con piedras sin labra o con poca labra de tamaño tal que permita manejarlas a mano.

La mampostería se clasifica en:

- Careada: en la que los mampuestos están labrados por una sola cara que define el paramento.
- Concertada: la que se construye colocando, en sus paramentos vistos, mampuestos con sus caras labradas en forma poligonal más o menos regular para que su asiento se verifique sobre superficies sensiblemente planas.
- Descafilada: cuando los mampuestos están labrados en los bordes de una cara, que define el paramento dejándose el resto de dicha cara saledizo o averrugado.
- En seco: la construida colocando los mampuestos a hueso, sin ningún mortero de unión ante ellos.
- Ordinaria: cuando se colocan, incluso en el paramento, piedras o mampuestos de varias dimensiones, sin labra ninguna, arreglada solamente a martillo.

La piedra a emplear en mampostería deberá cumplir las siguientes condiciones:

- Ser homogénea, de grano uniforme y resistente a las cargas que tenga que soportar. Se rechazarán las piedras que al golpearlas no den fragmentos de aristas vivas.
- Carecer de grietas, coqueras, nódulos y restos orgánicos. Dará sonido claro al golpearlas con el martillo.
- Ser inalterable al agua y a la superficie y resistente al fuego.
- Tener suficiente adherencia a los morteros.

Cada pieza deberá carecer de depresiones capaces de debilitarla, o de impedir su correcta colocación y será de una conformación tal, que satisfaga, tanto en su aspecto como estructuralmente, las exigencias de la fábrica especificadas.

Las dimensiones en las piedras serán las indicadas en los planos y, si no existieran tales detalles al respecto, se preverán las dimensiones y superficies de las caras necesarias para obtener las características generales y el aspecto indicado en los mismos.

Por lo general las piedras tendrán un espesor superior a diez centímetros (10 cm), anchos mínimos de una vez y medio su espesor y longitudes mayores de una vez y medio su ancho. Cuando se emplean piedras de coronación, sus longitudes serán, como mínimo, las del ancho del asiento de su tizón más veinticinco centímetros (25 cm).

Por lo menos un cincuenta por ciento (50 %) del volumen total de la mampostería estará formado por piedras cuya cubicación sea, como mínimo, de veinte decímetros cúbicos (20 $dm^3$).

Las piedras se trabajarán con el fin de quitarles todas las partes delgadas o débiles.

La capacidad de absorción de agua será inferior al dos por ciento (2 %) en peso.

- **Morteros de cemento**

En el Proyecto se definirá la dosificación en función del uso a que se destina.

El cemento será CEM I-32,5. En general, el mortero para fábricas de ladrillo y mampostería tendrá una dosificación de doscientos cincuenta kilogramos (250 kg) de CEM I-32,5 por metro cúbico, y para el resto de los usos será superior a cuatrocientos cincuenta kilogramos (450 kg) de CEM I-32,5 por metro cúbico.

- **Cubiertas**

Los materiales a utilizar en la formación de cubiertas deberán cumplir las prescripciones establecidas en el apartado 2.4 del Documento Básico HS: Salubridad del Código Técnico de la Edificación (CTE).

- **Paneles prefabricados de hormigón**

Los paneles de hormigón son elementos prefabricados de hormigón utilizados en el cerramiento de fachadas de edificios, sin que formen parte de la estructura resistente.

El hormigón y sus elementos constitutivos cumplirán las especificaciones establecidas en la Instrucción de Hormigón Estructural (EHE).

Además, se tendrán en cuenta las "Recomendaciones Internacionales unificadas para el cálculo y la ejecución de las estructuras formadas por la unión de paneles de gran tamaño" del Comité Europeo del Hormigón (CEB).

Los paneles serán tipo “sándwich”, formados por dos planchas de hormigón de cinco centímetros (5 cm) de espesor, con rigidizadores interiores y capa interior de poliestireno de diez centímetros (10 cm) de espesor.

El tamaño máximo admisible del árido será de veinte milímetros (20 mm).

Las características del hormigón que se utilice en la fabricación de los paneles de cerramiento serán definidas por el fabricante para que el producto cumpla con las condiciones de calidad y características declaradas por aquel.

La resistencia característica del hormigón de los paneles de cerramiento a los veintiocho días no será inferior a doscientos kilopondios por centímetro cuadrado (200 kp/cm$^2$) para el hormigón en masa o armado y ciento cincuenta kilopondios por centímetro cuadrado (150 kp/cm$^2$) para morteros reforzados con fibras sintéticas.

La resistencia al fuego mínima de los paneles de cerramiento vendrá determinada por lo especificado al respecto en la UNE-EN 1363-2:2000 "*Ensayos de resistencia al fuego. Parte 2: Procedimientos alternativos y adicionales".*

En la documentación del fabricante deberá venir especificado el coeficiente de dilatación térmica, el de hinchamiento y la resistencia térmica del panel, así como el tipo de acabado exterior, o revestimiento del mismo.

### ii) Ejecución

- **Forjados unidireccionales**

Para la ejecución de los forjados de viguetas de hormigón pretensado deberán cumplirse las prescripciones establecidas en la Instrucción de Hormigón Estructural (EHE) y en el Código Técnico de la Edificación (CTE).

Las viguetas se almacenarán en obra en su posición normal de trabajo, sobre apoyos de suficiente extensión y evitando contacto con el terreno o con cualquier producto que las pueda manchar o deteriorar.

- **Forjado reticular**

Los forjados serán con nervios de hormigón armado dispuestos en dos direcciones perpendiculares entre sí, y que cumplan las condiciones que establecen las bases de cálculo del Anejo correspondiente.

Las piezas de entrevigado serán de bloques de hormigón o cerámicas sin alabeos, roturas ni fisuraciones, deberán resistir, apoyado en sus bordes una carga vertical de doscientos cincuenta kilogramos por metro cuadrado (250 kg/m$^2$). Los puntales del encofrado serán capaces de soportar el peso del forjado que sobre él gravita más un treinta por ciento (30 %) por carga accidental durante la construcción. Se colocarán bajo las sopandas, no debiéndose utilizar diámetros inferiores a siete centímetros (7 cm), ni admitiéndose más de un puntal empalmado por cada cuatro voladizos.

Conviene introducir riostras y cruces de San Andrés discrecionalmente, sobre todo el contorno. Cuando la altura supere los cuatro metros (4 m) se tomarán precauciones en la disposición de puntales y su arriostramiento.

Cuando se trate del primer forjado se cuidará el apoyo de los puntales sobre el terreno.

El desencofrado se realizará:

- En condiciones normales de temperatura, el plazo de desencofrado será de veintiún días.
- Puede homogeneizarse la planta superior a los ocho días del hormigonado de la planta inferior, siempre que ésta se encuentre apuntalada.
- No deben existir más de tres plantas encofradas simultáneamente.
- Para luces de recuadros mayores de 6,0 x 6,0 m o bien cuando la temperatura se aproxime a los 5 °C, los ocho días del segundo apartado se sustituirán por diez días.
- En caso de voladizos el desencofrado se hará de manera que la fecha se obtenga gradualmente.
- Se evitará el desencofrado súbito y sin precauciones, evitando el impacto de los encofrados sobre los forjados.

Durante la construcción de los cerramientos y tabiques se evitará el acopio excesivo de material sobre el forjado e igualmente se tendrá en cuenta la deformación propia del mismo a fin de evitar la formación de fisuras en las fábricas.

Es muy importante evitar los agujeros en las zonas macizas de capiteles. En el caso de que sea inevitable los orificios, se preverán al hacer el Proyecto a fin de disponer el armado especial que cada caso requiera y poder emplear como molde tubos de PVC o metálicos sin herir el hormigón del capitel.

Se verificará que no disminuya la resistencia al esfuerzo cortante o a la flexión en el elemento y en ningún caso se practicarán agujeros después de hormigonar el forjado.

Las piezas de aligeramiento se mojarán previamente y en este estado se encontrarán en el momento de hormigonar.

La alineación de las piezas debe ser lo más perfecta posible utilizando el procedimiento que se estime oportuno.

Los capiteles o zonas macizas del forjado se anclarán a los pilares según el detalle que deberá figurar en los planos correspondientes.

Antes de hormigonar, se revisará la disposición, calibres y recubrimientos de las armaduras.

A no ser que se indique expresamente otra cosa, los nervios perimetrales tendrán un ancho mínimo de veinticinco centímetros (25 cm), pero siempre mayor que el canto del forjado.

Cuando existan fábricas u otro tipo de cargas que apoyen sobre forjados, se asegurará que dicho forjado ha sido calculado para dicha carga, a cuyo fin en los planos se indicará la zona prevista para dicho apoyo.

Se evitará la colocación de maquinillos en los bordes de los forjados sin el debido apeo.

Cuando se dejen vanos para la implantación de la grúa se procurará que no afecten a las fajas principales entre pilares y sobre todo que no deje en vuelo el forjado cortado.

- **Forjado placas alveolares**

La ejecución de los forjados de placas alveoladas cumplirá con las especificaciones establecidas al respecto en el artículo 76º y en el Anejo N.º12 de la Instrucción de Hormigón Estructural (EHE).

- **Fábrica de ladrillos y fábrica de bloques de hormigón**

El cálculo y la ejecución de las fábricas se regirán por el artículo 7 del Código Técnico de la Edificación, Documento Básico: Seguridad Estructural-Fábrica.

- **Mampostería**

Las fábricas de mampostería se ejecutarán con la mayor trabazón posible, evitándose que queden divididas en hojas en el sentido del espesor.

Si los mampuestos no tuvieran el suficiente cuerpo para constituir por ellos solos el espesor del muro y este tuviera necesidad de ejecutarse en dos hojas, se trabarán estas, colocando de trecho en trecho llaves o perpiaños de mucha cola que atizonen todo el grueso. Si, por el contrario, los mampuestos fueran de mucho volumen, deberán partirse para conseguir la regularización de la fábrica.

Si el espesor del muro fuera muy grande y no pudiera atravesarse con una sola piedra, se colocarán dos o más alternadas que alcancen más de la mitad de su espesor y, en caso de que lo juzgue necesario la Dirección de Obra, se engatillarán por sus colas con hierros o abrazaderas metálicas especiales. En estos muros de gran espesor se dejarán asimismo mampuestos de resalto, de modo que formen llaves verticales que enlacen la hilada construida con la que se va a colocar encima.

Las mismas precauciones de buena trabazón anteriormente señaladas se aplicarán indispensablemente a la ejecución de ángulos y esquinas. A este fin, se emplearán en esta parte de las fábricas las piedras de mayor tamaño de que se disponga y cuya altura corresponda a la que tenga la hilada o el banco en ejecución. Estas piedras de ángulo tendrán ligeramente labradas las dos caras que hayan de formar los paramentos del muro, y su colocación se hará alternando las juntas laterales.

Las fábricas de mampostería estarán perfectamente aplomadas y con sus aristas verticales, debiéndose emplear en su construcción la menor cantidad posible de ripios.

La mampostería concertada de paramentos habrá de serlo por hiladas horizontales y con la piedra desbastada a pico grueso por todas sus caras. Las líneas de juntas verticales deberán ser alternadas y en ningún caso habrá, entre la junta de dos hiladas contiguas, una distancia inferior a veinte centímetros (20 cm). La superficie de la cara de paramentos habrá de ser de forma aproximadamente rectangular, siendo el espesor máximo admitido en las juntas de dos centímetros (2 cm).

Las juntas deberán estar sin falta de mortero y apretado para que el relleno sea completo en profundidad.

Los mampuestos se colocarán en su primera hilada sobre tortada de mortero de dos o tres centímetros (2 o 3 cm) de espesor, y previa limpieza y riego del asiento, regándose también los mampuestos si fuera necesario. Se procederá primero a sentar los mampuestos de los dos paramentos, colocándose después los principales mampuestos de relleno a baño de mortero, bien ligados entre sí, acuñados con ripio, pero cuidando de la perfecta trabazón indicada en los párrafos anteriores. En los muros de poco espesor se enrasarán todas las hiladas y se procurará guardar la horizontalidad perfectamente. En el aparejo no deben concurrir más de tres aristas de mampuestos en un solo vértice.

En la mampostería careada las piedras del paramento exterior se prepararán de tal modo que las caras visibles tengan forma poligonal que llene el hueco que dejen los mampuestos contiguos. Estos polígonos podrán ser o no regulares, pero queda prohibida la concurrencia de cuatro aristas de mampuestos en un mismo vértice.

La trabazón tendrá piedras de atizonado completo en un veinticinco por ciento (25 %) del total de las piedras.

- **Cubiertas**

Las cubiertas deberán ejecutarse cumpliendo en todo momento las prescripciones establecidas en el apartado 2.4 del Documento Básico HS: Salubridad del Código Técnico de la Edificación (CTE).

- **Forjados de placas alveoladas prefabricadas**

Para el control de calidad de los forjados de placas alveoladas prefabricadas se seguirán las prescripciones establecidas al respecto en la Instrucción de Hormigón Estructural (EHE).

- **Fábrica de ladrillos**

Las características de los ladrillos se comprobarán antes de su utilización mediante la ejecución de los ensayos cuya frecuencia y tipo se señalan a continuación, previa autorización de la Dirección de Obra.

Por cada 500 $m^2$ de fábrica o fracción:

- Eflorescencia, si procede, según UNE 136029:2019.
- Heladicidad, si procede, según UNE-EN 772-22:2021.
- Succión según UNE-EN 772-11:2011.
- Resistencia a compresión según UNE-EN 772-1:2011+A1:2016.

Para el control de la ejecución se seguirá el artículo 8 del Código Técnico de la Edificación, Documento Básico: Seguridad Estructural-Fábrica.

- **Mampostería**

Las tolerancias de desvío en las caras de asiento respecto de un plano, y en juntas, respecto de la línea recta, no excederán de quince milímetros (15 mm).

- **Cubiertas**

Para el control de calidad de la recepción de los materiales y de la ejecución de las cubiertas se seguirán las prescripciones establecidas en el Código Técnico de la Edificación.

Tolerancias

Se verificará que no haya irregularidades ni que se hayan formado burbujas en la superficie impermeabilizada: tolerancia menor o igual a cinco milímetros (5 mm).

La prueba que se expone a continuación está destinada a comprobar el funcionamiento de la solución impermeabilizante dispuesta en una cubierta plana. El ensayo considerado como prueba de servicio, se fundamenta en la detección de posibles humedades cuando la cubierta se inunda durante un determinado período de tiempo.

Una vez terminado el sistema de impermeabilización se procede a efectuar la obstrucción de los desagües. Los puntos de desagüe tienen que estar conectados a la red o canalizados a un punto de evacuación suficiente y que no presente ningún tipo de riesgo de inundación de paredes sensibles de la obra.

Acto seguido se llena la cubierta con agua hasta llegar a un nivel de cinco centímetros (5 cm), aproximadamente, por debajo del punto más alto, del encuentro más bajo, de la impermeabilización con paramentos.

Se mantiene la inundación y el nivel indicado durante veinticuatro horas, como mínimo.

Pasado dicho periodo se procede a un minucioso examen de la parte inferior del forjado donde está situada la cubierta, para observar la posible presencia de puntos de filtración o pérdida de agua. Hay que fijarse especialmente en puntos singulares como desagües, encuentro con muros, pilares, juntas, etc.

Una vez efectuada la inspección se procederá a vaciar la zona inundada.

En cubiertas en las que no sea posible la inundación, se procede a la aplicación de un riego continuo, en la superficie, en un espacio de tiempo no inferior a las cuarenta y ocho horas.

### Artículo 4.5.2 Revestimientos

#### i) Materiales

- Enfoscados y enlucidos

Los materiales que forman el mortero de cemento a utilizar en el enfoscado de paramentos cumplirán con las especificaciones establecidas en la Norma UNE-EN 998-1:2018 *"Especificaciones de los morteros para albañilería. Parte 1: Morteros para revoco y enlucido".*

La cal a emplear en los revestimientos cumplirá las especificaciones de la UNE-EN: 459-1:2016 *"Cales para la construcción. Parte 1: Definiciones, especificaciones y criterios de conformidad".*

Los yesos utilizados en guarnecidos, tendidos y enlucidos deberán cumplir las especificaciones que figuran en la Norma UNE-EN 13279-1:2009 "*Yesos de construcción y conglomerantes a base de yeso para la construcción. Parte 1: Definiciones y especificaciones".*

Los prefabricados de yeso o escayola a utilizar en techos cumplirán lo especificado para los mismos en las siguientes Normas: UNE-EN 14246:2007 "*Placas de escayola para techos suspendidos. Definiciones, especificaciones y métodos de ensayo"* y UNE-EN 520:2005+A1:2010 *Placas de yeso laminado. Definiciones, especificaciones y métodos de ensayo*".

- Alicatados, solados y pavimentos

Los materiales a emplear en alicatados y solados de superficies deberán cumplir las especificaciones establecidas en la Norma UNE-EN 14411:2016 "*Baldosas cerámicas. Definiciones, clasificación, características y marcado".*

Para los pavimentos, en función del material, la normativa aplicable será la siguiente:

| TIPO DE PAVIMENTO | NORMA |
|---|---|
| Baldosas de terrazo | UNE-EN 13748-1:2005 "*Baldosas de terrazo. Parte 1. Baldosas de terrazo para uso interior"* |
| Cemento continuo | Instrucción de Hormigón Estructural (EHE) y la Instrucción para la Recepción de Cementos (RC) |
| Uso industrial | NFP 11-213 |

Tabla 10. Normativa aplicable sobre pavimentos

- Pinturas

Las materias primas constitutivas de las pinturas se regirán por las normas INTA Comisión 16 - Pinturas, Esmaltes y Barnices.

Los aceites secantes cumplirán las condiciones exigidas en las normas INTA 16 11 que le corresponda.

Los pigmentos y cargas cumplirán las exigencias de las normas INTA 16 12 que le sean de aplicación.

Los disolventes compuestos se regirán por las normas INTA 16 13 y los preparados por las 16 23 que le sean de aplicación.

Los plastificantes cumplirán las condiciones exigidas en la Norma INTA 16 14 01 A.

Los secantes se regirán por la Norma INTA 16 15 01 A.

Las resinas se regirán por las Normas INTA 16 16 que le sean de aplicación.

El Adjudicatario especificará las materias primas de las pinturas ofertadas y las normas INTA por las cuales se regirán.

### ii) Ejecución

- Enfoscados y enlucidos

Los enfoscados y enlucidos se ejecutarán de acuerdo con las especificaciones recogidas en la Norma Tecnológica de la Edificación (NTE) correspondiente, sin perjuicio de lo que, para los mismos, se establezca en el Código Técnico de la Edificación.

- Alicatados, solados y pavimentos

Los alicatados, solados y pavimentos se ejecutarán de acuerdo con las especificaciones recogidas en la Norma Tecnológica de la Edificación (NTE) correspondiente, sin perjuicio de lo que, para los mismos, se establezca en el Código Técnico de la Edificación.

- Pinturas

Para su ejecución será de aplicación las recomendaciones recogidas en la Norma Tecnológica de la Edificación: NTE-RPP “Pinturas”.

El material a emplear se suministrará en los envases originales, sellados y con la etiqueta del fabricante con la que se proporcionarán las instrucciones necesarias para su correcta aplicación.

Igualmente estarán impresas en el envase la fecha de fabricación, caducidad y el número de lote.

Los materiales deben suministrarse con el correspondiente certificado de composición con referencia al número del lote e indicando el número de kilogramos suministrados.

Los materiales se almacenarán de acuerdo con las instrucciones dadas por el fabricante y en todo caso estarán protegidos de la humedad, del sol directo y en locales bien ventilados.

La temperatura del recinto de almacenamiento no debe ser inferior a diez grados centígrados (10 °C), ni superior a treinta y dos grados centígrados (32 °C).

La superficie de aplicación estará preparada con todos los elementos (puertas, ventanas, etc.) recibidos y totalmente nivelada y lisa.

No se pintará bajo condiciones climatológicas adversas: tiempo lluvioso, humedad relativa superior al 85 %, temperatura no comprendida entre veintiocho y seis grados centígrados.

### iii) Control de calidad

- Enfoscados y enlucidos

Control de calidad de la fabricación

Si el producto viene envasado en sacos se muestrearán el cinco por ciento (5 %) de los sacos. Cuando la partida se suministre a granel, se tomarán cinco muestras de cada partida.

Los ensayos a realizar y los criterios para evaluar la conformidad de la cal a emplear en los revestimientos serán los especificados UNE-EN 459, en sus partes 2 y 3.

Los ensayos a realizar en los yesos utilizados en guarnecidos, tendidos y enlucidos serán los indicados en las Normas UNE-EN 13279-2:2014 "*Yesos de construcción y conglomerantes a base de yeso para la construcción. Parte 2: Métodos de ensayo"* y en la UNE 102042:2014 *Yesos y escayolas de construcción. Otros métodos de ensayo."*

Todos los productos suministrados deberán estar en posesión del marcado CE.

El número de muestras a ensayar seguirá el mismo criterio que el especificado para cales.

Control de calidad de la ejecución

Los controles a realizar durante la ejecución, así como su número serán los especificados en la Norma Tecnológica de la Edificación (NTE), aplicable en cada caso.

Tolerancias

Se cumplirán las exigencias establecidas en el Código Técnico de la Edificación.

- Alicatados, solados y pavimentos

Control de calidad de la fabricación

Los ensayos a realizar y los criterios para evaluar la conformidad de los alicatados y solados serán los especificados UNE-EN 14411:2016 "*Baldosas cerámicas. Definiciones,*

*clasificación, características, evaluación y verificación de la constancia de las prestaciones, y marcado".*

Para los pavimentos, en función del material, la normativa aplicable será la especificada en el apartado de i) Materiales.

Los ensayos se realizarán en todos los casos cada 500 $m^2$ o fracción.

Control de calidad de la ejecución

Los controles a realizar durante la ejecución, así como su número serán los especificados en la Norma Tecnológica de la Edificación (NTE), aplicable en cada caso.

Tolerancias

Según normativa citada en los apartados anteriores.

- Pinturas

Control de calidad de la fabricación

La toma de muestras se realizará conforme a la Norma INTA 16 00 21.

Los ensayos físicos y químicos se regirán por la normativa INTA que le sea de aplicación. Podrán sustituirse los ensayos mediante la presentación del certificado de calificación del INTA.

Control de calidad de la ejecución

Se realizarán los controles que se especifican en la Norma Tecnológica de la Edificación NTE-RPP "Pinturas".

### iv) Medición y abono

Los revestimientos de paramentos, suelos, escaleras y techos se medirán por metros cuadrados ($m^2$) de superficie realmente ejecutada, a excepción de los rodapiés y los revestimientos de escalera, que se medirán por metro colocado.

Las unidades se abonarán al precio que les corresponda de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

Los precios comprenden todos los materiales, mano de obra, operaciones y medios auxiliares necesarios para la correcta ejecución de las unidades de obra definidas.

### Artículo 4.5.3 Instalación de saneamiento y evacuación de aguas residuales

Las instalaciones de saneamiento y evacuación de aguas residuales deberán cumplir con las especificaciones establecidas en la normativa siguiente:

- Real Decreto 314/2006, de 17 de marzo, por el que se aprueba el Código Técnico de la Edificación y, en concreto, su Documento Básico HS 5: Evacuación de aguas.

Las instalaciones interiores de evacuación de aguas se ejecutarán con arreglo a la legislación vigente, por medio de empresas instaladoras autorizadas para el ejercicio de la actividad.

Para cada instalación se elaborará una documentación técnica, en la que se pondrá de manifiesto el cumplimiento de las prescripciones reglamentarias. Esta documentación será en forma de Proyecto suscrito por técnico titulado competente.

#### i) Medición y abono

La instalación interior de evacuación de aguas se medirá y abonará conforme a las unidades que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

En los precios unitarios se consideran incluidas las ayudas de albañilería y oficios necesarios para su total acabado y montaje.

### Artículo 4.5.4 Instalaciones interiores de suministro de agua

Las instalaciones interiores de suministro de agua deberán cumplir con las especificaciones establecidas en la normativa siguiente:

- Real Decreto 314/2006, de 17 de marzo, por el que se aprueba el Código Técnico de la Edificación y, en concreto, su Documento Básico HS 4: Suministro de agua.
- Orden 639/2006, de 22 de marzo, de la Consejería de Economía e Innovación Tecnológica, por la que se establece el procedimiento para el registro de puesta en servicio de las instalaciones interiores de suministro de agua.
- Orden 1415/2007, de 16 de mayo, de la Consejería de Economía e Innovación Tecnológica, por la que se modifica la Orden 639/2006.
- Orden de 19 de noviembre de 2013 y Orden de 12 de marzo de 2014, de la Consejería de Economía y Hacienda, por las que se modifica la Orden 639/2006.

Las instalaciones interiores de suministro de agua se ejecutarán con arreglo a la legislación vigente, por medio de empresas instaladoras autorizadas para el ejercicio de la actividad.

Para cada instalación se elaborará una documentación técnica, en la que se pondrá de manifiesto el cumplimiento de las prescripciones reglamentarias. Esta documentación, en función de las características de la instalación, será en forma de Proyecto suscrito por técnico titulado competente, o mediante Memoria Técnica suscrita por instalador autorizado.

Para cualquier instalación interior de suministro de agua, será preceptiva la autorización de la Dirección General de Industria, Energía y Minas de la Comunidad de Madrid.

#### i) Medición y abono

Los distintos elementos que componen la instalación interior de suministro de agua se medirán y abonarán conforme a las unidades que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

En los precios unitarios se consideran incluidas las ayudas de albañilería y oficios necesarios para su total acabado y montaje.

### Artículo 4.5.5 Instalaciones térmicas

Las instalaciones térmicas se ajustarán en todo momento a las disposiciones vigentes que le sean de aplicación y, en particular:

- Real Decreto 1027/2007, de 20 de julio, por el que se aprueba el Reglamento de Instalaciones Térmicas en los Edificios (RITE).
- Real Decreto 1826/2009, de 27 de noviembre, por el que se modifica el Reglamento de Instalaciones Térmicas en los Edificios, aprobado por Real Decreto 1027/2007, de 20 de julio.
- Real Decreto 249/2010, de 5 de marzo, por el que se adaptan determinadas disposiciones en materia de energía y minas a lo dispuesto en la Ley 17/2009, de 23 de noviembre, sobre el libre acceso a las actividades de servicios y su ejercicio, y la Ley 25/2009, de 22 de diciembre, de modificación de diversas leyes para su adaptación a la Ley sobre el libre acceso a las actividades de servicios y su ejercicio.
- Real Decreto 238/2013, de 5 de abril, por el que se modifican determinados artículos e instrucciones técnicas del Reglamento de Instalaciones Térmicas en los Edificios, aprobado por Real Decreto 1027/2007, de 20 de julio.
- Real Decreto 178/2021, de 23 de marzo, por el que se modifica el Real Decreto 1027/2007, de 20 de julio, por el que se aprueba el Reglamento de Instalaciones Térmicas en los Edificios.

Las instalaciones térmicas se ejecutarán con arreglo a la legislación vigente, por medio de empresas instaladoras autorizadas para el ejercicio de la actividad e instaladores

que dispongan del correspondiente carnet de instalador, según lo establecido en el Real Decreto 1027/2007.

Deberá elaborarse, previamente a la ejecución, una documentación técnica que defina las características de la instalación y que, en función de sus características, según determine el Real Decreto 1027/2007, revestirá la forma de Proyecto o Memoria suscritos por técnico titulado competente.

A la terminación de la instalación y realizadas las verificaciones pertinentes y, en su caso, la inspección inicial, el instalador autorizado ejecutor de la instalación emitirá un certificado de instalación, en el que se hará constar que la misma se ha realizado de conformidad con lo establecido en la legislación vigente y de acuerdo con la documentación técnica. En su caso, identificará y justificará las variaciones que en la ejecución se hayan producido con relación a lo previsto en dicha documentación.

El certificado, junto con la documentación técnica y, en su caso, el certificado de dirección de obra y el de inspección inicial, deberá depositarse ante la Dirección General de Industria, Energía y Minas de la Comunidad de Madrid, con objeto de registrar la referida instalación.

#### i) Medición y abono

Los distintos elementos que componen las instalaciones térmicas se medirán y abonarán conforme a las unidades que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

En los precios unitarios se consideran incluidas las ayudas de albañilería y oficios necesarios para su total acabado y montaje.

### Artículo 4.5.6 Instalaciones eléctricas de Baja Tensión

Las instalaciones eléctricas en Baja Tensión se ajustarán en todo momento a las disposiciones vigentes que le sean de aplicación y, en particular:

- Ley 21/1992, de 16 de julio, de Industria.
- Ley 2/2002, de 19 de junio, de Evaluación Ambiental de la Comunidad de Madrid.
- Ley 34/2007, de 15 de noviembre, de calidad del aire y protección de la atmósfera.
- Real Decreto 842/2002, de 2 de agosto, por el que se aprueba el Reglamento Electrotécnico para Baja Tensión y sus Instrucciones Técnicas Complementarias (ITC) BT 01 a BT 52.
- Orden 9344/2003, de 1 de octubre, de la Consejería de Economía e Innovación Tecnológica, por la que se establece el procedimiento para la tramitación,

puesta en servicio e inspección de las instalaciones eléctricas no industriales conectadas a una alimentación en baja tensión.

- Resolución de 12 de noviembre de 2013, de la Dirección General de Industria, Energía y Minas, por la que se publica modelos de impresos correspondientes a los procedimientos: "Inscripción en el Registro Integrado industrial de empresas y establecimientos", "Inscripción de talleres de reparación de vehículos", "Inscripción de almacenamientos de productos químicos" y "Tramitación de instalaciones eléctricas industriales conectadas a una alimentación en baja tensión".

Las instalaciones eléctricas se ejecutarán con arreglo a la legislación vigente, por medio de empresas instaladoras autorizadas para el ejercicio de la actividad e instaladores que dispongan del correspondiente carnet de instalador, según lo establecido en la ITC-BT 03 del Real Decreto 842/2002.

Deberá elaborarse, previamente a la ejecución, una documentación técnica que defina las características de la instalación y que, en función de sus características, según determine la correspondiente ITC, revestirá la forma de Proyecto o Memoria suscritos por técnico titulado competente.

A la terminación de la instalación y realizadas las verificaciones pertinentes y, en su caso, la inspección inicial, el instalador autorizado ejecutor de la instalación emitirá un certificado de instalación, en el que se hará constar que la misma se ha realizado de conformidad con lo establecido en el Reglamento y sus Instrucciones Técnicas Complementarias y de acuerdo con la documentación técnica. En su caso, identificará y justificará las variaciones que en la ejecución se hayan producido con relación a lo previsto en dicha documentación.

El certificado, junto con la documentación técnica y, en su caso, el certificado de dirección de obra y el de inspección inicial, deberá depositarse ante la Dirección General de Industria, Energía y Minas de la Comunidad de Madrid, con objeto de legalizar la referida instalación.

### i) Medición y abono

Los distintos elementos que componen las instalaciones eléctricas se medirán y abonarán conforme a las unidades que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

En los precios unitarios se consideran incluidas las ayudas de albañilería y oficios necesarios para su total acabado y montaje.

## Artículo 4.5.7 Dispositivos de cubrimiento de pozos, arquetas y cámaras

### i) Materiales

Los dispositivos de cubrimiento estarán formados por marco y tapa, siendo el primero el elemento fijado al alojamiento que recibe la tapa y le sirve de asiento. La tapa es el elemento móvil que cubre la abertura para el acceso.

Los marcos y tapas deberán cumplir con lo especificado en la Norma UNE-EN 124 *"Dispositivos de cubrimiento y de cierre para zonas de circulación utilizadas por peatones y vehículos. Principios de construcción, ensayos de tipo, marcado, control de calidad".*

El aseguramiento de la tapa al marco podrá realizarse por una de las siguientes formas:

- Con un dispositivo de acerrojado: Cierre con llave.
- Con suficiente masa superficial: Peso.
- Con una característica específica de diseño: Dispositivo adicional de cierre o varios dispositivos combinados: mecanismo elástico radial o circunferencial, bisagra o articulación, pestañas perimetrales…

El aseguramiento de la tapa al marco mediante cualquiera de los procedimientos anteriores o combinación de los mismos dependerá del diseño de cada dispositivo.

La clase resistente del dispositivo de cierre (A15, B125, C250, D400, E600, F900) dependerá del lugar de instalación.

En el caso de las cámaras, se incluirá un dispositivo de cierre específico para operaciones de mantenimiento cuya tapa estará formada por losas desmontables (cobijas) de hormigón armado canteadas con perfiles normalizados de acero.

Excepto las cobijas empleadas en las cámaras, los dispositivos de cubrimiento cumplirán los siguientes requisitos:

- Serán de fundición dúctil, hormigón armado, o mixtas de hormigón y acero.
- Los marcos podrán ser redondos o cuadrados.

- Las tapas serán redondas o cuadradas.
- En alojamientos visitables la cota de paso mínima será de 600 mm.

Todo dispositivo deberá estar marcado de manera duradera y visible tras la instalación conforme a lo que se establece en la Norma UNE-EN 124 y deberá constar de:

- Referencia a la Norma UNE-EN 124.
- Clase Resistente.
- Información del fabricante: Nombre y/o sigla del mismo y lugar de fabricación.
- Marca de organismo de certificación.

Adicionalmente podrá identificarse el producto con nombre y/o referencia de catálogo.

#### ii) Control de calidad

El Adjudicatario deberá facilitar la documentación técnica relativa a los dispositivos de cubrimiento, donde se indiquen las características técnicas, materias primas, proceso de fabricación y control de calidad durante el mismo, certificaciones de producto y recomendaciones de instalación y manipulación de los mismos.

Será requisito indispensable que los dispositivos de cubrimiento dispongan de certificado de producto conforme a lo establecido en la UNE-EN 124.

#### iii) Medición y abono

Los dispositivos de cubrimiento se medirán por unidades (ud) colocadas en obra y se abonarán al precio que corresponda de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

Las losas y cobijas se medirán por metros cuadrados ($m^2$) de superficie cubierta y se abonarán mediante la aplicación del precio que corresponda, de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

### Artículo 4.5.8 Elementos complementarios

Los alojamientos deberán ir provistos, además de con un dispositivo de cierre, con distintos elementos auxiliares:

- Pates de acceso.
- Escaleras.
- Escalas fijas.
- Pasarelas y plataformas.
- Barandillas y cadenas de seguridad.

- Rejilla tipo trámex.

En las instalaciones se colocarán escaleras metálicas o de obra como solución constructiva preferente, en contraposición con la instalación de escaleras de servicio fijas o pates, especialmente en aquellos recintos con equipos electromecánicos objeto de explotación y mantenimiento frecuente (elevadoras o grupos de presión, entre otros).

Igualmente, en las, cámaras, pozos, vasos de depósitos, plataformas o altillos, entre otros, en el acceso se optarán por la instalación de una escala de servicio fija, en detrimento de la sola utilización de escaleras de mano.

Las escalas verticales prefabricadas cumplirán con lo dispuesto en la Norma UNE-EN 14396:2004 sobre escaleras fijas para pozos de registro.

En el caso de elementos galvanizados, será de aplicación lo especificado en la Norma UNE-EN ISO 1461:2010 *"Recubrimientos de galvanización en caliente sobre piezas de hierro y acero. Especificaciones y métodos de ensayo".*

### i) Materiales

- **Pates**

Los pates a instalar en las obras de fábrica serán de polipropileno con alma de acero y deberán cumplir con lo especificado para los mismos en la Norma UNE-EN 13101:2003 *"Pates para pozos de registro enterrados. Requisitos, marcado, ensayos y evaluación de conformidad".*

Cuando los pates se coloquen en obras de fábrica de hormigón deberán cumplir con lo especificado para ellos en las Normas UNE-EN 1917:2008 "*Pozos de registro y cámaras de inspección de hormigón en masa, hormigón armado y hormigón con fibras de acero"* y en la UNE 127917:2015 "*Pozos de registro y cámaras de inspección de hormigón en masa, de hormigón con fibra de acero y de hormigón armado. Complemento nacional a la Norma UNE-EN 1917".*

La distancia mínima entre la pared de la obra de fábrica y la cara interior del pate será de ciento veinte milímetros (120 mm) y máxima de ciento sesenta milímetros (160 mm). La distancia entre peldaños estará comprendida entre doscientos cincuenta y trescientos milímetros (250 - 300 mm).

Los pates se dispondrán en una única alineación vertical y tendrán un ancho de trescientos milímetros (300 mm) como mínimo y de cuatrocientos milímetros (400 mm) como máximo.

Se anclarán a la pared entre setenta y cinco y ochenta y cinco milímetros (75 - 85 mm), en los taladros realizados al efecto.

La sección transversal del travesaño de apoyo será de 20 milímetros (20 mm) como mínimo y de treinta y cinco milímetros (35 mm) como máximo.

La separación del pate superior más próximo a la boca del pozo estará comprendida entre cuatrocientos y quinientos milímetros (400-500 mm).

En condiciones normales las medidas a aplicar serán las máximas de conformidad con lo dispuesto en el Real Decreto 486/1997.

Previa limpieza de los agujeros, se aplica el taco químico, anclaje químico o resina y se introduce el pate hasta su inserción total. El anclaje químico o resina deberá ser compatible con agua de consumo humano en el caso de tratarse de instalaciones de abastecimiento.

Deberán disponer de un pasamanos o asidero fijo en el exterior hasta una altura de 100 cm que facilite el acceso al interior del registro, pozo o arqueta.

Cuando no se pueda prolongar la escala con un pasamanos o asidero, se colocará preferentemente un asidero regulable en altura extraíble que sobresalgan también 100 cm.

- **Escaleras y escalas fijas**

Las escaleras serán fijas, ancladas a la pared de la estructura (escalas fijas) o transportables. En este último caso, podrán ser de una sola pieza o telescópicas y deberán ajustarse a lo establecido en su normativa específica.

Las escaleras fijas de acceso a los alojamientos o a las obras de fábrica deberán cumplir con lo especificado para las mismas en la Norma UNE-EN 14396:2004 "*Escaleras fijas para pozos de registro"* y Real Decreto 486/1997, de 14 de abril, por el que se establecen las disposiciones mínimas de seguridad y salud en los lugares de trabajo.

Las escaleras tendrán una anchura mínima de un metro (1 m), excepto en las de servicio, que será de cincuenta y cinco centímetros (55 cm) y la distancia máxima entre peldaños de treinta centímetros (30 cm).

Las escalas de servicio están formadas por una serie de escalones fijados y asegurados al edificio, arqueta, cámara, registro, depósito o pozo, entre otros. Las escalas pueden ser del tipo inclinadas (>75°) o verticales, ya sea separadas (escalones encajados en largueros laterales) o de pates (integradas):

- Distancia máxima entre escalones: 30 cm
- Profundidad o diámetro del escalón: 2-5 cm
- Ancho libre mínimo: ≥ 40 cm

≥ 35 cm en pozos que por su tamaño no se pueda de 40 cm

- Distancia mínima entre la pared posterior de los escalones y el objeto posterior más próximo de la pared del escalón: ≥ 16 cm

Cuando el paso desde el tramo final de una escala fija hasta la superficie a la que se desea acceder suponga un riesgo de caída por falta de apoyos, la barandilla o lateral de la escala se prolongará al menos un metro (1 m) por encima del último peldaño o se tomarán medidas alternativas que proporcionen una seguridad equivalente.

Las escalas fijas que tengan una altura superior a tres metros (3 m) dispondrán, al menos a partir de dicha altura, de una protección circundante.

Con carácter excepcional y debidamente justificado, no será necesaria la protección circundante en:

- Conductos, pozos angostos y otras instalaciones que, por su configuración, ya proporcionen dicha protección.
- En el interior de los vasos de los depósitos de agua, arquetas, cámaras, registros o pozos inundables, cuando debido al tamaño del recinto y su configuración, se estime que dificulta la evacuación y/o entrada de material.

En el caso de alturas superiores a 9 metros será obligatorio la instalación de plataformas de descanso cada 9 metros o fracción.

Las escaleras deberán disponer de huella, contrahuella y un pasamanos o asidero fijo en el exterior hasta una altura de 100 cm que facilite el acceso al interior del registro, pozo o arqueta. Cuando no se pueda prolongar la escala con un pasamanos o asidero, se colocará preferentemente un asidero regulable en altura extraíble que sobresalgan también 100 cm.

Los pavimentos de las huellas estarán formados por trámex que serán de acero inoxidable AISI 304, AISI 316, acero galvanizado en caliente o PRFV.

- **Pasarelas y plataformas**

Las pasarelas y plataformas deberán cumplir con lo establecido para las mismas en el Real Decreto 486/1997, por el que se establecen las disposiciones mínimas de seguridad y salud en los lugares de trabajo.

Las estructuras soportes serán de acero inoxidable, acero galvanizado o acero al carbono con protección anticorrosión.

Los pavimentos estarán formados por trámex que serán de acero inoxidable AISI 304, AISI 316, acero galvanizado en caliente o PRFV.

- **Barandillas y cadenas de seguridad**

Las barandillas y cadenas de seguridad serán de acero inoxidable AISI 304, AISI 316 o de acero galvanizado en caliente. En el caso de las barandillas, se admitirá la posibilidad de que sean de aluminio. En el interior de las instalaciones, previa aprobación de la Dirección de Obra, se admitirá la colocación de barandillas de PRFV.

Las barandillas deberán ser conformes al Real Decreto 486/1997, tendrán una altura mínima de 1 metro y dispondrán de protección que impida el paso o deslizamiento por debajo de las mismas o la caída de objetos sobre personas.

Por motivos de seguridad, las barandillas deberán cumplir las siguientes especificaciones:

- Se utilizará el procedimiento de plegado y soldadura de tubos y chapas para conseguir su forma. La soldadura deberá ser continua, no admitiéndose el punteado de elementos.
- Sus extremos serán curvados.
- Las placas de anclaje deberán garantizar la resistencia máxima en el sentido de la protección.
- La sujeción se realizará mediante anclajes con tirafondos en acero inoxidable, exceptuando los casos de base metálica, en los que se utilizará tornillería.
- Para longitudes superiores a 50 metros se instalarán uniones que permitan la dilatación.

- **Trámex**

Los trámex serán de acero inoxidable AISI 304, AISI 316, acero galvanizado en caliente o PRFV y estarán constituidos por pletinas de 30x2 o 30x3 mm, unidas formando mallas de 30x30, 20x20 o 8x8 mm. Estas mallas conformarán a su vez, piezas unitarias de dimensiones máximas de 3x1 m.

Los cercos y piezas angulares de apoyo para encajar los trámex tendrán la misma protección frente a la corrosión que estos.

El acabado deberá ser antideslizante, para lo cual los metálicos serán de doble pletina con doble diente de sierra.

Los trámex irán sujetos a la estructura soporte mediante tornillos, tuercas y piezas inferiores adaptables de acero inoxidable.

Las zonas de tránsito de peatones por debajo de la superficie cubierta con los trámex llevarán incorporado en éste, una malla de protección cuya abertura máxima de los intersticios será de ocho milímetros (8 mm).

Deberán estar diseñados para soportar operarios, herramientas y partes de la instalación que se puedan colocar sobre ellos durante el montaje y revisiones periódicas.

- **Estructuras de PRFV**

Las estructuras de PRFV deberán cumplir la Norma UNE-EN 13706 *"Materiales compuestos de plástico reforzado. Especificaciones para perfiles pultruidos" partes 1, 2 y 3*.

Los materiales a utilizar en las estructuras de PRFV serán resina ISOFTÁLICA en el caso de que el elemento se sitúe en espacios sin agresión química y resina VINILESTER, para los casos en los que se localice en espacios confinados con agresión química.

Este tipo de material no se usará nunca en exteriores.

Las características de los materiales serán las siguientes:

- Resistencia UV 5 en la escala de grises conforme a Norma UNE-EN ISO 4892-2:2014 *"Plásticos. Métodos de exposición a fuentes luminosas de laboratorio. Parte 2: Lámparas de arco de xenón"*.
- Resistencia al fuego M-1 (ASTM-E84).
- Resistencia al humo F-1 (ASTM-E84).
- Pigmentación mediante resina tintada.

### ii) Medición y abono

Los pates se medirán por unidades (ud) realmente colocadas y se abonarán al precio que corresponda de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

Las plataformas, pasarelas y emparrillados de trámex se medirán por metros cuadrados ($m^2$) de superficie realmente ejecutada y se abonarán al precio que corresponda, en función del tipo elemento, de los que figuren en el Cuadro de Precios de Canal de Isabel II.

En los precios se consideran incluidos el suministro y montaje, así como la parte proporcional de recercados, cortes, despuntes, soldaduras y todos los materiales, medios auxiliares y mano de obra necesarios para la correcta ejecución de la unidad considerada.

Los peldaños de escalera, las barandillas y las cadenas de seguridad se medirán y abonarán por metros realmente colocados, al precio que corresponda de los que figuren en el Cuadro de Precios de Canal de Isabel II.

En estos precios se consideran incluidos el suministro y montaje, así como todos los materiales, medios auxiliares y mano de obra necesarios para la correcta ejecución de la unidad considerada.

Las vigas, tubulares, escaleras y protecciones para escalera de PRFV se medirán por metros (m) colocados en obra y se abonarán al precio que corresponda, de los que figuren en el Cuadro de Precios de Canal de Isabel II.

Las plataformas y rejillas de PRFV se medirán por metros cuadrados ($m^2$) de superficie realmente colocada y se abonarán al precio que corresponda de los que figuren en el Cuadro de Precios de Canal de Isabel II.

En estos precios se consideran incluidos el suministro y montaje, así como todos los materiales, medios auxiliares y mano de obra necesarios para la correcta ejecución de la unidad considerada.

# CAPÍTULO 5 EQUIPOS MECÁNICOS

## SUBCAPÍTULO 5.1 ESPECIFICACIONES GENERALES

### Artículo 5.1.1 Acabados de superficies

El presente artículo tiene por objeto establecer los requisitos técnicos necesarios para el tratamiento y pintado de depósitos, estructuras, tuberías, soportes, accesorios, etc., construidos total o parcialmente con perfiles, chapas o tuberías en acero al carbono, así como elementos de fundición. Es aplicable a componentes aéreos, sumergidos en agua y enterrados.

Preparación de superficies

1.- Limpieza

Las grasas, aceites, suciedad y humedad deberán ser eliminados con paños o cepillos humedecidos en disolventes.

Todas las salpicaduras de soldadura, los cantos vivos y los defectos de laminación serán eliminados con muelas u otras herramientas adecuadas.

Eliminación de óxido.

2.- Chorreado

Todas las superficies de acero que posteriormente deban ser pintadas se prepararán mediante limpieza por chorreado abrasivo. El proceso se regirá por la Norma UNE-EN ISO 8501-1:2008 y se conseguirá un chorreado abrasivo “a metal casi blanco”, correspondiendo a un grado SA 2 ½ según dicha norma.

3.- Limpieza de la superficie chorreada

Inmediatamente después de finalizado el chorreado, se eliminará toda la granalla, polvo y suciedad de la zona a pintar, utilizando aire comprimido, seco y exento de grasa.

Condiciones ambientales

Al trabajar en el exterior, no se podrá aplicar ninguna imprimación en condiciones meteorológicas adversas: lluvia, niebla o condensación y rayos solares directos.

Se deberán observar, siempre los siguientes parámetros ambientales:

- La superficie a pintar esté, como mínimo, 3 °C por encima del punto de rocío.
- La humedad relativa máxima permitida para el pintado no supere, en ningún caso, el 80 %.
- Temperatura ambiente superior a 5 °C e inferior a 50 °C.
- Temperaturas superiores a 0 °C en el proceso de secado de la imprimación.

Galvanización en caliente

La galvanización en caliente se regirá y deberá cumplir con las condiciones especificadas en la UNE-EN ISO 1461:2010 "*Recubrimientos de galvanización en caliente sobre piezas de hierro y acero. Especificaciones y métodos de ensayo"* y la UNE-EN ISO 10684:2006 *"Elementos de fijación. Recubrimientos por galvanización en caliente".*

Pinturas para protección de superficies metálicas

Será de aplicación los sistemas de pintura recogidos en la Norma UNE-EN 12944-5:2018 "*Pinturas y barnices. Protección de estructuras de acero frente a la corrosión mediante sistemas de pintura protectores. Parte 5: Sistemas de pintura protectores",* considerando ambientes clasificados como C5-I y durabilidades de pintura altas (H).

Como mínimo se tendrán en cuenta las siguientes consideraciones:

- Las superficies metálicas sometidas a inmersión continua en agua o enterradas, se tratarán mediante tres capas de recubrimiento de pintura negra alquitrán-epoxi, de ciento veinte y cinco micras (125 µm) de espesor cada una.
- Las superficies metálicas no sumergidas expuestas en atmosferas industriales o en exteriores (componentes aéreos), se tratarán mediante aplicación de una pintura de imprimación, silicato de zinc, con un espesor de sesenta y cinco micras (65 µm) de película seca, una capa intermedia de pintura, epoxi-poliamida, con un espesor de setenta y cinco micras (75 µm) de película seca y una pintura de acabado, poliuretano alifático, con un espesor de cincuenta micras (50 µm) de película seca.

Maquinaria en general

Con carácter general deberán cumplir con lo especificado en los apartados de preparación superficies y aplicación de pintura, mencionados anteriormente. Los ensayos de adherencia deberán ser realizados de acuerdo con la Norma UNE-EN ISO 2409:2013 "*Pinturas y barnices. Ensayo de corte con enrejado".*

Soldaduras

Las soldaduras a acometer durante la ejecución de las obras se realizarán por arco. En el Proyecto deberá especificarse el tipo de electrodo a utilizar según la Norma UNE-EN ISO 15607:2020 "*Especificación y cualificación de los procedimientos de soldeo para los materiales metálicos. Reglas generales".*

El Adjudicatario presentará a la Dirección de Obra los planos de detalle de todas las soldaduras, indicando su localización, tipo, tamaños y extensión. Además, en los planos deberán distinguirse las soldaduras que se harán en taller de las que se harán en obra.

Los planos deberán indicar con símbolos de soldadura o esquemas, los detalles de las juntas soldadas y la preparación necesaria del metal base. Las juntas o grupo de juntas en las cuales el orden consecutivo o la técnica del soldeo son especialmente importantes, se deben controlar cuidadosamente para reducir al mínimo los esfuerzos y distorsión causados por el acortamiento al enfriarse.

La capacitación profesional de los operarios que realicen los trabajos de soldeo deberá ser acreditada según la Norma UNE-EN ISO 9606-1:2017 *"Cualificación de soldadores. Soldeo por fusión. Parte 1: Aceros" o* Código ASME Sección IX - Soldadura: *Desarrollo y calificación de Procedimientos y Soldadores.*

### Artículo 5.1.2 Forma de abono de las instalaciones y equipos

Los equipos industriales, las máquinas o elementos, las instalaciones que constituyendo una unidad en sí formen parte de la instalación general, se medirán y abonarán por unidad (ud), según el precio que corresponda de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II. Estos precios se refieren siempre a la unidad colocada, probada y en perfectas condiciones de funcionamiento.

La medición y abono de la obra ejecutada en esta clase de unidades de obra en un momento dado será la suma de las partidas siguientes:

a) El 65 % del total de la unidad cuya fabricación se hace en talleres, cuando la Dirección de Obra haya recibido la siguiente documentación: Nota de aceptación del control de calidad, certificados de materiales y pruebas correspondientes a los casos establecidos y que se haya recibido la unidad de que se trate en los almacenes de la obra.

b) El 10 % del total de la unidad una vez instalada en obra.

c) El 15 % del total de la unidad cuando haya sido probada en obra.

d) El 10 % restante del total de la unidad cuando se realice la Recepción de las obras.

Para las unidades cuya fabricación o construcción se realiza en obra, los sumandos serán los siguientes:

a) El 75 % del total de la unidad cuando esté totalmente instalada.

b) El 15 % del total de la unidad cuando haya sido probada.

c) El 10 % restante del total de la unidad cuando se realice la Recepción de las obras.

En estos precios unitarios se consideran incluidas las ayudas de albañilería y oficios necesarios para su total acabado y montaje.

### Artículo 5.1.3 Fabricación

El Adjudicatario facilitará a la Dirección de Obra el nombre y dirección de los talleres y factorías encargadas de la fabricación de los equipos mecánicos, en los que se practicarán las visitas de reconocimiento e inspección cuando la Dirección de Obra lo considere conveniente.

La Dirección de Obra solicitará la realización de los ensayos de material y las comprobaciones que crea necesarias para asegurar que los diferentes elementos reúnen las características proyectadas y aprobadas.

Comprobada la fabricación defectuosa, la Dirección de Obra rehusará la pieza o aparatos afectados, pudiendo llegar a la recusación y exclusión del taller o factoría implicada.

Las operaciones de carga, transporte, descarga y almacenaje se harán con máximo cuidado para evitar roturas o deformaciones, ya que la Dirección de Obra no aceptará las reparaciones en taller de obra sin la total garantía de que no se producen tensiones secundarias y otros daños por no disponer del equipo adecuado.

### Artículo 5.1.4 Control de calidad

Previo al control de calidad propio del promotor o al externo, el Adjudicatario deberá facilitar a la Dirección de Obra la documentación técnica de todos los equipos a instalar, la cual contendrá como mínimo la siguiente información:

- Especificación Técnica.
- Plano conjunto y detalle del equipo.
- Materiales que componen cada elemento del equipo.
- Normas de acuerdo con las cuales ha sido diseñado.

  Normas a emplear para las pruebas de recepción, especificando cuales de ellas deben realizarse en taller y cuales en obra. Las pruebas deberán realizarse de acuerdo con las normas españolas UNE, y en su defecto, a las europeas EN o internacionales ISO, acompañada de la correspondiente traducción al español.

En el caso de que las pruebas propuestas no se ajusten a ninguna norma oficial y deban desarrollarse bajo condiciones particulares, el Adjudicatario estará obligado a presentar cuanta información complementaria estime la Dirección de Obra, quien podrá rechazar el equipo propuesto si, a su juicio, dicho programa de pruebas no ofrece garantías suficientes.

- Programa de Puntos de Inspección (PPI), donde se recogerán de forma cronológica las distintas operaciones o fases que deben ser controlados.
- Manual de servicio que constará de:
  - Libro de operaciones de la instalación con las instrucciones de montaje, puesta en marcha y mantenimiento.
  - Planos generales de proceso.
  - Lista general de engrases.
  - Libro de componentes con croquis de dimensiones, secciones, hoja de datos, e instrucciones de cada equipo.
  - Lista de Repuestos.
- Certificado de garantía de los equipos contra defectos de diseño, material y fabricación por un período de dos años después de la recepción de las obras.

La Dirección de Obra podrá solicitar al Adjudicatario toda la información adicional que, a su juicio, sea precisa, para la aceptación o rechazo de los equipos a colocar en las obras.

Una vez aceptado el equipo mediante la aprobación de la Especificación Técnica y el programa de puntos de inspección de cada equipo, se autorizará a proceder con el control de calidad.

El Adjudicatario y sus talleres subcontratados y suministradores aceptarán en todo momento, las visitas e inspecciones.

En caso de detección de desviación, se levantará una nota de no aceptación del equipo hasta que la Dirección de Obra considere subsanada la desviación y emita nota de aceptación o bien se rechace definitivamente el equipo.

Los equipos deberán tener unas condiciones adecuadas de acopio en obra previo al montaje, los desperfectos ocasionados a causa de acopios deficientes correrán por cuenta del Adjudicatario.

### Artículo 5.1.5 Montaje

Los diferentes elementos serán presentados situándolos en obra en su exacta posición, sin que sea necesario forzar ninguna de las partes, asegurándose de que disponen de todos los grados de libertad en sus movimientos previstos en el Proyecto, sin que sea necesario ningún esfuerzo superior a los que previamente se han considerado. En el caso contrario los elementos serán devueltos al taller de origen para su corrección, o

serán rechazados definitivamente si la Dirección de Obra considera que es imposible eliminar satisfactoriamente todos los defectos.

Aprobados los elementos presentados, se procederán a recibir los anclajes y soportes en la forma prevista en el Proyecto.

## SUBCAPÍTULO 5.2 VÁLVULAS Y FILTROS

### Artículo 5.2.1 Generalidades

Los elementos de maniobra y control o válvulas deberán cumplir con los requisitos de diseño y funcionamiento, así como los métodos de evaluación de la conformidad, especificados para las mismas por las normas:

UNE-EN 736 "*Válvulas. Terminología".*

UNE-EN 1074 *"Válvulas para el suministro de agua. Requisitos de aptitud al uso y ensayos de verificación apropiados".*

En las válvulas, la denominación DN hará referencia al diámetro interior de la sección de paso a la misma, en la zona de su conexión con la conducción, independientemente de que, en su interior, pueda tener partes o conductos de un diámetro diferente.

Además, la presión nominal (PN) será igual o superior a la presión de diseño (DP) de la conducción que pueda alcanzarse en el emplazamiento de la válvula.

Los materiales de los distintos elementos de las válvulas cumplirán las siguientes Normas:

| | | |
|---|---|---|
| Acero | UNE-EN ISO 898-1:2015 | "*Características mecánicas de los elementos de fijación de acero al carbono y acero aleado. Parte 1: Pernos, tornillos y bulones con clases de calidad especificadas. Rosca de paso grueso y rosca de paso fino (ISO 898-1:2009)".* |
| | UNE-EN 10025-2:2020 | *"Productos laminados en caliente de acero para estructuras"*. |
| | UNE-EN 10028-1:2017 | *"Productos planos de acero para aplicaciones a presión. Parte 1: Prescripciones generales"*. |
| | UNE-EN 10028-2:2017 | *"Productos planos de acero para aplicaciones a presión. Parte 2: Aceros no aleados y aleados con propiedades especificadas a altas temperaturas".* |
| Acero inoxidable: | UNE-EN 10088-1:2015 | *"Aceros inoxidables. Parte 1: Relación de aceros inoxidables".* |
| Fundición dúctil: | UNE-EN 1563:2019 | *"Fundición. Fundición de grafito* |

| | | |
|---|---|---|
| | | *esferoidal".* |
| Aleaciones de cobre: | UNE-EN 1412:2017 | *"Cobre y aleaciones de cobre. Sistema europeo de designación numérica".* |
| | UNE-EN 1982:2018 | *"Cobre y aleaciones de cobre. Lingotes y piezas fundidas".* |
| | UNE-EN 12165:2017 | *"Cobre y aleaciones de cobre. Semiproductos para forja".* |
| Juntas elastoméricas: | UNE-EN 681-1:1996 | *"Juntas elastoméricas. Requisitos de los materiales para juntas de estanquidad de tuberías empleadas en canalizaciones de agua y en drenaje. Parte 1: Caucho vulcanizado".* |

La calidad de los distintos materiales de los componentes de las válvulas deberá ser al menos, la indicada a continuación:

| | |
|---|---|
| Acero: | 8.8 |
| Acero inoxidable: | 1.4021, 1.4057, 1.4301, 1.4306, 1.4401, 1.4404, 1.4435,1.4436 |
| Acero al carbono: | S275JR |
| Fundición nodular: | GJS-400-15, GJS-400-18, GJS-500-7 |
| Fundición gris: | EN-GJL-250 |
| Bronce: | CC499K |
| Latón: | CW603N<br>CW602N, CW614N, CW 617N, CW 713R |
| Elastómeros: | EPDM WA DUREZA 60 70<br>NBR |

Para otros materiales o calidades distintos de los detallados anteriormente se especificará la normativa y calidad mínima exigible.

Los elementos metálicos constituidos de las válvulas deberán contar con una protección anticorrosión interior y exterior a base de una o varias capas de resina epoxi-poliamida o vitrocerámico.

La estanqueidad entre los distintos elementos que componen las válvulas se llevará cabo mediante la interposición de una o varias juntas elastoméricas.

Deberán disponerse de los correspondientes macizos de anclaje de hormigón armado en todos los componentes sometidos a empujes por efecto de la presión, asegurando la inmovilidad de los mismos.

### Artículo 5.2.2 Válvulas de compuerta

#### i) Materiales

Las válvulas de compuerta deberán cumplir los requisitos establecidos en la Especificación técnica de elementos de maniobra y control. Válvulas de Compuerta de Canal de Isabel II.

#### ii) Ejecución

Para la utilización y montaje de estas válvulas será necesario disponer de la aprobación del producto por parte de la Dirección de Obra.

La unión con la conducción de las válvulas se realizará mediante bridas, intercalando un carrete de anclaje por un lado y un carrete de desmontaje por el otro.

Deberán instalarse alojadas en cámaras, registros o arquetas que permitan el acceso, maniobra o sustitución.

#### iii) Control de calidad

La fabricación, montaje y acabado de todos los elementos componentes de las válvulas deberán estar sujetos a un estricto y documentado proceso de autocontrol de fabricación que garantice la calidad del producto acabado y suministrado.

Será requisito indispensable que el Adjudicatario especifique la marca y modelo y presente la ficha técnica de las válvulas de compuerta a instalar.

Se ensayarán un 10 % de las unidades a instalar.

#### iv) Medición y abono

Las válvulas de compuerta se medirán por unidades (ud) realmente colocadas y se abonarán al precio que corresponda, en función del diámetro nominal, de la presión nominal y de la serie, de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

En el precio se incluye el suministro del equipo, la instalación, incluyendo juntas elastoméricas de estanqueidad y tornillería de acero inoxidable, y cuantos medios materiales, operaciones y pruebas sean necesarias para la correcta ejecución y funcionamiento de la unidad de obra.

### Artículo 5.2.3 Válvulas de mariposa

### i) Materiales

Las válvulas de mariposa deberán cumplir los requisitos establecidos en la Especificación técnica de elementos de maniobra y control. Válvulas de mariposa de Canal de Isabel II.

### ii) Ejecución

Las válvulas deberán instalarse con el eje o semi-eje en posición horizontal con el fin de evitar posibles retenciones de cuerpos extraños o sedimentaciones que eventualmente pudiera arrastrar el agua por el fondo de la tubería, dañando el cierre.

En las válvulas con un sentido preferente de estanquidad, el fabricante deberá proporcionar indicaciones para su instalación en la documentación técnica. Las válvulas excéntricas se instalarán teniendo en cuenta el sentido que favorezca la estanquidad en posición de cerrado, de manera general, esto será considerando el eje aguas arriba del obturador.

En redes de abastecimiento o reutilización, las válvulas de mariposa de diámetro igual o superior a seiscientos milímetros (600 mm) se instalarán con un by-pass dotado con, entre otros elementos, otra válvula de mariposa. La válvula de mariposa del by-pass deberá permanecer abierta durante la realización de maniobras en la válvula principal. Si el tramo de conducción es descendente, se instalará una ventosa aguas abajo de la válvula. Si por el contrario el tramo de conducción es ascendente, se instalará la ventosa aguas arriba de la válvula.

Todas las válvulas de mariposa se ubicarán en alojamientos que permitan su acceso, maniobra o sustitución, en su caso.

Para la utilización y montaje de estas válvulas será necesario disponer de la aprobación del producto por parte de la Dirección de Obra.

La unión con la conducción de las válvulas se realizará mediante bridas, intercalando un carrete de anclaje por un lado y un carrete de desmontaje por el otro.

### iii) Control de calidad

La fabricación, montaje y acabado de todos los elementos componentes de las válvulas deberán estar sujetos a un estricto y documentado proceso de autocontrol de fabricación que garantice la calidad del producto acabado y suministrado.

Será requisito indispensable que el Adjudicatario especifique la marca y modelo y presente la ficha técnica de las válvulas a instalar.

Se ensayarán un 10 % de las unidades a instalar.

### iv) Medición y abono

Las válvulas de mariposa se medirán por unidades (ud) realmente colocadas y se abonarán al precio que corresponda, en función del diámetro nominal, de la presión nominal, de la serie y del tipo de actuador, de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

En el precio se incluye el suministro del equipo, la instalación, incluyendo juntas elastoméricas de estanqueidad y tornillería de acero inoxidable, y cuantos medios materiales, operaciones y pruebas sean necesarias para la correcta ejecución y funcionamiento de la unidad de obra.

### Artículo 5.2.4 Válvulas de regulación y seguridad

#### i) Materiales

Las válvulas de regulación y seguridad deberán cumplir los requisitos establecidos en la Especificación técnica de elementos de maniobra y control. Válvulas de regulación y seguridad de Canal de Isabel II.

La válvula se seleccionará dependiendo de la función de regulación que realice.

- Válvulas de llenado de depósitos

Podrán ser válvulas de acción directa, accionadas por tornillo y pistón, válvulas de base, pilotadas, de membrana o de pistón, accionadas por flotador o válvulas de base, pilotadas de pistón accionadas por piloto de altitud.

- Válvulas reductoras de presión

Podrán ser válvulas de acción directa con piloto interno o válvulas de base, pilotadas, de membrana o de pistón.

- Válvulas mantenedoras de presión

Serán válvulas de base, pilotadas, de membrana o de pistón.

- Válvulas de control de caudal

El mecanismo de regulación será de embolo o paso anular, de desplazamiento axial, de dispositivo biela-manivela, con accionamiento manual de volante.

En el caso de las válvulas de seguridad, su función esencial es la de garantizar con su cierre o apertura la detención del flujo del agua en un tramo de la conducción, proteger otras instalaciones, evitar o reducir las consecuencias de una rotura de tubería o impedir la inversión de la dirección del flujo del agua.

Se consideran las siguientes válvulas de seguridad:

- Válvulas de alivio por sobrepresión

Se utilizarán válvulas de base, pilotadas, las cuales podrán ser de membrana o de pistón.

- Válvulas de retención

Las válvulas antirretorno, según sea el obturador o sistema de retención de la válvula podrán ser:

- De bola.
- De clapeta simple.
- De doble clapeta o de disco partido.
- De clapeta de fundición con dispositivo amortiguador.
- Tipo mariposa, de disco basculante con dispositivo amortiguador.
- De tipo díscolo o émbolo, con eje longitudinal centrado.

En agua residual solo se admiten los dos primeros sistemas de retención.

- Válvula de cierre automático por sobrevelocidad

Serán tipo mariposa céntrica, con mecanismo de actuación compuesto por detectores de velocidad mecánicos, contrapeso, acumulador y cilindro hidráulico, válvula piloto, bomba hidráulica manual y dispositivo de rearme.

### i) Ejecución

En el caso de ser necesario la instalación de válvulas reductoras de presión, estás deberán ser colocadas en paralelo, al menos dos unidades, permaneciendo alternativamente en funcionamiento cada una de ellas y manteniendo la otra en reserva.

El diámetro de las válvulas deberá ser inferior al de la conducción.

En los sistemas reguladores de presión, se instalarán dos válvulas de seccionamiento (compuerta o mariposa), una a cada lado de la válvula, junto con los carretes de desmontaje, manómetros de control y filtro aguas arriba de la línea de regulación.

Para la utilización y montaje de estas válvulas será necesario disponer de la aprobación del producto por parte de la Dirección de Obra.

### ii) Control de calidad

La fabricación, montaje y acabado de todos los elementos componentes de las válvulas deberán estar sujetos a un estricto y documentado proceso de autocontrol de fabricación que garantice la calidad del producto acabado y suministrado.

Será requisito indispensable que el Adjudicatario especifique la marca y modelo y presente la ficha técnica de las válvulas a instalar.

En cada caso, la Dirección de Obra valorará la validez y suficiencia de la documentación anterior, pudiendo solicitar documentación adicional.

Se ensayarán un diez por ciento (10 %) de las válvulas a instalar. En válvulas reguladoras al menos se ensayará una unidad de cada tipo y tamaño.

#### iii) Medición y abono

Las válvulas de regulación y seguridad se medirán por unidades (ud) realmente colocadas y se abonarán al precio que corresponda, en función tipo de válvula a colocar, del diámetro nominal y de la presión nominal, de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

En el precio se incluye el suministro del equipo, la instalación, incluyendo juntas elastoméricas de estanqueidad y tornillería de acero inoxidable, y cuantos medios materiales, operaciones y pruebas sean necesarias para la correcta ejecución y funcionamiento de la unidad de obra.

# CAPÍTULO 6 INSTALACIONES ELÉCTRICAS

## SUBCAPÍTULO 6.1 ESPECIFICACIONES GENERALES

Todas las instalaciones eléctricas cumplirán la reglamentación oficial vigente y las normas de la compañía suministradora en el momento que se lleve a efecto el montaje.

En los casos en los que la reglamentación oficial así lo requiera para la legalización de la instalación, se deberá disponer del correspondiente Proyecto visado por un técnico competente.

Para la puesta en servicio de la instalación serán imperativos la conformidad al suministro de la Compañía suministradora de energía, el Acta de Puesta en Servicio de centros de transformación, líneas eléctricas de media tensión y demás instalaciones que lo requieran, así como el Certificado de Instalación Eléctrica de Baja Tensión, otorgadas por la Dirección General de Industria, Energía y Minas.

El Adjudicatario realizará una correcta coordinación de protecciones, la misma estará suficientemente documentada y comprenderá todas y cada una de las protecciones eléctricas en los diferentes niveles de tensión, así como, de selectividad en los diferentes circuitos.

## SUBCAPÍTULO 6.2 FORMA DE ABONO DE LAS INSTALACIONES Y EQUIPOS

Los equipos industriales, las máquinas o elementos y las instalaciones que constituyendo una unidad en sí formen parte de la instalación general, se medirán por unidades según figuren en el Cuadro de Precios vigente de Canal de Isabel II.

Estos precios se refieren siempre a la unidad colocada, probada y en perfectas condiciones de funcionamiento.

La medición de la obra ejecutada en esta clase de unidades de obra en un momento dado será la suma de las partidas siguientes:

a) El 65 % del total de la unidad cuya fabricación se hace en talleres, cuando hayan sido recibidos por la Dirección de Obra la nota de aceptación del control de calidad, los certificados de materiales y pruebas correspondientes a los casos establecidos y se haya recibido la unidad de que se trate en los almacenes de la obra.

b) El 10 % de la unidad una vez instalada en obra.

c) El 15 % del total de la unidad cuando haya sido probada en obra.

d) El 10 % restante cuando se realice la Recepción de las obras.

Para las unidades cuya fabricación o construcción se realiza en obra, los sumandos serán los siguientes:

a) El 75 % del total de la unidad cuando esté totalmente instalada.

b) El 15 % del total de la unidad cuando haya sido probada.

c) El 10 % restante cuando se realice la Recepción de las obras.

En estos precios unitarios se consideran incluidas las ayudas de albañilería y oficios necesarios para su total acabado y montaje.

## SUBCAPÍTULO 6.3 BAJA TENSIÓN

En caso de que la parcela disponga de suministro eléctrico en Baja Tensión, la instalación comenzará en el Armario de Protección y Medida, el cual estará ubicado en fachada junto al acceso principal.

En caso de realizarse la medida en Alta Tensión, la instalación comenzará en el cuadro de Baja Tensión del Centro de Transformación.

Comprende la parte de la instalación comprendida entre las bornes de baja tensión y los distintos elementos a accionar, motores, etc.

### Artículo 6.3.1 Cuadro General de Distribución de Baja Tensión (CGDBT)

#### i) Características generales

El Cuadro General de Distribución de Baja Tensión (en lo sucesivo CGDBT), será un Conjunto Verificado, según la Norma UNE-EN 61439-1:2012 "*Conjuntos de aparamenta de baja tensión. Parte 1: Reglas generales"*.

En la fabricación del CGDBT, atendiendo a la Norma UNE-EN 61439, se contemplarán las siguientes figuras que intervendrán en su fabricación:

- Fabricante Original

Organización que lleva a cabo el diseño original y las verificaciones asociadas al conjunto de aparamenta de acuerdo con la norma aplicable a dicho conjunto.

- Fabricante del Conjunto

Organización que toma la responsabilidad del conjunto completo.

Para la fabricación del CGDBT, tanto el "Fabricante Original" como el "Fabricante del Conjunto" serán la misma organización.

### ii) Ejecución

Se montará en un habitáculo diferente al centro de transformación.

El CGDBT estará formado por columnas construidas con chapa de acero galvanizada, plegada y laminada en frío de dos milímetros (2 mm) de espesor, donde se ubicarán, los módulos de acometida, colocados en un extremo del conjunto y los diferentes módulos de salida.

Dispondrá de una compartimentación forma 4a/4b para acometidas, y 4b para salida de cables, según Norma UNE-EN 61439.

El CGDBT estará diseñado para soportar los efectos electrodinámicos producidos por cortocircuitos.

Cada módulo en su parte frontal tendrá una puerta de bisagra con cerradura dotada de tres (3) puntos de anclaje. La parte posterior se cerrará con una tapa desmontable mediante tornillos.

Las puertas dispondrán de un enclavamiento que impida el que puedan abrirse cuando haya tensión en la parte a que dan acceso, o bien todos los puntos en tensión dispondrán de protecciones mecánicas transparentes contra contactos accidentales.

El CGDBT en su conjunto será estanco a las proyecciones de agua, disponiendo al mismo tiempo de las aberturas necesarias para mantener una ventilación natural adecuada. Las entradas y salidas de cables se acondicionarán con este fin. El grado de protección de la envolvente será IP54 e IP20 en las partes activas desnudas y placas de entrada y salida de cables.

El tratamiento previo de la chapa consistirá en una preparación de superficie: repaso de cordones de soldaduras, eliminación de proyecciones, porosidades, golpes y aristas vivas, desengrasado, fosfatado e imprimación. El pintado será a base de resina epoxi con posterior secado al horno. El espesor mínimo de pintura seca aplicada no debe ser inferior a cien micras (100 µm). El color será RAL 1028 para depuración y RAL 7032 para elevadoras de agua para consumo humano/regenerada. Para el resto de las instalaciones, se consultará con la Dirección de Obra. Dispondrán de cáncamos para facilitar el transporte y montaje.

El diseño eléctrico de los circuitos y sus diferentes configuraciones eléctricas serán las que determine la Dirección de Obra, por lo que la fabricación del cuadro estará condicionada a la aprobación por parte de Canal de Isabel II de los esquemas eléctricos del mismo. Dichos esquemas se irán actualizando si hubiera cambios en obra y puesta en marcha. Lo anterior no eximirá al fabricante de su responsabilidad referente al cumplimiento de normas y reglamentos aplicables.

Tendrá tantas entradas de alimentación como transformadores y grupos electrógenos se instalen, dejando espacio libre suficiente para una adicional, en previsión del montaje futuro de un transformador adicional, el armario dispondrá del equipamiento, así como de elementos necesarios para facilitar la incorporación de una entrada adicional sin detener el funcionamiento de la instalación.

Cada módulo de entrada dispondrá de un interruptor automático magnetotérmico tetrapolar del tipo extraíble y corte omnipolar, dotado de un relé de protección diferencial ajustable con graduación de sensibilidad y temporización, con su transformador toroidal correspondiente, con capacidad para soportar los efectos de cortocircuitos, mando directo independiente a la puerta y con enclavamiento mecánico y eléctrico con el disyuntor del transformador correspondiente, de tal forma que cuando se dispare el disyuntor de alta tensión, lo haga también automáticamente este interruptor automático de entrada al cuadro. Estas entradas se montarán en un extremo del cuadro.

Igualmente dispondrá de un módulo de entrada de alimentación para la conexión de un grupo electrógeno móvil o estacionario, equipado con magnetotérmico tetrapolar, enclavado mecánicamente en posición abierto por medio de una cerradura con los interruptores de baja tensión de los transformadores de potencia, con el fin de evitar peligrosos retornos peligrosos en los transformadores BT/MT y el funcionamiento simultáneo con la red de distribución.

El embarrado principal que debe estar preparado para futuras ampliaciones laterales del cuadro será de tensión de cuatrocientos/doscientos treinta voltios (400/230V), estará constituido por pletinas de cobre estañado capaces de soportar los efectos electrodinámicos de cortocircuito, siendo de la misma sección la barra de neutro que las de fase. Todas ellas estarán protegidas con una capa aislante del color adecuado a cada una de las fases y neutro.

El cálculo de la corriente de cortocircuito y efectos electrodinámicos de los embarrados e interruptores automáticos deberá realizarse teniendo en cuenta la potencia total de los transformadores instalados, incluido el de reserva. Se justificará que el embarrado y los interruptores soportan los cortocircuitos generados en los puntos en que están situados.

El CGDBT estará dotado de los elementos adecuados para su puesta a tierra y dispondrá de resistencias de calefacción reguladas mediante termostato.

Cada salida dispondrá de un interruptor automático magnético o magnetotérmico, dependiendo de la carga, de la intensidad adecuada en cada caso, con mando independiente a la puerta y con capacidad para soportar los efectos del cortocircuito, dotado de un transformador toroidal y de un relé de protección diferencial ajustable, con graduación de sensibilidad y temporización.

Los disyuntores de entrada a CGDBT serán motorizados.

En el frente del armario se instalarán siguientes los equipos de medida y señalización:

- Aparatos de Medida:

  El CGDBT dispondrá de un analizador de redes en cada una de las acometidas de alimentación, de las siguientes características:

  - Display multilínea para la indicación local de las siguientes variables: tensión simple, tensión compuesta, intensidad, potencias activa y reactiva, y consumo de energías activa y reactiva, tasa de distorsión armónica, tanto en corriente como en tensión. Todas estas variables deberán estar integradas en el sistema de control a nivel de PLC.
  - Dos (2) Salidas Digitales.
  - Dos (2) Salidas Analógicas.
  - Puerto de comunicación Ethernet y con capacidad de comunicación en el protocolo de comunicaciones que determine Canal de Isabel II en cada caso.
  - Sus dimensiones mínimas serán 144 mm x 144 mm.

- Señalización óptica luminosa según ET 3301 y planos típicos.
- Señalización escrita:
  - Cada circuito estará señalizado con un letrero de formica negra con escritura en blanco, visible al menos desde dos (2) metros2 m de distancia, en el que figure el número de circuito a que corresponde en los esquemas y el nombre del mismo.
  - En una parte destacada, como puede ser el ángulo superior izquierdo, se colocará un letrero de las mismas características que los anteriores, en el que figure el número del cuadro y su nombre según los esquemas eléctricos siendo visible, al menos, desde una distancia a cinco (5) metros.
  - Todos los letreros se fijarán mediante remaches.

Si por la concentración de equipos, un único cuadro hace las veces de cuadro general de distribución y de CCM, dicho cuadro cumplirá con las especificaciones más exigentes de ambos.

### iii) Control de calidad

Los cuadros se realizarán de acuerdo con los esquemas eléctricos proyectados, así como a los planos de vistas físicas.

Antes de su expedición a obra se realizará el montaje total del armario con los componentes colocados, y realizado el cableado completo, con el fin de comprobar los circuitos.

El fabricante del conjunto verificado presentará las certificaciones de las verificaciones de diseño recogidas en la Norma UNE-EN 61439, emitidas por un laboratorio homologado e independiente.

Se realizará como mínimo los siguientes controles:

- Comprobación de dimensiones, espesor de chapa, acabado, etc.
- Comprobación del cableado de armarios y de cada componente en particular, de acuerdo con los esquemas, desde esto hasta los regleteros de bornas de salida.
- Comprobación de que se cumplen en todas las características indicadas en la especificación de diseño.
- Comprobación de las características y calidades de los componentes incluido en cada panel, tales como: contactores, arrancadores, transformadores, relés, fusibles, pulsadores, pilotos, regleteros de bornas, bandejas y conductores, racores, puestas a tierra, etc.
- Comprobación del correcto funcionamiento de interruptores, pulsadores, lámparas piloto, relés, etc.
- Comprobación de rótulos.
- Comprobación del correcto funcionamiento de los contactores con tensiones de mando diferente a la nominal.
- Comprobación de los enclavamientos.
- Comprobación del marcado de fases.
- Comprobación de números y secciones de conductores.
- Ensayo de rigidez dieléctrica.
- Ensayo de simulación de funcionamiento.
- Ensayo de resistencia de aislamiento de cada cuadro.

Se comprobará mediante la emisión de Certificado de Cumplimiento y Certificado de Prueba los siguientes ensayos:

- Aislamiento: Se realizará con una fase a tierra (si el circuito es monofásico) y se comprueba que el aislamiento es el adecuado según el vigente Reglamento de Baja Tensión.
- Rigidez Dieléctrica: Consistirá esta prueba en someter al panel a una tensión 2V + 1000 V, con un mínimo de 1500 V, siendo V la tensión nominal de servicio, el tiempo será de 1 minuto y se comprobará que no se producen anomalías.
- Continuidad de circuitos: Consistente esta prueba en comprobar la continuidad de los circuitos principales.
- Simulación de Funcionamiento: Consiste en una prueba en blanco del funcionamiento del sistema. Se comprobará que al quitar o poner los enclavamientos correspondientes el sistema actúa de acuerdo con lo previsto.

#### iv) Medición y abono

El abono de los cuadros general de distribución de baja tensión (CGDBT) se abonará de acuerdo con las unidades que figuren en el Cuadro de Precio vigente de Canal de Isabel II.

### Artículo 6.3.2 Líneas de alimentación, distribución, mando y señalización

#### i) Características

Comprende las líneas de alimentación desde las bornas de baja tensión de los transformadores hasta el cuadro de distribución general, desde éste hasta los cuadros de alumbrado y hasta los centros de control de motores, y desde éstos hasta los cuadros auxiliares y hasta los distintos receptores. Forman parte también de estas líneas, las correspondientes a circuitos de mando y señalización.

Para acometidas a cuadro de distribución general superiores a 1600 A, éstas se ejecutarán mediante blindobarra o sistema similar en cobre o aluminio desde el transformador correspondiente.

En el resto de los casos, todos los conductores serán de cobre con doble aislamiento en seco de polietileno reticulado, siendo de emisión de humos y opacidad reducida y resistente al fuego cuando así lo determine la correspondiente ficha. Corresponderán a la designación de las Normas UNE RV 0,6/1 KV. Los cables para aplicaciones generales en construcción cumplirán la Norma UNE-EN 50575:2015 de reacción frente al fuego.

### ii) Ejecución

Serán de una sola pieza, no permitiéndose empalme alguno.

Sus extremos estarán dotados de los terminales adecuados, así como de su identificación de forma permanente de acuerdo con los esquemas.

Además de las secciones mínimas fijadas por la reglamentación vigente (intensidad máxima admisible y criterios de caída de tensión desde bornes de baja tensión del transformador hasta el receptor), en el momento de realizarse la instalación, se establecen las siguientes:

- Para fuerza: dos milímetros y medio cuadrados (2,5 $mm^2$).
- Para maniobra y señalización: dos milímetros y medio cuadrados (2,5 $mm^2$) en el caso de utilizar cables unipolares y de uno y medio milímetros cuadrados (1,5 $mm^2$) si se utilizan cables multipolares.
- Por cada conjunto de cables de maniobra, control y señalización que conexionen entre sí cuadros, sinópticos, etc. se dejarán como reserva un mínimo de conductores igual al veinte por ciento (20 %).

Si la intensidad de corriente que circulase por algún tramo concreto de la instalación fuese muy elevada, puede estudiarse la sustitución de cables por barras de cobre debidamente blindadas.

El tendido de cables, según la parte de instalación a que pertenezcan, podrá realizarse de forma subterránea, sobre bandejas o bajo tubo. Se realizarán canalizaciones independientes por tensiones y dentro de éstas, los conductores tendrán colores diferentes según al tipo de circuito que correspondan (mando, señalización, etc.).

Siempre que sea posible, las canalizaciones eléctricas se llevarán por galerías de inspección y vigilancia sobre bandejas perforadas de acero laminado en frío y galvanizadas en caliente posteriormente a su mecanización, según UNE-EN ISO 1461:2010, colocadas en la parte más alta de ésta y a unos treinta centímetros (30 cm.) por debajo de la losa de cierre, preferentemente fijadas sobre la pared en disposición vertical.

Dentro de los edificios, se canalizarán sobre bandejas portacables de PVC rígido M-1, preferentemente fijadas sobre la pared en disposición vertical, mediante soportes adecuados. Las ramificaciones desde éstas hasta los receptores se canalizarán en tubos del mismo material que las bandejas.

En recorridos intrincados, se podrá utilizar bandejas de varillas electrosoldadas galvanizadas en caliente siendo éstas, cosidas mediante cable de cobre desnudo de al menos treinta y cinco milímetros cuadrados (35 $mm^2$) de sección, perfectamente grapado y conectado a la tierra de protección de masas de utilización.

La instalación dispondrá con cajas de registro en material plástico o PVC accesibles para la inspección y manipulación de los cables. Estarán dotadas de prensaestopas para la entrada y salida de cables. Dispondrán un grado IP54.

Las canalizaciones que hayan de realizarse en el exterior podrán ser aéreas o subterráneas.

Las canalizaciones aéreas, serán metálicas y galvanizadas en caliente. Se podrán canalizar bajo tubo metálico, sobre bandejas portacables metálicas de acero laminado en frío o sobre bandeja portacables de varillas electrosoldadas siendo estas últimas, cosidas mediante cable de cobre desnudo de al menos treinta y cinco milímetros cuadrados (35 $mm^2$) de sección. Las bandejas portacables siempre estarán dotadas con tapa.

La instalación dispondrá de cajas de registro accesibles, en aleación de aluminio, debidamente dimensionadas para la inspección y manipulación de los cables, siendo sus medidas mínimas de 120 mm x 120 mm x 60mm.

Estarán dotadas de prensaestopas metálicos para la entrada y salida de cables. Dispondrán de un grado de protección IP67.

Las canalizaciones subterráneas serán entubadas y dispondrán de los elementos de protección y señalización que prescriba la reglamentación vigente en el momento de efectuarse el montaje. Durante éste, se dejará metida la guía para el posterior paso de cables.

Se construirán el suficiente número de arquetas, debidamente dimensionadas, para que puedan sustituirse cables con facilidad. Los cables estarán etiquetados de forma permanente a su paso por cada arqueta.

Las arquetas se ubicarán de tal modo, que garanticen el aislamiento y eviten el intercambio de ambientes entre las diferentes salas o zonas de la instalación.

El número de capas será de tres (3) en los tendidos subterráneos y de dos (2) sobre bandeja.

Los circuitos de fuerza a cuatrocientos/doscientos treinta voltios (400/230VAC) y los de mando y señalización a veinticuatro voltios (24 VAC) se llevarán por canalizaciones separadas por tensiones.

Todas las conexiones se efectuarán dentro de cajas de derivación, que serán estancas, y se realizarán por medio de bornas de carril DIN.

Para cada zona de la instalación existirán cajas de tomas de corriente, repartidas uniformemente en la superficie de la parcela. Se dotará de un mínimo de dos por planta o instalación. En edificios industriales, las tomas de corriente se agruparán en cuadros según ET 3325 y se distribuirán de forma que no haya más de 25 m de distancia entre 2 cuadros.

Se instalarán en una única envolvente de características similares a los cuadros locales.

### iii) Control de calidad

Se comprobará que se corresponde con lo especificado en el Proyecto.

### iv) Medición y abono

Las canalizaciones subterráneas para BT se medirán por metro (m) y se abonarán, atendiendo al tipo de terreno en el que se ejecute, por aplicación del precio que corresponda de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

En el caso de canalizaciones de superficie se medirán por metro (m) y se abonarán por aplicación del precio que corresponda de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

Las cajas, prensaestopas y cajas de registro se medirán por unidad (ud) instalada en obra y se abonarán por aplicación del precio que corresponda de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

El cable se medirá por metro (m), en función de su tipo, nivel de aislamiento (kV), sección ($mm^2$), cubierta, y forma de instalación (bajo tubo, en el interior de conductos, instalación volada o grapada) y se abonará por aplicación del precio que corresponda de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

Los mecanismos de baja tensión se abonarán mediante la aplicación del precio que corresponda de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

## Artículo 6.3.3 Instalación de tierras de utilización

### i) Características

La tierra de utilización cumplirá con las especificaciones dictadas en el Reglamento Electrotécnico de Baja Tensión, y se ejecutará de forma independiente a la tierra de protección del centro de transformación.

### ii) Ejecución

La tierra de utilización estará formada por cables de cobre desnudo de cincuenta milímetros cuadrados (50 $mm^2$) unidos en diversos puntos a picas de acero cobrizado de dos (2) metros de longitud y catorce milímetros (14 mm) de diámetro, ubicadas en pozos dispuestos para este fin, ejecutándose éstos preferentemente en las proximidades de cada armario o receptor importante.

Todas las masas de los elementos que componen la instalación estarán conectadas a la red general con cables de cobre de 35 y 50 $mm^2$, mientras que los báculos y columnas de alumbrado se conexionarán con cable de 16 $mm^2$.

Se dejará preparada para poder conectarla en el futuro, si se considera conveniente y concurren las circunstancias precisas, a la puesta a tierra de masas del centro de transformación.

#### iii) Control de calidad

Las verificaciones previas a la puesta en servicio de las instalaciones deberán ser de acuerdo con la legislación vigente; ensayos instalaciones de puesta a tierra: medida de resistencia de puesta a tierra.

#### iv) Medición y abono

Las tomas de tierra se abonarán por unidad (ud) y se abonarán, en función de sus características, por aplicación de precio que corresponda de los que figuren en el Cuadro de Precios vigente de Canal de Isabel II.

## CAPÍTULO 7 ALUMBRADO

La estructura de la instalación de alumbrado, como regla general, será la siguiente: El cuadro general de alumbrado albergará el alumbrado exterior del recinto, así como salidas hacia cuadros locales de alumbrado y fuerza de los distintos edificios que lo requieran. Dichos cuadros locales distribuirán el alumbrado interior y las emergencias en distintos circuitos. Del mismo modo, las tomas de fuerzas en salas de proceso se concentrarán en pequeños cuadros según ET 3325, agrupados por circuitos desde el correspondiente cuadro local. En los edificios de oficinas y salas de operador las tomas de fuerza serán individuales, monofásicas y de 16 amperios, y también agrupadas por circuitos desde el correspondiente cuadro local.

El cuadro general de alumbrado podrá integrar el cuadro local de alumbrado y fuerza del edificio en que se halle.

### Artículo 7.1.1 Alumbrado de edificios

#### i) Características

Se utilizarán, en espacios interiores industriales lámparas estancas de halogenuros metálicos de luz blanca. Todas las luminarias y proyectores, así como los equipos auxiliares, estarán dotados de grado de protección adecuado para garantizar la estanquidad contra la entrada de polvo y agua.

Salvo indicación contraria se establece el siguiente nivel mínimo de iluminación:

- Cuando sea necesaria una distinción pequeña de detalle (vestuarios, aseos, trasteros, etc.): 100 lux.
- Cuando sea necesaria una distinción media de detalle (zona de trabajo): 300 lux. - Zonas de paso: 20 lux.

### ii) Ejecución

En cada edificio se montará un cuadro local de alumbrado y fuerza prefabricado de primera calidad, a base de acero laminado y con puerta que pueda montarse a ambas manos.

Como mínimo alojará:

- Dos (2) interruptores automáticos diferenciales de sensibilidad treinta miliamperios (0,03 A.), uno (1) para circuito de fuerza y uno (1) para circuitos de alumbrado.

- Tantos interruptores automáticos magnetotérmicos como circuitos de fuerza y alumbrado sean necesarios en el edificio.

El factor de potencia será corregido independientemente en cada punto de alumbrado.

El tipo de instalación será acorde en cada edificio, dejándose metidas guías en los tubos durante el montaje para el posterior paso de cables.

Existirán dispositivos de alumbrado de emergencia en todos los edificios, disponiéndose de medios de iluminación de emergencia adecuados a las dimensiones de los locales y número de trabajadores ocupados simultáneamente, capaces de mantener, al menos durante una hora, un nivel de iluminación de cinco (5) lux a nivel de suelo Su fuente de energía será independiente del sistema normal de iluminación.

- Edificio de control
  - Nivel mínimo de iluminación 400 lux a nivel del suelo.
  - La instalación será empotrada, bajo tubo corrugado y cajas de PVC.
  - El cable a emplear cumplirá la designación RV 0,6/1 KV de las normas UNE.

- Edificios industriales
  - Nivel mínimo de iluminación 200 lux a nivel de suelo, y además se discriminarán diferentes zonas dentro del edificio, atendiendo a las exigencias de iluminación:
    - Zonas de operación y mantenimiento de equipos 300 lux.
    - Salas destinadas al servicio eléctrico 500 lux.
  - La instalación será al aire bajo tubo y cajas de PVC rígido.
  - El cable a utilizar cumplirá la designación RV 0,6/1 KV de las normas UNE.

- Edificios con posibilidad de presencia de gases
  - El cuadro se montará en una zona del edificio en la que no pueda haber presencia de gases.

- Será de tipo antideflagrante y cumplirá la Instrucción Técnica Complementaria ITC-BT-29 del Reglamento Electrotécnico para Baja Tensión aprobado por Real Decreto 842/2002.
- El cable a utilizar responderá a la designación RV 0,6/1 KV de las normas UNE.

#### iii) Control de calidad

Se comprobará que su funcionamiento se corresponde con lo especificado en el Proyecto.

#### iv) Medición y abono

Las luminarias y proyectores se medirán por unidad (ud) y se abonarán, en función del tipo, mediante la aplicación del precio correspondiente de los que figuran en el Cuadro de Precios vigente de Canal de Isabel II.

## CAPÍTULO 8 SEGURIDAD Y SALUD EN LAS INSTALACIONES

### Artículo 8.1.1 Generalidades

Todas las instalaciones deberán cumplir la legislación vigente en materia de seguridad y salud en el trabajo en lo que les fuera aplicable, así como lo contemplado en la Parte I, Capítulo 3 del Real Decreto 314/2006 por el que se aprueba el Código Técnico de la Edificación.

### Artículo 8.1.2 Plataformas, escaleras, soportes y barandillas

El Adjudicatario deberá disponer las plataformas y escaleras necesarias para hacer perfectamente accesibles todos los elementos de medición y control, tales como manómetros, niveles, válvulas, registros, etc. En especial cualquier lugar de la instalación que deba ser objeto de un recorrido periódico del personal de operación deberá tener un acceso fácil y cómodo. Las plataformas y escaleras deberán tener en cualquier caso una anchura mínima de cien centímetros (100 cm) de paso libre. Las pasarelas y escaleras deberán llevar barandillas a ambos lados en los sitios que lo requieran, siendo éstas de material rígido y con una altura mínima de cien centímetros (100 cm). Además, dispondrán de una protección que impida el paso o deslizamiento por debajo de las mismas y la caída de objetos sobre personas.

En general, todo lugar de paso o trabajo cuya altura respecto a las superficies circundantes sea igual o superior a sesenta centímetros (60 cm) deberá ser protegido con barandillas. Se dispondrán todos los soportes y sujeciones que sean necesarios.

La construcción del suelo de escaleras, pasarelas y plataformas deberá ser fijo, estable y no resbaladizo, construido en trámex de pletinas de 30x2 o 30x3 mm, unidas

formando mallas de 30x30, 20x20 o 8x8 mm, antideslizante, debiendo estar diseñadas para soportar el peso de operarios, herramientas y partes de la instalación que se puedan colocar sobre ellos durante el montaje y las revisiones periódicas, mínimo de 500 kg/$m^2$.

Todas las zonas de paso de peatones por la parte inferior de escaleras, pasarelas y plataformas deberán llevar incorporado en el trámex de doble pletina, un pavimento perforado cuya abertura máxima de los intersticios será de ocho milímetros (8 mm).

### Artículo 8.1.3 Zonas resbaladizas

Los suelos de aquellas zonas que por razones del mantenimiento puedan representar peligro de resbalones y caídas debido a hielo, humedad, etc. Deberán disponer de tratamiento especial para evitar los riesgos anteriores.

### Artículo 8.1.4 Nivel de ruidos de los equipos

Los niveles de ruido se medirán y expresarán en decibelios con ponderación normalizada A, dB (A).

Todos los equipos una vez instalados deberán cumplir la normativa vigente en materia de ruidos.

El nivel de ruido será inferior a 80 dB en el exterior de locales que alberguen máquinas, para lo cual se asegurará un aislamiento acústico adecuado de los mismos, a fin de evitar la transmisión de ruidos y vibraciones al exterior, así como de garantizar el cumplimiento de la normativa que al respecto le sea de aplicación.

Si el local que alberga las máquinas requiere acceso frecuente por parte del personal de operación y mantenimiento, deberán disponerse los oportunos silenciadores, acoplamientos elásticos y cuantos elementos se consideren necesarios a fin de disminuir el nivel de ruido a la cifra antes indicada. De no ser posible alcanzar el nivel de ruido mencionado se emplearán obligatoriamente dispositivos de protección personal de acuerdo con la normativa vigente.

### Artículo 8.1.5 Aislamiento térmico

La superficie exterior de todas aquellas partes de la instalación en cuyo interior se puedan producir condensaciones o congelaciones si la temperatura baja de cero grados centígrados (0 °C) o la de aquellas que por su temperatura interior puedan alcanzar los cuarenta grados centígrados (40 °C) se aislarán térmicamente.

Todo el material empleado para aislamiento térmico será inerte químicamente y continuará con tal propiedad después de haber sido saturado de agua. El Adjudicatario proporcionará la documentación técnica con las características del aislamiento térmico que se propone emplear en las diversas partes de la instalación y elementos auxiliares: clase de material, espesor, etc.

Antes de aplicar el aislamiento se limpiarán las superficies a calorifugar y se les dará una capa de minio rojo como imprimación.

Después de concluir la operación de aislamiento de las tuberías, se recubrirán con chapa de acero suave galvanizado o con hoja de aluminio de primera calidad sujeta en forma adecuada para evitar flexión, pandeo o vibraciones. Si las tuberías son interiores y de diámetro menor de 6" el recubrimiento puede ser de PVC.

Todas las válvulas, bridas y accesorios irán cerrados dentro de cajas aisladas desmontables.

### Artículo 8.1.6 Instalaciones de manutención

En las instalaciones, se deberá establecer el número y clase de elementos mecánicos y eléctricos de manutención que aseguren el poder efectuar sin esfuerzo físico la manipulación y/o transporte de cualquier clase de piezas, aparatos o recipientes con un peso mayor de veinticinco kilogramos (25 kg).

### Artículo 8.1.7 Atmósferas explosivas

En las zonas o locales con atmósferas explosivas de las instalaciones de Canal de Isabel II será de aplicación las prescripciones contempladas en el Real Decreto 681/2003 de 12 de junio, sobre la protección de la salud y la seguridad de los trabajadores expuestos a los riesgos derivados de atmósferas explosivas en el lugar de trabajo.

En dicho decreto, se fija la señalización y limitación de las áreas en las que se puedan formar atmósferas explosivas, la clasificación de las mismas en función de los riesgos, así como la obligatoriedad de cumplimentar un parte de trabajos especiales para el mantenimiento, explotación y reparación en áreas de las instalaciones con este riesgo.

Será obligatoria la instalación de detectores automáticos de concentración peligrosa de gases con mando automático a extractores y señalización de alarmas acústica y visual.

### Artículo 8.1.8 Equipos de seguridad

El Adjudicatario presentará a la Dirección de Obra una clasificación de zonas susceptibles de riesgos potenciales en las instalaciones proyectadas, con las condiciones y equipos de seguridad necesarios, tanto fijos como personales, en cada una de dichas zonas.

### Artículo 8.1.9 Señalización y colores de seguridad

La significación y empleo de colores de seguridad se regirán por la Norma UNE-EN ISO 7010:2020 "*Símbolos gráficos. Colores y señales de seguridad. Señales de seguridad registradas*".

SEGURA SANCHEZ JOSE ANTONIO - 07237123N

Firmado digitalmente por SEGURA SANCHEZ JOSE ANTONIO - 07237123N
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REDACTOR DEL PROYECTO

D. José Antonio Segura Sánchez

Procaver Soluciones Urbanas, S.L.

# DOCUMENTO IV.- PRESUPUESTO

## CUADRO DE PRECIOS Nº 1

# CUADRO DE PRECIOS 1

**TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS**

| CÓDIGO | UD | RESUMEN | PRECIO |
|---|---|---|---|

## CAPÍTULO 01 TANQUE DE TORMENTAS

### SUBCAPÍTULO 01.1 MOVIMIENTO DE TIERRAS

**U01021020_1** **m3** **Excavación a cielo abierto, med. mecán. terreno medio** **6,47**

Excavación a cielo abierto, por medios mecánicos, en terreno medio (suelo con golpeo en el ensayo SPT entre 10 y 30 golpes / 30 cm), medido sobre perfil, con carga y transporte a vertedero autorizado o lugar de empleo, sin canon de vertido.

SEIS EUROS con CUARENTA Y SIETE CÉNTIMOS

**U01030340** **m3** **Relleno trasdós muros suelos adecuados de excavación** **5,53**

Relleno localizado en trasdós de muros con suelos adecuados procedentes de la excavación, incluso aportación, extendido, humectación y compactación en capas de 30 cm de espesor, con un grado de compactación del 95% del P.M.

CINCO EUROS con CINCUENTA Y TRES CÉNTIMOS

**mU02ER050** **m3** **Relleno localizado material filtrante** **20,75**

Relleno localizado con material filtrante de préstamos, en cimientos y trasdoses de muros.

VEINTE EUROS con SETENTA Y CINCO CÉNTIMOS

**U01025130** **m2** **Entibación cuajada zapatas o pozos con cajones chapa hasta 6 m** **23,95**

Entibación metálica cuajada en zapatas o pozos, hasta 6 m de profundidad, con cajones de paneles de chapa de acero, amortizables en 300 puestas, incluso p.p. de medios auxiliares.

VEINTITRES EUROS con NOVENTA Y CINCO CÉNTIMOS

### SUBCAPÍTULO 01.2 DRENAJE

**U09011080_01** **m** **Tubo de drenaje de polietileno de alta densidad de 15 cm diám.** **31,27**

Suministro y colocación de tubo de drenaje de polietileno de alta densidad corrugado, de doble pared ranurada, de 15 cm de diámetro. Colocado sobre cama de arena de río de 10 cm de espesor, revestido con geotextil de 125 g/m2 y relleno con grava filtrante 25 cm por encima del tubo con cierre de doble solapa del paquete filtrante (realizado con el propio geotextil). Con p.p. de medios auxiliares, incluso conexión a arqueta de evacuación de cámara.

TREINTA Y UN EUROS con VEINTISIETE CÉNTIMOS

### SUBCAPÍTULO 01.3 ESTRUCTURA

**U07010204** **m3** **HNE-15/B/12 o HNE-15/B/20** **88,91**

Suministro y puesta en obra de hormigón no estructural HNE-15/B/12 o HNE-15/B/20, elaborado en central y vertido desde camión o bomba, para rellenos o elementos no estructurales, colocado a cualquier profundidad, incluso compactación, curado y acabado. Según CE vigente.

OCHENTA Y OCHO EUROS con NOVENTA Y UN CÉNTIMOS

**U07010804** **m3** **HA-30/B/20/XC2,XC3 o HA-30/B/20/XC4 eltos horiz., con camión** **103,59**

Suministro y puesta en obra de hormigón HA-30/B/20/XC2,XC3 o HA-30/B/20/XC4, elaborado en central y vertido desde camión en elementos horizontales-verticales de estructura (cimentaciones, soleras, vigas, etc.), incluso compactación, vibrado, curado y acabado. Según CE vigente.

CIENTO TRES EUROS con CINCUENTA Y NUEVE CÉNTIMOS

**U07010210** **m3** **HNE-20/B/12 o HNE-20/B/20** **99,12**

Suministro y puesta en obra de hormigón no estructural HNE-20/B/12 o HNE-20/B/20, elaborado en central y vertido desde camión o bomba, para rellenos o elementos no estructurales, colocado a cualquier profundidad, incluso compactación, curado y acabado. Según CE vigente. Hormigón ciclópeo.

NOVENTA Y NUEVE EUROS con DOCE CÉNTIMOS

**U07030050** **kg** **Suministro y colocación de acero para armaduras en barras B500S** **1,74**

Suministro y colocación de acero para armaduras en barras corrugadas B 500 S, incluso cortado, doblado y recortes, según peso teórico.

UN EUROS con SETENTA Y CUATRO CÉNTIMOS

**U07020081** **m2** **Encofrado plano met. elem. vertical. estru. trabaj. entre 5 y 7** **34,70**

Encofrado plano para elementos verticales de estructura (muros, etc.) con paneles metálicos, con calidad de acabado cara vista, para trabajos a partir de 5 m de altura y hasta 7 m de altura, incluso molduras y berenjenos, tapes, velas, puntales, cimbras y andamiaje, desencofrado y limpieza.

TREINTA Y CUATRO EUROS con SETENTA CÉNTIMOS

**U07020040** **m2** **Encofrado plano met. elem. horiz. estru. trabaj. entre 3 y 5 m** **31,32**

Encofrado plano para elementos horizontales de estructura (losas, etc.) con paneles metálicos, con calidad de acabado cara vista, para trabajos a partir de 3 m de altura y hasta 5 m de altura, incluso molduras y berenjenos, tapes, velas, puntales, cimbras y andamiaje, desencofrado y

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limpieza.

TREINTA Y UN EUROS con TREINTA Y DOS CÉNTIMOS

## SUBCAPÍTULO 01.4 IMPERMEABILIZACIÓN

**08020360_1** **m2** **Impz muro c/lamn PVC e 1,5 mm** **20,93**

Impermeabilización de muro de sótano, mediante membrana impermeabilizante, compuesta por lámina de policloruro de vinilo PVC, de 1,5 mm de espesor, sin armadura, fijada en la parte superior mediante barra de terminación de aluminio anclada mecánicamente al soporte, incluso limpieza previa del soporte, fijaciones, mermas y solapos, según DB HS-1 del CTE.

VEINTE EUROS con NOVENTA Y TRES CÉNTIMOS

## SUBCAPÍTULO 01.5 OBRA CIVIL-EDIFICACIÓN

**808020300_2** **ml** **Zuncho horizontal de bloque "U" de hormigón visto** **22,32**

Zuncho horizontal de 20 cm de espesor, de bloques en "U" de hormigón, lisos, color gris, 40x20x20 cm, resistencia normalizada R10 (10 N/mm²), para revestir, recibidos con mortero de cemento industrial, color gris, M-7,5, suministrado a granel; con refuerzo de hormigón de relleno, HA-25/B/12/XC2, preparado en obra, vertido con medios manuales, y acero UNE-EN 10080 B 500 S, cuantía 4,3 kg/m; para muro de carga de fábrica armada. Incluso alambre de atar y separadores. El precio incluye la elaboración de la ferralla (corte, doblado y conformado de elementos) en taller industrial y el montaje en el lugar definitivo de su colocación en obra.

VEINTIDOS EUROS con TREINTA Y DOS CÉNTIMOS

**U08020300_1** **m2** **Fábrica bloques hueco hormigón estriado visto 40x20x20 cm** **55,75**

Fábrica de bloque hueco de hormigón estriado a cara vista, color blanco, dimensiones 40x20x20 cm, recibida con mortero M-250 de cemento BL 22,5 incluso rejuntado, limpieza de paños y piezas especiales, según normativa vigente.
Reforzado con armadura anclada a forjado existente y hormigón de relleno HA-25/B/112/XC2, en dinteles, zunchos horizontales y zunchos verticales y acero, UNE-EN 10080B, cuantía 0,6 kg/m2, armadura de tendel prefabricada de acero galvanizado en caliente con recubrimiento de resina epoxi.

CINCUENTA Y CINCO EUROS con SETENTA Y CINCO CÉNTIMOS

**U08020140** **m2** **Fábrica de ladrillo perforado 24x11,5x7 cm, 1/2 pie de esp.** **26,71**

Fábrica de ladrillo perforado 24x11,5x7 cm, de 1/2 pie de espesor, recibido con mortero de cemento CEM II/B-P 32,5 N y arena tipo M-5, para revestir en alzados, conforme a norma UNE-EN 998-1 y/o según normativa vigente y medida deduciendo huecos superiores a 1 m2.

VEINTISEIS EUROS con SETENTA Y UN CÉNTIMOS

**U08030030** **m2** **Enfoscado maestreado y fratasado mortero cem. y aditivo hidróf.** **28,63**

Enfoscado maestreado y fratasado con mortero de cemento y aditivo hidrófugo, incluso mallazo de alambre de acero galvanizado de 1x1 cm de cuadrícula, grapado a la viga del forjado con grapas de acero galvanizado, incluso colocación. Totalmente terminado.

VEINTIOCHO EUROS con SESENTA Y TRES CÉNTIMOS

**U08030320** **m2** **Pintura al temple liso en paramentos horizontales y verticales** **4,22**

Pintura al temple liso en paramentos horizontales y verticales, dos manos de color, incluso preparación de base y medios auxiliares para su aplicación.

CUATRO EUROS con VEINTIDOS CÉNTIMOS

**U08010010** **kg** **Acero S-275 JR en estructura soldada** **2,94**

Acero laminado S-275 JR, en perfiles laminados en caliente para vigas, pilares, zunchos y correas, mediante uniones soldadas; incluso p.p. de soldaduras, cortes, piezas especiales, despuntes y dos manos de imprimación con pintura de minio de plomo, montado y colocado, según normativa vigente.

DOS EUROS con NOVENTA Y CUATRO CÉNTIMOS

**U08020680_1** **m2** **Cubierta panel chapa acero perf. comercial prelac. 0,6 mm** **47,61**

Cubierta formada por panel de chapa de acero en perfil comercial, prelacada de 0,6 mm con núcleo de espuma de poliuretano de 40 kg/m3 con un espesor total de 50 mm sobre correas metálicas, i/p.p. de solapes, tapajuntas, accesorios de fijación, limahoyas, cumbrera, remates laterales, encuentros de chapa prelacada de 0,6 mm y 500 mm de desarrollo medio, instalado, incluso medios auxiliares y elementos de seguridad, según normativa vigente. Medida en verdadera magnitud. Incluso pieza perimetral de remate con goterón.

CUARENTA Y SIETE EUROS con SESENTA Y UN CÉNTIMOS

**U08020050_1** **m2** **Recrecido aligerado, sistema CÁVITI** **90,98**

Recrecido aligerado de hormigón armado de 65+15 cm de espesor, sobre encofrado perdido de piezas de polipropileno reciclado, C-65 "CÁVITI", de 750x500x650 mm, color negro, realizado con hormigón HA-30/B/12/XC1+XF1+XA1+XM2 fabricado en central, con cemento SR, y malla electrosoldada ME 15x15 Ø 8-8 B 500 T 6x2,20 UNE-EN 10080 como armadura de reparto,

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| | | colocada sobre separadores homologados en capa de compresión de 8 cm de espesor; apoyado todo ello sobre base de hormigón de limpieza.<br>Incluso encofrado, armado y hormigonado de zunchos perimetrales en huecos.<br>NOVENTA EUROS con NOVENTA Y OCHO CÉNTIMOS | |
| U08010030 | m2 | **Plataforma rejilla tramex antidesliz. y seguridad**<br>Plataforma formada por rejilla tipo tramex galvanizada, superantideslizante y de seguridad, (en paneles de 1.000x2.000 mm), formada por doble pletina dentada de cresta biselada, de 30x2 mm y 10x2 mm, respectivamente, en cuadrícula de 30x30 mm, incluido malla de protección por debajo de la pletina separadora, de 1 mm de espesor con taladros cuadrados de 8x8 mm, y p.p. de recercados o bastidor de angular 30x30x3 mm o pletina de 30x3 mm, despuntes, cortes, ajustes y soldaduras, totalmente terminada y colocada.<br>SESENTA Y DOS EUROS con OCHENTA Y NUEVE CÉNTIMOS | 62,89 |
| U08040040 | m2 | **Carpintería metálica con chapa plegada de hierro en puertas**<br>Puerta de chapa plegada (tipo Pegaso o equivalente) practicable o corredera para exteriores de edificaciones, realizada con doble chapa de acero galvanizado de 1 mm de espesor y panel intermedio, rigidizadores con perfiles de acero conformado en frío, herrajes de colgar, cerradura con manillón de nylon, cerco de perfil de acero conformado en frío con garras para recibir a la obra, bastidor y refuerzos de tubo de acero laminado, guías, topes, tiradores, pasadores y demás accesorios necesarios, patillas de fijación a obra, acabado con capa de pintura epoxi polimerizada al horno, elaborada en taller, ajuste y fijación en obra. instalada, i/ recibido de albañilería y precerco.<br>Incluso rejillas de ventilación.<br>DOSCIENTOS DOS EUROS con TREINTA Y OCHO CÉNTIMOS | 202,38 |
| U08040070 | m2 | **Carpintería metálica de acero galvanizado, practicable**<br>Carpintería metálica de acero galvanizado, en ventanas o puertas practicables, con perfiles conformados en frío de acero galvanizado de 1 mm de espesor, formando bastidor con despiece en retícula cuadrada o rectangular, con junquillos a presión de fleje de acero galvanizado de 0,5 mm de espesor con cantoneras en encuentro; patillas para anclaje de 10 cm i/corte, preparación y soldadura de perfiles en taller, ajuste y montaje en obra, pintura, i/ recibido de albañilería. Según NTE-FCA.<br>Incluso rejillas de ventilación.<br>DOSCIENTOS CUARENTA Y CUATRO EUROS con VEINTIOCHO CÉNTIMOS | 244,28 |
| U08040100_1 | Ud | **Puerta enrollable para garaje, de aluminio.**<br>MIL NOVECIENTOS NOVENTA Y SEIS EUROS con SESENTA Y UN CÉNTIMOS | 1.996,61 |
| U08010100_1 | m | **Barandilla tubo metálico H=1 m, pintada. Desmontable**<br>Barandilla metálica de tubo de diámetro 50 mm x e=1,5 mm y altura 1,00 m, compuesta por montantes separados, pasamanos y travesaño intermedio, y rodapié de pletina de 200 x 5 mm, incluso placas y tornillos de anclaje, pintura al esmalte satinado, dos manos y una mano de minio o antioxidante, previo rascado de los óxidos y limpieza manual. Totalmente colocada. Barandilla de fácil desmontaje en caso de necesidad, por temas de mantenimiento<br>CIENTO CINCUENTA Y SIETE EUROS con VEINTIUN CÉNTIMOS | 157,21 |
| U05070050_1 | ud | **Tapa de fundición ductil 80x80cm - D200**<br>Tapa de registro de fundicion dúctil 80x80 cm, recibido con mortero de cemento 1:6, sobre solera de hormigón totalmente terminada, incluso p.p. de medios auxiliares.<br>OCHENTA Y SEIS EUROS con VEINTIUN CÉNTIMOS | 86,21 |
| U05070050_2 | ud | **Tapa de fundición ductil 75x100cm - D400**<br>Tapa de registro de fundicion dúctil 75x100 cm, recibido con mortero de cemento 1:6, sobre solera de hormigón totalmente terminada, incluso p.p. de medios auxiliares.<br>CIENTO SETENTA Y NUEVE EUROS con TREINTA CÉNTIMOS | 179,30 |
| U05070050_3 | ud | **Tapa de fundición ductil 80x160cm - D400 - 4hojas**<br>Tapa de registro de fundicion dúctil 80x160 de 4 hojas D-400 recibido con mortero de cemento 1:6, sobre solera de hormigón totalmente terminada, incluso p.p. de medios auxiliares.<br>DOSCIENTOS DIECISIETE EUROS con NOVENTA CÉNTIMOS | 217,90 |

## SUBCAPÍTULO 01.6 EQUIPOS E INSTALACIONES

## APARTADO 01.6.1 ILUMINACIÓN

| | | | |
|---|---|---|---|
| U10050120 | ud | **Lumi. Adosable. LED Estanca IP-66 1x58 W**<br>Suministro y montaje de luminaria adosable Estanca LED. IP-66, 1x58 W. Factor de potencia | 274,25 |

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| | | >0,9. Eficiencia > 130Lm/W. Vida útil > 50000 horas. Difusor: Policarbonato, extruido.<br>Instalación adosado o suspendido, con equipo y lámpara totalmente montada.<br>DOSCIENTOS SETENTA Y CUATRO EUROS con VEINTICINCO CÉNTIMOS | |
| U10050080 | ud | **Lumi. Adosable. LED Estanca IP-66 1x16 W**<br>Suministro y montaje de luminaria adosable Estanca LED. IP-66, 1x16 W. Factor de potencia >0,9. Eficiencia > 130Lm/W. Vida útil > 50000 horas. Difusor: Policarbonato, extruido.<br>Instalación adosado o suspendido, con equipo y lámpara totalmente montada.<br>DOSCIENTOS TREINTA Y UN EUROS con CINCUENTA Y CINCO CÉNTIMOS | 231,55 |
| U10050290-1 | ud | **Proyector LED 130W IP-66**<br>Proyector LED SiCompact® 31 mini o equivalente.Flujo luminoso nominal 20000lm. Eficacia lumínica 154lm/W.Temperatura de color 4000K. Reproducción de color CRI > 70. Potencia nominal 130W. Índice de protección IP66. Resistencia contra impacto IK08. Instalada y en funcionamiento.<br>CUATROCIENTOS SETENTA Y TRES EUROS con TREINTA CÉNTIMOS | 473,30 |
| U10050250 | ud | **Aparato Autónomo de Emergencia Estanco**<br>Suministro y montaje de luminaria de emergencia estanco, con cuatro LED, flujo luminoso 375 lúmenes, carcasa de 290x130x70 mm, clase II, protección IP 65, con baterías de Ni-MH, autonomía de 1 h, alimentación a 230 V, tiempo de carga 24 h. Incluso accesorios y elementos de fijación.<br>CIENTO CUATRO EUROS con CUARENTA Y SEIS CÉNTIMOS | 104,46 |

## APARTADO 01.6.2 ELEMENTOS INTERIOR TANQUE

| | | | |
|---|---|---|---|
| LIMP_BAS | u | **LIMPIADOR BASCULANTE, L = 4,6 M, AISI 316**<br>Limpiador basculante marca Hidrostank ó similar, referencia LP-2814 , para una longitud entre paredes de 4,6 m. La capacidad viene definida en función de los siguientes parámetros: longitud a limpiar, altura disponible y pendiente de la solera. Fabricado en acero inoxidable AISI 316, acabado final chorreado con microesfera de vidrio. Incluye soportes en acero inoxidable AISI 316, rodamientos, juego de suspensión y demás piezas pequeñas. Tornillería y anclajes en A4. Incluye prueba de volteo con agua en fábrica grabada en vídeo.<br>TOTALMENTE INSTALADO<br>DIEZ MIL CUATROCIENTOS UN EUROS con NOVENTA Y TRES CÉNTIMOS | 10.401,93 |
| RCV.C.SEMISEC | u | **REGULADOR DE CAUDAL TIPO VORTEX EN CAMARA**<br>Válvula de Regulación de Caudal tipo vórtice, marca MOSBAEK-HIDROSTANK, modelo CY/DX 1000-PP300-C275-A30 / BCTWL, para regular un caudal de 142 l/s a una altura de lámina de agua de 4,7 metros. Fabricado en acero inoxidable AISI 316, acabado final chorreado con bolas de vidrio. Con brida loca de polipropileno DN 300 PN 10. Incluso con ventana de inspección. Incluye para la instalación de la válvula de regulación:<br>-- Un pasamuros DN 300 L=600 mm. para empotrar a pared, en acero inoxidable AISI 316, acabado final chorreado con bolas de vidrio, con brida loca de polipropileno DN 300 PN 10<br>-- Una válvula de guillotina DN 300 PN 10, cuerpo y tajadera en acero inoxidable AISI 316. Accionamiento mediante volante.<br>Incluye un bypass formado por<br>-- Un pasamuros DN 250 L=600 mm. para empotrar a pared, en acero inoxidable AISI 316, acabado final chorreado con bolas de vidrio, con brida loca de polipropileno DN 250 PN 10.<br>-- Una válvula de guillotina DN 250 PN 10, cuerpo y tajadera en acero inoxidable AISI 316. Accionamiento mediante volante.<br>-- Un codo DN 250 con prolongación, fabricado en acero inoxidable AISI 316, con brida loca de polipropileno DN 250 PN 10.<br>Tornillería y anclajes en A4<br>TOTALMENTE INSTALADO<br>DOCE MIL SETECIENTOS NOVENTA Y SEIS EUROS con TREINTA Y CUATRO CÉNTIMOS | 12.796,34 |
| CIR_LLEN | u | **CIRCUITO DE LLENADO PARA 2 LIMPIADORES**<br>Incluye los siguientes elementos: 2 electroválvulas y 2 llaves de bola de 1.5", para el llenado de los limpiadores y aislamiento de los circuitos. Canalización de agua desde las electroválvulas hasta los limpiadores en acero inoxidable DN 42, con piezas roscadas de 1.5". 2 arquetas de polipropileno marca Hidrostank para alojar las electroválvulas y llaves de bola, preparadas para la realización de la acometida de agua. No incluye: Acometida de agua desde la red general. Canalización incluida siempre que las arquetas se sitúen a menos de 10 metros de distancia de los limpiadores. | 4.321,76 |

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| | | TOTALMENTE INSTALADO | |
| | | CUATRO MIL TRESCIENTOS VEINTIUN EUROS con SETENTA Y SEIS CÉNTIMOS | |
| **REJA** | **u** | **REJA DE CADENAS** | **39.884,00** |
| | | Reja de cadenas Quilton mod. QC100, o equivalente, de dimensiones 10mm de paso y de ancho y alto 930x4800 mm en material AISI-316L. | |
| | | TREINTA Y NUEVE MIL OCHOCIENTOS OCHENTA Y CUATRO EUROS | |
| **VENT0001** | **Ud** | **VENTILADOR** | **1.198,83** |
| | | Ventilador helicocentrífugo de perfil bajo, de dos velocidades, potencia máxima de 24 W, caudal máximo de 240 m³/h, de 176 mm de diámetro y 303 mm de longitud, nivel de presión sonora de 31 dBA, para conductos de 100 mm de diámetro, formado por cuerpo de polipropileno, hélice de ABS, caja de bornes y motor para alimentación monofásica a 230 V y 50 Hz de frecuencia.<br>Incluye: Replanteo. Colocación. Conexionado y comprobación de su correcto funcionamiento.<br>Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto.<br>Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de Proyecto. | |
| | | MIL CIENTO NOVENTA Y OCHO EUROS con OCHENTA Y TRES CÉNTIMOS | |
| **IVV030** | **m** | **Conducto de PVC.** | **20,60** |
| | | Conducto de ventilación, formado por tubo liso de PVC, de 200 mm de diámetro exterior, pegado mediante adhesivo, colocado en posición horizontal. Incluso material auxiliar para montaje y sujeción a la obra, accesorios y piezas especiales.<br>Criterio de valoración económica: El precio no incluye las compuertas de regulación, las compuertas cortafuego, las rejillas ni los difusores.<br>Incluye: Replanteo del recorrido del conducto y de la situación de los elementos de sujeción. Presentación en seco de tubos y piezas especiales. Fijación del material auxiliar para montaje y sujeción a la obra. Montaje, conexionado y comprobación de su correcto funcionamiento.<br>Criterio de medición de proyecto: Longitud proyectada, según documentación gráfica de Proyecto, medida entre los ejes de los elementos o de los puntos a conectar, sin descontar las piezas especiales.<br>Criterio de medición de obra: Se medirá la longitud realmente ejecutada según especificaciones de Proyecto. | |
| | | VEINTE EUROS con SESENTA CÉNTIMOS | |

## APARTADO 01.6.3 PLC + INSTALACIÓN ELÉCTRICA

| | | | |
|---|---|---|---|
| **CONTRL** | **u** | **CIRCUITO DE CONTROL PARA 2 LIMPIADORES** | **35.231,52** |
| | | Incluye los siguientes elementos: 2 detectores inductivos para detectar el volteo de los limpiadores. Sensor de nivel por radar tipo Vegapuls C11, para detección en continuo del nivel de agua del tanque, ajustable mediante Bluetooth. Cuadro completo para el control del sistema en modo manual y automático con autómata programado Siemens SIMATIC S7-1500, CPU 1516-3 PN/DP con pantalla táctil SIMATIC HMI MTP1500 UNIFIED COMFORT PANEL, analizador de redes SENTRON PAC3200 22-65V DC, tarjeta de comunicaciones SINAUT ST7, TIM 1531 IRC, router SCALANCE M876-4 LTE (4G) EU y antena ANT 794-4MR GSM CUATRIBANDA UMTS. Incluye también SAI para comunicaciones. Canalización y conexión eléctrica de los diferentes elementos en el cuadro de control. No incluye cuadro de protección eléctrica ni acometida desde la red general. Tensión de alimentación: 400 V, 50 Hz, 3 fases + neutro + tierra. Potencia aproximada: 2 kW.<br>TOTALMENTE INSTALADO | |
| | | TREINTA Y CINCO MIL DOSCIENTOS TREINTA Y UN EUROS con CINCUENTA Y DOS CÉNTIMOS | |
| **U03073090** | **ud** | **Caudalímetro electromagnético tub. parcialm. llena PN 10 Ø600** | **18.768,82** |
| | | Suministro, instalación y puesta en servicio de caudalímetro electromagnético, sobre tubería DN 600 mm, con sección parcialmente llena y principio de medida nivel continuo capacitivo, con electrónica separada del tubo de medida, incluso carrete PN 10, grado de protección IP68, alimentación eléctrica a 24 Vcc, precisión mejor del 1 %, con recubrimiento interno del tubo de medida y certificado de calibración del equipo de laboratorio acreditado, según ficha técnica, electrónica, instalación eléctrica, montaje, totalmente instalado, probado y puesto en servicio. | |
| | | DIECIOCHO MIL SETECIENTOS SESENTA Y OCHO EUROS con OCHENTA Y DOS CÉNTIMOS | |
| **U03073080** | **ud** | **Caudalímetro electromagnético tub. parcialm. llena PN 10 Ø500** | **16.263,52** |
| | | Suministro, instalación y puesta en servicio de caudalímetro electromagnético, sobre tubería DN 500 mm, con sección parcialmente llena y principio de medida nivel continuo capacitivo, con electrónica separada del tubo de medida, incluso carrete PN 10, grado de protección IP68, ali- | |

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| | | mentación eléctrica a 24 Vcc, precisión mejor del 1 %, con recubrimiento interno del tubo de medida y certificado de calibración del equipo de laboratorio acreditado, según ficha técnica, electrónica, instalación eléctrica, montaje, totalmente instalado, probado y puesto en servicio. | |
| | | DIECISEIS MIL DOSCIENTOS SESENTA Y TRES EUROS con CINCUENTA Y DOS CÉNTIMOS | |
| U03080030 | ud | **Medidor nivel ultrasonidos** | 1.800,36 |
| | | Suministro, instalación y puesta en servicio de medidor de nivel ultrasónico, alimentación eléctrica a 24Vcc, con precisión mejor del 0,1%, IP 68, alcance de medida 5 m para líquidos, incluso 15 m de cable de conexión, totalmente instalado y probado. | |
| | | MIL OCHOCIENTOS EUROS con TREINTA Y SEIS CÉNTIMOS | |
| U03080050 | m | **Cable 64 fibras Monomodo** | 11,55 |
| | | Suministro e instalación de cable de 64 fibras ópticas en Mono-modo 9/125, con aislamiento PE-AP, bajo canalización de tritubo según especificaciones de Canal de Isabel II, incluso parte proporcional de empalmes, fusionado y conectorización, probado y certificado. | |
| | | ONCE EUROS con CINCUENTA Y CINCO CÉNTIMOS | |
| U03080060 | ud | **Repartidor 64 FO** | 2.159,91 |
| | | Suministro e instalación de repartidor de 64 fibras ópticas para un total de 64 adaptadores de tipo FC-FC y sus correspondientes 64 pig-tail de monomodos, todos fusionados y comprobados con equipo ODTR. | |
| | | DOS MIL CIENTO CINCUENTA Y NUEVE EUROS con NOVENTA Y UN CÉNTIMOS | |
| U03080100 | ud | **Latiguillo FO Multimodo** | 15,98 |
| | | Suministro e instalación de latiguillos de fibra óptica multimodo con conectores FC-FC, de una longitud de 1,50 m. | |
| | | QUINCE EUROS con NOVENTA Y OCHO CÉNTIMOS | |
| U10030780 | m | **Cable RV-K 0,6/1 KV 1x1,5 mm2** | 0,81 |
| | | Cable de cobre aislado en polietileno reticulado y cubierta de PVC, tipo RV-K 0,6/1 KV de 1x1,5 mm2. Instalado bajo tubo o conductos. | |
| | | CERO EUROS con OCHENTA Y UN CÉNTIMOS | |
| U10030010 | m | **Cable RZ1-K 0,6/1 KV 1x1,5 mm2** | 1,15 |
| | | Cable de cobre aislado en polietileno reticulado y cubierta de poliolefina, tipo RZ1-K 0,6/1 KV de 1x1,5 mm2. Instalado bajo tubo o conductos. | |
| | | UN EUROS con QUINCE CÉNTIMOS | |
| U10030020 | m | **Cable RZ1-K 0,6/1 KV 1x2,5 mm2** | 1,46 |
| | | Cable de cobre aislado en polietileno reticulado tipo RZ1-K 0,6/1 KV de 1x2,5 mm2. Instalado bajo tubo o conductos. | |
| | | UN EUROS con CUARENTA Y SEIS CÉNTIMOS | |
| U10060010 | ud | **Base de toma de corriente con contacto de tierra (2P+T), tipo Sc** | 16,31 |
| | | Base de toma de corriente con contacto de tierra (2P+T), tipo Schuko, para empotrar, gama media, intensidad asignada 16 A, tensión asignada 250 V. | |
| | | DIECISEIS EUROS con TREINTA Y UN CÉNTIMOS | |
| U10060020 | ud | **Toma corr. 2P+T 16A IP-55** | 17,24 |
| | | Toma de corriente montaje superficie 2P+T, para 16 A, IP-55, cuerpo aislante en poliamida, tornillería de latón. | |
| | | DIECISIETE EUROS con VEINTICUATRO CÉNTIMOS | |
| U10060060 | ud | **Toma corr. 3P+T 32 A IP-55** | 49,07 |
| | | Toma de corriente montaje superficie 3P+T, para 32 A, IP-55, cuerpo aislante en poliamida, tornillería de latón. | |
| | | CUARENTA Y NUEVE EUROS con SIETE CÉNTIMOS | |
| U10060110_1 | Ud | **Interruptor automático magnetotérmico 10A 2P** | 31,71 |
| | | Interruptor automático magnetotérmico, de 2 módulos, bipolar (2P), intensidad nominal 10 A, poder de corte 6 kA, curva C, de 36x80x77,8 mm, grado de protección IP20, montaje sobre carril DIN (35 mm) y fijación a carril mediante garras. Totalmente montado, conexionado y probado.<br>Incluye: Montaje y conexionado del elemento.<br>Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto.<br>Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de Proyecto. | |
| | | TREINTA Y UN EUROS con SETENTA Y UN CÉNTIMOS | |
| U10060110_2 | Ud | **Interruptor automático magnetotérmico 16A 2P** | 31,71 |
| | | Interruptor automático magnetotérmico, de 2 módulos, bipolar (2P), intensidad nominal 16 A, poder de corte 6 kA, curva C, de 36x80x77,8 mm, grado de protección IP20, montaje sobre carril DIN (35 mm) y fijación a carril mediante garras. Totalmente montado, conexionado y probado.<br>Incluye: Montaje y conexionado del elemento.<br>Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto.<br>Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según es- | |

| CÓDIGO | UD | RESUMEN | PRECIO |
|---|---|---|---|

pecificaciones de Proyecto.

TREINTA Y UN EUROS con SETENTA Y UN CÉNTIMOS

**U10060110_3** **Ud** **Interruptor automático magnetotérmico 32A 3P** **72,87**

Interruptor automático magnetotérmico, de 3 módulos, tripolar (3P), intensidad nominal 32 A, poder de corte 6 kA, curva C, de 54x80x77,8 mm, grado de protección IP20, montaje sobre carril DIN (35 mm) y fijación a carril mediante garras. Totalmente montado, conexionado y probado.
Incluye: Montaje y conexionado del elemento.
Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto.
Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de Proyecto.

SETENTA Y DOS EUROS con OCHENTA Y SIETE CÉNTIMOS

**U10060110_4** **Ud** **Interruptor automático magnetotérmico 10A 3P** **63,52**

Interruptor automático magnetotérmico, de 3 módulos, tripolar (3P), intensidad nominal 10 A, poder de corte 6 kA, curva C, de 54x80x77,8 mm, grado de protección IP20, montaje sobre carril DIN (35 mm) y fijación a carril mediante garras. Totalmente montado, conexionado y probado.
Incluye: Montaje y conexionado del elemento.
Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto.
Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de Proyecto.

SESENTA Y TRES EUROS con CINCUENTA Y DOS CÉNTIMOS

**U10031190** **m** **Cable AL XZ1 (S), tensión nominal 0,6/1 kV 1x95 mm2 AL** **3,53**

Cable eléctrico unipolar tipo AL XZ1 (S), tensión nominal 0,6/1 kV, de seguridad en caso de incendio (S), reacción al fuego clase Eca, con conductor de aluminio, rígido (clase 2), de 1x95 mm² cubierta de material libre de halógenos, con las siguientes características: no propagación de la llama, baja emisión de humos opacos, libre de halógenos, nula emisión de gases corrosivos, resistencia a la absorción de agua, resistencia al frío, resistencia a los rayos ultravioleta, resistencia a los agentes químicos, resistencia a las grasas y aceites y resistencia a los golpes. Según HD 603-5X-1.

TRES EUROS con CINCUENTA Y TRES CÉNTIMOS

**U10040080** **m** **Canaliz. eléctrica Polímero termoplástico libre de halógenos ríg** **8,54**

Canalización eléctrica de superficie para conducción de cables a base de tubo de Polímero termoplástico libre de halógenos rígido libre de halógenos, no propagador de llama, M 20, roscable, grapado sobre hormigón, con tres abrazaderas de acero plastificadas, tres tacos de plástico y tres tirafondos de acero inoxidable.

OCHO EUROS con CINCUENTA Y CUATRO CÉNTIMOS

**U10040510** **ud** **Caja estanca poliéster inyectado 80x80x45 mm** **12,17**

Suministro y montaje de caja estanca en poliéster inyectado de 80x80x45 mm, IP-55, totalmente instalada, incluyendo prensaestopas, fijaciones inoxidables y bornas de conexión.

DOCE EUROS con DIECISIETE CÉNTIMOS

**U10040520** **ud** **Caja estanca poliéster inyectado 105x105x55 mm** **15,80**

Suministro y montaje de caja estanca en poliéster inyectado de 105x105x55 mm, IP-55, totalmente instalada, incluyendo prensaestopas, fijaciones inoxidables y bornas de conexión.

QUINCE EUROS con OCHENTA CÉNTIMOS

**U10040570** **ud** **Caja estanca poliéster inyectado 220x170x140 mm** **71,05**

Suministro y montaje de caja estanca en poliéster inyectado de 220x170x140 mm, IP-55, totalmente instalada, incluyendo prensaestopas, fijaciones inoxidables y bornas de conexión.

SETENTA Y UN EUROS con CINCO CÉNTIMOS

**U10040010** **m** **Canaliz. subterránea aceras** **49,85**

Canalización subterránea en acera, para cables de baja tensión bajo tubo, comprendiendo zanja de 0,60x0,60 m, sobre lecho de hormigón y hormigonado hasta rasante de calzada, con reposición de firme asfáltico, incluyendo excavación y relleno de zanja, cables de acero pasa-guía, cinta de señalización de canalización eléctrica, dos tubos de PE-AD corrugado curvable 160 mm y corchetes.

CUARENTA Y NUEVE EUROS con OCHENTA Y CINCO CÉNTIMOS

**U10040020** **m** **Canaliz. subterránea calzada** **73,93**

Canalización subterránea en calzada, para cables de baja tensión bajo tubo, comprendiendo zanja de 0,60x0,60 m, sobre lecho de hormigón y hormigonado hasta rasante de calzada, con reposición de firme asfáltico, incluyendo excavación y relleno de zanja, cables de acero pasa-guía, cinta de señalización de canalización eléctrica, dos tubos de PE-AD corrugado curvable 160 mm y corchetes.

SETENTA Y TRES EUROS con NOVENTA Y TRES CÉNTIMOS

| CÓDIGO | UD | RESUMEN | PRECIO |
|---|---|---|---|
| U10040030 | m | **Canaliz. sub. ter. medio hormigonada** | 68,57 |
| | | Canalización subterránea en terreno medio hormigonada, para cables de baja tensión bajo tubo, comprendiendo zanja de 0,60x0,60 m, embutidos en dado de hormigón de 0,60x0,40 m, incluyendo excavación y relleno de zanja, cables de acero pasa-guía, cinta de señalización de canalización eléctrica, dos tubos de PE-AD corrugado curvable 160 mm y corchetes. | |
| | | SESENTA Y OCHO EUROS con CINCUENTA Y SIETE CÉNTIMOS | |
| U10040060 | ud | **Arq. hormigón pref. 1x1x1 m** | 230,09 |
| | | Arqueta de hormigón prefabricada para canalización de baja tensión de 1,00x1,00x1,00 m con tapa de hormigón totalmente instalada. | |
| | | DOSCIENTOS TREINTA EUROS con NUEVE CÉNTIMOS | |
| IEX405 | Ud | **Armario de distribución, modular.** | 555,42 |
| | | Armario de distribución metálico, de superficie, con puerta ciega, grado de protección IP40, aislamiento clase II, de 1050x650x250 mm, apilable con otros armarios, con techo, suelo y laterales desmontables por deslizamiento (sin tornillos), cierre de seguridad, escamoteable, con llave, acabado con pintura epoxi, microtexturizado. Totalmente montado.<br>Incluye: Colocación y fijación del elemento.<br>Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto.<br>Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de Proyecto. | |
| | | QUINIENTOS CINCUENTA Y CINCO EUROS con CUARENTA Y DOS CÉNTIMOS | |
| U10040670_1 | Ud | **Caja de protección y medida.** | 311,28 |
| | | Suministro e instalación en el interior de hornacina mural, en vivienda unifamiliar o local, de caja de protección y medida CPM2-E4, de hasta 63 A de intensidad, para 1 contador trifásico, formada por una envolvente aislante, precintable, autoventilada y con mirilla de material transparente resistente a la acción de los rayos ultravioletas, para instalación empotrada. Incluso equipo completo de medida, bornes de conexión, bases cortacircuitos y fusibles para protección de la derivación individual. Normalizada por la empresa suministradora y preparada para acometida subterránea. Totalmente montada, conexionada y probada.<br>Incluye: Replanteo de la situación de los conductos y anclajes de la caja. Fijación. Colocación de tubos y piezas especiales. Conexionado.<br>Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto.<br>Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de Proyecto. | |
| | | TRESCIENTOS ONCE EUROS con VEINTIOCHO CÉNTIMOS | |
| U15060060 | ud | **Legalización instalación de baja tensión** | 4.000,00 |
| | | Legalización de la instalaciones de Baja Tensión, según la legislación vigente que le sea de aplicación, incluso proyecto técnico, suscrito por técnico titulado competente y visado por el Colegio Oficial correspondiente, Certificado de Dirección de Obra Eléctrica, Certificado de Instalación Eléctrica en Baja Tensión (antiguo Dictamen o Boletín eléctrico), Certificado de Inspección por Organismo de Control, Declaraciones responsables según modelos DGIEM, abono de tasas oficiales y cualquier otra documentación y gestión necesaria ante Organismos competentes para la Autorización y puesta en servicio de la instalación. | |
| | | CUATRO MIL EUROS | |
| U10070010 | ud | **Toma de tierra normal con una pica** | 169,84 |
| | | Toma de tierra normal, compuesta de: una pica de acero cobre de 2,5 m de longitud y 18 mm de diámetro, 3 metros de cable de cobre de 50 mm2 de sección y grapas de conexión a la pica. Montaje completo. | |
| | | CIENTO SESENTA Y NUEVE EUROS con OCHENTA Y CUATRO CÉNTIMOS | |

## APARTADO 01.6.4 INSTALACIÓN SANEAMIENTO

| | | | |
|---|---|---|---|
| U02090010 | m | **Tubería PVC-O DN 110 PN 16** | 10,39 |
| | | Suministro e instalación de tubería de PVC-O 500, de diámetro nominal DN 110 mm, presión nominal PN 16, MRS 50 N/mm2, SDR 45,8 y S 22,4, conforme a la norma UNE-ISO 16422 y/o según normativa vigente, color exterior y marcado según Normas de Canal de Isabel II vigentes, incluso parte proporcional de unión por junta elástica, medios auxiliares y pruebas necesarias para su correcto funcionamiento. | |
| | | DIEZ EUROS con TREINTA Y NUEVE CÉNTIMOS | |
| U05090220 | ud | **Sumidero evacuac. aguas 30x30x50 1/2** | 87,69 |
| | | Sumidero para evacuación de aguas de dimensiones interiores 30x30x50 cm, realizada con fábrica de ladrillo perforado de 1/2 pie de espesor, recibido con mortero de cemento 1:6, sobre so- | |

lera de hormigón HM 20/P/20/I de 15 cm de espesor, enfoscado y bruñido interiormente, incluso marco y rejilla de fundición.

OCHENTA Y SIETE EUROS con SESENTA Y NUEVE CÉNTIMOS

## SUBCAPÍTULO 01.7 URBANIZACIÓN EXTERIOR

## APARTADO 01.7.1 PAVIMENTACIÓN

**U01030160** **m3** **Terraplén suelo seleccionado préstamos** **7,53**

Terraplén formado con suelos seleccionados procedentes de préstamos, incluso aportación, nivelación y compactación al 95% P.M., medido sobre perfil.

SIETE EUROS con CINCUENTA Y TRES CÉNTIMOS

**ANS010** **m²** **Solera de hormigón.** **44,89**

Solera de hormigón con malla electrosoldada de 20 cm de espesor, realizada con hormigón HA-30/F/20/X0+XF2 fabricado en central, con malla electrosoldada superior como armadura de reparto, ME 10x10 Ø 5-5 B 500 T 6x2,20 UNE-EN 10080 y con malla electrosoldada inferior, ME 20x20 Ø 5-5 B 500 T 6x2,20 UNE-EN 10080, extendido y vibrado manual mediante regla vibrante, sin tratamiento de su superficie y posterior aplicación de agente filmógeno, (0,15 l/m²); con juntas de retracción de 5 mm de espesor, mediante corte con disco de diamante. Incluso panel de poliestireno expandido de 3 cm de espesor, para la ejecución de juntas de dilatación. El precio no incluye la base de la solera.

CUARENTA Y CUATRO EUROS con OCHENTA Y NUEVE CÉNTIMOS

## APARTADO 01.7.2 CERRAMIENTO

**U09080010_01** **m** **Cerramiento muro bloques hormigón y malla simple torsión** **97,24**

Cerramiento de muro de 220 cm de altura formado por 120 cm bloques huecos de hormigón visto blanco, de 40x20x20 cm, rellenos de HM-20 y 100 cm de malla de simple torsión galvanizada 50/16, de 50 mm de paso de malla y 2,7 mm de diámetro. Incluso cimentación de 40x40 cm de hormigón HM-20, y p.p. de postes de tubo de acero galvanizado de 48 mm, postes de esquina, jabalcones, tornapuntas, tensores, grupillas y accesorios. Totalmente terminado.

NOVENTA Y SIETE EUROS con VEINTICUATRO CÉNTIMOS

**mE15VPM030** **ud** **PUERTA 4,00x2,00 40/14 STD** **349,12**

Puerta de 1 hoja de 4,00x2,00 m. para cerramiento exterior, con bastidor de tubo de acero laminado en frío de 40x40 mm. y malla S/T galvanizada en caliente 40/14 STD, i/herrajes de colgar y seguridad, elaborada en taller, ajuste y montaje en obra. (sin incluir recibido de albañilería).

TRESCIENTOS CUARENTA Y NUEVE EUROS con DOCE CÉNTIMOS

## APARTADO 01.7.3 ACOMETIDAS

**U01021010** **m3** **Excavación a cielo abierto, med. mecán. terreno blando** **2,72**

Excavación a cielo abierto, por medios mecánicos, en terreno blando (suelo con golpeo en el ensayo SPT menor o igual que 10 golpes / 30 cm), medido sobre perfil.

DOS EUROS con SETENTA Y DOS CÉNTIMOS

**U01030070** **m3** **Relleno zanja propios selec. Tmax 30 mm** **7,95**

Relleno de zanjas con suelos seleccionados, tamaño máximo 30 mm, procedentes de la propia excavación, incluso aportación, extendido y compactación hasta una densidad del 95% P.M., medido sobre perfil.

SIETE EUROS con NOVENTA Y CINCO CÉNTIMOS

**U02050010** **m** **Tubería polietileno PE-100, PN 16, DN 25** **0,85**

Suministro e instalación de tubería de polietileno PE-100, diámetro nominal DN 25 mm, presión nominal PN 16, MRS 10 N/mm2, SDR 11 y S 5, conforme a norma UNE-EN 12201 y/o según normativa vigente, color exterior y marcado según Normas de Canal de Isabel II vigentes, incluso parte proporcional de elementos electrosoldables, medios auxiliares y pruebas necesarias para su correcto funcionamiento.

CERO EUROS con OCHENTA Y CINCO CÉNTIMOS

**E17ABT110** **m** **LÍNEA ACOMETIDA TRIFÁSICA ALUMINIO 4x50 mm2** **14,22**

Línea eléctrica de acometida trifásica de 4x50 mm2 de sección, sobre canalización (no incluida), formada por conductores unipolares aislados de aluminio, con aislamiento en polietileno reticulado (XLPE) y cubierta en PVC, para una tensión nominal de 0,6/1kV, de conductor tipo RV y clase de reacción al fuego Eca, conforme a EN 50575:2014+A1:2016 (CPR CE EU-305/2011). Totalmente instalada; i/p.p. de conexiones y medios auxiliares. Conforme a REBT: ITC-BT-07, ITC-BT-09 e ITC-BT-11.

| CÓDIGO | UD | RESUMEN | PRECIO |
|---|---|---|---|
| | | CATORCE EUROS con VEINTIDOS CÉNTIMOS | |
| **E17ABC010** | **m** | **CANALIZ. ACOMET. ELÉCTR. 50x80 cm ACERA 2x160 mm** | **31,04** |
| | | Canalización subterránea enterrada bajo acera, en zanja de 50 cm de ancho y 80 cm de profundidad de dimensiones mínimas, para acometida eléctrica en baja tensión; formada por 2 tubos de polietileno corrugado de alta densidad de doble pared (línea + reserva) de 160 mm de diámetro. Incluye apertura y excavación de la zanja por medios mecánicos, formación de cuna de arena de río de 5 cm de espesor, colocación de los tubos, relleno de costados y tapado de tubos con arena de río, colocación de cinta de señalización, y relleno de zanja y compactado con las tierras procedentes de la excavación, hasta el nivel base del pavimento (solera, acera, etc). Totalmente terminada; i/p.p. de limpieza y medios auxiliares. | |
| | | TREINTA Y UN EUROS con CUATRO CÉNTIMOS | |
| **mU13AQ030-M** | **ud** | **ARMARIO APM-6 PROTECCIÓN CGP + PLC** | **2.667,91** |
| | | Armario APM-6, instalado. incluida obra civil y salidas. Para colocación de cuadro CGP y PLC | |
| | | DOS MIL SEISCIENTOS SESENTA Y SIETE EUROS con NOVENTA Y UN CÉNTIMOS | |
| **mE21CG010** | **ud** | **PUNTO DE TOMA DE AGUA SOBRE SOPORTE VERTICAL DE 1.50 M DE ALTURA** | **522,80** |
| | | Suministro y colocación de grifo de1/2" de diámetro, para manguera, colocado roscado, totalmente equipado, instalado y funcionando.inlcuyendo arqueta con válvula de corte en pie de soporte y soporte verticval de acero de sujección. | |
| | | QUINIENTOS VEINTIDOS EUROS con OCHENTA CÉNTIMOS | |

## CAPÍTULO 02 COLECTORES EXTERIORES

## SUBCAPÍTULO 02.1 ENTRADA PLUVIALES

### APARTADO 02.1.1 MOVIMIENTO DE TIERRAS

| | | | |
|---|---|---|---|
| **U01022020** | **m3** | **Excavación en zanja, med. mecán. terreno medio** | **12,86** |
| | | Excavación en zanja, por medios mecánicos, en terreno medio (suelo con golpeo en el ensayo SPT entre 10 y 30 golpes / 30 cm), medido sobre perfil. | |
| | | DOCE EUROS con OCHENTA Y SEIS CÉNTIMOS | |
| **U01023020** | **m3** | **Excavación en pozo, med. mecán. terreno medio** | **18,63** |
| | | Excavación en pozo, por medios mecánicos, en terreno medio (suelo con golpeo en el ensayo SPT entre 10 y 30 golpes / 30 cm), medido sobre perfil. | |
| | | DIECIOCHO EUROS con SESENTA Y TRES CÉNTIMOS | |
| **U01040040** | **m2** | **Refino nivelación fondo zanjas** | **2,46** |
| | | Refino, nivelación y apisonado de fondo de zanja para asiento de tubería, por cualquier procedimiento, incluso limpieza. | |
| | | DOS EUROS con CUARENTA Y SEIS CÉNTIMOS | |
| **U01030020** | **m3** | **Grava o gravilla en rellenos o asiento de tubería** | **18,69** |
| | | Grava o gravilla en rellenos o asiento de tubería, por cualquier procedimiento, de tamaño máximo 25 mm, exenta de materia orgánica, con contenido de sulfatos inferior al 0,3%, expresado en trióxido de azufre, incluso aportación, extendido y nivelación, medido sobre perfil. | |
| | | DIECIOCHO EUROS con SESENTA Y NUEVE CÉNTIMOS | |
| **U01030050** | **m3** | **Relleno zanja propios adecuad. Tmax 150 mm** | **7,95** |
| | | Relleno de zanjas con suelos adecuados, tamaño máximo 150 mm, procedentes de la propia excavación, incluso aportación, extendido y compactación hasta una densidad del 100% P.M., medido sobre perfil. | |
| | | SIETE EUROS con NOVENTA Y CINCO CÉNTIMOS | |
| **U01030340** | **m3** | **Relleno trasdós muros suelos adecuados de excavación** | **5,53** |
| | | Relleno localizado en trasdós de muros con suelos adecuados procedentes de la excavación, incluso aportación, extendido, humectación y compactación en capas de 30 cm de espesor, con un grado de compactación del 95% del P.M. | |
| | | CINCO EUROS con CINCUENTA Y TRES CÉNTIMOS | |
| **U01025100** | **m2** | **Entibación cuajada zanjas o pozos con paneles acero hasta 6 m** | **23,84** |
| | | Entibación metálica cuajada en zanjas y pozos, hasta 6 m de profundidad, con paneles de chapa de acero, amortizables en 400 puestas, incluso p.p. de codales extensibles metálicos y medios auxiliares. | |
| | | VEINTITRES EUROS con OCHENTA Y CUATRO CÉNTIMOS | |

### APARTADO 02.1.2 OBRAS DE FÁBRICA

| | | | |
|---|---|---|---|
| **U05030150** | **ud** | **Pozo de registro diámetro interior 1100 mm y 1<H<2m profun., enf** | **812,64** |
| | | Pozo de registro, diámetro interior 1100 mm de entre 1,00 y 2,00 m de profundidad, construido con fábrica de ladrillo macizo de 1 pie de espesor, recibido con mortero M-10, colocado sobre | |

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| | | solera de hormigón HA-25/P/40/I de 0,30 m mínimo de espesor, armada con mallazo; enfoscado interior y exterior fratasado con mortero hidrófugo bruñido en toda su altura con mortero CS-IV-Wc2. Incluso colocado, totalmente terminado y p. p. de formación de cuna en el fondo del pozo, formación de brocal asimétrico en la coronación para recibir cerco y tapa y medios auxiliares. | |
| | | OCHOCIENTOS DOCE EUROS con SESENTA Y CUATRO CÉNTIMOS | |
| U05030080 | m | **En exceso para pozo de registro, diámetro interior 100 cm y prof** | 385,64 |
| | | En exceso para pozo de registro, diámetro interior 1000 mm y profundidad > 3,10 m, formado por piezas prefabricadas de hormigón armado, recibido y sellado de juntas de piezas prefabricadas con M-350, incluso pates totalmente terminado. | |
| | | TRESCIENTOS OCHENTA Y CINCO EUROS con SESENTA Y CUATRO CÉNTIMOS | |
| U05070110 | ud | **Tapa de registro de fundición dúctil, clase D 400 tráfico medio** | 244,38 |
| | | Tapa de registro de fundición dúctil, clase D 400 para tráfico medio, conforme a norma UNE 124, de 600 mm. de luz libre, con bloqueo automático, tapa articulada, junta anti ruido para asiento estable de la tapa, con dispositivo acerrojado y antirrobo, enrasada con la superficie, marcado con identificación de Canal de Isabel II y servicio correspondiente (Abastecimiento, Saneamiento, Reutilización), incluso marco y anclaje, colocada en obra, totalmente instalada. | |
| | | DOSCIENTOS CUARENTA Y CUATRO EUROS con TREINTA Y OCHO CÉNTIMOS | |
| U05090240 | ud | **Pate polipropileno con alma de acero** | 13,91 |
| | | Pate con alma de acero recubierto de polipropileno, conforme a la norma UNE-EN 13101 y/o según normativa vigente, para acceso a pozos de registro, totalmente colocado, incluso taco químico, anclaje químico o resina. | |
| | | TRECE EUROS con NOVENTA Y UN CÉNTIMOS | |

## APARTADO 02.1.3 TUBERÍAS

| | | | |
|---|---|---|---|
| U02080040 | m | **Tubería PVC-U DN 500, SN 8 kN/m2** | 156,93 |
| | | Suministro e instalación de tubería de PVC-U de pared estructurada, rigidez nominal SN>= 8 kN/m2, de diámetro nominal DN 500 mm, conforme a norma UNE-EN 13476 y/o según normativa vigente, incluso parte proporcional de unión con junta elástica, medios auxiliares y pruebas necesarias para su correcto funcionamiento. | |
| | | CIENTO CINCUENTA Y SEIS EUROS con NOVENTA Y TRES CÉNTIMOS | |
| mU09C090 | ud | **ENTRONQUE ACOMET. TUBULAR POZO ALCANTAR. O COLECTOR** | 294,96 |
| | | Entronque de acometida tubular, a pozo de alcantarillado, o colector existente, inlcuida la demolición de calzada y acera hsta la conexión con el pozo en la calle,la posterior reposición del pavimento y el transporte y gestión de los residuos. | |
| | | DOSCIENTOS NOVENTA Y CUATRO EUROS con NOVENTA Y SEIS CÉNTIMOS | |
| U01030350 | m | **Banda de señalización** | 0,28 |
| | | Banda de señalización, según normas o especificaciones técnicas de Canal de Isabel II vigentes. | |
| | | CERO EUROS con VEINTIOCHO CÉNTIMOS | |

## SUBCAPÍTULO 02.2 SALIDA PLUVIALES

## APARTADO 02.2.1 MOVIMIENTO DE TIERRAS

| | | | |
|---|---|---|---|
| U01022020 | m3 | **Excavación en zanja, med. mecán. terreno medio** | 12,86 |
| | | Excavación en zanja, por medios mecánicos, en terreno medio (suelo con golpeo en el ensayo SPT entre 10 y 30 golpes / 30 cm), medido sobre perfil. | |
| | | DOCE EUROS con OCHENTA Y SEIS CÉNTIMOS | |
| U01023020 | m3 | **Excavación en pozo, med. mecán. terreno medio** | 18,63 |
| | | Excavación en pozo, por medios mecánicos, en terreno medio (suelo con golpeo en el ensayo SPT entre 10 y 30 golpes / 30 cm), medido sobre perfil. | |
| | | DIECIOCHO EUROS con SESENTA Y TRES CÉNTIMOS | |
| U01040040 | m2 | **Refino nivelación fondo zanjas** | 2,46 |
| | | Refino, nivelación y apisonado de fondo de zanja para asiento de tubería, por cualquier procedimiento, incluso limpieza. | |
| | | DOS EUROS con CUARENTA Y SEIS CÉNTIMOS | |
| U01030020 | m3 | **Grava o gravilla en rellenos o asiento de tubería** | 18,69 |
| | | Grava o gravilla en rellenos o asiento de tubería, por cualquier procedimiento, de tamaño máximo 25 mm, exenta de materia orgánica, con contenido de sulfatos inferior al 0,3%, expresado en | |

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| | | trióxido de azufre, incluso aportación, extendido y nivelación, medido sobre perfil. DIECIOCHO EUROS con SESENTA Y NUEVE CÉNTIMOS | |
| U07010810 | m3 | **HA-30/B/20/XC2,XC3 o HA-30/B/20/XC4 en elementos horizontales ve** Suministro y puesta en obra de hormigón HA-30/B/20/XC2,XC3 o HA-30/B/20/XC4 , elaborado en central y vertido con bomba en elementos horizontales de estructura (cimentaciones, soleras, vigas, etc.), incluso compactación, vibrado, curado y acabado. Según CE vigente. CIENTO VEINTIUN EUROS con SETENTA Y OCHO CÉNTIMOS | 121,78 |
| U01030050 | m3 | **Relleno zanja propios adecuad. Tmax 150 mm** Relleno de zanjas con suelos adecuados, tamaño máximo 150 mm, procedentes de la propia excavación, incluso aportación, extendido y compactación hasta una densidad del 100% P.M., medido sobre perfil. SIETE EUROS con NOVENTA Y CINCO CÉNTIMOS | 7,95 |
| U01030340 | m3 | **Relleno trasdós muros suelos adecuados de excavación** Relleno localizado en trasdós de muros con suelos adecuados procedentes de la excavación, incluso aportación, extendido, humectación y compactación en capas de 30 cm de espesor, con un grado de compactación del 95% del P.M. CINCO EUROS con CINCUENTA Y TRES CÉNTIMOS | 5,53 |
| U01025100 | m2 | **Entibación cuajada zanjas o pozos con paneles acero hasta 6 m** Entibación metálica cuajada en zanjas y pozos, hasta 6 m de profundidad, con paneles de chapa de acero, amortizables en 400 puestas, incluso p.p. de codales extensibles metálicos y medios auxiliares. VEINTITRES EUROS con OCHENTA Y CUATRO CÉNTIMOS | 23,84 |

## APARTADO 02.2.2 OBRAS DE FÁBRICA

| | | | |
|---|---|---|---|
| U05030150 | ud | **Pozo de registro diámetro interior 1100 mm y 1<H<2m profun., enf** Pozo de registro, diámetro interior 1100 mm de entre 1,00 y 2,00 m de profundidad, construido con fábrica de ladrillo macizo de 1 pie de espesor, recibido con mortero M-10, colocado sobre solera de hormigón HA-25/P/40/I de 0,30 m mínimo de espesor, armada con mallazo; enfoscado interior y exterior fratasado con mortero hidrófugo bruñido en toda su altura con mortero CS-IV-Wc2. Incluso colocado, totalmente terminado y p. p. de formación de cuna en el fondo del pozo, formación de brocal asimétrico en la coronación para recibir cerco y tapa y medios auxiliares. OCHOCIENTOS DOCE EUROS con SESENTA Y CUATRO CÉNTIMOS | 812,64 |
| U05030080 | m | **En exceso para pozo de registro, diámetro interior 100 cm y prof** En exceso para pozo de registro, diámetro interior 1000 mm y profundidad > 3,10 m, formado por piezas prefabricadas de hormigón armado, recibido y sellado de juntas de piezas prefabricadas con M-350, incluso pates totalmente terminado. TRESCIENTOS OCHENTA Y CINCO EUROS con SESENTA Y CUATRO CÉNTIMOS | 385,64 |
| U05070110 | ud | **Tapa de registro de fundición dúctil, clase D 400 tráfico medio** Tapa de registro de fundición dúctil, clase D 400 para tráfico medio, conforme a norma UNE 124, de 600 mm. de luz libre, con bloqueo automático, tapa articulada, junta anti ruido para asiento estable de la tapa, con dispositivo acerrojado y antirrobo, enrasada con la superficie, marcado con identificación de Canal de Isabel II y servicio correspondiente (Abastecimiento, Saneamiento, Reutilización), incluso marco y anclaje, colocada en obra, totalmente instalada. DOSCIENTOS CUARENTA Y CUATRO EUROS con TREINTA Y OCHO CÉNTIMOS | 244,38 |
| U05090240 | ud | **Pate polipropileno con alma de acero** Pate con alma de acero recubierto de polipropileno, conforme a la norma UNE-EN 13101 y/o según normativa vigente, para acceso a pozos de registro, totalmente colocado, incluso taco químico, anclaje químico o resina. TRECE EUROS con NOVENTA Y UN CÉNTIMOS | 13,91 |
| U07EA160 | ud | **ALIVIADERO OBRA 2,50x2,00+1,70 m** Aliviadero para alcantarillado de dimensiones interiores 2,50x2,00 m y 2,10 m de altura libre interior, realizado sobre solera de hormigón en masa HM-20/P/40/I de 20 cm de espesor, incluso formación de pendientes, fábrica de ladrillo macizo de 1 pie de espesor, tomados con mortero de cemento, losa armada de 16 cm de canto y viga armada de 40 cm, realizadas con HA-25/P/20/I, enfoscada y bruñida interiormente con mortero CSIV-W2, y conducto de pozo, de 80 cm de diámetro y 1,70 m de altura, realizado con anillos de hormigón en masa, prefabricados, de borde machihembrado, y cono asimétrico para formación de brocal del pozo, con cierre de marco y tapa de fundición, de 62,5 cm de diámetro, i/sellado de juntas con mortero de cemento, recibido de pates y de cerco de tapa, y con medios auxiliares, sin incluir la excavación del pozo | 1.191,02 |

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| | | y su relleno perimetral posterior. Según UNE-EN 998-1:2010 y UNE-EN 998-2:2004. MIL CIENTO NOVENTA Y UN EUROS con DOS CÉNTIMOS | |
| U02V010 | ud | **EMBOCADURA PARA CONDUCTO D=600 mm** | 442,14 |
| | | Embocadura para conducto D=600 mm, formada por imposta de 0,40x0,20 m, aletas de h=0,90 m y espesor 0,30 m, con talud 2/1, cimientos de 0,50x0,50 m, solera entre aletas de espesor 0,25 m, incluyendo excavación, encofrado, hormigón HM-20 en cimientos y alzados, terminado. CUATROCIENTOS CUARENTA Y DOS EUROS con CATORCE CÉNTIMOS | |

## APARTADO 02.2.3 TUBERÍAS

| | | | |
|---|---|---|---|
| U02080050 | m | **Tubería PVC-U DN 630, SN 8 kN/m2** | 171,66 |
| | | Suministro e instalación de tubería de PVC-U de pared estructurada, rigidez nominal SN>= 8 kN/m2, de diámetro nominal DN 630 mm, conforme a norma UNE-EN 13476 y/o según normativa vigente, incluso parte proporcional de unión con junta elástica, medios auxiliares y pruebas necesarias para su correcto funcionamiento. CIENTO SETENTA Y UN EUROS con SESENTA Y SEIS CÉNTIMOS | |
| U02040200 | m | **Marco prefabricado visitable tipo HA30P/12 de 1,00x1,80 m S/R** | 553,99 |
| | | Suministro y colocación de marco prefabricado visitable de hormigón armado tipo HA-30/P/12, resistente a los sulfatos, de 1,00 x 1,80 m, conforme a norma UNE-EN 14844 y/o incluso normativa vigente, incluso sellado de juntas interiores y exteriores con mortero tipo M-450, CEM-I 32,5/SR. QUINIENTOS CINCUENTA Y TRES EUROS con NOVENTA Y NUEVE CÉNTIMOS | |
| U01026250 | m | **Tubería hincada chapa de acero DN 800 escudo abierto** | 933,27 |
| | | Tubería hincada de DN 800 mm de diámetro interior, de chapa de acero de espesor mínimo 0,8% del diámetro, revestida con al menos 300 micras de resina de poliuretano, conforme a la norma UNE-EN 10224 y/o normativa vigente, en cualquier clase de terreno incluso roca, con equipo de escudo abierto, extracción de los productos procedentes de la excavación totalmente colocada, incluso p.p. de juntas de estanquidad, inyecciones bentoníticas, demolición posterior de macizo, maquinaria y medios auxiliares, medido sobre perfil. NOVECIENTOS TREINTA Y TRES EUROS con VEINTISIETE CÉNTIMOS | |
| U01026330 | ud | **Implantación, retirada y transporte escudo abierto acero <1500** | 1.538,47 |
| | | Implantación, retirada y transporte de equipo perforador de escudo abierto para hinca de tubería de chapa de acero de diámetro interior inferior a 1500 mm. MIL QUINIENTOS TREINTA Y OCHO EUROS con CUARENTA Y SIETE CÉNTIMOS | |
| mU09C090 | ud | **ENTRONQUE ACOMET. TUBULAR POZO ALCANTAR. O COLECTOR** | 294,96 |
| | | Entronque de acometida tubular, a pozo de alcantarillado, o colector existente, inlcuida la demolición de calzada y acera hsta la conexión con el pozo en la calle,la posterior reposición del pavimento y el transporte y gestión de los residuos. DOSCIENTOS NOVENTA Y CUATRO EUROS con NOVENTA Y SEIS CÉNTIMOS | |
| U01030350 | m | **Banda de señalización** | 0,28 |
| | | Banda de señalización, según normas o especificaciones técnicas de Canal de Isabel II vigentes. CERO EUROS con VEINTIOCHO CÉNTIMOS | |

## CAPÍTULO 03 GESTIÓN DE RESIDUOS

| | | | |
|---|---|---|---|
| AABBCC | ud | **Gestión de Residuos de Construcción y Demolición** | 11.460,23 |
| | | Gestión integral de Residuos incluyendo la identificación de los residuos generados y Estimación de la cantidad de cada tipo que se genera en la obra codificados conforme a la Lista Europea de Residuos (Orden MAM/304/2002 del Ministerio de Medio Ambiente de 8 de febrero), medidas de segregación "in situ" previstas por el plan de gestión de residuos, operaciones de valorización "in situ" y de reutilización, destino de los residuos no valorables o reutilizables, según estudio de gestión de residuos incluido en el proyecto, pliego de prescripciones y Orden 2690/2006, de 28 de Julio, de la Comunidad de Madrid. ONCE MIL CUATROCIENTOS SESENTA EUROS con VEINTITRES CÉNTIMOS | |

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## CAPÍTULO 04 SEGURIDAD Y SALUD

**C.19.8.1** **Ud** **Seguridad y Salud** **13.980,00**

PROTECCIONES INDIVIDUALES Y COLECTIVAS E INSTALACIONES DE HIGIENE Y BIENESTAR s/. Real Decreto 1627/97, de 24 de Octubre, por el que se establecen las disposiciones mínimas necesarias de seguridad y salud en las obras de construcción se han de disponer de las medidas de protección:
- Protecciones individuales con objeto de la prevención de los riesgos laborales, de los riesgos específicos en cada unos de los "tajos" relativos a las obras civiles, tales como cinturones, cascos, guantes, ropa adecuada de obras y equipamiento en general para protección de los trabajadores.
- Protecciones colectivas con objeto de la prevención de los riesgos laborales relativos a las obras civiles, tales como instalaciones provisionales de obra, vallados, señalización, balizado, entibaciones, zanjas y equipamiento en general para protecciones de obras.
- Instalaciones de higiene y bienestar, tales como casetas de obra, aseo, vestuarios, comedor, primeros auxilios y equipamiento en general para higiene y bienestar de obras.

TRECE MIL NOVECIENTOS OCHENTA EUROS

# CUADRO DE PRECIOS Nº 2

# CUADRO DE PRECIOS 2

**TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS**

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## CAPÍTULO 01 TANQUE DE TORMENTAS

### SUBCAPÍTULO 01.1 MOVIMIENTO DE TIERRAS

**U01021020_1** **m3** **Excavación a cielo abierto, med. mecán. terreno medio**

Excavación a cielo abierto, por medios mecánicos, en terreno medio (suelo con golpeo en el ensayo SPT entre 10 y 30 golpes / 30 cm), medido sobre perfil, con carga y transporte a vertedero autorizado o lugar de empleo, sin canon de vertido.

| | |
|---|---|
| Mano de obra | 0,4133 |
| Maquinaria | 6,0542 |
| **TOTAL PARTIDA** | **6,47** |

**U01030340** **m3** **Relleno trasdós muros suelos adecuados de excavación**

Relleno localizado en trasdós de muros con suelos adecuados procedentes de la excavación, incluso aportación, extendido, humectación y compactación en capas de 30 cm de espesor, con un grado de compactación del 95% del P.M.

| | |
|---|---|
| Mano de obra | 2,1084 |
| Maquinaria | 2,4646 |
| Resto de obra y materiales | 0,9545 |
| **TOTAL PARTIDA** | **5,53** |

**mU02ER050** **m3** **Relleno localizado material filtrante**

Relleno localizado con material filtrante de préstamos, en cimientos y trasdoses de muros.

| | |
|---|---|
| Mano de obra | 2,0257 |
| Maquinaria | 9,1660 |
| Resto de obra y materiales | 9,5585 |
| **TOTAL PARTIDA** | **20,75** |

**U01025130** **m2** **Entibación cuajada zapatas o pozos con cajones chapa hasta 6 m**

Entibación metálica cuajada en zapatas o pozos, hasta 6 m de profundidad, con cajones de paneles de chapa de acero, amortizables en 300 puestas, incluso p.p. de medios auxiliares.

| | |
|---|---|
| Mano de obra | 3,4790 |
| Maquinaria | 18,2031 |
| Resto de obra y materiales | 2,2650 |
| **TOTAL PARTIDA** | **23,95** |

### SUBCAPÍTULO 01.2 DRENAJE

**U09011080_01** **m** **Tubo de drenaje de polietileno de alta densidad de 15 cm diám.**

Suministro y colocación de tubo de drenaje de polietileno de alta densidad corrugado, de doble pared ranurada, de 15 cm de diámetro. Colocado sobre cama de arena de río de 10 cm de espesor, revestido con geotextil de 125 g/m2 y relleno con grava filtrante 25 cm por encima del tubo con cierre de doble solapa del paquete filtrante (realizado con el propio geotextil). Con p.p. de medios auxiliares, incluso conexión a arqueta de evacuación de cámara.

| | |
|---|---|
| Mano de obra | 10,8621 |
| Resto de obra y materiales | 20,4075 |
| **TOTAL PARTIDA** | **31,27** |

### SUBCAPÍTULO 01.3 ESTRUCTURA

**U07010204** **m3** **HNE-15/B/12 o HNE-15/B/20**

Suministro y puesta en obra de hormigón no estructural HNE-15/B/12 o HNE-15/B/20, elaborado en central y vertido desde camión o bomba, para rellenos o elementos no estructurales, colocado a cualquier profundidad, incluso compactación, curado y acabado. Según CE vigente.

| | |
|---|---|
| Mano de obra | 5,1320 |
| Maquinaria | 7,2376 |
| Resto de obra y materiales | 76,5450 |
| **TOTAL PARTIDA** | **88,91** |

**U07010804** **m3** **HA-30/B/20/XC2,XC3 o HA-30/B/20/XC4 eltos horiz., con camión**

Suministro y puesta en obra de hormigón HA-30/B/20/XC2,XC3 o HA-30/B/20/XC4, elaborado en central y vertido desde camión en elementos horizontales-verticales de estructura (cimentacio-

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nes, soleras, vigas, etc.), incluso compactación, vibrado, curado y acabado. Según CE vigente.

| | |
|---|---|
| Mano de obra | 6,7960 |
| Maquinaria | 0,1960 |
| Resto de obra y materiales | 96,5965 |
| **TOTAL PARTIDA** | **103,59** |

**U07010210** **m3** **HNE-20/B/12 o HNE-20/B/20**

Suministro y puesta en obra de hormigón no estructural HNE-20/B/12 o HNE-20/B/20, elaborado en central y vertido desde camión o bomba, para rellenos o elementos no estructurales, colocado a cualquier profundidad, incluso compactación, curado y acabado. Según CE vigente. Hormigón ciclópeo.

| | |
|---|---|
| Mano de obra | 5,1320 |
| Maquinaria | 7,2376 |
| Resto de obra y materiales | 86,7475 |
| **TOTAL PARTIDA** | **99,12** |

**U07030050** **kg** **Suministro y colocación de acero para armaduras en barras B500S**

Suministro y colocación de acero para armaduras en barras corrugadas B 500 S, incluso cortado, doblado y recortes, según peso teórico.

| | |
|---|---|
| Mano de obra | 0,3479 |
| Maquinaria | 0,0075 |
| Resto de obra y materiales | 1,3888 |
| **TOTAL PARTIDA** | **1,74** |

**U07020081** **m2** **Encofrado plano met. elem. vertical. estru. trabaj. entre 5 y 7**

Encofrado plano para elementos verticales de estructura (muros, etc.) con paneles metálicos, con calidad de acabado cara vista, para trabajos a partir de 5 m de altura y hasta 7 m de altura, incluso molduras y berenjenos, tapes, velas, puntales, cimbras y andamiaje, desencofrado y limpieza.

| | |
|---|---|
| Mano de obra | 23,4323 |
| Maquinaria | 2,4253 |
| Resto de obra y materiales | 8,8450 |
| **TOTAL PARTIDA** | **34,70** |

**U07020040** **m2** **Encofrado plano met. elem. horiz. estru. trabaj. entre 3 y 5 m**

Encofrado plano para elementos horizontales de estructura (losas, etc.) con paneles metálicos, con calidad de acabado cara vista, para trabajos a partir de 3 m de altura y hasta 5 m de altura, incluso molduras y berenjenos, tapes, velas, puntales, cimbras y andamiaje, desencofrado y limpieza.

| | |
|---|---|
| Mano de obra | 21,5275 |
| Maquinaria | 2,1772 |
| Resto de obra y materiales | 7,6150 |
| **TOTAL PARTIDA** | **31,32** |

## SUBCAPÍTULO 01.4 IMPERMEABILIZACIÓN

**08020360_1** **m2** **Impz muro c/lamn PVC e 1,5 mm**

Impermeabilización de muro de sótano, mediante membrana impermeabilizante, compuesta por lámina de policloruro de vinilo PVC, de 1,5 mm de espesor, sin armadura, fijada en la parte superior mediante barra de terminación de aluminio anclada mecánicamente al soporte, incluso limpieza previa del soporte, fijaciones, mermas y solapos, según DB HS-1 del CTE.

| | |
|---|---|
| Mano de obra | 3,4790 |
| Resto de obra y materiales | 17,4469 |
| **TOTAL PARTIDA** | **20,93** |

## SUBCAPÍTULO 01.5 OBRA CIVIL-EDIFICACIÓN

**808020300_2** **ml** **Zuncho horizontal de bloque "U" de hormigón visto**

Zuncho horizontal de 20 cm de espesor, de bloques en "U" de hormigón, lisos, color gris, 40x20x20 cm, resistencia normalizada R10 (10 N/mm²), para revestir, recibidos con mortero de cemento industrial, color gris, M-7,5, suministrado a granel; con refuerzo de hormigón de relleno, HA-25/B/12/XC2, preparado en obra, vertido con medios manuales, y acero UNE-EN 10080 B 500 S, cuantía 4,3 kg/m; para muro de carga de fábrica armada. Incluso alambre de atar y sepa-

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| | | radores. El precio incluye la elaboración de la ferralla (corte, doblado y conformado de elementos) en taller industrial y el montaje en el lugar definitivo de su colocación en obra. | |
| | | Mano de obra | 2,8284 |
| | | Maquinaria | 0,0959 |
| | | Resto de obra y materiales | 19,3995 |
| | | **TOTAL PARTIDA** | **22,32** |
| **U08020300_1** | **m2** | **Fábrica bloques hueco hormigón estriado visto 40x20x20 cm** | |
| | | Fábrica de bloque hueco de hormigón estriado a cara vista, color blanco, dimensiones 40x20x20 cm, recibida con mortero M-250 de cemento BL 22,5 incluso rejuntado, limpieza de paños y piezas especiales, según normativa vigente.<br>Reforzado con armadura anclada a forjado existente y hormigón de relleno HA-25/B/112/XC2, en dinteles, zunchos horizontales y zunchos verticales y acero, UNE-EN 10080B, cuantía 0,6 kg/m2, armadura de tendel prefabricada de acero galvanizado en caliente con recubrimiento de resina epoxi. | |
| | | Mano de obra | 10,0377 |
| | | Resto de obra y materiales | 45,7154 |
| | | **TOTAL PARTIDA** | **55,75** |
| **U08020140** | **m2** | **Fábrica de ladrillo perforado 24x11,5x7 cm, 1/2 pie de esp.** | |
| | | Fábrica de ladrillo perforado 24x11,5x7 cm, de 1/2 pie de espesor, recibido con mortero de cemento CEM II/B-P 32,5 N y arena tipo M-5, para revestir en alzados, conforme a norma UNE-EN 998-1 y/o según normativa vigente y medida deduciendo huecos superiores a 1 m2. | |
| | | Mano de obra | 15,5655 |
| | | Resto de obra y materiales | 11,1474 |
| | | **TOTAL PARTIDA** | **26,71** |
| **U08030030** | **m2** | **Enfoscado maestreado y fratasado mortero cem. y aditivo hidróf.** | |
| | | Enfoscado maestreado y fratasado con mortero de cemento y aditivo hidrófugo, incluso mallazo de alambre de acero galvanizado de 1x1 cm de cuadrícula, grapado a la viga del forjado con grapas de acero galvanizado, incluso colocación. Totalmente terminado. | |
| | | Mano de obra | 22,6135 |
| | | Resto de obra y materiales | 6,0210 |
| | | **TOTAL PARTIDA** | **28,63** |
| **U08030320** | **m2** | **Pintura al temple liso en paramentos horizontales y verticales** | |
| | | Pintura al temple liso en paramentos horizontales y verticales, dos manos de color, incluso preparación de base y medios auxiliares para su aplicación. | |
| | | Mano de obra | 4,0009 |
| | | Resto de obra y materiales | 0,2225 |
| | | **TOTAL PARTIDA** | **4,22** |
| **U08010010** | **kg** | **Acero S-275 JR en estructura soldada** | |
| | | Acero laminado S-275 JR, en perfiles laminados en caliente para vigas, pilares, zunchos y correas, mediante uniones soldadas; incluso p.p. de soldaduras, cortes, piezas especiales, despuntes y dos manos de imprimación con pintura de minio de plomo, montado y colocado, según normativa vigente. | |
| | | Mano de obra | 0,8460 |
| | | Maquinaria | 0,1254 |
| | | Resto de obra y materiales | 1,9728 |
| | | **TOTAL PARTIDA** | **2,94** |
| **U08020680_1** | **m2** | **Cubierta panel chapa acero perf. comercial prelac. 0,6 mm** | |
| | | Cubierta formada por panel de chapa de acero en perfil comercial, prelacada de 0,6 mm con núcleo de espuma de poliuretano de 40 kg/m3 con un espesor total de 50 mm sobre correas metálicas, i/p.p. de solapes, tapajuntas, accesorios de fijación, limahoyas, cumbrera, remates laterales, encuentros de chapa prelacada de 0,6 mm y 500 mm de desarrollo medio, instalado, incluso medios auxiliares y elementos de seguridad, según normativa vigente. Medida en verdadera magnitud. Incluso pieza perimetral de remate con goterón. | |
| | | Mano de obra | 10,4370 |
| | | Maquinaria | 37,0500 |
| | | Resto de obra y materiales | 0,1200 |
| | | **TOTAL PARTIDA** | **47,61** |

# CUADRO DE PRECIOS 2

## TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS

| CÓDIGO | UD | RESUMEN | PRECIO |
|---|---|---|---|
| **U08020050_1** | **m2** | **Recrecido aligerado, sistema CÁVITI** | |
| | | Recrecido aligerado de hormigón armado de 65+15 cm de espesor, sobre encofrado perdido de piezas de polipropileno reciclado, C-65 "CÁVITI", de 750x500x650 mm, color negro, realizado con hormigón HA-30/B/12/XC1+XF1+XA1+XM2 fabricado en central, con cemento SR, y malla electrosoldada ME 15x15 Ø 8-8 B 500 T 6x2,20 UNE-EN 10080 como armadura de reparto, colocada sobre separadores homologados en capa de compresión de 8 cm de espesor; apoyado todo ello sobre base de hormigón de limpieza. | |
| | | Incluso encofrado, armado y hormigonado de zunchos perimetrales en huecos. | |
| | | Mano de obra | 10,8806 |
| | | Maquinaria | 0,4341 |
| | | Resto de obra y materiales | 79,6676 |
| | | **TOTAL PARTIDA** | **90,98** |
| **U08010030** | **m2** | **Plataforma rejilla tramex antidesliz. y seguridad** | |
| | | Plataforma formada por rejilla tipo tramex galvanizada, superantideslizante y de seguridad, (en paneles de 1.000x2.000 mm), formada por doble pletina dentada de cresta biselada, de 30x2 mm y 10x2 mm, respectivamente, en cuadrícula de 30x30 mm, incluido malla de protección por debajo de la pletina separadora, de 1 mm de espesor con taladros cuadrados de 8x8 mm, y p.p. de recercados o bastidor de angular 30x30x3 mm o pletina de 30x3 mm, despuntes, cortes, ajustes y soldaduras, totalmente terminada y colocada. | |
| | | Mano de obra | 17,3950 |
| | | Resto de obra y materiales | 45,4900 |
| | | **TOTAL PARTIDA** | **62,89** |
| **U08040040** | **m2** | **Carpintería metálica con chapa plegada de hierro en puertas** | |
| | | Puerta de chapa plegada (tipo Pegaso o equivalente) practicable o corredera para exteriores de edificaciones, realizada con doble chapa de acero galvanizado de 1 mm de espesor y panel intermedio, rigidizadores con perfiles de acero conformado en frío, herrajes de colgar, cerradura con manillón de nylon, cerco de perfil de acero conformado en frío con garras para recibir a la obra, bastidor y refuerzos de tubo de acero laminado, guías, topes, tiradores, pasadores y demás accesorios necesarios, patillas de fijación a obra, acabado con capa de pintura epoxi polimerizada al horno, elaborada en taller, ajuste y fijación en obra. instalada, i/ recibido de albañilería y precerco. | |
| | | Incluso rejillas de ventilación. | |
| | | Mano de obra | 17,3950 |
| | | Resto de obra y materiales | 184,9800 |
| | | **TOTAL PARTIDA** | **202,38** |
| **U08040070** | **m2** | **Carpintería metálica de acero galvanizado, practicable** | |
| | | Carpintería metálica de acero galvanizado, en ventanas o puertas practicables, con perfiles conformados en frío de acero galvanizado de 1 mm de espesor, formando bastidor con despiece en retícula cuadrada o rectangular, con junquillos a presión de fleje de acero galvanizado de 0,5 mm de espesor con cantoneras en encuentro; patillas para anclaje de 10 cm i/corte, preparación y soldadura de perfiles en taller, ajuste y montaje en obra, pintura, i/ recibido de albañilería. Según NTE-FCA. | |
| | | Incluso rejillas de ventilación. | |
| | | Mano de obra | 6,9580 |
| | | Resto de obra y materiales | 237,3200 |
| | | **TOTAL PARTIDA** | **244,28** |
| **U08040100_1** | **Ud** | **Puerta enrollable para garaje, de aluminio.** | |
| | | Mano de obra | 34,7900 |
| | | Resto de obra y materiales | 1.961,8200 |
| | | **TOTAL PARTIDA** | **1.996,61** |
| **U08010100_1** | **m** | **Barandilla tubo metálico H=1 m, pintada. Desmontable** | |
| | | Barandilla metálica de tubo de diámetro 50 mm x e=1,5 mm y altura 1,00 m, compuesta por montantes separados, pasamanos y travesaño intermedio, y rodapié de pletina de 200 x 5 mm, incluso placas y tornillos de anclaje, pintura al esmalte satinado, dos manos y una mano de minio o antioxidante, previo rascado de los óxidos y limpieza manual. Totalmente colocada. Barandilla de fácil desmontaje en caso de necesidad, por temas de mantenimiento | |
| | | Mano de obra | 13,9160 |
| | | Resto de obra y materiales | 143,2890 |
| | | **TOTAL PARTIDA** | **157,21** |

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| **U05070050_1** | **ud** | **Tapa de fundición ductil 80x80cm - D200** | |
| | | Tapa de registro de fundicion dúctil 80x80 cm, recibido con mortero de cemento 1:6, sobre solera de hormigón totalmente terminada, incluso p.p. de medios auxiliares. | |
| | | Mano de obra | 5,2630 |
| | | Resto de obra y materiales | 80,9458 |
| | | **TOTAL PARTIDA** | **86,21** |
| **U05070050_2** | **ud** | **Tapa de fundición ductil 75x100cm - D400** | |
| | | Tapa de registro de fundicion dúctil 75x100 cm, recibido con mortero de cemento 1:6, sobre solera de hormigón totalmente terminada, incluso p.p. de medios auxiliares. | |
| | | Mano de obra | 6,9180 |
| | | Maquinaria | 160,0900 |
| | | Resto de obra y materiales | 12,2958 |
| | | **TOTAL PARTIDA** | **179,30** |
| **U05070050_3** | **ud** | **Tapa de fundición ductil 80x160cm - D400 - 4hojas** | |
| | | Tapa de registro de fundicion dúctil 80x160 de 4 hojas D-400 recibido con mortero de cemento 1:6, sobre solera de hormigón totalmente terminada, incluso p.p. de medios auxiliares. | |
| | | Mano de obra | 10,3770 |
| | | Maquinaria | 195,2300 |
| | | Resto de obra y materiales | 12,2958 |
| | | **TOTAL PARTIDA** | **217,90** |

## SUBCAPÍTULO 01.6 EQUIPOS E INSTALACIONES

## APARTADO 01.6.1 ILUMINACIÓN

| | | | |
|---|---|---|---|
| **U10050120** | **ud** | **Lumi. Adosable. LED Estanca IP-66 1x58 W** | |
| | | Suministro y montaje de luminaria adosable Estanca LED. IP-66, 1x58 W. Factor de potencia >0,9. Eficiencia > 130Lm/W. Vida útil > 50000 horas. Difusor: Policarbonato, extruido. Instalación adosado o suspendido, con equipo y lámpara totalmente montada. | |
| | | Mano de obra | 7,7955 |
| | | Resto de obra y materiales | 266,4500 |
| | | **TOTAL PARTIDA** | **274,25** |
| **U10050080** | **ud** | **Lumi. Adosable. LED Estanca IP-66 1x16 W** | |
| | | Suministro y montaje de luminaria adosable Estanca LED. IP-66, 1x16 W. Factor de potencia >0,9. Eficiencia > 130Lm/W. Vida útil > 50000 horas. Difusor: Policarbonato, extruido. Instalación adosado o suspendido, con equipo y lámpara totalmente montada. | |
| | | Mano de obra | 7,7955 |
| | | Resto de obra y materiales | 223,7500 |
| | | **TOTAL PARTIDA** | **231,55** |
| **U10050290-1** | **ud** | **Proyector LED 130W IP-66** | |
| | | Proyector LED SiCompact® 31 mini o equivalente.Flujo luminoso nominal 20000lm. Eficacia lumínica 154lm/W.Temperatura de color 4000K. Reproducción de color CRI > 70. Potencia nominal 130W. Índice de protección IP66. Resistencia contra impacto IK08. Instalada y en funcionamiento. | |
| | | Mano de obra | 7,7955 |
| | | Resto de obra y materiales | 465,5000 |
| | | **TOTAL PARTIDA** | **473,30** |
| **U10050250** | **ud** | **Aparato Autónomo de Emergencia Estanco** | |
| | | Suministro y montaje de luminaria de emergencia estanco, con cuatro LED, flujo luminoso 375 lúmenes, carcasa de 290x130x70 mm, clase II, protección IP 65, con baterías de Ni-MH, autonomía de 1 h, alimentación a 230 V, tiempo de carga 24 h. Incluso accesorios y elementos de fijación. | |
| | | Mano de obra | 7,7955 |
| | | Resto de obra y materiales | 96,6600 |
| | | **TOTAL PARTIDA** | **104,46** |

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## APARTADO 01.6.2 ELEMENTOS INTERIOR TANQUE

**LIMP_BAS** **u** **LIMPIADOR BASCULANTE, L = 4,6 M, AISI 316**

Limpiador basculante marca Hidrostank ó similar, referencia LP-2814 , para una longitud entre paredes de 4,6 m. La capacidad viene definida en función de los siguientes parámetros: longitud a limpiar, altura disponible y pendiente de la solera. Fabricado en acero inoxidable AISI 316, acabado final chorreado con microesfera de vidrio. Incluye soportes en acero inoxidable AISI 316, rodamientos, juego de suspensión y demás piezas pequeñas. Tornillería y anclajes en A4. Incluye prueba de volteo con agua en fábrica grabada en vídeo.
TOTALMENTE INSTALADO

| | |
|---|---|
| Mano de obra | 58,0600 |
| Resto de obra y materiales | 10.343,8684 |
| **TOTAL PARTIDA** | **10.401,93** |

**RCV.C.SEMISEC** **u** **REGULADOR DE CAUDAL TIPO VORTEX EN CAMARA**

Válvula de Regulación de Caudal tipo vórtice, marca MOSBAEK-HIDROSTANK, modelo CY/DX 1000-PP300-C275-A30 / BCTWL, para regular un caudal de 142 l/s a una altura de lámina de agua de 4,7 metros. Fabricado en acero inoxidable AISI 316, acabado final chorreado con bolas de vidrio. Con brida loca de polipropileno DN 300 PN 10. Incluso con ventana de inspección. Incluye para la instalación de la válvula de regulación:
-- Un pasamuros DN 300 L=600 mm. para empotrar a pared, en acero inoxidable AISI 316, acabado final chorreado con bolas de vidrio, con brida loca de polipropileno DN 300 PN 10
-- Una válvula de guillotina DN 300 PN 10, cuerpo y tajadera en acero inoxidable AISI 316. Accionamiento mediante volante.
Incluye un bypass formado por
-- Un pasamuros DN 250 L=600 mm. para empotrar a pared, en acero inoxidable AISI 316, acabado final chorreado con bolas de vidrio, con brida loca de polipropileno DN 250 PN 10.
-- Una válvula de guillotina DN 250 PN 10, cuerpo y tajadera en acero inoxidable AISI 316. Accionamiento mediante volante.
-- Un codo DN 250 con prolongación, fabricado en acero inoxidable AISI 316, con brida loca de polipropileno DN 250 PN 10.
Tornillería y anclajes en A4
TOTALMENTE INSTALADO

| | |
|---|---|
| Mano de obra | 58,0600 |
| Resto de obra y materiales | 12.738,2789 |
| **TOTAL PARTIDA** | **12.796,34** |

**CIR_LLEN** **u** **CIRCUITO DE LLENADO PARA 2 LIMPIADORES**

Incluye los siguientes elementos: 2 electroválvulas y 2 llaves de bola de 1.5", para el llenado de los limpiadores y aislamiento de los circuitos. Canalización de agua desde las electroválvulas hasta los limpiadores en acero inoxidable DN 42, con piezas roscadas de 1.5". 2 arquetas de polipropileno marca Hidrostank para alojar las electroválvulas y llaves de bola, preparadas para la realización de la acometida de agua. No incluye: Acometida de agua desde la red general. Canalización incluida siempre que las arquetas se sitúen a menos de 10 metros de distancia de los limpiadores.
TOTALMENTE INSTALADO

| | |
|---|---|
| Mano de obra | 58,0600 |
| Resto de obra y materiales | 4.263,6964 |
| **TOTAL PARTIDA** | **4.321,76** |

**REJA** **u** **REJA DE CADENAS**

Reja de cadenas Quilton mod. QC100, o equivalente, de dimensiones 10mm de paso y de ancho y alto 930x4800 mm en material AISI-316L.

| | |
|---|---|
| Mano de obra | 58,0600 |
| Resto de obra y materiales | 39.825,9399 |
| **TOTAL PARTIDA** | **39.884,00** |

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**VENT0001** **Ud** **VENTILADOR**

Ventilador helicocentrífugo de perfil bajo, de dos velocidades, potencia máxima de 24 W, caudal máximo de 240 m³/h, de 176 mm de diámetro y 303 mm de longitud, nivel de presión sonora de 31 dBA, para conductos de 100 mm de diámetro, formado por cuerpo de polipropileno, hélice de ABS, caja de bornes y motor para alimentación monofásica a 230 V y 50 Hz de frecuencia.
Incluye: Replanteo. Colocación. Conexionado y comprobación de su correcto funcionamiento.
Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto.
Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de Proyecto.

| | |
|---|---|
| Mano de obra | 7,8625 |
| Resto de obra y materiales | 1.190,9664 |
| **TOTAL PARTIDA** | **1.198,83** |

**IVV030** **m** **Conducto de PVC.**

Conducto de ventilación, formado por tubo liso de PVC, de 200 mm de diámetro exterior, pegado mediante adhesivo, colocado en posición horizontal. Incluso material auxiliar para montaje y sujeción a la obra, accesorios y piezas especiales.
Criterio de valoración económica: El precio no incluye las compuertas de regulación, las compuertas cortafuego, las rejillas ni los difusores.
Incluye: Replanteo del recorrido del conducto y de la situación de los elementos de sujeción. Presentación en seco de tubos y piezas especiales. Fijación del material auxiliar para montaje y sujeción a la obra. Montaje, conexionado y comprobación de su correcto funcionamiento.
Criterio de medición de proyecto: Longitud proyectada, según documentación gráfica de Proyecto, medida entre los ejes de los elementos o de los puntos a conectar, sin descontar las piezas especiales.
Criterio de medición de obra: Se medirá la longitud realmente ejecutada según especificaciones de Proyecto.

| | |
|---|---|
| Mano de obra | 4,5963 |
| Resto de obra y materiales | 16,0062 |
| **TOTAL PARTIDA** | **20,60** |

## APARTADO 01.6.3 PLC + INSTALACIÓN ELÉCTRICA

**CONTRL** **u** **CIRCUITO DE CONTROL PARA 2 LIMPIADORES**

Incluye los siguientes elementos: 2 detectores inductivos para detectar el volteo de los limpiadores. Sensor de nivel por radar tipo Vegapuls C11, para detección en continuo del nivel de agua del tanque, ajustable mediante Bluetooth. Cuadro completo para el control del sistema en modo manual y automático con autómata programado Siemens SIMATIC S7-1500, CPU 1516-3 PN/DP con pantalla táctil SIMATIC HMI MTP1500 UNIFIED COMFORT PANEL, analizador de redes SENTRON PAC3200 22-65V DC, tarjeta de comunicaciones SINAUT ST7, TIM 1531 IRC, router SCALANCE M876-4 LTE (4G) EU y antena ANT 794-4MR GSM CUATRIBANDA UMTS. Incluye también SAI para comunicaciones. Canalización y conexión eléctrica de los diferentes elementos en el cuadro de control. No incluye cuadro de protección eléctrica ni acometida desde la red general. Tensión de alimentación: 400 V, 50 Hz, 3 fases + neutro + tierra. Potencia aproximada: 2 kW.
TOTALMENTE INSTALADO

| | |
|---|---|
| Mano de obra | 39,6460 |
| Resto de obra y materiales | 35.191,8708 |
| **TOTAL PARTIDA** | **35.231,52** |

**U03073090** **ud** **Caudalímetro electromagnético tub. parcialm. llena PN 10 Ø600**

Suministro, instalación y puesta en servicio de caudalímetro electromagnético, sobre tubería DN 600 mm, con sección parcialmente llena y principio de medida nivel continuo capacitivo, con electrónica separada del tubo de medida, incluso carrete PN 10, grado de protección IP68, alimentación eléctrica a 24 Vcc, precisión mejor del 1 %, con recubrimiento interno del tubo de medida y certificado de calibración del equipo de laboratorio acreditado, según ficha técnica, electrónica, instalación eléctrica, montaje, totalmente instalado, probado y puesto en servicio.

| | |
|---|---|
| Mano de obra | 130,4625 |
| Maquinaria | 27,5600 |
| Resto de obra y materiales | 18.610,8000 |
| **TOTAL PARTIDA** | **18.768,82** |

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|---|---|---|---|
| **U03073080** | **ud** | **Caudalímetro electromagnético tub. parcialm. llena PN 10 Ø500** | |
| | | Suministro, instalación y puesta en servicio de caudalímetro electromagnético, sobre tubería DN 500 mm, con sección parcialmente llena y principio de medida nivel continuo capacitivo, con electrónica separada del tubo de medida, incluso carrete PN 10, grado de protección IP68, alimentación eléctrica a 24 Vcc, precisión mejor del 1 %, con recubrimiento interno del tubo de medida y certificado de calibración del equipo de laboratorio acreditado, según ficha técnica, electrónica, instalación eléctrica, montaje, totalmente instalado, probado y puesto en servicio. | |
| | | Mano de obra | 130,4625 |
| | | Maquinaria | 27,5600 |
| | | Resto de obra y materiales | 16.105,5000 |
| | | **TOTAL PARTIDA** | **16.263,52** |
| **U03080030** | **ud** | **Medidor nivel ultrasonidos** | |
| | | Suministro, instalación y puesta en servicio de medidor de nivel ultrasónico, alimentación eléctrica a 24Vcc, con precisión mejor del 0,1%, IP 68, alcance de medida 5 m para líquidos, incluso 15 m de cable de conexión, totalmente instalado y probado. | |
| | | Mano de obra | 27,0600 |
| | | Resto de obra y materiales | 1.773,3000 |
| | | **TOTAL PARTIDA** | **1.800,36** |
| **U03080050** | **m** | **Cable 64 fibras Monomodo** | |
| | | Suministro e instalación de cable de 64 fibras ópticas en Mono-modo 9/125, con aislamiento PE-AP, bajo canalización de tritubo según especificaciones de Canal de Isabel II, incluso parte proporcional de empalmes, fusionado y conectorización, probado y certificado. | |
| | | Mano de obra | 1,4064 |
| | | Resto de obra y materiales | 10,1400 |
| | | **TOTAL PARTIDA** | **11,55** |
| **U03080060** | **ud** | **Repartidor 64 FO** | |
| | | Suministro e instalación de repartidor de 64 fibras ópticas para un total de 64 adaptadores de tipo FC-FC y sus correspondientes 64 pig-tail de monomodos, todos fusionados y comprobados con equipo ODTR. | |
| | | Mano de obra | 70,3200 |
| | | Resto de obra y materiales | 2.089,5900 |
| | | **TOTAL PARTIDA** | **2.159,91** |
| **U03080100** | **ud** | **Latiguillo FO Multimodo** | |
| | | Suministro e instalación de latiguillos de fibra óptica multimodo con conectores FC-FC, de una longitud de 1,50 m. | |
| | | Mano de obra | 1,8040 |
| | | Resto de obra y materiales | 14,1800 |
| | | **TOTAL PARTIDA** | **15,98** |
| **U10030780** | **m** | **Cable RV-K 0,6/1 KV 1x1,5 mm2** | |
| | | Cable de cobre aislado en polietileno reticulado y cubierta de PVC, tipo RV-K 0,6/1 KV de 1x1,5 mm2. Instalado bajo tubo o conductos. | |
| | | Mano de obra | 0,2577 |
| | | Resto de obra y materiales | 0,5500 |
| | | **TOTAL PARTIDA** | **0,81** |
| **U10030010** | **m** | **Cable RZ1-K 0,6/1 KV 1x1,5 mm2** | |
| | | Cable de cobre aislado en polietileno reticulado y cubierta de poliolefina, tipo RZ1-K 0,6/1 KV de 1x1,5 mm2. Instalado bajo tubo o conductos. | |
| | | Mano de obra | 0,2577 |
| | | Resto de obra y materiales | 0,8900 |
| | | **TOTAL PARTIDA** | **1,15** |
| **U10030020** | **m** | **Cable RZ1-K 0,6/1 KV 1x2,5 mm2** | |
| | | Cable de cobre aislado en polietileno reticulado tipo RZ1-K 0,6/1 KV de 1x2,5 mm2. Instalado bajo tubo o conductos. | |
| | | Mano de obra | 0,2577 |
| | | Resto de obra y materiales | 1,2000 |
| | | **TOTAL PARTIDA** | **1,46** |
| **U10060010** | **ud** | **Base de toma de corriente con contacto de tierra (2P+T), tipo Sc** | |

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| | | Base de toma de corriente con contacto de tierra (2P+T), tipo Schuko, para empotrar, gama media, intensidad asignada 16 A, tensión asignada 250 V. | |
| | | Mano de obra | 5,1540 |
| | | Resto de obra y materiales | 11,1600 |
| | | **TOTAL PARTIDA** | **16,31** |
| **U10060020** | **ud** | **Toma corr. 2P+T 16A IP-55** | |
| | | Toma de corriente montaje superficie 2P+T, para 16 A, IP-55, cuerpo aislante en poliamida, tornillería de latón. | |
| | | Mano de obra | 5,1540 |
| | | Resto de obra y materiales | 12,0900 |
| | | **TOTAL PARTIDA** | **17,24** |
| **U10060060** | **ud** | **Toma corr. 3P+T 32 A IP-55** | |
| | | Toma de corriente montaje superficie 3P+T, para 32 A, IP-55, cuerpo aislante en poliamida, tornillería de latón. | |
| | | Mano de obra | 5,1540 |
| | | Resto de obra y materiales | 43,9200 |
| | | **TOTAL PARTIDA** | **49,07** |
| **U10060110_1** | **Ud** | **Interruptor automático magnetotérmico 10A 2P** | |
| | | Interruptor automático magnetotérmico, de 2 módulos, bipolar (2P), intensidad nominal 10 A, poder de corte 6 kA, curva C, de 36x80x77,8 mm, grado de protección IP20, montaje sobre carril DIN (35 mm) y fijación a carril mediante garras. Totalmente montado, conexionado y probado.<br>Incluye: Montaje y conexionado del elemento.<br>Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto.<br>Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de Proyecto. | |
| | | Mano de obra | 5,1053 |
| | | Resto de obra y materiales | 26,6018 |
| | | **TOTAL PARTIDA** | **31,71** |
| **U10060110_2** | **Ud** | **Interruptor automático magnetotérmico 16A 2P** | |
| | | Interruptor automático magnetotérmico, de 2 módulos, bipolar (2P), intensidad nominal 16 A, poder de corte 6 kA, curva C, de 36x80x77,8 mm, grado de protección IP20, montaje sobre carril DIN (35 mm) y fijación a carril mediante garras. Totalmente montado, conexionado y probado.<br>Incluye: Montaje y conexionado del elemento.<br>Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto.<br>Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de Proyecto. | |
| | | Mano de obra | 5,1053 |
| | | Resto de obra y materiales | 26,6018 |
| | | **TOTAL PARTIDA** | **31,71** |
| **U10060110_3** | **Ud** | **Interruptor automático magnetotérmico 32A 3P** | |
| | | Interruptor automático magnetotérmico, de 3 módulos, tripolar (3P), intensidad nominal 32 A, poder de corte 6 kA, curva C, de 54x80x77,8 mm, grado de protección IP20, montaje sobre carril DIN (35 mm) y fijación a carril mediante garras. Totalmente montado, conexionado y probado.<br>Incluye: Montaje y conexionado del elemento.<br>Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto.<br>Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de Proyecto. | |
| | | Mano de obra | 6,1156 |
| | | Resto de obra y materiales | 66,7590 |
| | | **TOTAL PARTIDA** | **72,87** |
| **U10060110_4** | **Ud** | **Interruptor automático magnetotérmico 10A 3P** | |
| | | Interruptor automático magnetotérmico, de 3 módulos, tripolar (3P), intensidad nominal 10 A, poder de corte 6 kA, curva C, de 54x80x77,8 mm, grado de protección IP20, montaje sobre carril DIN (35 mm) y fijación a carril mediante garras. Totalmente montado, conexionado y probado.<br>Incluye: Montaje y conexionado del elemento.<br>Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica | |

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| | | de Proyecto.<br>Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de Proyecto. | |
| | | Mano de obra | 6,1156 |
| | | Resto de obra y materiales | 57,4056 |
| | | **TOTAL PARTIDA** | **63,52** |
| **U10031190** | **m** | **Cable AL XZ1 (S), tensión nominal 0,6/1 kV 1x95 mm2 AL**<br>Cable eléctrico unipolar tipo AL XZ1 (S), tensión nominal 0,6/1 kV, de seguridad en caso de incendio (S), reacción al fuego clase Eca, con conductor de aluminio, rígido (clase 2), de 1x95 mm² cubierta de material libre de halógenos, con las siguientes características: no propagación de la llama, baja emisión de humos opacos, libre de halógenos, nula emisión de gases corrosivos, resistencia a la absorción de agua, resistencia al frío, resistencia a los rayos ultravioleta, resistencia a los agentes químicos, resistencia a las grasas y aceites y resistencia a los golpes. Según HD 603-5X-1. | |
| | | Mano de obra | 0,9045 |
| | | Resto de obra y materiales | 2,6300 |
| | | **TOTAL PARTIDA** | **3,53** |
| **U10040080** | **m** | **Canaliz. eléctrica Polímero termoplástico libre de halógenos ríg**<br>Canalización eléctrica de superficie para conducción de cables a base de tubo de Polímero termoplástico libre de halógenos rígido libre de halógenos, no propagador de llama, M 20, roscable, grapado sobre hormigón, con tres abrazaderas de acero plastificadas, tres tacos de plástico y tres tirafondos de acero inoxidable. | |
| | | Mano de obra | 5,2185 |
| | | Resto de obra y materiales | 3,3200 |
| | | **TOTAL PARTIDA** | **8,54** |
| **U10040510** | **ud** | **Caja estanca poliéster inyectado 80x80x45 mm**<br>Suministro y montaje de caja estanca en poliéster inyectado de 80x80x45 mm, IP-55, totalmente instalada, incluyendo prensaestopas, fijaciones inoxidables y bornas de conexión. | |
| | | Mano de obra | 3,4790 |
| | | Resto de obra y materiales | 8,6900 |
| | | **TOTAL PARTIDA** | **12,17** |
| **U10040520** | **ud** | **Caja estanca poliéster inyectado 105x105x55 mm**<br>Suministro y montaje de caja estanca en poliéster inyectado de 105x105x55 mm, IP-55, totalmente instalada, incluyendo prensaestopas, fijaciones inoxidables y bornas de conexión. | |
| | | Mano de obra | 3,4790 |
| | | Resto de obra y materiales | 12,3200 |
| | | **TOTAL PARTIDA** | **15,80** |
| **U10040570** | **ud** | **Caja estanca poliéster inyectado 220x170x140 mm**<br>Suministro y montaje de caja estanca en poliéster inyectado de 220x170x140 mm, IP-55, totalmente instalada, incluyendo prensaestopas, fijaciones inoxidables y bornas de conexión. | |
| | | Mano de obra | 3,4790 |
| | | Resto de obra y materiales | 67,5700 |
| | | **TOTAL PARTIDA** | **71,05** |
| **U10040010** | **m** | **Canaliz. subterránea aceras**<br>Canalización subterránea en acera, para cables de baja tensión bajo tubo, comprendiendo zanja de 0,60x0,60 m, sobre lecho de hormigón y hormigonado hasta rasante de calzada, con reposición de firme asfáltico, incluyendo excavación y relleno de zanja, cables de acero pasa-guía, cinta de señalización de canalización eléctrica, dos tubos de PE-AD corrugado curvable 160 mm y corchetes. | |
| | | Mano de obra | 11,0810 |
| | | Maquinaria | 14,2436 |
| | | Resto de obra y materiales | 24,5220 |
| | | **TOTAL PARTIDA** | **49,85** |
| **U10040020** | **m** | **Canaliz. subterránea calzada**<br>Canalización subterránea en calzada, para cables de baja tensión bajo tubo, comprendiendo zanja de 0,60x0,60 m, sobre lecho de hormigón y hormigonado hasta rasante de calzada, con reposición de firme asfáltico, incluyendo excavación y relleno de zanja, cables de acero pasa-guía, cinta de señalización de canalización eléctrica, dos tubos de PE-AD corrugado curvable 160 mm | |

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| | | y corchetes. | |
| | | Mano de obra | 7,6280 |
| | | Maquinaria | 13,3200 |
| | | Resto de obra y materiales | 52,9800 |
| | | **TOTAL PARTIDA** | **73,93** |
| **U10040030** | **m** | **Canaliz. sub. ter. medio hormigonada** | |
| | | Canalización subterránea en terreno medio hormigonada, para cables de baja tensión bajo tubo, comprendiendo zanja de 0,60x0,60 m, embutidos en dado de hormigón de 0,60x0,40 m, incluyendo excavación y relleno de zanja, cables de acero pasa-guía, cinta de señalización de canalización eléctrica, dos tubos de PE-AD corrugado curvable 160 mm y corchetes. | |
| | | Mano de obra | 20,7450 |
| | | Maquinaria | 16,2767 |
| | | Resto de obra y materiales | 31,5480 |
| | | **TOTAL PARTIDA** | **68,57** |
| **U10040060** | **ud** | **Arq. hormigón pref. 1x1x1 m** | |
| | | Arqueta de hormigón prefabricada para canalización de baja tensión de 1,00x1,00x1,00 m con tapa de hormigón totalmente instalada. | |
| | | Mano de obra | 85,6850 |
| | | Resto de obra y materiales | 144,4000 |
| | | **TOTAL PARTIDA** | **230,09** |
| **IEX405** | **Ud** | **Armario de distribución, modular.** | |
| | | Armario de distribución metálico, de superficie, con puerta ciega, grado de protección IP40, aislamiento clase II, de 1050x650x250 mm, apilable con otros armarios, con techo, suelo y laterales desmontables por deslizamiento (sin tornillos), cierre de seguridad, escamoteable, con llave, acabado con pintura epoxi, microtexturizado. Totalmente montado.<br>Incluye: Colocación y fijación del elemento.<br>Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto.<br>Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de Proyecto. | |
| | | Mano de obra | 5,0692 |
| | | Resto de obra y materiales | 550,3506 |
| | | **TOTAL PARTIDA** | **555,42** |
| **U10040670_1** | **Ud** | **Caja de protección y medida.** | |
| | | Suministro e instalación en el interior de hornacina mural, en vivienda unifamiliar o local, de caja de protección y medida CPM2-E4, de hasta 63 A de intensidad, para 1 contador trifásico, formada por una envolvente aislante, precintable, autoventilada y con mirilla de material transparente resistente a la acción de los rayos ultravioletas, para instalación empotrada. Incluso equipo completo de medida, bornes de conexión, bases cortacircuitos y fusibles para protección de la derivación individual. Normalizada por la empresa suministradora y preparada para acometida subterránea. Totalmente montada, conexionada y probada.<br>Incluye: Replanteo de la situación de los conductos y anclajes de la caja. Fijación. Colocación de tubos y piezas especiales. Conexionado.<br>Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto.<br>Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de Proyecto. | |
| | | Mano de obra | 31,4850 |
| | | Resto de obra y materiales | 279,7936 |
| | | **TOTAL PARTIDA** | **311,28** |
| **U15060060** | **ud** | **Legalización instalación de baja tensión** | |
| | | Legalización de la instalaciones de Baja Tensión, según la legislación vigente que le sea de aplicación, incluso proyecto técnico, suscrito por técnico titulado competente y visado por el Colegio Oficial correspondiente, Certificado de Dirección de Obra Eléctrica, Certificado de Instalación Eléctrica en Baja Tensión (antiguo Dictamen o Boletín eléctrico), Certificado de Inspección por Organismo de Control, Declaraciones responsables según modelos DGIEM, abono de tasas oficiales y cualquier otra documentación y gestión necesaria ante Organismos competentes para la Autorización y puesta en servicio de la instalación. | |
| | | **TOTAL PARTIDA** | **4.000,00** |
| **U10070010** | **ud** | **Toma de tierra normal con una pica** | |
| | | Toma de tierra normal, compuesta de: una pica de acero cobre de 2,5 m de longitud y 18 mm de | |

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diámetro, 3 metros de cable de cobre de 50 mm2 de sección y grapas de conexión a la pica.
Montaje completo.

| | |
|---|---|
| Mano de obra | 8,7490 |
| Resto de obra y materiales | 161,0915 |
| **TOTAL PARTIDA** | **169,84** |

## APARTADO 01.6.4 INSTALACIÓN SANEAMIENTO

**U02090010** **m** **Tubería PVC-O DN 110 PN 16**

Suministro e instalación de tubería de PVC-O 500, de diámetro nominal DN 110 mm, presión nominal PN 16, MRS 50 N/mm2, SDR 45,8 y S 22,4, conforme a la norma UNE-ISO 16422 y/o según normativa vigente, color exterior y marcado según Normas de Canal de Isabel II vigentes, incluso parte proporcional de unión por junta elástica, medios auxiliares y pruebas necesarias para su correcto funcionamiento.

| | |
|---|---|
| Mano de obra | 0,5110 |
| Maquinaria | 0,5512 |
| Resto de obra y materiales | 9,3300 |
| **TOTAL PARTIDA** | **10,39** |

**U05090220** **ud** **Sumidero evacuac. aguas 30x30x50 1/2**

Sumidero para evacuación de aguas de dimensiones interiores 30x30x50 cm, realizada con fábrica de ladrillo perforado de 1/2 pie de espesor, recibido con mortero de cemento 1:6, sobre solera de hormigón HM 20/P/20/I de 15 cm de espesor, enfoscado y bruñido interiormente, incluso marco y rejilla de fundición.

| | |
|---|---|
| Mano de obra | 49,9985 |
| Resto de obra y materiales | 37,6934 |
| **TOTAL PARTIDA** | **87,69** |

## SUBCAPÍTULO 01.7 URBANIZACIÓN EXTERIOR

## APARTADO 01.7.1 PAVIMENTACIÓN

**U01030160** **m3** **Terraplén suelo seleccionado préstamos**

Terraplén formado con suelos seleccionados procedentes de préstamos, incluso aportación, nivelación y compactación al 95% P.M., medido sobre perfil.

| | |
|---|---|
| Mano de obra | 0,4690 |
| Maquinaria | 1,8242 |
| Resto de obra y materiales | 5,2370 |
| **TOTAL PARTIDA** | **7,53** |

**ANS010** **m²** **Solera de hormigón.**

Solera de hormigón con malla electrosoldada de 20 cm de espesor, realizada con hormigón HA-30/F/20/X0+XF2 fabricado en central, con malla electrosoldada superior como armadura de reparto, ME 10x10 Ø 5-5 B 500 T 6x2,20 UNE-EN 10080 y con malla electrosoldada inferior, ME 20x20 Ø 5-5 B 500 T 6x2,20 UNE-EN 10080, extendido y vibrado manual mediante regla vibrante, sin tratamiento de su superficie y posterior aplicación de agente filmógeno, (0,15 l/m²); con juntas de retracción de 5 mm de espesor, mediante corte con disco de diamante. Incluso panel de poliestireno expandido de 3 cm de espesor, para la ejecución de juntas de dilatación. El precio no incluye la base de la solera.

| | |
|---|---|
| Mano de obra | 10,1472 |
| Maquinaria | 1,5455 |
| Resto de obra y materiales | 33,1940 |
| **TOTAL PARTIDA** | **44,89** |

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## APARTADO 01.7.2 CERRAMIENTO

**U09080010_01** **m** **Cerramiento muro bloques hormigón y malla simple torsión**

Cerramiento de muro de 220 cm de altura formado por 120 cm bloques huecos de hormigón visto blanco, de 40x20x20 cm, rellenos de HM-20 y 100 cm de malla de simple torsión galvanizada 50/16, de 50 mm de paso de malla y 2,7 mm de diámetro. Incluso cimentación de 40x40 cm de hormigón HM-20, y p.p. de postes de tubo de acero galvanizado de 48 mm, postes de esquina, jabalcones, tornapuntas, tensores, grupillas y accesorios. Totalmente terminado.

| | |
|---|---|
| Mano de obra | 38,2267 |
| Resto de obra y materiales | 59,0101 |
| **TOTAL PARTIDA** | **97,24** |

**mE15VPM030** **ud** **PUERTA 4,00x2,00 40/14 STD**

Puerta de 1 hoja de 4,00x2,00 m. para cerramiento exterior, con bastidor de tubo de acero laminado en frío de 40x40 mm. y malla S/T galvanizada en caliente 40/14 STD, i/herrajes de colgar y seguridad, elaborada en taller, ajuste y montaje en obra. (sin incluir recibido de albañilería).

| | |
|---|---|
| Mano de obra | 62,6800 |
| Resto de obra y materiales | 286,4385 |
| **TOTAL PARTIDA** | **349,12** |

## APARTADO 01.7.3 ACOMETIDAS

**U01021010** **m3** **Excavación a cielo abierto, med. mecán. terreno blando**

Excavación a cielo abierto, por medios mecánicos, en terreno blando (suelo con golpeo en el ensayo SPT menor o igual que 10 golpes / 30 cm), medido sobre perfil.

| | |
|---|---|
| Mano de obra | 0,2480 |
| Maquinaria | 2,4725 |
| **TOTAL PARTIDA** | **2,72** |

**U01030070** **m3** **Relleno zanja propios selec. Tmax 30 mm**

Relleno de zanjas con suelos seleccionados, tamaño máximo 30 mm, procedentes de la propia excavación, incluso aportación, extendido y compactación hasta una densidad del 95% P.M., medido sobre perfil.

| | |
|---|---|
| Mano de obra | 3,4320 |
| Maquinaria | 4,4630 |
| Resto de obra y materiales | 0,0500 |
| **TOTAL PARTIDA** | **7,95** |

**U02050010** **m** **Tubería polietileno PE-100, PN 16, DN 25**

Suministro e instalación de tubería de polietileno PE-100, diámetro nominal DN 25 mm, presión nominal PN 16, MRS 10 N/mm2, SDR 11 y S 5, conforme a norma UNE-EN 12201 y/o según normativa vigente, color exterior y marcado según Normas de Canal de Isabel II vigentes, incluso parte proporcional de elementos electrosoldables, medios auxiliares y pruebas necesarias para su correcto funcionamiento.

| | |
|---|---|
| Mano de obra | 0,2852 |
| Maquinaria | 0,0243 |
| Resto de obra y materiales | 0,5400 |
| **TOTAL PARTIDA** | **0,85** |

**E17ABT110** **m** **LÍNEA ACOMETIDA TRIFÁSICA ALUMINIO 4x50 mm2**

Línea eléctrica de acometida trifásica de 4x50 mm2 de sección, sobre canalización (no incluida), formada por conductores unipolares aislados de aluminio, con aislamiento en polietileno reticulado (XLPE) y cubierta en PVC, para una tensión nominal de 0,6/1kV, de conductor tipo RV y clase de reacción al fuego Eca, conforme a EN 50575:2014+A1:2016 (CPR CE EU-305/2011). Totalmente instalada; i/p.p. de conexiones y medios auxiliares. Conforme a REBT: ITC-BT-07, ITC-BT-09 e ITC-BT-11.

| | |
|---|---|
| Mano de obra | 5,8635 |
| Resto de obra y materiales | 8,3540 |
| **TOTAL PARTIDA** | **14,22** |

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| **E17ABC010** | **m** | **CANALIZ. ACOMET. ELÉCTR. 50x80 cm ACERA 2x160 mm** | |
| | | Canalización subterránea enterrada bajo acera, en zanja de 50 cm de ancho y 80 cm de profundidad de dimensiones mínimas, para acometida eléctrica en baja tensión; formada por 2 tubos de polietileno corrugado de alta densidad de doble pared (línea + reserva) de 160 mm de diámetro. Incluye apertura y excavación de la zanja por medios mecánicos, formación de cuna de arena de río de 5 cm de espesor, colocación de los tubos, relleno de costados y tapado de tubos con arena de río, colocación de cinta de señalización, y relleno de zanja y compactado con las tierras procedentes de la excavación, hasta el nivel base del pavimento (solera, acera, etc). Totalmente terminada; i/p.p. de limpieza y medios auxiliares. | |
| | | Mano de obra | 8,3086 |
| | | Maquinaria | 6,2677 |
| | | Resto de obra y materiales | 16,4606 |
| | | **TOTAL PARTIDA** | **31,04** |
| **mU13AQ030-M** | **ud** | **ARMARIO APM-6 PROTECCIÓN CGP + PLC** | |
| | | Armario APM-6, instalado. incluida obra civil y salidas. Para colocación de cuadro CGP y PLC | |
| | | Mano de obra | 89,4600 |
| | | Resto de obra y materiales | 2.578,4460 |
| | | **TOTAL PARTIDA** | **2.667,91** |
| **mE21CG010** | **ud** | **PUNTO DE TOMA DE AGUA SOBRE SOPORTE VERTICAL DE 1.50 M DE ALTURA** | |
| | | Suministro y colocación de grifo de1/2" de diámetro, para manguera, colocado roscado, totalmente equipado, instalado y funcionando.inlcuyendo arqueta con válvula de corte en pie de soporte y soporte verticval de acero de sujección. | |
| | | Mano de obra | 50,7040 |
| | | Resto de obra y materiales | 472,0971 |
| | | **TOTAL PARTIDA** | **522,80** |

## CAPÍTULO 02 COLECTORES EXTERIORES

## SUBCAPÍTULO 02.1 ENTRADA PLUVIALES

## APARTADO 02.1.1 MOVIMIENTO DE TIERRAS

| | | | |
|---|---|---|---|
| **U01022020** | **m3** | **Excavación en zanja, med. mecán. terreno medio** | |
| | | Excavación en zanja, por medios mecánicos, en terreno medio (suelo con golpeo en el ensayo SPT entre 10 y 30 golpes / 30 cm), medido sobre perfil. | |
| | | Mano de obra | 1,9836 |
| | | Maquinaria | 10,8790 |
| | | **TOTAL PARTIDA** | **12,86** |
| **U01023020** | **m3** | **Excavación en pozo, med. mecán. terreno medio** | |
| | | Excavación en pozo, por medios mecánicos, en terreno medio (suelo con golpeo en el ensayo SPT entre 10 y 30 golpes / 30 cm), medido sobre perfil. | |
| | | Mano de obra | 2,1489 |
| | | Maquinaria | 16,4812 |
| | | **TOTAL PARTIDA** | **18,63** |
| **U01040040** | **m2** | **Refino nivelación fondo zanjas** | |
| | | Refino, nivelación y apisonado de fondo de zanja para asiento de tubería, por cualquier procedimiento, incluso limpieza. | |
| | | Mano de obra | 0,4188 |
| | | Maquinaria | 1,9852 |
| | | Resto de obra y materiales | 0,0600 |
| | | **TOTAL PARTIDA** | **2,46** |
| **U01030020** | **m3** | **Grava o gravilla en rellenos o asiento de tubería** | |
| | | Grava o gravilla en rellenos o asiento de tubería, por cualquier procedimiento, de tamaño máximo 25 mm, exenta de materia orgánica, con contenido de sulfatos inferior al 0,3%, expresado en trióxido de azufre, incluso aportación, extendido y nivelación, medido sobre perfil. | |
| | | Mano de obra | 3,4790 |
| | | Maquinaria | 4,2233 |
| | | Resto de obra y materiales | 10,9900 |

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| | | **TOTAL PARTIDA** | **18,69** |
| **U01030050** | **m3** | **Relleno zanja propios adecuad. Tmax 150 mm** | |
| | | Relleno de zanjas con suelos adecuados, tamaño máximo 150 mm, procedentes de la propia excavación, incluso aportación, extendido y compactación hasta una densidad del 100% P.M., medido sobre perfil. | |
| | | Mano de obra | 3,4320 |
| | | Maquinaria | 4,4630 |
| | | Resto de obra y materiales | 0,0500 |
| | | **TOTAL PARTIDA** | **7,95** |
| **U01030340** | **m3** | **Relleno trasdós muros suelos adecuados de excavación** | |
| | | Relleno localizado en trasdós de muros con suelos adecuados procedentes de la excavación, incluso aportación, extendido, humectación y compactación en capas de 30 cm de espesor, con un grado de compactación del 95% del P.M. | |
| | | Mano de obra | 2,1084 |
| | | Maquinaria | 2,4646 |
| | | Resto de obra y materiales | 0,9545 |
| | | **TOTAL PARTIDA** | **5,53** |
| **U01025100** | **m2** | **Entibación cuajada zanjas o pozos con paneles acero hasta 6 m** | |
| | | Entibación metálica cuajada en zanjas y pozos, hasta 6 m de profundidad, con paneles de chapa de acero, amortizables en 400 puestas, incluso p.p. de codales extensibles metálicos y medios auxiliares. | |
| | | Mano de obra | 4,1748 |
| | | Maquinaria | 15,1387 |
| | | Resto de obra y materiales | 4,5300 |
| | | **TOTAL PARTIDA** | **23,84** |

## APARTADO 02.1.2 OBRAS DE FÁBRICA

| | | | |
|---|---|---|---|
| **U05030150** | **ud** | **Pozo de registro diámetro interior 1100 mm y 1<H<2m profun., enf** | |
| | | Pozo de registro, diámetro interior 1100 mm de entre 1,00 y 2,00 m de profundidad, construido con fábrica de ladrillo macizo de 1 pie de espesor, recibido con mortero M-10, colocado sobre solera de hormigón HA-25/P/40/I de 0,30 m mínimo de espesor, armada con mallazo; enfoscado interior y exterior fratasado con mortero hidrófugo bruñido en toda su altura con mortero CS-IV-Wc2. Incluso colocado, totalmente terminado y p. p. de formación de cuna en el fondo del pozo, formación de brocal asimétrico en la coronación para recibir cerco y tapa y medios auxiliares. | |
| | | Mano de obra | 456,6466 |
| | | Maquinaria | 16,0580 |
| | | Resto de obra y materiales | 339,9308 |
| | | **TOTAL PARTIDA** | **812,64** |
| **U05030080** | **m** | **En exceso para pozo de registro, diámetro interior 100 cm y prof** | |
| | | En exceso para pozo de registro, diámetro interior 1000 mm y profundidad > 3,10 m, formado por piezas prefabricadas de hormigón armado, recibido y sellado de juntas de piezas prefabricadas con M-350, incluso pates totalmente terminado. | |
| | | Mano de obra | 153,3600 |
| | | Maquinaria | 22,4812 |
| | | Resto de obra y materiales | 209,8000 |
| | | **TOTAL PARTIDA** | **385,64** |
| **U05070110** | **ud** | **Tapa de registro de fundición dúctil, clase D 400 tráfico medio** | |
| | | Tapa de registro de fundición dúctil, clase D 400 para tráfico medio, conforme a norma UNE 124, de 600 mm. de luz libre, con bloqueo automático, tapa articulada, junta anti ruido para asiento estable de la tapa, con dispositivo acerrojado y antirrobo, enrasada con la superficie, marcado con identificación de Canal de Isabel II y servicio correspondiente (Abastecimiento, Saneamiento, Reutilización), incluso marco y anclaje, colocada en obra, totalmente instalada. | |
| | | Mano de obra | 30,0800 |
| | | Resto de obra y materiales | 214,3000 |
| | | **TOTAL PARTIDA** | **244,38** |
| **U05090240** | **ud** | **Pate polipropileno con alma de acero** | |
| | | Pate con alma de acero recubierto de polipropileno, conforme a la norma UNE-EN 13101 y/o | |

según normativa vigente, para acceso a pozos de registro, totalmente colocado, incluso taco químico, anclaje químico o resina.

| | |
|---|---|
| Mano de obra | 4,9620 |
| Resto de obra y materiales | 8,9500 |
| **TOTAL PARTIDA** | **13,91** |

## APARTADO 02.1.3 TUBERÍAS

**U02080040** **m** **Tubería PVC-U DN 500, SN 8 kN/m2**

Suministro e instalación de tubería de PVC-U de pared estructurada, rigidez nominal SN>= 8 kN/m2, de diámetro nominal DN 500 mm, conforme a norma UNE-EN 13476 y/o según normativa vigente, incluso parte proporcional de unión con junta elástica, medios auxiliares y pruebas necesarias para su correcto funcionamiento.

| | |
|---|---|
| Mano de obra | 1,7885 |
| Maquinaria | 1,9292 |
| Resto de obra y materiales | 153,2100 |
| **TOTAL PARTIDA** | **156,93** |

**mU09C090** **ud** **ENTRONQUE ACOMET. TUBULAR POZO ALCANTAR. O COLECTOR**

Entronque de acometida tubular, a pozo de alcantarillado, o colector existente, inlcuida la demolición de calzada y acera hsta la conexión con el pozo en la calle,la posterior reposición del pavimento y el transporte y gestión de los residuos.

| | |
|---|---|
| Mano de obra | 110,5470 |
| Maquinaria | 4,4524 |
| Resto de obra y materiales | 179,9576 |
| **TOTAL PARTIDA** | **294,96** |

**U01030350** **m** **Banda de señalización**

Banda de señalización, según normas o especificaciones técnicas de Canal de Isabel II vigentes.

| | |
|---|---|
| Mano de obra | 0,0496 |
| Resto de obra y materiales | 0,2300 |
| **TOTAL PARTIDA** | **0,28** |

## SUBCAPÍTULO 02.2 SALIDA PLUVIALES

## APARTADO 02.2.1 MOVIMIENTO DE TIERRAS

**U01022020** **m3** **Excavación en zanja, med. mecán. terreno medio**

Excavación en zanja, por medios mecánicos, en terreno medio (suelo con golpeo en el ensayo SPT entre 10 y 30 golpes / 30 cm), medido sobre perfil.

| | |
|---|---|
| Mano de obra | 1,9836 |
| Maquinaria | 10,8790 |
| **TOTAL PARTIDA** | **12,86** |

**U01023020** **m3** **Excavación en pozo, med. mecán. terreno medio**

Excavación en pozo, por medios mecánicos, en terreno medio (suelo con golpeo en el ensayo SPT entre 10 y 30 golpes / 30 cm), medido sobre perfil.

| | |
|---|---|
| Mano de obra | 2,1489 |
| Maquinaria | 16,4812 |
| **TOTAL PARTIDA** | **18,63** |

**U01040040** **m2** **Refino nivelación fondo zanjas**

Refino, nivelación y apisonado de fondo de zanja para asiento de tubería, por cualquier procedimiento, incluso limpieza.

| | |
|---|---|
| Mano de obra | 0,4188 |
| Maquinaria | 1,9852 |
| Resto de obra y materiales | 0,0600 |
| **TOTAL PARTIDA** | **2,46** |

**U01030020** **m3** **Grava o gravilla en rellenos o asiento de tubería**

Grava o gravilla en rellenos o asiento de tubería, por cualquier procedimiento, de tamaño máximo 25 mm, exenta de materia orgánica, con contenido de sulfatos inferior al 0,3%, expresado en

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|---|---|---|---|
| | | trióxido de azufre, incluso aportación, extendido y nivelación, medido sobre perfil. | |
| | | Mano de obra | 3,4790 |
| | | Maquinaria | 4,2233 |
| | | Resto de obra y materiales | 10,9900 |
| | | **TOTAL PARTIDA** | **18,69** |
| **U07010810** | **m3** | **HA-30/B/20/XC2,XC3 o HA-30/B/20/XC4 en elementos horizontales ve** | |
| | | Suministro y puesta en obra de hormigón HA-30/B/20/XC2,XC3 o HA-30/B/20/XC4 , elaborado en central y vertido con bomba en elementos horizontales de estructura (cimentaciones, soleras, vigas, etc.), incluso compactación, vibrado, curado y acabado. Según CE vigente. | |
| | | Mano de obra | 6,7960 |
| | | Maquinaria | 18,3880 |
| | | Resto de obra y materiales | 96,5965 |
| | | **TOTAL PARTIDA** | **121,78** |
| **U01030050** | **m3** | **Relleno zanja propios adecuad. Tmax 150 mm** | |
| | | Relleno de zanjas con suelos adecuados, tamaño máximo 150 mm, procedentes de la propia excavación, incluso aportación, extendido y compactación hasta una densidad del 100% P.M., medido sobre perfil. | |
| | | Mano de obra | 3,4320 |
| | | Maquinaria | 4,4630 |
| | | Resto de obra y materiales | 0,0500 |
| | | **TOTAL PARTIDA** | **7,95** |
| **U01030340** | **m3** | **Relleno trasdós muros suelos adecuados de excavación** | |
| | | Relleno localizado en trasdós de muros con suelos adecuados procedentes de la excavación, incluso aportación, extendido, humectación y compactación en capas de 30 cm de espesor, con un grado de compactación del 95% del P.M. | |
| | | Mano de obra | 2,1084 |
| | | Maquinaria | 2,4646 |
| | | Resto de obra y materiales | 0,9545 |
| | | **TOTAL PARTIDA** | **5,53** |
| **U01025100** | **m2** | **Entibación cuajada zanjas o pozos con paneles acero hasta 6 m** | |
| | | Entibación metálica cuajada en zanjas y pozos, hasta 6 m de profundidad, con paneles de chapa de acero, amortizables en 400 puestas, incluso p.p. de codales extensibles metálicos y medios auxiliares. | |
| | | Mano de obra | 4,1748 |
| | | Maquinaria | 15,1387 |
| | | Resto de obra y materiales | 4,5300 |
| | | **TOTAL PARTIDA** | **23,84** |

## APARTADO 02.2.2 OBRAS DE FÁBRICA

| | | | |
|---|---|---|---|
| **U05030150** | **ud** | **Pozo de registro diámetro interior 1100 mm y 1<H<2m profun., enf** | |
| | | Pozo de registro, diámetro interior 1100 mm de entre 1,00 y 2,00 m de profundidad, construido con fábrica de ladrillo macizo de 1 pie de espesor, recibido con mortero M-10, colocado sobre solera de hormigón HA-25/P/40/I de 0,30 m mínimo de espesor, armada con mallazo; enfoscado interior y exterior fratasado con mortero hidrófugo bruñido en toda su altura con mortero CS-IV-Wc2. Incluso colocado, totalmente terminado y p. p. de formación de cuna en el fondo del pozo, formación de brocal asimétrico en la coronación para recibir cerco y tapa y medios auxiliares. | |
| | | Mano de obra | 456,6466 |
| | | Maquinaria | 16,0580 |
| | | Resto de obra y materiales | 339,9308 |
| | | **TOTAL PARTIDA** | **812,64** |
| **U05030080** | **m** | **En exceso para pozo de registro, diámetro interior 100 cm y prof** | |
| | | En exceso para pozo de registro, diámetro interior 1000 mm y profundidad > 3,10 m, formado por piezas prefabricadas de hormigón armado, recibido y sellado de juntas de piezas prefabricadas con M-350, incluso pates totalmente terminado. | |
| | | Mano de obra | 153,3600 |
| | | Maquinaria | 22,4812 |
| | | Resto de obra y materiales | 209,8000 |

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| | | **TOTAL PARTIDA.....** | **385,64** |
| **U05070110** | **ud** | **Tapa de registro de fundición dúctil, clase D 400 tráfico medio** | |
| | | Tapa de registro de fundición dúctil, clase D 400 para tráfico medio, conforme a norma UNE 124, de 600 mm. de luz libre, con bloqueo automático, tapa articulada, junta anti ruido para asiento estable de la tapa, con dispositivo acerrojado y antirrobo, enrasada con la superficie, marcado con identificación de Canal de Isabel II y servicio correspondiente (Abastecimiento, Saneamiento, Reutilización), incluso marco y anclaje, colocada en obra, totalmente instalada. | |
| | | Mano de obra..... | 30,0800 |
| | | Resto de obra y materiales..... | 214,3000 |
| | | **TOTAL PARTIDA.....** | **244,38** |
| **U05090240** | **ud** | **Pate polipropileno con alma de acero** | |
| | | Pate con alma de acero recubierto de polipropileno, conforme a la norma UNE-EN 13101 y/o según normativa vigente, para acceso a pozos de registro, totalmente colocado, incluso taco químico, anclaje químico o resina. | |
| | | Mano de obra..... | 4,9620 |
| | | Resto de obra y materiales..... | 8,9500 |
| | | **TOTAL PARTIDA.....** | **13,91** |
| **U07EA160** | **ud** | **ALIVIADERO OBRA 2,50x2,00+1,70 m** | |
| | | Aliviadero para alcantarillado de dimensiones interiores 2,50x2,00 m y 2,10 m de altura libre interior, realizado sobre solera de hormigón en masa HM-20/P/40/I de 20 cm de espesor, incluso formación de pendientes, fábrica de ladrillo macizo de 1 pie de espesor, tomados con mortero de cemento, losa armada de 16 cm de canto y viga armada de 40 cm, realizadas con HA-25/P/20/I, enfoscada y bruñida interiormente con mortero CSIV-W2, y conducto de pozo, de 80 cm de diámetro y 1,70 m de altura, realizado con anillos de hormigón en masa, prefabricados, de borde machihembrado, y cono asimétrico para formación de brocal del pozo, con cierre de marco y tapa de fundición, de 62,5 cm de diámetro, i/sellado de juntas con mortero de cemento, recibido de pates y de cerco de tapa, y con medios auxiliares, sin incluir la excavación del pozo y su relleno perimetral posterior. Según UNE-EN 998-1:2010 y UNE-EN 998-2:2004. | |
| | | Mano de obra..... | 484,8825 |
| | | Maquinaria ..... | 28,3380 |
| | | Resto de obra y materiales..... | 677,7775 |
| | | **TOTAL PARTIDA.....** | **1.191,02** |
| **U02V010** | **ud** | **EMBOCADURA PARA CONDUCTO D=600 mm** | |
| | | Embocadura para conducto D=600 mm, formada por imposta de 0,40x0,20 m, aletas de h=0,90 m y espesor 0,30 m, con talud 2/1, cimientos de 0,50x0,50 m, solera entre aletas de espesor 0,25 m, incluyendo excavación, encofrado, hormigón HM-20 en cimientos y alzados, terminado. | |
| | | Mano de obra..... | 174,3734 |
| | | Maquinaria ..... | 96,1204 |
| | | Resto de obra y materiales..... | 171,6734 |
| | | **TOTAL PARTIDA.....** | **442,14** |

## APARTADO 02.2.3 TUBERÍAS

| | | | |
|---|---|---|---|
| **U02080050** | **m** | **Tubería PVC-U DN 630, SN 8 kN/m2** | |
| | | Suministro e instalación de tubería de PVC-U de pared estructurada, rigidez nominal SN>= 8 kN/m2, de diámetro nominal DN 630 mm, conforme a norma UNE-EN 13476 y/o según normativa vigente, incluso parte proporcional de unión con junta elástica, medios auxiliares y pruebas necesarias para su correcto funcionamiento. | |
| | | Mano de obra..... | 2,0440 |
| | | Maquinaria ..... | 2,2048 |
| | | Resto de obra y materiales..... | 167,4100 |
| | | **TOTAL PARTIDA.....** | **171,66** |
| **U02040200** | **m** | **Marco prefabricado visitable tipo HA30P/12 de 1,00x1,80 m S/R** | |
| | | Suministro y colocación de marco prefabricado visitable de hormigón armado tipo HA-30/P/12, resistente a los sulfatos, de 1,00 x 1,80 m, conforme a norma UNE-EN 14844 y/o incluso normativa vigente, incluso sellado de juntas interiores y exteriores con mortero tipo M-450, CEM-I 32,5/SR. | |
| | | Mano de obra..... | 22,4091 |
| | | Maquinaria ..... | 28,1015 |
| | | Resto de obra y materiales..... | 503,4800 |

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| | | **TOTAL PARTIDA.....** | **553,99** |
| **U01026250** | **m** | **Tubería hincada chapa de acero DN 800 escudo abierto** | |
| | | Tubería hincada de DN 800 mm de diámetro interior, de chapa de acero de espesor mínimo 0,8% del diámetro, revestida con al menos 300 micras de resina de poliuretano, conforme a la norma UNE-EN 10224 y/o normativa vigente, en cualquier clase de terreno incluso roca, con equipo de escudo abierto, extracción de los productos procedentes de la excavación totalmente colocada, incluso p.p. de juntas de estanquidad, inyecciones bentoníticas, demolición posterior de macizo, maquinaria y medios auxiliares, medido sobre perfil. | |
| | | Mano de obra..... | 309,0900 |
| | | Maquinaria..... | 365,3900 |
| | | Resto de obra y materiales..... | 258,7900 |
| | | **TOTAL PARTIDA.....** | **933,27** |
| **U01026330** | **ud** | **Implantación, retirada y transporte escudo abierto acero <1500** | |
| | | Implantación, retirada y transporte de equipo perforador de escudo abierto para hinca de tubería de chapa de acero de diámetro interior inferior a 1500 mm. | |
| | | Maquinaria..... | 1.538,4700 |
| | | **TOTAL PARTIDA.....** | **1.538,47** |
| **mU09C090** | **ud** | **ENTRONQUE ACOMET. TUBULAR POZO ALCANTAR. O COLECTOR** | |
| | | Entronque de acometida tubular, a pozo de alcantarillado, o colector existente, inlcuida la demolición de calzada y acera hsta la conexión con el pozo en la calle,la posterior reposición del pavimento y el transporte y gestión de los residuos. | |
| | | Mano de obra..... | 110,5470 |
| | | Maquinaria..... | 4,4524 |
| | | Resto de obra y materiales..... | 179,9576 |
| | | **TOTAL PARTIDA.....** | **294,96** |
| **U01030350** | **m** | **Banda de señalización** | |
| | | Banda de señalización, según normas o especificaciones técnicas de Canal de Isabel II vigentes. | |
| | | Mano de obra..... | 0,0496 |
| | | Resto de obra y materiales..... | 0,2300 |
| | | **TOTAL PARTIDA.....** | **0,28** |

## CAPÍTULO 03 GESTIÓN DE RESIDUOS

| | | | |
|---|---|---|---|
| **AABBCC** | **ud** | **Gestión de Residuos de Construcción y Demolición** | |
| | | Gestión integral de Residuos incluyendo la identificación de los residuos generados y Estimación de la cantidad de cada tipo que se genera en la obra codificados conforme a la Lista Europea de Residuos (Orden MAM/304/2002 del Ministerio de Medio Ambiente de 8 de febrero), medidas de segregación "in situ" previstas por el plan de gestión de residuos, operaciones de valorización "in situ" y de reutilización, destino de los residuos no valorables o reutilizables, según estudio de gestión de residuos incluido en el proyecto, pliego de prescripciones y Orden 2690/2006, de 28 de Julio, de la Comunidad de Madrid. | |
| | | **TOTAL PARTIDA.....** | **11.460,23** |

## CAPÍTULO 04 SEGURIDAD Y SALUD

| | | | |
|---|---|---|---|
| **C.19.8.1** | **Ud** | **Seguridad y Salud** | |
| | | PROTECCIONES INDIVIDUALES Y COLECTIVAS E INSTALACIONES DE HIGIENE Y BIENESTAR s/. Real Decreto 1627/97, de 24 de Octubre, por el que se establecen las disposiciones mínimas necesarias de seguridad y salud en las obras de construcción se han de disponer de las medidas de protección:<br>- Protecciones individuales con objeto de la prevención de los riesgos laborales, de los riesgos específicos en cada unos de los "tajos" relativos a las obras civiles, tales como cinturones, cascos, guantes, ropa adecuada de obras y equipamiento en general para protección de los trabajadores.<br>- Protecciones colectivas con objeto de la prevención de los riesgos laborales relativos a las obras civiles, tales como instalaciones provisionales de obra, vallados, señalización, balizado, entibaciones, zanjas y equipamiento en general para protecciones de obras.<br>- Instalaciones de higiene y bienestar, tales como casetas de obra, aseo, vestuarios, comedor, primeros auxilios y equipamiento en general para higiene y bienestar de obras. | |

| CÓDIGO | UD | RESUMEN | PRECIO |
|---|---|---|---|
| | | Resto de obra y materiales..... | 13.980,0000 |
| | | **TOTAL PARTIDA.....** | **13.980,00** |

# MEDICIONES Y PRESUPUESTO

# PRESUPUESTO Y MEDICIONES

**TANQUES DE TORMENTAS NORTE URBANIZACIÓN KODAK LAS ROZAS**

| CÓDIGO | RESUMEN | UDS | LONGITUD | ANCHURA | ALTURA | PARCIALES | CANTIDAD | PRECIO | IMPORTE |
|---|---|---|---|---|---|---|---|---|---|
| | **CAPÍTULO 01 TANQUE DE TORMENTAS** | | | | | | | | |
| | **SUBCAPÍTULO 01.1 MOVIMIENTO DE TIERRAS** | | | | | | | | |
| **U01021020_1** | **m3 Excavación a cielo abierto, med. mecán. terreno medio** | | | | | | | | |
| | Excavación a cielo abierto, por medios mecánicos, en terreno medio (suelo con golpeo en el ensayo SPT entre 10 y 30 golpes / 30 cm), medido sobre perfil, con carga y transporte a vertedero autorizado o lugar de empleo, sin canon de vertido. | | | | | | | | |
| | Excavación (2 m sobreancho) | 1 | 332,82 | | 7,30 | 2.429,59 | | | |
| | | | | | | | 2.429,590 | 6,47 | 15.719,45 |
| **U01030340** | **m3 Relleno trasdós muros suelos adecuados de excavación** | | | | | | | | |
| | Relleno localizado en trasdós de muros con suelos adecuados procedentes de la excavación, incluso aportación, extendido, humectación y compactación en capas de 30 cm de espesor, con un grado de compactación del 95% del P.M. | | | | | | | | |
| | Excavación | 0,75 | | | | 1.822,19 | | =01.1 U01021020_1 | |
| | Ocupación tanque | -0,75 | 188,82 | | 7,30 | -1.033,79 | | | |
| | | | | | | | 788,400 | 5,53 | 4.359,85 |
| **mU02ER050** | **m3 Relleno localizado material filtrante** | | | | | | | | |
| | Relleno localizado con material filtrante de préstamos, en cimientos y trasdoses de muros. | | | | | | | | |
| | Excavación | 0,25 | | | | 607,398 | | =01.1 U01021020_1 | |
| | Ocupación tanque | -0,25 | 188,820 | | 7,300 | -344,597 | | | |
| | | | | | | | 262,801 | 20,75 | 5.453,12 |
| **U01025130** | **m2 Entibación cuajada zapatas o pozos con cajones chapa hasta 6 m** | | | | | | | | |
| | Entibación metálica cuajada en zapatas o pozos, hasta 6 m de profundidad, con cajones de paneles de chapa de acero, amortizables en 300 puestas, incluso p.p. de medios auxiliares. | | | | | | | | |
| | Perímetro (2 m sobreancho) | 1 | 80,00 | | 7,30 | 584,00 | | | |
| | | | | | | | 584,000 | 23,95 | 13.986,80 |
| | **TOTAL SUBCAPÍTULO 01.1 MOVIMIENTO DE TIERRAS .....** | | | | | | | | **39.519,22** |
| | **SUBCAPÍTULO 01.2 DRENAJE** | | | | | | | | |
| **U09011080_01** | **m Tubo de drenaje de polietileno de alta densidad de 15 cm diám.** | | | | | | | | |
| | Suministro y colocación de tubo de drenaje de polietileno de alta densidad corrugado, de doble pared ranurada, de 15 cm de diámetro. Colocado sobre cama de arena de río de 10 cm de espesor, revestido con geotextil de 125 g/m2 y relleno con grava filtrante 25 cm por encima del tubo con cierre de doble solapa del paquete filtrante (realizado con el propio geotextil). Con p.p. de medios auxiliares, incluso conexión a arqueta de evacuación de cámara. | | | | | | | | |
| | Drenaje perimetral | 1 | 76,88 | | | 76,88 | | | |
| | | | | | | | 76,880 | 31,27 | 2.404,04 |
| | **TOTAL SUBCAPÍTULO 01.2 DRENAJE .....** | | | | | | | | **2.404,04** |
| | **SUBCAPÍTULO 01.3 ESTRUCTURA** | | | | | | | | |
| **U07010204** | **m3 HNE-15/B/12 o HNE-15/B/20** | | | | | | | | |
| | Suministro y puesta en obra de hormigón no estructural HNE-15/B/12 o HNE-15/B/20, elaborado en central y vertido desde camión o bomba, para rellenos o elementos no estructurales, colocado a cualquier profundidad, incluso compactación, curado y acabado. Según CE vigente. | | | | | | | | |
| | Hormigón limpieza losa (1 m sobreancho) | 1 | 252,13 | | 0,10 | 25,21 | | | |
| | | | | | | | 25,210 | 88,91 | 2.241,42 |

| CÓDIGO | RESUMEN | UDS | LONGITUD | ANCHURA | ALTURA | PARCIALES | CANTIDAD | PRECIO | IMPORTE |
|---|---|---|---|---|---|---|---|---|---|
| **U07010804** | **m3 HA-30/B/20/XC2,XC3 o HA-30/B/20/XC4 eltos horiz., con camión** | | | | | | | | |
| | Suministro y puesta en obra de hormigón HA-30/B/20/XC2,XC3 o HA-30/B/20/XC4, elaborado en central y vertido desde camión en elementos horizontales-verticales de estructura (cimentaciones, soleras, vigas, etc.), incluso compactación, vibrado, curado y acabado. Según CE vigente. | | | | | | | | |
| | Losa cubierta | 1,12 | 186,63 | | 0,60 | 125,42 | | | |
| | Losa cimentación (1 m sobreancho) | 1 | 252,13 | | 0,60 | 151,28 | | | |
| | Losa intermedia | 1 | 7,82 | | 0,30 | 2,35 | | | |
| | Muros tipo 1 | 1 | 51,75 | | | 51,75 | | | |
| | Muros tipo 2 | 1 | 32,18 | | | 32,18 | | | |
| | Muros tipo 3 | 1 | 11,68 | | | 11,68 | | | |
| | Muros tipo 4 | 1 | 7,59 | | | 7,59 | | | |
| | Muros tipo 5 | 1 | 11,64 | | | 11,64 | | | |
| | Muros tipo 6 | 1 | 53,21 | | | 53,21 | | | |
| | Muros tipo 7 | 1 | 33,64 | | | 33,64 | | | |
| | Muros tipo 8 | 1 | 18,26 | | | 18,26 | | | |
| | Muros tipo 9 | 1 | 1,80 | | | 1,80 | | | |
| | Muros tipo 10 | 1 | 1,91 | | | 1,91 | | | |
| | Pilar 35x35 | 3 | 5,45 | 0,35 | 0,35 | 2,00 | | | |
| | | | | | | | 504,710 | 103,59 | 52.282,91 |
| **U07010210** | **m3 HNE-20/B/12 o HNE-20/B/20** | | | | | | | | |
| | Suministro y puesta en obra de hormigón no estructural HNE-20/B/12 o HNE-20/B/20, elaborado en central y vertido desde camión o bomba, para rellenos o elementos no estructurales, colocado a cualquier profundidad, incluso compactación, curado y acabado. Según CE vigente. Hormigón ciclópeo. | | | | | | | | |
| | Cambio de nivel | 1 | 0,52 | | | 0,52 | | | |
| | | | | | | | 0,520 | 99,12 | 51,54 |
| **U07030050** | **kg Suministro y colocación de acero para armaduras en barras B500S** | | | | | | | | |
| | Suministro y colocación de acero para armaduras en barras corrugadas B 500 S, incluso cortado, doblado y recortes, según peso teórico. | | | | | | | | |
| | Muros | 1 | 65.663,56 | | | 65.663,56 | | | |
| | Losas | 1 | 45.558,65 | | | 45.558,65 | | | |
| | Pilares | 1 | 817,32 | | | 817,32 | | | |
| | Refuerzos varios | 1 | 11.086,80 | | | 11.086,80 | | | |
| | Solapes | 1 | 8.620,69 | | | 8.620,69 | | | |
| | | | | | | | 131.747,020 | 1,74 | 229.239,81 |
| **U07020081** | **m2 Encofrado plano met. elem. vertical. estru. trabaj. entre 5 y 7** | | | | | | | | |
| | Encofrado plano para elementos verticales de estructura (muros, etc.) con paneles metálicos, con calidad de acabado cara vista, para trabajos a partir de 5 m de altura y hasta 7 m de altura, incluso molduras y berenjenos, tapes, velas, puntales, cimbras y andamiaje, desencofrado y limpieza. | | | | | | | | |
| | Muros | 2 | 186,63 | | 5,75 | 2.146,25 | | | |
| | | 1 | 5,40 | | 5,75 | 31,05 | | | |
| | | 1 | 19,44 | | 5,75 | 111,78 | | | |
| | Losa cimenatción | 1 | 186,63 | | 0,60 | 111,98 | | | |
| | Parapastas | 1 | 37,41 | | | 37,41 | | | |
| | | | | | | | 2.438,470 | 34,70 | 84.614,91 |
| **U07020040** | **m2 Encofrado plano met. elem. horiz. estru. trabaj. entre 3 y 5 m** | | | | | | | | |
| | Encofrado plano para elementos horizontales de estructura (losas, etc.) con paneles metálicos, con calidad de acabado cara vista, para trabajos a partir de 3 m de altura y hasta 5 m de altura, incluso molduras y berenjenos, tapes, velas, puntales, cimbras y andamiaje, desencofrado y limpieza. | | | | | | | | |
| | Losa cubierta | 1,12 | 186,63 | | | 209,03 | | | |
| | Losa intermedia | 1 | 7,82 | | | 7,82 | | | |
| | | | | | | | 216,850 | 31,32 | 6.791,74 |
| | **TOTAL SUBCAPÍTULO 01.3 ESTRUCTURA .....** | | | | | | | | **375.222,33** |

## SUBCAPÍTULO 01.4 IMPERMEABILIZACIÓN

**08020360_1** **m2 Impz muro c/lamn PVC e 1,5 mm**

Impermeabilización de muro de sótano, mediante membrana impermeabilizante, compuesta por lámina de policloruro de vinilo PVC, de 1,5 mm de espesor, sin armadura, fijada en la parte superior

| CÓDIGO | RESUMEN | UDS | LONGITUD | ANCHURA | ALTURA | PARCIALES | CANTIDAD | PRECIO | IMPORTE |
|---|---|---|---|---|---|---|---|---|---|
| | mediante barra de terminación de aluminio anclada mecánicamente al soporte, incluso limpieza previa del soporte, fijaciones, mermas y solapos, según DB HS-1 del CTE. | | | | | | | | |
| | Perímetro | 1 | 61,50 | | 6,35 | 390,53 | | | |
| | Solapes | 1 | 177,63 | | | 177,63 | | | |
| | | | | | | | 568,160 | 20,93 | 11.891,59 |
| | **TOTAL SUBCAPÍTULO 01.4 IMPERMEABILIZACIÓN .....** | | | | | | | | **11.891,59** |

## SUBCAPÍTULO 01.5 OBRA CIVIL-EDIFICACIÓN

**808020300_2** **ml Zuncho horizontal de bloque "U" de hormigón visto**

Zuncho horizontal de 20 cm de espesor, de bloques en "U" de hormigón, lisos, color gris, 40x20x20 cm, resistencia normalizada R10 (10 N/mm²), para revestir, recibidos con mortero de cemento industrial, color gris, M-7,5, suministrado a granel; con refuerzo de hormigón de relleno, HA-25/B/12/XC2, preparado en obra, vertido con medios manuales, y acero UNE-EN 10080 B 500 S, cuantía 4,3 kg/m; para muro de carga de fábrica armada. Incluso alambre de atar y separadores. El precio incluye la elaboración de la ferralla (corte, doblado y conformado de elementos) en taller industrial y el montaje en el lugar definitivo de su colocación en obra.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Perimetro | 1 | 35,00 | | | 35,00 | | |
| | | | | | | 35,00 | |
| | | | | | | 35,000 | 22,32 | 781,20 |

**U08020300_1** **m2 Fábrica bloques hueco hormigón estriado visto 40x20x20 cm**

Fábrica de bloque hueco de hormigón estriado a cara vista, color blanco, dimensiones 40x20x20 cm, recibida con mortero M-250 de cemento BL 22,5 incluso rejuntado, limpieza de paños y piezas especiales, según normativa vigente.
Reforzado con armadura anclada a forjado existente y hormigón de relleno HA-25/B/112/XC2, en dinteles, zunchos horizontales y zunchos verticales y acero, UNE-EN 10080B, cuantía 0,6 kg/m2, armadura de tendel prefabricada de acero galvanizado en caliente con recubrimiento de resina epoxi.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Edificio | 2 | 10,20 | | 4,35 | 88,74 | | |
| | 1 | 6,40 | | 4,40 | 28,16 | | |
| | 1 | 6,40 | | 4,30 | 27,52 | | |
| Cuarto eléctrico | 1 | 5,46 | | 4,40 | 24,02 | | |
| Otros | 1 | 8,72 | | 4,40 | 38,37 | 206,81 | | |
| | | | | | | 206,810 | 55,75 | 11.529,66 |

**U08020140** **m2 Fábrica de ladrillo perforado 24x11,5x7 cm, 1/2 pie de esp.**

Fábrica de ladrillo perforado 24x11,5x7 cm, de 1/2 pie de espesor, recibido con mortero de cemento CEM II/B-P 32,5 N y arena tipo M-5, para revestir en alzados, conforme a norma UNE-EN 998-1 y/o según normativa vigente y medida deduciendo huecos superiores a 1 m2.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Chimeneas | 6 | 3,20 | | 1,90 | 36,48 | | |
| Recrecido arquetas | 1 | 3,46 | | 0,60 | 2,08 | | |
| | 1 | 4,79 | | 0,60 | 2,87 | | |
| | 1 | 3,41 | | 0,60 | 2,05 | | |
| | 1 | 3,21 | | 0,60 | 1,93 | | |
| Plataforma tramex | 1 | 18,82 | | 0,60 | 11,29 | 56,70 | | |
| | | | | | | 56,700 | 26,71 | 1.514,46 |

**U08030030** **m2 Enfoscado maestreado y fratasado mortero cem. y aditivo hidróf.**

Enfoscado maestreado y fratasado con mortero de cemento y aditivo hidrófugo, incluso mallazo de alambre de acero galvanizado de 1x1 cm de cuadrícula, grapado a la viga del forjado con grapas de acero galvanizado, incluso colocación. Totalmente terminado.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Chimeneas | 12 | 3,20 | | 1,90 | 72,96 | | |
| Recrecido arquetas | 2 | 3,46 | | 0,60 | 4,15 | | |
| | 2 | 4,79 | | 0,60 | 5,75 | | |
| | 2 | 3,41 | | 0,60 | 4,09 | | |
| | 2 | 3,21 | | 0,60 | 3,85 | | |
| Plataforma tramex | 2 | 18,82 | | 0,60 | 22,58 | | |
| | | | | | | 113,380 | 28,63 | 3.246,07 |

**U08030320** **m2 Pintura al temple liso en paramentos horizontales y verticales**

Pintura al temple liso en paramentos horizontales y verticales, dos manos de color, incluso preparación de base y medios auxiliares para su aplicación.

| | | | | | |
|---|---|---|---|---|---|
| Chimeneas | 12 | 3,20 | 1,90 | 72,96 | |
| Recrecido arquetas | 2 | 3,46 | 0,60 | 4,15 | |

| CÓDIGO | RESUMEN | UDS | LONGITUD | ANCHURA | ALTURA | PARCIALES | CANTIDAD | PRECIO | IMPORTE |
|---|---|---|---|---|---|---|---|---|---|
| | | 2 | 4,79 | | 0,60 | 5,75 | | | |
| | | 2 | 3,41 | | 0,60 | 4,09 | | | |
| | | 2 | 3,21 | | 0,60 | 3,85 | | | |
| | Plataforma tramex | 2 | 18,82 | | 0,60 | 22,58 | | | |
| | | | | | | | 113,380 | 4,22 | 478,46 |
| U08010010 | **kg Acero S-275 JR en estructura soldada** | | | | | | | | |
| | Acero laminado S-275 JR, en perfiles laminados en caliente para vigas, pilares, zunchos y correas, mediante uniones soldadas; incluso p.p. de soldaduras, cortes, piezas especiales, despuntes y dos manos de imprimación con pintura de minio de plomo, montado y colocado, según normativa vigente. | | | | | | | | |
| | Estructura edificio | 4 | 6,25 | | 31,47 | 786,75 | | | |
| | | | | | | | 786,75 | | |
| | | | | | | | 786,750 | 2,94 | 2.313,05 |
| U08020680_1 | **m2 Cubierta panel chapa acero perf. comercial prelac. 0,6 mm** | | | | | | | | |
| | Cubierta formada por panel de chapa de acero en perfil comercial, prelacada de 0,6 mm con núcleo de espuma de poliuretano de 40 kg/m3 con un espesor total de 50 mm sobre correas metálicas, i/p.p. de solapes, tapajuntas, accesorios de fijación, limahoyas, cumbrera, remates laterales, encuentros de chapa prelacada de 0,6 mm y 500 mm de desarrollo medio, instalado, incluso medios auxiliares y elementos de seguridad, según normativa vigente. Medida en verdadera magnitud. Incluso pieza perimetral de remate con goterón. | | | | | | | | |
| | Cubierta edificio | 1 | 10,60 | 6,60 | | 69,96 | | | |
| | | | | | | | 69,96 | | |
| | | | | | | | 69,960 | 47,61 | 3.330,80 |
| U08020050_1 | **m2 Recrecido aligerado, sistema CÁVITI** | | | | | | | | |
| | Recrecido aligerado de hormigón armado de 65+15 cm de espesor, sobre encofrado perdido de piezas de polipropileno reciclado, C-65 "CÁVITI", de 750x500x650 mm, color negro, realizado con hormigón HA-30/B/12/XC1+XF1+XA1+XM2 fabricado en central, con cemento SR, y malla electrosoldada ME 15x15 Ø 8-8 B 500 T 6x2,20 UNE-EN 10080 como armadura de reparto, colocada sobre separadores homologados en capa de compresión de 8 cm de espesor; apoyado todo ello sobre base de hormigón de limpieza. | | | | | | | | |
| | Incluso encofrado, armado y hormigonado de zunchos perimetrales en huecos. | | | | | | | | |
| | | 1 | 10,00 | 6,00 | | 60,00 | | | |
| | | -1 | 2,50 | 3,00 | | -7,50 | | | |
| | | | | | | | 52,50 | | |
| | | | | | | | 52,500 | 90,98 | 4.776,45 |
| U08010030 | **m2 Plataforma rejilla tramex antidesliz. y seguridad** | | | | | | | | |
| | Plataforma formada por rejilla tipo tramex galvanizada, superantideslizante y de seguridad, (en paneles de 1.000x2.000 mm), formada por doble pletina dentada de cresta biselada, de 30x2 mm y 10x2 mm, respectivamente, en cuadrícula de 30x30 mm, incluido malla de protección por debajo de la pletina separadora, de 1 mm de espesor con taladros cuadrados de 8x8 mm, y p.p. de recercados o bastidor de angular 30x30x3 mm o pletina de 30x3 mm, despuntes, cortes, ajustes y soldaduras, totalmente terminada y colocada. | | | | | | | | |
| | | 1 | 8,50 | 0,95 | | 8,08 | | | |
| | | | | | | | 8,08 | | |
| | | | | | | | 8,080 | 62,89 | 508,15 |
| U08040040 | **m2 Carpintería metálica con chapa plegada de hierro en puertas** | | | | | | | | |
| | Puerta de chapa plegada (tipo Pegaso o equivalente) practicable o corredera para exteriores de edificaciones, realizada con doble chapa de acero galvanizado de 1 mm de espesor y panel intermedio, rigidizadores con perfiles de acero conformado en frío, herrajes de colgar, cerradura con manillón de nylon, cerco de perfil de acero conformado en frío con garras para recibir a la obra, bastidor y refuerzos de tubo de acero laminado, guías, topes, tiradores, pasadores y demás accesorios necesarios, patillas de fijación a obra, acabado con capa de pintura epoxi polimerizada al horno, elaborada en taller, ajuste y fijación en obra. instalada, i/ recibido de albañilería y precerco. | | | | | | | | |
| | Incluso rejillas de ventilación. | | | | | | | | |
| | Acceso edificación | 1 | 1,75 | | 2,10 | 3,68 | | | |
| | | | | | | | 3,68 | | |
| | | | | | | | 3,680 | 202,38 | 744,76 |
| U08040070 | **m2 Carpintería metálica de acero galvanizado, practicable** | | | | | | | | |
| | Carpintería metálica de acero galvanizado, en ventanas o puertas practicables, con perfiles conformados en frío de acero galvanizado de 1 mm de espesor, formando bastidor con despiece en retícula cuadrada o rectangular, con junquillos a presión de fleje de acero galvanizado de 0,5 mm de espesor | | | | | | | | |

| CÓDIGO | RESUMEN | UDS | LONGITUD | ANCHURA | ALTURA | PARCIALES | CANTIDAD | PRECIO | IMPORTE |
|---|---|---|---|---|---|---|---|---|---|
| | con cantoneras en encuentro; patillas para anclaje de 10 cm i/corte, preparación y soldadura de perfiles en taller, ajuste y montaje en obra, pintura, i/ recibido de albañilería. Según NTE-FCA. Incluso rejillas de ventilación. | | | | | | | | |
| | Cuarto eléctrico | 1 | | | | 1,00 | | | |
| | | | | | | | 1,00 | | |
| | | | | | | | 1,000 | 244,28 | 244,28 |
| U08040100_1 | **Ud Puerta enrollable para garaje, de aluminio.** Cerramiento exterior | | | | | | | | |
| | | | | | | | 0,000 | 1.996,61 | 0,00 |
| U08010100_1 | **m Barandilla tubo metálico H=1 m, pintada. Desmontable** Barandilla metálica de tubo de diámetro 50 mm x e=1,5 mm y altura 1,00 m, compuesta por montantes separados, pasamanos y travesaño intermedio, y rodapié de pletina de 200 x 5 mm, incluso placas y tornillos de anclaje, pintura al esmalte satinado, dos manos y una mano de minio o antioxidante, previo rascado de los óxidos y limpieza manual. Totalmente colocada. Barandilla de fácil desmontaje en caso de necesidad, por temas de mantenimiento | | | | | | | | |
| | | 1 | 6,00 | | | 6,00 | | | |
| | | | | | | | 6,00 | | |
| | | | | | | | 6,000 | 157,21 | 943,26 |
| U05070050_1 | **ud Tapa de fundición ductil 80x80cm - D200** Tapa de registro de fundicion dúctil 80x80 cm, recibido con mortero de cemento 1:6, sobre solera de hormigón totalmente terminada, incluso p.p. de medios auxiliares. | | | | | | | | |
| | | 2 | | | | 2,00 | | | |
| | | | | | | | 2,00 | | |
| | | | | | | | 2,000 | 86,21 | 172,42 |
| U05070050_2 | **ud Tapa de fundición ductil 75x100cm - D400** Tapa de registro de fundicion dúctil 75x100 cm, recibido con mortero de cemento 1:6, sobre solera de hormigón totalmente terminada, incluso p.p. de medios auxiliares. | | | | | | | | |
| | | 1 | | | | 1,00 | | | |
| | | | | | | | 1,00 | | |
| | | | | | | | 1,000 | 179,30 | 179,30 |
| U05070050_3 | **ud Tapa de fundición ductil 80x160cm - D400 - 4hojas** Tapa de registro de fundicion dúctil 80x160 de 4 hojas D-400 recibido con mortero de cemento 1:6, sobre solera de hormigón totalmente terminada, incluso p.p. de medios auxiliares. | | | | | | | | |
| | | 1 | | | | 1,00 | | | |
| | | | | | | | 1,00 | | |
| | | | | | | | 1,000 | 217,90 | 217,90 |
| | **TOTAL SUBCAPÍTULO 01.5 OBRA CIVIL-EDIFICACIÓN.....** | | | | | | | | **30.980,22** |

## SUBCAPÍTULO 01.6 EQUIPOS E INSTALACIONES

### APARTADO 01.6.1 ILUMINACIÓN

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| U10050120 | **ud Lumi. Adosable. LED Estanca IP-66 1x58 W** Suministro y montaje de luminaria adosable Estanca LED. IP-66, 1x58 W. Factor de potencia >0,9. Eficiencia > 130Lm/W. Vida útil > 50000 horas. Difusor: Policarbonato, extruido. Instalación adosado o suspendido, con equipo y lámpara totalmente montada. | | | | | | | | |
| | Caseta | 8 | | | | 8,00 | | | |
| | | | | | | | 8,00 | | |
| | | | | | | | 8,000 | 274,25 | 2.194,00 |
| U10050080 | **ud Lumi. Adosable. LED Estanca IP-66 1x16 W** Suministro y montaje de luminaria adosable Estanca LED. IP-66, 1x16 W. Factor de potencia >0,9. Eficiencia > 130Lm/W. Vida útil > 50000 horas. Difusor: Policarbonato, extruido. Instalación adosado o suspendido, con equipo y lámpara totalmente montada. | | | | | | | | |
| | Puertas | 2 | | | | 2,00 | | | |
| | | | | | | | 2,00 | | |

| CÓDIGO | RESUMEN | UDS | LONGITUD | ANCHURA | ALTURA | PARCIALES | CANTIDAD | PRECIO | IMPORTE |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2,000 | 231,55 | 463,10 |
| **U10050290-1** | **ud Proyector LED 130W IP-66** | | | | | | | | |
| | Proyector LED SiCompact® 31 mini o equivalente.Flujo luminoso nominal 20000lm. Eficacia lumínica 154lm/W.Temperatura de color 4000K. Reproducción de color CRI > 70. Potencia nominal 130W. Índice de protección IP66. Resistencia contra impacto IK08. Instalada y en funcionamiento. | | | | | | | | |
| | Tanque | 4 | | | | 4,00 | | | |
| | | | | | | | 4,00 | | |
| | | | | | | | 4,000 | 473,30 | 1.893,20 |
| **U10050250** | **ud Aparato Autónomo de Emergencia Estanco** | | | | | | | | |
| | Suministro y montaje de luminaria de emergencia estanco, con cuatro LED, flujo luminoso 375 lúmenes, carcasa de 290x130x70 mm, clase II, protección IP 65, con baterías de Ni-MH, autonomía de 1 h, alimentación a 230 V, tiempo de carga 24 h. Incluso accesorios y elementos de fijación. | | | | | | | | |
| | Caseta | 3 | | | | 3,00 | | | |
| | | | | | | | 3,00 | | |
| | | | | | | | 3,000 | 104,46 | 313,38 |
| | **TOTAL APARTADO 01.6.1 ILUMINACIÓN.....** | | | | | | | | **4.863,68** |
| | **APARTADO 01.6.2 ELEMENTOS INTERIOR TANQUE** | | | | | | | | |
| **LIMP_BAS** | **u LIMPIADOR BASCULANTE, L = 4,6 M, AISI 316** | | | | | | | | |
| | Limpiador basculante marca Hidrostank ó similar, referencia LP-2814 , para una longitud entre paredes de 4,6 m. La capacidad viene definida en función de los siguientes parámetros: longitud a limpiar, altura disponible y pendiente de la solera. Fabricado en acero inoxidable AISI 316, acabado final chorreado con microesfera de vidrio. Incluye soportes en acero inoxidable AISI 316, rodamientos, juego de suspensión y demás piezas pequeñas. Tornillería y anclajes en A4. Incluye prueba de volteo con agua en fábrica grabada en vídeo. | | | | | | | | |
| | TOTALMENTE INSTALADO | | | | | | | | |
| | | 2 | | | | 2,00 | | | |
| | | | | | | | 2,000 | 10.401,93 | 20.803,86 |
| **RCV.C.SEMISEC** | **u REGULADOR DE CAUDAL TIPO VORTEX EN CAMARA** | | | | | | | | |
| | Válvula de Regulación de Caudal tipo vórtice, marca MOSBAEK-HIDROSTANK, modelo CY/DX 1000-PP300-C275-A30 / BCTWL, para regular un caudal de 142 l/s a una altura de lámina de agua de 4,7 metros. Fabricado en acero inoxidable AISI 316, acabado final chorreado con bolas de vidrio. Con brida loca de polipropileno DN 300 PN 10. Incluso con ventana de inspección. Incluye para la instalación de la válvula de regulación:<br>-- Un pasamuros DN 300 L=600 mm. para empotrar a pared, en acero inoxidable AISI 316, acabado final chorreado con bolas de vidrio, con brida loca de polipropileno DN 300 PN 10<br>-- Una válvula de guillotina DN 300 PN 10, cuerpo y tajadera en acero inoxidable AISI 316. Accionamiento mediante volante.<br>Incluye un bypass formado por<br>-- Un pasamuros DN 250 L=600 mm. para empotrar a pared, en acero inoxidable AISI 316, acabado final chorreado con bolas de vidrio, con brida loca de polipropileno DN 250 PN 10.<br>-- Una válvula de guillotina DN 250 PN 10, cuerpo y tajadera en acero inoxidable AISI 316. Accionamiento mediante volante.<br>-- Un codo DN 250 con prolongación, fabricado en acero inoxidable AISI 316, con brida loca de polipropileno DN 250 PN 10.<br>Tornillería y anclajes en A4<br>TOTALMENTE INSTALADO | | | | | | | | |
| | | 1 | | | | 1,00 | | | |
| | | | | | | | 1,000 | 12.796,34 | 12.796,34 |
| **CIR_LLEN** | **u CIRCUITO DE LLENADO PARA 2 LIMPIADORES** | | | | | | | | |
| | Incluye los siguientes elementos: 2 electroválvulas y 2 llaves de bola de 1.5", para el llenado de los limpiadores y aislamiento de los circuitos. Canalización de agua desde las electroválvulas hasta los limpiadores en acero inoxidable DN 42, con piezas roscadas de 1.5". 2 arquetas de polipropileno marca Hidrostank para alojar las electroválvulas y llaves de bola, preparadas para la realización de la acometida de agua. No incluye: Acometida de agua desde la red general. Canalización incluida siempre que las arquetas se sitúen a menos de 10 metros de distancia de los limpiadores. | | | | | | | | |
| | TOTALMENTE INSTALADO | | | | | | | | |
| | | 1 | | | | 1,00 | | | |

| CÓDIGO | RESUMEN | UDS | LONGITUD | ANCHURA | ALTURA | PARCIALES | CANTIDAD | PRECIO | IMPORTE |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 1,000 | 4.321,76 | 4.321,76 |
| **REJA** | **u REJA DE CADENAS** | | | | | | | | |
| | Reja de cadenas Quilton mod. QC100, o equivalente, de dimensiones 10mm de paso y de ancho y alto 930x4800 mm en material AISI-316L. | | | | | | | | |
| | | 1 | | | | 1,00 | | | |
| | | | | | | | 1,000 | 39.884,00 | 39.884,00 |
| **VENT0001** | **Ud VENTILADOR** | | | | | | | | |
| | Ventilador helicocentrífugo de perfil bajo, de dos velocidades, potencia máxima de 24 W, caudal máximo de 240 m³/h, de 176 mm de diámetro y 303 mm de longitud, nivel de presión sonora de 31 dBA, para conductos de 100 mm de diámetro, formado por cuerpo de polipropileno, hélice de ABS, caja de bornes y motor para alimentación monofásica a 230 V y 50 Hz de frecuencia.<br>Incluye: Replanteo. Colocación. Conexionado y comprobación de su correcto funcionamiento.<br>Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto.<br>Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de Proyecto. | | | | | | | | |
| | | 1 | | | | 1,00 | | | |
| | | | | | | | 1,00 | | |
| | | | | | | | 1,000 | 1.198,83 | 1.198,83 |
| **IVV030** | **m Conducto de PVC.** | | | | | | | | |
| | Conducto de ventilación, formado por tubo liso de PVC, de 200 mm de diámetro exterior, pegado mediante adhesivo, colocado en posición horizontal. Incluso material auxiliar para montaje y sujeción a la obra, accesorios y piezas especiales.<br>Criterio de valoración económica: El precio no incluye las compuertas de regulación, las compuertas cortafuego, las rejillas ni los difusores.<br>Incluye: Replanteo del recorrido del conducto y de la situación de los elementos de sujeción. Presentación en seco de tubos y piezas especiales. Fijación del material auxiliar para montaje y sujeción a la obra. Montaje, conexionado y comprobación de su correcto funcionamiento.<br>Criterio de medición de proyecto: Longitud proyectada, según documentación gráfica de Proyecto, medida entre los ejes de los elementos o de los puntos a conectar, sin descontar las piezas especiales.<br>Criterio de medición de obra: Se medirá la longitud realmente ejecutada según especificaciones de Proyecto. | | | | | | | | |
| | Ventilación deposito | 1 | 20,00 | | | 20,00 | | | |
| | | | | | | | 20,00 | | |
| | | | | | | | 20,000 | 20,60 | 412,00 |
| | | | | | | | | **TOTAL APARTADO 01.6.2 ELEMENTOS INTERIOR TANQUE** | **79.416,79** |

## APARTADO 01.6.3 PLC + INSTALACIÓN ELÉCTRICA

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **CONTRL** | **u CIRCUITO DE CONTROL PARA 2 LIMPIADORES** | | | | | | | | |
| | Incluye los siguientes elementos: 2 detectores inductivos para detectar el volteo de los limpiadores. Sensor de nivel por radar tipo Vegapuls C11, para detección en continuo del nivel de agua del tanque, ajustable mediante Bluetooth. Cuadro completo para el control del sistema en modo manual y automático con autómata programado Siemens SIMATIC S7-1500, CPU 1516-3 PN/DP con pantalla táctil SIMATIC HMI MTP1500 UNIFIED COMFORT PANEL, analizador de redes SENTRON PAC3200 22-65V DC, tarjeta de comunicaciones SINAUT ST7, TIM 1531 IRC, router SCALANCE M876-4 LTE (4G) EU y antena ANT 794-4MR GSM CUATRIBANDA UMTS. Incluye también SAI para comunicaciones. Canalización y conexión eléctrica de los diferentes elementos en el cuadro de control. No incluye cuadro de protección eléctrica ni acometida desde la red general. Tensión de alimentación: 400 V, 50 Hz, 3 fases + neutro + tierra. Potencia aproximada: 2 kW.<br>TOTALMENTE INSTALADO | | | | | | | | |
| | | 1 | | | | 1,00 | | | |
| | | | | | | | 1,000 | 35.231,52 | 35.231,52 |
| **U03073090** | **ud Caudalímetro electromagnético tub. parcialm. llena PN 10 Ø600** | | | | | | | | |
| | Suministro, instalación y puesta en servicio de caudalímetro electromagnético, sobre tubería DN 600 mm, con sección parcialmente llena y principio de medida nivel continuo capacitivo, con electrónica separada del tubo de medida, incluso carrete PN 10, grado de protección IP68, alimentación eléctrica a 24 Vcc, precisión mejor del 1 %, con recubrimiento interno del tubo de medida y certificado de calibración del equipo de laboratorio acreditado, según ficha técnica, electrónica, instalación eléctrica, | | | | | | | | |

| CÓDIGO | RESUMEN | UDS | LONGITUD | ANCHURA | ALTURA | PARCIALES | CANTIDAD | PRECIO | IMPORTE |
|---|---|---|---|---|---|---|---|---|---|
| | montaje, totalmente instalado, probado y puesto en servicio. | | | | | | | | |
| | Entrada | 1 | | | | 1,00 | | | |
| | Salida | 1 | | | | 1,00 | | | |
| | | | | | | | 2,00 | | |
| | | | | | | | 2,000 | 18.768,82 | 37.537,64 |
| **U03073080** | **ud Caudalímetro electromagnético tub. parcialm. llena PN 10 Ø500** | | | | | | | | |
| | Suministro, instalación y puesta en servicio de caudalímetro electromagnético, sobre tubería DN 500 mm, con sección parcialmente llena y principio de medida nivel continuo capacitivo, con electrónica separada del tubo de medida, incluso carrete PN 10, grado de protección IP68, alimentación eléctrica a 24 Vcc, precisión mejor del 1 %, con recubrimiento interno del tubo de medida y certificado de calibración del equipo de laboratorio acreditado, según ficha técnica, electrónica, instalación eléctrica, montaje, totalmente instalado, probado y puesto en servicio. | | | | | | | | |
| | Bypass | 1 | | | | 1,00 | | | |
| | | | | | | | 1,00 | | |
| | | | | | | | 1,000 | 16.263,52 | 16.263,52 |
| **U03080030** | **ud Medidor nivel ultrasonidos** | | | | | | | | |
| | Suministro, instalación y puesta en servicio de medidor de nivel ultrasónico, alimentación eléctrica a 24Vcc, con precisión mejor del 0,1%, IP 68, alcance de medida 5 m para líquidos, incluso 15 m de cable de conexión, totalmente instalado y probado. | | | | | | | | |
| | Tanque | 1 | | | | 1,00 | | | |
| | | | | | | | 1,00 | | |
| | | | | | | | 1,000 | 1.800,36 | 1.800,36 |
| **U03080050** | **m Cable 64 fibras Monomodo** | | | | | | | | |
| | Suministro e instalación de cable de 64 fibras ópticas en Mono-modo 9/125, con aislamiento PEAP, bajo canalización de tritubo según especificaciones de Canal de Isabel II, incluso parte proporcional de empalmes, fusionado y conectorización, probado y certificado. | | | | | | | | |
| | Acometida | 1 | 100,00 | | | 100,00 | | | |
| | | | | | | | 100,00 | | |
| | | | | | | | 100,000 | 11,55 | 1.155,00 |
| **U03080060** | **ud Repartidor 64 FO** | | | | | | | | |
| | Suministro e instalación de repartidor de 64 fibras ópticas para un total de 64 adaptadores de tipo FC-FC y sus correspondientes 64 pig-tail de monomodos, todos fusionados y comprobados con equipo ODTR. | | | | | | | | |
| | | 1 | | | | 1,00 | | | |
| | | | | | | | 1,00 | | |
| | | | | | | | 1,000 | 2.159,91 | 2.159,91 |
| **U03080100** | **ud Latiguillo FO Multimodo** | | | | | | | | |
| | Suministro e instalación de latiguillos de fibra óptica multimodo con conectores FC-FC, de una longitud de 1,50 m. | | | | | | | | |
| | | 1 | | | | 1,00 | | | |
| | | | | | | | 1,00 | | |
| | | | | | | | 1,000 | 15,98 | 15,98 |
| **U10030780** | **m Cable RV-K 0,6/1 KV 1x1,5 mm2** | | | | | | | | |
| | Cable de cobre aislado en polietileno reticulado y cubierta de PVC, tipo RV-K 0,6/1 KV de 1x1,5 mm2. Instalado bajo tubo o conductos. | | | | | | | | |
| | Alumbrado tanque | 3 | 50,00 | | | 150,00 | | | |
| | | | | | | | 150,00 | | |
| | | | | | | | 150,000 | 0,81 | 121,50 |
| **U10030010** | **m Cable RZ1-K 0,6/1 KV 1x1,5 mm2** | | | | | | | | |
| | Cable de cobre aislado en polietileno reticulado y cubierta de poliolefina, tipo RZ1-K 0,6/1 KV de 1x1,5 mm2. Instalado bajo tubo o conductos. | | | | | | | | |
| | Alumbrado caseta | 3 | 40,00 | | | 120,00 | | | |
| | Tomas de corriente | 3 | 30,00 | | | 90,00 | | | |
| | Reja | 5 | 15,00 | | | 75,00 | | | |
| | | | | | | | 285,00 | | |
| | | | | | | | 285,000 | 1,15 | 327,75 |
| **U10030020** | **m Cable RZ1-K 0,6/1 KV 1x2,5 mm2** | | | | | | | | |
| | Cable de cobre aislado en polietileno reticulado tipo RZ1-K 0,6/1 KV de 1x2,5 mm2. Instalado bajo tubo o conductos. | | | | | | | | |

| CÓDIGO | RESUMEN | UDS | LONGITUD | ANCHURA | ALTURA | PARCIALES | CANTIDAD | PRECIO | IMPORTE |
|---|---|---|---|---|---|---|---|---|---|
| | Tomas de corriente 32A | 3 | 30,00 | | | 90,00 | | | |
| | | | | | | | 90,00 | | |
| | | | | | | | 90,000 | 1,46 | 131,40 |
| **U10060010** | **ud Base de toma de corriente con contacto de tierra (2P+T), tipo Sc** | | | | | | | | |
| | Base de toma de corriente con contacto de tierra (2P+T), tipo Schuko, para empotrar, gama media, intensidad asignada 16 A, tensión asignada 250 V. | | | | | | | | |
| | TC | 3 | | | | 3,00 | | | |
| | | | | | | | 3,00 | | |
| | | | | | | | 3,000 | 16,31 | 48,93 |
| **U10060020** | **ud Toma corr. 2P+T 16A IP-55** | | | | | | | | |
| | Toma de corriente montaje superficie 2P+T, para 16 A, IP-55, cuerpo aislante en poliamida, tornillería de latón. | | | | | | | | |
| | TC 16 | 2 | | | | 2,00 | | | |
| | | | | | | | 2,00 | | |
| | | | | | | | 2,000 | 17,24 | 34,48 |
| **U10060060** | **ud Toma corr. 3P+T 32 A IP-55** | | | | | | | | |
| | Toma de corriente montaje superficie 3P+T, para 32 A, IP-55, cuerpo aislante en poliamida, tornillería de latón. | | | | | | | | |
| | TC 32 | 2 | | | | 2,00 | | | |
| | | | | | | | 2,00 | | |
| | | | | | | | 2,000 | 49,07 | 98,14 |
| **U10060110_1** | **Ud Interruptor automático magnetotérmico 10A 2P** | | | | | | | | |
| | Interruptor automático magnetotérmico, de 2 módulos, bipolar (2P), intensidad nominal 10 A, poder de corte 6 kA, curva C, de 36x80x77,8 mm, grado de protección IP20, montaje sobre carril DIN (35 mm) y fijación a carril mediante garras. Totalmente montado, conexionado y probado. | | | | | | | | |
| | Incluye: Montaje y conexionado del elemento. | | | | | | | | |
| | Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto. | | | | | | | | |
| | Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de Proyecto. | | | | | | | | |
| | Alumbrado caseta | 1 | | | | 1,00 | | | |
| | Alumbrado tanque | 1 | | | | 1,00 | | | |
| | Limpiadores | 1 | | | | 1,00 | | | |
| | Previsión rack | 1 | | | | 1,00 | | | |
| | Ventilación | 1 | | | | 1,00 | | | |
| | | | | | | | 5,00 | | |
| | | | | | | | 5,000 | 31,71 | 158,55 |
| **U10060110_2** | **Ud Interruptor automático magnetotérmico 16A 2P** | | | | | | | | |
| | Interruptor automático magnetotérmico, de 2 módulos, bipolar (2P), intensidad nominal 16 A, poder de corte 6 kA, curva C, de 36x80x77,8 mm, grado de protección IP20, montaje sobre carril DIN (35 mm) y fijación a carril mediante garras. Totalmente montado, conexionado y probado. | | | | | | | | |
| | Incluye: Montaje y conexionado del elemento. | | | | | | | | |
| | Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto. | | | | | | | | |
| | Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de Proyecto. | | | | | | | | |
| | Tomas 16 | 5 | | | | 5,00 | | | |
| | | | | | | | 5,00 | | |
| | | | | | | | 5,000 | 31,71 | 158,55 |
| **U10060110_3** | **Ud Interruptor automático magnetotérmico 32A 3P** | | | | | | | | |
| | Interruptor automático magnetotérmico, de 3 módulos, tripolar (3P), intensidad nominal 32 A, poder de corte 6 kA, curva C, de 54x80x77,8 mm, grado de protección IP20, montaje sobre carril DIN (35 mm) y fijación a carril mediante garras. Totalmente montado, conexionado y probado. | | | | | | | | |
| | Incluye: Montaje y conexionado del elemento. | | | | | | | | |
| | Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto. | | | | | | | | |
| | Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de Proyecto. | | | | | | | | |
| | tomas 32 | 2 | | | | 2,00 | | | |
| | | | | | | | 2,00 | | |

| CÓDIGO | RESUMEN | UDS | LONGITUD | ANCHURA | ALTURA | PARCIALES | CANTIDAD | PRECIO | IMPORTE |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2,000 | 72,87 | 145,74 |
| **U10060110_4** | **Ud Interruptor automático magnetotérmico 10A 3P** | | | | | | | | |
| | Interruptor automático magnetotérmico, de 3 módulos, tripolar (3P), intensidad nominal 10 A, poder de corte 6 kA, curva C, de 54x80x77,8 mm, grado de protección IP20, montaje sobre carril DIN (35 mm) y fijación a carril mediante garras. Totalmente montado, conexionado y probado. Incluye: Montaje y conexionado del elemento. Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto. Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de Proyecto. | | | | | | | | |
| | Reja | 1 | | | | 1,00 | | | |
| | | | | | | | 1,00 | | |
| | | | | | | | 1,000 | 63,52 | 63,52 |
| **U10031190** | **m Cable AL XZ1 (S), tensión nominal 0,6/1 kV 1x95 mm2 AL** | | | | | | | | |
| | Cable eléctrico unipolar tipo AL XZ1 (S), tensión nominal 0,6/1 kV, de seguridad en caso de incendio (S), reacción al fuego clase Eca, con conductor de aluminio, rígido (clase 2), de 1x95 mm² cubierta de material libre de halógenos, con las siguientes características: no propagación de la llama, baja emisión de humos opacos, libre de halógenos, nula emisión de gases corrosivos, resistencia a la absorción de agua, resistencia al frío, resistencia a los rayos ultravioleta, resistencia a los agentes químicos, resistencia a las grasas y aceites y resistencia a los golpes. Según HD 603-5X-1. | | | | | | | | |
| | Acometida | 4 | 30,00 | | | 120,00 | | | |
| | | | | | | | 120,00 | | |
| | | | | | | | 120,000 | 3,53 | 423,60 |
| **U10040080** | **m Canaliz. eléctrica Polímero termoplástico libre de halógenos ríg** | | | | | | | | |
| | Canalización eléctrica de superficie para conducción de cables a base de tubo de Polímero termoplástico libre de halógenos rígido libre de halógenos, no propagador de llama, M 20, roscable, grapado sobre hormigón, con tres abrazaderas de acero plastificadas, tres tacos de plástico y tres tirafondos de acero inoxidable. | | | | | | | | |
| | Distribución eléctrica | 1 | 165,00 | | | 165,00 | | | |
| | | | | | | | 165,00 | | |
| | | | | | | | 165,000 | 8,54 | 1.409,10 |
| **U10040510** | **ud Caja estanca poliéster inyectado 80x80x45 mm** | | | | | | | | |
| | Suministro y montaje de caja estanca en poliéster inyectado de 80x80x45 mm, IP-55, totalmente instalada, incluyendo prensaestopas, fijaciones inoxidables y bornas de conexión. | | | | | | | | |
| | Alumbrado | 11 | | | | 11,00 | | | |
| | Reja | 2 | | | | 2,00 | | | |
| | TC cuarto eléctrico | 1 | | | | 1,00 | | | |
| | | | | | | | 14,00 | | |
| | | | | | | | 14,000 | 12,17 | 170,38 |
| **U10040520** | **ud Caja estanca poliéster inyectado 105x105x55 mm** | | | | | | | | |
| | Suministro y montaje de caja estanca en poliéster inyectado de 105x105x55 mm, IP-55, totalmente instalada, incluyendo prensaestopas, fijaciones inoxidables y bornas de conexión. | | | | | | | | |
| | TC | 3 | | | | 3,00 | | | |
| | | | | | | | 3,00 | | |
| | | | | | | | 3,000 | 15,80 | 47,40 |
| **U10040570** | **ud Caja estanca poliéster inyectado 220x170x140 mm** | | | | | | | | |
| | Suministro y montaje de caja estanca en poliéster inyectado de 220x170x140 mm, IP-55, totalmente instalada, incluyendo prensaestopas, fijaciones inoxidables y bornas de conexión. | | | | | | | | |
| | General | 2 | | | | 2,00 | | | |
| | | | | | | | 2,00 | | |
| | | | | | | | 2,000 | 71,05 | 142,10 |
| **U10040010** | **m Canaliz. subterránea aceras** | | | | | | | | |
| | Canalización subterránea en acera, para cables de baja tensión bajo tubo, comprendiendo zanja de 0,60x0,60 m, sobre lecho de hormigón y hormigonado hasta rasante de calzada, con reposición de firme asfáltico, incluyendo excavación y relleno de zanja, cables de acero pasa-guía, cinta de señalización de canalización eléctrica, dos tubos de PE-AD corrugado curvable 160 mm y corchetes. | | | | | | | | |
| | Acomerida | 1 | 1,50 | | | 1,50 | | | |
| | | | | | | | 1,50 | | |
| | | | | | | | 1,500 | 49,85 | 74,78 |
| **U10040020** | **m Canaliz. subterránea calzada** | | | | | | | | |

| CÓDIGO | RESUMEN | UDS | LONGITUD | ANCHURA | ALTURA | PARCIALES | CANTIDAD | PRECIO | IMPORTE |
|---|---|---|---|---|---|---|---|---|---|
| | Canalización subterránea en calzada, para cables de baja tensión bajo tubo, comprendiendo zanja de 0,60x0,60 m, sobre lecho de hormigón y hormigonado hasta rasante de calzada, con reposición de firme asfáltico, incluyendo excavación y relleno de zanja, cables de acero pasa-guía, cinta de señalización de canalización eléctrica, dos tubos de PE-AD corrugado curvable 160 mm y corchetes. | | | | | | | | |
| | Acometida | 1 | 5,00 | | | 5,00 | | | |
| | | | | | | | 5,00 | | |
| | | | | | | | 5,000 | 73,93 | 369,65 |
| **U10040030** | **m Canaliz. sub. ter. medio hormigonada** | | | | | | | | |
| | Canalización subterránea en terreno medio hormigonada, para cables de baja tensión bajo tubo, comprendiendo zanja de 0,60x0,60 m, embutidos en dado de hormigón de 0,60x0,40 m, incluyendo excavación y relleno de zanja, cables de acero pasa-guía, cinta de señalización de canalización eléctrica, dos tubos de PE-AD corrugado curvable 160 mm y corchetes. | | | | | | | | |
| | Acometida | 1 | 15,00 | 3,00 | | 45,00 | | | |
| | | | | | | | 45,00 | | |
| | | | | | | | 45,000 | 68,57 | 3.085,65 |
| **U10040060** | **ud Arq. hormigón pref. 1x1x1 m** | | | | | | | | |
| | Arqueta de hormigón prefabricada para canalización de baja tensión de 1,00x1,00x1,00 m con tapa de hormigón totalmente instalada. | | | | | | | | |
| | Acomerida | 2 | | | | 2,00 | | | |
| | | | | | | | 2,00 | | |
| | | | | | | | 2,000 | 230,09 | 460,18 |
| **IEX405** | **Ud Armario de distribución, modular.** | | | | | | | | |
| | Armario de distribución metálico, de superficie, con puerta ciega, grado de protección IP40, aislamiento clase II, de 1050x650x250 mm, apilable con otros armarios, con techo, suelo y laterales desmontables por deslizamiento (sin tornillos), cierre de seguridad, escamoteable, con llave, acabado con pintura epoxi, microtexturizado. Totalmente montado.<br>Incluye: Colocación y fijación del elemento.<br>Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto.<br>Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de Proyecto. | | | | | | | | |
| | CGBT | 1 | | | | 1,00 | | | |
| | | | | | | | 1,00 | | |
| | | | | | | | 1,000 | 555,42 | 555,42 |
| **U10040670_1** | **Ud Caja de protección y medida.** | | | | | | | | |
| | Suministro e instalación en el interior de hornacina mural, en vivienda unifamiliar o local, de caja de protección y medida CPM2-E4, de hasta 63 A de intensidad, para 1 contador trifásico, formada por una envolvente aislante, precintable, autoventilada y con mirilla de material transparente resistente a la acción de los rayos ultravioletas, para instalación empotrada. Incluso equipo completo de medida, bornes de conexión, bases cortacircuitos y fusibles para protección de la derivación individual. Normalizada por la empresa suministradora y preparada para acometida subterránea. Totalmente montada, conexionada y probada.<br>Incluye: Replanteo de la situación de los conductos y anclajes de la caja. Fijación. Colocación de tubos y piezas especiales. Conexionado.<br>Criterio de medición de proyecto: Número de unidades previstas, según documentación gráfica de Proyecto.<br>Criterio de medición de obra: Se medirá el número de unidades realmente ejecutadas según especificaciones de Proyecto. | | | | | | | | |
| | | 1 | | | | 1,00 | | | |
| | | | | | | | 1,00 | | |
| | | | | | | | 1,000 | 311,28 | 311,28 |
| **U15060060** | **ud Legalización instalación de baja tensión** | | | | | | | | |
| | Legalización de la instalaciones de Baja Tensión, según la legislación vigente que le sea de aplicación, incluso proyecto técnico, suscrito por técnico titulado competente y visado por el Colegio Oficial correspondiente, Certificado de Dirección de Obra Eléctrica, Certificado de Instalación Eléctrica en Baja Tensión (antiguo Dictamen o Boletín eléctrico), Certificado de Inspección por Organismo de Control, Declaraciones responsables según modelos DGIEM, abono de tasas oficiales y cualquier otra documentación y gestión necesaria ante Organismos competentes para la Autorización y puesta en servicio de la instalación. | | | | | | | | |
| | | 1 | | | | 1,00 | | | |
| | | | | | | | 1,00 | | |

| CÓDIGO | RESUMEN | UDS | LONGITUD | ANCHURA | ALTURA | PARCIALES | CANTIDAD | PRECIO | IMPORTE |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 1,000 | 4.000,00 | 4.000,00 |
| **U10070010** | **ud Toma de tierra normal con una pica** | | | | | | | | |
| | Toma de tierra normal, compuesta de: una pica de acero cobre de 2,5 m de longitud y 18 mm de diámetro, 3 metros de cable de cobre de 50 mm2 de sección y grapas de conexión a la pica. Montaje completo. | | | | | | | | |
| | | 4 | | | | 4,00 | | | |
| | | | | | | | 4,00 | | |
| | | | | | | | 4,000 | 169,84 | 679,36 |
| | **TOTAL APARTADO 01.6.3 PLC + INSTALACIÓN ELÉCTRICA** | | | | | | | | **107.181,39** |
| | **APARTADO 01.6.4 INSTALACIÓN SANEAMIENTO** | | | | | | | | |
| **U02090010** | **m Tubería PVC-O DN 110 PN 16** | | | | | | | | |
| | Suministro e instalación de tubería de PVC-O 500, de diámetro nominal DN 110 mm, presión nominal PN 16, MRS 50 N/mm2, SDR 45,8 y S 22,4, conforme a la norma UNE-ISO 16422 y/o según normativa vigente, color exterior y marcado según Normas de Canal de Isabel II vigentes, incluso parte proporcional de unión por junta elástica, medios auxiliares y pruebas necesarias para su correcto funcionamiento. | | | | | | | | |
| | Colector exterior pluviales | 1 | 8,60 | | | 8,60 | | | |
| | | 1 | 8,00 | | | 8,00 | | | |
| | | | | | | | 16,60 | | |
| | | | | | | | 16,600 | 10,39 | 172,47 |
| **U05090220** | **ud Sumidero evacuac. aguas 30x30x50 1/2** | | | | | | | | |
| | Sumidero para evacuación de aguas de dimensiones interiores 30x30x50 cm, realizada con fábrica de ladrillo perforado de 1/2 pie de espesor, recibido con mortero de cemento 1:6, sobre solera de hormigón HM 20/P/20/I de 15 cm de espesor, enfoscado y bruñido interiormente, incluso marco y rejilla de fundición. | | | | | | | | |
| | Solera exterior edificación | 1 | 2,00 | | | 2,00 | | | |
| | | | | | | | 2,00 | | |
| | | | | | | | 2,000 | 87,69 | 175,38 |
| | **TOTAL APARTADO 01.6.4 INSTALACIÓN SANEAMIENTO...** | | | | | | | | **347,85** |
| | **TOTAL SUBCAPÍTULO 01.6 EQUIPOS E INSTALACIONES ..** | | | | | | | | **191.809,71** |
| | **SUBCAPÍTULO 01.7 URBANIZACIÓN EXTERIOR** | | | | | | | | |
| | **APARTADO 01.7.1 PAVIMENTACIÓN** | | | | | | | | |
| **U01030160** | **m3 Terraplén suelo seleccionado préstamos** | | | | | | | | |
| | Terraplén formado con suelos seleccionados procedentes de préstamos, incluso aportación, nivelación y compactación al 95% P.M., medido sobre perfil. | | | | | | | | |
| | Zona delantera edificación | 1 | 5,50 | 4,30 | 0,60 | 14,19 | | | |
| | Formación rampa | 1 | 14,20 | | 0,30 | 4,26 | | | |
| | Zona Lateral edificación | 1 | 18,20 | | | 18,20 | | | |
| | | | | | | | 36,65 | | |
| | | | | | | | 36,650 | 7,53 | 275,97 |
| **ANS010** | **m² Solera de hormigón.** | | | | | | | | |
| | Solera de hormigón con malla electrosoldada de 20 cm de espesor, realizada con hormigón HA-30/F/20/X0+XF2 fabricado en central, con malla electrosoldada superior como armadura de reparto, ME 10x10 Ø 5-5 B 500 T 6x2,20 UNE-EN 10080 y con malla electrosoldada inferior, ME 20x20 Ø 5-5 B 500 T 6x2,20 UNE-EN 10080, extendido y vibrado manual mediante regla vibrante, sin tratamiento de su superficie y posterior aplicación de agente filmógeno, (0,15 l/m²); con juntas de retracción de 5 mm de espesor, mediante corte con disco de diamante. Incluso panel de poliestireno expandido de 3 cm de espesor, para la ejecución de juntas de dilatación. El precio no incluye la base de la solera. | | | | | | | | |
| | Zona delantera edificación | 1 | 5,50 | 4,30 | | 23,65 | | | |
| | Formación rampa | 1 | 14,20 | | | 14,20 | | | |
| | Zona Lateral edificación | 1 | 18,20 | | | 18,20 | | | |
| | | | | | | | 56,05 | | |

| CÓDIGO | RESUMEN | UDS | LONGITUD | ANCHURA | ALTURA | PARCIALES | CANTIDAD | PRECIO | IMPORTE |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 56,050 | 44,89 | 2.516,08 |
| | **TOTAL APARTADO 01.7.1 PAVIMENTACIÓN.....** | | | | | | | | **2.792,05** |
| | **APARTADO 01.7.2 CERRAMIENTO** | | | | | | | | |
| **U09080010_01** | **m Cerramiento muro bloques hormigón y malla simple torsión** | | | | | | | | |
| | Cerramiento de muro de 220 cm de altura formado por 120 cm bloques huecos de hormigón visto blanco, de 40x20x20 cm, rellenos de HM-20 y 100 cm de malla de simple torsión galvanizada 50/16, de 50 mm de paso de malla y 2,7 mm de diámetro. Incluso cimentación de 40x40 cm de hormigón HM-20, y p.p. de postes de tubo de acero galvanizado de 48 mm, postes de esquina, jabalcones, tornapuntas, tensores, grupillas y accesorios. Totalmente terminado. | | | | | | | | |
| | Zona delantera-rampa-lateral | 1 | 26,65 | | | 26,65 | | | |
| | | | | | | | 26,65 | | |
| | | | | | | | 26,650 | 97,24 | 2.591,45 |
| **mE15VPM030** | **ud PUERTA 4,00x2,00 40/14 STD** | | | | | | | | |
| | Puerta de 1 hoja de 4,00x2,00 m. para cerramiento exterior, con bastidor de tubo de acero laminado en frío de 40x40 mm. y malla S/T galvanizada en caliente 40/14 STD, i/herrajes de colgar y seguridad, elaborada en taller, ajuste y montaje en obra. (sin incluir recibido de albañilería). | | | | | | | | |
| | Acceso a tanque | 1 | | | | 1,000 | | | |
| | | | | | | | 1,000 | 349,12 | 349,12 |
| | **TOTAL APARTADO 01.7.2 CERRAMIENTO .....** | | | | | | | | **2.940,57** |
| | **APARTADO 01.7.3 ACOMETIDAS** | | | | | | | | |
| **U01021010** | **m3 Excavación a cielo abierto, med. mecán. terreno blando** | | | | | | | | |
| | Excavación a cielo abierto, por medios mecánicos, en terreno blando (suelo con golpeo en el ensayo SPT menor o igual que 10 golpes / 30 cm), medido sobre perfil. | | | | | | | | |
| | | 2 | 65,00 | 0,40 | 1,00 | 52,00 | | | |
| | | | | | | | 52,000 | 2,72 | 141,44 |
| **U01030070** | **m3 Relleno zanja propios selec. Tmax 30 mm** | | | | | | | | |
| | Relleno de zanjas con suelos seleccionados, tamaño máximo 30 mm, procedentes de la propia excavación, incluso aportación, extendido y compactación hasta una densidad del 95% P.M., medido sobre perfil. | | | | | | | | |
| | | 2 | 65,00 | 0,40 | 1,00 | 52,00 | | | |
| | | | | | | | 52,000 | 7,95 | 413,40 |
| **U02050010** | **m Tubería polietileno PE-100, PN 16, DN 25** | | | | | | | | |
| | Suministro e instalación de tubería de polietileno PE-100, diámetro nominal DN 25 mm, presión nominal PN 16, MRS 10 N/mm2, SDR 11 y S 5, conforme a norma UNE-EN 12201 y/o según normativa vigente, color exterior y marcado según Normas de Canal de Isabel II vigentes, incluso parte proporcional de elementos electrosoldables, medios auxiliares y pruebas necesarias para su correcto funcionamiento. | | | | | | | | |
| | | 1 | 65,00 | | | 65,00 | | | |
| | | | | | | | 65,000 | 0,85 | 55,25 |
| **E17ABT110** | **m LÍNEA ACOMETIDA TRIFÁSICA ALUMINIO 4x50 mm2** | | | | | | | | |
| | Línea eléctrica de acometida trifásica de 4x50 mm2 de sección, sobre canalización (no incluida), formada por conductores unipolares aislados de aluminio, con aislamiento en polietileno reticulado (XLPE) y cubierta en PVC, para una tensión nominal de 0,6/1kV, de conductor tipo RV y clase de reacción al fuego Eca, conforme a EN 50575:2014+A1:2016 (CPR CE EU-305/2011). Totalmente instalada; i/p.p. de conexiones y medios auxiliares. Conforme a REBT: ITC-BT-07, ITC-BT-09 e ITC-BT-11. | | | | | | | | |
| | | 1 | 65,000 | | | 65,000 | | | |
| | | | | | | | 65,000 | 14,22 | 924,30 |
| **E17ABC010** | **m CANALIZ. ACOMET. ELÉCTR. 50x80 cm ACERA 2x160 mm** | | | | | | | | |
| | Canalización subterránea enterrada bajo acera, en zanja de 50 cm de ancho y 80 cm de profundidad de dimensiones mínimas, para acometida eléctrica en baja tensión; formada por 2 tubos de polietileno | | | | | | | | |

| CÓDIGO | RESUMEN | UDS | LONGITUD | ANCHURA | ALTURA | PARCIALES | CANTIDAD | PRECIO | IMPORTE |
|---|---|---|---|---|---|---|---|---|---|
| | corrugado de alta densidad de doble pared (línea + reserva) de 160 mm de diámetro. Incluye apertura y excavación de la zanja por medios mecánicos, formación de cuna de arena de río de 5 cm de espesor, colocación de los tubos, relleno de costados y tapado de tubos con arena de río, colocación de cinta de señalización, y relleno de zanja y compactado con las tierras procedentes de la excavación, hasta el nivel base del pavimento (solera, acera, etc). Totalmente terminada; i/p.p. de limpieza y medios auxiliares. | 1 | 65,000 | | | 65,000 | | | |
| | | | | | | | 65,000 | 31,04 | 2.017,60 |
| **mU13AQ030-M** | **ud ARMARIO APM-6 PROTECCIÓN CGP + PLC** | | | | | | | | |
| | Armario APM-6, instalado. incluida obra civil y salidas. Para colocación de cuadro CGP y PLC | 1 | | | | 1,000 | | | |
| | | | | | | | 1,000 | 2.667,91 | 2.667,91 |
| **mE21CG010** | **ud PUNTO DE TOMA DE AGUA SOBRE SOPORTE VERTICAL DE 1.50 M DE ALTURA** | | | | | | | | |
| | Suministro y colocación de grifo de1/2" de diámetro, para manguera, colocado roscado, totalmente equipado, instalado y funcionando.inlcuyendo arqueta con válvula de corte en pie de soporte y soporte verticval de acero de sujección. | | | | | | | | |
| | Acometida abstecimiento de agua | 1 | | | | 1,000 | | | |
| | | | | | | | 1,000 | 522,80 | 522,80 |
| | **TOTAL APARTADO 01.7.3 ACOMETIDAS.....** | | | | | | | | **6.742,70** |
| | **TOTAL SUBCAPÍTULO 01.7 URBANIZACIÓN EXTERIOR .....** | | | | | | | | **12.475,32** |
| | **TOTAL CAPÍTULO 01 TANQUE DE TORMENTAS .....** | | | | | | | | **664.302,43** |

| CÓDIGO | RESUMEN | UDS | LONGITUD | ANCHURA | ALTURA | PARCIALES | CANTIDAD | PRECIO | IMPORTE |
|---|---|---|---|---|---|---|---|---|---|
| | **CAPÍTULO 02 COLECTORES EXTERIORES** | | | | | | | | |
| | **SUBCAPÍTULO 02.1 ENTRADA PLUVIALES** | | | | | | | | |
| | **APARTADO 02.1.1 MOVIMIENTO DE TIERRAS** | | | | | | | | |
| **U01022020** | **m3 Excavación en zanja, med. mecán. terreno medio** | | | | | | | | |
| | Excavación en zanja, por medios mecánicos, en terreno medio (suelo con golpeo en el ensayo SPT entre 10 y 30 golpes / 30 cm), medido sobre perfil. | | | | | | | | |
| | TUBERÍA DN 500 | | | | | | | | |
| | Colector entrada | 1,2 | 15,00 | 2,00 | 3,00 | 108,00 | | | |
| | | | | | | | 108,000 | 12,86 | 1.388,88 |
| **U01023020** | **m3 Excavación en pozo, med. mecán. terreno medio** | | | | | | | | |
| | Excavación en pozo, por medios mecánicos, en terreno medio (suelo con golpeo en el ensayo SPT entre 10 y 30 golpes / 30 cm), medido sobre perfil. | | | | | | | | |
| | Pozo de entrada a tanque | 1 | 2,00 | 3,00 | 3,00 | 18,00 | | | |
| | | | | | | | 18,000 | 18,63 | 335,34 |
| **U01040040** | **m2 Refino nivelación fondo zanjas** | | | | | | | | |
| | Refino, nivelación y apisonado de fondo de zanja para asiento de tubería, por cualquier procedimiento, incluso limpieza. | | | | | | | | |
| | TUBERÍA DN 500 | | | | | | | | |
| | Colector entrada | 1 | 15,00 | 2,00 | | 30,00 | | | |
| | | | | | | | 30,000 | 2,46 | 73,80 |
| **U01030020** | **m3 Grava o gravilla en rellenos o asiento de tubería** | | | | | | | | |
| | Grava o gravilla en rellenos o asiento de tubería, por cualquier procedimiento, de tamaño máximo 25 mm, exenta de materia orgánica, con contenido de sulfatos inferior al 0,3%, expresado en trióxido de azufre, incluso aportación, extendido y nivelación, medido sobre perfil. | | | | | | | | |
| | TUBERÍA DN 500 | | | | | | | | |
| | Colector entrada | 1 | 15,00 | 2,00 | 1,00 | 30,00 | | | |
| | | | | | | | 30,000 | 18,69 | 560,70 |
| **U01030050** | **m3 Relleno zanja propios adecuad. Tmax 150 mm** | | | | | | | | |
| | Relleno de zanjas con suelos adecuados, tamaño máximo 150 mm, procedentes de la propia excavación, incluso aportación, extendido y compactación hasta una densidad del 100% P.M., medido sobre perfil. | | | | | | | | |
| | Excavación zanja | 1 | | | | 108,00 | =02.1.1 | U01022020 | |
| | Relleno grava | -1 | | | | -30,00 | =02.1.1 | U01030020 | |
| | | | | | | | 78,000 | 7,95 | 620,10 |
| **U01030340** | **m3 Relleno trasdós muros suelos adecuados de excavación** | | | | | | | | |
| | Relleno localizado en trasdós de muros con suelos adecuados procedentes de la excavación, incluso aportación, extendido, humectación y compactación en capas de 30 cm de espesor, con un grado de compactación del 95% del P.M. | | | | | | | | |
| | Pozo de entrada a tanque | 1 | | | | 18,00 | =02.1.1 | U01023020 | |
| | | | | | | | 18,000 | 5,53 | 99,54 |
| **U01025100** | **m2 Entibación cuajada zanjas o pozos con paneles acero hasta 6 m** | | | | | | | | |
| | Entibación metálica cuajada en zanjas y pozos, hasta 6 m de profundidad, con paneles de chapa de acero, amortizables en 400 puestas, incluso p.p. de codales extensibles metálicos y medios auxiliares. | | | | | | | | |
| | TUBERÍA DN 500 | | | | | | | | |
| | Colector entrada | 2 | 15,00 | | 3,00 | 90,00 | | | |
| | | | | | | | 90,000 | 23,84 | 2.145,60 |
| | **TOTAL APARTADO 02.1.1 MOVIMIENTO DE TIERRAS.....** | | | | | | | | **5.223,96** |

| CÓDIGO | RESUMEN | UDS | LONGITUD | ANCHURA | ALTURA | PARCIALES | CANTIDAD | PRECIO | IMPORTE |
|---|---|---|---|---|---|---|---|---|---|
| | **APARTADO 02.1.2 OBRAS DE FÁBRICA** | | | | | | | | |
| **U05030150** | **ud Pozo de registro diámetro interior 1100 mm y 1<H<2m profun., enf** | | | | | | | | |
| | Pozo de registro, diámetro interior 1100 mm de entre 1,00 y 2,00 m de profundidad, construido con fábrica de ladrillo macizo de 1 pie de espesor, recibido con mortero M-10, colocado sobre solera de hormigón HA-25/P/40/I de 0,30 m mínimo de espesor, armada con mallazo; enfoscado interior y exterior fratasado con mortero hidrófugo bruñido en toda su altura con mortero CS-IV-Wc2. Incluso colocado, totalmente terminado y p. p. de formación de cuna en el fondo del pozo, formación de brocal asimétrico en la coronación para recibir cerco y tapa y medios auxiliares. | | | | | | | | |
| | Pozo de entrada a tanque | 1 | | | | 1,00 | | | |
| | | | | | | | 1,00 | | |
| | | | | | | | 1,000 | 812,64 | 812,64 |
| **U05030080** | **m En exceso para pozo de registro, diámetro interior 100 cm y prof** | | | | | | | | |
| | En exceso para pozo de registro, diámetro interior 1000 mm y profundidad > 3,10 m, formado por piezas prefabricadas de hormigón armado, recibido y sellado de juntas de piezas prefabricadas con M-350, incluso pates totalmente terminado. | | | | | | | | |
| | Pozo de entrada a tanque | 1 | | | | 1,00 | | | |
| | | | | | | | 1,000 | 385,64 | 385,64 |
| **U05070110** | **ud Tapa de registro de fundición dúctil, clase D 400 tráfico medio** | | | | | | | | |
| | Tapa de registro de fundición dúctil, clase D 400 para tráfico medio, conforme a norma UNE 124, de 600 mm. de luz libre, con bloqueo automático, tapa articulada, junta anti ruido para asiento estable de la tapa, con dispositivo acerrojado y antirrobo, enrasada con la superficie, marcado con identificación de Canal de Isabel II y servicio correspondiente (Abastecimiento, Saneamiento, Reutilización), incluso marco y anclaje, colocada en obra, totalmente instalada. | | | | | | | | |
| | Pozo de entrada a tanque | 1 | | | | 1,00 | | | |
| | | | | | | | 1,000 | 244,38 | 244,38 |
| **U05090240** | **ud Pate polipropileno con alma de acero** | | | | | | | | |
| | Pate con alma de acero recubierto de polipropileno, conforme a la norma UNE-EN 13101 y/o según normativa vigente, para acceso a pozos de registro, totalmente colocado, incluso taco químico, anclaje químico o resina. | | | | | | | | |
| | Pozo de entrada a tanque | 10 | | | | 10,00 | | | |
| | | | | | | | 10,00 | | |
| | | | | | | | 10,000 | 13,91 | 139,10 |
| | **TOTAL APARTADO 02.1.2 OBRAS DE FÁBRICA.....** | | | | | | | | **1.581,76** |
| | **APARTADO 02.1.3 TUBERÍAS** | | | | | | | | |
| **U02080040** | **m Tubería PVC-U DN 500, SN 8 kN/m2** | | | | | | | | |
| | Suministro e instalación de tubería de PVC-U de pared estructurada, rigidez nominal SN>= 8 kN/m2, de diámetro nominal DN 500 mm, conforme a norma UNE-EN 13476 y/o según normativa vigente, incluso parte proporcional de unión con junta elástica, medios auxiliares y pruebas necesarias para su correcto funcionamiento. | | | | | | | | |
| | Colector entrada | 1 | 15,00 | | | 15,00 | | | |
| | | | | | | | 15,000 | 156,93 | 2.353,95 |
| **mU09C090** | **ud ENTRONQUE ACOMET. TUBULAR POZO ALCANTAR. O COLECTOR** | | | | | | | | |
| | Entronque de acometida tubular, a pozo de alcantarillado, o colector existente, inlcuida la demolición de calzada y acera hsta la conexión con el pozo en la calle,la posterior reposición del pavimento y el transporte y gestión de los residuos. | | | | | | | | |
| | | 1 | | | | 1,000 | | | |
| | | | | | | | 1,000 | 294,96 | 294,96 |
| **U01030350** | **m Banda de señalización** | | | | | | | | |
| | Banda de señalización, según normas o especificaciones técnicas de Canal de Isabel II vigentes. | | | | | | | | |
| | TUBERÍA DN 630 | | | | | | | | |
| | Colector entrada | 1 | 15,00 | | | 15,00 | | | |
| | | | | | | | 15,000 | 0,28 | 4,20 |

| CÓDIGO | RESUMEN | UDS | LONGITUD | ANCHURA | ALTURA | PARCIALES | CANTIDAD | PRECIO | IMPORTE |
|---|---|---|---|---|---|---|---|---|---|
| | **TOTAL APARTADO 02.1.3 TUBERÍAS .....** | | | | | | | | **2.653,11** |
| | **TOTAL SUBCAPÍTULO 02.1 ENTRADA PLUVIALES .....** | | | | | | | | **9.458,83** |

## SUBCAPÍTULO 02.2 SALIDA PLUVIALES

### APARTADO 02.2.1 MOVIMIENTO DE TIERRAS

**U01022020** **m3 Excavación en zanja, med. mecán. terreno medio**

Excavación en zanja, por medios mecánicos, en terreno medio (suelo con golpeo en el ensayo SPT entre 10 y 30 golpes / 30 cm), medido sobre perfil.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Colector salida tanque | | | | | | | | |
| Tubería PVC-U DN 630, SN 8 kN/m2 | | | | | | | | |
| P1-P2 | 1,2 | 14,68 | 2,00 | 1,70 | 59,89 | | | |
| P2-P3 | 1,2 | 9,83 | 2,00 | 3,87 | 91,30 | | | |
| Marco prefabricado visitable tipo HA30P/12 de 1,00x1,80 m S/R | | | | | | | | |
| P3-P4 | 1,2 | 27,90 | 3,00 | 5,06 | 508,23 | | | |
| P4-P4bis | 1,2 | 18,16 | 3,00 | 5,65 | 369,37 | | | |
| P4bis-P5 | 1,2 | 28,64 | 3,00 | 5,60 | 577,38 | | | |
| P5-P6 | 1,2 | 50,00 | 3,00 | 5,02 | 903,60 | | | |
| Tubería PVC-U DN 630, SN 8 kN/m2 | | | | | | | | |
| P6-P7 | 1,2 | 50,00 | 2,00 | 2,93 | 351,60 | | | |
| Marco prefabricado visitable tipo HA30P/12 de 1,00x1,80 m S/R | | | | | | | | |
| Tramo P-10 a Tanque | 1,2 | 20,00 | 10,00 | 7,50 | 1.800,00 | | | |
| | | | | | | 4.661,370 | 12,86 | 59.945,22 |

**U01023020** **m3 Excavación en pozo, med. mecán. terreno medio**

Excavación en pozo, por medios mecánicos, en terreno medio (suelo con golpeo en el ensayo SPT entre 10 y 30 golpes / 30 cm), medido sobre perfil.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| P-1 | 1 | 3,00 | 3,00 | 1,50 | 13,50 | | | |
| P-2 | 1 | 3,00 | 3,00 | 3,60 | 32,40 | | | |
| P-3 | 1 | 3,00 | 3,00 | 4,50 | 40,50 | | | |
| P-4 | 1 | 3,00 | 3,00 | 5,98 | 53,82 | | | |
| P-4 BIS | 1 | 3,00 | 3,00 | 5,70 | 51,30 | | | |
| P-5 | 1 | 3,00 | 3,00 | 5,90 | 53,10 | | | |
| P-6 | 1 | 3,00 | 3,00 | 4,55 | 40,95 | | | |
| P-7 | 1 | 3,00 | 3,00 | 1,70 | 15,30 | | | |
| | | | | | | 300,870 | 18,63 | 5.605,21 |

**U01040040** **m2 Refino nivelación fondo zanjas**

Refino, nivelación y apisonado de fondo de zanja para asiento de tubería, por cualquier procedimiento, incluso limpieza.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Colector salida tanque | | | | | | | | |
| Tubería PVC-U DN 630, SN 8 kN/m2 | | | | | | | | |
| P1-P2 | 1,2 | 14,68 | 2,00 | | 35,23 | | | |
| P2-P3 | 1,2 | 9,83 | 2,00 | | 23,59 | | | |
| Marco prefabricado visitable tipo HA30P/12 de 1,00x1,80 m S/R | | | | | | | | |
| P3-P4 | 1,2 | 27,90 | 3,00 | | 100,44 | | | |
| P4-P4bis | 1,2 | 18,16 | 3,00 | | 65,38 | | | |
| P4bis-P5 | 1,2 | 28,64 | 3,00 | | 103,10 | | | |
| P5-P6 | 1,2 | 50,00 | 3,00 | | 180,00 | | | |
| Tubería PVC-U DN 630, SN 8 kN/m2 | | | | | | | | |
| P6-P7 | 1,2 | 50,00 | 2,00 | | 120,00 | | | |
| Marco prefabricado visitable tipo HA30P/12 de 1,00x1,80 m S/R | | | | | | | | |
| Tramo P-10 a Tanque | 1,2 | 20,00 | 3,00 | | 72,00 | | | |
| | | | | | | 699,740 | 2,46 | 1.721,36 |

**U01030020** **m3 Grava o gravilla en rellenos o asiento de tubería**

Grava o gravilla en rellenos o asiento de tubería, por cualquier procedimiento, de tamaño máximo 25 mm, exenta de materia orgánica, con contenido de sulfatos inferior al 0,3%, expresado en trióxido de azufre, incluso aportación, extendido y nivelación, medido sobre perfil.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Colector salida tanque | | | | | | | | |
| Tubería PVC-U DN 630, SN 8 kN/m2 | | | | | | | | |

| CÓDIGO | RESUMEN | UDS | LONGITUD | ANCHURA | ALTURA | PARCIALES | CANTIDAD | PRECIO | IMPORTE |
|---|---|---|---|---|---|---|---|---|---|
| | P1-P2 | 1,2 | 14,68 | 2,00 | 1,00 | 35,23 | | | |
| | P2-P3 | 1,2 | 9,83 | 2,00 | 1,00 | 23,59 | | | |
| | Marco prefabricado visitable tipo HA30P/12 de 1,00x1,80 m S/R | | | | | | | | |
| | P3-P4 | 1,2 | 27,90 | 3,00 | 1,00 | 100,44 | | | |
| | P4-P4bis | 1,2 | 18,16 | 3,00 | 1,00 | 65,38 | | | |
| | P4bis-P5 | 1,2 | 28,64 | 3,00 | 1,00 | 103,10 | | | |
| | P5-P6 | 1,2 | 50,00 | 3,00 | 1,00 | 180,00 | | | |
| | Tubería PVC-U DN 630, SN 8 kN/m2 | | | | | | | | |
| | P6-P7 | 1,2 | 50,00 | 2,00 | 1,00 | 120,00 | | | |
| | Marco prefabricado visitable tipo HA30P/12 de 1,00x1,80 m S/R | | | | | | | | |
| | Tramo P-10 a Tanque | 1,2 | 20,00 | 10,00 | 1,00 | 240,00 | | | |
| | | | | | | | 867,740 | 18,69 | 16.218,06 |
| **U07010810** | **m3 HA-30/B/20/XC2,XC3 o HA-30/B/20/XC4 en elementos horizontales ve** | | | | | | | | |
| | Suministro y puesta en obra de hormigón HA-30/B/20/XC2,XC3 o HA-30/B/20/XC4 , elaborado en central y vertido con bomba en elementos horizontales de estructura (cimentaciones, soleras, vigas, etc.), incluso compactación, vibrado, curado y acabado. Según CE vigente. | | | | | | | | |
| | Marco prefabricado visitable tipo HA30P/12 de 1,00x1,80 m S/R | | | | | | | | |
| | P3-P4 | 1,2 | 27,90 | 3,00 | 0,20 | 20,09 | | | |
| | P4-P4bis | 1,2 | 18,16 | 3,00 | 0,20 | 13,08 | | | |
| | P4bis-P5 | 1,2 | 28,64 | 3,00 | 0,20 | 20,62 | | | |
| | P5-P6 | 1,2 | 50,00 | 3,00 | 0,20 | 36,00 | | | |
| | Tramo P-10 a Tanque | 1,2 | 20,00 | 3,00 | 0,20 | 14,40 | | | |
| | | | | | | | 104,190 | 121,78 | 12.688,26 |
| **U01030050** | **m3 Relleno zanja propios adecuad. Tmax 150 mm** | | | | | | | | |
| | Relleno de zanjas con suelos adecuados, tamaño máximo 150 mm, procedentes de la propia excavación, incluso aportación, extendido y compactación hasta una densidad del 100% P.M., medido sobre perfil. | | | | | | | | |
| | Excavación zanja | 1 | | | | 4.661,37 | | =02.2.1 | U01022020 |
| | Relleno grava | -1 | | | | -867,74 | | =02.2.1 | U01030020 |
| | | | | | | | 3.793,630 | 7,95 | 30.159,36 |
| **U01030340** | **m3 Relleno trasdós muros suelos adecuados de excavación** | | | | | | | | |
| | Relleno localizado en trasdós de muros con suelos adecuados procedentes de la excavación, incluso aportación, extendido, humectación y compactación en capas de 30 cm de espesor, con un grado de compactación del 95% del P.M. | | | | | | | | |
| | Pozos | 1 | | | | 300,87 | | =02.2.1 | U01023020 |
| | | | | | | | 300,870 | 5,53 | 1.663,81 |
| **U01025100** | **m2 Entibación cuajada zanjas o pozos con paneles acero hasta 6 m** | | | | | | | | |
| | Entibación metálica cuajada en zanjas y pozos, hasta 6 m de profundidad, con paneles de chapa de acero, amortizables en 400 puestas, incluso p.p. de codales extensibles metálicos y medios auxiliares. | | | | | | | | |
| | Colector salida tanque | | | | | | | | |
| | Tubería PVC-U DN 630, SN 8 kN/m2 | | | | | | | | |
| | P1-P2 | 2 | 14,68 | | 1,70 | 49,91 | | | |
| | P2-P3 | 2 | 9,83 | | 3,87 | 76,08 | | | |
| | Marco prefabricado visitable tipo HA30P/12 de 1,00x1,80 m S/R | | | | | | | | |
| | P3-P4 | 2 | 27,90 | | 5,06 | 282,35 | | | |
| | P4-P4bis | 2 | 18,16 | | 5,65 | 205,21 | | | |
| | P4bis-P5 | 2 | 28,64 | | 5,60 | 320,77 | | | |
| | P5-P6 | 2 | 50,00 | | 5,02 | 502,00 | | | |
| | Tubería PVC-U DN 630, SN 8 kN/m2 | | | | | | | | |
| | P6-P7 | 2 | 50,00 | | 2,93 | 293,00 | | | |
| | Marco prefabricado visitable tipo HA30P/12 de 1,00x1,80 m S/R | | | | | | | | |
| | Tramo P-10 a Tanque | 2 | 20,00 | | 7,50 | 300,00 | | | |
| | | 2 | 10,00 | | 7,50 | 150,00 | | | |
| | | | | | | | 2.179,320 | 23,84 | 51.954,99 |

**TOTAL APARTADO 02.2.1 MOVIMIENTO DE TIERRAS..... 179.956,27**

| CÓDIGO | RESUMEN | UDS | LONGITUD | ANCHURA | ALTURA | PARCIALES | CANTIDAD | PRECIO | IMPORTE |
|---|---|---|---|---|---|---|---|---|---|
| | **APARTADO 02.2.2 OBRAS DE FÁBRICA** | | | | | | | | |
| **U05030150** | **ud Pozo de registro diámetro interior 1100 mm y 1<H<2m profun., enf** | | | | | | | | |
| | Pozo de registro, diámetro interior 1100 mm de entre 1,00 y 2,00 m de profundidad, construido con fábrica de ladrillo macizo de 1 pie de espesor, recibido con mortero M-10, colocado sobre solera de hormigón HA-25/P/40/I de 0,30 m mínimo de espesor, armada con mallazo; enfoscado interior y exterior fratasado con mortero hidrófugo bruñido en toda su altura con mortero CS-IV-Wc2. Incluso colocado, totalmente terminado y p. p. de formación de cuna en el fondo del pozo, formación de brocal asimétrico en la coronación para recibir cerco y tapa y medios auxiliares. | | | | | | | | |
| | P-1 | 1 | | | | 1,00 | | | |
| | P-2 | 1 | | | | 1,00 | | | |
| | P-3 | 1 | | | | 1,00 | | | |
| | P-4 | 1 | | | | 1,00 | | | |
| | P-4 BIS | 1 | | | | 1,00 | | | |
| | P-5 | 1 | | | | 1,00 | | | |
| | P-6 | 1 | | | | 1,00 | | | |
| | P-7 | 1 | | | | 1,00 | | | |
| | | | | | | | 8,000 | 812,64 | 6.501,12 |
| **U05030080** | **m En exceso para pozo de registro, diámetro interior 100 cm y prof** | | | | | | | | |
| | En exceso para pozo de registro, diámetro interior 1000 mm y profundidad > 3,10 m, formado por piezas prefabricadas de hormigón armado, recibido y sellado de juntas de piezas prefabricadas con M-350, incluso pates totalmente terminado. | | | | | | | | |
| | P-2 | 1,5 | | | | 1,50 | | | |
| | P-3 | 2,5 | | | | 2,50 | | | |
| | P-4 | 4 | | | | 4,00 | | | |
| | P-4 BIS | 4 | | | | 4,00 | | | |
| | P-5 | 4 | | | | 4,00 | | | |
| | P-6 | 2,5 | | | | 2,50 | | | |
| | | | | | | | 18,500 | 385,64 | 7.134,34 |
| **U05070110** | **ud Tapa de registro de fundición dúctil, clase D 400 tráfico medio** | | | | | | | | |
| | Tapa de registro de fundición dúctil, clase D 400 para tráfico medio, conforme a norma UNE 124, de 600 mm. de luz libre, con bloqueo automático, tapa articulada, junta anti ruido para asiento estable de la tapa, con dispositivo acerrojado y antirrobo, enrasada con la superficie, marcado con identificación de Canal de Isabel II y servicio correspondiente (Abastecimiento, Saneamiento, Reutilización), incluso marco y anclaje, colocada en obra, totalmente instalada. | | | | | | | | |
| | P-1 | 1 | | | | 1,00 | | | |
| | P-2 | 1 | | | | 1,00 | | | |
| | P-3 | 1 | | | | 1,00 | | | |
| | P-4 | 1 | | | | 1,00 | | | |
| | P-4 BIS | 1 | | | | 1,00 | | | |
| | P-5 | 1 | | | | 1,00 | | | |
| | P-6 | 1 | | | | 1,00 | | | |
| | P-7 | 1 | | | | 1,00 | | | |
| | | | | | | | 8,000 | 244,38 | 1.955,04 |
| **U05090240** | **ud Pate polipropileno con alma de acero** | | | | | | | | |
| | Pate con alma de acero recubierto de polipropileno, conforme a la norma UNE-EN 13101 y/o según normativa vigente, para acceso a pozos de registro, totalmente colocado, incluso taco químico, anclaje químico o resina. | | | | | | | | |
| | P-1 | 5 | | | | 5,00 | | | |
| | P-2 | 12 | | | | 12,00 | | | |
| | P-3 | 14 | | | | 14,00 | | | |
| | P-4 | 19 | | | | 19,00 | | | |
| | P-4 BIS | 18 | | | | 18,00 | | | |
| | P-5 | 19 | | | | 19,00 | | | |
| | P-6 | 15 | | | | 15,00 | | | |
| | P-7 | 5 | | | | 5,00 | | | |
| | | | | | | | 107,000 | 13,91 | 1.488,37 |

| CÓDIGO | RESUMEN | UDS | LONGITUD | ANCHURA | ALTURA | PARCIALES | CANTIDAD | PRECIO | IMPORTE |
|---|---|---|---|---|---|---|---|---|---|
| **U07EA160** | **ud ALIVIADERO OBRA 2,50x2,00+1,70 m** | | | | | | | | |
| | Aliviadero para alcantarillado de dimensiones interiores 2,50x2,00 m y 2,10 m de altura libre interior, realizado sobre solera de hormigón en masa HM-20/P/40/I de 20 cm de espesor, incluso formación de pendientes, fábrica de ladrillo macizo de 1 pie de espesor, tomados con mortero de cemento, losa armada de 16 cm de canto y viga armada de 40 cm, realizadas con HA-25/P/20/I, enfoscada y bruñida interiormente con mortero CSIV-W2, y conducto de pozo, de 80 cm de diámetro y 1,70 m de altura, realizado con anillos de hormigón en masa, prefabricados, de borde machihembrado, y cono asimétrico para formación de brocal del pozo, con cierre de marco y tapa de fundición, de 62,5 cm de diámetro, i/sellado de juntas con mortero de cemento, recibido de pates y de cerco de tapa, y con medios auxiliares, sin incluir la excavación del pozo y su relleno perimetral posterior. Según UNE-EN 998-1:2010 y UNE-EN 998-2:2004. | | | | | | | | |
| | Punto de Vertido | 1 | | | | 1,00 | | | |
| | | | | | | | 1,000 | 1.191,02 | 1.191,02 |
| **U02V010** | **ud EMBOCADURA PARA CONDUCTO D=600 mm** | | | | | | | | |
| | Embocadura para conducto D=600 mm, formada por imposta de 0,40x0,20 m, aletas de h=0,90 m y espesor 0,30 m, con talud 2/1, cimientos de 0,50x0,50 m, solera entre aletas de espesor 0,25 m, incluyendo excavación, encofrado, hormigón HM-20 en cimientos y alzados, terminado. | | | | | | | | |
| | Punto de Vertido | 1 | | | | 1,00 | | | |
| | | | | | | | 1,000 | 442,14 | 442,14 |
| | **TOTAL APARTADO 02.2.2 OBRAS DE FÁBRICA.....** | | | | | | | | **18.712,03** |
| | **APARTADO 02.2.3 TUBERÍAS** | | | | | | | | |
| **U02080050** | **m Tubería PVC-U DN 630, SN 8 kN/m2** | | | | | | | | |
| | Suministro e instalación de tubería de PVC-U de pared estructurada, rigidez nominal SN>= 8 kN/m2, de diámetro nominal DN 630 mm, conforme a norma UNE-EN 13476 y/o según normativa vigente, incluso parte proporcional de unión con junta elástica, medios auxiliares y pruebas necesarias para su correcto funcionamiento. | | | | | | | | |
| | Colector salida tanque | | | | | | | | |
| | Tubería PVC-U DN 630, SN 8 kN/m2 | | | | | | | | |
| | P1-P2 | 1 | 14,68 | | | 14,68 | | | |
| | P2-P3 | 1 | 9,83 | | | 9,83 | | | |
| | P6-P7 | 1 | 50,00 | | | 50,00 | | | |
| | | | | | | | 74,510 | 171,66 | 12.790,39 |
| **U02040200** | **m Marco prefabricado visitable tipo HA30P/12 de 1,00x1,80 m S/R** | | | | | | | | |
| | Suministro y colocación de marco prefabricado visitable de hormigón armado tipo HA-30/P/12, resistente a los sulfatos, de 1,00 x 1,80 m, conforme a norma UNE-EN 14844 y/o incluso normativa vigente, incluso sellado de juntas interiores y exteriores con mortero tipo M-450, CEM-I 32,5/SR. | | | | | | | | |
| | Colector salida tanque | | | | | | | | |
| | Marco prefabricado visitable tipo | | | | | | | | |
| | HA30P/12 de 1,00x1,80 m S/R | | | | | | | | |
| | P3-P4 | 1 | 27,90 | | | 27,90 | | | |
| | P4-P4bis | 1 | 18,16 | | | 18,16 | | | |
| | P4bis-P5 | 1 | 28,64 | | | 28,64 | | | |
| | P5-P6 | 1 | 50,00 | | | 50,00 | | | |
| | Marco prefabricado visitable tipo | | | | | | | | |
| | HA30P/12 de 1,00x1,80 m S/R | | | | | | | | |
| | Tramo P-10 a Tanque | 1 | 20,00 | | | 20,00 | | | |
| | | | | | | | 144,700 | 553,99 | 80.162,35 |
| **U01026250** | **m Tubería hincada chapa de acero DN 800 escudo abierto** | | | | | | | | |
| | Tubería hincada de DN 800 mm de diámetro interior, de chapa de acero de espesor mínimo 0,8% del diámetro, revestida con al menos 300 micras de resina de poliuretano, conforme a la norma UNE-EN 10224 y/o normativa vigente, en cualquier clase de terreno incluso roca, con equipo de escudo abierto, extracción de los productos procedentes de la excavación totalmente colocada, incluso p.p. de juntas de estanquidad, inyecciones bentoníticas, demolición posterior de macizo, maquinaria y medios auxiliares, medido sobre perfil. | | | | | | | | |
| | Colector salida tanque | | | | | | | | |
| | Tramo P-7 a P-10 | 1 | 138,00 | | | 138,00 | | | |
| | | | | | | | 138,000 | 933,27 | 128.791,26 |

| CÓDIGO | RESUMEN | UDS | LONGITUD | ANCHURA | ALTURA | PARCIALES | CANTIDAD | PRECIO | IMPORTE |
|---|---|---|---|---|---|---|---|---|---|
| U01026330 | **ud Implantación, retirada y transporte escudo abierto acero <1500** | | | | | | | | |
| | Implantación, retirada y transporte de equipo perforador de escudo abierto para hinca de tubería de chapa de acero de diámetro interior inferior a 1500 mm. | 2 | | | | 2,00 | | | |
| | | | | | | | 2,000 | 1.538,47 | 3.076,94 |
| mU09C090 | **ud ENTRONQUE ACOMET. TUBULAR POZO ALCANTAR. O COLECTOR** | | | | | | | | |
| | Entronque de acometida tubular, a pozo de alcantarillado, o colector existente, inlcuida la demolición de calzada y acera hsta la conexión con el pozo en la calle,la posterior reposición del pavimento y el transporte y gestión de los residuos. | 1 | | | | 1,000 | | | |
| | | | | | | | 1,000 | 294,96 | 294,96 |
| U01030350 | **m Banda de señalización** | | | | | | | | |
| | Banda de señalización, según normas o especificaciones técnicas de Canal de Isabel II vigentes. | | | | | | | | |
| | Colector salida tanque | | | | | | | | |
| | Tubería PVC-U DN 630, SN 8 kN/m2 | 1 | | | | 74,51 | | =02.2.3 | U02080050 |
| | Marco prefabricado visitable tipo | 1 | | | | 144,70 | | =02.2.3 | U02040200 |
| | HA30P/12 de 1,00x1,80 m S/R | | | | | | | | |
| | | | | | | | 219,210 | 0,28 | 61,38 |

**TOTAL APARTADO 02.2.3 TUBERÍAS ..... 225.177,28**

**TOTAL SUBCAPÍTULO 02.2 SALIDA PLUVIALES..... 423.845,58**

**TOTAL CAPÍTULO 02 COLECTORES EXTERIORES..... 433.304,41**

| CÓDIGO | RESUMEN | UDS | LONGITUD | ANCHURA | ALTURA | PARCIALES | CANTIDAD | PRECIO | IMPORTE |
|---|---|---|---|---|---|---|---|---|---|
| | **CAPÍTULO 03 GESTIÓN DE RESIDUOS** | | | | | | | | |
| AABBCC | **ud Gestión de Residuos de Construcción y Demolición** | | | | | | | | |
| | Gestión integral de Residuos incluyendo la identificación de los residuos generados y Estimación de la cantidad de cada tipo que se genera en la obra codificados conforme a la Lista Europea de Residuos (Orden MAM/304/2002 del Ministerio de Medio Ambiente de 8 de febrero), medidas de segregación "in situ" previstas por el plan de gestión de residuos, operaciones de valorización "in situ" y de reutilización, destino de los residuos no valorables o reutilizables, según estudio de gestión de residuos incluido en el proyecto, pliego de prescripciones y Orden 2690/2006, de 28 de Julio, de la Comunidad de Madrid. | | | | | | | | |
| | s/Plan Gestión Residuos | 1 | | | | 1,000 | | | |
| | | | | | | | 1,000 | 11.460,23 | 11.460,23 |
| | **TOTAL CAPÍTULO 03 GESTIÓN DE RESIDUOS** | | | | | | | | **11.460,23** |

| CÓDIGO | RESUMEN | UDS | LONGITUD | ANCHURA | ALTURA | PARCIALES | CANTIDAD | PRECIO | IMPORTE |
|---|---|---|---|---|---|---|---|---|---|
| | **CAPÍTULO 04 SEGURIDAD Y SALUD** | | | | | | | | |
| C.19.8.1 | **Ud Seguridad y Salud**<br>PROTECCIONES INDIVIDUALES Y COLECTIVAS E INSTALACIONES DE HIGIENE Y BIENESTAR s/. Real Decreto 1627/97, de 24 de Octubre, por el que se establecen las disposiciones mínimas necesarias de seguridad y salud en las obras de construcción se han de disponer de las medidas de protección:<br>- Protecciones individuales con objeto de la prevención de los riesgos laborales, de los riesgos específicos en cada unos de los "tajos" relativos a las obras civiles, tales como cinturones, cascos, guantes, ropa adecuada de obras y equipamiento en general para protección de los trabajadores.<br>- Protecciones colectivas con objeto de la prevención de los riesgos laborales relativos a las obras civiles, tales como instalaciones provisionales de obra, vallados, señalización, balizado, entibaciones, zanjas y equipamiento en general para protecciones de obras.<br>- Instalaciones de higiene y bienestar, tales como casetas de obra, aseo, vestuarios, comedor, primeros auxilios y equipamiento en general para higiene y bienestar de obras. | | | | | | | | |
| | | 1 | | | | 1,000 | | | |
| | | | | | | | 1,000 | 13.980,00 | 13.980,00 |
| | **TOTAL CAPÍTULO 04 SEGURIDAD Y SALUD.....** | | | | | | | | **13.980,00** |
| | **TOTAL .....** | | | | | | | | **1.123.047,07** |

## RESUMEN DE PRESUPUESTO

De acuerdo con los precios establecidos por las diferentes unidades de obra, asciende el Presupuesto de Ejecución Material, a la expresada cantidad de **UN MILLÓN CIENTO VEINTITRES MIL CUARENTA Y SIETE EUROS CON SIETE CÉNTIMOS (1.123.047,07 €).**

| Nº Orden | Capítulo | Importe | Porcentaje del presupuesto |
|---|---|---|---|
| C01 | TANQUE DE TORMENTAS | 664.302,43 € | 59,15% |
| C02 | COLECTORES EXTERIORES | 433.304,41 € | 38,58% |
| C03 | GESTIÓN DE RESIDUOS | 11.460,23 € | 1,02% |
| C04 | SEGURIDAD Y SALUD | 13.980,00 € | 1,24% |
| TOTAL PPTO. EJECUCIÓN MATERIAL | | 1.123.047,07 € | 100,00% |
| | 13% Gastos generales | 145.996,12 € | |
| | 6% Beneficio industrial | 67.382,82 € | |
| | Presup. Ejecucion por Contrata | 1.336.426,01 € | |

SEGURA SANCHEZ JOSE ANTONIO - 07237123N

Firmado digitalmente por SEGURA SANCHEZ JOSE ANTONIO - 07237123N
Nombre de reconocimiento (DN): c=ES, serialNumber=IDCES-07237123N, givenName=JOSE ANTONIO, sn=SEGURA SANCHEZ, cn=SEGURA SANCHEZ JOSE ANTONIO - 07237123N
Fecha: 2024.04.05 22:41:30 +02'00'

REDACTOR DEL PROYECTO
D. José Antonio Segura Sánchez
Procaver Soluciones Urbanas, S.L.

# DOCUMENTO V.- ESTUDIO DE SEGURIDAD Y SALUD

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## 1. OBJETO Y JUSTIFICACIÓN DE ESTE ESTUDIO

El equipo proyectista, al afrontar la tarea de redactar el presente Estudio de Seguridad y Salud para la obra: **PROYECTO DE CONSTRUCCIÓN DEL TANQUE DE TORMENTAS NORTE DE LA UNIDAD DE EJECUCIÓN UE-VII.1. "SISTEMAS GENERALES P.E. + KODAK" DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID)** se enfrenta con el problema de definir los riesgos que en su día se puedan presentar en la realización de la obra.

El presente Estudio de Seguridad y Salud se redacta en cumplimiento de lo dispuesto en el Real Decreto 1627/1997, de 24 de octubre, sobre disposiciones mínimas de seguridad y salud en las obras de construcción, teniendo como objetivo la prevención de accidentes laborales, enfermedades profesionales y daños a terceros que las actividades y medios materiales previstos puedan ocasionar durante la ejecución de la obra anteriormente citada.

De acuerdo con ello, este estudio debe ser complementado, antes del inicio de la obra, por el plan de seguridad y salud elaborado por el contratista. Dicho plan desarrollará las medidas preventivas previstas en el estudio, adaptando éstas a las técnicas y soluciones que han de ponerse finalmente en obra. Eventualmente, el plan de seguridad y salud podrá proponer alternativas preventivas a las medidas planificadas aquí, en las condiciones establecidas en el artículo 7 del ya citado Real Decreto 1627/1997. En su conjunto, el plan de seguridad y salud constituirá el conjunto de medidas y actuaciones preventivas derivadas de este estudio, que el contratista se compromete a disponer en las distintas actividades y fases de la obra, sin perjuicio de las modificaciones y actualizaciones que pueda haber lugar, en las condiciones reglamentariamente establecidas.

Además, sirve para dar las directrices básicas a la Empresa Contratista para llevar a cabo su obligación de redacción de un Plan de Seguridad y Salud en el que se analicen, estudien, desarrollen y complementen en función de su propio sistema de ejecución de obra, las previsiones contenidas en este estudio; en dicho Plan se incluirán las propuestas de medidas alternativas de prevención que el contratista proponga previa justificación técnica, que no podrán implicar disminución ni de los niveles de protección previstos ni de la valoración económica de los mismos dentro del presente estudio, por ello los errores u omisiones que pudieran existir en el mismo, nunca podrán ser tomados por el contratista en su favor.

En consecuencia, se contemplará específicamente una actuación preventiva eficaz, respecto de los riesgos profesionales que pudieran derivarse, procurando para ello, la protección integral de cuantos trabajadores intervengan en el proceso productivo, desde el propio inicio de la obra.

Así mismo, se establecerán las medidas preventivas adecuadas respecto de los riesgos que se deriven, bien durante la realización de la obra o terminada esta, por los trabajos de reparación,

conservación, entretenimiento y mantenimiento, y las instalaciones preceptivas de higiene, salud y bienestar de los trabajadores.

La realización del presente Estudio de Seguridad y Salud queda justificada en virtud de lo contemplado en el artículo 4 del R.D. 1627/97, que establece:

- *El promotor estará obligado a que en la fase de redacción del proyecto se elabore un estudio de seguridad y salud en los proyectos de obras en que se den alguno de los supuestos siguientes:*

  - *Que el presupuesto de ejecución por contrata incluido en el proyecto sea igual o superior a 450.000 Euros.*
  - *Que la duración estimada sea superior a 30 días laborables, empleándose en algún momento a más de 20 trabajadores simultáneamente.*
  - *Que el volumen de mano de obra estimada, entendiendo por tal la suma de los días de trabajo del total de los trabajadores en la obra, sea superior a 500.*
  - *Las obras de túneles, galerías, conducciones subterráneas y presas ".*

El proyecto dentro del que se enmarca el presente estudio de seguridad y salud supera *el volumen de mano de obra estimada, entendiendo por tal la suma de los días de trabajo del total de los trabajadores en la obra, sea superior a 500*, por lo que se realiza un Estudio de Seguridad y Salud.

## 1.2.- CARACTERÍSTICAS DE LA OBRA

### 1.2.1.- DESCRIPCIÓN DE LA OBRA Y SITUACIÓN

Para el diseño del tanque de tormentas y la red de saneamiento del sector se adoptan como criterios de diseño los recogidos en la actual normativa vigente del Canal de Isabel II del año 2016. Se tienen en cuenta además las recomendaciones realizadas en la "Guía Básica de Diseño de Sistemas de Gestión Sostenible de Aguas Pluviales en Zonas Verdes y otros Espacios Libres" editada por el Área de Gobierno de Medio Ambiente y Movilidad del Ayuntamiento de Madrid.

### 1.2.2.- AUTOR DEL PROYECTO Y ESTUDIO DE SEGURIDAD, PRESUPUESTO, PLAZO DE EJECUCIÓN Y MANO DE OBRA.

Promotor de la obra: **JUNTA DE COMPENSACIÓN UE-VII.1. "SISTEMAS GENERALES P.E. + KODAK"**

Presupuesto Seguridad y Salud: **13.980,00 €**

Plazo de ejecución de la obra: **6 meses**

El número de trabajadores en punta se estima en **10 personas**

Autor del Proyecto: **D. José Antonio Segura Sánchez, como de Ingeniero de Caminos, Canales y Puertos colegiado nº 14.718, en nombre y representación de la mercantil PROCAVER SOLUCIONES URBANAS, S.L.**

### 1.2.3.- INTERFERENCIAS Y SERVICIOS AFECTADOS

Las interferencias con conducciones de toda índole han sido causa frecuente de accidentes, por ello se considera muy importante detectar su existencia y localización exacta sobre el terreno en el que vamos a trabajar, con el fin de poder detectar y evaluar claramente los peligros y riesgos derivados de ellos.

Es por ello que se hace imprescindible, antes de la iniciación de cualquier tipo de trabajo, el ponerse en contacto con las correspondientes compañías suministradoras, para solicitar la situación de sus instalaciones en la zona, y tener la certeza de si la obra afectará alguna canalización de suministro de cada compañía. En el caso que así fuera, se solicitará antes del inicio de la obra el desvío provisional, la desconexión o anulación definitiva.

**No deberá permitirse, por ningún motivo, la realización de cualquier tarea en instalaciones con servicio no desconectado o en proximidad**.

En nuestro caso, es de especial relevancia la interferencia con terceros, circulación de vehículos y personas, dado que la obra se realiza en calles dentro del municipio de Madrid

Relación no exhaustiva de las interferencias con servicios que puedan afectar a la realización de la obra:

- Líneas eléctricas aéreas.
- Galerías eléctricas subterráneas.
- Estaciones de transformación.
- Conducciones de gas.
- Redes de telecomunicaciones y telefonía.
- Líneas de iluminación pública.
- Canalizaciones de abastecimiento de agua.
- Canalizaciones de saneamiento.
- Instalaciones contra incendio.

En el Plan de Seguridad y Salud que elabore el contratista, debe quedar reflejada la existencia de los servicios afectados que discurren por la zona de obras o por su zona de influencia.

Dadas las características de la obra, los servicios afectados deberán de identificarse por parte de la empresa contratista mediante la realización de calas previa recopilación de los planos por parte del organismo pertinente.

A continuación, se adjunta una serie de normas de seguridad a tener en cuenta cuando se desarrollen trabajos próximos a los diferentes tipos de servicios. Toda la normativa de

seguridad que se detalla a continuación estará supeditada a las instrucciones generales específicas que suministre por escrito la compañía de servicios y, únicamente en caso de que en algún apartado las exigencias en materia de seguridad resulten inferiores a las aquí indicadas, se harán prevalecer estas.

ACTIVIDADES

- Identificar, analizar y evaluar la incidencia de la obra en las propiedades colindantes.
- Identificar, analizar y evaluar la incidencia de las posibles interferencias con servicios afectados.
    - Conducciones de agua
    - Líneas eléctricas
    - Conducciones de gases
    - Líneas telefónicas
    - Viales con tráfico de vehículos y personas
    - Red de saneamiento
    - Otros servicios
- Identificar, analizar y evaluar las incidencias climatológicas y las debidas a la naturaleza de los terrenos.
- Identificar incidencias en el medio ambiente.
- Identificar incidencias relativas a las concentraciones humanas.

MAQUINARIA, EQUIPOS, INSTALACIONES

- Detectores de líneas eléctricas.
- Detectores de gases.
- Equipos de respiración autónomos o semiautónomos.
- Señales de tráfico.
- Medios auxiliares de sostenimiento, defensa, señalización, cerramiento, vallado, apuntalamiento, etc.
- Extintores de incendios, adecuados al tipo de fuego previsible.

**PROPIEDADES COLINDANTES Y TERCEROS**

- Se señalizarán los accesos naturales a la obra y se prohibirá el paso a toda persona ajena, colocando los cerramientos necesarios.
- La señalización será mediante:
    - Avisos al público colocados perfectamente y en consonancia con su mensaje.
    - Indicación y limitación en caso necesario de pasos peatonales y de vehículos.

- Postes soporte para banda de acotamiento.
- Adhesivos reflectantes destinados para señalizaciones de vallas de acotamiento, paneles de balizamiento, maquinaria pesada, etc.

- Todos los desvíos, itinerarios alternativos, estrechamiento de calzada, etc, que se produzcan durante el transcurso de la obra, se señalizarán según la Norma de Carreteras 8.3. IC del MOPU de 31 de agosto de 1987 y de las Ordenanzas Municipales de balizamiento y obras del Ayuntamiento, según proceda.

- Las señales utilizadas podrán ser de alguno de los tipos siguientes:

  - TP, señales de peligro.
  - TR, señales de reglamentación y prioridad.
  - TS, señales de indicación.
  - TM, señalización manual.
  - TB, elementos de balizamiento reflectantes.
  - TL, elementos luminosos.
  - TD, elementos de defensa.

**NORMAS DE SEGURIDAD. CONDUCCIONES DE AGUA**

- Cualquier conducción existente en el emplazamiento de la obra, se identificará antes del comienzo de los trabajos, mediante la información recibida a través de los Servicios encargados del Propietario de aquélla.

- Los datos relativos a direcciones y números del teléfono del Propietario se registrarán debidamente y estarán disponibles para las personas que trabajen en la zona afectada. También se tendrán los teléfonos de Bomberos, Protección Civil, Policía, Guardia Civil, Ambulancias y Centros Asistenciales del Contratista Principal y de las Subcontratas.

- Todas las personas con riesgo de verse afectadas por una fuga de agua o rotura de la conducción, recibirán instrucciones sobre la conducta a seguir en caso de accidente.

- Las zonas de obra que pudieran sufrir anegamientos o inundaciones a consecuencia de posibles pérdidas de una conducción se protegerán con dispositivos de evacuación y drenaje.

- Los pasos de máquinas y vehículos sobre la conducción se establecerán en lugares concretos, correctamente señalizados, y se acondicionarán adecuadamente, en función de los vehículos que puedan circular (anchura, carga, etc).

- La apertura de zanjas, pozos o cualquier otro tipo de excavación se realizará adoptando las precauciones necesarias para no dañar la conducción.

- La excavación final deberá ser manual con el fin de no dañar la conducción.

## NORMAS DE SEGURIDAD. LÍNEAS ELÉCTRICAS EN GENERAL

- Cualquier línea existente en el emplazamiento de la obra se identificará antes del comienzo de los trabajos, mediante la información recibida a través de los Servicios Encargados de la Compañía Eléctrica a que está adscrita dicha línea.

- Los datos relativos a direcciones y números de teléfono de la Compañía Eléctrica se registrarán debidamente y estarán disponibles para las personas que trabajan en la zona afectada.

- Aquellas personas relacionadas con las instalaciones eléctricas, o las que tengan probabilidad de interferir en la zona de influencia de una línea, recibirán instrucciones sobre la distancia de seguridad a respetar y la conducta a seguir en caso de accidente.

- Cuando se produzca un contacto con la línea, o se detecte una avería o rotura de aisladores, conductores, etc, que puedan suponer un peligro inminente para las personas se avisará inmediatamente a los Servicios encargados de la Compañía Eléctrica en cuestión.

- La ejecución de cualquier trabajo en tensión, quedará reservado exclusivamente, al personal que esté especialmente instruido en las técnicas correspondientes, el cual seguirá los procedimientos previstos en cada caso y utilizarán los medios adecuados en correcto estado de mantenimiento.

- En caso de incendio próximo a una línea, se intentará en primer lugar lograr la desconexión de la misma y para combatir el incendio se utilizarán extintores de material dieléctrico con agentes extintores adecuados.

- Previamente al comienzo de los trabajos en una línea será requisito indispensable obtener el documento que acredite su consignación por la Compañía Eléctrica correspondiente.

- El personal que concluya trabajos en una línea eléctrica, solicitará por escrito la desconsignación de la misma, quedando advertido de que a partir de ese momento no podrá realizar ya ninguna operación en ella considerando que la línea se encuentra de nuevo en tensión.

- Las líneas eléctricas que puedan instalarse para el servicio de la obra, y dependiendo de ésta, cumplirán la reglamentación oficial vigente, como si de líneas genéricas se tratara y quedarán encomendadas al cuidado y vigilancia del Servicio Eléctrico de Obra. En concreto se respetarán los límites especificados para las distancias de cruzamiento y paralelismo con otras líneas.

## NORMAS DE SEGURIDAD. LÍNEAS ELÉCTRICAS AÉREAS

- Antes de comenzar los trabajos en la zona se comprobara las distancias entre la obra proyectada, maquinaria y sus elementos estructurales y la línea eléctrica aérea. La posición de la línea se fijará, por medio de las referencias oportunas, en relación con las diferentes zonas de actividad.

- La zona de influencia de la línea o de riesgo que en ningún momento deberá ser invadida por los trabajadores, los medios de ejecución o las cargas que transporten éstos, lo cual se determinará por los Servicios encargados de la Compañía Eléctrica. Su amplitud será en función de la tensión de la línea, de la situación del centro del vano, del conductor más próximo a la zona de trabajo, de la forma de fijación del mismo a sus apoyos continuos, de la longitud de las cadenas de suspensión, y de las acciones del viento que, en el caso más favorable, provocarán una inclinación de 45º a dichas cadenas.

- Las distancias de seguridad, que definan la amplitud mencionada serán las siguientes:

| $U_n$ | $D_{PEL-1}$ | $D_{PEL-2}$ | $D_{PROX-1}$ | $D_{PROX-2}$ |
|---|---|---|---|---|
| ≤1 | 50 | 50 | 70 | 300 |
| 3 | 62 | 52 | 112 | 300 |
| 6 | 62 | 53 | 112 | 300 |
| 10 | 65 | 55 | 115 | 300 |
| 15 | 66 | 57 | 116 | 300 |
| 20 | 72 | 60 | 122 | 300 |
| 30 | 82 | 66 | 132 | 300 |
| 45 | 98 | 73 | 148 | 300 |
| 66 | 120 | 85 | 170 | 300 |
| 110 | 160 | 100 | 210 | 500 |
| 132 | 180 | 110 | 330 | 500 |
| 220 | 260 | 160 | 410 | 500 |
| 380 | 390 | 250 | 540 | 700 |

  - Un=tensión nominal de la instalación (kV).
  - DPEL-1=distancia hasta el límite exterior de la zona de peligro cuando exista riesgo de sobretensión por rayo (cm).
  - DPEL-2 = distancia hasta el límite exterior de la zona de peligro cuando no exista el riesgo de sobretensión por rayo (cm).
  - DPROX-1 =distancia hasta el límite exterior de la zona de proximidad cuando resulte posible delimitar con precisión la zona de trabajo y controlar que ésta no se sobrepasa durante la realización del mismo (cm).
  - DPROX-2=distancia hasta el límite exterior de la zona de proximidad cuando no resulte posible delimitar con precisión la zona de trabajo y controlar que ésta no se sobrepasa durante la realización del mismo (cm).
    - * Las distancias para valores de tensión intermedios se calcularán por interpolación lineal.

- La estimación de distancias con respecto a la línea se efectuará mediante taquímetro o pértigas aislantes adecuadas a la tensión de la misma. Nunca se empleará otros instrumentos que no ofrezcan aislamiento suficiente, tales como reglas de madera, tubos de plástico, cintas metálicas, etc.

- Los límites indicados para la distancia de seguridad podrán reducirse previa conformidad de los Servicios encargados de la Compañía Eléctrica, a los valores que estos juzguen oportunos.

- La zona de alcance del medio de ejecución se establecerá atendiendo a los movimientos de traslación, rotación y combinados del cuerpo principal de la máquina y de cada una de sus partes móviles, a las oscilaciones del sistema de elevación en vacío y en carga, a posibles incidencias internas o externas tales como reventón de neumáticos en vehículos, asientos del terreno, acopios, etc.

- Las zonas de influencia y alcance se representarán gráficamente sobre un esquema de emplazamiento de la línea, dibujado a escala rigurosa. Si se produce alguna superposición entre ambas zonas, existirá riesgo de contacto con la línea y será necesario atenerse a las tres normas que siguen, contando siempre con los Servicios encargados de la Compañía Eléctrica.

    - En caso de que la Compañía Eléctrica acceda a dejar la línea fuera de servicio, realizará ella esa operación. Los obligados dispositivos de cortocircuito y puesta a tierra de trabajo de todos los conductores, a uno y otro lado del punto de intervención, serán visibles desde la zona de trabajo. Antes del comienzo de la propia actividad de obra, se requerirá de la Compañía una confirmación escrita de que la línea haya quedado descargada y de no se restablecerá el servicio sin previa comunicación igualmente escrita.

    - Cuando la Compañía Eléctrica considere oportuno el desvío provisional o definitivo de la línea o su conversión en subterránea, materializará ella esos cambios. Antes de iniciar la construcción de la obra, se requerirá de la Compañía, una confirmación escrita de que han concluido los correspondientes trabajos por su parte.

    - La sustitución de cables desnudos por conductores provistos de aislamiento, en el tramo afectado, mediante by-pass aéreo o subterráneo, operación posible para tensiones iguales o menores a 25 Kv, se llevará a cabo por la Compañía si es aceptado por ésta. En cuanto al requerimiento sobre ausencia de riesgo se estará a lo indicado en el caso de supresión del servicio en la línea.

- Cuando no sea factible cualquiera de las operaciones indicadas en las tres normas anteriores, podrán disponerse resguardos protectores de la siguiente resistencia estructural en torno a la línea, arriostrados de forma que no puedan abatirse sobre ella, y que sirvan de limitación a las evoluciones de los trabajadores, los medios de ejecución o las cargas que transporte. Tales resguardos se montarán, con la previa de la Compañía y

la supervisión de ésta; si los mismos poseen partes metálicas, éstas se conectarán a tierra adecuadamente.

- En cualquier caso, será aconsejable reducir la zona de alcance de las máquinas que operan cerca de la línea, mediante la colocación de dispositivos de seguridad que limiten el recorrido de partes móviles de aquéllas, o por medio de la colocación de obstáculos sobre el terreno y siempre que éstos no sean rebasados por alguna máquina.

- Cuando se trabaje en la proximidad de una línea se colocarán barreras provisionales o gálibos, adecuadamente señalizados, con el fin de recordar la existencia de ella. Estos elementos se dispondrán también en los elementos de cruces de trayectos con la línea, previamente establecidos para canalizar el tráfico de máquinas y vehículos, con señalización de altura máxima.

- El traslado de cargas, vertido de tierras y acopio de materiales se prohibirán debajo de la línea, ya que, de lo contrario, disminuiría la distancia entre la línea y el terreno.

- No se conducirán vehículos por debajo de líneas eléctricas, siempre que exista la posibilidad de rutas alternativas.

- Cuando se transporte objetos largos debajo de líneas eléctricas aéreas estarán siempre en posición horizontal.

- Limitar el movimiento de traslación, de rotación y de elevación de las máquinas de elevación o movimiento de tierras por dispositivos de parada mecánicos.

- Si una máquina o vehículo cualquiera entra en contacto o provoca un arco eléctrico con una línea, el personal que se halle en la zona peligrosa observará las siguientes normas:

    - No tocará la máquina o vehículo o la línea caída en tierra.

    - Permanecerá inmóvil o intentará salir de la zona a pequeños pasos.

    - Advertirá a las otras personas amenazadas que no toquen la máquina o la línea, ni realicen otros actos imprudentes.

    - Avisará a las personas situadas fuera de la zona peligrosa para que no se acerquen a la máquina o vehículo.

    - No auxiliará a las posibles víctimas, hasta que no se restablezca la distancia de seguridad entre la línea y la máquina o vehículo.

    - En el caso de no ser posible separar la máquina inmediatamente de la línea eléctrica, el conductor deberá abandonarla saltando con los dos pies juntos a una distancia lo más alejada posible de ella

- En caso de caída de la línea, se prohibirá el acceso del personal a la zona de peligro hasta que un experto de los Servicios encargados de la Compañía Eléctrica asegure la falta permanente de tensión.

**NORMAS DE SEGURIDAD. LÍNEAS ELÉCTRICAS SUBTERRÁNEAS**

- Informarse de la posible existencia de cables enterrados, en la Compañía Eléctrica que suministra energía a la zona.

- Efectuar las gestiones oportunas para conseguir el correspondiente descargo de la línea.

- En caso de que no sea posible el descargo o existan dudas razonables sobre el corte de tensión efectuado por la Compañía (indefinición de comienzo y fin del descargo, ausencia de justificación documental sobre la forma de realización del descargo, etc) se considerará a todos los efectos que la línea sigue en tensión, por lo que, en caso de que ineludiblemente se deba trabajar en el área afectada por la línea, se deberán considerar dos procedimientos:

*1) Conocida perfectamente la línea (tensión, profundidad, trazado y sistema de protección).*

- Se podrá excavar mecánicamente hasta una distancia (proyecciones horizontal y vertical) de 0,5 metros, debiéndose continuar la aproximación manualmente hasta acceder a la protección (fábrica de ladrillo, tubo, etc.) o a la cubierta aislante en caso de cubrición con arenas o tierras.

- El procedimiento de trabajo desde que se inicie la excavación, pasando por los apeos correspondientes, cambio de emplazamiento, si procede, y posterior protección se efectuará de conformidad con la Compañía Suministradora de fluido eléctrico.

- Estos trabajos de principio a fin deberán estar supervisados “in situ” por un responsable de los mismos.

- Las protecciones personales obligatorias, específicas del riesgo, consistirán en guantes dieléctricos adecuados a la tensión de línea, protegidos con guantes de trabajo de cuero. Igualmente será necesario y obligatorio el casco con barbuquejo, protección ocular y calzado de seguridad de la clase III (aislante).

- El responsable de los trabajos, no permitirá el inicio de éstos, mientras no compruebe que el procedimiento de trabajo tiene el Visto Bueno de la Compañía Eléctrica y que el personal dispone y utiliza las protecciones personales obligatorias.

- En cualquier caso es preceptiva la realización de calicatas por lo menos en dos puntos del trazado, para confirmar la exactitud del trazado, antes del inicio de los trabajos.

*2) Conocida la existencia de la línea, pero no su trazado, profundidad y sistema de protección mecánica.*

- Solicitar a la Compañía que mediante un detector de campo nos defina las coordenadas de trazado de la línea en la zona a operar.

- Si nos ofrecen garantías sobre la exactitud de las mediciones, operar de acuerdo con el apartado 1º, pero solicitando la supervisión por persona cualificada perteneciente a la Compañía Eléctrica.

- Si no ofrece garantía la medición o no la realiza la Compañía Eléctrica, efectuar el correspondiente escrito a la propiedad de la obra poniéndole en antecedentes del caso, así como el no inicio del trabajo en la posible zona afectada, dado su extrema peligrosidad, al objeto de que efectúe las diligencias necesarias para el correspondiente descargo, o en su caso, la realización de los trabajos por la Compañía Eléctrica o por otra, con la correspondiente especialización en trabajos en tensión.

**NORMAS DE SEGURIDAD. CONDUCCIONES DE GASES**

En caso de que exista afección y las tuberías vayan enterradas se actuará según los pasos siguientes.

1) Identificación.

Se identificará el trazado de la tubería que se quiere excavar a partir de los planos constructivos de la misma suministrados por la Compañía Suministradora del Gas.

2) Señalización.

Se procederá a localizar la tubería mediante detector, marcando con piquetas su dirección y profundidad.

*Procedimientos de operación*

a) Conducciones enterradas a profundidad igual o menor a 1 metro.

En este caso se empezará siempre haciendo catas a mano, hasta llegar a la generatriz superior de la tubería, se realizarán tantas como se estimen necesarias para asegurarse de la posición de la tubería.

b) Conducciones enterradas a distancia superior a 1 metro.

Se podrá empezar la excavación con máquina hasta llegar a 1 metro sobre la tubería, procediéndose a continuación como en el punto anterior.

Una vez localizada la tubería, se podrá excavar mediante medios mecánicos hasta 0,5 metros de la tubería.

*Procedimientos de trabajo. Normas de seguridad*

Cuando se trabaje en la proximidad de conducciones de líquidos y gases inflamables o cuando sea necesario descubrir las conducciones, se prestará especial interés a los siguientes puntos:

- Comprobación continúa de la existencia de gas en el ambiente. En caso de escape de gas o incendio, todo el personal de obra se retirará más allá del límite de seguridad señalado, recibiendo solamente instrucciones del personal competente de la Compañía propietaria de la instalación.

- La zona de trabajo, estará vallada y señalizada convenientemente, quedando prohibido fumar o realizar cualquier tipo de fuego o chispa del área afectada, para lo cual se evitará el uso de máquinas de combustión, si no están dotadas de rejillas cortafuegos.

- Tanto los compresores como cualquier tipo de aparato eléctrico (grupo electrógeno, taladro, cortadora, sierra circular, etc.), se colocarán fuera de la zona, tan lejos como sea posible de la instalación en servicio.

- Todas las máquinas usadas que funcionan eléctricamente, dispondrán de una correcta toma de tierra y los cables o mangueras de alimentación eléctrica usados en estos trabajos, estarán perfectamente aislados.

- Para colocar o sacar bombillas del portalámparas, es obligatorio desconectar previamente el circuito eléctrico.

- Queda prohibido manipular cualquier aparato, válvula o instrumento de la instalación en servicio.

- Está prohibida la utilización, por parte del personal, de calzado que lleve piezas de hierro, con el fin de evitar la posible formación de chispas al entrar en contacto con los elementos metálicos.

- No se podrá almacenar ningún material sobre esta conducción.

**NORMAS DE SEGURIDAD. CONDUCCIONES TELEFÓNICAS**

- Cualquier línea existente en el emplazamiento de la obra se identificará antes del comienzo de los trabajos, mediante la información recibida a través de los Servicios Encargados de la Compañía Telefónica.

- Los datos relativos a direcciones y números de teléfonos de la Compañía se registrarán debidamente y estarán disponibles para las personas aludidas anteriormente.

- Es aconsejable no realizar excavaciones con máquinas a distancias inferiores a 0,50 m de la conducción en servicio. Por debajo de dicha cota, se usará la pala manual.

- Una vez descubierta la conducción, y en el caso de que la profundidad de la excavación sea superior a la de la conducción, se suspenderá o apuntalará para que no rompa por flexión en los tramos de excesiva longitud, y se protegerá y señalizará convenientemente para evitar que sea dañada por maquinaria, herramientas, etc.

- Queda totalmente prohibido manipular cualquier elemento de la conducción en servicio.

- No almacenar ningún material sobre la conducción, ni hacer uso de la conducción como punto de apoyo.

- En caso de rotura de la conducción, esta deberá comunicarse inmediatamente a la compañía instaladora, para su posterior reparación.

**NORMAS DE SEGURIDAD. INTERFERENCIA CON VIALES**

- Todas las personas con riesgo de verse afectadas por el tráfico de vehículos, recibirán instrucciones sobre las medidas de prevención a adoptar y la conducta a seguir en caso necesario.

- Deberán disponer de chaleco reflectante.

- Cualquier vial existente en el emplazamiento de la obra se identificará y señalizará convenientemente, de acuerdo con la legislación vigente.

- El tramo de vial, común al recinto de obra o accesos de la obra se señalizará y/o protegerá convenientemente.

- Los trayectos de las máquinas y vehículos de la obra, que necesariamente crucen un vial, se establecerán fijando los lugares de paso obligatorio, previamente autorizados por el Propietario, los cuales dispondrán de la señalización y protección adecuadas.

- Dichos lugares de paso se situarán, siempre que sea posible, en zonas de buena visibilidad, tanto para el usuario del vial como para el personal de la obra.

- En caso de que por el vial circule tráfico intenso o el movimiento de obra sea notable, se estudiará la posibilidad de asignar señalistas en los puntos de entrada y salida de los cruces.

**NORMAS DE SEGURIDAD. RED DE SANEAMIENTO**

- Cualquier conducción, galería de saneamiento, pozo, arqueta, registro, etc., se identificará antes del comienzo de los trabajos mediante la información recibida a través de los Servicios encargados del Propietario de aquélla.

- Los datos relativos a direcciones y números del teléfono del Propietario se registrarán debidamente y estarán disponibles para las personas que trabajan en la zona afectada.

- Todos los trabajadores con riesgo de verse afectadas por una fuga de agua, por afección de gases tóxicos y/o asfixia por falta de oxígeno, recibirán instrucciones sobre la conducta a seguir.

- En el caso de trabajo en recintos confinados, los trabajadores dispondrán de la formación correspondiente, siendo conocedores de las normas de seguridad relativas al trabajo en recintos confinados. Se dispondrá de un equipo de medición de gases previa instrucción a los trabajadores sobre su utilización.

- Siempre que se esté trabajando en un espacio confinado, será obligatoria la presencia de un Recurso Preventivo, que velara por la seguridad y el cumplimiento de las medidas anteriores, así como de lo establecido en el Plan de Seguridad y Salud al respecto.

- Las zonas de obra que pudieran sufrir anegamientos o inundaciones a consecuencia de pérdidas por roturas de la conducción se protegerán con dispositivos de evacuación y drenajes.

- Las aperturas de zanjas, pozos o cualquier otro tipo de excavación se realizarán adoptando las precauciones necesarias para no dañar la conducción.

- La excavación final deberá ser manual para no dañar la conducción.

### 1.2.4.- UNIDADES CONSTRUCTIVAS QUE COMPONEN LA OBRA

Las obras desde el punto de vista de su ejecución y por lo que respecta a su protección, tanto colectiva como individual, se pueden dividir en diversos grupos de actividades diferenciadas unas de otras por sus distintas características, en lo que hace referencia a los riesgos que suscitan, y a las medidas previsoras o correctoras que deberán aplicarse.

Se desarrolla una descripción de las unidades de obra y actividades que van a componer los trabajos y que serán objeto de análisis posteriormente:

1. <u>Implantación en obra:</u>

    - Instalaciones provisionales.
    - Desvíos de tráfico y accesos.
    - Colocación de casetas e instalaciones de higiene y bienestar.
    - Vallado perimetral de obra y señalización provisional.
    - Recepción de maquinaria.
    - Gestión de acopios.
    - Trabajos topográficos y de replanteo.

2. <u>Demoliciones:</u>

    - Demoliciones de forma manual.
    - Demoliciones con medios mecánicos.
    - Eliminación de escombros y restos de obra.

3. Excavación de zanjas, pozos, arquetas y acometidas:

   - Excavación de zanja.
   - Entibación.
   - Ejecución de pozos.

4. Instalación de conducciones y accesorios.

   - Manipulación de cargas de forma manual.
   - Manipulación de cargas de forma mecánica.
   - Colocación de tuberías y piezas especiales.
   - Corte de tubería con radial.
   - Acometidas de polietileno.
   - Pruebas de carga de tubería.

5. Obras de fábrica:

   - Pequeñas cimentaciones para anclajes y cámaras.
   - Obra civil.
   - Armado de estructuras para arquetas, anclajes y cámaras
   - Encofrado de estructuras.
   - Hormigonado en masa.
   - Enlucidos, enfoscados y guarnecidos.
   - Impermeabilización de cámaras.
   - Tapas y cobijas.

6. Reposición de acera y calzada:

   - Relleno.
   - Compactación.
   - Hormigonado.
   - Asfaltado.
   - Acerado, adoquinado y enlosado.
   - Colocación de bordillos.
   - Marcas viales horizontales y verticales.

### 1.2.5.- MAQUINARIA Y MEDIOS AUXILIARES EMPLEADOS

Se realiza una descripción de los medios auxiliares y maquinaria a emplear en la ejecución de la obra por tipos, para posteriormente enumerar su uso en cada actividad de obra.

1. Maquinaria de Movimiento de Tierras y Pavimentación

   - Camión Basculante.
   - Retroexcavadora.

- Pisón rana.
- Rodillo vibrante autopropulsado.
- Fresadora de aglomerado
- Extendedora de mezcla bituminosa.
- Camión riego asfáltico.
- Dúmper o motovolquete.
- Minicargadora.

2. Maquinaria de Elevación de Material.

- Grúa sobre camión o camión pluma.
- Grúa autopropulsada.
- Carretilla elevadora.

3. Maquinaria para Hormigonar:

- Camión hormigonera.
- Hormigonera eléctrica.
- Compresor.
- Grupo electrógeno.
- Barredora autopropulsada.
- Sierra Cortadora de pavimento.
- Martillo neumático.
- Máquina pintabandas.

4. Relación de Maquinaria Menor:

- Mesa de sierra circular.
- Motosierra.
- Vibrador de hormigón.
- Taladro eléctrico.
- Bomba de achique.
- Sierra radial eléctrica.
- Cortadora de productos cerámicos.
- Soldeo de tope y enchufe.
- Carraca hidráulica.
- Rozadora eléctrica.

5. Vehículos de Transporte de Objetos.

- Góndola de transporte.
- Dúmper o motovolquete autopropulsado.
- Carretilla elevadora.

6. Medios Auxiliares.

- Escaleras de mano.
- Cables y eslingas.

- Pasarelas de obra.
- Contenedores.
- Balizas luminosas
- Puntales
- Entibaciones.
- Carretón o carretilla de mano.
- Planchas metálicas o chapones.
- Valla metálica para cierre de seguridad.
- Valla metálica tipo ayuntamiento.
- Big-Bag`s

## 1.3.- RIESGOS LABORALES Y MEDIDAS DE PROTECCIÓN EN ACTIVIDADES DE OBRA.

### 1.3.1.- IMPLANTACIÓN DE OBRA

**1. Descripción de la unidad.**

Se incluyen aquí todas las acciones necesarias para iniciar la actividad en la zona de obra objeto del proyecto de renovación de red de abastecimiento.

Para el análisis de esta unidad se considera oportuno realizar una descripción de las actividades de obra que la componen:

- Montaje de instalaciones para personal, comedores, vestuarios y aseos. Debido al carácter móvil de la obra, las instalaciones de higiene y bienestar suelen consistir en casetas de almacén, comedor-vestuario y aseo químico que se desplaza por la obra en función a la situación de los trabajos.

- Instalaciones provisionales necesarias para la ejecución de la obra. Al ser una instalación móvil no se planifica realizar conexiones a red de agua o electricidad, por lo que se realiza mediante depósitos de agua y grupos electrógenos independientes.

- Vallado perimetral con accesos distintos para vehículos y peatones. La zona de casetas de obra y acopios se mantendrá delimitada en función a la posible ubicación de la misma en acuerdo con el Ayuntamiento que supervise los trabajos.

- Vallado perimetral de obra. Al tratarse de una obra móvil el vallado se realizará de la zona de excavación de zanja, acopios de material y zonas pendientes de reposición, consistentes en vallado tipo ayuntamiento, metálico de pie de hormigón o new jersey en función de la zona de trabajo.

- Desvíos provisionales para guiar tráfico, peatones y accesos a instalaciones.

- Recepción de maquinaria, equipos y materiales de obra.

**2. Análisis de riesgos de cada actividad y medidas preventivas asociadas a los riesgos.**

Las actividades que se estudian en esta unidad de obra son las siguientes:

### 1.3.2.- MONTAJE DE CASETAS E INSTALACIONES DE HIGIENE Y BIENESTAR

**A.- Descripción de la Actividad**

En esta actividad analizamos los riesgos derivados de los trabajos de colocación de casetas de almacén, vestuario y comedor, junto al conjunto de instalaciones necesarias para la ejecución de los trabajos.

El procedimiento de trabajo conlleva el posicionamiento de camión y grúa, previa comprobación de la no interferencia con servicio o elemento alguno, el amarre de la carga y la carga y descarga de elementos verticales (que será analizada en apartados posteriores).

**B.- Evaluación de Riesgos**

- Atropellos y atrapamientos:
- Caídas al mismo nivel.
- Caídas a distinto nivel.
- Golpes o pinchazos contra objetos y herramientas.
- Caídas de objetos en manipulación.

**C.- Medidas Preventivas**

- El manejo del camión pluma o de la grúa móvil, se realizará según las pautas establecidas en su manual de instrucciones de uso y manejo.
- Cuando se ice algún elemento, se asegurará correctamente mediante, eslingas metálicas o cintas textiles. Si el elemento es muy voluminoso se sustentará de dos puntos para evitar que se desplace y pueda caer.
- Las zonas de terreno de recepción de caseta deben estar preparada de forma que sea estable y segura para evitar tropiezos y caídas durante la colocación y manipulación de la caseta de obra.
- El acceso a la caja del camión grúa para el amarre y colocación de las casetas se realizará siempre por las escalas fijas o escaleras de mano fijadas a la estructura.
- El izado y posicionamiento de cargas se realizará respetando la distancia mínima de seguridad.
- No se sobrepasará las cargas máximas admisibles para el traslado de material de forma manual o mecánica.

**D.- Equipos de Protección Individual**

- Casco homologado.
- Ropa de trabajo.
- Guantes de uso general, para manejos de materiales, bordillos, prefabricados, tubos.

- Botas de agua.
- Chaleco reflectante.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.
- Impermeables o trajes de agua para casos de días lluviosos.
- Mascarilla auto filtrante para trabajos con ambiente pulvígeno.

**E.- Protecciones Colectivas**

- Señalización de tráfico adecuada.
- Vallas de limitación y protección de bordes de zanjas y desniveles.
- Cintas de balizamiento.
- Balizas luminosas.
- Topes de desplazamiento de material

**F.- Maquinaria y Medios Auxiliares empleados**

- Camión grúa.
- Camión basculante.
- Herramientas manuales.
- Escaleras de mano.
- Eslingas, cables y cadenas.

### 1.3.3.- INSTALACIONES PROVISIONALES DE ELECTRICIDAD, DISTRIBUCIÓN DE AGUA O SANEAMIENTO.

**A.- Descripción de la Actividad**

Se analizan los riesgos derivados de los posibles trabajos de conexionado eléctrico, conexionado a red de distribución de agua o saneamiento de forma provisional de las casetas de obra. Destacar que estas conexiones se realizarán bajo la supervisión de las compañías responsables de los servicios.

**B.- Evaluación de Riesgos**

- Contactos eléctricos:
- Caídas al mismo nivel.
- Golpes o pinchazos contra objetos y herramientas.

**C.- Medidas Preventivas**

- Los trabajos de conexionado a red se realizan en ausencia de tensión.
- Solo personal formado y cualificado ejecutara los trabajos eléctricos.
- Las herramientas de trabajo se encontrarán en buen estado de conservación en especial su aislamiento.
- Mantener las zonas de trabajo limpias y ordenadas.
- El cableado eléctrico provisional debe ir canalizado y protegido y fuera de las zonas de paso de trabajadores y maquinaria.

- Los equipos de trabajo deben ser verificados antes de su utilización desechando aquellos que presenten anomalías.
- Las herramientas se trasladarán en cajas o habitáculos adecuados.

**D.- Equipos de Protección Individual**

- Casco homologado.
- Ropa de trabajo.
- Guantes de uso general, para manejos de materiales, bordillos, prefabricados, tubos.
- Botas de agua.
- Chaleco reflectante.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.

**E.- Protecciones Colectivas**

- Señalización de tráfico adecuada.
- Vallas de limitación y protección de bordes de zanjas y desniveles.
- Cintas de balizamiento.
- Balizas luminosas.
- Topes de desplazamiento de material

**F.- Maquinaria y Medios Auxiliares empleados**

- Herramientas manuales.
- Escaleras de mano.
- Plataformas de trabajo.

### 1.3.4.- DESVÍOS DE TRÁFICO Y ACCESOS.

**A.- Descripción de la Actividad**

Las posibles afecciones al tráfico rodado o paso de peatones serán analizadas con el promotor y el Ayuntamiento, para adoptar las medidas oportunas. El procedimiento de colocación de la señalización se hará siempre con apoyo de señalista y en el sentido de la circulación, de manera que el operario que la coloca queda protegido por ella y se desmontará en el sentido contrario.

**B.- Evaluación de Riesgos**

- Choques entre objetos.
- Caída de objetos.
- Atropellos.

**C.- Medidas Preventivas**

- Se habilitarán accesos y caminos de circulación para peatones por el interior de la zona de casetas para garantizar un paso seguro para los operarios frente a las zonas de movilidad de la maquinaria.
- En los accesos de peatones se colocará la siguiente señalización: prohibición de paso de personas ajenas a la obra, paneles informativos comunes de riesgos y peligro en general, tal como contempla el RD 485/1997 de Señalización de los lugares de trabajo.
- Las zonas de paso de peatones estarán diferenciadas de las de tránsito de maquinaria.
- Los pasos, accesos y vías de circulación estarán mantenidos y conservados.
- En los caminos de circulación de vehículos y maquinaria se colocará la señalización de limitación de velocidad a 20 km/hora y prohibición de paso para peatones.
- El diseño y construcción de los caminos interiores de la obra cumplirá con las normas de seguridad vial y reglamento general de circulación y la norma de carreteras de aplicación.
- Todas las salidas existirán un tramo horizontal de una longitud mínima de 6 metros con objeto de facilitar la visibilidad del conductor en las maniobras de acceso.
- El personal realizará uso de los EPI's de alta visibilidad para garantizar una mayor visibilidad.
- Los trabajos provisionales de señalización se realizarán con apoyo de señalistas.
- Los señalistas no se situarán en zonas de poca visibilidad.
- Las zonas de paso y caminos de circulación deben estar en buen estado de conservación y libres de acopios que puedan suponer golpes o caídas.
- Los chapones o plataformas que aseguren el paso dispondrán de tierra en los extremos para evitar tropiezos y mayor fijación de los mismos.
- Los medios utilizados para la realización de los desvíos se trasladarán de forma estable y segura en la maquinaria.
- Las zonas de interferencia con paso de maquinaria se extremará la precaución por la posible caída de objetos de la misma.

**D.- Equipos de Protección Individual**

- Casco homologado.
- Ropa de trabajo.
- Guantes de uso general, para manejos de materiales, bordillos, prefabricados, tubos.
- Botas de agua.
- Chaleco reflectante.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.

**E.- Protecciones Colectivas**

- Señalización de tráfico adecuada.
- Vallas de limitación y protección de bordes de zanjas y desniveles.
- Cintas de balizamiento.
- Balizas luminosas.
- Topes de desplazamiento de material

### 1.3.5.- VALLADO PERIMETRAL DE OBRA

#### A.- Descripción de la Actividad

Incluye esta actividad el vallado perimetral de las zonas de trabajo. Al tratarse de una obra móvil el vallado se realizará de la zona de excavación de zanja, acopios de material y zonas pendientes de reposición, consistentes en vallado tipo ayuntamiento, metálico de pie de hormigón o new jersey en función de la zona de trabajo.

#### B.- Evaluación de Riesgos

- Caídas de objetos.
- Golpes o cortes por objetos o herramientas.
- Caídas de personal al mismo nivel.
- Sobresfuerzos.
- Proyección de fragmentos o partículas.

#### C.- Medidas Preventivas

- Mantener las zonas de trabajo limpias y ordenadas.
- En los desplazamientos pisar sobre el suelo, en zonas estables del terreno no sobre acopios.
- Evitar subirse y andar sobre postes y materiales en el manejo de herramientas.
- El transporte de herramientas se realizará en las cajas porta herramientas adecuadas.
- No se trabajarán en el mismo vertical varios operarios por el riesgo de caída de objetos.
- En el acopio de materiales y medios se hará teniendo en cuenta los pesos y formas de cada uno de ellos. Se apilarán de mayor a menor, permaneciendo los más pesados y voluminosos en las zonas bajas.
- Para darle la herramienta a otro compañero nunca se arrojará para que la coja.
- Guardar la distancia mínima de seguridad con otros compañeros durante la instalación del vallado.
- No dirigir los golpes hacia lugares cercanos a otros operarios o a los pies.
- Los trabajos de corte con radial o fijación a terreno en caso de ser necesarios, se realizarán con los EPI's adecuados y respetando la distancia de seguridad con el resto de los operarios.
- Los trabajos se ejecutarán desde posiciones no forzadas y seguras.
- No se sobrepasará la carga máxima permitida de 25 km por persona.

#### D.- Equipos de Protección Individual

- Casco homologado.
- Ropa de trabajo.
- Guantes de uso general, para manejos de materiales, bordillos, prefabricados, tubos.
- Chaleco reflectante.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores

- Siempre que las condiciones de trabajo exijan otros elementos de protección distintos a los anteriormente descritos, se dotará a los trabajadores de los mismos.

### E.- Protecciones Colectivas

- Señalización de tráfico adecuada.
- Vallas de limitación y protección de bordes de zanjas y desniveles.
- Cintas de balizamiento.
- Balizas luminosas.
- Topes de desplazamiento de material.

### F.- Maquinaria y Medios Auxiliares empleados

- Herramientas manuales.
- Escaleras de mano.
- Plataformas de trabajo.
- Radiales o taladros eléctricos.
- Puntales.

## 1.3.6.- RECEPCIÓN DE MAQUINARIA, EQUIPOS Y MATERIALES DE OBRA.

### A.- Descripción de la Actividad

Se analizan los riesgos derivados de la recepción de los equipos, materiales y maquinaria que se van a utilizar a lo largo de la obra. Los riesgos intrínsecos de la utilización y mantenimiento de la maquinaria se realizaran en el apartado de análisis de cada una de ellas.

### B.- Evaluación de Riesgos

- Atropellos.
- Caídas al mismo nivel
- Caídas a distinto nivel.
- Riesgos de incendios o explosiones.
- Choques entre objetos.
- Desprendimientos al interior de la zanja.
- Vuelcos de maquinaria.
- Caída de objetos.
- Sobreesfuerzos

### C.- Medidas Preventivas

- La maquinaria solo será utilizada por personal formado y cualificado.
- Los trabajos de sujeción de material se realizarán desde zonas estables y con los medios auxiliares adecuados.
- El acceso a la caja del camión se realizará por las escalas fijas del vehículo o bien por escaleras de mano sujetas al mismo.

- Cada maquinaria ira dotada de un extintor timbrado y con las revisiones al día.
- Los posibles acopios de material inflamable se realizarán en zonas habilitadas para tal fin con las medidas preventivas oportunas.
- El desplazamiento de cargas se realizará desde dos puntos de amarre para evitar su balanceo.
- Las zonas de acopio permanecerán delimitadas siempre que se encuentren fuera del recinto de obra.
- Los acopios de material se dejarán a una distancia superior a los 2 metros del borde de coronación de la zanja
- La maquinaria a emplear en la obra irá provista de cabinas antivuelco y anti-impacto.
- Los operarios harán uso de los cinturones de seguridad homologados, verificando el correcto estado antes de iniciar los trabajos.
- Los equipos de elevación deben ser verificados antes de su utilización.
- Las cargas elevar estarán flejados o paletizadas para evitar su caída o desprendimiento.
- Los acopios de colocarán teniendo en cuenta los mejores accesos por las distintas calles y las zonas más libres y amplias del recinto de obra.

**D.- Equipos de Protección Individual**

- Casco homologado.
- Ropa de trabajo de alta visibilidad.
- Guantes de uso general, para manejos de materiales.
- Botas de agua.
- Chaleco reflectante.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.

**E.- Protecciones Colectivas**

- Señalización de tráfico adecuada.
- Vallas de limitación y protección.
- Cintas de balizamiento.
- Balizas luminosas.
- Topes de desplazamiento de material

### 1.3.7.- TRABAJOS TOPOGRÁFICOS Y DE REPLANTEO.

**A.- Descripción de la Actividad**

Esta actividad que se realiza desde el inicio de la obra hasta su final, comprende todas las labores que un equipo de topografía especializado, formado generalmente por un topógrafo y ayudantes, realiza para dejar hitos y medidas referenciadas en el terreno, definiendo por medio de los replanteos, todos los datos geométricos, para poder llevar a cabo las actividades y ejecutar los elementos constructivos que componen la obra.

Se procederá al replanteo de todas las unidades de obra mediante la colocación de estacas, referencias topográficas sobre el suelo o referencias topográficas en las zanjas desde la parte superior de las mismas. En algún caso habrá que acceder al interior de la zanja para replanteos de cotas en tuberías y/o servicios.

Este equipo normalmente reforzado, inicia su trabajo antes de comienzo de las actividades de la obra, realizando los replanteos previos y demás comprobaciones para definir las fases previas de la misma. Se desplaza habitualmente con un vehículo tipo furgoneta o todo terreno, que tiene capacidad para llevar los aparatos, trípodes, miras y medios auxiliares para el replanteo y mediciones.

Una vez comenzada la obra, la exposición al riesgo de accidentes se incrementa notablemente, ya que recorren y tienen presencia en todos los tajos y actividades de la misma, generalmente durante toda su duración.

En este sentido cabe destacar, que el peón, dada la posición que ocupa durante el desarrollo de los trabajos, está expuesto a mayor grado de riesgos que el operador o topógrafo, que en general se ubica en lugares estratégicos fuera de la zona afectada.

**B.- Evaluación de Riesgos**

- Caída de personas a distinto nivel durante las operaciones de replanteo.
- Caída de personas al mismo nivel.
- Pisadas sobre objetos.
- Golpes o cortes por objetos y herramientas.
- Proyección de fragmentos o partículas.
- Sobreesfuerzos.
- Exposición a contactos eléctricos.
- Exposición a sustancias nocivas.
- Accidentes causados por seres vivos.
- Atropellos o golpes con vehículos o maquinaria.
- Exposición a temperaturas extremas.

**C.- Medidas Preventivas**

- Antes del inicio de los trabajos de campo, se realizará un recorrido rápido con objeto de señalar los lugares de observación y los recorridos a realizar, detectando los posibles riesgos y la forma de evitarlos o minimizarlos.
- Extremar la precaución en las labores de fijación de estacas, respetando la distancia mínima de seguridad con los pies.
- Contactos eléctricos con miras al interferir con servicios afectados.
- Se comprobará la existencia de cables eléctricos o servicios afectados de toda índole.
- Todos los operarios llevarán calzado de seguridad.

- Para la realización de comprobaciones o materializar datos en zonas de encofrado o en alturas de estructuras y obras de fábrica, se tendrá que acceder por escaleras reglamentarias o accesos adecuados.
- Todos los trabajos que se realicen en alturas, de comprobación o replanteo, tienen que desarrollarse con cinturón de sujeción y estar anclado a puntos fijos de las estructuras si no existen protecciones colectivas.
- Deben evitarse ascensos y descensos por zonas de mucha pendiente. En caso necesario, se buscarán las zonas donde el ascenso o descenso sea más accesible pese a encontrarse lejos del punto de inspección. En algún caso puede recurrirse al apoyo de otra persona o al amarre con un cinturón de sujeción anclado a un punto suficientemente resistente.
- Debe evitarse la estancia durante los replántelos en zonas donde pueda existir riesgo de caída de objetos a distinto nivel. En el caso de no poder evitarse tal circunstancia, el equipo de topografía deberá notificar su presencia en dicho puesto de trabajo al resto del personal de obra.
- Para clavar las estacas con ayuda de los punteros largos se deberá hacer uso de guantes con marcado CE y punteros con protector de golpes en manos.
- Deben evitarse el uso de punteros que presenten deformaciones en la zona de golpeo.
- Previo desarrollo de la actividad se comprobará la existencia de cables eléctricos, para evitar contactos directos con los mismos.
- Los equipos de replanteo deben mantenerse fuera del radio de acción de maquinaria en movimiento.
- Se exigirá que todos los vehículos de transporte pasen correcta y periódicamente la ITV correspondiente.
- En caso de que los trabajos se desarrollen en carretera, se seguirán en todo momento las Recomendaciones de Señalización de Obras Fijas y Móviles del Ministerio de Fomento. En caso de ser necesario el corte de alguno de los carriles de circulación, se alternará el tráfico por medio de señalistas.
- La utilización por parte del operario de pintura de spray para marcaje de puntos requiere las siguientes normas de utilización que se recogen en las instrucciones de uso del producto y que se contemplan así mismo en el envase.
- Debe protegerse de los rayos solares.
- Se debe evitar su exposición a temperaturas superiores a 50 ºC.
- No debe perforarse ni quemar, incluso después de usado.
- No vaporizar hacia una llama o cuerpo incandescente.
- Debe mantenerse alejado de cualquier fuente de ignición.

**D.- Equipos de Protección Individual**

- Casco homologado.
- Ropa de trabajo.
- Guantes de uso general, para manejos de materiales, bordillos, prefabricados, tubos.
- Chaleco reflectante.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores
- Botas de goma para tiempo lluvioso.
- Siempre que las condiciones de trabajo exijan otros elementos de protección distintos a los anteriormente descritos, se dotará a los trabajadores de los mismos.

### E.- Maquinaria y Medios Auxiliares empleados

- Herramientas manuales.
- Escaleras de mano.
- Plataformas de trabajo.
- Equipos de topografía.

## 1.3.8.- TRABAJOS EN ESPACIOS CONFINADOS

### A.- Descripción de la Actividad

Son considerados espacios confinados las galerías de servicios soterradas, los pozos y las arquetas en servicio en los que se retira la entrada de hombre para acceder al interior.

### B.- Evaluación de Riesgos

- Caídas al mismo nivel.
- Caídas a distinto nivel.
- Caída de objetos en manipulación.
- Pisadas sobre objetos.
- Golpes y cortes con objetos y herramientas.
- Golpes contra objetos inmóviles.
- Golpes contra objetos móviles.
- Atrapamientos por o entre objetos.
- Proyección de fragmentos o partículas.
- Contacto eléctrico.
- Sobreesfuerzos por posturas incómodas.
- Exposición a sustancias nocivas o tóxicas.
- Ruido.
- Inundaciones.

### C.- Medidas Preventivas

- El acceso a depósitos, pozos y arquetas será por los pates existentes si se encuentran en buen estado. En caso contrario se utilizarán escaleras de mano reglamentarias ancladas en sus extremos y sobresaldrán 1 metro por encima de la cota de desembarco.
- Los montadores subirán y bajarán por escaleras de mano y/o pates de manera frontal, es decir, mirando directamente hacía los peldaños que se están utilizando y extremando las precauciones en el acceso debido al riesgo de resbalar por pavimento mojado.
- El punto de acceso al espacio confinado quedará delimitado en caso de posible caída a distinto nivel mediante vallado perimetral y señalizado con la leyenda “trabajadores en el interior”

- El acceso a espacios confinados se realizará siempre en un número mínimo de 2 personas, permaneciendo una tercera siempre en el exterior, en comunicación continua y constante con el interior, bien de manera visual o mediante walkies o sistema alternativo de idéntica eficacia.
- Previo al acceso al recinto se procederá a realizar la lectura de la atmósfera interior con el detector de gases. Para ello se introducirá el detector en el interior del espacio confinado con ayuda de una pértiga. Quedará suspendido durante 5 minutos hasta obtener la primera lectura. Si es favorable se procederá a entrar estando los trabajadores dotados de mascará con filtro ABDEK para todo tipo de gases inorgánicos y orgánicos.
- Los trabajadores controlarán de manera permanente el estado de la atmósfera de la zona de trabajo mediante medidores multifuncionales con detección de oxígeno, monóxido de carbono, dióxido de carbono, sulfhídrico y metano. En caso de sobrepasarse los valores límites establecidos será necesario paralizar los trabajos hasta conseguir atmósfera respirable.
- Si el resultado de la comprobación del estado de la atmósfera no es favorable será necesario paralizar los trabajos para decidir la forma de actuar. La primera opción será utilizar extracción localizada y abrir otra posible entrada para generar un flujo de aire suficiente.
- Si tras implantar dicha medida preventiva y repetir el proceso de medición anterior no se consigue atmosfera respirable, la realización de los trabajos implicará la utilización de equipos autónomos de respiración por parte de empresa especialista en este tipo de trabajos en atmósfera no respirable.
- Se prohíbe utilizar en el interior de espacios confinados maquinas-herramientas de combustión interna.
- La instalación eléctrica será normalizada, en particular en lo referente a cuadros eléctricos, aislamiento de conductores eléctricos, toma de tierra de cuadros eléctricos y conexión de equipos eléctricos a cuadros de alimentación.
- El espacio confinado tendrá iluminación general adecuada y suficiente.
- En caso de corte de suministro habrá previsto iluminación de emergencia, así como linternas. Se utilizarán portátiles de iluminación alimentados a tensión de seguridad de 24 voltios.
- Las herramientas eléctricas de mano serán preferentemente de doble aislamiento y su conexión a la energía eléctrica será normalizada mediante clavijas estancas.
- Los trabajadores evitarán dejar materiales y herramientas en el suelo en previsión de pisadas y torceduras. Se utilizarán cajas de herramientas adaptadas para la tarea.
- Los trabajadores no realizarán trabajos superpuestos y no se darán la espalda entre sí, más aún, si son de oficios diferentes.
- Los trabajadores evitarán las prisas y la precipitación, así como posturas incomodas que puedan dar lugar a sobreesfuerzos.
- Si las posturas incómodas son inevitables por la configuración del espacio confinado los trabajadores realizarán rotación de tareas para minimizar el tiempo de exposición.
- En caso de utilización de productos químicos en el interior de espacios confinados se cumplirán las indicaciones de la ficha de producto en cuanto a condiciones de ventilación en caso de existir restricciones al respecto.

**D.- Equipos de Protección Individual**

- Casco de seguridad.
- Botas de seguridad.
- Ropa de trabajo.
- Gafas de protección.
- Chaleco reflectante.
- Guantes de protección.
- Protectores Auditivos.
- Mascarilla de protección contra gases nocivos orgánicos e inorgánicos.

### 1.3.9.- DEMOLICIONES.

**A.- Descripción de la Actividad**

Se incluyen aquí todas las acciones necesarias para la demolición de acera y calzada cuando el recorrido de la zanja de excavación para canalizaciones coincida con las mismas.

Para el análisis de esta unidad se considera oportuno realizar una descripción de las actividades de obra que la componen:

- Demolición mediante medios mecánicos, consistente en los trabajos de levantado de pavimentos por medio de retroexcavadora o similar.
- Demolición mediante medios manuales, consistentes en trabajos de levantado de pavimentos mediante martillo neumático o eléctrico, debido a la presencia de servicios afectados.

1.3.9.1.- DEMOLICION POR MEDIOS MECANICOS.

**B.- Evaluación de Riesgos**

- Atropellos y atrapamientos:
- Explosiones e incendios.
- Electrocuciones.
- Caídas al mismo nivel
- Caídas a distinto nivel.
- Golpes o pinchazos contra objetos y herramientas.
- Caídas de objetos en manipulación.

**C.- Medidas Preventivas**

- Cuando una máquina de demolición este trabajando, no se permitirá el acceso al terreno comprendido en su radio de trabajo.
- No se permitirá el transporte de personas sobre estas máquinas.
- No se realizarán mediciones, replanteos ni ningún otro trabajo en las zonas donde estén trabajando máquinas hasta que estén paradas y el lugar seguro de no ofrecer riesgos de vuelcos o desprendimientos de tierras.
- Estará siempre manejada por personal autorizado y cualificado.

- Antes del inicio de los trabajos deberán ser anuladas las acometidas de servicios afectados existentes.
- Todas las maquinarias irán equipadas con equipos contraincendios y botiquines.
- No se fumará durante la carga de combustible.
- Todos los elementos tendrán la comprobación periódica que indique el fabricante en su manual de uso.
- Previo al inicio de los trabajos se procederá al desmantelamiento de todos los elementos que obstaculicen los trabajos con maquinaria, tales como bolardos, armarios o arquetas.
- Las zonas de picado deben estar delimitadas en todo momento mediante vallado tipo ayuntamiento.
- Se protegerán los elementos de servicios públicos que se vean afectados tales como alcantarillas, bocas de riesgo, alcorques, farolas para minimizar el riesgo de caída.
- No se abandonará la maquinaria sin antes haber dejado reposada en el suelo la cuchara o pala, parado el motor, quitada la llave de contacto y puesto el freno.
- No se sobrepasará la carga por encima de otros operarios.
- Los vehículos de carga o contenedores no sobrepasaran su límite máximo de carga.

**D.- Equipos de Protección Individual**

- Ropa de trabajo.
- Protecciones auditivas.
- Chaleco reflectante.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.
- Impermeables o trajes de agua para casos de días lluviosos.
- Mascarilla auto filtrante para trabajos con ambiente pulvígeno.

**E.- Protecciones Colectivas**

- Señalización de tráfico adecuada.
- Vallas de limitación y protección de bordes de zanjas y desniveles.
- Cintas de balizamiento.
- Balizas luminosas.

**F.- Maquinaria y Medios Auxiliares empleados**

- Retroexcavadora.
- Herramientas manuales.

## 1.3.9.2.- DEMOLICION POR MEDIOS MANUALES

**B.- Evaluación de Riesgos**

- Polvo ambiental.
- Contactos eléctricos:
- Golpes por o entre objetos

- Explosiones e incendios
- Sobresfuerzos:
- Caídas al mismo nivel

**C.- Medidas Preventivas**

- De haber posibilidades de polvo silíceo (o perjudicial) se dotará a los trabajadores de mascarillas antipolvo.
- Las zonas de trabajo susceptibles de generar polvo se mantendrán húmedas para minimizar su acción.
- Los equipos eléctricos se mantendrán fuera de las zonas de acumulación de agua.
- Antes de iniciar los trabajos se revisará el cableado y aislamiento de los mismos, desechando aquellos que presenten anomalías.
- Los compresores estarán situados a una distancia prudente de la zona de trabajo. Motores compresores y calderines estarán provistos de aparatos de medida eléctrica y manométrica.
- La zona de estacionamiento de compresores se encontrar delimitada.
- Las mangueras y conexiones se revisarán antes de su utilización.
- Se cumplirá el Reglamento de Recipientes a Presión respecto a su manejo, funcionamiento, revisiones y retumbado.
- De la puesta en marcha del compresor destinado a los martillos, se encargará una sola persona debidamente autorizada por el jefe del tajo; los empalmes de manguera y demás circuitos a presión, serán revisados diariamente para que estén en perfectas condiciones.
- Los calderines llevarán una placa en sitio visible, indicando la presión máxima de trabajo a que pueden someterse. Diariamente se revisarán las válvulas de seguridad. No se permitirán los empalmes y acoplamientos de mangueras y tuberías, cuyos dispositivos de unión estén en malas condiciones. La reparación se realizará por personal especializado. Se prohíbe la utilización de alambres en sustitución de las piezas abrazaderas de las conducciones.
- Respetar la distancia mínima de seguridad con los servicios afectados.
- Los trabajos se ejecutarán desde zonas estables del terreno.
- Se hará uso de protecciones lumbares adecuadas para evitar sobrecargas de la zona lumbar.
- Mantener las zonas de trabajo limpias y ordenadas.
- El cableado eléctrico provisional debe ir canalizado y protegido y fuera de las zonas de paso de trabajadores y maquinaria.

**D.- Equipos de Protección Individual**

- Casco homologado.
- Mascarilla
- Ropa de trabajo.
- Protectores auditivos.
- Guantes de uso general, para manejos de materiales, bordillos, prefabricados, tubos.
- Botas de agua.
- Chaleco reflectante.

- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.

### E.- Protecciones Colectivas

- Señalización de tráfico adecuada.
- Vallas de limitación y protección de bordes de zanjas y desniveles.
- Cintas de balizamiento.
- Balizas luminosas.

### F.- Maquinaria y Medios Auxiliares empleados

- Herramientas manuales.
- Plataformas de trabajo.
- Pistolete.
- Compresor.
- Taladro eléctrico.

## 1.3.10.- ELIMINACIÓN DE ESCOMBROS Y RESTOS EN OBRA.

### A.- Descripción de la Actividad

Esta actividad conlleva la carga en camión de los restos de las demoliciones y otros restos generados por la obra y la salida de los mismos de la zona de obras. Las posibles afecciones al tráfico rodado o paso de peatones serán analizadas con el promotor y el Ayuntamiento, para adoptar las medidas oportunas.

### B.- Evaluación de Riesgos

- Atropellos:
- Choques entre objetos.
- Caída a distinto nivel.
- Caída de objetos.

### C.- Medidas Preventivas

- Las maniobras de carga y traslado de contenedores se realizarán en zonas habilitadas para tal fin y con apoyo de señalistas en las maniobras de carga y traslado de material.
- Las zonas de acopio deben estar en buen estado de conservación.
- Las zonas de acceso a contenedores o sacas se mantendrán limpias y ordenadas.
- Los materiales que no puedan evacuarse se colocarán en una zona de obra donde no interfiera en las zonas de paso de peatones y vehículos...
- Los acopios de áridos se realizarán de forma estable y segura para su posterior traslado a vertedero.
- No se sobrecargará las carretillas de mano para el traslado de material.
- La evacuación y recogida de escombros se realizará de forma periódica para evitar su acumulación excesiva.

- Las sacas y contenedores para la recogida de material serán verificadas antes de realizar su traslado.
- Las sacas deben encontrase dentro de los márgenes temporales de uso que establece el fabricante.

### D.- Equipos de Protección Individual

- Casco homologado.
- Ropa de trabajo.
- Guantes de uso general, para manejos de materiales, bordillos, prefabricados, tubos.
- Botas de agua.
- Chaleco reflectante.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.

### E.- Protecciones Colectivas

- Señalización de tráfico adecuada.
- Vallas de limitación y protección de bordes de zanjas y desniveles.
- Cintas de balizamiento.

### F.- Maquinaria y Medios Auxiliares empleados

- Herramientas manuales.
- Contenedores o sacas.
- Carretón o carretilla de mano.
- Plataformas de trabajo.
- Dúmper.
- Camión Basculante

## 1.3.11.- EXCAVACIÓN DE ZANJAS, POZOS, ARQUETAS Y ACOMETIDAS

### A.- Descripción de la Actividad

Se incluyen aquí todas las acciones necesarias para la excavación de zanja, mediante medios mecánicos o manuales, para la colocación de la red de abastecimiento de agua.

El procedimiento de ejecución previsible es mediante máquina retroexcavadora o miniexcavadora según las dimensiones de la zanja en cuestión, si bien, el proyecto ha previsto las correspondientes excavaciones a mano, con el fin de que se produzcan el mínimo de roturas, tanto en la red de distribución de agua como en el resto de los servicios existentes, a veces muy próximos unos de otros.

Para el análisis de esta unidad se considera oportuno realizar una descripción de las actividades de obra que la componen:

- *Despeje y desbroce del terreno* en los casos en que la traza discurra por zonas rusticas o zonas verdes.
- *Excavación de zanja mediante medios mecánicos*, consistente en los trabajos de excavación de terreno duro por medio de retroexcavadora o similar.
- *Excavación mediante medios manuales*, consistentes en trabajos de excavación de terreno medio o blando mediante palas o rastrillos, debido a la presencia de servicios afectados se analiza en el apartado anterior.
- *Entibación*. En función a la profundidad y propiedades de la excavación definida en el proyecto se analizan los diversos casos de entibación que puedan darse durante la ejecución de la excavación.
- *Ejecución de pozos*. Excavación en vertical hasta una determinada profundidad definida en el proyecto y revestimiento de ésta mediante fábrica de ladrillo o elementos prefabricados en función de lo definido en proyecto.

1.3.11.1.- EXCAVACIÓN DE ZANJA POR MEDIOS MECÁNICOS O MANUALES

**B.- Evaluación de Riesgos**

- Atropellos, colisiones, vuelcos y falsas maniobras:
- Deslizamiento y desprendimiento de tierras.
- Contactos eléctricos directos.
- Interferencias de conducciones subterráneas.
- Inundaciones.
- Golpes entre vehículos.
- Caídas del personal al mismo nivel.
- Caídas del personal a distinto nivel.
- Explosiones o incendios.
- Ruidos y generación de polvo.
- Desprendimientos del material dentro del radio de acción de la maquinaria.

**C.- Medidas Preventivas**

- No se realizarán mediciones, replanteos ni ningún otro trabajo en las zonas donde estén trabajando maquinas hasta que estén paradas y en lugar seguro de no ofrecer riesgos de vuelcos o desprendimientos.
- Los caminos y zonas de paso de maquinaria se limpiarán de la posible caída de material.
- Se tendrán chapones metálicos preparados con sus dimensiones adecuadas para paso de vehículos sobre las zanjas.
    - Tendrán soldadas orejetas para su manipulación mecanizada. En su defecto tendrán dos agujeros para favorecer dicha manipulación. Se elevarán y pondrán en obra sujetos siempre por dos puntos diferentes.
    - Para la manipulación mecanizada no se improvisarán los aparejos de izado ni los elementos de sustentación y amarre.
    - Las herramientas manuales para su manipulación y puesta definitiva en obra no serán improvisadas.
    - Se utilizarán barras de uñas adecuadas.

  - Se prohíbe la manipulación manual para ajustar y calzar el chapón en el punto de instalación.
  - En el acopio temporal estarán ordenados y bien apilados., separados de zonas de paso y circulación.
  - Durante el montaje, los montadores estarán auxiliados por señalistas dotados de paletas normalizadas.
- Los camiones interiores de la obra se situarán al menos a 4 metros del borde la zanja.
- Cambios en el movimiento de vehículos: se mantendrán los camiones lejos de los taludes de la excavación.
- Revisar los neumáticos para minimizar el riesgo de explosión de neumáticos.
- Los neumáticos de los vehículos de transporte serán objeto de revisión periódica, en cuanto a estado de cubiertas y presiones de hinchado, vigilando asimismo la posible aparición de grietas en sus llantas, que pudieran originar roturas súbitas de las mismas.
- Los trabajos de reparación de la maquinaria se realizarán obligatoriamente con la maquinaria parada.
- Las maniobras de la maquinaria estarán dirigidas por persona distinta al conductor.
- Se cumplirá la prohibición de presencia del personal en la proximidad de las máquinas durante su trabajo.
- Al realizar trabajos en la zanja, la distancia mínima entre los trabajadores será de 1 metro.
- Se atenderá en todo momento a lo indicado en el estudio geotécnico del presente proyecto en cuanto a la estabilidad del terreno, pendientes máximas en talud, altura de talud, mesetas, etc. En ausencia de datos se atenderá a lo indicado en las notas técnicas de prevención referentes a estabilidad de taludes en función del tipo del terreno, resistencia del terreno y altura del talud.
- Las tierras procedentes de excavación, así como los acopios de materiales, se situarán a distancia no menor de 2 metros del borde de la misma.
- Antes de iniciar los trabajos debe revisarse el estado de los taludes de excavación.
- En la ejecución de la zanja habrá que controlar las condiciones del suelo, la proximidad de servicios públicos tales como caminos y carreteras y cualquier otra fuente susceptible de transmitir vibraciones y presiones adicionales, la proximidad de puntos de agua, la proximidad de servicios afectados y las alteraciones artificiales del terreno.
- Antes de comenzar con los trabajos habrá que revisar las zanjas después de dos días de inactividad.
- Se evitará dejar lentejones y restos de materiales en la coronación de los taludes.
- Se dispondrán de módulos metálicos de entibación en caso de ser necesaria la entibación de zanjas en zonas inestables para profundidades superiores a 1, 30 m.
- Quedan prohibidos los acopios a una distancia inferior a los 2 metros del borde la zanja.
- Cuando la profundidad de la zanja sea igual o superior a 1,5 metros, se entibará conforme a la actividad desarrollado más adelante.
- Las paredes de la excavación se controlarán cuidadosamente después de grandes lluvias o heladas, desprendimientos o cuando se interrumpa el trabajo más de un día, por cualquier circunstancia.
- Si los trabajos requieren iluminación se efectuará mediante torretas aisladas con toma de tierra, en la que se instalarán proyectores de intemperie, alimentados a través del cuadro general de obra.

- Si los trabajos requieren iluminación portátil, la alimentación de las lámparas se efectuará a 24 V. Los portátiles estarán provistos de rejilla protectora y de carcasa - mangos aislados eléctricamente.
- La estancia de personal trabajando en planos inclinados con fuerte pendiente, o debajo de macizos horizontales, estará prohibida.
- Antes del inicio de los trabajos se inspeccionará al tajo con el fin de detectar las posibles causas de accidentes así como la existencia de servicios afectados
- Se estudiarán las condiciones del suelo y si ha sido alterado de alguna forma, antes de la excavación, en especial en periodos de lluvia.
- Se efectuará el achique inmediato de las aguas que afloren o caigan en el interior de las zanjas para evitar que se altere la estabilidad de los taludes.
- Si el desbroce está en zona no visible, se balizará con malla naranja el perímetro para evitar el acceso de personal ajeno a la obra.
- No acopiar material en zonas de tránsito de vehículos o zonas de paso de peatones.
- En el interior de las zanjas se trabajará siempre por parejas.
- Los desplazamientos por las zonas de excavación se realizarán por zonas seguras y estables.
- Los bordes de talud estarán señalizados con malla naranja tipo sttopper o cinta de señalización y vallados o protecciones mediante barreras tipo new jerseys debidamente ancladas en caso necesario (p.ej: zonas de paso de personas ajenas por caminos colindantes).
- El acceso a zanjas y pozos se hará por escaleras, que sobresaldrán 1 metro como mínimo por encima de la excavación.
- El personal que deba trabajar en el interior de la excavación conocerá los riesgos a los que está sometido.
- Cuando la profundidad de una zanja sea igual o superior a los 2 m se protegerán los bordes de coronación mediante una barandilla reglamentaria (sólida de 90 cm de altura, pasamanos, listón intermedio y rodapié) situada a una distancia mínima de 2 m del borde.
- Cuando la profundidad de la zanja sea inferior a los 2 m, puede instalarse una señalización de peligro formada por cuerda de banderolas sobre pies derechos.
- Los trabajos a realizar en los bordes de las zanjas, con taludes no muy estables, se ejecutarán sujetos con el cinturón de seguridad amarrado a “puntos fuertes” ubicados en el exterior de las zanjas. (no obstante se evitará en lo posible esta medida protegiendo el talud
- Los recipientes que contengan productos tóxicos, inflamables, deben estar herméticamente cerrados.
- Se estudiará la proximidad de instalaciones de servicio público, carretera de mucho tráfico y cualquier otra fuente de vibración, así como la proximidad de arroyos, alcantarillas antiguas, cables enterrados, etc.
- Los operarios realizarán los trabajos con protecciones auditivas cuando se sobrepasen los niveles acústicos recomendados.
- Las zonas de excavación se mantendrán húmedas para evitar la generación de polvo.
- Zonas de trabajo limpias y ordenadas.
- Mientras se excava, se observará:
- Si cambian las condiciones del suelo, especialmente después de haber llovido.
- Si las condiciones indican algo de oxígeno o gas en la zanja.

- La manera de entrar o salir de la excavación.
- No se sobrepasara la carga por encima de otros operarios.
- Los vehículos de carga o contenedores no sobrepasaran su límite máximo de carga.
- Los camiones de transporte de tierras y vegetaciones circularán a velocidad reducida y con lonas que protejan la caída de materiales.
- Colocación de los equipos pesados o tuberías, con los medios adecuados.
- Al proceder al vaciado, la retroexcavadora actuará con las zapatas de anclaje, apoyadas en el terreno.
- La salida a la calle de camiones será avisada por persona distinta al conductor, para prevenir a los usuarios de la vía pública.
- Mantenimiento correcto de la maquinaria.
- Correcta disposición de la carga de tierras en el camión, no cargándolo más de lo admitido.

**D.- Equipos de Protección Individual**

- Ropa de trabajo.
- Protecciones auditivas.
- Chaleco reflectante.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.
- Impermeables o trajes de agua para casos de días lluviosos.
- Mascarilla auto filtrante para trabajos con ambiente pulvígeno.

**E.- Protecciones Colectivas**

- Señalización de tráfico adecuada.
- Vallas de limitación y protección de bordes de zanjas y desniveles.
- Cintas de balizamiento.

**F.- Maquinaria y Medios Auxiliares empleados**

- Escaleras de mano.
- Contenedores.
- Dúmper.
- Camión Basculante.
- Retroexcavadora.
- Minicargadora
- Herramientas manuales.

## 1.3.11.2.- ENTIBACIÓN DE ZANJAS

**A.- Descripción de la Actividad**

Consiste en la colocación de un sistema constituido por elementos metálicos o de madera, acodalados entre sí mediante puntales, con objeto de evitar el desplome de las paredes

verticales de las zanjas, permitiendo así la realización de trabajos en el interior de las zanjas en condiciones de seguridad.

Para la elección del mismo se necesitará conocer el empuje del terreno, el diámetro de la tubería, y la longitud del tubo. Se deberá realizar un estudio pormenorizado en cada caso, teniendo en cuenta no sólo los empujes del terreno, y las solicitaciones de edificios o viales cercanos, sino las filtraciones de agua, los factores atmosféricos o las sobrecargas ocasionales, considerando incluso la posibilidad de realizar cálculos geotécnicos

Se realizarán entibaciones siempre que por causas justificadas no se puedan realizar taludes estables.

**B.- Evaluación de Riesgos**

- Caídas a distinto nivel.
- Caídas al mismo nivel
- Atropellos o colisiones.
- Sepultamiento.
- Desprendimientos.
- Caída de objetos durante la manipulación.
- Sobreesfuerzos.
- Ruido.

**C.- Medidas Preventivas**

- Se señalizará los caminos de circulación interna, construyéndose dos accesos separados de la excavación, uno para personas y otro para la circulación de maquinaria y vehículos.
- No golpear la entibación durante la excavación. Los codales no se utilizarán para el ascenso y descenso de cargas ni para acceder a la zanja.
- No se realizarán trabajos en el interior de la excavación hasta que no se hayan finalizado los trabajos de entibación.
- Cuando en función de la profundidad de la excavación y de las características del entorno no se puedan realizar taludes auto estables, se estudiará la realización de bermas auto estables, cuando no sea posible realizar bermas, ataludamientos, amén de los agotamientos necesarios y el terreno no presente adecuada resistencia ni cohesión, se establecerá el sistema de entibación más adecuado que sea compatible con el sistema productivo.
- Se utilizaran testigos que indiquen cualquier movimiento de tierras que suponga un riesgo de desprendimientos.
- Se revisaran las entibaciones tras la interrupción de los trabajos antes de reanudarse de nuevo.
- Siempre que sea previsible el paso de peatones o vehículos junto al borde del corte, se dispondrán de vallas móviles que se iluminarán cada 10 m. con puntos de luz portátil
- Las áreas de trabajo en las que el avance de la excavación determine riesgo de caída de altura, se acotarán debidamente con barandilla de 0,90 m. de altura siempre que se prevea la circulación de personas o vehículos en las inmediaciones.

- No deben retirarse las medidas de protección de una zanja mientras hayan operarios trabajando en profundidad igual o superior a 1,30 m bajo el nivel del terreno.
- Los materiales necesarios para refuerzo y entibado se acopiarán en obra con la antelación suficiente, para que el avance de la excavación sea seguido con la inmediata colocación de los mismos.
- Para la ejecución de la actividad se planifica el uso de los siguientes equipos de protección individual, protecciones colectivas, maquinaria y medios auxiliares.
- Si la inestabilidad del terreno no permite la permanencia del personal dentro de la zanja, antes de su entibado, será obligado hacer este, desde el exterior de la misma.
- Se extremarán las prevenciones después de interrupciones del trabajo o después de alteraciones atmosféricas como lluvias o heladas.
- Las tierras procedentes de excavación, así como los acopios de materiales, si su peso es tal, que puedan afectar a la estabilidad del talud, se situarán a la distancia que defina el estudio geotécnico de proyecto.
- Si la entibación es de madera, se utilizarán tableros o tablones suficientemente resistentes y se acodalarán con puntales o tablones, tal como se establezca en cada caso.
- Tipos de entibación:
    - Ligera: para cortes de profundidad comprendida entre 1,25 y 2 m. (un tablón horizontal con codales )
    - Semicuajada: para cortes de profundidad entre 2 m y 2,50 m (tablones verticales sobre ellos tablones horizontales y todo el conjunto acodalado)
    - Cuajada: para cortes con profundidad superior a 2,50m (tableros de madera o metálicos con una superficie igual a la del talud y acodalados) En terrenos sueltos, para cualquier profundidad debe utilizarse siempre entibación cuajada.
    - Para pozos: Camisa metálica en todo el perímetro
- La entibación deberá sobrepasar la altura de coronación del talud.
- Los clavos existentes en la madera ya usada se quitarán o remacharán inmediatamente después de haber desentubado, retirándolos a zonas de recogida de escombros.
- Se sustituirán los tablones, maderas, etc. deteriorados
- Si la entibación es metálica o con paneles si disponen de nervios o zonas reforzadas, de manera general, será estas zonas donde se acodalen, aunque deberá ser el fabricante o suministrador quien determine como y donde deber acodalarse.
- No permanecerán trabajadores bajo las cargas suspendidas.
- El ascenso y descenso a las zanjas y los pozos se realizará mediante escaleras de mano, que sobresaldrán 1 metro como mínimo por encima de la excavación y situadas cada 20 m.
- Las tareas de desentibado tienen tantos riesgos como las de entibado, debido a la posibilidad de derrumbamientos por descompresión del terreno. Siempre se realizará por tramos cortos, empezando por la parte inferior y acabando por la superior. La extracción de los elementos de la entibación se hará desde el nivel del suelo no desde la zanja. En terrenos especialmente peligrosos por carecer de consistencia o frente a cualquier dura de estabilidad, se dispondrá el abandono de la entibación.
- Se extremará la vigilancia de taludes de las zanjas, durante las operaciones de entibado y desentibado, en prevención de derrumbamientos del terreno.

**D.- Equipos de Protección Individual**

- Casco homologado.
- Mascarilla
- Ropa de trabajo.
- Protectores auditivos.
- Guantes de uso general, para manejos de materiales, bordillos, prefabricados, tubos.
- Botas de agua.
- Chaleco reflectante.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.

**E.- Protecciones Colectivas**

- Señalización de tráfico adecuada.
- Vallas de limitación y protección de bordes de zanjas y desniveles.
- Cintas de balizamiento.
- Balizas luminosas.

**F.- Maquinaria y Medios Auxiliares empleados**

- Escaleras de mano.
- Puntales.
- Camión pluma.
- Camión basculante.
- Radiales
- Herramientas manuales.
- Plataformas de trabajo.

## 1.3.11.3.- EJECUCIÓN DE POZOS

**A.- Descripción de la Actividad**

Actividad consistente en la excavación a una determinada profundidad definida en el proyecto y el revestimiento de ésta mediante fábrica de ladrillo o elementos prefabricados en función de lo definido en proyecto. La excavación se realizará con el empleo de medios mecánicos siempre que por sus dimensiones sea posible, evitando en la medida de lo posible la ejecución a mano y de acuerdo con lo establecido en el apartado correspondiente a zanjas.

El revestimiento se ejecutará mediante grúa para el caso de módulos prefabricados y mediante colocación de la fábrica de ladrillo desde el interior del pozo para el caso de fábrica de ladrillo.

**B.- Evaluación de Riesgos**

- Caída de personas al mismo nivel
- Caída de personas a distinto nivel al acceder a los pozos y zanjas
- Golpes de objetos.

- Pisadas sobre materiales.
- Los propios de la maquinaria y medios auxiliares a utilizar ( Ver capítulo de maquinaria y medios auxiliares)

### C.- Medidas Preventivas

- Cuando se deban utilizar sistemas de elevación o bajada de materiales al interior de un pozo, el plan de seguridad y salud de la obra contemplará las condiciones de diseño y construcción de los mismos, habida cuenta de que el método que sea utilizado no tiene que entrañar peligro alguno para los trabajadores que se encuentran en el fondo del pozo y que el aparato elevador deberá disponer de limitador de final de carrera del gancho, así como de un pestillo de seguridad instalado en el mismo gancho
- Las medidas de seguridad y protecciones colectivas son las mismas que las especificadas para la realización de zanjas en general, si bien hay que tener en cuenta la característica especial de la conexión de estas con alcantarillas existentes.
- Dentro de los pozos, para el alumbrado se dispondrá de portátiles de 24 V
- Está prohibido fumar en las proximidades de los entronques con los colectores
- Durante la ejecución del entronque se vigilará atentamente la existencia de gases, mediante la utilización de un detector.
- Al menor síntoma de mareo y/o asfixia, se dará la alarma, saldrán ordenadamente de las zonas próximas al entronque y se pondrá este hecho en conocimiento del Jefe de Obra.
- Se habilitará una parte del pozo para bajar tanto la electricidad, como la tubería de achique de agua, como los conductos de aire comprimido, en caso de ser estos precisos.

## 1.3.12.- INSTALACIONES DE CONDUCCIONES Y ACCESORIOS.

### A.- Descripción de la Actividad

Se incluyen aquí todas las acciones necesarias para la colocación de conducciones y accesorios necesarios para la red de abastecimiento de agua a instalar.

Para el análisis de esta unidad se considera oportuno realizar una descripción de las actividades de obra que la componen:

- Manipulación de cargas de forma manual.
- Manipulación de cargas de forma mecánica.
- Colocación de tubería y piezas especiales.
- Corte de tubería con radial.
- Acometidas de polietileno.
- Pruebas de carga de tubería.

1.3.12.1.- MANIPULACIÓN DE CARGAS DE FORMA MANUAL

**A.- Descripción de la Actividad**

- Elementos que se colocan manualmente: acopio de materiales, colocación de equipos,
- Retirada de elementos de pequeño tamaño,
- La manipulación de los elementos que requieren prácticamente todas las actividades (montaje de encofrados para el hormigonado,…).

*Siempre que sea posible se utilizarán equipos de trabajo o incluso herramientas manuales auxiliares para el levantamiento de cargas, aunque en numerosas ocasiones es inevitable realizar esta manipulación.*

**B.- Evaluación de Riesgos**

- Caídas al mismo nivel
- Golpes contra objetos.
- Sobresfuerzos.
- Caídas de objetos en manipulación.

**C.- Medidas Preventivas**

- No transporte cargas que por su forma o volumen le impida ver el camino a recorrer.
- Antes de levantar un objeto se deberá inspeccionar la zona que lo rodea y la ruta que se va a seguir en su traslado, asegurándose de que no hay obstáculos o materias derramadas con las que se pueda tropezar o resbalar.
- Si el desbroce esta en zona no visible, se balizará con malla naranja el perímetro para evitar el acceso de personal ajeno a la obra.
- Se examinará el campo de movimiento de dicho objeto para evitar golpear con otros objetos y desequilibrarse y para evitar golpear a otros trabajadores
- Nunca transporte cargas mirando hacia atrás.
- Se debe examinar el objeto a transportar o manipular para decidir cuál es la mejor manera de agarrarlo.
- No se debe llevar más carga de la que se pueda razonablemente transportar.
- Para evitar lesiones de cintura, no torsione el cuerpo mientras levanta objetos.
- No se sobrepasara la carga por encima de otros operarios.
- Se deben evitar torsiones de tronco mientras se soporta una carga
- Se manipularán piezas voluminosas o pesadas de una en una, nunca varias piezas a la vez.
- Procurar siempre que los materiales estén a la altura en que se ha de trabajar con ellos.
- Es obligatoria la inspección visual del objeto pesado a levantar para eliminar aristas afiladas, clavos, astillas, grasa, papeles o etiquetas mal adheridas, con el fin de dejarlo en condiciones de manejo.
- Acercarse lo más posible a la carga de modo que el centro de gravedad de ésta quede lo más próximo posible al centro de gravedad del cuerpo.
- Afianzar los pies sobre el suelo. Buscar el equilibrio. Mantener los pies ligeramente separados y uno ligeramente adelantado respecto al otro.

- Agarrar el objeto firmemente. Lo correcto es cogerlo con la palma de la mano y la base de los dedos. Utilice ambas manos. Los movimientos curvos y continuos son preferibles a los movimientos rectos con cambios bruscos. Mantener los brazos pegados al cuerpo par que sea éste el que soporte el peso.
- Doblar las rodillas. Con ello utilizamos la fuerza de los músculos de las piernas que son más potentes que los de los brazos. El hecho de flexionar las piernas ayuda a mantener la espalda recta. Arquear la espalda entraña un riesgo de lesión en la columna, aunque la carga no sea demasiado pesada.



- Elevar la carga empleando las piernas y los brazos estirados. Para transportar una carga, ésta debe mantenerse pegada al cuerpo, sujetándola con los brazos extendidos, no flexionados.



- Evitar los giros del tronco, sobre todo si se realiza mientras se levanta la carga. En este caso es preferible primero levantar la carga y luego girar todo el cuerpo moviendo los pies a base de pequeños desplazamientos.
- Aprovechar el propio peso y la reacción de los objetos. Cuando levantamos un objeto debemos aprovechar el impulso dado a la carga para despegarla del suelo. De igual forma, en el descenso de la carga servirse de la gravedad y evitar tener que vencerla con el esfuerzo muscular.
- En el traslado de una carga llevarla de manera que no interfiera el campo de visión.
- Si se nota una distensión, parar y pedir ayuda.
- Como premisa general, no levantar más de 25 Kg Si se rebasa este peso, solicitar ayuda. La legislación vigente admite levantamientos de hasta 40 Kg, a personas físicamente preparadas y en acciones puntuales.
- Al objeto de reducir la fatiga no permanecer demasiado tiempo en la misma posición y efectuar movimientos suaves de estiramiento de los músculos. De manera general evitar trabajos que requieran posturas forzadas o extremas de algún segmento corporal o el mantenimiento prolongado de cualquier postura.
- Para descargar materiales, es obligatorio tomar las medidas siguientes:
- Entregar el material, no tirarlo.
- Colocar el material ordenado y, en caso de apilarlo, hacerlo en pilas estables, lejos de accesos, zonas de paso o sitios donde pueda recibir golpes o desmoronarse.

- En lo posible evite los movimientos bruscos y forzados del cuerpo.

**D.- Equipos de Protección Individual**

- Ropa de trabajo.
- Protecciones auditivas.
- Chaleco reflectante
- Fajas dorsolumbares, si está recomendado por el facultativo.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.
- Impermeables o trajes de agua para casos de días lluviosos.
- Mascarilla auto filtrante para trabajos con ambiente pulvígeno.

1.3.12.2.- MANIPULACIÓN DE CARGAS DE FORMA MECÁNICA

**A.- Descripción de la Actividad**

Se analizan los riesgos derivados de los posibles trabajos de traslado de conducciones y accesorios mediante camión grúa o retroexcavadora.

**B.- Evaluación de Riesgos**

- Atropellos o colisiones.
- Golpes por o entre objetos:
- Desprendimientos de objetos.
- Caídas de personal a distinto nivel.

**C.- Medidas Preventivas**

- Antes de comenzar la maniobra se comprobará el peso exacto de la pieza, y que tanto la máquina como los elementos auxiliares necesarios para efectuar el izado son capaces de resistir a la carga y que se encuentran en perfecto estado de conservación y funcionamiento.
- Se comprobará que el estrobado de las piezas es correcto y no permite el desplazamiento o caída de la carga.
- El estrobado de piezas y la sujeción a estructuras de poleas de reenvío se harán preferentemente por medio de cáncamos y grilletes. Cuando esto no fuera posible, los cables y estrobos se protegerán con cantoneras.
- Se evitará dar golpes a los grilletes, así como soldar sobre ellos o calentarlos. Las mismas precauciones se adoptarán con las poleas.
- Se acotará y señalizará la zona de izado.
- Se comprobará, antes de comenzar la maniobra, que el camino que ha de recorrer la pieza está libre de obstáculos.
- Se procurará que las parejas de radioteléfonos utilizados en la obra, emitan en diferentes longitudes de onda para evitar interferencias: en cualquier caso se deben utilizar claves de identificación cada vez que se dé una orden por medio de radioteléfono.

- El personal que ordene las maniobras deberá estar especializado; se evitarán los cambios del personal dedicado a estas tareas.
- El personal dedicado habitualmente a la ejecución de maniobras, dispondrá de tablas e instrucciones que le permitan seleccionar correctamente los elementos adecuados a cada maniobra.
- Las maniobras importantes estarán calculadas y supervisadas por un técnico capacitado para ello.
- El izado de la carga se hará vertical y no en sentido oblicuo.
- Se prohíbe el traslado de personal sobre cargas, ganchos o eslingas vacías.
- Para el izado de materiales menudos emplearán recipientes cuya capacidad de carga esté calculada y reflejada de forma bien visible sobre el recipiente.
- Se prohíbe terminantemente situarse sobre piezas suspendidas.
- Se prohibirá dejar los aparatos de elevación con cargas suspendidas.
- Especial atención a la presencia de líneas eléctricas aéreas.
- Si en la proximidad de la grúa hay líneas eléctricas se respetarán siempre las distancias mínimas establecidas, en caso de duda se pedirá el corte de corriente.
- Se prohibirá dejar los aparatos de elevación con cargas suspendidas.
- Se comprobará que el terreno sobre el que ha de asentarse la grúa tiene la resistencia adecuada.
- No se emplearán grúas para arrastrar piezas ni para arrancar objetos empotrados.
- Se comprobará con frecuencia el correcto funcionamiento de los mecanismos limitadores de carga y del anemómetro; se prohíbe terminantemente anular o modificar estos aparatos.
- No se efectuarán izados cuando la velocidad del viento sobrepase la velocidad límite establecida en las especificaciones de la grúa.
- Aún cuando la velocidad del viento no llegue al límite, se considerará el posible efecto sobre la pieza debido al tamaño o forma de ésta, desistiendo del izado cuando se sospeche que se pueden producir oscilaciones de la pieza a causa del viento.
- Las maniobras con grúa se efectuarán con todos los gatos apoyados.
- Durante la parada de fin de jornada se adoptarán las precauciones especificadas al efecto por el fabricante.

**ELEMENTOS AUXILIARES PARA LA ELEVACIÓN DE CARGAS**

- Ganchos

  - No se sobrepasará la carga máxima de utilización.
  - No se usarán ganchos viejos, ni se intentará enderezar éstos.
  - Los ganchos han de contar con pestillo para evitar que se desenganche la carga.

- Cables

  - Existen muchos tipos de cables, según la disposición de alambres y cordones de la forma de enrollamiento, etc.
  - Cada tipo de cable está pensado para una utilización concreta, usarlo de otra forma puede dar lugar a accidentes, por tanto debemos:
  - Elegir el cable más adecuado: Un cable está bien elegido si tiene la composición adecuada y la capacidad de carga necesaria para la operación a realizar, además de carecer de defectos apreciables. No obstante, se puede dar una

regla muy importante, y es que un cable de alma metálica no debe emplearse para confeccionar eslingas, porque puede partirse con facilidad aún con cargas muy inferiores a lo habitual.

- Revisarlo frecuentemente: es absolutamente necesario revisar los cables con mucha frecuencia, atendiendo especialmente a:
    - ✓ Alambres rotos.
    - ✓ alambres desgastados.
    - ✓ Oxidaciones.
    - ✓ Deformaciones.
- Realizar un mantenimiento correcto. En cuanto a mantenimiento de los cables, damos a continuación las siguientes reglas:
- Desarrollo de cables: Si el cable viene en rollos, lo correcto es hacer rodar el rollo. Si viene en carrete, se colocará éste de forma que pueda girar sobre su eje.
- Cortado de cables: El método más práctico para cortar cable es por medio de soplete; también puede utilizarse una cizalla.
- Engrase de cables: La grasa reduce el desgaste y protege al cable de la corrosión.
- Almacenamiento de cables: Deberá ser en lugares secos y bien ventilados, los cables no deben apoyar en el suelo.

- Eslingas

Eslingas y estrobos son elementos fundamentales en el movimiento de cargas, su uso es tan frecuente en las obras que a menudo producen accidentes debido a la rotura de estos elementos o al desenganche de la carga.

En general, estos accidentes pueden estar ocasionados por: Mala ejecución de la eslinga: Las gafas de las eslingas pueden estar realizadas de tres maneras:

- Gazas cerradas con costuras. Las costuras consisten en un entrelazado de los cordones del cable. Tiene buena resistencia.
- Gazas cerradas con perrillos. Son las más empleadas por lo sencillo de su ejecución. El número de perrillos y la separación entre ellos depende del diámetro del cable que se vaya a utilizar.

| | | |
|---|---|---|
| Hasta 12 mm | Núm. Perrillos 3 | Distancia 6 Diámetros |
| 12 mm a 20 mm | Núm. Perrillos 4 | Distancia 6 Diámetros |
| 20 mm a 25 mm | Núm. Perrillos 5 | Distancia 6 Diámetros |
| 25 mm a 35 mm | Núm. Perrillos 6 | Distancia 6 Diámetros |

- Gazas con casquillos prensados. Se caracteriza porque se realiza el cierre absoluto de los dos ramales mediante un casquillo metálico.
- Para elegir correctamente una eslinga, se tendrá en cuenta que el cable que la constituye tenga:

- Capacidad de carga suficiente. La carga máxima depende fundamentalmente del ángulo formado por los ramales. cuanto mayor sea el ángulo más pequeño es la capacidad de carga de la eslinga. Nunca debe hacerse trabajar una eslinga con un ángulo superior a 90 grados (Ángulo correcto).
- Composición del cable de la eslinga. Deben emplearse siempre cables muy flexibles, por eso desestiman los de alma metálica. Otra norma muy importante es la de no utilizar jamás redondos de ferralla (cabillas o latiguillos) para sustituir a la eslinga.
- Para utilizar correctamente eslingas y estrobos, debemos tener en cuenta los puntos siguientes:
- Cuidar el asentamiento de las eslingas, es fundamental que la eslinga quede bien asentada en la parte baja del gancho.
- Evitar los cruces de eslingas. La mejor manera de evitar éstos es reunir los distintos ramales en un anillo central.
- Elegir los terminales adecuados. En una eslinga se puede colocar diversos accesorios: anillas, grilletes, ganchos, etc., cada uno tiene una aplicación concreta.
- Asegurar la resistencia de los puntos de enganche.
- Conservarlas en buen estado. No se deben dejar a la intemperie y menos aún tiradas por el suelo. Como mejor están son colgadas.

**D.- Equipos de Protección Individual**

- Casco homologado.
- Mascarilla
- Ropa de trabajo.
- Protectores auditivos
- Arnés o cinturón de seguridad (cuando sea necesario).
- Guantes de uso general, para manejos de materiales, bordillos, prefabricados, tubos.
- Botas de agua.
- Chaleco reflectante.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.

**E.- Protecciones Colectivas**

- Señalización de tráfico adecuada.
- Vallas de limitación y protección de bordes de zanjas y desniveles.
- Cintas de balizamiento.
- Balizas luminosas.

**F.- Maquinaria y Medios Auxiliares empleados**

- Escaleras de mano.
- Puntales.
- Camión pluma.
- Camión basculante.
- Herramientas manuales.
- Plataformas de trabajo.

1.3.12.3.- COLOCACIÓN Y MONTAJE DE TUBERÍAS Y ACCESORIOS

**A.- Descripción de la Actividad**

- Suministro e instalación de tubería de fundición dúctil para abastecimiento/agua regenerada, con DN 80 mm; DN 100 mm; DN 150 mm y DN 200 m.
- Empalme (terminal) brida-enchufe DN 100 mm; DN 150 mm y DN 200 mm.
- Brida ciega (PN 16 atm), DN 150 mm.
- Manguito enchufe-enchufe, DN 100 mm y DN 150 mm.
- Codos con dos enchufes y codo con dos bridas de diferentes diámetros.
- Derivación en T de DN 150 mm con dos enchufes
- Derivación en T de DN 150 mm y DN 200 mm con tres bridas.
- Carrete pasamuros de diferentes diámetros.
- Juntas de desmontaje, conos de reducción y válvulas de compuerta de diferentes diámetros.
- Suministro e instalación de ventosa doble cuerpo trifunción para aguas residuales DN 80 mm.

**B.- Evaluación de Riesgos**

- Atropellos o golpes con maquinaria.
- Caídas del personal a distinto nivel.
- Caídas del personal al mismo nivel.
- Golpes y cortes por uso de herramientas manuales.
- Sobresfuerzos por posturas obligadas.
- Caídas de objetos y materiales.
- Atrapamientos.

**C.- Medidas Preventivas**

- Si el camión realiza maniobras de marcha atrás, dispondrá de la ayuda de un señalista.
- Si permanece algún trabajador sobre la caja, los hastíales de la misma, deberán permanecer subidos en todo momento, evitando así el riesgo de caída.
- No se saltará al suelo desde la carga o desde la caja. Puede en el salto fracturarse los talones, o provocarse cualquier otra lesión en piernas, columna vertebral, etc.
- El acceso al interior de las excavaciones se realizará con escalera cuando la inclinación del terreno no asegure la estabilidad.
- Mantener las zonas de trabajo limpias y ordenadas.
- Dadas las dimensiones de este tipo de tuberías, cuando estén en suspensión se guiarán mediante sogas instaladas en los extremos, evitando así la situación de trabajadores bajo cargas suspendidas, los golpes, atrapamientos por el movimiento pendular.
- Las herramientas de trabajo deben ser verificadas antes de su utilización desechando aquellas que presenten anomalías.
- La colocación de canalizaciones se realizará con herramientas adecuadas.
- No se manipularán equipos que sobrepasen los 25 kg de peso.
- Si se tienen que acopiar en zona próxima a una excavación, se impedirá el posible deslizamiento o rodadura de los elementos acopiados, se colocarán si fueran necesario

topes mediante elementos (Tablones, redondos, elementos metálicos, etc.) anclados en el terreno.

- Se elegirán los ganchos y eslingas adecuadas.
- Se asegurarán los puntos de enganche.
- La sujeción será tal que evite que se puedan caer o desplazar los tubos.
- No se desplazarán las cargas sobre los trabajadores.
- No se desembridarán los elementos de colocación hasta que no estén debidamente sujetos y anclados los tubos.
- El material para los montajes de canalizaciones se depositara de forma suave en el interior de las zanjas evitando el balanceo o arrojarlo al interior de la misma.
- Si para la colocación de un tubo con otro es necesaria la colocación de una junta de goma entre ellos. Se prestará atención en su correcta colocación previa al inicio del empuje del tubo macho, son muchas las ocasiones en que se pretenden hacer rectificaciones de la junta cuando se está empujando, lo que provoca el aprisionamiento de dedos, manos o brazos.
- Se tendrán en cuenta las recomendaciones dadas para la manipulación manual de cargas o manipulación de cargas por medios mecánicos.

1.3.12.4.- CORTE DE TUBERÍAS CON RADIAL

**B.- Evaluación de Riesgos**

- Atropellos o golpes con maquinaria.
- Caídas del personal a distinto nivel.
- Golpes y cortes con objetos o herramientas.
- Proyección de fragmentos y partículas.
- Atrapamientos.
- Contacto eléctrico.
- Exposición a ruidos y vibraciones.

**C.- Medidas Preventivas**

- Si el camión realiza maniobras de marcha atrás, dispondrá de la ayuda de un señalista.
- Asegurar la correcta fijación de las piezas a cortar.
- Elegir los discos y las revoluciones adecuados a material a cortar.
- Al colocar el disco, no forzarlos, deben entrar libremente ajustándose sin sobrepresiones ni holguras.
- Usar el equipo con su resguardo fijo cuyo ángulo puede ajustarse de forma que cubra el disco en la dirección del trabajador, dejando libre el ángulo de corte.
- Vigilar el desgaste del disco así como la evolución del corte, evitando su cierre cuando la herramienta está atacando el material.
- Al realizar los trabajos, delimitar y señalizar la zona de trabajo, procurando evitar riesgos a terceros.
- Utilizar ropa ajustada que permita la libertad de movimiento, recomendándose el uso de vestuario de algodón o mezcla, para que sea resistente a chispas y fragmentos.
- Observaciones:
- Se recomienda usar como mínimo un mandil de cuero o protección similar.

- Al realizar los trabajos, delimitar y señalizar la zona de trabajo, procurando evitar riesgos a terceros.
- Asegurarse de que el interruptor de la maquina es de tipo “hombre muerto”, de forma que al dejar de presionarlo pare la máquina.
- Desconectarla de la fuente de alimentación cuando no se utilice.
- La manipulación, limpieza, cambio o comprobación de discos se realizará con radial parada y desconectada de la red, haciendo uso de guantes de protección.
- Se recomienda establecer turnos y cambios de actividad en prevención de lesiones por exposición continuada a ruido y a las vibraciones mano-brazo.
- Tanto el operador como los trabajadores próximos deben utilizar protección auditiva.
- Garantizar la ventilación. Si existe polvo en el ambiente utilizar mascarillas contra polvo.
- Sí los materiales a cortar generan grandes cantidades de polvo usar corte por vía húmeda.

**D.- Equipos de Protección Individual**

- Casco homologado.
- Mascarilla
- Ropa de trabajo.
- Protectores auditivos.
- Guantes de uso general, para manejos de materiales, bordillos, prefabricados, tubos.
- Botas de agua.
- Chaleco reflectante.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.

**E.- Protecciones Colectivas**

- Señalización de tráfico adecuada.
- Formación e información al trabajador autorizado según manual de instrucciones del equipo.
- Sistemas de ventilación.
- Corte por vía húmeda.

**F.- Maquinaria y Medios Auxiliares empleados**

- Escaleras de mano.
- Puntales.
- Camión pluma.
- Camión basculante.
- Herramientas manuales.
- Plataformas de trabajo.
- Sierra de corte.

1.3.12.5.- ACOMETIDAS DE POLIETILENO

**B.- Evaluación de Riesgos**

- Atropellos o golpes con maquinaria.
- Caídas del personal a distinto nivel.
- Caídas del personal al mismo nivel.
- Contactos eléctricos.
- Contactos térmicos.
- Golpes y cortes con objetos en manipulación y equipos de corte.
- Atrapamientos con canalizaciones.

**C.- Medidas Preventivas**

- El personal irá equipado con casco, calzado de seguridad, guantes y chaleco reflectante.
- Si el camión realiza maniobras de marcha atrás, dispondrá de la ayuda de un señalista.
- Las zonas de paso de los trabajadores estarán despejadas, habilitando caminos de acceso a cada tajo. Previo al inicio el tajo estará delimitado mediante vallas autónomas tipo ayuntamiento con la correspondiente señalización vial y de obras.
- Las tapas de las bocas de las instalaciones se manipularán mediante herramientas manuales (ganchos de apertura para tapas), no directamente con las manos. Levantar la tapa efectuando la fuerza con el brazo y o con la espalda, siguiendo las normas para manejo de cargas. Para tapas de peso excesivo para un solo trabajador, solicitar la ayuda de un compañero, o en caso necesario usar trípode o camión grúa.
- Mantener las zonas de trabajo limpias y ordenadas.
- No tocar los posibles servicios eléctricos o de gas que se puedan encontrar en el interior de la zanja, y avisar a la compañía propietaria.
- La alimentación eléctrica de estos equipos se realizará mediante grupo electrógeno, éste se mantendrá a una distancia de seguridad del equipo de soldadura para evitar el riesgo de explosión.
- El traslado de conjunto de abrazaderas y sistema de presión hidráulica, así como el de calentamiento de las placas se realizará por medios mecánicos para evitar sobre esfuerzos y golpes con estos elementos.
- El manejo de las placas se realizará con precaución, ya que cuando éstas se colocan y retiran están calientes, por lo que pueden producir accidentes por contacto térmico elevado. Se hará uso de guantes de protección y ropa de trabajo adecuada que cubra las extremidades.
- La colocación de las placas de calentamiento en el lugar de la unión se llevará a cabo entre dos trabajadores cuando éstas sean de gran tamaño.
- Los tubos para las conducciones se acopiarán en una superficie lo más horizontal posible sobre durmientes de madera, en un receptáculo delimitado por varios pies derechos que impidan que por cualquier causa los conductos se deslicen o rueden. Otra solución será mediante cercado de los rollos de tritubo.
- Vigilar que la protección del disco del rotaflex esté siempre puesta.
- Al terminar de usar el rotaflex o hacer un descanso y al pasárselo a un compañero, esperar a que el disco deje de girar.

- Extremar el cuidado en el manejo y condiciones de almacenamiento de las muelas o discos.
- Seleccionar un tipo de muela acorde al tipo de trabajo a realizar.
- Revisar previamente a su uso el estado de la muela, no utilizando las que presenten grietas.
- No deben quedar con holgura ni entrar forzadas en el eje de la máquina.
- Seguir las instrucciones y precauciones de montaje, utilización y mantenimiento.
- Durante las operaciones de corte de tuberías, aproximación de los dos extremos de tubería a unir y calentamiento de las mismos, no permanecerán trabajadores en la proximidades, cuya única intervención será la de colocar os tubos en las abrazaderas y las placas térmicas en su lugar correspondiente
- Como para puesta en obra se emplearán camiones-grúa deberemos aplicar las recomendaciones correspondientes al manejo de cargas suspendidas para evitar golpes o atrapamientos.
- En caso de manejo manual de los tubos se realizará la manipulación entre varias personas.
- Además se informará al personal sobre los métodos correctos de manipulación de cargas, dirigiendo las maniobras el responsable del tajo.
- En el extendido sobre el suelo del tubo antes de su colocación se tendrá especial cuidado al eliminar en algunos casos el vallado de la zona (cuando se trabaja en calles estrechas) y hacerse el tendido sobre la calzada. La recomendación inicial para esta operación será evitar realizar los trabajos en la calzada y, si no fuese posible dentro de la zona protegida, se auxiliará la maniobra con personal de control (se alistas), balizando convenientemente con conos reflectantes y la señalización asociada al tipo de vía.

**D.- Equipos de Protección Individual**

- Casco homologado.
- Mascarilla
- Ropa de trabajo.
- Protectores auditivos.
- Guantes de uso general, para manejos de materiales, bordillos, prefabricados, tubos.
- Botas de agua.
- Chaleco reflectante.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.

**E.- Protecciones Colectivas**

- Vallado en la zona de actuación.
- Señales de tráfico e información.
- Pasarelas en zanjas con barandillas de protección de 0,90 m de altura mínima, barra intermedia y rodapié de 0.15 m.
- Tapas provisionales para huecos, pozos y arquetas.
- Chapas metálicas para paso provisional de vehículos.
- Interruptores diferenciales en cuadros eléctricos.
- Topes de protección para vehículos, ante desniveles.
- Tacos y calzos para acopios de tubos.

- Transformadores de seguridad para trabajos con electricidad en zonas húmedas o muy conductoras.
- Equipos portátiles de iluminación de 24 voltios.
- Las entibaciones serán cuajadas, cuando sean necesarias.
- Las máquinas de corte de tubería llevarán sus elementos protectores homologados.

**F.- Maquinaria y Medios Auxiliares empleados**

- Escaleras de mano.
- Máquina de electrocución.
- Camión pluma.
- Camión basculante.
- Herramientas manuales.
- Plataformas de trabajo.
- Sierra de corte.

## 1.3.12.6.- PRUEBAS DE CARGA DE LAS INSTALACIONES DE CARGA DE AGUA

**B.- Evaluación de Riesgos**

- Atropellos o golpes con maquinaria.
- Caídas del personal a distinto nivel.
- Golpes y cortes por el uso de herramienta manual.
- Caída de objetos y materiales.
- Desprendimientos.
- Los propios debido a la maquinaria y medios auxiliares empleados.
- Inundaciones.

**C.- Medidas Preventivas**

- El personal irá equipado con casco, calzado de seguridad, guantes y chaleco
- La descarga de material se realizara con las herramientas adecuadas.
- El acceso al interior de la zanja se realizará con escaleras fijadas al terreno.
- La prueba de carga se realizará con la presión y de la forma que determine el promotor.
- Los cierres de los equipos serán verificados antes de iniciar las pruebas.
- Las zonas de paso deben quedar delimitadas en todo momento.
- En caso de colocar topes se revisaran para verificar su estabilidad.
- No permanecerán trabajadores en el fondo de la zanja, se supervisarán los tubos, codos, llaves, etc desde la zona superior.
- Si se diese una fuga, es posible que se afecte la estabilidad del talud, de ser así se revisarán y si es necesario se ataluzarán las zonas con peligro de desprendimiento.
- La bomba de presión se utilizará tal como especifique su manual de instrucciones de uso, el operario que la maneje será conocedor del mismo.

- El personal que supervise la prueba en los distintos tramos, estará en contacto con el operario que de presión, de tal manera que si detecta una fuga de agua, se paralice de inmediato la operación.
- Se preverá una zona de desagüe que parece lógico que esté en el punto más bajo, si es posible se canalizará el agua a una zona de drenaje, de lo contrario se colocarán bombas de achique que evacuen el agua lo más pronto posible.

**D.- Equipos de Protección Individual**

- Casco homologado.
- Mascarilla
- Ropa de trabajo.
- Protectores auditivos.
- Guantes de uso general, para manejos de materiales, bordillos, prefabricados, tubos.
- Botas de agua.
- Chaleco reflectante.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.

**E.- Protecciones Colectivas**

- Señalización de tráfico adecuada.
- Formación e información al trabajador autorizado según manual de instrucciones del equipo.
- Vallado perimetral de zona de pruebas.

**F.- Maquinaria y Medios Auxiliares empleados**

- Escaleras de mano.
- Puntales.
- Equipos de presión.
- Herramientas manuales.
- Plataformas de trabajo.

### 1.3.13.- OBRAS DE FÁBRICA

**A.- Descripción de la Actividad**

Se incluyen aquí todas las acciones necesarias para la colocación de conducciones y accesorios necesarios para la red a instalar de abastecimiento de agua.

Para el análisis de esta unidad se considera oportuno realizar una descripción de las actividades de obra que la componen:

- *Pequeñas cimentaciones para anclajes y cámaras*. Consistentes en el compactado de tierras, armado de estructuras y hormigonado de losas para la cimentación de piezas hidráulicas o cámaras.

- *Obra civil*. Se incluye en esta actividad todas las obras de fábrica de ladrillo para la realización de galerías de servicio, colectores, pozos de saneamiento o arquetas en general.
- *Armado de estructuras para arquetas, anclajes y cámaras:* Suministro y colocación de acero para armaduras en barras corrugadas B 500 S incluso cortado, doblado y recortes.
- *Encofrado de estructuras*. En esta unidad analizamos los trabajos de encofrado para la ejecución de las arquetas de válvulas, desagües y ventosas proyectadas con paneles fenólicos o metálicos.
- *Hormigonado*. Se analiza en esta actividad el suministro y puesta en obra del hormigón para rellenos no estructurales, para armar soleras o cimentaciones y para bases de calzadas, soleras de acera, paseos, bordillos o escaleras, mediante el empleo de camiones hormigonera, entre otros.
- *Enlucidos, enfoscados y guarnecidos*. Se incluyen en el análisis de esta actividad los enfoscados en paramentos verticales tales como pozos y arquetas.
- *Impermeabilización de cámaras*. La cara vista de las cámaras se le aplicara una emulsión asfáltica impermeabilizante aplicada con brocha o pistola por toda la superficie.
- *Tapas y cobijas*. Se incluye en esta unidad la colocación de tapas de fundición dúctil y la construcción de cobijas para el cierre de cámaras.

1.3.13.1.- PEQUEÑAS CIMENTACIONES PARA ANCLAJES Y CÁMARAS

**B.- Evaluación de Riesgos**

- Caídas al mismo nivel:
- Caídas a distinto nivel:
- Golpes contra objetos.
- Sobresfuerzos.
- Caídas de objetos en manipulación.
- Riesgos eléctricos.
- Vuelco de maquinaria o atropellos
- Desprendimientos de tierras.

**C.- Medidas Preventivas**

- Es importante el orden y la limpieza del lugar de trabajo mediante la recogida y retirada de escombros procedentes de algún derribo, restos de maderas de desencofrado, etc...con el fin de evitar caídas, torceduras, etc.
- Es importante el orden y la limpieza del lugar de trabajo mediante la recogida y retirada de escombros procedentes de algún derribo, restos de maderas de desencofrado, etc...con el fin de evitar caídas, torceduras, etc.
- Es recomendable el uso de barandillas en aquellas zonas con riesgo de caída de 2 m. o más de altura, así como al menos la señalización de aquellas zonas cuya altura sea menor.
- Es recomendable el uso de barandillas en aquellas zonas con riesgo de caída de 2 m. o más de altura, así como al menos la señalización de aquellas zonas cuya altura sea menor.

- Cuando exista necesidad de salvar zanjas, se hará uso de pasarelas adecuadas de al menos 60 cm. de anchura, con barandillas laterales en caso necesario mayores o iguales a 2m.
- Cuando exista necesidad de salvar zanjas, se hará uso de pasarelas adecuadas de al menos 60 cm. de anchura, con barandillas laterales en caso necesario mayores o iguales a 2m.
- Cuando se usen escaleras de mano, estas en caso de ser de madera, nunca serán de clavazón y en cualquier caso se colocaran de forma que su punto más alto supere en al menos 1m la plataforma de desembarco, tengan zapatas antideslizantes y estén amarradas en su parte superior o punto de apoyo.
- Si el desbroce esta en zona no visible, se balizará con malla naranja el
- Nunca transporte cargas mirando hacia atrás.
- El personal encargado del vertido del hormigón tendrá la capacidad y formación necesaria para dichas tareas, tanto si se trata de hormigonado mediante bombeo, mediante cubos suspendidos de la grúa o desde camión hormigonera.
- En todo momento se evitará que las cargas suspendidas pasen por encima de personas, para lo que es conveniente la formación y adiestramiento de los operarios encargados de las grúas
- Se deben ejecutar los trabajos desde posturas no forzadas para evitar lesiones lumbares.
- No se sobrepasara la carga por encima de otros operarios.
- Para evitar el desmoronamiento o derrumbe de las paredes de zapatas o zanjas se entibarán siempre que sea posible y los trabajos lo permitan.
- Antes de izar cargas con la grúa se comprobará que dichas cargas están perfectamente aseguradas para evitar caídas imprevistas. Así mismo se comprobará que los cables de la grúa no estén deteriorados o deformados, procediendo a su sustitución en caso contrario.
- Se prevendrá el riesgo de contactos eléctricos mediante la instalación de dispositivos diferenciales junto a una toma de tierra.
- Se prevendrá el riesgo de contactos eléctricos mediante la instalación de dispositivos diferenciales junto a una toma de tierra.
- Se deberán evitar los trabajos sobre superficies embarradas por el posible deslizamiento o vuelco de las máquinas
- Para evitar el desmoronamiento o derrumbe de las paredes de zapatas o zanjas se entibarán siempre que sea posible y los trabajos lo permitan.
- Cuando se usen escaleras de mano, estas en caso de ser de madera, nunca serán de clavazón y en cualquier caso se colocaran de forma que su punto más alto supere en al menos 1m la plataforma de desembarco, tengan zapatas antideslizantes y estén amarradas en su parte superior o punto de apoyo.
- El personal encargado del vertido del hormigón tendrá la capacidad y formación necesaria para dichas tareas, tanto si se trata de hormigonado mediante bombeo, mediante cubos suspendidos de la grúa o desde camión hormigonera.

**D.- Equipos de Protección Individual**

- Ropa de trabajo.
- Protecciones auditivas.
- Chaleco reflectante.

- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.
- Impermeables o trajes de agua para casos de días lluviosos.
- Mascarilla auto filtrante para trabajos con ambiente pulvígeno.

**E.- Protecciones Colectivas**

- Señalización de tráfico adecuada.
- Formación e información al trabajador autorizado según manual de instrucciones del equipo.
- Vallado perimetral de zona de pruebas.

**F.- Maquinaria y Medios Auxiliares empleados**

- Escaleras de mano.
- Puntales.
- Equipos de presión.
- Herramientas manuales.
- Plataformas de trabajo.

1.3.13.2.- OBRA CIVIL

**B.- Evaluación de Riesgos**

- Vuelco de maquinaria o atropellos:
- Caídas a distinto nivel.
- Caída de objetos al interior de la zanja.
- Golpes, cortes y heridas.
- Daños oculares por salpicaduras u otras causas.
- Atrapamientos por desprendimientos.
- Sobreesfuerzos.
- Los derivados del uso de las herramientas

**C.- Medidas Preventivas**

- Los camiones-hormigonera dispondrán de espacio de maniobra suficiente para efectuar tanto la carga como los movimientos de desplazamiento, sin interferencias.
- Los trabajos de relleno u hormigonado con dúmper se realizarán a la distancia mínima del borde de coronación.
- Antes de iniciar el hormigonado, se comprobará el estado de los encofrados, la limpieza de las superficies de éstos y la de las superficies del terreno que hayan de estar en contacto con el hormigón.
- Se protegerá la zona de trabajo mediante limitación con barandilla de tipo ayuntamiento.
- En todo momento se mantendrá limpias y ordenadas las superficies de tránsito y de apoyo para realizar los trabajos de enfoscado para evitar los accidentes por resbalón.
- Se accederá de forma segura mediante escaleras cuando así sea necesario para profundidades superiores a 1 m.
- Al terminar la jornada de trabajo, las superficies hormigonadas deberán quedar perfectamente protegidas y señalizadas de forma que se evite el riesgo derivado de

accesos involuntarios a ellas. Esta medida es de especial importancia en bases viarias de hormigón, más expuestas a este riesgo que otras unidades de obra.

- Se protegerá la zona de trabajo limitándola con barandilla de ayuntamiento y/o con cinta señalizadora.
- Se prohíbe los "puentes de un tablón". Se establecerán plataformas de trabajo de al menos 90 cm de anchura con protección de barandilla en la espalda.
- Se prohíbe balancear las cargas de materiales suspendidas para su puesta en los tajos, en prevención del riesgo de caída.
- El ladrillo suelto se izará apilado ordenadamente en el interior de plataformas de izar emplintadas, vigilando que no puedan caer las piezas por desplome durante el transporte.
- La cerámica paletizada transportada con camión grúa se gobernará mediante cabos, nunca directamente con las manos, en prevención de golpes, atrapamiento o caídas al vacío por péndulo de la carga.
- No se colocarán personas en el ámbito de acción de las canaletas de descarga.
- Los trabajos de ejecución de pozos se realizan trasladando el material con cubos y bateas, no arrojándolos al interior.
- Los acopios deben respetar la distancia mínima de seguridad con el borde de coronación de la zanja.
- Los escombros y cascotes se evacuarán diariamente vertiéndolo en contenedores dispuestos al efecto para evitar el riesgo de pisadas sobre materiales.
- Los escombros y cascotes se apilarán en lugares habilitados a tal efecto.
- El material sobrante se acopiara en las bateas adecuadas para su posterior traslado.
- No se acopiara material en las zonas de acceso a los tajos.
- Durante los trabajos de hormigonado se hará uso de las gafas de protección para evitar salpicaduras.
- El encargado revisara el estado de los taludes de excavación antes de iniciar los trabajos en el interior.
- Los acopios de material no sobrecargarán el talud de excavación, respetando la distancia mínima de 2 metros al borde de coronación.
- El transporte de sacos de aglomerantes o de áridos se realizará preferentemente sobre carretilla de mano, para evitar sobreesfuerzos.
- El hormigonado de elementos en zanja a profundidades superiores a 1,5 metros, no se realizará mediante paleo.
- Se revisará el estado de las herramientas y medios auxiliares que se utilicen, separando o desechando las que no reúnan las condiciones adecuadas.

**D.- Equipos de Protección Individual**

- Ropa de trabajo.
- Protecciones auditivas.
- Chaleco reflectante.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.
- Impermeables o trajes de agua para casos de días lluviosos.
- Mascarilla auto filtrante para trabajos con ambiente pulvígeno.

**E.- Protecciones Colectivas**

- Señalización de tráfico adecuada.
- Vallas de limitación y protección de bordes de zanjas y desniveles.
- Cintas de balizamiento.
- Balizas luminosas.
- Topes de desplazamiento de vehículos

**F.- Maquinaria y Medios Auxiliares empleados**

- Escaleras de mano.
- Puntales.

1.3.13.3.- ARMADO DE ESTRUCTURAS PARA ARQUETAS, ANCLAJES Y CÁMARAS

**B.- Evaluación de Riesgos**

- Caídas al mismo nivel
- Caídas a distinto nivel por talud de la excavación.
- Caída de objetos durante su manipulación.
- Accidentes por eventual rotura de los hierros en el estirado de los mismos.
- Choques o golpes contra objetos.
- Atrapamientos.
- Rotura de piezas o mecanismos con proyección de partículas.
- Contactos eléctricos directos.
- Sobreesfuerzos musculares.
- Cuerpos extraños en los ojos

**C.- Medidas Preventivas**

- Se esmerará el orden y la limpieza durante la ejecución de los trabajos.
- El material sobrante se acopiara en las bateas o contenedores habilitados para tal fin.
- El material sobrante debe acopiarse fuera de las zonas de acceso a las excavaciones.
- Procurar que las armaduras a preformar y atar, así como la plataforma de apoyo y de trabajo del operario estén a la altura en que se ha de trabajar con ellos.
- Los accesos al interior de la excavación se realizarán por escaleras fijadas al terreno.
- Los paquetes de armadura se moverán con eslingas de cadena, cable o textiles. Nunca se moverán sujetos por el acero dulce retorcido con el que se suelen atar.
- El izado de paquetes de armaduras en barras sueltas o montadas se hará suspendiendo la carga en dos puntos separados, lo suficiente para que la carga permanezca estable, evitando la permanencia o paso de personas bajo cargas suspendidas.
- Los paquetes de armaduras suelen venir atados con acero dulce retorcido sobre sí mismo. Para desatarlos se cortará el acero con unas tenazas, no se intentará desenroscar.
- La maquinaria empleada cumplirá la normativa que le sea de aplicación.
- Mantener despejados los lugares de paso de las armaduras a manipular.

- No se posicionarán operarios debajo de las cargas durante su posicionamiento o traslado.
- El personal no se situará en el radio de acción de la barra al doblarse, ni frente a los extremos de las barras en los momentos en que se esté efectuando el corte.
- Se pondrán sobre las parrillas, planchas de madera a fin de que el personal no pueda introducir el pie al andar por encima de éstas. De idéntica manera se marcarán pasos sobre los forjados antes del hormigonado, para facilitar en lo posible esta tarea.
- Los equipos de corte deben ser verificados antes de su utilización, en especial conectores y mangueras.
- Los discos de corte de maquinaria no deben presentar deformaciones, y ser verificados antes de cada corte, desechando aquellos que presenten anomalías.
- Los equipos eléctricos permanecerán fuera de las zonas de acumulación de agua.
- Los equipos deben estar diseñados para trabajar en la intemperie.
- En la medida de lo posible el transporte de ferralla se realizara por medios mecánicos o bien mediante dos personas.
- Es obligatorio el uso de gafas de protección para ejecutar los cortes de ferralla.
- Las zonas donde se realicen corte se mantendrán delimitadas y respetando la distancia mínima de seguridad con el resto de operarios

**D.- Equipos de Protección Individual**

- Ropa de trabajo.
- Protecciones auditivas.
- Chaleco reflectante.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.
- Impermeables o trajes de agua para casos de días lluviosos.
- Mascarilla auto filtrante para trabajos con ambiente pulvígeno.

**E.- Protecciones Colectivas**

- Señalización de tráfico adecuada.
- Formación e información al trabajador autorizado según manual de instrucciones del equipo.
- Cinta de balizamiento para acopios.
- Vallado perimetral de zona de pruebas.

**F.- Maquinaria y Medios Auxiliares empleados**

- Escaleras de mano.
- Puntales.
- Herramientas manuales.
- Plataformas de trabajo.
- Camión Pluma.
- Uñas metálicas
- Cables y eslingas
- Sierras de corte o radiales.

1.3.13.4.- ENCOFRADO DE ESTRUCTURAS

**B.- Evaluación de Riesgos**

- Caídas al mismo nivel
- Caídas a distinto nivel.
- Golpes contra objetos.
- Sobresfuerzos.
- Caídas de objetos en manipulación.
- Riesgos eléctricos.
- Riesgo de incendio.
- Propios de maquinaria y equipos de trabajo.

**C.- Medidas Preventivas**

- Se esmerará el orden y la limpieza durante la ejecución de los trabajos.
- El material sobrante se acopiara en las bateas o contenedores habilitados para tal fin.
- El material sobrante debe acopiarse fuera de las zonas de acceso a las excavaciones.
- El ascenso y descenso al interior de la excavación o zanja se efectuará a través de escaleras de mano reglamentarias.
- Antes del vertido de hormigón el Encargado de Seguridad, comprobará la buena estabilidad del conjunto.
- Se prohíbe la permanencia de operarios en las zonas de batido de cargas durante las operaciones de izado de tablones, sopandas, puntales y ferralla;
- Los clavos o puntas existentes en la madera usada se extraerán o remacharán, según casos.
- Una vez concluido un determinado tajo, se limpiará eliminando todo el material sobrante, que se apilará, en un lugar conocido para su posterior retirada.
- El desencofrado se realizará siempre con ayuda de uñas metálicas realizándose siempre desde el lado del que no puede desprenderse la madera, es decir, desde el ya desencofrado.
- Durante las maniobras de hormigonado con canaleta los operarios mantendrán la distancia mínima de seguridad con la misma.
- Los trabajos se realizaran desde posturas seguras que no supongan sobresfuerzos lumbares.
- No se sobrepasara la carga por encima de otros operarios.
- El traslado de útiles se realizara con la carga flejada y bien sujeta.
- Los medios de elevación serán verificados antes de su utilización.
- Los equipos eléctricos deben ser verificados antes de su utilización en especial las mangueras y conexiones.
- Los equipos estarán diseñados para trabajar en la intemperie.
- Se prohíbe hacer fuego directamente sobre los encofrados.
- El personal que utilice las máquinas-herramienta contará con autorización escrita de la Jefatura de la Obra, entregándose a la Dirección Facultativa el listado de las personas autorizadas.
- El corte con radial se ejecutara con los EPI’s adecuados, verificando el correcto estado de la maquinaria antes de su utilización.

### D.- Equipos de Protección Individual

- Ropa de trabajo.
- Protecciones auditivas.
- Chaleco reflectante.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.
- Impermeables o trajes de agua para casos de días lluviosos.
- Mascarilla auto filtrante para trabajos con ambiente pulvígeno.

### E.- Protecciones Colectivas

- Señalización de tráfico adecuada.
- Formación e información al trabajador autorizado según manual de instrucciones del equipo.
- Vallado perimetral de zona de pruebas.

### F.- Maquinaria y Medios Auxiliares empleados

- Escaleras de mano.
- Puntales.
- Equipos de presión.
- Herramientas manuales.
- Plataformas de trabajo.
- Camión Pluma.
- Uñas metálicas
- Cables y eslingas
- Sierras de corte o radiales.
- Mesas de corte.
- Camión hormigonera.
- Hormigonera eléctrica.

## 1.3.13.5.- HORMIGONADO

### B.- Evaluación de Riesgos

- Caída de objetos.
- Caída de personas al mismo o/a distinto nivel.
- Atropellos o vuelcos de maquinaria.
- Pinchazos y golpes contra obstáculos.
- Pisadas sobre objetos punzantes.
- Trabajo sobre pisos húmedos o mojados.
- Contactos con el hormigón.
- Desplome de las paredes de las zanjas.
- Vibraciones por manejo de la aguja vibrante
- Electrocución.

**C.- Medidas Preventivas**

- Se prohíbe rigurosamente a persona alguna permanecer debajo de las cargas suspendidas por los camiones plumas o grúas.
- No se cargará el cubo por encima de la carga máxima admisible de la grúa. Se señalizará expresamente el nivel de llenado equivalente al peso máximo.
- En todo momento se mantendrán las zonas de trabajo limpias y ordenadas.
- Se habilitarán caminos de acceso a los tajos, estableciéndose pasarelas de 60 centímetros como mínimo para poder trabajar.
- Si existe la posibilidad de que la persona que maneja el cubo tenga riesgo de caída a distinto nivel, deberá llevar cinturón de seguridad tipo arnés que anclará a punto resistente.
- Los operarios nunca se situarán detrás de los vehículos en maniobras de marcha atrás, que por otra parte siempre deberán ser dirigidos desde fuera del vehículo.
- Previamente al inicio del vertido del hormigón directamente con el camión hormigonera, se instalarán topes, si fuera necesario en el lugar donde haya que quedar situado el camión, siendo conveniente no estacionarlo en rampas con pendientes fuertes.
- Las maniobras de posicionamiento de canaleta se realizaran a velocidad reducida para minimizar el riesgo de golpe con otros operarios.
- Las zonas armadas a hormigonar dispondrán de plataformas seguros para asegurar el paso y un tránsito seguro.
- Se dispondrán protectores en las esperas salientes que se encuentren en zonas de paso o acceso a las estructuras.
- Cuando entre hormigón dentro de la bota, inmediatamente se quitará la misma para lavar primero el pie hasta que desaparezca el hormigón y luego la bota. De no hacerlo así, se producirá quemaduras en el pie.
- El uso de la ropa de trabajo adecuada será obligatorio pare evitar lesiones dermatológicas al entrar en contacto con el hormigón.
- Antes del vertido del hormigón se revisarán los encofrados en evitación de reventones o derrames innecesarios.
- Se reforzara las estructuras de fijación mediante la colocación de puntales.
- La vibración de hormigón se realizará desde plataformas estables y seguras.
- En caso de existir riesgo de caída a distinto nivel se utilizarán cinturones de seguridad amarrados a puntos fijos de las estructuras.
- Los equipos de trabajo serán verificados antes de su utilización.
- Los equipos eléctricos de suministro se mantendrán fuera de las zonas de acumulación de agua.

**D.- Equipos de Protección Individual**

- Ropa de trabajo.
- Protecciones auditivas.
- Chaleco reflectante.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.
- Impermeables o trajes de agua para casos de días lluviosos.
- Mascarilla auto filtrante para trabajos con ambiente pulvígeno.

**E.- Protecciones Colectivas**

- Señalización de tráfico adecuada.
- Formación e información al trabajador autorizado según manual de instrucciones del equipo.
- Vallado perimetral de zona de pruebas.

**F.- Maquinaria y Medios Auxiliares empleados**

- Escaleras de mano.
- Puntales.
- Equipos de presión.
- Herramientas manuales.
- Plataformas de trabajo.
- Camión Pluma.
- Camión hormigonera
- Uñas metálicas
- Cables y eslingas
- Hormigonera eléctrica.
- Cubilote.

1.3.13.6.- ENLUCIDOS, ENFOSCADOS Y GUARNECIDOS

**B.- Evaluación de Riesgos**

- Caídas a distinto nivel desde terrazas, balcones, bordes de forjado etc.
- Caídas al mismo nivel.
- Cortes y golpes por herramientas.
- Salpicaduras de pasta o mortero a los ojos.
- Contactos directos eléctricos.
- Sobreesfuerzos

**C.- Medidas Preventivas**

- Los andamios para enfoscados de interiores se formarán sobre borriquetas.
- Se colgarán de elementos firmes de la estructura cables en los que amarrar el fijador del cinturón de seguridad para realizar trabajos sobre borriquetas en los lugares con riesgo de caída desde altura.
- Las plataformas sobre borriquetas para ejecutar enyesados (y asimilables) de techos, tendrán la superficie horizontal y cuajada de tablones, evitando escalones y huecos que puedan originar tropiezos y caídas.
- Para la utilización de borriquetas en balcones o terrazas, se instalarán redes tensas de seguridad entre el forjado superior y el que sirve de apoyo, en evitación del riesgo de caídas desde altura.
- Se mantendrán limpias y ordenadas las superficies de tránsito y trabajo, para evitar caídas por resbalones.
- Los sacos aglomerantes o de aglomerados (cementos diversos o áridos) se dispondrán de forma que no obstaculicen los lugares de paso, para evitar accidentes por tropiezo.

- Las herramientas de trabajo deben encontrarse en buen estado de conservación.
- Las herramientas se trasladarán en cajas de herramientas adecuadas.
- No se arrojaran al interior de pozos y arquetas cuando se encuentren operarios en el interior.
- Es obligatorio el uso de las gafas de protección adecuadas y encontrarse dentro de los márgenes temporales de uso especificados por el fabricante.
- La conexión de los cables a los cuadros eléctricos auxiliares se hará mediante clavijas macho-hembra.
- Las "miras" (reglas, tablones) se cargarán a hombro, en su caso, de tal forma que, al caminar, el extremo que va por delante se encuentre por encima de la altura del casco de quien lo transporta, para evitar los golpes a otros operarios.
- El transporte de "miras" sobre carretillas se efectuará atando firmemente el paquete de miras a la carretilla, para evitar los accidentes por desplome de las miras.
- El transporte de sacos de aglomerantes o de áridos dentro de las plantas se realizará preferentemente sobre carretilla de mano, para evitar sobreesfuerzos.
- Los sacos de aglomerantes o de aglomerados (cementos diversos o de áridos) se acopiarán ordenadamente repartidos junto a los tajos en los que se les vaya a utilizar, lo más separados posible de los vanos, para evitar sobrecargas innecesarias
- Se tenderán cables amarrados a "puntos fuertes" en la zona de cubierta, en los que amarrar el fiador del cinturón de seguridad, para realizar los enfoscados (y asimilables) desde andamios colgados en fachadas, patios y huecos de ascensores.

**D.- Equipos de Protección Individual**

- Ropa de trabajo.
- Casco de seguridad.
- Botas de seguridad.
- Cinturón de seguridad.
- Guantes de cuero.
- Gafas de seguridad anti proyecciones.
- Botas de goma.
- Traje para tiempo lluvioso.
- Siempre que las condiciones de trabajo exijan otros elementos de protección distintos a los anteriormente descritos, se dotará a los trabajadores de los mismos.

**E.- Protecciones Colectivas**

- Delimitación del área afectada.
- Protecciones para trabajos eléctricos.
- Protección contra caídas de altura de personas y objetos.
- Orden y limpieza de las zonas aledañas.
- Condena de huecos con mallazos.
- Barandilla y rodapié en andamios y plataformas.
- Plataformas de carga y descarga.

**F.- Maquinaria y Medios Auxiliares empleados**

- Escaleras de mano.
- Puntales.
- Andamios.
- Herramientas manuales.
- Plataformas de trabajo.
- Uñas metálicas

1.3.13.7.- IMPERMEABILIZACIÓN DE CÁMARAS

**B.- Evaluación de Riesgos**

- Riesgos de caída al mismo nivel.
- Riesgos de caída a distinto nivel.
- Explosiones, quemaduras e incendios.
- Derrames de productos inflamables.
- Caída de objetos o herramientas.

**C.- Medidas Preventivas**

- Los recipientes que transporten los líquidos de sellado, (betunes, asfaltos, morteros, siliconas), se llenarán de tal forma que se garantice que no habrá derrames innecesarios.
- Poner en conocimiento del superior cualquier antecedente de vértigo o miedo a las alturas.
- Es obligatorio utilizar cinturón de seguridad cuando se trabaja en altura y no existe protección colectiva eficaz.
- El riesgo de caída de altura se controlará manteniendo los andamios.
- Las bombonas de gases, (butano o propano), de las lamparillas o mecheros de sellado de materiales bituminosos, se almacenarán separados de estos en posición vertical y a la sombra.
- Se conservará perfectamente a lo largo del tiempo en servicio, en orden y limpio, el almacén de productos inflamables cuidando no quede interrumpida su ventilación. En el exterior, junto al acceso, existirá un extintor de polvo químico seco.
- Se instalarán letreros de “peligro de incendios por el uso de sopletes a mecheros de gas” en los accesos a la cubierta, para recordar este riesgo constantemente al personal.
- Cuando se efectúe el sellado de materiales bituminosos se vigilará constantemente la posición de mecheros y lamparillas para evitar incendios. Se dispondrá de extintores en la zona de trabajo, y los mecheros han de estar apagados cuando no se utilicen.
- El encargado de la obra, comprobará que han sido apagados los mecheros o sopletes a la interrupción de cada periodo de trabajo.
- El personal encargado de impermeabilización será conocedor de los riesgos de la ejecución en las cámaras.
- Los recipientes para transportar materiales de sellado se llenarán al 50 % para evitar derrames innecesarios.
- Existirá un almacén habilitado para los productos bituminosos e inflamables.

- Las herramientas de mano se llevarán enganchadas con mosquetón, para evitar su caída a otro nivel.
- Está prohibido arrojar materiales o herramientas desde altura.
- El personal encargado de la impermeabilización de la cubierta será conocedor del sistema constructivo más correcto a poner en práctica, en prevención de los riesgos por impericia.
- Los rollos de tela asfáltica se repartirán uniformemente, evitando sobrecargas, calzados para evitar que rueden y ordenados por zonas de trabajo.
- Las planchas de materiales aislantes ligeras, se izarán a la cubierta mediante bateas suspendidas de la grúa a los que no se le habrán soltado los flejes, (o la envoltura en los que son servidos por el fabricante). Estas bateas, se gobernarán mediante cabos, nunca directamente con el cuerpo o las manos.

**D.- Equipos de Protección Individual**

- Ropa de trabajo.
- Casco de seguridad.
- Botas de seguridad.
- Cinturón de seguridad.
- Guantes de cuero.
- Gafas de seguridad anti proyecciones.
- Botas de goma.
- Traje para tiempo lluvioso.
- Siempre que las condiciones de trabajo exijan otros elementos de protección distintos a los anteriormente descritos, se dotará a los trabajadores de los mismos.

**E.- Protecciones Colectivas**

- Delimitación del área afectada.
- Barandillas y rodapié de protección de bordes de forjado.
- Viseras de protección para evitar la caída de objetos.
- Cable de vida.
- Andamios
- Plataformas de trabajo.

**F.- Maquinaria y Medios Auxiliares empleados**

- Escaleras de mano.
- Puntales.
- Andamios.
- Herramientas manuales.
- Plataformas de trabajo.
- Uñas metálicas

1.3.13.8.- TAPAS Y COBIJAS

**B.- Evaluación de Riesgos**

- Caída de personas a distinto nivel.
- Caída de objetos desprendidos.
- Golpes o cortes por objetos o herramientas.
- Contactos eléctricos.

**C.- Medidas Preventivas**

- Orden y limpieza en los lugares de trabajo.
- Adecuada iluminación y ventilación de los tajos.
- El acceso al interior de las cajas de los camiones se realizara con esclareas de mano.
- Mantener delimitados los pozos y cámaras hasta su reposición o cierre.
- Los elementos pesados serán recibidos por un mínimo de una cuadrilla.
- Los medios de elevación deben ser verificados antes de su utilización.
- Las cargas se elevaran desde dos puntos para evitar balanceos.
- Los operarios que utilicen máquinas herramientas, tendrán autorización de uso.
- Hacer uso de uñas metálicas para el posicionamiento de cobijas y tapas.
- Está prohibido el conexionado de cables eléctricos a los cuadros de alimentación sin clavija macho hembra.
- Las máquinas deberán tener doble aislamiento o toma de tierra conectada.

**D.- Equipos de Protección Individual**

- Ropa de trabajo.
- Protecciones auditivas.
- Chaleco reflectante.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.
- Impermeables o trajes de agua para casos de días lluviosos.
- Mascarilla auto filtrante para trabajos con ambiente pulvígeno.

**E.- Protecciones Colectivas**

- Señalización de tráfico adecuada.
- Formación e información al trabajador autorizado según manual de instrucciones del equipo.
- Vallado perimetral de zona de pruebas.

**F.- Maquinaria y Medios Auxiliares empleados**

- Escaleras de mano.
- Puntales.
- Equipos de presión.
- Herramientas manuales.
- Plataformas de trabajo.
- Camión Pluma.

- Uñas metálicas
- Cables y eslingas.

## 1.3.14.- REPOSICIÓN DE ACERA, CALZADA Y ZONAS VERDES

### A.- Descripción de la Actividad

Se incluyen aquí todas las acciones necesarias para la reposición de pavimentos (tanto de calzada como de aceras) afectados por la ejecución de las obras que habiendo sido retirados, deben ser repuestos.

Para el análisis de esta unidad se considera oportuno realizar una descripción de las actividades de obra que la componen:

- *Relleno de áridos para la reposición de acera y calzada*. Consistentes en el relleno de zanjas con suelos seleccionados, mediante el uso de camión basculante, dúmper y retroexcavadora.
- *Compactación de áridos*. Esta se realiza mediante el uso de pisones ranas debido a las dimensiones de la zanja.
- *Hormigonado de acera y calzada*. Se analiza de forma detallada en la unidad de obras de fábrica.
- *Asfaltado de firmes*. En esta actividad incluimos los trabajos de recorte de capa de aglomerado, riego de imprimación con emulsión asfáltica, fresado de pavimento asfaltico, sellado de juntas con betún y aplicación de mezcla bituminosa en caliente tipo AC 16 surf D/S.
- *Acerado, adoquinado, enlosado y colocación de bordillos*. Se describen los trabajos de colocación de solado de acera (bordillos y loseta hidráulica o adoquinado) y mortero de asiento y enlechado de juntas.
- *Reposición de marcas viales horizontales y verticales*. En esta actividad se analizan los trabajos de estarcido en pavimento con pintura termoplástica de los pasos de peatones, pasos de cebra, marcas transversales y longitudinales de viales, y colocación de señalización vertical retirada por interferencia con la zona de obra.

1.3.14.1.- RELLENO DE ÁRIDOS

### B.- Evaluación de Riesgos

- Caídas de personas a distinto nivel.
- Caídas de personas al mismo nivel.
- Caídas de objetos por desplome o derrumbamiento.
- Choques contra objetos móviles.
- Atrapamiento por o entre objetos.
- Sobreesfuerzos.
- Exposición a temperaturas ambientales extremas.
- Atropellos o golpes con vehículos.

**C.- Medidas Preventivas**

- Los accesos al interior de la excavación se realizarán con escaleras amarradas firmemente al terreno.
- Mantener las zonas de paso y acceso libres de material y limpias.
- Se prohíbe sobrecargar los vehículos por encima de la carga máxima admisible, que llevarán siempre escrita de forma legible.
- Todo el material desprendido de los trabajos de relleno de zanjas debe ser retirado para evitar interferencias con peatones y vehículos.
- Durante las labores de vaciado de áridos con dúmper no permanecerán operarios en el interior de la excavación.
- Los conductores de cualquier vehículo provisto de Cabina cerrada, quedan obligados a utilizar el casco de seguridad para abandonar la cabina en el interior de la obra.
- Cada equipo de carga para rellenos será dirigido por un jefe de equipo que coordinará las maniobras.
- En aquellas zonas que se realicen los rellenos de forma manual se ejecutarán con las protecciones lumbares adecuadas.
- Los operarios se mantendrán hidratados evitando los esfuerzos en las horas de mayor acumulación de calor.
- Los vehículos de compactación y apisonado irán provistos de cabina de seguridad de protección en caso de vuelco.
- Todo el personal que maneje los camiones, dúmper, (apisonadoras, o compactadoras), será especialista en el manejo de estos vehículos, estando en posesión de la documentación de capacitación acreditativa.
- Se prohíbe el transporte de personal fuera de la cabina de conducción y/o en número superior a los asientos existentes en el interior.
- Todos los vehículos serán revisados periódicamente en especial los órganos de accionamiento neumático, quedando reflejadas las revisiones en el libro de mantenimiento.
- Se instalará en el borde de los terraplenes de vertido, sólidos topes de limitación de recorrido para vertido en retroceso, a las distancias señaladas en los planos.
- Todas las maniobras de vertido en retroceso serán dirigidas por el Jefe de Equipo.
- Todos los vehículos empleados en esta obra, para las operaciones de rellenos y compactación serán dotados de bocina automática de marcha hacia atrás.
- Se señalizarán los accesos a la vía pública, mediante las señales normalizadas de « peligro indefinido», « peligro salida de camiones » y « STOP ».

**D.- Equipos de Protección Individual**

- Ropa de trabajo.
- Protecciones auditivas.
- Chaleco reflectante.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.
- Impermeables o trajes de agua para casos de días lluviosos.
- Mascarilla auto filtrante para trabajos con ambiente pulvígeno.

**E.- Protecciones Colectivas**

- Señalización de tráfico adecuada.
- Formación e información al trabajador autorizado según manual de instrucciones del equipo.
- Vallado perimetral de zona de pruebas.
- Correcta conservación de la barandilla situada en la coronación del vaciado (0,90 m. de altura, con rodapié, y con resistencia de 150 kg/m).
- Los recipientes que contengan productos tóxicos o inflamables (combustibles para la maquinaria), deben estar herméticamente cerrados.
- No apilar materiales en zonas de tránsito, retirando los objetos que impidan el paso.
- Formación y conservación de un retablo, en borde de rampa para tope de vehículos.
- Señalización y ordenación del tráfico de máquinas de forma visible y sencilla.
- Se construirán dos accesos a la excavación separados entre sí, uno para la circulación de personas y otro para la de la maquinaria y camiones.
- Se habilitará en el interior de la obra una zona de espera, para estacionamiento de la maquinaria en general, y realización de su inspección y mantenimiento.
- Durante el tiempo de parada de las maquinas se señalizará su entorno con "señales de peligro", para evitar los riesgos por fallo de frenos o por atropello durante la puesta en marcha.

**F.- Maquinaria y Medios Auxiliares empleados**

- Escaleras de mano.
- Retroexcavadora.
- Pala cargadora.
- Dúmper.
- Camión basculante.
- Herramientas manuales.
- Plataformas de trabajo.

1.3.14.2.- COMPACTACIÓN DE ÁRIDOS

**B.- Evaluación de Riesgos**

- Vuelco de maquinaria o atropellos
- Caídas a distinto nivel.
- Caídas de objetos por desplome o derrumbamiento.
- Riesgos eléctricos.
- Golpes por objetos o herramientas
- Sobreesfuerzos.
- Atropellos o golpes con vehículos.
- Generación de polvo y ruido

**C.- Medidas Preventivas**

- El frente de excavación realizado mecánicamente, no sobrepasará en más de un metro, la altura máxima de ataque del brazo de la máquina.
- El frente y paramentos verticales de una excavación debe ser inspeccionado siempre al iniciar los trabajos por el Capataz o Encargado.

- Evitar que los vehículos de obra circulen en la proximidad de los bordes superiores de la excavación.
- Los desniveles se saldarán de frente y no lateralmente, lo que daría lugar a vuelco.
- No se excavará socavando la base, lo que daría lugar a vuelco.
- Se establecerán zonas de maniobra, espera y estacionamiento de máquinas y vehículos.
- Si la maquinaria está situada por encima de la zona a excavar y en bordes vaciados, siempre que el terreno lo permite, será de tipo retroexcavadora o se hará el refino a mano.
- Los operarios deben hacer uso de los EPI's de alta visibilidad para mejorar su visibilidad.
- Antes del comienzo de los trabajos tras cualquier parada, el Encargado (Jefe de obra), inspeccionará el tajo con el fin de detectar posibles grietas o movimientos de terreno.
- El acceso o aproximación a distancias inferiores a 2 m del borde de coronación del talud sin protección, se efectuará sujeto con un cinturón de seguridad, amarrado a un punto fuerte (construido exprofeso, árbol, etc.).
- Deben eliminarse los árboles, arbustos y matojos cuyas raíces han quedado al descubierto, mermando la estabilidad propia y del corte efectuado en el terreno.
- Señalizar, balizar y proteger convenientemente las zonas en las que se puedan producir desprendimientos y/o caídas de rocas y/o árboles.
- Si al realizar cualquier operación, se encuentra cualquier anomalía no prevista, cursos de agua, restos de construcciones, se parará la obra al menos en ese tajo y se comunicará a la Dirección Técnica.
- Deben prohibirse los trabajos en la proximidad de postes eléctricos cuya sensibilidad no quede garantizada antes del inicio de las tareas.
- Los operarios deben respetar la distancia mínima de seguridad con los equipos de compactación.
- La maquinaria permanecerá desconectada cuando no se haga uso de la misma.
- Los trabajos de compactado con pisón rana se ejecutaran con los EPI's de protección lumbar adecuadas.
- Se prohíbe en obra el transporte de personas sobre maquinas.
- Siempre que existan interferencias entre trabajos y las zonas de circulación de peatones, maquinas o vehículos se ordenarán y controlarán mediante personal auxiliar debidamente adiestrado que dirija y vigile sus movimientos. "Encargado de señales".
- Siempre que sea posible, los accesos serán distintos para máquinas y personas. Para maquinas un ancho mínimo de 4,5 m con pendientes no superiores a 12 % en recta y 8 % en curva. Además existirá un tramo horizontal de 6 m en el acceso a la calle.
- En verano, proceder al regadío de las zonas que puedan originar polvareda durante su demolición.
- Es recomendable que el personal que interviene en trabajos de desbroce, tengan actualizadas y con las dosis de refuerzo preceptivas, las correspondientes vacunas antitetánicas y antitífica.

**D.- Equipos de Protección Individual**

- Ropa de trabajo.
- Protecciones auditivas.

- Chaleco reflectante.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.
- Impermeables o trajes de agua para casos de días lluviosos.
- Mascarilla auto filtrante para trabajos con ambiente pulvígeno.

**E.- Protecciones Colectivas**

- Señalización de tráfico adecuada.
- Vallas de limitación y protección de bordes de zanjas y desniveles.
- Cintas de balizamiento.
- Balizas luminosas.
- Topes de desplazamiento de vehículos

**F.- Maquinaria y Medios Auxiliares empleados**

- Escaleras de mano.
- Puntales.
- Pisón rana.
- Rodillo vibrante
- Herramientas manuales.

1.3.14.3.- ASFALTADO DE FIRMES

**B.- Evaluación de Riesgos**

- Caídas al mismo nivel
- Caídas desde máquinas y vehículos
- Atropellos y colisiones entre maquinas
- Cortes y golpes
- Ruido, polvo y vibraciones
- Emanaciones tóxicas por utilización de material bituminoso

**C.- Medidas Preventivas**

- Se esmerará el orden y la limpieza durante la ejecución de los trabajos.
- Los desplazamientos se realizaran por los laterales de la calzada para evitar las zonas de deslizamiento.
- El ascenso y descenso de la máquina se hará por los peldaños y asideros dispuestos para tal función, y siempre de forma frontal y asiéndose con las dos manos.
- Todas las plataformas de estancia o para seguimiento y ayuda al extendido asfáltico, estarán protegidas con barandillas tubulares en prevención de caídas, formadas por pasamanos de 90 cm, barra intermedia y rodapié de 15 cm, desmontables para permitir una mejor limpieza.
- Se preparará la señalización necesaria con arreglo a norma
- Para el buen funcionamiento de la máquina y en especial por razones de seguridad, deben efectuarse escrupulosamente las revisiones prescritas en su libro de mantenimiento.

- No se permite la permanencia sobre la extendedora en marcha a otra persona que no sea el conductor, para evitar accidentes por caída.
- Se prohíbe expresamente el acceso de operarios a la regla vibrante durante las operaciones de extendido.
- No se permitirá que nadie toque la máquina de riego, a no ser el personal asignado.
- Los bordes de la extendedora, en prevención de atrapamientos, estarán señalizados a bandas amarillas y negras alternativas.
- Los operarios caminarán por el exterior de la zona recién asfaltada, siempre que puedan
- Los operarios se colocarán siempre que puedan de espaldas al viento, para evitar en lo posible la inhalación de gases y vapores, de lo contrario usarán mascarilla
- Se tendrá previsto el equipo de protección individual para el regador
- Se dispondrá de equipo de extinción en la cuba de extendido de la emulsión
- El regador cuidará mucho su posición con relación al viento. Lo recibirá siempre por la espalda
- En días de viento, cuando el entorno así lo exija porque haya personas, vehículos o edificaciones cercanas, se bajará la boquilla de riego todo lo cerca del suelo que se pueda para evitar salpicaduras
- Deberá haber un extintor de polvo polivalente en la cabina de la máquina.

**D.- Equipos de Protección Individual**

- Ropa de trabajo.
- Protecciones auditivas.
- Chaleco reflectante.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.
- Impermeables o trajes de agua para casos de días lluviosos.
- Mascarilla auto filtrante para trabajos con ambiente pulvígeno.

**E.- Protecciones Colectivas**

- Señalización de tráfico adecuada.
- Formación e información al trabajador autorizado según manual de instrucciones del equipo.
- Cinta de balizamiento para acopios.
- Vallado perimetral de zona de pruebas.

**F.- Maquinaria y Medios Auxiliares empleados**

- Escaleras de mano.
- Carretón o carretilla de mano.
- Herramientas manuales.
- Plataformas de trabajo.
- Camión Pluma.
- Rodillo vibrante.
- Fresadora.
- Extendedora.
- Compactadora.

1.3.14.4.- ACERADO: BORDILLOS, ADOQUINADO Y ENLOSADO

**B.- Evaluación de Riesgos**

- Caídas al mismo nivel
- Atropellos y vuelco de maquinarias.
- Cortes y golpes
- Aplastamientos producidos por la caída de algún bordillo
- Ruido, polvo y vibraciones.
- Riesgos eléctricos.
- Sobresfuerzos.
- Caídas de objetos en manipulación.

**C.- Medidas Preventivas**

- Se esmerará el orden y la limpieza durante la ejecución de los trabajos...
- Se prestará especial atención a la colocación de bordillos en proximidades de huecos, tales como sumideros, arquetas, etc. deben estar perfectamente protegidos con tablones de madera o metálicos.
- La plataforma de trabajo debe tener una anchura mínima de 0,60 m., los tablones que la forman deben estar sujetos a las borriquetas mediante lías y no deben volar más de 0,20 m. En trabajos en altura la plataforma estará provista de barandillas de 0,90 m. y rodapiés de 0,20 m.
- Todo el material sobrante debe acopiarse en bateas adecuadas fuera de las zonas de paso.
- No permanecerá ningún trabajador en las proximidades de la maquinaria auxiliar, tales como dúmper, o carretilla elevadora.
- Se señalizarán las zonas de trabajo, garantizando unas zonas seguras alejadas del tránsito de vehículos.
- Los bordillos se acopiarán de forma horizontal, no vertical
- Se prohibirá lanzar herramientas o materiales desde el suelo al interior de la zanja.
- Las herramientas de corte se revisaran antes de su utilización verificando los discos de corte y conexiones.
- Los discos utilizados cumplirán con las especificaciones técnicas del fabricante.
- Se tendrá en cuenta el contenido del apartado “Manipulación manual de cargas” para el manejo y colocación de bordillos por los trabajadores, estando coordinados en sus movimientos para evitar descompensar el peso del bordillo en su colocación hacia uno de los trabajadores, pudiendo ocasionarle un accidente por atrapamiento de pies o manos, golpes contra objetos u otras causas.
- El izado de piezas de solado se hará en jaulas, bandejas o dispositivos similares dotados de laterales fijos o abatibles que impidan la caída durante su elevación.
- Los trabajos que puedan generar acumulación de polvo se realizaran con el uso de las mascarillas y gafas de proyección.
- Las zonas sensibles de generación de polvo se mantendrán húmedas para minimizarlas.
- Cuando el local no disponga de luz natural suficiente, se le dotará de iluminación eléctrica, cuya instalación irá a más de 2 m. sobre el suelo y proporcionará una intensidad mínima de 100 lux.

- Diariamente, antes de poner en uso una cortadora o una pulidora eléctrica se comprobará el cable de alimentación con especial atención a los enlaces con la máquina y con la toma de corriente.
- Se repartirán los bordillos de forma que queden lo más próximos posibles a la zona de colocación, para evitar su transporte de forma manual por los trabajadores.
- Los trabajos se ejecutan desde plataformas adecuados para no ejecutarlos desde posturas forzadas.
- Cuando la carga y posicionamiento de los bordillos se realice con maquinaria auxiliar tipo camión grúa, se debe asegurar que el elemento de sujeción se encuentra en condiciones óptimas de utilización y que el bordillo se ha atado de manera simétrica, equilibrando su peso.
- En todo momento se mantendrán las zonas de trabajo, limpias, ordenadas y suficientemente iluminadas.

**D.- Equipos de Protección Individual**

- Ropa de trabajo.
- Protecciones auditivas.
- Chaleco reflectante.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.
- Impermeables o trajes de agua para casos de días lluviosos.
- Mascarilla auto filtrante para trabajos con ambiente pulvígeno.

**E.- Protecciones Colectivas**

- Señalización de tráfico adecuada.
- Formación e información al trabajador autorizado según manual de instrucciones del equipo.
- Vallado perimetral de zona de pruebas.

**F.- Maquinaria y Medios Auxiliares empleados**

- Herramientas manuales.
- Plataformas de trabajo.
- Camión Pluma.
- Uñas metálicas
- Cables y eslingas
- Sierras de corte o radiales.
- Mesas de corte.
- Hormigonera eléctrica.

## 1.3.14.5.- MARCAS VIALES HORIZONTALES Y VERTICALES

**B.- Evaluación de Riesgos**

- Caída de objetos.
- Caída de personas al mismo o/a distinto nivel.
- Atropello por vehículos que invadan el corte.
- Riesgos producidos por agentes químicos spray marcador.
- En disposición de Señalización de obras en la Calzada.

- Cortes y golpes
- Caídas de personas al mismo nivel.
- Atropellos por vehículos ajenos a la obra que invadan la zona vedada al tráfico.

**C.- Medidas Preventivas**

- Precaución en el traslado y manipulación de señales, estas deben ir paletizadas y flejados para evitar su movimiento involuntario.
- En caso de ser necesario se realizará el uso de escaleras que aseguren una estabilidad.
- Extremar precauciones en proximidades de taludes en desmontes, especialmente cuando el terreno esté suelto o la roca muy fracturada.
- La colocación de las señales siempre será en sentido tal que el trabajador quede protegido por otra. Para la colocación de la primera el trabajador será protegido mediante señalización móvil.
- Tanto la retirada como colocación de la señalización a instalar, deberá realizarse de acuerdo a los criterios marcados en la Norma de Carreteras 8.3.-IC “Señalización de obras”.
- Se utilizaran los EPI’s indicados en la ficha de seguridad del producto químico utilizados en las labores de marcaje.
- Los trabajos aquí tratados serán ejecutados por personal especializado.
- Los trabajos de fijación se realizaran con las herramientas adecuadas y en buen estado de conservación.
- Las zonas de trabajo se mantendrán limpias y ordenadas.
- Todos los trabajos que se lleven a cabo en la calzada (ya se trate de actividades propias de proyecto, así como operaciones con maquinaria- carga, descarga, operaciones de mantenimiento o reparación, etc.), deberán de contar previamente con la correspondiente protección proporcionada por la señalización de obras, en conformidad con los criterios de la Norma de Carreteras 8.3.-IC “Señalización de obras”.
- Se prohíbe que ningún operario transporte una señal atravesando zonas abiertas al tráfico. Quedando terminantemente prohibido el atravesar las vías abiertas al tráfico por lugares no permitidos para ello.
- Ropa de trabajo adecuada, ropa de alta visibilidad o impermeable en ambientes lluviosos.
- La retirada se llevará a cabo en sentido inverso al del montaje.
- Para el mantenimiento y reposición de la señalización y el balizamiento existente durante la ejecución de la obra, se dispondrá un servicio especial de vigilancia. Dicho servicio estará compuesto por un operario con vehículo, convenientemente identificado y equipado (extintor, botiquín, etc) y diverso material para reposición de señalización y balizamiento.

**D.- Equipos de Protección Individual**

- Ropa de trabajo.
- Protecciones auditivas.
- Chaleco reflectante.
- Botas de seguridad con puntera reforzada para manejo de materiales anteriores.

- Impermeables o trajes de agua para casos de días lluviosos.
- Mascarilla auto filtrante para trabajos con ambiente pulvígeno.

**E.- Protecciones Colectivas**

- Señalización de tráfico adecuada.
- Formación e información al trabajador autorizado según manual de instrucciones del equipo.
- Vallado perimetral de zona de pruebas.

**F.- Maquinaria y Medios Auxiliares empleados**

- Escalera de mano.
- Herramientas manuales.
- Plataformas de trabajo.
- Camión Pluma.
- Cables y eslingas

## 1.4.- RIESGOS LABORALES Y MEDIDAS DE PROTECCIÓN PARA MAQUINARIA Y EQUIPOS.

Se recoge aquí la relación de máquinas más empleadas en cada unidad de obra, así como su evaluación de riesgos y sus medidas preventivas más importantes. Como recomendación general para todas las máquinas, se deben mantener en perfecto estado de mantenimiento y pasar todas las revisiones periódicas oportunas.

### 1.4.1.- MÁQUINAS HERRAMIENTAS

**B.- Evaluación de Riesgos**

- Descargas eléctricas.
- Proyección de partículas.
- Ambiente ruidoso.
- Generación de polvo.
- Explosiones e incendios.
- Cortes en extremidades.

**C.- Medidas Preventivas**

- Cada herramienta se usará para su fin específico.
- No usar herramientas en mal estado.
- Eliminar las rebabas.
- Todas las herramientas estarán dotadas de doble aislamiento de seguridad.
- El personal que utilice estas herramientas ha de conocer las instrucciones de uso.
- Las herramientas serán revisadas periódicamente, de manera que se cumplan las instrucciones de conservación del fabricante.

- Estarán acopiadas en el almacén de obra, llevándolas al mismo una vez finalizado el trabajo, colocando las herramientas más pesadas en las baldas más próximas al suelo.
- La desconexión de las herramientas no se harán de tirón brusco.
- No se usará una herramienta eléctrica sin enchufe. Si hubiera necesidad de emplear mangueras, éstas se harán de la herramienta al enchufe y nunca a la inversa.
- Los trabajos con estas herramientas se realizarán siempre en posición estable.
- Para trabajos en altura, se impedirá su caída accidental a niveles inferiores.
- Zonas de trabajo limpias y ordenadas.
- Las mangueras de alimentación a herramientas estarán en buen uso.
- Los huecos estarán protegidos con barandilla.
- Las maquinas herramientas no protegidas eléctricamente mediante el sistema de doble aislamiento, tendrán sus carcasas de protección de motores eléctricos, etc., conectadas a la red de tierras en combinación con los disyuntores diferenciales del cuadro eléctrico general de la obra.
- Las maquinas herramientas a utilizar en lugares en los que existen productos inflamables o explosivos (disolventes inflamables, explosivos, combustibles y similares), estarán protegidas mediante carcasas antideflagrantes.
- En ambientes húmedos la alimentación para las maquinas herramientas no protegidas con doble aislamiento, se realizará mediante conexión a transformadores a 24 V.
- Los motores eléctricos de las maquinas herramientas estarán protegidos por la carcasa y resguardos propios de cada aparato, para evitar los riesgos de atrapamientos, o de contacto con la energía eléctrica.
- Las transmisiones motrices por correas, estarán siempre protegidas mediante bastidor que soporte una malla metálica, dispuesta de tal forma, que permitiendo la observación de la correcta transmisión motriz, impida el atrapamiento de los operarios o de los objetos.
- Esta precaución deberá preverse ante cualquier máquina con posibilidad de atrapamiento. Por otra parte, la provisionalidad propia de la actividad de construcción, hace que entre instalación y reinstalación se extravíen las protecciones. Si prevé la necesidad del montaje de un taller mecánico de obra, se sugiere que aumente sus precauciones en este sentido.
- Las transmisiones mediante engranajes accionados mecánicamente, estarán protegidos mediante un bastidor soporte de un cerramiento a base de malla metálica, que permitiendo la observación del buen funcionamiento de la transmisión, impida el atrapamiento de personas u objetos.
- Igual precaución se sugiere adoptar, si prevé la utilización de herramientas de banco de accionamiento manual que utilicen engranajes.
- Lo mismo en el caso de utilizar maquinaria con tornillos sin fin.
- La máxima dificultad estribará al intentar resolver la exigencia de posibilidad de engrase sin necesidad de desmontar las protecciones. No olvide que los rendimientos exigidos para el personal, condicionado por sus propias exigencias, pueden ser el mayor obstáculo a vencer.
- Las maquinas herramientas con capacidad de corte, tendrán el disco protegido mediante una carcasa antiproyecciones.
- El transporte aéreo mediante gancho (grúa) de las maquinas herramientas (mesa de sierra, tronzadora, dobladora, etc.), se realizará ubicándola flejada en el interior de una batea emplintadas resistente, para evitar el riesgo de caída de la carga.

- Siempre que sea posible, las máquinas herramientas con producción de polvo se utilizarán a sotavento, para evitar el riesgo por trabajar en el interior de atmósferas nocivas.
- Las herramientas accionadas mediante compresor se utilizarán a una distancia mínima del mismo de 10 m (como norma general), para evitar el riesgo por alto nivel acústico.
- Se prohíbe el uso de máquinas herramienta al personal no autorizado para evitar accidentes por impericia.
- Se prohíbe dejar las herramientas eléctricas de corte (o taladro), abandonadas en el suelo, para evitar accidentes.
- Siempre que sea posible, las mangueras de presión para accionamiento de máquinas herramientas, se instalarán de forma aérea. Se señalizarán mediante cuerda de banderolas, los lugares de cruce aéreo de las vías de circulación interna, para prevenir los riesgos de tropiezo (o corte del circuito de presión).
- Se prohíbe realizar reparaciones o manipulaciones en la maquinaria accionada por transmisiones por correas en marcha. Las reparaciones, ajustes, etc., se realizarán a motor parado, para evitar accidentes.
- El montaje y ajuste de transmisiones por correas se realizará mediante montacorreas (o dispositivos similares), nunca con destornilladores, las manos, etc., para evitar el riesgo de atrapamiento.
- Las máquinas en situación de avería o de semiavería, que no respondan a todas las órdenes recibidas como se desea, pero sí a algunas, se paralizarán inmediatamente quedando señalizadas mediante una señal de peligro con la leyenda “NO CONECTAR, EQUIPO (O MÁQUINA) AVERIADO”.
- Una precaución adicional para máquinas de entidad, será que se retiren los fusibles o contactores en caso de avería.
- La instalación de letreros con leyendas de “máquina averiada”, “maquina fuera de servicio”, etc., serán instalados y retirados por la misma persona.

### 1.4.2.- RETROEXCAVADORA

### B.- Evaluación de Riesgos

- Atropello (mala visibilidad, velocidad inadecuada)
- Deslizamiento de la maquina (terrenos embarrados)
- Maquina en marcha fuera de control (abandono de la cabina de mando sin desconectar la máquina y bloquear los frenos).
- Vuelco de la maquina (inclinación del terreno superior a la admisible para la circulación de la retro).
- Caída por pendientes.
- Choque contra otros vehículos.
- Contacto con líneas eléctricas aéreas o enterradas.
- Interferencias con infraestructuras urbanas (alcantarillado, red de aguas, líneas de gas o eléctricas).
- Incendio.
- Quemaduras.
- Atrapamiento
- Proyección de objetos.
- Caídas de personas desde la máquina.

- Golpes.
- Ruido propio y ambiental.
- Vibraciones.
- Los derivados de los trabajos realizados en ambientes pulverulentos.
- Condiciones meteorológicas extremas.
- Derivados de rescatar cucharones bivalva atrapados en el interior de las zanjas.
- Propios del procedimiento y diseño elegido para el movimiento de tierras.

**C.- Medidas Preventivas**

- Se acotará a una distancia igual a la del alcance máximo del brazo excavador, el entorno de la máquina. Se prohíbe en la zona la realización de trabajos o la permanencia de personas.
- No se admitirán retroexcavadoras desprovistas de cabinas antivuelco, siendo estas las indicadas por el fabricante.
- Las retro estarán dotadas de un botiquín portátil de primeros auxilios.
- Se prohíbe que los conductores abandonen la retro sin haber antes depositado la cuchara bivalva en el suelo y cerrada.
- Se prohíbe el transporte de personas sobre la retro, en prevención de caídas, golpes, etc.
- Se prohíbe utilizar el brazo articulado o las cucharas para izar personas y acceder a trabajos puntuales.
- Se aconseja no utilizar la retro como una grúa, para la introducción de (piezas, tuberías, etc.), en el interior de las zanjas.
- No obstante, si se decide que la retro se utilice como grúa, será bajo las siguientes condiciones:
- La cuchara tendrá en su parte exterior trasera una argolla soldada expresamente, para efectuar cuelgues. Este equipo deberá venir montado de fábrica.
- El cuelgue se efectuará mediante ganchos o mosquetón de seguridad incorporado al balancín o aparejo indeformable.
- El tubo se suspenderá de los extremos (dos puntos), en posición paralela al eje de la zanja, con la máquina puesta en la dirección de la misma y sobre su directriz.
- La carga será guiada por cabos manejados por dos operarios.
- La maniobra será dirigida por un especialista.
- En caso de inseguridad de los paramentos de la zanja, se paralizarán inmediatamente los trabajos.
- Las retroexcavadoras a utilizar en esta obra, estarán dotadas de extintor, timbrado y con las revisiones al día.
- Las retro a utilizar en esta obra estarán dotadas de luces y bobina de retroceso.
- La retroexcavadora llevará siempre escrito, de forma legible el límite de carga útil de la misma.
- Se prohíbe realizar esfuerzos por encima del límite de carga útil de la retroexcavadora.
- Se prohíbe estacionar la retro a menos de tres metros, del borde de barrancos, hoyos, zanjas y asimilables, para evitar el riesgo de vuelcos por fatiga del terreno.
- Se prohíbe verter los productos de la excavación con la retro a menos de dos metros, del borde de corte superior de una zanja o trinchera, para evitar riesgos por sobrecarga del terreno.

*Normas para los maquinistas de retroexcavadoras*

- Para subir o bajar de la retro, utilice los peldaños y asideros dispuestos para tal menester, subiendo y bajando de forma frontal (mirando hacia ella), evitará lesiones por caídas.
- No permita el acceso a la retro, apersonas no autorizadas, pueden provocar accidentes, o lesionarse.
- Para evitar lesiones durante las operaciones de mantenimiento, apoye primero la cuchara en el suelo, pare el motor, ponga en servicio el freno de mano y bloquee la maquina; a continuación realice las operaciones de servicio que necesite.
- No guarde combustible ni trapos grasientos en la retro, pueden incendiarse.
- No libere los frenos de la maquina en posición de parada, si antes no ha instalado los tacos de inmovilización de las ruedas.
- Antes de iniciar cada turno de trabajo, compruebe que funcionan los mandos correctamente, evitará accidentes.
- Si topa con cables eléctricos, no salga de la maquina hasta haber interrumpido el contacto y alejado a la retro del lugar. Salte entonces, sin tocar a un tiempo el terreno y la máquina (u objeto en contacto con este).

**D.- Equipos de Protección Individual**

- Ropa de trabajo adecuada.
- Botas de seguridad.
- Chaleco reflectante.
- Guantes de cuero.
- Gafas de protección.
- Casco de seguridad.

### 1.4.3.- CAMIÓN BASCULANTE

**B.- Evaluación de Riesgos**

- Atropellos de personas.
- Choque contra otros vehículos.
- Vuelco del camión.
- Vuelco por desplazamiento de carga.
- Caídas.
- Atrapamientos.

**C.- Medidas Preventivas**

- El acceso de camiones en la obra se efectuará por la puerta destinada al acceso de maquinaria.
- Las operaciones de carga y descarga, se efectuara en las zonas de acopio de materiales.
- Todos los camiones dedicados al transporte de materiales, estarán en perfectas condiciones de mantenimiento y conservación.

- Antes de iniciar las maniobras de carga y descarga del material además de haber sido instalado el freno de mano de la cabina del camión, se instalarán calzos de inmovilización de las ruedas, en prevención de accidentes por fallo mecánico.
- El ascenso y descenso de las cajas de los camiones, se efectuará mediante escalerillas metálicas fabricadas para tal menester, dotadas de ganchos de inmovilización y seguridad.
- Todas las maniobras de carga y descarga serán dirigidas por un especialista conocedor del proceder más adecuado.
- El colmo máximo permitido para materiales sueltos no superará la pendiente ideal del 5 % y se cubrirá con una lona, en previsión de desplomes.
- Las cargas se instalarán sobre la caja de forma uniforme compensando los pesos, de la manera más uniformemente repartida posible.
- El gancho de la grúa auxiliar, estará dotado de pestillo de seguridad.

*Normas de seguridad para los trabajos de carga y descarga de camiones*

- Pida antes de proceder a su tarea, que le doten de guantes o manoplas de cuero. Utilícelas constantemente y evitará pequeñas lesiones molestas en las manos.
- Utilice siempre las botas de seguridad, evitará atrapamientos o golpes en los pies.
- Si debe guiar las cargas en suspensión, hágalo mediante “cabos de gobierno” atados a ellas. Evite empujarlas directamente con las manos para no tener lesiones.
- No salte al suelo desde la carga o desde la caja si no es para evitar un riesgo grave. Puede en el salto fracturarse los talones y eso es una lesión grave.

### D.- Equipos de Protección Individual

- Botas de seguridad.
- Ropa de trabajo adecuada.
- Guantes de protección para trabajos de mantenimiento.
- Gafas de protección para trabajos de mantenimiento.
- Casco de seguridad para trabajos de mantenimiento.
- Chaleco reflectante.

## 1.4.4.- DÚMPER

### B.- Evaluación de Riesgos

- Vuelco de la máquina en tránsito.
- Atropello de personas.
- Choque por falta de visibilidad.
- Los derivados de la vibración constante durante la conducción.
- Polvo ambiental.
- Golpes con la manivela de puesta en marcha.
- Ruido.
- Los derivados de respirar monóxido de carbono (trabajos en locales cerrados o mal ventilados).
- Caída del vehículo durante maniobras en carga en marcha de retroceso.

### C.- Medidas Preventivas

- En previsión de accidentes, se prohíbe el transporte de piezas (puntales, tablones y similares) que sobresalgan lateralmente del cubilote del dúmper.
- Los dúmperes a utilizar en esta obra, llevarán en el cubilote un letrero en el que se diga cuál es la carga máxima admisible.

*Normas de seguridad para los conductores de dúmper.*

- Los conductores de dúmperes estarán en posesión del carnet de conducir clase B, para poder ser autorizados a su conducción.
- Cuando ponga el motor en marcha, sujete con fuerza la manivela y evite soltarla de la mano. Los golpes por esta llave suelen ser muy dolorosos y producen serias lesiones.
- No ponga el vehículo en marcha, sin antes cerciorarse de que tiene el freno de mano en posición de frenado, evitará accidentes por movimientos incontrolados.
- No cargue el cubilote del dúmper por encima de la carga máxima en la grabada. Evitará accidentes.
- No transporte personas en su dúmper, es sumamente arriesgado para ellas y para usted, y es algo totalmente prohibido en esta obra.
- Asegúrese siempre de tener una perfecta visibilidad frontal. Evitará accidentes. Los dúmperes se deben conducir, mirando al frente, evite que la carga le haga conducir con el cuerpo inclinado mirando por los laterales de la maquina.
- Evite descargar al borde de cortes del terreno si ante éstos, no existe instalado un tope final de recorrido. Un despiste puede precipitarles con consecuencias muy graves.
- Respete tanto las señales de circulación interna a la obra como las externas.
- Si debe remontar pendientes con el dúmper cargado, es más seguro, hacerlo en marcha hacia atrás, de lo contrario puede volcar.

### D.- Equipos de Protección Individual

- Casco de seguridad.
- Ropa de trabajo.
- Botas de seguridad.
- Guantes de protección para trabajos de mantenimiento.
- Chaleco reflectante.
- Gafas de protección para trabajos de mantenimiento.
- Faja dorsolumbar.

## 1.4.5.- PISÓN RANA

### B.- Evaluación de Riesgos

- Golpes en manos y muñecas por retroceso de la manivela de arranque al poner la máquina en marcha.
- Golpes y/o atrapamientos en manos, brazos y pies al efectuar giros en zanjas estrechas.
- Vuelcos originados por distracción del operario.
- Caídas al mismo nivel
- Atrapamientos.

- Proyección de objetos.
- Ruido.
- Maquina en marcha fuera de control.
- Vibraciones.
- Sobreesfuerzos.
- Exposición a temperaturas ambientales extremas.

### C.- Medidas Preventivas

- El personal que deba manejar los pisones mecánicos, conocerá perfectamente su manejo y los riesgos profesionales de la máquina.
- Las zonas en fase de compactación quedarán cerradas al paso mediante señalización.
- Antes de poner en funcionamiento el pisón asegurarse de que están montadas todas las tapas y carcasas protectoras.
- Guiar el pisón en avance frontal, evitando los desplazamientos laterales. La maquina puede descontrolarse y producir lesiones.
- El pisón produce polvo ambiental en apariencia ligera. Riegue siempre la zona a aplanar, o use una mascarilla de filtro mecánico recambiable antipolvo.
- El pisón produce ruido. Utilice siempre cascos o taponcillos antirruido. Evitará perder agudeza de oído o quedar sordo.
- El pisón puede atraparle un pie. Utilice siempre calzado con la puntera reforzada.
- La posición de guía puede hacerle inclinar la espalda.
- El operario deberá utilizar botas de seguridad y guantes de cuero.
- Se protegerá con cinturón antivibratorio siempre que permanezca al mando de la máquina durante toda la jornada de trabajo, o en intervalos ininterrumpidos de tiempo superiores a 30 minutos.

### D.- Equipos de Protección Individual

- Protectores auditivos.
- Cinturón elástico antivibratorio.
- Ropa de trabajo.
- Guantes de cuero.
- Casco de seguridad.
- Botas de seguridad.
- Chaleco reflectante.
- Faja dorsolumbar.

## 1.4.6.- GRUPO ELECTRÓGENO

### B.- Evaluación de Riesgos

- Riesgos eléctricos.
- Atrapamientos.
- Contactos directos o indirectos.
- Ruido.
- Golpes.

### C.- Medidas Preventivas

- Coloque el grupo electrógeno sobre una superficie lisa y firme, y cálcelo para evitar movimientos indeseados.
- Coloque la pica de tierra inmediatamente después de colocar el grupo electrógeno.
- El cable de tierra debe ser amarillo y verde.
- Se puede mejorar la conductividad del terreno humedeciendo periódicamente el mismo, en la zona donde esté clavada la pica.
- Conecte la carcasa y partes metálicas del grupo electrógeno a tierra.
- No trabaje nunca sin que el grupo electrógeno cuente con las protecciones eléctricas necesarias.
- Compruebe que las máquinas enganchadas al grupo cuentan con la protección eléctrica necesaria para cada máquina.
- No manipule el grupo electrógeno mientras está funcionando.
- Solo el personal autorizado realizará las reparaciones en los grupos electrógenos.
- Está totalmente prohibido puentear los interruptores.

### D.- Equipos de Protección Individual

- Protectores auditivos.
- Ropa de trabajo.
- Botas de seguridad dieléctricas.
- Guantes de protección.
- Casco de seguridad.
- Chaleco reflectante.
- Gafas de protección.

## 1.4.7.- GÓNDOLA DE TRANSPORTE

### B.- Evaluación de Riesgos

- Caídas al mismo nivel.
- Caída de materiales.
- Pisadas sobre objetos.
- Golpes y/o cortes con objetos y herramientas.
- Proyección de fragmentos o partículas.
- Atrapamientos por o entre objetos.
- Incendio y explosión.
- Contacto térmico.
- Contacto eléctrico.
- Vuelco de la máquina.
- Atropello.
- Vibraciones.
- Ruido.

**C.- Medidas Preventivas**

- El conductor usará el equipo de trabajo como especifique el manual de instrucciones de uso y manejo que deberá ser proporcionado por el fabricante o suministrador.
- Esta máquina únicamente debe ser utilizada por personal autorizado y debidamente instruido, con una formación específica adecuada. Lógicamente tendrá carnet de conducir de clase específica al tipo de vehículo utilizado.
- El conductor seguirá lo establecido por el fabricante en cuanto a su mantenimiento y conservación.
- El conductor tendrá la cabina dotada de extintor de incendios, timbrado y con las revisiones al día. En su defecto lo solicitará a su superior jerárquico
- El conductor no pondrá en marcha la máquina, ni accionarán los mandos sin encontrarse sentado en el puesto del operador.
- El conductor inspeccionará visualmente alrededor de la máquina, antes de subir a ella y siempre antes de reanudar la marcha.
- El conductor comprobará que el camión dispone de la tarjeta de inspección técnica de vehículos sellada y actualizada, avisador acústico de marcha atrás y señal luminosa de funcionamiento.
- El conductor accederá a la plataforma de carga por las escalas concebidas para tal fin. Nunca saltará al suelo desde la góndola.
- El conductor respetará la carga máxima que indique el fabricante.
- El conductor circulará por los caminos internos de la obra establecidos, respetando todas las normas del código de circulación, siguiendo las instrucciones del encargado.
- Si por cualquier circunstancia, el conductor tuviera que parar en la rampa de acceso/salida, el vehículo quedará frenado y calzado con topes.
- El conductor respetará en todo momento la señalización de la obra.
- El conductor anunciará las maniobras dentro de la obra con antelación, sin brusquedades.
- El conductor será auxiliado en por un señalista en caso de ser necesario.
- El conductor acondicionará la velocidad de circulación a las características de la carga transportada, la visibilidad y las condiciones del terreno.
- No permanecerá nadie en las proximidades del tráiler en el momento de realizar éste cualquier tipo de maniobra, ni mientras se está descargando. El conductor vigilará dicha circunstancia y en caso contrario lo comunicará al encargado de obra.
- Si el conductor descarga material cerca del borde de taludes, respetará las distancias de seguridad establecidas en función de la transmisión de carga prevista y que será como mínimo 2 metros.
- El conductor, para determinadas maniobras en zona de poca visibilidad, y especialmente marcha atrás, solicitarán la colaboración de otra persona que realice funciones de señalista y le advierta de cada uno de sus movimientos.
- Antes de comenzar la descarga el conductor tendrá echado el freno de mano y el motor parado, utilizándose calzos en caso de duda.
- El conductor y/o mecánico realizarán los trabajos de mantenimiento en lugares habilitados para ello dentro de la obra previa consulta con el encargado. Nunca los trabajos de mantenimiento se realizarán en el tajo. En la labores de mantenimiento el camión estará en terreno llano y firme, con el freno de mano activado y caso de duda con calzos inmovilizadores.

- En presencia de líneas eléctricas aéreas se cumplirán las medidas preventivas indicadas en el apartado correspondiente de este plan de seguridad y salud.

### D.- Equipos de Protección Individual

- Botas de seguridad.
- Ropa de trabajo adecuada.
- Guantes de protección para trabajos de mantenimiento y/o descarga de equipos de trabajo.
- Gafas de protección para trabajos de mantenimiento.
- Casco de seguridad para trabajos de mantenimiento.
- Chaleco reflectante.

## 1.4.8.- CAMIÓN GRÚA

### B.- Evaluación de Riesgos

- Vuelco del camión.
- Atrapamientos.
- Caídas al subir (o bajar) a la zona de mandos.
- Atropello de personas.
- Desplome de la carga.
- Golpes por la carga a paramentos (verticales u horizontales).

### C.- Medidas Preventivas

- Antes de realizar las maniobras de carga se instalarán calzos inmovilizadores en las cuatro ruedas y los gatos estabilizadores.
- Las maniobras de carga y descarga serán dirigidas por un especialista en prevención de los riesgos por maniobras incorrectas.
- Los ganchos de cuelgue estarán dotados de pestillos de seguridad.
- Se prohíbe expresamente sobrepasar la carga máxima admisible fijada por el fabricante del camión en función de la longitud del brazo de grúa.
- El gruísta tendrá en todo momento a la vista la carga suspendida. Si esto no fuera posible, las maniobras serán expresamente dirigidas por un señalista, en previsión de los riesgos por maniobras incorrectas.
- Las rampas para acceso del camión grúa no superarán inclinaciones del 20 % como norma general (salvo características especiales del camión en concreto), en prevención de los riesgos de atoramiento o vuelco.
- Se prohíbe realizar suspensión de cargas de forma lateral cuando la superficie de apoyo del camión esté inclinada hacia el lado de la carga, en previsión de los accidentes por vuelco.
- Se prohíbe estacionar o circular con el camión grúa a distancias inferiores a 2 m, del corte del terreno (o situación similar), en previsión de los accidentes por vuelco.
- Se prohíbe realizar tirones sesgados de la carga.
- Se prohíbe arrastrar cargas con el camión grúa.

- Las cargas en suspensión, para evitar golpes y balanceos se guiarán mediante cabos de gobierno.
- Se prohíbe la permanencia de personas en torno al camión grúa a distancias inferiores a 5 m.
- Se prohíbe la permanencia bajo las cargas en suspensión.
- El conductor del camión grúa estará en posesión del certificado de capacitación que acredite su pericia.

*Normas de seguridad para los operadores del camión grúa*

- Mantenga el camión alejado de terrenos inseguros, propensos a hundimientos. Puede volcar el camión y sufrir lesiones.
- No de marcha atrás sin ayuda de un señalista. Tras el camión puede haber operarios y objetos que usted desconoce al iniciar la maniobra.
- Suba y baje del camión grúa por los lugares previstos para ello.
- Limpie sus zapatos del barro o de la grava que pudieran tener antes de subir a la cabina. Si se resbalan los pedales durante la maniobra o marcha, puede provocar accidentes.
- Antes de poner en servicio el camión, compruebe todos los dispositivos de frenado.
- Asegúrese que todos los ganchos de los aparejos, balancines, eslingas o estrobos posean el pestillo de seguridad que evite el desenganche fortuito.
- Antes de izar una carga, compruebe en la tabla de la cabina la distancia de extensión máxima del brazo. No sobrepase el límite marcado en la tabla.
- Respete siempre las tablas, rótulos y señales adheridas a la máquina y haga que las respeten el resto del personal.
- Si entra en contacto con una línea eléctrica, pida auxilio con la bocina y espere recibir instrucciones. No intente abandonar la cabina aunque el contacto eléctrico haya cesado, podría sufrir lesiones. Sobre todo no permita que nadie toque el camión grúa, puede estar cargada de electricidad.
- No realice nunca arrastres de carga o tirones sesgados. La grúa puede volcar y, en el mejor de los casos, las presiones y esfuerzos realizados pueden dañar los sistemas hidráulicos del brazo.
- No intente sobrepasar la carga máxima autorizada para ser izada. Los sobreesfuerzos pueden dañar la grúa y sufrir accidentes.
- No permita que nadie se encarame sobre la carga. No consienta que nadie se cuelgue del gancho. Es muy peligroso.
- Asegure la inmovilidad del brazo de la grúa antes de iniciar ningún desplazamiento. Póngalo en la posición de viaje y evitará accidentes por movimientos descontrolados.
- No abandone la máquina con una carga suspendida, no es seguro.

**D.- Equipos de Protección Individual**

- Casco de seguridad.
- Guantes de protección.
- Calzado de seguridad.
- Gafas de protección.

- Ropa de trabajo.
- Chaleco reflectante
- Protectores auditivos.

### 1.4.9.- GRÚA AUTOPROPULSADA

### B.- Evaluación de Riesgos

- Vuelco de la grúa autopropulsada
- Atrapamientos
- Caídas a distinto nivel
- Atropello de personas
- Golpes por la carga
- Desplome de la estructura en montaje (perfilería general, tramos de grúa torre, climatizadores, etc.)
- Contacto con la energía eléctrica.
- Caídas al subir o bajar de la cabina.
- Quemaduras (mantenimiento).

### C.- Medidas Preventivas

- En los planos se indica el lugar de estación de la grúa autopropulsada para montaje de (la grúa torre, la estructura metálica, grandes equipos, etc.).
- La grúa autopropulsada, tendrá al día el libro de mantenimiento, en prevención de riesgos por fallo mecánico.
- El gancho (o doble gancho), de la grúa autopropulsada estará dotado de pestillo (o pestillos), de seguridad, en prevención del riesgo de desprendimientos de la carga.
- El Coordinador de seguridad en ejecución comprobará el correcto apoyo de los gatos estabilizadores antes de entrar en servicio la grúa autopropulsada.
- Se dispondrá en obra de una partida de tablones de 9 cm de espesor (o placas de palastro), para ser utilizadas como plataformas de reparto de cargas de los gatos estabilizadores en el caso de tener que fundamentar sobre terrenos blandos.
- Si la máquina se emplea para el montaje de prefabricados o cubiertas, extremar las precauciones en caso de régimen de fuertes vientos.
- Las maniobras de carga (descarga), estarán siempre guiadas por un especialista, en previsión de los riesgos por maniobras incorrectas.
- Extremar las precauciones especialmente durante maniobras de sustentación de objetos para su recibido (soldaduras, embulonados, etc.). Considerar que un movimiento inesperado o no conveniente de la pieza en suspensión, puede hacer caer al operario o a los operarios que la reciben.
- Se prohíbe utilizar la grúa autopropulsada para arrastrar las cargas, por ser una maniobra insegura.
- Se prohíbe permanecer o realizar trabajos en un radio de 5m (como norma general), en torno a la grúa autopropulsada en prevención de accidentes.
- Se prohíbe permanecer o realizar trabajos dentro del radio de acción de cargas suspendidas, en prevención de accidentes.

*Normas o medidas preventivas tipo de aplicación para puestas en estación de grúas*

*autopropulsadas en las vías urbanas*

- Se vallará el entorno de la grúa autopropulsada en estación, a la distancia más alejada posible en prevención de daños a terceros. El cercado se puede prever a base de vallas “tipo ayuntamiento”, asegurándose su continuidad mediante enganche y atado con alambre.
- Se instalarán señales de “peligro obras”, balizamiento y dirección obligatoria para la orientación de los vehículos automóviles a los que la ubicación de la máquina desvíe de su normal recorrido. Recurriéndose a la ayuda de señalistas si fuese necesario e incluso de la “Policía local”.

*Normas de seguridad para los operadores de la grúa autopropulsada*

- Mantenga la maquina alejada de terrenos inseguros, propensos a hundimientos. Puede volcar la máquina y sufrir lesiones.
- Evite pasar el brazo de la grúa, con carga o sin ella sobre el personal.
- No dé marcha atrás sin ayuda de un señalista. Tras la maquina puede haber operarios y objetos que usted desconoce al iniciar la maniobra.
- Suba y baje a la cabina y plataformas por los lugares previstos para ello.
- No salte nunca directamente al suelo desde la maquina si no es por un inminente riesgo para su integridad física.
- Limpie sus zapatos del barro o de la grava que pudieran tener antes de subir a la cabina. Si se resbalan los pedales durante la maniobra o marcha, puede provocar accidentes.
- Antes de poner en servicio la máquina, compruebe todos los dispositivos de frenado.
- Asegúrese que todos los ganchos de los aparejos, balancines, eslingas o estrobos posean el pestillo de seguridad que evite el desenganche fortuito.
- Antes de izar una carga, compruebe en la tabla de la cabina la distancia de extensión máxima del brazo. No sobrepase el límite marcado en la tabla.
- Respete siempre las tablas, rótulos y señales adheridas a la máquina y haga que las respeten el resto del personal.
- Si entra en contacto con una línea eléctrica, pida auxilio con la bocina y espere recibir instrucciones. No intente abandonar la cabina aunque el contacto eléctrico haya cesado, podría sufrir lesiones. Sobre todo no permita que nadie toque la grúa autopropulsada, puede estar cargada de electricidad.
- No haga por si mismo maniobras en espacios angostos. Pida la ayuda de un señalista y evitará accidentes.
- Antes de cruzar un “puente provisional de obra”, cerciórese de que tiene la resistencia necesaria para soportar el peso de la máquina.
- No realice nunca arrastres de carga o tirones sesgados. La grúa puede volcar y, en el mejor de los casos, las presiones y esfuerzos realizados pueden dañar los sistemas hidráulicos del brazo.
- No intente sobrepasar la carga máxima autorizada para ser izada. Los sobreesfuerzos pueden dañar la grúa y sufrir accidentes.
- Levante una sola carga cada vez. La carga de varios objetos distintos puede resultar problemática y difícil de gobernar.

- Asegúrese de que la maquina está estabilizada antes de levantar cargas. Ponga en servicio los gatos estabilizadores totalmente extendidos, es la posición más segura.
- No permita que nadie se encarame sobre la carga. No consienta que nadie se cuelgue del gancho. Es muy peligroso.
- Asegure la inmovilidad del brazo de la grúa antes de iniciar ningún desplazamiento. Póngalo en la posición de viaje y evitará accidentes por movimientos descontrolados.
- No abandone la máquina con una carga suspendida, no es seguro.
- No permita que el resto de personal acceda a la cabina o maneje los mandos. Pueden provocar accidentes.
- No consienta que se utilicen, aparejos, balancines, eslingas o estrobos defectuosos o dañados. No es seguro.
- Utilice siempre las prendas de protección que se le indiquen en la obra.

**D.- Equipos de Protección Individual**

- Casco de seguridad
- Guantes de cuero.
- Ropa de trabajo.
- Chaleco reflectante.
- Botas de seguridad.
- Gafas de protección.

### 1.4.10.- SIERRA CORTADORA DE PAVIMENTO

**B.- Evaluación de Riesgos**

- Caída al mismo nivel.
- Caída de materiales.
- Pisadas sobre objetos.
- Atrapamientos por o entre objetos.
- Golpes y/o cortes con objetos y herramientas.
- Proyección de fragmentos o partículas.
- Contacto eléctrico.
- Contacto térmico.
- Ruido.
- Exposición a polvo.
- Sobreesfuerzos.

**C.- Medidas Preventivas**

- Esta máquina únicamente debe ser utilizada por personal autorizado y debidamente instruido, con una formación específica adecuada.
- La máquina cumplirá con todos los requisitos establecidos por el RD. 1215/1997, por lo que deberá ir provista de marcado CE, Declaración CE de Conformidad y Manual de Instrucciones en castellano.
- La cortadora será utilización por el operador tal como especifique el manual de instrucciones de uso y manejo que deberá ser proporcionado por el fabricante o suministrador.

- El operador realizará las revisiones periódicas indicadas por el fabricante, que serán realizadas por el personal cualificado para ello.
- El operador no pondrá en marcha la máquina, ni accionarán los mandos sin encontrarse en el puesto del operador.
- Para la elevación y movilización de la máquina, se utilizará un cable de acero resistente al peso de la misma que se cogerá de los ganchos que la propia máquina presenta en su chasis para facilitar estas operaciones. El operador consultará el manual de instrucciones de uso y mantenimiento en cualquier caso.
- Antes de proceder al corte se deberá haber realizado un estudio detallado del pavimento a cortar, con el fin de conocer posibles conducciones enterradas, mallazo. El operador conocerá la zona de trabajo y las posibles interferencias.
- También antes de cortar se procederá al replanteo exacto de la línea de corte a realizar, de forma que se pueda seguir con la rueda guía de la cortadora de pavimento sin riesgos adicionales para el operador.
- El operador antes de poner en marcha la máquina deberá asegurarse de que el disco no esté en contacto con el suelo.
- El operador deberá tener muy en cuenta el tipo de disco a utilizar en cada caso, corte seco o corte húmedo.
- Todos los trabajos de mantenimiento, así como el traslado de la maquina deberá hacerse con el motor parado. El operador tendrá en cuenta el manual de instrucciones.
- Las protecciones de seguridad que incorpora la máquina no deben retirarse ni modificarse por el operador, en particular, las protecciones de los elementos móviles tales como poleas, ejes y correas de conexión. Se prohíbe trabajar con un equipo de trabajo con elementos móviles accesibles.
- Las protecciones de seguridad que incorpora la máquina no deben retirarse ni modificarse por el operador.
- Las máquinas con motor eléctrico deben tener doble aislamiento. En caso contrario el operador conectará la toma de tierra de la cortadora.
- En las máquinas con motor de gasolina, el operador no fumará ni permitirá que se fume cuando se esté repostando.
- El operador repostará en un lugar ventilado y cuidando que no existan derrames ya que estos y los gases pueden provocar igualmente incendios.
- Cuando la máquina esté funcionando (e incluso recién parada) no deberá tocarse el silenciador ya que puede producir quemaduras.
- El operador no debe poner en marcha el equipo si se han retirado las protecciones de las correas de transmisión.
- En caso de tener que corregir la línea de corte, el operador no realizará tirones violentos.

**D.- Equipos de Protección Individual**

- Casco de protección.
- Ropa de trabajo adecuada.
- Gafas antipolvo y mascarilla recambiable (cuando se corte en vía seca).
- Protectores auditivos.
- Botas de seguridad.
- Guantes de protección.
- Muñequeras antivibraciones.

- Faja dorsolumbar.

### 1.4.11.- SIERRA CIRCULAR DE MESA

#### B.- Evaluación de Riesgos

- Cortes.
- Golpes por objetos.
- Abrasiones.
- Atrapamientos.
- Emisión de partículas.
- Emisión de polvo.
- Ruido ambiental.
- Contacto con la energía eléctrica.

#### C.- Medidas Preventivas

- No se ubicarán a distancias inferiores a 3 m del borde de los forjados con la excepción de los que estén protegidos (redes o barandillas).
- No se instalarán en el interior de áreas de batido de cargas suspendidas del gancho de la grúa.
- Utilice el empujador para manejar la madera.
- Si la máquina, inesperadamente se detiene, retírese de ella y avise para que sea reparada. No intente realizar ni ajustes ni reparaciones. Desconecte el enchufe.
- Antes de iniciar el corte: con la máquina desconectada de la energía eléctrica, gire el disco a mano. Haga que lo sustituyan si está fisurado, rajado o le falta algún diente.
- Extraiga previamente todos los clavos o partes metálicas hincadas en la madera que desee cortar.
- Efectúe el corte a ser posible a la intemperie y siempre protegido con una mascarilla de filtro mecánico recambiable.
- Efectúe el corte a sotavento. El viento alejará de usted las partículas perniciosas, pero procure no lanzarlas sobre sus compañeros, también pueden al respirarlas sufrir daños.
- Empape en agua el material cerámico antes de cortar, evitará gran cantidad de polvo.
- La alimentación eléctrica de las sierras de disco se realizará mediante mangueras antihumedad, dotadas de clavijas estancas a través del cuadro eléctrico de distribución.
- Se prohíbe ubicarla sobre lugares encharcados, para evitar los riesgos de caídas y los eléctricos.

#### D.- Equipos de Protección Individual

- Casco de seguridad.
- Gafas de seguridad.
- Ropa de trabajo.
- Botas de seguridad.
- Guantes de protección.
- Chaleco reflectante.

### 1.4.12.- VIBRADOR

## B.- Evaluación de Riesgos

- Caídas al mismo nivel.
- Caídas a distinto nivel.
- Pisadas sobre objetos.
- Golpes y/o cortes con objetos y herramientas.
- Proyección de fragmentos o partículas.
- Atrapamientos por o entre objetos.
- Contactos eléctricos directos e indirectos.
- Exposición a sustancias nocivas o tóxicas.
- Vibraciones.
- Ruido.
- Sobreesfuerzos.

## C.- Medidas Preventivas

- Esta máquina únicamente debe ser utilizada por personal autorizado y debidamente instruido, con una formación específica adecuada.
- La máquina cumplirá con todos los requisitos establecidos por el RD. 1215/1997, por lo que deberá ir provista de marcado CE, Declaración CE de Conformidad y Manual de Instrucciones en castellano.
- El operador el vibrador tal como especifique el manual de instrucciones de uso y manejo que deberá ser proporcionado por el fabricante o suministrador.
- El operador vigilará que se realizan las revisiones periódicas indicadas por el fabricante, que serán realizadas por personal cualificado para ello.
- El operador debe saber que para evitar la transmisión de vibraciones al resto de los trabajadores y la desunión de las armaduras con el hormigón, no se debe vibrar apoyando la aguja directamente sobre las armaduras.
- El operador debe saber que no se dejará el vibrador abandonado conectado a la red eléctrica, ni se anularán los componentes de protección contra el riesgo eléctrico. Además, las conexiones eléctricas se efectuarán mediante conductores estancos de intemperie.
- El operador debe saber que la manguera de alimentación desde el cuadro eléctrico estará protegida si discurre por zonas de paso.
- El operador debe saber que para evitar los riesgos derivados del trabajo repetitivo, sujeto a vibraciones, está previsto que las tareas sean desarrolladas por etapas con descansos mediante cambio de los trabajadores, de tal forma que se evite la permanencia constante manejando el vibrador durante todas las horas de trabajo.
- El operador debe saber que no se trabajará en estructuras sin protecciones colectivas, y en su defecto con arnés de seguridad.
- El operador debe saber que no se dejará el vibrador en manos de trabajadores inexpertos.
- El operador debe adoptar posturas cómodas evitándose mantener la espalda corvada.
- El operador debe saber que los vibradores se moverán asidos por sus empuñadoras que se mantendrán limpias y en buen estado.

- El operador debe saber que nunca habrá dos equipos de vibrado en el mismo tajo dándose la espalda.

**D.- Equipos de Protección Individual**

- Casco de seguridad.
- Ropa de trabajo.
- Gafas contra las proyecciones.
- Botas impermeables.
- Guantes de goma.
- Faja antivibratoria.
- Muñequeras antivibratorias.

### 1.4.13.- MOTOSIERRA

**B.- Evaluación de Riesgos**

- Caídas al mismo nivel.
- Caídas a distinto nivel.
- Caída de materiales en manipulación.
- Pisadas sobre objetos.
- Golpes y/o cortes con objetos y herramientas.
- Proyección de fragmentos o partículas.
- Atrapamientos por o entre objetos.
- Incendio y/o explosión.
- Contacto térmico.
- Exposición a sustancias nocivas o tóxicas.
- Vibraciones.
- Ruido.
- Sobreesfuerzos.

**C.- Medidas Preventivas**

- Esta máquina únicamente debe ser utilizada por personal autorizado y debidamente instruido, con una formación específica adecuada.
- La máquina cumplirá con todos los requisitos establecidos por el RD. 1215/1997, por lo que deberá ir provista de marcado CE, Declaración CE de Conformidad y Manual de Instrucciones en castellano.
- El operador usará la motosierra tal como especifique el manual de instrucciones de uso y manejo que deberá ser proporcionado por el fabricante o suministrador.
- El operador vigilará que se realizan las revisiones periódicas indicadas por el fabricante, que serán realizadas por personal cualificado para ello.
- El operador deben mantener limpias todas las carcasas y empuñadoras. Los letreros de seguridad deben ser legibles.
- Antes de comenzar a trabajar, el operador comprobará que el protector de la mano trasera se encuentra instalado, así como el protector de la cadena y el tapón del depósito de combustible.

- El operador comprobará periódicamente el gatillo del acelerador, el interruptor de parada del motor, el freno de la cadena, los rieles de la cadena no presentan grietas ni deformaciones, los dientes de la cadena están afilados, engrasados y no presentan grietas ni deformaciones. La cadena debe estar correctamente tensa, ni excesivamente ni lo contrario. Debe desplazarse sin dificultad por la espada sin doblarse.
- El operador comprobará también que las tuercas y tornillos están bien apretados.
- El operador debe saber que el repostaje de combustible se realizará con la maquina parada y en posición horizontal. Se evitarán derrames.
- El operador debe saber que el conducto de entrada de aire al motor y el silenciador de escape deben estar limpios y sin obstrucciones.
- El operador debe saber que la maquina se mantendrá limpia y engrasada por parte del operador.
- El operador debe saber que la sustitución de la cadena se realizará con la maquina parada y con las herramientas manuales adecuadas para ello. El operador aplicará un procedimiento seguro.
- El operador debe saber que la longitud y anchura de la espada debe ser conforme con el trabajo a realizar. El operador conocerá el manual de instrucciones de uso.
- El operador debe saber que durante el transporte la maquina debe ir apagada.
- El operador debe saber que después de cada trabajo la espada y la sierra se debe proteger con una funda.
- El operador debe saber que la motosierra se arrancará estando apoyada en el suelo. Nunca se mantendrá con una mano.
- El operador evitará soltar de golpe la empuñadora de arranque.
- El operador tiene prohibido cortar en posiciones inestables, por encima de los hombros, en zonas inestables, excesivamente inclinado.
- El operador nunca cortará con una única mano.
- El operador mantendrá las muñecas rectas durante el corte, por lo que será necesario cambiar la posición u orientación de las empuñaduras según la dirección del corte.
- El operador vigilara que no existe ninguna parte del cuerpo cerca del alcance del giro de la cadena ni del silenciador del escape del motor. - La forma correcta de sujetar la motosierra consiste en colocarla al lado derecho, sujetando la empuñadura delantera con todos los dedos de la mano izquierda, y la empuñadura trasera con la mano derecha. Los pies deben estar siempre firmemente apoyados para resistir el rebote de la maquina en atascos y para cuando se toque el material a cortar con el borde superior de la espada. El operador cumplirá el procedimiento indicado. No obstante, se evitará que la parte superior de la punta de la espada toque los elementos a cortar.
- El operador cumplirá el procedimiento que se indica para realizar el corte. Para realizar el corte, lo primero será trazar una línea como guía para el corte. Después se desliza el morro de la espada por la línea trazada para a continuación penetrar en el objeto de forma recta.
- El operador cumplirá el procedimiento que se indica para realizar el corte grande. Para realizar grandes cortes longitudinales se aplicará un método escalonado. Primero se corta entre 1-2 centímetros a lo largo de toda la línea de corte con el morro de la espada, después de aumenta la profundidad del corte 5 centímetros, para terminar por hundir completamente la espada y realizar el corte.
- El operador vigilará que la cadena debe girar a su máxima velocidad manteniendo una presión constante y firme sobre la motosierra.

- El operador evitará que la ranura de corte se pueda cerrar sobre la cadena durante la realización del corte.
- El operador no sujetará los elementos a cortar o ya cortados con las extremidades inferiores.
- El operador no abandonará la maquina en funcionamiento en el suelo, ni depositarla en el suelo mientras la cadena este en movimiento.
- El operador no manipulará la maquina hasta que se haya enfriado.
- El operador debe saber que la motosierra no será utilizada por el mismo trabajador más de una hora continuada en previsión de exposición prolongada habrá rotaciones.

**D.- Equipos de Protección Individual**

- Ropa de trabajo.
- Guantes.
- Calzado de seguridad.
- Gafas de seguridad antiproyecciones.
- Gafas de seguridad antipolvo.
- Protectores auditivos.
- Mascarilla autofiltrante para materia particulada y polvo.

### 1.4.14.- CARRACA HIDRÁULICA

**B.- Evaluación de Riesgos**

- Caídas al mismo nivel.
- Caídas a distinto nivel.
- Caída de materiales en manipulación.
- Desprendimientos de materiales.
- Pisadas sobre objetos.
- Golpes y/o cortes con objetos y herramientas.
- Proyección de fragmentos o partículas.
- Atrapamientos por o entre objetos.
- Sobreesfuerzos.

**C.- Medidas Preventivas**

- Esta máquina únicamente debe ser utilizada por personal autorizado y debidamente instruido, con una formación específica adecuada.
- La máquina cumplirá con todos los requisitos establecidos por el RD. 1215/1997, por lo que deberá ir provista de marcado CE, Declaración CE de Conformidad y Manual de Instrucciones en castellano.
- El operador usará el equipo de trabajo tal como especifique el manual de instrucciones de uso y manejo que deberá ser proporcionado por el fabricante o suministrador.
- El operador vigilará que se realizan las revisiones periódicas indicadas por el fabricante, que serán realizadas por personal cualificado para ello.
- El operador utilizará el equipo de trabajo dentro de los rangos establecidos de presión por el fabricante.

- El operador utilizará el equipo de trabajo dentro de los rangos de diámetros establecidos por el fabricante.
- El operador deben mantener limpias todas las carcasas y empuñadoras. Los letreros de seguridad deben ser legibles.
- Antes de comenzar a trabajar, el operador comprobará que los latiguillos flexibles se encuentran bien mantenidos y conservados así como bien conectados. En caso se sustitución serán nuevos y de idénticas condiciones a los originales.
- El operador para realizar labores de mantenimiento y/o conservación mantendrá el equipo de trabajo totalmente despresurizado y enclavado.
- En el montaje de la cadena de corte alrededor de la tubería a cortar se extremará la prudencia para evitar dejar los dedos entre la cadena y la tubería.
- En caso de manipular la cadena, el operador no aumentará su tamaño por encima de lo recomendado por el fabricante. La manipulación de la cadena será con el equipo de trabajo totalmente despresurizado.
- En la sustitución de dientes y/o eslabones el operador utilizará recambios originales.
- El operador antes de accionar el equipo de trabajo comprobará que la cadena se encuentra bien asentada sobre la tubería a cortar y bien amarrada sobre sí misma.
- El operador comprobará que la cadena este lubricada, mantenida y conservada de acuerdo con el manual de instrucciones del fabricante.
- El operador vigilará que durante la operación de corte nadie se situé en el radio de acción de la cadena.
- El operador adoptará posturas cómodas durante el proceso de corte en previsión de sobreesfuerzos.
- El operador nunca intentará aumentar el par de presión de manera artificial mediante la manipulación del sistema, en particular, válvulas limitadores de presión.
- El operador evitará trabajar de manera continua en rangos de presión elevada en previsión de proyecciones y roturas del equipo de trabajo.
- Durante las operaciones de sustitución del aceite hidráulico el operador realizará la tarea conforme al procedimiento de trabajo indicado por el fabricante. Será preferible realizar la tarea en taller ya que la obra puede no disponer de los útiles y medios auxiliares para realiza la tarea en condiciones de seguridad.
- Los aceites serán tratados como productos químicos de acuerdo con lo indicado en el apartado correspondiente de este plan de seguridad. Se tendrá en cuenta la ficha de producto para su manipulación, almacenamiento y posterior gestión como residuo.

**D.- Equipos de Protección Individual**

- Ropa de trabajo que será desechable si el equipo de trabajo se utiliza para cortar fibrocemento.
- Guantes de protección.
- Casco de seguridad.
- Botas de seguridad.
- Gafas de seguridad antiproyecciones.
- Faja dorsolumbar.

### 1.4.15.- COMPRESOR

#### B.- Evaluación de Riesgos

- Ruido.
- Rotura manguera de presión.
- Atrapamientos.
- Explosiones e incendios.

#### C.- Medidas Preventivas

- Ubicar el compresor en lugares señalados, calzando las ruedas con tacos antideslizantes, quedando la lanza de arrastre en posición horizontal para dejar el aparato nivelado.
- El transporte en suspensión se efectuará mediante un eslingado a 4 puntos del compresor, para garantizar la seguridad de la carga.
- Los compresores a utilizar serán silenciosos para evitar la contaminación acústica.
- Las carcasas protectoras de los compresores estarán siempre instaladas en posición de cerradas, para prevenir atrapamientos y ruido.
- Las mangueras a utilizar estarán en perfectas condiciones de uso, sin grietas ni desgastes para evitar reventones, protegiéndose en los cruces de caminos.
- Las operaciones de abastecimiento de combustible se realizarán con el motor parado, para prevenir incendios y explosiones.

#### D.- Equipos de Protección Individual

- Casco de seguridad.
- Protectores auditivos.
- Ropa de trabajo.
- Botas de seguridad.
- Guantes de protección.
- Gafas de protección
- Chaleco reflectante.

### 1.4.16.- MARTILLO NEUMÁTICO

#### B.- Evaluación de Riesgos

- Vibraciones en mano-brazo y globales (cuerpo entero).
- Polvo.
- Sobreesfuerzos.
- Rotura de manguera bajo presión.
- Proyección de objetos y partículas.
- Caídas a distinto nivel.

### C.- Medidas Preventivas

- Cada tajo con martillos estará compuesto por dos cuadrillas que se turnarán cada hora, para prevenir lesiones por exposición prolongada a vibraciones.
- Se prohíbe el uso de martillos neumáticos a personal no autorizado.
- Prestar atención en el uso del martillo neumático en excavaciones con presencia de líneas eléctricas y otros servicios a partir de ser encontrada la banda o señalización de aviso.
- Prohibido dejar los martillos abandonados e hincados en paramentos que rompen, para evitar desplomes incontrolados.
- El operario debe utilizar los equipos de protección individual especiales para este trabajo, como muñequeras, ropa de trabajo cerrada, faja elástica de protección de cintura ajustada firmemente, botas de seguridad, mascarilla de filtro mecánico recambiable para el polvo, etc.
- Antes de accionar el martillo, asegúrese que está bien amarrado el puntero.

### D.- Equipos de Protección Individual

- Casco de seguridad.
- Botas de seguridad.
- Faja dorsolumbar.
- Gafas de protección.
- Protectores auditivos
- Mascarillas para polvo.
- Guantes de protección.

## 1.4.17.- BOMBA DE ACHIQUE

### B.- Evaluación de Riesgos

- Caída al mismo nivel.
- Caída a distinto nivel.
- Caída de objetos.
- Pisadas sobre objetos.
- Golpes y/o cortes con objetos y herramientas.
- Proyección de fragmentos o partículas.
- Contacto eléctrico.
- Incendio y/o explosión.
- Inundación.
- Exposición a sustancias nocivas o toxicas.
- Sobreesfuerzos.

### C.- Medidas Preventivas

- Esta máquina únicamente debe ser utilizada por personal autorizado y debidamente instruido, con una formación específica adecuada.

- La máquina cumplirá con todos los requisitos establecidos por los RD 1644/2008 y RD. 1215/1997, por lo que deberá ir provista de marcado CE, Declaración CE de Conformidad y Manual de Instrucciones en castellano.
- El operador utilizará la bomba de achique de agua tal como especifique el manual de instrucciones de uso y manejo que deberá ser proporcionado por el fabricante o suministrador.
- El operador mantendrá el equipo de trabajo limpio y con los carteles de seguridad e informativos legibles.
- La alimentación eléctrica debe ser normalizada: toma de tierra, interruptor diferencial e interruptor magnetotérmico. El operador comprobará la perfecta conexión eléctrica así como la existencia de conductores eléctricos bien aislados y clavijas de conexión estancas y normalizadas.
- El operador mantendrá la bomba limpia y libre de materiales inflamables y aceitosos.
- El operador debe saber que la bomba tendrá características hidráulicas adecuadas a los caudales y presión a evacuar por el motor eléctrico. En caso de incompatibilidad el operador informará al encargado de la obra.
- El operador utilizará únicamente mangueras con guarda de resorte ya que evitan las dobladuras y otros daños que pueden derivar en roturas y lesiones.
- El operador no utilizará mangueras parcialmente deterioradas y/o desgastadas.
- El operador utilizará las mangueras serán del tamaño y espesor adecuada.
- El operador no utilizará racores improvisados para acoplar mangueras.
- El encargado de la obra así como el operador de la bomba de achique deben tener en cuenta los efectos que puede tener la bajada del nivel freático sobre el terreno circundante antes de instalar la bomba de achique.
- El operador conocerá el peso y centro de gravedad del conjunto bomba más motor eléctrico para su instalación segura.
- El operador debe tener que la sujeción de la bomba y de la tubería sea adecuada al peso del conjunto.
- La sujeción podrá ser rígida o flexible. En caso de bomba sumergible las cadenas o cables de izado estarán anclados. Se consultará el manual de instrucciones de uso del equipo de trabajo por parte del operador en caso de duda.
- El operador utilizará eslingas normalizadas y certificadas para suspender la bomba. Nunca quedará suspendida de los cables eléctricos y/o mangueras de trasvase de líquidos.
- El operador verificará el punto de instalación para comprobar la existencia de protecciones colectivas.
- El operador transportará la bomba mediante el asa dispuesta para tal fin. Nunca se utilizará los cables eléctricos y mangueras para este fin.
- El operador comprobará la ausencia de daños estructurales y fugas de líquido.
- El operador comprobará que los tornillos y tuercas permanecen apretados.
- El operador comprobará el nivel de los aceites del motor así como el aislamiento.
- El operador debe mantener la bomba siempre en vertical y nunca debe trabajar en seco.
- No se utilizará la bomba mientras haya trabajadores en el interior del agua.
- En presencia de ruido o vibración anormal el operador deberá detener la bomba.
- El operador no introducirá herramientas ni las manos en la coladera con la maquina funcionando.

- El operador no abandonará la bomba mientras se encuentra funcionando.
- El operador no tocará ni manipulará la bomba durante su funcionamiento ni inmediatamente después.
- El operador mantendrá la manguera de trasiego de líquido lo más tensa posible. El extremo de descarga de líquido debe estar siempre por encima del nivel del líquido a achicar. El extremo de descarga no debe estar sumergido.
- El operador no hará funcionar la bomba suspendida en el aire.
- El operador evitará golpear la maquina contra elementos estructurales.

### D.- Equipos de Protección Individual

- Botas de seguridad.
- Ropa de trabajo adecuada.
- Guantes de protección.
- Casco de seguridad.
- Protectores auditivos.
- Gafas de protección.
- Chaleco reflectante.

## 1.4.18.- CORTADORA DE PRODUCTOS CERÁMICOS

### B.- Evaluación de Riesgos

- Cortes en dedos, manos, brazos,...
- Proyección de partículas al cortar.
- Retroceso de las piezas cortadas.
- Rotura del disco.
- Polvo.
- Ruido.
- Sobreesfuerzos.
- Contactos eléctricos.
- Vibraciones.
- Sobreesfuerzos y lesiones músculo-esqueléticas.
- Los derivados de los lugares de ubicación
- Abrasiones.

### C.- Medidas Preventivas

- La máquina tendrá en todo momento colocada la protección del disco y de la transmisión.
- Antes de comenzar el trabajo se comprobará el estado del disco, si éste estuviera desgastado o resquebrajado se procedería a su inmediata sustitución.
- La pieza a cortar no deberá presionarse contra el disco, de forma que pueda bloquear éste. Asimismo, la pieza no presionará el disco en oblicuo por el lateral.
- La máquina estará colocada en zonas que no sean de paso y además bien ventiladas, si no es del tipo de corte bajo chorro de agua.
- Conservación adecuada de la alimentación eléctrica, sobre todo en máquinas con agua.

- Uso de guantes de cuero, mascarilla con filtro y gafas antipartículas.
- La cortadora a utilizar en esta obra, estará dotada de los siguientes elementos de protección:
    a. Carcasa de cubrición del disco
    b. Interruptor estanco
    c. Toma de tierra.
    d. Botón de parada de emergencia (rojo) claramente distinguible del de puesta en marcha.
    e. Sistemas de captación de polvo, cuando no se realiza el corte en vía húmeda.
- Los cables eléctricos de conexión estarán en perfecto estado, no presentarán cortes ni rotura, de detectar alguna de estas anomalías serán cambiados de inmediato.
- No se pondrá en funcionamiento la máquina sin la instalación completa de sus elementos de protección.
- El personal empleará pantallas o gafas para protegerse de las posibles proyecciones.
- El disco será revisado diariamente, sustituyendo toda hoja exageradamente recalentada o que presente grietas profundas, ya que podría producir un accidente. Se usarán los discos aconsejados por el fabricante.
- El operador, tiene la obligación de mantener el disco de corte en perfecto estado de afilado.
- Ante cualquier operación de limpieza, reparación o mantenimiento, se debe asegurar de que el enchufe de alimentación de la red eléctrica está desconectado.
- Las piezas no deberán sobrepasar el grosor que permite el corte del disco.
- Los cortes de ladrillo o elementos prefabricados se realizarán mediante el disco más adecuado para el corte de material componente, teniendo en cuenta lo recomendado por el fabricante.
- Siempre que sea posible los cortes de material cerámico o de prefabricados se realizarán en vía húmeda, es decir bajo el chorro de agua que impida el origen del polvo.
- Se vigilará estrechamente la anulación de la efectividad de la toma de tierra de esta máquina cuando el cable dispuesto para ello discurra por el interior de la manguera de suministro eléctrico.
- Si se necesita usar cables de prolongación, estos deberán ser homologados.
- La pieza a cortar no deberá presionarse contra el disco, de forma que pueda bloquear éste. Asimismo, la pieza no presionará el disco en oblicuo por el lateral.

**D.- Equipos de Protección Individual**

- Casco de polietileno.
- Gafas de seguridad antiproyecciones.
- Mascarilla antipolvo con filtro mecánico recambiable.
- Ropa de trabajo.
- Botas de seguridad.
- Guantes de cuero.
- Protección auditiva
- Para cortar por vía húmeda se utilizará:
    - Guantes de goma o de P.V.C ajustados.
    - Traje impermeable.
    - Botas de seguridad de goma.

## 1.4.19.- HORMIGONERA ELÉCTRICA

### B.- Evaluación de Riesgos

- Atrapamientos.
- Contactos con la energía eléctrica.
- Golpes por elementos móviles.
- Polvo ambiental.
- Ruido ambiental.

### C.- Medidas Preventivas

- No se ubicarán a distancias inferiores a 3 m. del borde de excavación.
- No se situarán en el interior de zonas batidas por cargas suspendidas del gancho de la grúa.
- La ubicación de la hormigonera quedará señalizada mediante cuerda de banderolas, una señal de peligro, y un rótulo con la leyenda: “prohibido utilizar a personas no autorizadas”.
- Existirá un camino de acceso fijo a la hormigonera para los dúmperes, separado del de las carretillas manuales.
- Tendrán protegidos mediante una carcasa metálica los órganos de transmisión.
- Estarán dotados de freno de basculamiento del bombo.
- Las carcasas y demás partes metálicas de las hormigoneras de accionamiento estanco, en prevención del riesgo eléctrico.
- Las operaciones de limpieza directa-manual se efectuarán previa desconexión de la red eléctrica de la hormigonera.
- El cambio de ubicación de la hormigonera pastera a gancho de grúa, se efectuará mediante la utilización de un balancín (o aparejo indeformable), que la suspenda pendiente de cuatro puntos seguros.
- Se mantendrá limpia la zona de trabajo.

### D.- Equipos de Protección Individual

- Casco de seguridad. Mascarilla antipolvo.
- Gafas de seguridad antipolvo.
- Ropa de trabajo
- Guantes de goma o P.V.C.
- Botas de seguridad.

## 1.4.20.- CAMIÓN HORMIGONERA

### B.- Evaluación de Riesgos

- Atropello de personas.
- Choque contra otros vehículos.
- Vuelco del camión.
- Vuelco por desplazamiento de carga.
- Caídas.

- Atrapamientos.

### C.- Medidas Preventivas

- El acceso de camiones en la obra se efectuará por la puerta destinada al acceso de maquinaria.
- Las operaciones de carga y descarga, se efectuara en las zonas de acopio de materiales.
- Se procurará que las rampas de acceso a los tajos sean uniformes y que no superen la pendiente del 20%.
- Antes de iniciar las maniobras de carga y descarga del material además de haber sido instalado el freno de mano de la cabina del camión, se instalarán calzos de inmovilización de las ruedas, en prevención de accidentes por fallo mecánico.
- Se procurará no llenar en exceso la cuba en prevención de vertidos innecesarios durante el transporte del hormigón.
- Todas las maniobras de carga y descarga serán dirigidas por un especialista conocedor del proceder más adecuado.
- Se evitará la limpieza de la cuba y canaletas en la proximidad de los tajos.
- Los operarios que manejen las canaletas desde la parte superior de las arquetas evitarán en lo posible permanecer a una distancia inferior a los 60 cm. Del borde de las mismas.
- Queda expresamente prohibido el estacionamiento y desplazamiento del camión hormigonera a una distancia inferior a los dos metros del borde de las arquetas. En caso de ser necesaria una aproximación inferior a la citada se deberá entibar la zona afectada por el establecimiento del camión hormigonera, dotándose además al lugar de un tope firme y fuerte para la rueda trasera del camión, evitando las caídas y deslizamientos.

### D.- Equipos de Protección Individual

- Chaleco reflectante.
- Botas de seguridad.
- Ropa de trabajo adecuada.
- Guantes de cuero.
- Gafas de protección.
- Casco de seguridad.

## 1.4.21.- RODILLO VIBRANTE AUTOPROPULSADO

### B.- Evaluación de Riesgos

- Atropello
- Maquina en marcha fuera de control.
- Vuelco (por fallo de terreno o inclinación excesiva)
- Caída por pendientes.
- Choque contra otros vehículos.
- Incendio (mantenimiento).
- Quemaduras (mantenimiento).

- Caídas de personas al subir o bajar.
- Ruido.
- Vibraciones.
- Exposición a temperaturas ambientales extremas.

**C.- Medidas Preventivas**

- Los conductores de rodillos vibrantes serán operarios de probada destreza en el manejo de estas máquinas, en prevención de los riesgos por impericia.
- Las compactadoras a utilizar estarán dotadas de cabina antivuelcos y antiimpactos.
- Las compactadoras, estarán dotadas de un botiquín de primeros auxilios, ubicado de forma resguardada para conservarlo limpio.
- Se prohíbe expresamente el abandono del rodillo vibrante con el motor en marcha.
- Se prohíbe el transporte de personas ajenas a la conducción sobre el rodillo vibrante.
- Se prohíbe el acceso a la conducción con vestimentas sin ceñir, cadenas, pulseras, anillos, relojes, porque pueden engancharse en los salientes o en los controles.
- Los rodillos vibrantes estarán dotados de luces de marcha adelante y de retroceso.
- Se prohíbe la permanencia de operarios en el tajo de rodillos vibrantes, en prevención de atropellos.
- Se prohíbe expresamente dormitar a la sombra proyectada por el rodillo vibrante en estación, en prevención de accidentes.

*Normas de seguridad para los conductores de los rodillos vibrantes*

- Conduce usted una máquina peligrosa. Extreme su precaución para evitar accidentes.
- Compruebe siempre, antes de subir a la cabina, que no hay ninguna persona dormitando a la sombra proyectada por la máquina.
- Para subir o bajar a la cabina, utilice los peldaños y asideros dispuestos para tal menester. Evitará, caídas y lesiones.
- No acceda a la máquina encaramándose por los rodillos. Puede sufrir caídas.
- No salte directamente al suelo si no es por peligro inminente para su persona. Si lo hace, puede fracturarse los talones. Lo cual es un accidente grave.
- No trate de realizar ajustes con la máquina en movimiento o con el motor en marcha, puede sufrir lesiones.
- No permita el acceso a la compactadora a personas ajenas y menos a su manejo. Pueden accidentarse o provocar accidentes.
- No trabaje con la compactadora en situación de avería o semiavería. Repárela primero, luego, reanude su trabajo. No corra riesgos innecesarios.
- Para evitar las lesiones durante las operaciones de mantenimiento, ponga en servicio el freno de mano, bloquee la máquina, pare el motor extrayendo la llave de contacto. Realice las operaciones de servicio que se requieren.
- No guarde combustible ni trapos grasientos sobre la máquina, pueden producir incendios.
- No libere los frenos de la máquina en posición de parada si antes no ha instalado los tacos de inmovilización de los rodillos.
- Antes de iniciar cada turno de trabajo, compruebe mediante maniobras lentas que todos los mandos responden correctamente.

- Ajuste siempre el asiento a sus necesidades, alcanzará los controles con menos dificultad y s e cansará menos.
- Utilice siempre las prendas de protección personal que le recomiende el encargado de la obra.

**D.- Equipos de Protección Individual**

- Ropa de trabajo adecuada.
- Botas de seguridad.
- Chaleco reflectante.
- Guantes de cuero.
- Gafas de protección.
- Casco de seguridad.
- Protectores auditivos.

### 1.4.22.- FRESADORA DE AGLOMERADO

**B.- Evaluación de Riesgos**

- Caídas al mismo nivel.
- Caídas a distinto nivel.
- Caída de materiales.
- Pisadas sobre objetos.
- Golpes y/o cortes con objetos y herramientas.
- Atrapamientos por o entre objetos.
- Proyecciones de fragmentos o partículas.
- Contacto eléctrico.
- Contacto térmico.
- Ruidos.
- Vibraciones.
- Incendios y explosión.
- Atropellos.
- Exposición a polvo.

**C.- Medidas Preventivas**

- Esta máquina únicamente debe ser utilizada por personal autorizado y debidamente instruido, con una formación específica adecuada.
- La máquina cumplirá con todos los requisitos establecidos por el RD. 1215/1997, por lo que deberá ir provista de marcado CE, Declaración CE de Conformidad y Manual de Instrucciones en castellano.
- El conductor utilizará la fresadora tal como especifique el manual de instrucciones de uso y manejo que deberá ser proporcionado por el fabricante o suministrador.
- El conductor vigilará el cumplimiento de las revisiones periódicas indicadas por el fabricante, que serán realizadas por el personal cualificado para ello.

- Las labores de mantenimiento y conservación ser realizarán sobre superficie horizontal así como con el freno de mano activado y con calzos inmovilizadores. El conductor vigilará el cumplimiento de dichas medidas preventivas.
- El operador no pondrá en marcha la máquina, ni accionarán los mandos sin encontrarse sentado en el puesto del operador.
- Estará equipada con:
    - Señalización acústica de marcha atrás y rotativo luminoso.
    - Servofrenos y frenos de mano.
    - Pórticos de seguridad antivuelco.
    - Asiento amortiguador y ergonómico.
    - Protector tubo de escape.
    - Silenciador con apagachispas y purificador de gases.
    - Paro de seguridad de emergencia.
    - Placas indicadoras: identificación con los datos del fabricante, de equipos amóviles, presión de hinchado de neumáticos.
- El conductor señalizarán los movimientos con antelación.
- El conductor confirmará el perfecto estado de conservación y mantenimiento, en particular de la fresa.
- El conductor comprobará la ausencia de trabajadores en el radio de acción de la máquina.
- El conductor no colocará el equipo de trabajo cerca de fuentes de humedad ni de calor.
- El conductor se protegerá los ojos de posibles partículas proyectadas durante los trabajos.
- El conductor utilizará siempre la máquina con las dos manos.
- El conductor hará avanzar la fresadora con ritmo uniforme y poca presión.
- El conductor desenchufará la máquina y esperará a que pare la fresa antes de cualquier manipulación (cambio de fresa, limpieza, etc…). El conductor tendrá en cuenta que para cambiar la fresa debe esperar el tiempo que sea necesario para evitar contacto térmicos.
- El conductor quitará la fresa siempre que se acabe de trabajar.
- El conductor vigilará que los resguardos de los elementos de transmisión de energía están perfectamente instalados.
- El conductor vigilará las maniobras de aproximación de los camiones a la cinta transportadora de la fresadora.
- El conductor anulará la fresa cuando en el radio de acción del equipo de trabajo existen otros trabajos u oficios en previsión de proyección de fragmentos o partículas.

**D.- Equipos de Protección Individual**

- Gafas antiproyecciones.
- Chaleco reflectante.
- Ropa de trabajo.
- Guantes de protección.
- Botas de seguridad.
- Mascarillas antipolvo.
- Protectores auditivos.

## 1.4.23.- EXTENDEDORA DE MEZCLA BITUMINOSA

### B.- Evaluación de Riesgos

- Caída de personas desde la máquina.
- Caída de personas al mismo nivel.
- Los derivados de los trabajos realizados bajo altas temperaturas, (suelo caliente + radiación solar + vapor).
- Los derivados de la inhalación de vapores de betún asfáltico, (nieblas de humos asfálticos).
- Quemaduras.
- Sobreesfuerzos, (apaleo circunstancial).
- Atropello durante las maniobras de acoplamiento de los camiones de transporte de aglomerado asfáltico con la extendedora.

### C.- Medidas Preventivas

- No se permite la permanencia sobre la extendedora en marcha a otra persona que no sea su conductor, para evitar accidentes por caída.
- Las maniobras de aproximación y vertido de productos asfálticos en la tolva estarán dirigida por un especialista, en previsión de los riesgos por impericia.
- Todos los operarios de auxilio quedarán en posición en la cuneta por delante de la máquina durante las operaciones de llenado de la tolva, en prevención de los riesgos por atrapamiento y atropello durante las maniobras.
- Los bordes laterales de la extendedora, en prevención de atrapamientos, estarán señalizados a bandas amarillas y negras alternativas.
- Todas las plataformas de estancia o para seguimiento y ayuda al extendido asfáltico, estarán bordeadas de barandillas tubulares en prevención de las posibles caídas, formadas por pasamanos de 90 cm de altura barra intermedia y rodapié de 15 cm desmontable para permitir una mejor limpieza.
- Se prohíbe expresamente, el acceso de operarios a la regla vibrante durante las operaciones de extendido, en prevención de accidentes.
- Sobre la máquina, junto a los lugares de paso y en aquellos con el riesgo específico, se adherirán las siguientes señales:
    - Peligro sustancias calientes (“peligro, fuego”).
    - Rótulo: NO TOCAR, ALTAS TEMPERATURAS.
- Si el modelo de máquina lo permite, prevea la instalación de sombrillas o de todos para protección solar, por zonas próximas a las de trabajo para descanso del personal.

### D.- Equipos de Protección Individual

- Botas de seguridad.
- Ropa de trabajo reflectante.
- Guantes de protección.
- Protector de la cabeza.
- Protección de las vías respiratorias.

## 1.4.24.- CARRETILLA ELEVADORA

### B.- Evaluación de Riesgos

- Caída de cargas transportadas
- Caída de grandes piezas
- Caída de piezas pequeñas
- Caída de piezas almacenadas
- Caída del conductor al subir o abandonar el puesto de conductor en marcha
- Caída de la carretilla
- Vuelco de la carretilla evolucionando con obstáculos en el suelo
- Caída de una persona transportadora
- Golpes contra terceras personas
- Tropezón de un peatón con una carretilla parada
- Contactos con órganos de la carretilla
- Posiciones fatigosas o dolorosas
- Condiciones climáticas
- Exposición a los ruidos
- Exposición a las vibraciones
- Polución de la atmósfera
- Incendio explosión
- Descargas eléctricas

### C.- Medidas Preventivas

**1.1.1.1.** Estado del suelo:

- Los suelos y vías de circulación deben ser duros, lisos y planos.
- Las posibles vías férreas deben tener la parte superior de los raíles al mismos nivel que la calzada, con el fin de evitar desequilibrios de la carga a consecuencia de sacudidas al pasar sobre las vías.
- Todas las vías de circulación de carretillas deben estar libres de obstáculos y señalizadas mediante pintura blanca antideslizante.
- Dimensiones de las vías de circulación
- Los pasillos de circulación deben estar dispuestos de modo que se eviten los ángulos y recodos bruscos, los planos inclinados y las rampas que presenten un declive pronunciado, pasos estrechos y techos bajos.
- La anchura de un pasillo principal de dirección única debe ser, como mínimo, igual a dos veces la anchura de la carretilla y su carga, aumentada 1,5 m.

**1.1.1.2.** Señalización:

- Los lugares peligrosos deberán ser señalizados mediante avistas similares a los de la señalización por carretera.
- La altura de paso
- Se recomienda que la altura de las puertas sea tal que permita asegurar el paso de las carretillas con su carga, sin ningún tipo de recelo. Ahora bien, si por encima de los pasillos de circulación existe obstáculo lo suficientemente bajos como para entorpecer

el paso de la carretilla, éstos deberán ser señalizados previamente y delimitados mediante franjas amarillas y negras.

**1.1.1.3.** Circulación por rampas:

- Se recomienda que las pendientes de las rampas no sean superiores al 10%. Además deben asegurar el paso gradual en la parte inferior de la rampa, para evitar que las horquillas y la carga puedan tocar el suelo.
- En principio, toda carretilla con carga que tenga que bajar una rampa lo hará marcha atrás, y con el mástil inclinado hacia atrás, al máximo. De todas formas, si la pendiente es de inclinación inferior a la máxima de la horquilla, se podrá bajar la rampa de frente al sentido del descenso, llevando, eso sí, el mástil a su inclinación máxima hacia atrás.
- Siempre se debe circular a baja velocidad, y el frenado debe ser progresivo.

**1.1.1.4.** Circulación por la vía pública:

- Cuando se utilicen las carretillas en la vía pública, deberán responder a las prescripciones particulares en el país.

*Normas de seguridad para los conductores de las carretillas:*

- Solo debe conducir o manipular la carretilla la persona autorizada.
- El conductor debe prohibir que alguien se suba a la carretilla, a los brazos de la horquilla o a equipos y remolques, a menos que contenga elementos especialmente previstos para transportar a una segunda persona.
- El conductor debe asegurarse que las alturas de paso libre sean suficientes para poder pasar con toda seguridad con la carretilla cargada.
- El conductor no debe introducir la carretilla en un montacargas sin haber sido autorizado. Antes de entrar en el montacargas, debe asegurarse que éste puede soportar el peso de la carretilla, con su carga y conductor.
- Las carretillas deben entrar en un montacargas o en un local de dimensiones reducidas con la carga hacia delante.
- El conductor nunca debe dar media vuelta en una pendiente.
- Antes de pasar sobre un puente de acceso, el conductor deberá asegurarse que esté convenientemente amarrado y que la carretilla está bien enfrentada al puente. Deberá cruzar lentamente y con prudencia.
- El conductor debe evitar los períodos inútiles de funcionamiento del motor para impedir la acumulación de humos y de gas en los recintos cerrados o semicerrados.
- Al estacionar la carretilla, el conductor debe asegurarse de que todas las palancas estén en punto muerto, el motor parado, los frenos echados, la llave de contacto sacada o la toma de batería retenida.
- Evitar estacionar la carretilla en una pendiente. Si no hay más remedio, calzar las ruedas.

- Si la carretilla automotora presenta algún defecto, el conductor debe señalarlo inmediatamente al mando competente y nadie puede ser autorizado a utilizar la carretilla hasta que haya sido puesta nuevamente en buen estado.
- A menos de estar especialmente autorizado, el conductor no debe efectuar ninguna reparación o transformación, ni ninguna regulación en la carretilla.
- El conductor debe siempre parar el motor antes de llenar el depósito. Debe asegurarse que los tapones han sido nuevamente colocados y que todo el combustible derramado se ha evaporado o lo ha secado, antes de poner el motor en marcha.
- El conductor no debe nunca utilizar una llama desnuda para verificar el nivel del electrolito en una batería o el nivel del carburante en el depósito.
- El conductor debe mirar en la dirección de avance de la carretilla y mantener la vista en el camino que recorre. Debe disminuir la velocidad de marcha en los cruces y en lugares donde la visibilidad no es perfecta debido a obstáculos y tocar el claxon. Cuando transporte cargas voluminosas que impidan la visibilidad en la marcha adelante debe conducir con la carga detrás.
- Como regla general, el conductor, que siempre ha de atender a las reglas de tráfico, debe circular por el lado del pasillo previsto en los reglamentos locales y adaptar su velocidad a las condiciones locales de circulación. Debe mantener una distancia razonable con los vehículos que le preceden equivalentemente a la distancia de 3 carretillas, y ser siempre dueño de su máquina.
- El conductor no debe adelantarse a un vehículo en marcha en un cruce, en un punto peligroso o en lugar de visibilidad reducida.
- El conductor debe transportar únicamente cargas que hayan sido preparadas correctamente.
- El conductor debe mantener siempre las piernas, brazos, pies, manos y cabeza dentro de las dimensiones de la carretilla.
- El conductor debe arrancar y parar suavemente y evitar los virajes rápidos; nunca se debe utilizar la marcha atrás como freno.
- No introducir nunca la cabeza entre los largueros del mástil.
- Cuando el conductor abandona la carretilla, debe asegurarse que la horquilla se encuentra en su posición más baja.
- El conductor debe respetar siempre él límite de capacidad de su carretilla y de sus accesorios. No debe aumentar la capacidad del aparato añadiendo un contrapeso suplementario o haciendo subir al personal sobre la carretilla.
- Para asegurar la estabilidad de la carga, se recomienda al conductor separar suficientemente las ramas e introducir la horquilla bajo la carga tan lejos como sea posible.
- El conductor no debe permitir a nadie que se ponga o que circule debajo de una horquilla o de un accesorio, en posición alta, estén cargados o no.
- El conductor debe transportar la carga tan baja como sea posible compatible con la seguridad del servicio.
- El conductor debe tener la mayor prudencia cuando se incline el mástil, cargado hacia delante o hacia atrás. Solamente utilizará la posible inclinación total hacia delante, o hacia atrás a proximidad del suelo.

**D.- Equipos de Protección Individual**

- Ropa de trabajo adecuada.

- Casco de seguridad. Guantes de seguridad.
- Chaleco reflectante.
- Gafas de protección.

### 1.4.25.- ROZADORA ELÉCTRICA

#### B.- Evaluación de Riesgos

- Erosiones en las manos.
- Cortes.
- Proyecciones de partículas.
- Los derivados de la rotura del disco.
- Los derivados del trabajo con producción de ruido.

#### C.- Medidas Preventivas

- Elegir siempre el disco adecuado para el material a rozar.
- No "rozar" en zonas poco accesibles o en posición inclinada lateralmente; el disco puede fracturarse y producir lesiones.
- Vigilar que las aberturas de ventilación están limpias y sin taponar.
- No desmontar nunca la protección normalizada del disco ni cortar sin ella. Puede sufrir accidentes serios.
- Revisar periódicamente el estado de las escobillas ya que la vibración y el polvo producen un desgaste superior al normal.
- Mojar la zona a cortar previamente, disminuirá la formación de polvo, además el operario usará siempre la mascarilla con filtro mecánico antipolvo, para evitar lesiones pulmonares.
- Se revisará diariamente los discos de corte, cerciorándose de que se cambian inmediatamente los deteriorados. Antes de iniciar las manipulaciones de cambio de discos, desconectar el aparato de la red eléctrica.

#### D.- Equipos de Protección Individual

- Botas de seguridad
- Ropa de trabajo.
- Guantes de uso general, de cuero y anticorte
- Gafas de seguridad
- Protección auditiva

### 1.4.26.- RADIAL

#### B.- Evaluación de Riesgos

- Cortes.
- Golpes al trabajar con piezas inestables.
- Quemaduras.
- Proyecciones de partículas y disco.

- Contactos eléctricos directos.
- Contactos eléctricos indirectos.
- Aspiración de polvo y partículas.
- Caídas de personas a distinto nivel.
- Caída de personas al mismo nivel.
- Exposición a ruidos.

### C.- Medidas Preventivas

**1.1.1.5.** Almacenamiento

- Almacenar las amoladoras en lugares secos, sin sufrir golpes y según indicaciones del fabricante.

**1.1.1.6.** Utilización

- Dependiendo del material a trabajar se elegirá la máquina, disco y elementos auxiliares adecuados.
- No sobrepasar la velocidad de rotación prevista e indicada en la muela.
- Se utilizará un diámetro de muela compatible con la potencia y características de la máquina.
- Antes de posar la máquina, asegúrese de que está totalmente parada para evitar movimientos incontrolados de disco.
- Situar la empuñadura lateral en función del trabajo a realizar.
- Cuando se trabaja con piezas de pequeño tamaño o en equilibrio inestable asegurarlas antes de comenzar los trabajos.
- Las amoladoras, así como cualquier otra herramienta portátil, tendrán un sistema de protección contra contactos indirectos por doble aislamiento.
- Su sistema de accionamiento permitirá su total parada con seguridad y su accionamiento se hará de forma voluntaria imposibilitando la puesta en marcha involuntaria.

### D.- Equipos de Protección Individual

- Ropa de trabajo adecuada.
- Guantes de protección.
- Calzado de seguridad.
- Gafas de seguridad.
- Protectores auditivos.
- Mascarilla autofiltrante para materia particulada y polvo.

## 1.4.27.- TALADRO ELÉCTRICO

### B.- Evaluación de Riesgos

- Caída al mismo nivel.
- Caída a distinto nivel.
- Caída de objetos en manipulación.

- Pisadas sobre objetos.
- Golpes y/o cortes con objetos y herramientas.
- Proyección de fragmentos o partículas.
- Atrapamientos por o entre objetos.
- Contacto eléctrico.
- Contacto térmico.
- Incendio y/o explosión.
- Exposición a polvo.
- Ruido.
- Vibraciones.
- Sobreesfuerzos.

**C.- Medidas Preventivas**

- Esta máquina únicamente debe ser utilizada por personal autorizado y debidamente instruido, con una formación específica adecuada.
- La máquina cumplirá con todos los requisitos establecidos por el RD. 1215/1997, por lo que deberá ir provista de marcado CE, Declaración CE de Conformidad y Manual de Instrucciones en castellano.
- El operador utilizará el equipo de trabajo conforme al manual de instrucciones del fabricante.
- El operador deberá vigilar la realización de las revisiones del equipo de trabajo, que serán realizados por personal cualificado para ello.
- El operador no utilizará este tipo de herramienta en proximidades de líquidos o gases inflamables.
- El operador comprobará que el aparato no carece de alguna de las piezas constituyentes en su carcasa de protección (o la tiene deteriorada). En caso afirmativo, será reparado antes de utilizarlo.
- El operador comprobará el estado del cable de la clavija de conexión, rechazando el aparato si aparece con deterioros que dejen al descubierto hilos de cobre, o si tienen empalmes rudimentarios cubiertos con cinta aislante, etc., así se evitarán los contactos con la energía eléctrica.
- El operador elegirá siempre la broca adecuada para el material a taladrar, se evitarán riesgos innecesarios.
- El operador no realizará taladros inclinados "a pulso", puede fracturarse la broca y producir lesiones.
- El operador no aumentará el orificio oscilando en rededor la broca, puede fracturarse y producir lesiones, para agrandar el agujero utilizar brocas de mayor sección.
- El operador no realizará reparaciones improvisadas.
- El operador no presionará el aparato excesivamente, la broca puede romperse y causarle lesiones.
- El operador deberá taladrar sobre banco las piezas de tamaño reducido, amordazadas en tornillo sin fin, para evitar accidentes.
- El operador evitará recalentar las brocas, girarán inútilmente y además pueden fracturarse y causarle daños.
- El operador no posicionará el taladro aún en movimiento en el suelo, es una posición insegura.

- El operador desconectará el taladro de la red eléctrica antes de iniciar las manipulaciones por el cambio de la broca.
- El operador debe saber que los taladros portátiles a utilizar estarán protegidas mediante doble aislamiento eléctrico.
- Los taladros portátiles serán utilizados, por personal especializado.
- El operador comprobará diariamente el buen estado de los taladros portátiles, retirando del servicio aquellas máquinas que ofrezcan deterioros que impliquen riesgos para los operarios.
- El operador debe tener en cuenta que la conexión o suministro eléctrico a los taladros portátiles, se realizará mediante manguera antihumedad a partir del cuadro de planta, dotada con clavijas machohembra estancas.
- El operador no depositará en el suelo ni dejará abandonado el taladro portátil conectado a la red eléctrica.
- El operador debe tener en cuenta las posibles conducciones ocultas, redes eléctricas, de tuberías de agua, saneamiento, etc... representan un gran peligro si se les causa daños durante el trabajo. Por tanto es indispensable comprobar previamente la zona de trabajo por el operador.
- El operador no deberá llevar ropa amplia, cabello largo suelto o joyas. Podrían engancharse con las brocas y provocar un accidente.
- El operador evitará una posición corporal inadecuada. Asegurarse de la estabilidad en todo momento.
- Sostener el aparato siempre firmemente, con las dos manos.
- El operador mantendrá las empuñaduras secas y exentas de aceite y grasa.
- Cuando sea interrumpido el trabajo, el taladro deberá ser desconectado por el operador
- El operador durante el trabajo debe mantener el cable de la red siempre hacia atrás, separado del aparato.
- El operador no tirará nunca del cable para desenchufar.
- El operador protegerá el cable del calor, aceite y aristas agudas.
- Si durante el trabajo se estropea el cable, no deberá ser tocado, se desconectará inmediatamente del enchufe por el operador.
- El operador debe evitar el arranque involuntario, no llevar el aparato al conectarlo en la red, con los dedos sobre el botón del interruptor. Antes de meter el enchufe en la caja de conexión, asegurarse de que el aparato está desconectado.
- El operador no pondrá nunca en funcionamiento el taladro si está sucio o mojado. El polvo o la humedad adheridos a la superficie del aparato dificultan el agarre del mismo y en circunstancias desfavorables, pueden producir una descarga eléctrica.
- Las reparaciones deben ser realizadas únicamente por un experto, utilizando siempre repuesto originales.
- El operador guardará el taladro siempre en lugar seco.
- El operador utilizará siempre cables de prolongación homologados.

**D.- Equipos de Protección Individual**

- Casco de seguridad
- Gafas de seguridad antiproyecciones.
- Ropa de trabajo.
- Guantes de protección.
- Faja dorsolumbar.

- Muñequeras antivibración.
- Botas de seguridad.
- Mascarilla autofiltrante para materia particulada.
- Protectores auditivos.

### 1.4.28.- CAMIÓN DE RIEGO ASFÁLTICO

#### B.- Evaluación de Riesgos

- Atropellos.
- Caídas al mismo y distinto nivel.
- Aplastamiento.
- Cortes y golpes.
- Quemaduras.

#### C.- Medidas Preventivas

- No lleve ropas sueltas, brazaletes, cadenas, cabellos largos no recogidos, etc.
- No haga ajustes con la máquina en marcha.
- Las rejillas y chapas de protección que evitan el contacto con piezas móviles deben permanecer en su sitio, bien ajustadas
- Utilice gafas de protección cuando golpee objetos, como bulones, pasadores, etc.
- Prevención de quemaduras.
- Se revisarán periódicamente todos los puntos de escape del motor y su sistema de depuración de gases. En ésta y en otras operaciones de comprobación evite las quemaduras por contacto con superficies calientes
- Evite el contacto con la piel y ojos al manipular los productos asfálticos ya que pueden producir graves quemaduras.
- Tome toda clase de precauciones cuando sea necesario calentar, con los quemadores, el producto asfáltico.
- Siempre verifique el nivel de refrigerante con el motor parado y aflojando el tapón lentamente.
- El sistema de enfriamiento contiene álcali, evite su contacto con la piel y los ojos.
- El llenado de aceite hidráulico debe hacerse con el motor parado, quitando su tapón lentamente.
- Evite el contacto con la piel y ojos con el electrolito de la batería.
- Los productos asfálticos es necesario calentarlos en mayor o menor grado, por ello es muy importante tomar las máximas precauciones con los calentadores de que dispone la máquina.
- Todos los combustibles, la mayoría de los lubricantes y algunas mezclas refrigerantes, son inflamables.
- No fume cuando este repostando combustible, ni en zonas donde se carguen baterías o almacenen materiales inflamables.
- Controle la existencia de fugas en mangueras, racores,... si existen, elimínelas inmediatamente.
- Evite tener trapos impregnados con grasa u otros materiales inflamables dentro de la máquina.

- Limpie los derrames de aceite o de combustibles, no permita la acumulación de materiales inflamable en la máquina.
- Suba y baje de la máquina por los lugares indicados para ello.
- Utilice ambas manos para subir o bajar de la máquina y mire hacia ella.
- Cuando la máquina está en movimiento no intente subir o bajar de la misma.
- No intente subir o bajar de la máquina si va cargado con materiales o herramientas.

**D.- Equipos de Protección Individual**

- Ropa de trabajo reflectante.
- Botas de seguridad.
- Guantes de protección.
- Protección de las vías respiratorias.
- Protector de extremidades contra la penetración de sustancias nocivas o tóxicas.

### 1.4.29.- BARREDORA AUTOPROPULSADA

**B.- Evaluación de Riesgos**

- Caída de personas a distinto nivel
- Choques con otras máquinas, vehículos y objetos inmóviles
- Atropello de personas
- Atrapamiento por vuelco de la máquina
- Incendio por fallo del motor
- Exposición a ambiente térmico extremo
- Exposición a elevados niveles de ruido
- Exposición a ambiente pulvígeno

**C.- Medidas Preventivas**

- Para acceder a la cabina del vehículo se dispondrá de estribos correctos
- Además de observar las medidas propias del correcto funcionamiento del vehículo, se seguirán escrupulosamente las medidas de seguridad de acuerdo con el Reglamento de Seguridad Vial.
- No superar nunca la velocidad permitida para realizar estos trabajos
- La barredora dispondrá siempre de rotativo luminoso, luces de marcha atrás.
- No manipular el motor, en caso de avería avisar al personal especializado
- Estará prohibida la permanencia de personas en la zona de trabajo de la máquina
- Señal acústica dé marcha atrás.
- La limpieza interior y exterior, comprobación de niveles, filtro del aire, sistemas de basculación y mantenimiento rutinario en general debe ser realizado todos los días.
- Antes de actuar sobre la maquinaría, se deben tener todas las precauciones para evitar ser atrapado por ella, como la colocación de gatos mecánicos o topes que impidan el cierre repentino de la caja de la barredora y atrape a algún trabajador en el interior.
- Antes de abrir cualquier conducción hidráulica es preciso eliminar la presión.

- Al sustituir los cepillos de la barredora, al estar estos de materiales punzantes y cortantes y de peso, se procederá a tomar las medidas de protección individual que sean necesarias, como guantes de cuero y botas de seguridad.
- Se prohíbe expresamente la comprobación del funcionamiento de los cepillos de la barredora utilizando para ello los pies, las manos o cualquier otra parte del cuerpo. Así mismo se prohíbe agacharse sobre la barredora para ver el funcionamiento del cepillo central.
- Si por la realización del trabajo, barrer la calzada, se levantará polvo y este pudiera reducir la visibilidad del tráfico, se procederá a regar la zona, ligeramente. Si está labor no evitase el polvo, se señalizará escrupulosamente esta operación, avisando con mayor antelación a la circulación.

**D.- Equipos de Protección Individual**

- Ropa de trabajo adecuada.
- Botas de seguridad.
- Chaleco reflectante.
- Guantes de cuero.
- Gafas de protección.
- Casco de seguridad.
- Mascarilla para polvo.

### 1.4.30.- PINTABANDAS

**B.- Evaluación de Riesgos**

- Caída al mismo nivel.
- Caída de objetos.
- Pisadas sobre objetos.
- Golpes y/o cortes con objetos y herramientas.
- Proyección de fragmentos o partículas.
- Incendio y/o explosión.
- Exposición a sustancias nocivas o toxicas.
- Sobreesfuerzos.
- Atropellos.
- Incendio.
- Vibraciones.
- Ruido.

**C.- Medidas Preventivas**

- Esta máquina únicamente debe ser utilizada por personal autorizado y debidamente instruido, con una formación específica adecuada.
- La máquina cumplirá con todos los requisitos establecidos por el RD. 1215/1997, por lo que deberá ir provista de marcado CE, Declaración CE de Conformidad y Manual de Instrucciones en castellano.
- El operador utilizará el pintabandas tal como especifique el manual de instrucciones de uso y manejo que deberá ser proporcionado por el fabricante o suministrador.

- El operador verificará el área de trabajo antes de comenzar, para comprobar la existencia de ventilación, y la ausencia de puntos de ignición.
- El operador verificará los sistemas de seguridad de la pistola: seguro y procedimiento de alivio de presión.
- El operador pintará siempre que el guarda de la boquilla instalado y en su sitio en previsión de inyección accidental sobre la mano o cualquier otra parte del cuerpo.
- El operador utilizará únicamente mangueras con guarda de resorte ya que evitan las dobladuras y otros daños que pueden derivar en roturas y lesiones.
- El operador no utilizará mangueras parcialmente deterioradas y/o desgastadas.
- El operador debe saber que las mangueras a alta presión no pueden volver a conectarse en caso de desconexión.
- El proceso de limpieza del equipo de trabajo debe hacerse a baja presión aplicando el procedimiento de alivio de presión. El operador conocerá el procedimiento de alivio de presión.
- El operador no pondrá en marcha la máquina, ni accionarán los mandos sin encontrarse sentado en el puesto del operador.
- El operador no podrá apuntar con la pistola a ninguna parte del cuerpo.
- El operador no pondrá los dedos o las manos sobre la boquilla, ni utilizará parte alguna del cuerpo para detener una fuga.
- El operador rociará siempre que la guarda de la boquilla instalada.
- El operador debe saber que el gatillo de la pistola debe estar siempre asegurado al detener el trabajo.
- El operador debe saber que para limpiar la boquilla, quitarla siempre de la pistola, aplicando siempre el procedimiento de alivio de presión.
- Antes de cada uso el operador verificará el funcionamiento de todos los dispositivos de seguridad así como las conexiones de los fluidos.
- El operador no podrá fumar durante la manipulación del equipo.
- El operador tendrá prohibido la alteración del equipo. Se cumplirá en todo momento el manual de instrucciones del fabricante.
- Durante el trabajo el operador tendrá un extintor cerca.
- El operador no dejará la maquina desatendida con presión en el sistema.
- Utilizar máquinas pintabandas con marcado CE prioritariamente o adaptadas al RD1215/1997.
- Se recomienda que la máquina pintabandas esté dotada de avisador luminoso tipo rotatorio o flash.
- Ha de estar dotado de señal acústica de marcha atrás.
- Cuando esta máquina circule únicamente por la obra, verificar que la persona que la conduce está autorizada, tiene la formación e información específica de PRL que fija el RD 1.215/1997, de 18 de julio, artículo 5, y se ha leído su manual de instrucciones. Si la máquina circula por una vía pública, es necesario, además, que el conductor tenga el carnet B de conducir.
- Verificar que se mantiene al día la ITV (Inspección Técnica de Vehículos). Los registros de ITV sólo son exigibles en las máquinas matriculadas que superen los 25 Km. /h.
- Antes de iniciar los trabajos, comprobar que todos los dispositivos de la máquina pintabandas responden correctamente y están en perfecto estado: frenos, neumáticos, etc.

- Para utilizar el teléfono móvil durante la conducción hay que disponer de un sistema de manos libres.
- Ajustar el asiento y los mandos a la posición adecuada.
- Antes de iniciar los trabajos, hay que comprobar que todos los dispositivos de la máquina pintabandas responden correctamente y están en perfecto estado: frenos, neumáticos, etc.
- Verificar que la cabina esté limpia, sin restos de aceite, grasa o barro y sin objetos descontrolados en la zona de los mandos.
- El conductor tiene que limpiarse el calzado antes de acceder a la cabina.
- Comprobar que todos los rótulos de información de los riesgos estén en buen estado y situados en lugares visibles.
- Verificar la existencia de un extintor en la máquina pintabandas.
- Controlar la máquina únicamente desde el asiento del conductor.
- Prohibir la presencia de trabajadores o terceros en el radio de acción de la máquina.
- Prohibir el transporte de personas ajenas a la actividad.
- No subir ni bajar con la máquina pintabandas en movimiento.
- Durante la conducción, utilizar siempre un sistema de retención (cabina, cinturón de seguridad o similar). Fuera de la obra, hay que utilizar el cinturón de seguridad obligatoriamente.
- Si la visibilidad en el trabajo disminuye por circunstancias meteorológicas o similares por debajo de los límites de seguridad, hay que aparcar la máquina en un lugar seguro y esperar.
- No está permitido bajar pendientes con el motor parado o en punto muerto.
- Hay que respetar la señalización interna de la obra.
- Siempre que sea posible, utilizar pinturas con etiqueta ecológica o compuestas por productos menos perjudiciales que otros para la salud de los trabajadores.
- En operaciones de mantenimiento, no utilizar ropa holgada, ni joyas, y utilizar los equipos de protección adecuados.
- En operaciones de mantenimiento, la máquina ha de estar estacionada en terreno llano, el freno de estacionamiento conectado, la palanca de transmisión en punto neutral, el motor parado y el interruptor de la batería en posición de desconexión.
- Efectuar las tareas de reparación de la máquina pinta bandas con el motor parado y la máquina estacionada.
- Los residuos generados como consecuencia de una avería o de su resolución hay que segregarlos en contenedores.
- En operaciones de transporte, comprobar si la longitud, la tara y el sistema de bloqueo y sujeción son los adecuados. Asimismo, hay que asegurarse de que las rampas de acceso pueden soportar el peso de la máquina pinta bandas y, una vez situada, hay que retirar la llave del contacto.
- Estacionar la máquina pinta bandas en zonas adecuadas, de terreno llano y firme, sin riesgos de desplomes, desprendimientos o inundaciones (como mínimo a 2 m de los bordes de coronación). Hay que poner los frenos, sacar las llaves del contacto, cerrar el interruptor de la batería y el compartimiento del motor.

**D.- Equipos de Protección Individual**

- Botas de seguridad.

- Ropa de trabajo adecuada.
- Guantes de protección.
- Protector de la cabeza.
- Protectores auditivos.
- Gafas de protección.
- Chaleco reflectante.

### 1.4.31.- MINICARGADORA

### B.- Evaluación de Riesgos

- Vuelco por hundimiento del terreno.
- Deslizamiento por pendientes.
- Golpes a personas o cosas en el movimiento de giro.
- Atrapamientos.
- Contacto con líneas eléctricas.
- Rotura de canalizaciones (agua, alcantarillado, gas, electricidad).
- Ruidos.
- Vibraciones.

### C.- Medidas Preventivas

- Mantenimiento periódico de la máquina, tal como marque su libro de revisiones.
- No se realizarán reparaciones u operaciones de mantenimiento con la máquina funcionando.
- Empleo de la máquina por personal especializado y cualificado.
- La cabina estará dotada de extintor de incendios.
- No se fumará durante la carga de combustible, ni se comprobará con llama el llenado del depósito.
- No transportar personas en la máquina.
- Si fuera necesario descender por una rampa se situará la cuchara en la parte trasera de la máquina.
- El conductor no abandonará la máquina sin parar el motor y la puesta de la marcha contraria al sentido de la pendiente.
- El personal de obra estará fuera del radio de acción de la máquina para evitar atropellos y golpes durante los movimientos de ésta o por algún giro imprevisto.
- Al circular lo hará con la cuchara plegada.
- Al finalizar el trabajo de la máquina, la cuchara quedará apoyada en el suelo o plegada sobre la máquina. Si la parada es prolongada se desconectará la batería y se retirará la llave de contacto.
- El conductor, deberá limpiar el barro adherido al calzado para que no resbalen los pies sobre los pedales.
- Cuando se realicen maniobras complicadas o de difícil visibilidad para el conductor, será apoyado por otro trabajador, que le marcará las pautas a seguir.

### D.- Equipos de Protección Individual

- Ropa de trabajo adecuada.

- Botas de seguridad.

### E.- Protecciones Colectivas

- Luces y bocinas de retroceso.
- Extintor.
- Cabina antivuelco.

## 1.4.32.- TRÁCTEL PARA ARRASTRE DE CARGAS

### B.- Evaluación de Riesgos

- Caída de materiales en manipulación.
- Pisadas sobre objetos.
- Golpes y/o cortes con objetos y herramientas.
- Atrapamientos por o entre objetos.
- Sobreesfuerzos.

### C.- Medidas Preventivas

- La máquina cumplirá con todos los requisitos establecidos por el RD. 1215/1997, por lo que deberá ir provista de marcado CE, Declaración CE de Conformidad y Manual de Instrucciones en castellano.
- El operador utilizará el equipo de trabajo tal como especifique el manual de instrucciones de uso y manejo que deberá ser proporcionado por el fabricante o suministrador.
- El operador realizará las revisiones periódicas indicadas por el fabricante y serán realizadas por el personal cualificado para ello.
- Esta máquina únicamente debe ser utilizada por personal autorizado y debidamente instruido, con una formación específica adecuada.
- El operador comprobará la validez del tráctel antes de usarlo en función de las piezas a mover y los recorridos a realizar.
- El operador debe saber que se trata de un medio auxiliar que sirve para cambiar de posición cargas pesadas, por lo que requiere que exista un punto firme en el que amarrar el cable extremo del tráctel; el otro extremo, se recibe a la pieza que se desee arrastrar.
- El operador debe saber que si la pieza es pesada, se suele utilizar apoyos sobre ruedas de rodamientos.
- El operador debe saber el procedimiento de montaje consistente en amarrar el gancho del tráctel o el cable extremo al punto firme desde el que se hará funcionar, amarrar el cable de tracción al objeto que se desea arrastrar, montar la palanca y accionar la palanca de manera suave, hasta conseguir la tensión inicial.
- El operador debe comprobar el recorrido que va a realizar la pieza, por lo general es la línea recta que traza el cable tenso, si existen obstáculos, se deberán retirar antes de la realización del arrastre.
- El operador debe, una vez realizada la maniobra, inmovilizar la pieza arrastrada si es que puede sufrir algún deslizamiento.

- El operador debe accionar la palanca y se quitará la tensión para que el aparato se apoye en el suelo y permita soltar el tráctel de la pieza y del punto firme.
- El operador debe recoger el cable sobrante en previsión de pisadas sobre objetos.
- El operador no podrá utilizar el tráctel para la elevación ni desplazamiento de personas.
- El operador no podrá usar el tráctel para cargas superiores a su capacidad nominal.
- El operador no podrá utilizar el tractor para otros trabajos que no sean aquellos para los que están previstos en su manual de instrucciones.
- El operador no podrá desmontar los dispositivos de seguridad durante la utilización de estos aparatos ni utilizarlos sin estos dispositivos.

**D.- Equipos de Protección Individual**

- Botas de seguridad.
- Casco de seguridad.
- Ropa de trabajo
- Guantes de protección.
- Chaleco reflectante.
- Faja dorsolumbar.

## 1.5.- RIESGOS Y MEDIDAS DE PROTECCIÓN PARA MEDIOS AUXILIARES.

*Se analizan en este apartado los riesgos detectados en los diferentes medios auxiliares empleados para la ejecución de la obra, cuya relación no exhaustiva se recoge en el apartado 1.2.5.*

*También se van a analizar las medidas preventivas propuestas en cada caso.*

### 1.5.1.- ESCALERAS DE MANO

**B.- Evaluación de Riesgos**

- Caída de personal.
- Deslizamiento y vuelco.
- Rotura por defectos ocultos.
- Los derivados por usos inadecuados.

**C.- Medidas Preventivas**

- Se prohíbe el uso de escaleras para salvar alturas superiores a 7 metros.
- Estarán dotadas de zapatas antideslizantes.
- Se apoyarán sobre superficies planas.
- Las escaleras de mano estarán firmemente amarradas en su extremo superior al objeto o estructura al que dan acceso.
- Las escaleras de mano sobrepasarán en 1 m la altura a salvar. Esta cota se medirá en vertical desde el plano de desembarco, al extremo superior del larguero.

- Las escaleras de mano se instalarán de tal forma, que su apoyo inferior diste de la proyección vertical del superior, 1/4 de la longitud del larguero entre apoyos.
- Se prohíbe transportar pesos a mano (o a hombro), iguales o superiores a 25 Kg. sobre escaleras de mano.
- Evite que los trabajadores asciendan o desciendan con objetos ocupando sus manos. Los pequeños objetos o herramientas pueden transportarse en el interior de cajas pendientes de los hombros, mediante cinta de lona, o utilizando cinturones porta-herramientas.
- Se prohíbe apoyar la base de las escaleras de mano, sobre lugres u objetos poco firmes que pueden mermar la estabilidad de este medio auxiliar.
- El acceso de operarios a través de las escaleras de mano, se realizará de uno en uno. Se prohíbe la utilización al unísono de la escalera a dos o más operarios.
- El ascenso y descenso a través de las escaleras de mano, se efectuará frontalmente; es decir, mirando directamente hacia los peldaños que se están utilizando.

**1.1.1.7.** Escaleras de madera

- Las escaleras tendrán los largueros de una sola pieza, sin defectos ni nudos que puedan mermar su seguridad.
- Los peldaños de madera estarán ensamblados.
- Las escaleras de madera estarán protegidas de la intemperie mediante barnices transparentes, para que no oculten los posibles defectos.
- Las escaleras de madera se guardarán a cubierto; a ser posible se utilizarán preferentemente para usos internos de la obra.

**1.1.1.8.** Escaleras metálicas

- Los largueros serán de una sola pieza y estarán sin deformaciones o abolladuras que puedan mermar su seguridad.
- Las escaleras metálicas estarán pintadas con pinturas antioxidación que las preserven de las agresiones de la intemperie.
- Las escaleras metálicas no estarán suplementadas con uniones soldadas.
- El empalme de escaleras metálicas se realizará mediante la instalación de los dispositivos industriales fabricados para tal fin.

**1.1.1.9.** Escaleras de tijera

- Son de aplicación las condiciones enunciadas en los apartados A y B para las calidades “madera o metal”.
- Las escaleras de tijera estarán dotadas en su articulación superior, de topes de seguridad de apertura.
- Las escaleras de tijera estarán dotadas hacia la mitad de su altura, de cadenilla (o cable de acero) de limitación de apertura máxima.
- Las escaleras de tijera se utilizarán siempre como tales abriendo ambos largueros para no mermar seguridad.
- Las escaleras de tijera en posición de uso, estarán montadas con los largueros en posición de máxima apertura para no mermar su seguridad.

- Las escaleras de tijera nunca se utilizarán a modo de borriquetas para sustentar las plataformas de trabajo.
- Las escaleras de tijera no se utilizarán, si la posición necesaria sobre ellas para realizar un determinado trabajo, obliga a ubicar los pies en los tres últimos peldaños.
- Las escaleras de tijera se utilizarán montadas siempre sobre pavimentos horizontales (o sobre superficies provisionales horizontales).
- Evitar se desplieguen sobre las zancas de las escaleras con suplementos (cajones, bloques, materiales diversos y asimilables), por ser situaciones inestables de alto riesgo.

**D.- Equipos de Protección Individual**

- Casco de seguridad.
- Arnés anticaída.
- Botas de seguridad.
- Guantes de protección.
- Ropa de trabajo adecuada.

### 1.5.2.- CABLES Y ESLINGAS

**B.- Evaluación de Riesgos**

- Golpes y atrapamientos con la carga y las eslingas.
- Caídas de la carga sobre las personas en caso de rotura de cable o eslinga.
- Cortes y heridas.
- Atrapamientos
- Sobreesfuerzos
- Atropellos durante el desplazamiento por la vía
- Derrame o desplome de la carga durante el transporte
- Golpes por la carga a las personas o a las cosas durante el transporte aéreo
- Contactos eléctricos

**C.- Medidas Preventivas**

- Usar preferiblemente eslingas de nylon homologadas en lugar de cables.
- Los ganchos serán normalizados y con pestillo de seguridad.
- Los cables y eslingas serán adecuados a la carga a soportar, en cada uno de ellos debe figurar la carga de trabajo y la etiqueta de homologación. No someterlos a su carga máxima de golpe.
- Almacenarlos en lugares secos, a cubierto, bien ventilados, nunca tirados por el suelo.
- Desechar y destruir los cables que estén en mal estado, alargamiento anormal, hilos rotos, cocas, óxido, etc., en un 10 % del mismo.
- Desechar las eslingas si se observan deterioros importantes, cortes, desgarros, etc.
- Usar guantes de cuero y lona para evitar los cortes, heridas, etc.
- No permanecer bajo cargas suspendidas.

La elección de una eslinga debe efectuarse en función de los siguientes conceptos:

a) Peso de la carga a elevar

En caso de duda, estimar por alto. Para calcular el peso de un bulto se ha de multiplicar su volumen por la densidad del producto que lo compone. Densidades aproximadas a recordar:

| | |
|---|---|
| Madera | 0,8 |
| Piedra y hormigón | 2,5 |
| Acero, hierro, fundición | 8 |

b) Carga de trabajo de la eslinga

La carga de trabajo de un cable es aquélla que puede ser soportada por él, con toda seguridad. Este dato debe estar marcado, con cifras o letras bien legibles, en el anillo de la eslinga o en una placa fijada por presión a uno de sus ramales. A continuación facilitamos las cargas de trabajo de los cables de uso más corriente.

| Cargas de trabajo (en Kgs.) de los cables de uso más frecuente | | | | | |
|---|---|---|---|---|---|
| Diámetro en mm | 9,45 | 12,6 | 15,7 | 18,9 | 25,2 |
| Carga en Kgs | 710 | 1.270 | 1.970 | 2.850 | 5.080 |

El ángulo que forman entre sí los ramales de una eslinga, disminuye la resistencia de ésta. A título de ejemplo facilitamos unos coeficientes por los que se debe dividir la resistencia de la eslinga, en función del ángulo que forman sus ramales entre sí, cuando está situada en posición de trabajo.

| Ángulo formado por los ramales | 0º | 45º | 60º | 90º | 120º |
|---|---|---|---|---|---|
| Coeficiente | 1 | 1,08 | 1,15 | 1,41 | 2 |

**1.1.1.10.** Observaciones

- Cuando una carga es soportada por un eslinga de 4 ramales, el ángulo debe medirse y calcular la resistencia de la eslinga partiendo del supuesto de que el peso total es sustentado por:
- Ramales, si la carga es rígida.
- Ramales, si la carga es flexible.

- Enganchar bien, es seguridad
- Para trabajar con eslingas, es preciso conocer: las causas de disminución de su resistencia
- Son muy numerosas. Además del desgaste, deben tomarse en consideración los nudos, las soldaduras en los cables y los medios utilizados en las uniones.
- Los nudos disminuyen la resistencia de la eslinga de un 30 a un 50%.
- Las soldaduras de los anillos terminales u ojales, aun cuando estén realizadas dentro de la más depurada técnica, producen una disminución de la resistencia del orden de un 15 a un 20%.
- Los sujeta-cables, aun cuando se utilicen correctamente y en número suficiente. Las uniones realizadas de esta forma reducen la resistencia de la eslinga alrededor del 20%.
- Las soldaduras o las zonas unidas con sujeta cables nunca se colocaran sobre el gancho del equipo elevador, ni sobre las aristas. Las uniones o empalmes deberán quedar en las zonas libres, trabajando únicamente a tracción.
- No deberán cruzarse los cables de dos ramales de eslingas distintas, sobre el gancho de sujeción, ya que en este caso uno de los cables estaría comprimido por el otro.
- Si el ángulo que forman los ramales entre sí sobrepasa los 90º, deben utilizarse eslingas más largas o ejes transversales (pórticos).
- Los ganchos que se utilicen han de estar en perfecto estado, sin deformaciones de ninguna clase:
- Las eslingas y cadenas se engancharán de tal forma que la cadena o eslinga descanse en el fondo de la curvatura del gancho y no en la punta.
- Hay que comprobar el buen funcionamiento del dispositivo que impide el desenganche accidental de las cargas.
- Si el gancho es móvil, debe estar bien engrasado de manera que gire libremente.
- Los ganchos de las eslingas y cadenas, etc., deben llevar un dispositivo de seguridad. No emplear jamás una “S”; puede abrirse y, en consecuencia, provocar la caída de la carga.
- Se deben escoger las eslingas (cables, cadenas) o aparatos de elevación (horquillas, garras, pinzas articuladas, “palonniers”, etc.) apropiados a la carga. No se debe utilizar jamás alambre de hierro o acero cementado. Las eslingas pueden ser sencillas, sin-fin o de varios hilos (mechas) reunidos en un anillo central.
- Los cables utilizados en eslinga sencilla deben estar provistos en sus extremos de un anillo emplomado o cerrados por terminales de cable (sujeta cables). Este anillo, que debe ser realizado alrededor de un guardacabo destinado a evitar plegados demasiado fuertes, puede estar provisto de un anillo o de un gancho.
- Los sujeta cables deben ser de tamaño apropiado al diámetro de los cables y colocados de tal forma que el asiento se encuentre en el lado del cable que trabaja. Son necesarios, por lo menos, tres sujeta cables por cada anillo.
- Las eslingas de cables no deberán estar oxidadas, presentar deformaciones (reducción de diámetro, aplastamientos, deshilados, etc.) ni tener mechas rotas o nudos.
- Los cables no deberán estar sometidos a una carga de maniobra superior a la sexta parte de su carga de rotura. Si no se sabe esta última indicación, se puede calcular, aproximadamente, el valor máximo de la carga de maniobra mediante la fórmula:

*F (en Kg.) = 8 d2 (Ø del cable en mm.).*

- Las eslingas sin-fin, de cable, deberán estar cerradas, bien sea mediante un emplomado efectuado por un especialista o bien con sujeta cables. El emplomado deberá quedar en perfecto estado. Los sujeta cables deberán ser al menos cuatro, estando su asiento colocado contra el cable que trabaja, quedando el mismo número a cada lado del centro del empalme.
- En las cadenas, su solidez está limitada a la resistencia del peor eslabón o del más gastado. Toda cadena cuyo diámetro del redondo que forma el eslabón se haya reducido en un 5% no deberá ser utilizada más. No sustituyan nunca un eslabón por un bulón o por una ligadura de alambre de hierro, etc. No se debe jamás soldar un eslabón en una forja o con el soplete.
- Las cadenas utilizadas para las eslingas deberán ser cadenas calibradas; hay que proveer a sus extremos de anillos o ganchos.
- Las cadenas utilizadas en eslingas no deberán tener ni uno sólo de sus eslabones; corroído, torcido, aplastado, abierto o golpeado. Es preciso comprobarlas periódicamente eslabón por eslabón.
- Las cadenas de las eslingas no deberán estar sometidas a una carga de maniobra superior a la quinta parte de su carga de rotura. Si no se conoce este último dato, se puede calcular, aproximadamente, el valor de la carga de maniobra con ayuda de la siguiente fórmula:

*F (en Kg.) = 6 d2 (Ø de redondo en mm.).*

- En el momento de utilizar las cadenas, se debe comprobar que no estén cruzadas, ni torcidas, enroscadas, mezcladas o anudadas. Procurar no utilizarlas a temperaturas muy bajas pues aumenta su fragilidad. Ponerlas tensas sin golpearlas.
- Hay que evitar dar a las eslingas dobleces excesivos, especialmente en los cantos vivos; con este fin se interpondrán entre las eslingas y dichos cantos vivos, materiales blandos: madera, caucho, trapos, cuero, etc.
- Comprobar siempre que la carga esté bien equilibrada y bien repartida entre los ramales, tensando progresivamente las eslingas.

#### **1.1.1.11.** Recomendaciones para el gruísta

*Operación de izado*

- Nunca se deben levantar cargas si las cadenas o cables están enredados. Se deben destorcer antes de empezar a levantar.
- No se debe nunca arrastrar o hacer esfuerzos laterales. El gancho y los cables deben estar siempre verticalmente sobre la carga.
- En ningún caso se debe izar una carga moviendo el puente al mismo tiempo, a menos que esté a más de dos metros del suelo y en una zona libre de obstáculos.
- Es necesario probar los frenos por medio de cortos levantamientos, colocando los controles en posición de desconectado.
- Si se manejan metales calientes o cargas pesadas fuera de lo corriente, los frenos deben ser probados antes del transporte. Para ello, se levanta la carga, se desconectan los controles, observando si los frenos sostienen la carga.

- Los cilindros de oxígeno y acetileno o generadores de gas, estén vacíos o llenos, sólo podrán ser levantados si están colocados en un embalaje o dispositivo especial para su transporte. En ningún caso se usará el electroimán.
- No se deben llevar cargas suspendidas por electroimán sobre personas o máquinas.

*Transporte*

- Se deben evitar las arrancadas o detenciones bruscas.
- Solamente se obedecerán las señales del estrobador o de otra persona autorizada.
- Si tiene alguna duda no debe realizar la operación.
- La carga debe llevarse, en lo posible, sin pasar sobre el personal o sobre las máquinas.
- Antes de iniciar un movimiento de traslación, el maquinista deberá asegurarse de que no existen personas en las vigas, puente, etc., que puedan ser lesionadas.
- Prestar atención a que la carga, ganchos o cadenas, vayan a una altura suficiente para librar todos los obstáculos.
- No debe permitir que nadie viaje en el gancho o la carga.
- Mucha atención para evitar choques con otras grúas en su recorrido y contra los topes de los raíles.
- Si se transportan cargas largas, se deben vigilar los extremos y cuidar de no golpear a personas, escaleras, máquinas, etc.
- Es muy peligroso tratar de enderezar una carga golpeándola contra un muro, pilar, objeto u otra carga.
- Las grúas no deben usarse para mover carros de ferrocarril o carros lingoteras.
- Las cadenas o los cables no deben arrastrarse por el suelo o por encima de máquinas o materiales.

*Operación de descenso*

- Las cargas nunca se deben dejar suspendidas, especialmente, si se trabaja con electroimán. La carga siempre debe ser dejada en tierra antes de abandonar la cabina.
- Las cargas no deben ser balanceadas para lanzarlas a lugares donde no pueda llegar el gancho.
- Al colocar una carga en una plataforma o carro, hay que asegurarse de que ambos extremos estén en el mismo nivel antes de colocarla en la plataforma, pues si la carga se apoya solamente en un extremo, la hará moverse.
- El gancho nunca se bajará más allá del punto en que quedan menos de dos vueltas completas de cable en el tambor.

#### **1.1.1.12.** Recomendaciones para el estrobador

- El estrobador debe tener siempre presente que él y el gruísta forman un equipo de trabajo, y han de estar en perfecto acuerdo para evitar accidentes a las personas y daños a las instalaciones.
- Debe observar que las cadenas, cables, estrobos, etc., se encuentren en perfecto estado.

- El estrobador no debe pedir al gruísta que levante una carga que sobrepase la capacidad de la grúa o de los estrobos o aparatos de elevación. En caso de duda, consultar con el mando.
- Debe dar al gruísta señales de acuerdo con el Código establecido. Solamente el estrobador asignado a la grúa está autorizado para dar señales, salvo que haya una persona especialmente designada.
- Antes de dar señales, debe estar seguro de que el gancho de la grúa se encuentra perpendicular y directamente sobre la carga, y bien centrado.
- El estrobador no debe dar las señales al gruísta para mover una carga a menos que esté totalmente seguro de que no ocasionará un accidente a personas o daños a los materiales y equipos.
- Debe usar las prendas de protección personal asignadas, tales como casco, guantes, gafas, botas de seguridad u otros para faenas específicas.
- Siempre que sea posible, el estrobador caminará delante de la carga llevada por la grúa vigilando que el personal del taller esté a salvo.
- El estrobador debe evitar caminar bajo la carga suspendida y en todo momento debe estar alerta a las señales de alarma dadas por el gruísta.
- Debe colocar las manos en posición adecuada al izar o bajar una carga. Usará gancho de mano para situar cadenas, cables o estrobos, o para alcanzarlos o retirarlos cuando hay riesgo de atrapamiento de las manos.
- Evitar que la carga descanse sobre cables de alambre, pues puede estropear los cordones y el cable.

### 1.5.3.- CONTENEDORES

#### B.- Evaluación de Riesgos

- Caídas al mismo nivel.
- Caídas de objetos en manipulación.
- Pisadas sobre objetos.
- Golpes y/o cortes con objetos y herramientas.
- Atrapamientos por o entre objetos.
- Exposición a polvo.
- Sobreesfuerzos.

#### C.- Medidas Preventivas

- Se controlarán los movimientos del contendedor durante las operaciones de carga y descarga al camión de transporte a vertedero.
- Se subirá y bajará del camión por los lugares establecidos para este fin.
- No se saltará nunca desde la plataforma de transporte al suelo.
- Se subirá a la plataforma solamente si es necesario para soltar las mordazas de inmovilización del contenedor.
- Los operarios se colocarán en lugar seguro durante la carga y descarga y ubicación del contenedor de escombros.
- Las maniobras de situación del contenedor en el lugar adecuado para su función se suele realizar por empuje humano directo del contenedor sujeto al riesgo de sobreesfuerzo, para evitarlo instale un tráctel amarrado por un extremo a un punto

fuerte y por el otro al contenedor y muévalo por este procedimiento o se aplicará medida equivalente segura.

- Para cargar el contenedor siempre se hará enrasando la carga y se cubrirá con una lona contra los vertidos accidentales de la carga.

### D.- Equipos de Protección Individual

- Calzado de seguridad
- Casco de seguridad.
- Faja dorsolumbar.
- Guantes de protección.
- Ropa de trabajo.
- Chaleco reflectante.

## 1.5.4.- PASARELAS DE OBRA

### B.- Evaluación de Riesgos

- Caídas de personas a igual o distinto nivel.
- Rotura de la pasarela.
- Atrapamientos.
- Golpes, heridas y cortes durante el transporte, manejo e instalación.

### C.- Medidas Preventivas

- Las pasarelas que salven alturas de más de 2 m deben de disponer barandillas de 90 cm de altura, barra intermedia y rodapié de protección.
- La anchura mínima de estas pasarelas debe ser de 0,60 m.
- Dispondrán de accesos seguros y fáciles, estando libres de obstáculos y su superficie no será resbaladiza.
- En caso de estar formadas por tablones de madera, se deben usar tablones sin rajaduras nudos o defectos, y deberán clavarse entre sí.
- Para distancias entre apoyos de menos de 3 m usar tablones de 5 cm de grosor, para distancias superiores usar tablones de 7 cm de grosor.

### D.- Equipos de Protección Individual

- Guantes de seguridad.
- Calzado de seguridad.
- Ropa de trabajo
- Chaleco reflectante.

## 1.5.5.- BALIZA LUMINOSA INTERMITENTE

### B.- Evaluación de Riesgos

- Caída de personas al mismo nivel.

- Pisadas sobre objetos.
- Choques y golpes contra objetos inmóviles.
- Golpes y cortes por objetos o herramientas.
- Proyección de fragmentos o partículas.
- Sobreesfuerzos, posturas inadecuadas o movimientos repetitivos.
- Contacto con sustancias cáusticas o corrosivas.
- Exposición al ruido.
- Iluminación inadecuada.

### C.- Medidas Preventivas

- Se utilizarán en situaciones de escasa visibilidad, o durante la noche, para la organización del tráfico como consecuencia de la afectación de las obras a vías de circulación abiertas al tráfico y para la organización interna de obra.

**1.1.1.13.** Se colocarán en:

- Calles de acceso a zonas de trabajo.
- Calles donde se trabaja y se interfiera con la circulación.
- Desvíos por obras, etc.
- Riesgo de las zonas de trabajo que generan polvo o que pueda interferir a terceros.
- Limitación de velocidad en la carretera a las distancias reglamentarias del entronque con ella.

### D.- Equipos de Protección Individual

- Guantes de neopreno.
- Mono de trabajo.
- Casco de seguridad homologado.

## 1.5.6.- PUNTALES

### B.- Evaluación de Riesgos

- Caída desde altura de las personas durante la instalación de puntales.
- Caída desde altura de los puntales por incorrecta instalación.
- Caída desde altura de los puntales durante las maniobras de transporte elevado.
- Golpes en diversas partes del cuerpo durante la manipulación.
- Atrapamiento de dedos, (extensión y retracción).
- Caída de elementos conformadores del puntal sobre los pies.
- Vuelco de la carga durante operaciones de carga y descarga.
- Rotura del puntal por fatiga del material.
- Rotura del puntal por mal estado (corrosión interna y/o externa).
- Deslizamiento del puntal por falta de acuñamiento o de clavazón.
- Desplome de encofrados por causas de la disposición de puntales.

**C.- Medidas Preventivas**

- Los puntales se acopiarán ordenadamente por capas horizontales de un único puntal en altura y fondo el que desee, con la única salvedad de que cada capa se disponga de forma perpendicular a la inmediata inferior.
- Se prohíbe expresamente tras el desencofrado el amontonamiento irregular de los puntales.
- Los puntales se izarán (o descenderán) en paquetes flejados por los dos extremos; el conjunto, se suspenderá mediante aparejo de eslingas del gancho de la grúa.
- Se prohíbe expresamente en esta obra, la carga a hombro de más de dos puntales por un solo hombre en prevención de sobreesfuerzos.
- Los puntales de tipo telescópico se transportarán a brazo u hombro con los pasadores y mordazas instaladas en posición de inmovilidad de la capacidad de extensión o retracción de los puntales.
- Los tablones durmientes de apoyo de los puntales que deben trabajar inclinados con respecto a la vertical serán los que se acuñarán. Los puntales, siempre apoyarán de forma perpendicular a la cara del tablón.
- Los puntales se clavarán al durmiente y a la sopanda, para conseguir una mayor estabilidad.
- El reparto de la carga sobre las superficies apuntaladas se realizará uniformemente repartido. Se prohíbe expresamente en esta obra las sobrecargas en los puntales.

*Normas preventivas para el uso de puntales de madera:*

- Serán de una sola pieza, en madera sana, preferiblemente sin nudos y seca.
- Estarán descortezados con el fin de poder ver el estado real del rollizo.
- Tendrán la longitud exacta para el apeo en el que se les instale.
- Se acuñarán, con doble cuña de madera superpuesta en la base, clavándose entre sí.
- Preferiblemente no se emplearán dispuestos para recibir solicitaciones a flexión.
- Se prohíbe expresamente en esta obra el empalme o suplementación con tacos (o fragmentos de puntal, materiales diversos y asimilables), los puntales de madera.
- Todo puntal agrietado se rechazará para el uso de transmisión de cargas.

*Normas preventivas para el uso de puntales metálicos:*

- Tendrán la longitud adecuada para la misión a realizar.
- Estarán en perfectas
- condiciones de mantenimiento (ausencia de óxido, pintados, con todos sus componentes, etc.).
- Los tornillos sin fin los tendrán engrasados en prevención de esfuerzos innecesarios.
- Carecerán de deformaciones en el fuste (abolladuras o torcimientos).
- Estarán dotados en sus extremos de las placas para apoyo y clavazón.

**D.- Equipos de Protección Individual**

- Ropa de trabajo.

- Casco de seguridad.
- Faja dorsolumbar.
- Cinturones de seguridad o arnés anticaída.
- Botas de seguridad.
- Guantes de cuero.
- Gafas de protección.

### 1.5.7.- ENTIBACIONES

### B.- Evaluación de Riesgos

- Caídas al mismo nivel.
- Caídas a distinto nivel.
- Caída de objetos.
- Atrapamientos y aplastamientos.
- Golpes.
- Cortes.
- Desprendimientos.

### C.- Medidas Preventivas

- Las zonas de paso y trabajo se mantendrán limpias de materiales y sin encharcamientos si desniveles del terreno.
- El acceso al fondo de la entibación se realizará por escaleras previstas al efecto, tanto en el talud de excavación, como de mano en la zona de la entibación propiamente dicha.
- No se permitirá bajo ningún concepto trepar por los paneles de entibación ni desplazarse por los codales de los mismos.
- La parte superior de la excavación tendrá barandilla metálica de 90 cm. de altura (salvo que la parte superior de la entibación metálica la pueda sustituir).
- Ningún trabajador accederá a la excavación hasta que no se haya asegurado suficientemente la entibación metálica.
- Se montarán rodapiés a lo largo de la entibación (en las zonas necesarias) con el fin de evitar la caída de materiales al fondo.
- El movimiento del material de la entibación se realizará con elementos de izado adecuados al peso de los mismos (grilletes, estrobos, etc) revisándose periódicamente y desechando los que se encuentren en mal estado.
- No existirá personal en la zona de afección del movimiento de los materiales de entibación, señalándose la zona y designando un señalista que controle el proceso en caso necesario.
- No existirá personal en la zona de afección del movimiento de los materiales de entibación, señalizándose la zona y designando un señalista que controle el proceso en caso necesario.
- Todos los montajes y movimientos de la entibación se realizarán siguiendo las instrucciones del fabricante.
- Se instalará el tipo de entibación previsto según el proyecto de ejecución de la empresa suministradora. Cada modelo de blindaje está diseñado para soportar un empuje determinado de cargas en el terreno.

- Todo sistema de entibación deberá estar homologado.
- Se prohíbe la permanencia de operarios en la zona de batido de cargas durante la operación de izado de tableros.
- El ascenso y descenso del personal a las entibaciones se hará por medio de escaleras de mano seguras.
- Se extremará la vigilancia de taludes durante las operaciones de entibado y desentibado en prevención de derrumbamientos del terreno. Estas operaciones se realizarán bajo vigilancia constante del encargado del tajo.
- Si hubiera entibaciones de más de 2 metros de altura, se protegerán los bordes con barandillas de 1 m de altura, provistas de pasamanos, listón intermedio y rodapié. Si ello no es posible y hay que acceder a la parte superior, se utilizará arnés de seguridad amarrados a un punto fuerte.

**D.- Equipos de Protección Individual**

- Casco de seguridad.
- Botas de seguridad.
- Cinturón de seguridad.
- Guantes de cuero.
- Ropa de trabajo.
- Traje impermeable (en caso de lluvia).
- Chaleco reflectante.

### 1.5.8.- CARRETILLA DE MANO

**B.- Evaluación de Riesgos**

- Caída al mismo nivel.
- Caída a distinto nivel.
- Caídas de objetos en manipulación.
- Pisadas sobre objetos.
- Golpes y/o cortes con objetos y herramientas.
- Sobreesfuerzos.

**C.- Medidas Preventivas**

- Utilizar la carretilla de mano requiere una cierta habilidad para no provocar accidentes, el transporte del material se realiza sobre la cuba apoyada en una sola rueda; se seguirán de manera general las siguientes medidas de seguridad.
- Se cargará la carretilla de manera uniforme para garantizar su equilibrio.
- Para la conducción de la carretilla una vez cargada se flexionarán ligeramente las piernas ante la carretilla, se sujetará firmemente los mangos guía, el trabajador debe alzarse de manera uniforme para que no se desequilibre y vuelque. Posteriormente se moverá la carretilla y se transportará el material.
- Para la descargar, se repitará la misma maniobra descrita en el punto anterior, sólo que en el sentido inverso.
- Cuando se salven obstáculos o diferencias de nivel, se debe preparar una pasarela sobre el obstáculo o diferencia de nivel, con un ángulo de inclinación lo más suave

posible, de lo contrario el trabajador puede accidentarse por sobreesfuerzo. La pasarela debe tener como mínimo 60 centímetros de anchura.

- No se conducirán carretillas que transporten objetos que sobresalgan por los lados, es peligrosa. Se puede chocar en el trayecto y accidentarse.
- El camino de circulación con las carretillas de mano debe mantenerse limpio para evitar chocar y volcar el contenido.
- Se tendrán en cuenta las recomendaciones sobre manipulación manual de cargas para evitar sobreesfuerzos.

**D.- Equipos de Protección Individual**

- Botas de seguridad.
- Casco de seguridad.
- Faja dorsolumbar.
- Guantes de seguridad.
- Ropa de trabajo.

### 1.5.9.- PLANCHAS METÁLICAS O CHAPONES

**B.- Evaluación de Riesgos**

- Caída de materiales.
- Pisadas sobre objetos.
- Golpes y/o cortes con objetos y herramientas.
- Atrapamientos por o entre objetos.
- Atropellos.
- Sobreesfuerzos.

**C.- Medidas Preventivas**

- Durante el montaje, los montadores estarán auxiliados por señalistas dotados de paletas normalizadas.
- Tendrán soldadas orejetas para su manipulación mecanizada. En su defecto tendrán dos agujeros para favorecer dicha manipulación. Se elevarán y pondrán en obra sujetos siempre por dos puntos diferentes.
- Para la manipulación mecanizada no se improvisarán los aparejos de izado ni los elementos de sustentación y amarre.
- Las herramientas manuales para su manipulación y puesta definitiva en obra no serán improvisadas.
- Se utilizarán barras de uñas adecuadas.
- Se prohíbe la manipulación manual para ajustar y calzar el chapón en el punto de instalación.
- En el acopio temporal estarán ordenados y bien apilados., separados de zonas de paso y circulación.

**D.- Equipos de Protección Individual**

- Guantes de seguridad.

- Calzado de seguridad.
- Ropa de trabajo
- Faja dorsolumbar.
- Chaleco reflectante.

### 1.5.10.- VALLA TIPO AYUNTAMIENTO

#### B.- Evaluación de Riesgos

- Caída al mismo nivel.
- Caída de materiales.
- Golpes y/o cortes con objetos y herramientas.
- Pisadas sobre objetos.
- Atrapamientos.
- Sobreesfuerzos

#### C.- Medidas Preventivas

- El transporte de las vallas hasta la zona de instalación será mecanizado.
- La instalación de las vallas será uniendo unas con otras con los propios elementos de las mismas.
- Además se atarán con alambre para evitar su desajuste rápido.
- Se utilizarán vallas normalizadas con panel para la colocación de información adicional. De manera general tendrá 1 metro de altura y 2.5 metros de longitud. Serán preferentemente de color blanco.
- Las vallas estarán en buen estado de conservación y mantenimiento evitándose oxidaciones y elementos torcidos y/o cortados.
- Las vallas conformarán alineaciones uniformes evitándose partes salientes.
- Sobre las vallas se colocará la señalización vial preceptiva.
- La ubicación de las vallas se señalizará con antelación por medio de paneles direccionales.

#### D.- Equipos de Protección Individual

- Guantes de seguridad.
- Calzado de seguridad.
- Ropa de trabajo
- Casco de seguridad.
- Faja dorsolumbar.

### 1.5.11.- VALLA METÁLICA CON PIES DE HORMIGÓN O SIMILAR

#### B.- Evaluación de Riesgos

- Caída al mismo nivel.
- Caída de materiales.
- Golpes y/o cortes con objetos y herramientas.
- Pisadas sobre objetos.

- Atrapamientos por o entre objetos.
- Exposición a sustancias nocivas o tóxicas.
- Sobreesfuerzos

**C.- Medidas Preventivas**

- El transporte de las vallas hasta la zona de instalación será mecanizado.
- La instalación de las vallas será uniendo unas con otras con los propios elementos de las mismas.
- Además se atarán con alambre para evitar su desajuste rápido.
- Las vallas estarán en buen estado de conservación y mantenimiento evitándose oxidaciones y elementos torcidos y/o cortados.
- Las vallas conformarán alineaciones uniformes evitándose partes salientes.
- Sobre las vallas se colocará la señalización de obra que sea preceptiva.
- Se aplicarán procedimientos seguros para la manipulación manual de cargas.
- Las herramientas manuales se utilizarán para los fines previstos, en adecuadas condiciones de conservación y mantenimiento.

**D.- Equipos de Protección Individual**

- Guantes de seguridad.
- Calzado de seguridad.
- Ropa de trabajo
- Casco de seguridad.
- Faja dorsolumbar.

## 1.6.- RIESGOS DE DAÑOS A TERCEROS Y MEDIDAS PREVENTIVAS.

Los riesgos que se derivan de los daños a terceros, variables en calidad, importancia y probabilidad, son consecuencia de la afección de las obras, bien a los colindantes, o bien a determinados servicios, cuya modificación obliga a los usuarios a variar sus respectivas costumbres, o los somete a determinadas limitaciones (pasos sobre zanjas, desvíos, pasarelas, cortes de agua y luz, etc.)

**B.- Evaluación de Riesgos**

- Riesgos derivados de la circulación de vehículos y maquinaria (atropellos, atrapamientos, choques, etc.)
- Riesgos derivados de modificación de trayectos y circulaciones (falta de visibilidad)
- Polvo.
- Ruido.
- Caídas, golpes y proyecciones.
- Caída de objetos.
- Salpicaduras.
- Inundaciones.

- Interrupción de servicios públicos, agua, luz, etc., con el perjuicio que ello va a suponer para la vecindad.

**C.- Protección Colectiva**

- Vallas de delimitación y protección, balizas luminosas y señales de prohibido el paso en:

  - Posibles demoliciones.
  - Zonas de trabajo.
  - Zonas de maquinaria.
  - Zonas de acopios.
  - Zanjas.
  - Instalaciones y locales.

- Señalización de tráfico y balizas luminosas en:

  - Calles de acceso a zonas de trabajo.
  - Calles donde se trabaje con interferencia de la circulación.
  - Desvíos (por obras, instalaciones, etc.)

- Paneles informativos (sobre riesgos, modificación de trayectos de vehículos y personas, itinerarios alternativos, etc.)
- Aviso de riesgos de las zonas de trabajo que generan polvo o de aquéllas en las que éste pueda interferir o afectar a terceros.
- Señalización e instalación de cerramientos en los accesos naturales de la obra, con prohibición de paso a las personas ajenas a la misma.
- Disposición de pasarelas con barandilla en todos aquellos puntos de cruce sobre zanjas en los que resulte realmente inútil el desvío de transeúntes por otros itinerarios.

## 1.7.- CERRAMIENTO, SEÑALIZACIÓN Y ACCESO

Como complemento de la protección colectiva, de los equipos de protección individual previstos y de la protección de riesgos a terceros, se establecerá un cerramiento del recinto de la obra, y el empleo de una señalización normalizada, que advierta en cada uno de los “momentos” de obra, de los riesgos existentes a todos los que trabajan o circulan por la misma. Dicho cerramiento, se dispondrá desde antes del inicio de los primeros trabajos, hasta la total terminación de la obra.

### 1.1.1.14. CERRAMIENTO

El cerramiento perimetral que se define en los planos que se presentan como

propuesta. El Plan de Seguridad y Salud que desarrollará este Estudio de Seguridad y Salud, definirá la solución final, que se efectuará con accesos para el personal y vehículos (en caso de ser necesario), separadas y debidamente señalizadas.

#### 1.1.1.15. SEÑALIZACIÓN

La señalización es una información, y como tal un exceso de la misma puede ocasionar confusión. Por tanto, se instalarán, entre otros, los siguientes tipos de señales, cuyas cantidades y características se especifican en el apartado PRESUPUESTO.

Siempre que los trabajos a realizar afecten a la circulación por carretera y caminos se realizarán con las oportunas medidas de señalización, desvío y balizamiento, de acuerdo a las recomendaciones de la Norma 8.3 IC “Señalización de Obras” y las Publicaciones del Ministerio de Fomento “Manual de Ejemplo de Señalización de Obras Fijas” y “Señalización móvil de Obras”.

## 1.8.- INSTALACIONES DE HIGIENE Y BIENESTAR

Las instalaciones que entran dentro de este epígrafe son las siguientes:

a) ASEOS.

Se instalarán en locales expresamente diseñados para tal fin, que podrán ser construidos mediante elementos modulares prefabricados, siendo recomendable un local por cada 10 trabajadores o fracción. Los locales dispondrán de agua corriente fría, perchas y conexión con el saneamiento exterior para la evacuación de las aguas residuales.

b) VESTUARIOS.

Cada uno de los locales de vestuarios dispondrá de ventilación directa. Los vestuarios dispondrán del espacio suficiente para la instalación de taquillas (una por trabajador), bancos y áreas de circulación o movimiento y el diseño de su distribución y tabiquería serán tales que impidan que el interior del vestuario sea visible desde el exterior del mismo.

c) COMEDOR.

El local destinado a comedor dispondrá de amplitud suficiente para el alojamiento de la totalidad de los trabajadores, con ventilación directa y suficiente iluminación. Las mesas tendrán capacidad para un número de comensales no inferior a cuatro por unidad. El comedor dispondrá de elemento calienta-comidas con capacidad suficiente. No obstante lo anterior, la contrata adjudicataria podrá reducir las dimensiones y capacidad del comedor si al menos un

25% de los trabajadores manifestasen su deseo o intención de efectuar sus comidas en lugares exteriores a la zona de obras. Esta renuncia habría de manifestarse por escrito y sólo en caso de superarse el porcentaje fijado, podrá la contrata adecuar la capacidad del comedor al número de trabajadores previstos, si bien en ningún caso podrá reducirse dicha capacidad por debajo del 40% del número total de trabajadores de la obra. En casos especiales el comedor podrá ser utilizado eventualmente para reuniones de tipo asociativo, de trabajo o de carácter educativo en relación con los trabajadores.

## 1.9.-PLAN DE EVACUACIÓN Y EMERGENCIA. SERVICIOS SANITARIOS.

Estas medidas preventivas tienen por objeto definir la secuencia de acciones para el control inicial de las Situaciones de Emergencia que pueden producirse en las obras, planificando los medios humanos y materiales disponibles.

A su vez, la aplicación de primeros auxilios se realizará a través de la instalación de los elementos adecuados (botiquines, teléfonos, etc.), en la forma y lugares que se detallan más adelante. De un modo más concreto, se pasa a especificar las diferentes medidas preventivas y de primeros auxilios que aquí se han apuntado.

*1) EMERGENCIA POR INCENDIO Y POSIBLE EVACUACIÓN. -*

En función del alcance del incendio, podemos diferenciar uno de los siguientes niveles de emergencia:

- Conato de emergencia: Incendio que puede ser controlado y dominado de forma sencilla y rápida por el personal y medios existentes en la zona de trabajo: extintores y mangueras de agua (camión cisterna).
- Emergencia parcial: Incendio que no puede ser controlado por el personal y medios existentes en la zona de trabajo y requiere de la actuación de personal específicamente formado para ello (Equipo de Intervención).
- Emergencia general: Es el incendio que no solo puede afectar a la zona de trabajo, sino a otros sectores y a terceras personas. Se evacuarán inmediatamente las instalaciones, se comunicará a los responsables y se precisará de Servicios de Ayuda Externos.

Normas de actuación:

**Si descubre un incendio:**

- póngalo en conocimiento del jefe de intervención
- conserve la calma y actué con rapidez
- si es un fuego pequero, intente sofocarlo con los medios disponibles
- no extinga un fuego solo, sin haber comunicado previamente su existencia
- ataque al incendio situándose siempre entre la salida y el fuego
- no corra riesgos innecesarios

- en caso de presencia de humo, muévase agachado ya que el calor y los gases serán menores a esa altura
- si se prenden sus ropas, no corra, tírese al suelo, ruede y pida ayuda
- si se encuentra atrapado en una sala:
  1. cierre las puertas
  2. tape las rendijas de las puertas con trapos húmedos
  3. si es posible hágase ver por las ventanas

**Si es preciso proceder a la evacuación de las obras:**

- preste atención a las órdenes de los responsables
- abandone el lugar de trabajo con el mínimo entorpecimiento, mantenga la calma y serenidad: no corra ni grite
- si hay humo, salga reptando y; a ser posible, con un trapo húmedo cubriendo entrada de las vías respiratorias
- no utilice su vehículo para salir del recinto
- no retroceda
- póngalo en conocimiento del jefe de emergencias

*2) MEDIOS HUMANOS PARA EMERGENCIAS*

Para la correcta operatividad del Plan de Emergencia, se precisa la definición de una **estructura organizativa**. Dicha estructura, estará constituida por mandos y equipos de actuación que posibiliten el correcto desarrollo de las acciones que se consideran necesarias.

Si bien el contratista deberá definir su propio Plan de Emergencia y sus correspondientes recursos, teniendo en cuenta las dimensiones de la obra que nos ocupa, se propone la designación de los siguientes recursos:

- **Jefe de Emergencia** que recaerá en la figura del Jefe de Obra
- **Jefe de Intervención** que recaerá en la figura del Encargado de Obra, quien deberá contar con formación en primeros auxilios y uso de equipos de primera intervención en caso de incendio.

Son funciones del Jefe de Emergencia:

- Acudir al lugar del siniestro (una vez avisado por el jefe de intervención)
- Asumir la dirección y coordinación de los equipos de extinción y evacuación.
- Decidir la respuesta que se deberá tomar contra la emergencia a la vista de la situación creada

Son funciones del Jefe de Intervención:

- Mantener continuamente informado al Jefe de Emergencia de la evolución de la emergencia, asesorándole sobre las decisiones que se deben de tomar.
- Se pondrá en contacto con los Servicios Externos de Emergencias, si el Jefe de Emergencia se lo pide o, en su ausencia así lo estima necesario
- Recibirá a los Servicios Externos de Emergencias
- Ofrecerá ayuda a los Servicios Externos, apoyándolos si fuera necesario
- Una vez controlada la emergencia, informará del fin al Jefe de Emergencias, y junto a éste decidirán la vuelta a la normalidad

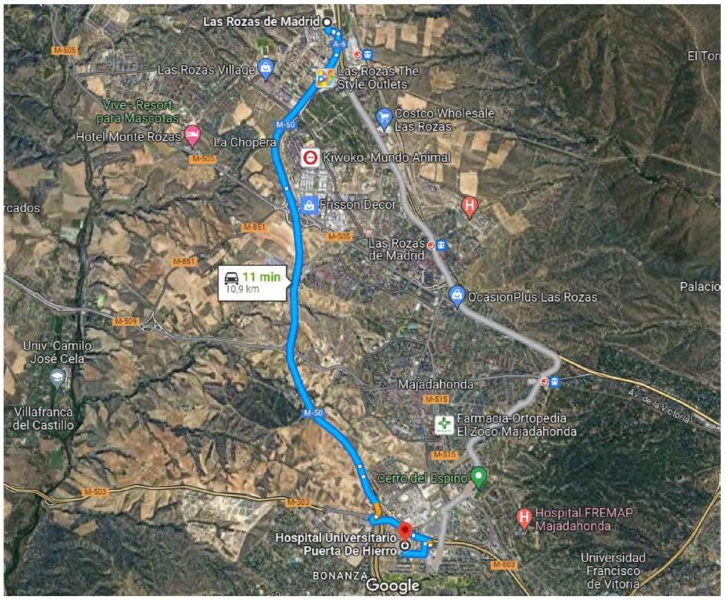
*3) BOTIQUINES Y OTRAS INSTALACIONES SANITARIAS. -*

Sin perjuicio de la existencia del Centro Asistencial de Primeros Auxilios más próximo a las obras, se instalarán botiquines de emergencia en las casetas.

En esta obra se puede acudir a los centros sanitarios siguientes:

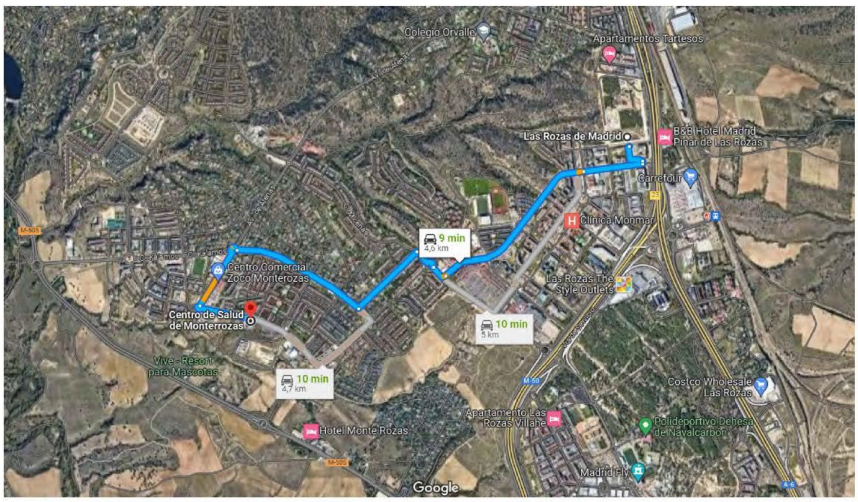
- Hospital Puerta de Hierro Majadahonda
  - Calle Manuel de Falla 1, 28222, Majadahonda (Madrid)
  - Teléfono: 911 91 60 00

**ITINERARIO A HOSPITAL**




- Centro de Salud de Monterrozas
  - Calle Aristóteles 72; 28290 Las Rozas De Madrid, Madrid
  - Teléfono: 916 31 86 59

## ITINERARIO A CENTRO DE SALUD




- Teléfono de emergencias de la Comunidad de Madrid 112.

- Mutua de accidentes de la empresa constructora.

Además:

- Se expondrá en lugar (o lugares) visible(s) un listado con las direcciones y teléfonos de los centros asignados para urgencias, ambulancias, médicos, etc., para garantizar la rapidez en la atención y el transporte de posibles accidentados. Esta información se colocará como mínimo en las oficinas, comedores, vestuarios, así como en el tablero o panel informativo que, en su caso, se disponga en la obra. Asimismo dispondrán de dicho listín y lo llevarán consigo los técnicos y jefes de obra, encargados, capataces, jefes de equipo, vigilantes.
- Se dispondrá de acceso rodado para facilitar el paso de vehículos de emergencia hasta los diversos tajos, estableciendo pasarelas, si ello fuese necesario, para el cruce sobre zanjas.
- Todos los tajos dispondrán de salida de aguas de lluvia, preferentemente en régimen libre. De no poder ser así, se dispondrán los bombeos adecuados.

*4) ACTUACIÓN EN CASO DE ACCIDENTE*

El accidente laboral significa un fracaso de la prevención de riesgos por multitud de causas, entre las que destacan las de difícil o nulo control. Por desgracia, es posible que pese a todo el esfuerzo desarrollado y nuestra intención preventiva, se produzca algún fracaso. El Contratista adjudicatario queda obligado a recoger dentro de su "plan de seguridad y salud" los siguientes principios de socorro:

1º El accidentado es lo primero. Se le atenderá de inmediato con el fin de evitar el agravamiento o progresión de las lesiones. Lo anterior siempre y cuando no exista riesgo para los trabajadores que atienden al trabajador accidentado, en cuyo caso habría que esperar a los servicios de emergencia.

2º En caso de caída desde altura o a distinto nivel y en el caso de accidente eléctrico, se supondrá siempre, que pueden existir lesiones graves, en consecuencia, se extremarán las precauciones de atención primaria en la obra, aplicando las técnicas especiales para la inmovilización del accidentado hasta la llegada de la ambulancia y de reanimación en el caso de accidente eléctrico.

3º En caso de gravedad manifiesta, se evacuará al herido en camilla y ambulancia; se evitarán en lo posible según el buen criterio de las personas que atiendan primariamente al accidentado, la utilización de los transportes particulares, por lo que implican de riesgo e incomodidad para el accidentado.

4º El Contratista adjudicatario comunicará, a través del "plan de seguridad y salud" que componga, la infraestructura sanitaria propia, mancomunada o contratada con la que cuenta, para garantizar la atención correcta a los accidentados y su más cómoda y segura evacuación de esta obra.

5º El Contratista adjudicatario comunicará, a través del "plan de seguridad y salud" que componga, el nombre y dirección del centro asistencial más próximo, previsto para la asistencia sanitaria de los accidentados, según sea su organización. El nombre y dirección del centro asistencial, que se suministra en este estudio de seguridad y salud, debe entenderse como provisional. Podrá ser cambiado por el Contratista adjudicatario.

6º El Contratista adjudicatario, queda obligado a instalar una serie de rótulos con caracteres visibles a 2 m., de distancia, en el que se suministre a los trabajadores y resto de personas participantes en la obra, la información necesaria para conocer el centro asistencial, su dirección, teléfonos de contacto etc.

7º El Contratista adjudicatario instalará el rótulo precedente de forma obligatoria en los siguientes lugares de la obra: acceso a la obra en sí; en la oficina de obra; en el vestuario aseo del personal; en el comedor y en tamaño hoja Din A4, en el interior de cada maletín botiquín de primeros auxilios. Esta obligatoriedad se considera una condición fundamental para lograr la eficacia de la asistencia sanitaria en caso de accidente laboral.

| |
|---|
| **COMUNICACIONES INMEDIATAS EN CASO DE ACCIDENTE LABORAL.**<br>El Contratista adjudicatario incluirá, en su plan de seguridad y Salud, la siguiente obligación de comunicación inmediata de los accidentes laborales: |
| Accidentes de tipo leve.<br>Al Coordinador en materia de seguridad y salud durante la ejecución de la obra: de todos y de cada uno de ellos, con el fin de investigar sus causas y adoptar las correcciones oportunas.<br>A la Dirección Facultativa de la obra: de todos y de cada uno de ellos, con el fin de investigar sus causas y adoptar las correcciones oportunas.<br>A la Autoridad Laboral: en las formas que establece la legislación vigente en materia de accidentes laborales. |
| Accidentes de tipo grave.<br>Al Coordinador en materia de seguridad y salud durante la ejecución de la obra: de todos y de cada uno de ellos, con el fin de investigar sus causas y adoptar las correcciones oportunas.<br>A la Dirección Facultativa de la obra: de forma inmediata, con el fin de investigar sus causas y adoptar las correcciones oportunas.<br>A la Autoridad Laboral: en las formas que establece la legislación vigente en materia de accidentes laborales. |
| Accidentes mortales.<br>Al juzgado de guardia: para que pueda procederse al levantamiento del cadáver y a las investigaciones judiciales.<br>Al Coordinador en materia de seguridad y salud durante la ejecución de la obra: de todos y de cada uno de ellos, con el fin de investigar sus causas y adoptar las correcciones oportunas.<br>A la Dirección Facultativa de la obra: de forma inmediata, con el fin de investigar sus causas y adoptar las correcciones oportunas.<br>A la Autoridad Laboral: en las formas que establece la legislación vigente en materia de accidentes laborales. |

## 1.10.- ACTUACIONES PREVENTIVAS DE CARÁCTER GENERAL

### 1.10.1.- FORMACIÓN E INFORMACIÓN

Todo el personal deberá recibir, al ingresar en la obra y antes de iniciar su cometido en la misma, una formación acerca del trabajo que vaya a realizar, los métodos de trabajo y sus riesgos, así como de las medidas de seguridad que, con carácter obligatorio, deberá emplear y de la actitud que deba adoptar en caso de emergencia, en especial en cuanto afecte al tajo o tajos a los que vaya a ser adscrito.

Dicha información deberá repetirse tantas veces como la Dirección Facultativa de las obras y, en su nombre, el Coordinador de Seguridad y Salud durante la ejecución de las obras, lo considere oportuno y siempre en caso de que el trabajador sea trasladado de un tajo a otro de nueva designación.

Entre el personal más cualificado se impartirán cursillos de primeros auxilios, de forma que en todo momento cualquiera de los tajos de la obra tenga asignado al menos un trabajador con posibilidad de actuación inmediata en caso necesario.

La formación del personal se llevará a cabo, con carácter general, por la empresa a la que éste pertenezca, en aplicación de los artículos 18 y 19 de la Ley 31/95 de Prevención de Riesgos Laborales. Los gastos imputables a dicha formación deberán ser asumidos por la propia empresa, por lo que no se establece en este Estudio otra previsión en tal sentido, que la correspondiente a los honorarios del personal técnico que hubiera de impartir las correspondientes clases o charlas.

El hecho de contratar a trabajadores autónomos como a subcontratistas, no exime a la empresa contratante de los mismos de la obligación de formarlos en el sentido que aquí se trata, pero tampoco exime a los mismos de la obligación de recibir dicha formación ni de la obligación de exigirla, si no se realizase de forma adecuada.

### 1.10.2.- VIGILANCIA DE LA SALUD

Según el art. 22 de la Ley 31/1995 de 8 de Noviembre, de prevención de riesgos laborales, cada empresario garantizará que todo su personal que empiece a trabajar en la obra, habrá pasado o pasará un reconocimiento médico que lo habilite para realizar las tareas para las cuales se les ha contratado. Este reconocimiento médico tendrá validez anual y se repetirá en periodos de un año.

### 1.10.3.- HIGIENE INDUSTRIAL

La Higiene Industrial es la técnica del reconocimiento, evaluación y control de los factores de riesgo o agentes ambientales presentes en los puestos de trabajo, que pueden provocar una enfermedad profesional, una disminución de la salud, incomodidad o deficiencia significativa entre los trabajadores o en el resto de los miembros de la comunidad.

Para llevar a un buen término las técnicas de Higiene Industrial, en una primera fase se identificarán en el puesto de trabajo, teniendo en cuenta los procesos y productos utilizados, y agentes contaminantes.

Dichos agentes o factores de riesgo pueden ser:

| | |
|---|---|
| *1. Agentes Físicos:* | Ruido, Estrés Térmico, Radiaciones Ionizantes y no Ionizantes, Temperatura y Humedad, Iluminación. |
| *2. Agentes Químicos:* | Gases, Vapores, Aerosoles sólidos o líquidos, Polvo. |
| *3. Agentes Biológicos:* | Virus, Bacterias, Hongos, Parásitos. |

### 1.10.4.- PSICOLOGÍA APLICADA

Con el fin de identificar, eliminar y/o minimizar el riesgo de comportamientos que supongan un riesgo para la Seguridad y Salud de los trabajadores, será necesaria la intervención del Psicólogo.

Su función se concretará en:

- Asesoramiento en aquellos aspectos que puedan contribuir a mejorar las condiciones de trabajo y disminuir los factores de riesgo psicosocial, asegurando el enlace de la vigilancia y la investigación con la práctica.
- Valoración, a través de las pruebas que considere oportunas, de la adecuación de el/los trabajador/es que deban utilizar maquinaria peligrosa o deban realizar operaciones que impliquen un riesgo para la seguridad de los trabajadores o personas ajenas a la obra (transeúntes).
- Durante la realización de la obra, se desarrollará una campaña de sensibilización en prevención, concretada en carteles, informaciones escritas individuales, e integración de la cultura de la prevención en todas las actividades de formación.

### 1.10.5.- ERGONOMÍA

La ergonomía es el conjunto de conocimientos relativos al hombre y necesarios para concebir útiles, máquinas y dispositivos que puedan ser usados con un máximo confort, seguridad y eficacia, y con el objetivo principal de evitar en lo posible el riesgo de accidente de trabajo, enfermedad profesional, y garantizar la Seguridad y Salud en la obra.

Tiene como misión:

- Formar e informar sobre la correcta manipulación de cargas, evitando en lo posible que se realicen de manera manual.
- Asesorar en lo que concierne al ritmo de trabajo y la planificación de descansos para evitar la carga física.
- Establecer una pauta temporal de trabajo-descanso para aquellas tareas que sometan al trabajador a vibraciones y/o ruido.
- Facilitar los medios necesarios para la correcta ejecución de trabajos que requieran de una especial atención y/o concentración, como maniobras y uso de maquinaria, en condiciones de visibilidad y comunicaciones adecuadas.
- Evitar situaciones de aislamiento o monotonía o reducir, en lo posible, su intensidad y duración.

- Optar por aquellos métodos alternativos de trabajo que puedan ofrecer las mejores condiciones de confort durante la realización de las tareas.

## 1.10.7.- NORMAS DE SEGURIDAD EXTENSIBLES A TODA LA OBRA

### *a. PERSONAL DE OBRA EN GENERAL*

Todo trabajador que se incorpore a la obra facilitará sus datos y documentación preventiva al encargado de la obra o personal designado por la contrata en caso de no estar presente en la obra el jefe de obra, a su incorporación a la misma.

OBLIGACIONES

- Debe conocer y cumplir las “Normas de Seguridad” relativas a su tajo y puesto de trabajo.
- Debe conocer y respetar las “Normas de Seguridad” extensible a los riesgos genéricos comunes a toda la obra”.
- Es obligatorio el uso de todo el equipo de protección personal que, por su actividad y puesto de trabajo, se le asigne.
- El casco y botas de seguridad son obligatorias en todo el recinto de la obra.
- En todos los trabajos en los que se pueden producir proyección de materiales (picar hormigón, uso de radial, descarga de cubos, etc.) es obligado el uso de gafas protectoras.
- Avise inmediatamente de todos los peligros que observe.
- Si detecta la caída de materiales, desde algún punto de la obra, póngalo en conocimiento del Encargado o del Técnico de Seguridad.
- Ayude a mantener las protecciones colectivas de la obra.
- Respete la señalización existente en la obra.
- Si observa a otro trabajador, sea cual sea su categoría, realizando alguna labor de forma peligrosa para él o para sus compañeros, comuníqueselo para advertirle del riesgo que corre, o que genera para otros, o para terceros.
- Utilice los caminos y accesos acondicionados para ello. En caso de no existir un acceso en condiciones, debe ponerlo en conocimiento del Encargado o Técnico de Seguridad.
- Los desplazamientos por las zonas de trabajo se deben realizar siempre por los lugares de paso, nunca por encima de materiales acopiados ni sobrepasando obstáculos o máquinas.
- Para acceder a zonas a diferente altura se deben utilizar escaleras

correctamente instaladas, nunca cuerpos de andamio o tablones.

- Está prohibido utilizar escaleras de mano para alcanzar alturas de más de 5 metros.
- Está prohibido utilizar una escalera de mano de más de 3 metros que no esté bien fijada en ambos extremos.
- Las escaleras de mano deben sobrepasar en 1 metro la altura a alcanzar. Si no se dispone de la escalera apropiada se debe solicitar al encargado o al servicio de seguridad de la obra.
- Siempre que se vaya a acceder a una nueva zona de trabajo, se debe acondicionar un acceso que garantice la seguridad de toda persona que se dirija a esa zona. Si tiene alguna duda sobre cómo hacerlo, consulte al encargado o al servicio de seguridad de la obra. En caso de no disponer del material necesario debe solicitarlo al encargado o al servicio de seguridad de la obra.
- Dé preferencia a las máquinas sobre su vehículo.
- No estacione su vehículo en zonas de paso o en caminos. Si no existe espacio suficiente, comuníquelo a su superior o al Técnico de Seguridad para que habilite y acondicione el espacio necesario.
- La velocidad máxima permitida en la obra es de 20 Km./h.
- Siga las instrucciones de sus superiores.
- Use las herramientas adecuadas. Cuando finalice, guárdelas.
- Ante cualquier accidente “IN ITINERE”, estará obligado a comunicarlo inmediatamente a la obra. De no poder ser, deberá exigir al Médico que le asista un documento que acredite dicho accidente con la hora y lugar donde se ha producido. Se entiende por accidente “IN ITINERE” el que se produce en el camino habitual de ida o regreso del trabajo y en el tiempo correspondiente a los horarios de entrada y salida de la obra.
- Ayude a mantener el orden y la limpieza en la obra.
- Dentro de la obra se deben mantener los materiales en el mayor orden posible, retirando los restos de materiales utilizados a puntos concretos, agrupados y lejos de los lugares de paso, hasta su retirada.
- Los restos de envoltorios y comida de los almuerzos se deben recoger y colocar dentro de los cubos de basura existentes para ello. En caso de que no exista cubo en las proximidades de alguno de los tajos, deberá comunicarlo al Encargado o al Técnico de Seguridad.
- Los vestuarios, aseos y comedor deben mantenerse limpios y ordenados.

PROHIBICIONES

- No inutilice nunca los dispositivos de seguridad.
- No se aproxime nunca a una máquina en funcionamiento. Mantenga la distancia de seguridad. En caso de que tenga que entrar en el radio de acción de la máquina, asegúrese de que el maquinista tiene conocimiento de ello antes de entrar en esa zona.
- No abandone nunca una herramienta mecánica conectada, debe

asegurarse de que la ha desconectado y ha recogido el cable antes de depositarla en el suelo.

- No procede realizar la limpieza o el mantenimiento de máquinas y elementos móviles, si no se ha asegurado previamente de que la máquina está parada y comunique al operador de la máquina la tarea que va a realizar y el punto de trabajo. Coloque en el pupitre de accionamiento el cartel que indica “personal trabajando” para evitar que se accionen los mandos por personas que desconozcan su situación.
- No deje nunca materiales ni herramientas en lugares desde los que se puedan caer.
- Está prohibido arrojar materiales desde alturas superiores a los 2 metros. En caso de que sea necesario, se acordonará una zona de seguridad que impida el acceso de personas a la zona de caída de materiales.

### *b. VISITANTES Y CONTROL DE ACCESOS*

En este apartado se describen las Normas Generales de Seguridad y Salud durante la visita a la obra.

- Toda persona que visite la obra, deberá de comunicarlo a la oficina de obra.
- Todo visitante durante su estancia en la obra, deberá estar acompañado por una persona autorizada.
- Durante la visita a la obra, debe llevar los equipos de protección individual apropiados a la fase desarrollada. En cualquier caso como mínimo dispondrá de casco de seguridad cuando exista riesgos de caída de materiales desde zonas superiores, botas de seguridad y chaleco de alta visibilidad cuando se transite por zonas próximas a trabajos con maquinaria.
- Cualquier situación de riesgo observada durante la visita, que pudiera provocar un accidente y/o incidente deberá ser comunicada a través de la persona que le acompañe.
- Debe respetar las distintas señalizaciones de seguridad existentes en obra, ya que puede accidentarse aunque no desarrolle directamente los trabajos.
- Queda totalmente prohibido realizar fotografías, o videos durante la visita a la obra, sin la autorización previa del equipo de la obra.
- Respetar las distintas vías de circulación habilitadas para los peatones.
- No se deben acercar a las máquinas en movimiento.
- En caso de no cumplir con las normas de seguridad, puede ser expulsado de la obra.

<u>OBLIGACIONES</u>

El acceso a la obra estará vallado, y se prohibirá el acceso a estas a toda persona ajena a las mismas.

- Antes de permitir el acceso a la obra de empleados de las empresas

suministradoras de acopios, se les informara de los riesgos.

- Debe conocer y cumplir las “Normas de Seguridad” relativas al personal visitante de las obras.
- Siga las instrucciones del personal que le acompaña en la visita.
- El casco y botas de seguridad son obligatorias en todo el recinto de la obra.
- Respete la señalización existente en la obra.
- Utilice los caminos y accesos acondicionados para las visitas.
- Los desplazamientos por las zonas se deben realizar siempre por los lugares de paso, nunca por encima de materiales acopiados ni sobrepasando obstáculos o máquinas. Dé siempre preferencia de paso a las máquinas y vehículos.
- Si visita algún área de trabajo concreto, deberá ser acompañado por la persona responsable que le informará sobre las normas de seguridad a seguir en prevención de posibles accidentes.

PROHIBICIONES

- Está prohibido permanecer o visitar la obra, si no se está debidamente autorizado y acompañado del personal responsable durante la visita.
- No se salga del itinerario marcado para el personal visitante de las obras.
- No se sitúe jamás debajo de cargas suspendidas.
- No se sitúe en zonas donde puedan caer objetos, herramientas o materiales provenientes de las zonas superiores de trabajo.
- No se aproxime nunca a una máquina en funcionamiento. Manténgase siempre fuera de su radio de acción.
- No se acerque a los órganos móviles de las máquinas.
- Está prohibido tomar fotos o películas en la obra si no se cuenta con autorización expresa.

### *c. PREVENCIÓN DE RIESGOS DE TRABAJADORAS EMBARAZADAS*

Dada la variabilidad de las unidades de obra y la diferencia de riesgos en función de la distinta situación de la obra, si a lo largo del desarrollo de la misma existieran trabajadoras embarazadas o en periodo de lactancia, estas, comunicarán en todo momento a su médico especialista los trabajos que habitualmente realicen, explicando los riesgos inherentes, para lo cual está a su disposición este Estudio de Seguridad y Salud y el Plan de Seguridad y Salud del contratista que lo desarrollará, por si de ellos pudieran derivarse riesgos para ella o para el feto.

*RIESGOS GENERALES*

- Abortos y partos de fetos muertos.
- Malformaciones del recién nacido.
- Bajo peso al nacer y partos prematuros.
- Desórdenes del desarrollo.
- Cáncer en la infancia.

*MEDIDAS PREVENTIVAS*

- Se seguirán en todo momento las recomendaciones dadas por el médico especialista, contemplando incluso la posibilidad de cambio de actividad si esto fuera necesario.
- Ajustar las condiciones de trabajo a la situación de la mujer trabajadora, tal como recomiende el médico especialista.
- Modular el tiempo de trabajo, con especial incidencia en la prohibición del trabajo nocturno o a turnos cuando sea necesario.

### *d. ALCOHOL Y OTRAS SUSTANCIAS ESTUPEFACIENTES*

La mayoría de las personas ignora que, incluso una cantidad relativamente pequeña de alcohol, puede predisponer al accidente, lo que tiene especial incidencia en la seguridad tanto laboral como vial.

En los accidente de trabajo, la determinación de la concentración de alcohol en sangre no se lleva a cabo en general más que en aquellos que se aprecia embriaguez evidente.

Después del accidente, la atención se centra sobre todo en el herido y en la prestación de los primeros auxilios. Nadie piensa en un posible estado de embriaguez y, cuando más tarde aparece la sospecha, ya no es posible determinar el grado de alcoholemia del lesionado.

EFECTOS DEL ALCOHOL SOBRE EL CUERPO HUMANO:

- Efectos sobre el cerebro lo que hace que disminuya la concentración, la atención, la capacidad de reacción, el sentido de la coordinación. Hace cometer errores en la percepción del tiempo y las distancias.
- Predispone a sufrir golpes de calor.
- Disminuye la resistencia del cuerpo humano al frió.
- Efectos sobre el olfato. Después de una cierta cantidad de alcohol suele ser unos 50 minutos después de beber 40 gramos de alcohol (un litro de cerveza) el olfato disminuye hasta el punto de apenas percibir el olor de los

vapores de amoníaco.

- Efectos en la vista. Disminuye la visión estereoscópica y la visión esférica, al tiempo que se prolonga el efecto de deslumbramiento. Además reduce en un 25% tanto la capacidad como el campo visual. Como consecuencia, se limita la percepción de los peligros.
- Puede influir en el sistema nervioso provocando la disminución del sentido del tacto, de la percepción de calor, del equilibrio, de los movimientos reflejos, etc. Los trabajadores son propensos a sobrestimar sus posibilidades, con lo que se muestran eufóricos y atrevidos.
- Hay que tener en cuenta que estos efectos son potenciados si es mezclado el alcohol con algunos medicamentos.
- Con antiestamínicos (fármacos para resfriados y alergias) tranquilizantes, somníferos, marihuana o hachís.
- Con aspirinas y derivados.
- Con cafeína, además puede producir cuadros de excitación y agresividad.
- Estas escuetas explicaciones demuestran bien que el consumo de alcohol conlleva un enorme aumento del riesgo de accidente en el puesto de trabajo. Esto es extensible a cualquier sustancia estupefaciente.
- EN ESTA OBRA ESTÁ PROHIBIDO LA INGESTA DE ALCOHOL Y OTRAS SUSTANCIAS ESTUPEFACIENTES.

### *e. TRABAJOS EN TIEMPO LLUVIOSO*

RIESGOS MÁS FRECUENTES

- Electrocuciones
- Descargas eléctricas
- Vuelcos de maquinaría por las malas condiciones del terreno
- Caída al mismo nivel por resbalones

NORMAS DE SEGURIDAD Y MEDIDAS PREVENTIVAS

- Se supervisarán todas las mangueras eléctricas de la obra, asegurándose de que están en perfectas condiciones y protegidas contra la intemperie.
- No permanecerán cables eléctricos en contacto con charcos o barro, si el cable no está aislado puede producirse una derivación de la corriente que provoque daños en los trabajadores.

Si se cuelgan cables de elementos metálicos como por ejemplo cerramiento, andamios, estructura metálica, etc., se tendrá en cuenta que deben ser cables protegidos y la sujeción se hará con bridas de plásticos nunca con alambre de atar que puede deteriorar el

cable.

ACCESOS Y RECORRIDOS POR LA OBRA

- En época de lluvias, los accesos suelen tener mucho barro lo que en muchas ocasiones les hace intransitables para la maquinaría.
- Para evitar vuelcos de maquinaría se deben acondicionar las zonas donde estas deben acceder bien limpiando el barro o echando material que haga que el terreno sea consistente (zahorras, gravas, etc.)
- Especial atención con las zonas donde deben apoyarse grúas y andamios. No deben producirse asientos del terreno

### *f. TRABAJOS EN TIEMPO CALUROSO*

RIESGOS MÁS FRECUENTES

- Lipotimias
- Golpes de calor
- Deshidratación
- Quemaduras por el sol

NORMAS DE SEGURIDAD Y MEDIDAS PREVENTIVAS

- Todos los trabajadores tendrán a su disposición agua potable para beber y refrescarse.
- Descansos periódicos cuando se estén realizando actividades con intenso ejercicio físico.
- Se colocarán toldos para proyectar sombra en aquellos trabajos que se realicen en un punto fijo, ejemplo, dobladores de ferralla, señalistas, etc.
- Cuando no exista riesgo de caída de altura de materiales, los trabajadores usarán sombrero o gorra de algodón.
- Siempre se usará ropa de trabajo para protegerse de la exposición al sol.
- Se habilitarán espacios protegidos del sol para los periodos de descanso.
- b.- Protecciones individuales
- Gorra de algodón o sombrero de paja
- Ropa de trabajo de algodón para proteger la piel del sol.

## 1.11.- ORGANIZACIÓN PREVENTIVA DE LA OBRA, COORDINACIÓN DE ACTIVIDADES EMPRESARIALES Y DOCUMENTACIÓN OBLIGATORIA

### 1.11.1- SERVICIOS DE PREVENCIÓN

La Contrata Adjudicataria **llevará a cabo las actividades preventivas en cualquiera de las modalidades establecidas por el Reglamento de los Servicios de Prevención** (R.D. 39/1997, de 17 de Enero), mediante el establecimiento a su propia costa de unos servicios de prevención que actuarán con sometimiento a las estipulaciones legales de obligado cumplimiento.

Como mínimo, estos Servicios de Prevención incluirán en su cometido las labores de asesoría técnica, vigilancia de seguridad e información a los trabajadores y en ellos se integrarán los asesores técnicos, los vigilantes de seguridad y salud, las brigadas de seguridad y salud y el comité de seguridad y salud, así como, en relación directa con el Coordinador, la labor de coordinación de las acciones preventivas y las funciones de cualificación recogidas en el citado texto reglamentario.

### 1.11.2- ORGANIGRAMA PREVENTIVO

**Asesoría Técnica**. Vinculado a su organización preventiva de empresa, la Contrata Adjudicataria dispondrá de un servicio de Asesoría Técnica de Seguridad y Salud como ayuda al Jefe de Obra. Además, los asesores técnicos tendrán encomendada, de forma expresa la misión de informar a los trabajadores en los aspectos relativos a seguridad, prevención de riesgos, salud, higiene y bienestar. La autoría de este estudio de seguridad y salud, considera necesaria la asignación a la obra de un **Técnico de Seguridad** que garantice con su labor cotidiana, los niveles de prevención plasmados en este estudio de seguridad y Salud.

Se adscribirá al organigrama preventivo al propio **jefe de obra y jefes de producción**, si los hubiera, quienes participarán activamente en la planificación preventiva de los trabajos, teniendo presente la forma más segura para su realización desde el momento mismo de su planificación

Se hará partícipe a los **subcontratistas y trabajadores autónomos** que participen en esta obra, de los riesgos y medidas preventivas contempladas en este Plan de Seguridad y Salud referentes a los trabajos que van realizar. Esta información, será complementaria a lo que ellos tengan previsto en su Evaluación de Riesgos, obligatoria según Ley 31/1995.

Al objeto de conseguir que el conjunto de empresas concurrentes en la obra posean la información necesaria en relación con la organización preventiva de la misma, así como el procedimiento para asegurar el cumplimiento del plan de seguridad y salud, por parte de todos los trabajadores, **cada subcontrata designará**:

- **Técnicos de prevención designados por su empresa** para planificar las medidas preventivas, formar e informar a sus trabajadores e investigar accidentes
- **Vigilantes de seguridad** con la función de vigilar el cumplimiento del plan de seguridad y salud por parte de sus trabajadores

En base a lo anterior, se establecen a continuación las siguientes **obligaciones para cada uno de los agentes implicados en la ejecución de las obras**:

**Jefe de Obra**

Es la persona directamente responsable de la Prevención de Riesgos Laborales en la obra. Su misión es implantar de forma eficaz el Plan de seguridad y salud de la obra, poniendo todos los medios necesarios a disposición de los trabajadores para la consecución de este fin. Antes de que algún trabajador utilice cualquier máquina, deberán autorizar por escrito para el manejo de la misma, con el visto bueno del técnico en prevención el cual comprobará la formación teórica practica del mismo para el manejo de dicho dispositivo, solicitará al Servicio de Prevención acciones formativas para los trabajadores. Investigarán, junto con la colaboración del Técnico en Prevención y encargado, los accidentes e incidentes.

En caso de preverse actividades en obra que no estén contempladas en el Plan de Seguridad y Salud, comunicará este hecho al técnico de prevención de la obra el cual informará al Coordinador de seguridad y salud. Posteriormente, el Técnico en Prevención realizará un anexo al PSS que aprobará el promotor con el informe favorable por parte del Coordinador de seguridad y salud de la obra.

**Administrativo**

Colaborará con el jefe de obra en la elaboración de la documentación necesaria para cumplimentar el sistema de Gestión de Prevención de Riesgos Laborales de la obra. Coordinará y recabará toda la documentación acreditativa del cumplimiento de las obligaciones preventivas por parte de las empresas subcontratistas y gestionará el archivo de seguridad de la obra.

**Encargado**

Es la persona responsable de cumplir y hacer cumplir a todos los operarios de la obra lo indicado en la normativa vigente y lo reflejado en el Plan de Seguridad y Salud. Esta persona colaborara con el Técnico de Prevención, comprobará la autorización para el uso de maquinaria de los trabajadores que usen las mismas, colaborará en la investigación de

accidentes e incidentes, tomará datos del personal subcontratado presente en la obra que enviará al administrativo para registro, rellenará el parte de control de maquinaria y equipos auxiliares para supervisar las condiciones de los mismos en obra, realizando una revisión periódica de los mismos.

**Oficiales, Ayudantes y Peones especializados**

Deberán tener conocimiento y cumplir lo establecido con respecto a los trabajos que van a realizar. Nunca neutralizará ningún dispositivo de seguridad eléctrico o mecánico que dificulte su trabajo. Si observa en su tajo un riesgo inminente, lo comunicará de inmediato a su mando superior. Utilizarán en todo momento los equipos de protección individual que se les entreguen para las actividades que tengan que desarrollar. No improvisará nunca el procedimiento para la ejecución de un trabajo, si no sabe preguntará a un superior.

**Peones**

Deberán tener conocimiento y cumplir lo establecido con respecto a los trabajos que van a realizar. Nunca neutralizará ningún dispositivo de seguridad eléctrico o mecánico que dificulte su trabajo. Si observa en su tajo un riesgo inminente, lo comunicará de inmediato a su mando superior. Utilizarán en todo momento los equipos de protección individual que se les entreguen para las actividades que tengan que desarrollar. No improvisará nunca el procedimiento para la ejecución de un trabajo, si no sabe preguntará a un superior. No manejarán en ningún caso máquinas herramienta o maquinaria, no están cualificados para ello.

**Técnico de Prevención**

El técnico de Prevención asignado en la obra planificará las medidas preventivas, formará e informará a los trabajadores, colaborará en la investigación de los accidentes en incidentes y desarrollará la coordinación de actividades empresariales con las diferentes empresas concurrentes en el centro de trabajo de la obra.

**Responsable de Seguridad de cada empresa subcontratista presente en obra**

Supervisar el cumplimiento del Plan de Seguridad de los trabajadores de su empresa. Colaborar con la coordinación de actividades empresariales y de seguridad.

### 1.11.3- RECURSOS PREVENTIVOS

En función del Real Decreto 604/2006 que modifica el Real Decreto 1627/1997 es necesario incluir en el Plan de Seguridad el nombramiento de los recursos preventivos que regula la Ley 54/2003.

Según la Ley 54/2003 la presencia de los recursos preventivos en las obras de

construcción será preceptiva en los siguientes casos:

- Cuando los riesgos puedan verse agravados o modificados en el desarrollo del proceso o la actividad, por la concurrencia de operaciones diversas que se desarrollan sucesiva o simultáneamente y que hagan preciso el control de la correcta aplicación de los métodos de trabajo. La presencia de recursos preventivos de cada contratista será necesario cuando, durante la obra, se desarrollen trabajos con riesgos especiales, tal y como se definen en el real decreto 1627/97.

- Cuando se realicen actividades o procesos que reglamentariamente sean considerados como peligrosos o con riesgos especiales:

  1. Trabajos con riesgos especialmente graves de sepultamiento, hundimiento o caída de altura por las particulares características de la actividad desarrollada, los procedimientos aplicados, o el entorno del puesto de trabajo.

  2. Obras de excavación de túneles, pozos y otros trabajos que supongan movimientos de tierra subterráneos.

  3. Trabajos que requieran montar o desmontar elementos prefabricados pesados.

  4. Trabajos en proximidad a líneas eléctricas aéreas

- Cuando la necesidad de dicha presencia sea requerida por la Inspección de Trabajo y Seguridad Social, si las circunstancias del caso así lo exigieran debido a las condiciones de trabajo detectadas.

**Designación del Recurso Preventivo.**

Según la Ley 54/2003 se consideran recursos preventivos a los que el contratista podrá asignar la presencia, los siguientes:

a) Uno o varios trabajadores designados de la empresa.

b) Uno o varios miembros del servicio de prevención de la empresa.

c) Uno o varios miembros del o los servicios de prevención ajenos concertados por la empresa.

Los recursos preventivos a que se refiere el apartado anterior deberán tener la capacidad suficiente, disponer de los medios necesarios y ser suficientes en número para vigilar el cumplimiento de las actividades preventivas, debiendo permanecer en el centro de trabajo durante el tiempo en que se mantenga la situación que determine su presencia.

Trabajadores designados con 60 horas de formación nivel básico.

### Presencia de Recursos Preventivos

**El contratista adjudicatario de las obras deberá definir en el Plan de Seguridad y Salud los recursos preventivos que designará para el desarrollo de las obras, identificando las actividades en las que su presencia será requerida.**

**A priori, se establece la necesidad de los mismos en la ejecución de las siguientes actividades:**

- **Trabajos en el interior de zanjas**
- **Trabajos en proximidad de servicios afectados (conducciones eléctricas y de gas)**
- **Trabajos de manipulación de casetas (elementos prefabricados)**

**Es necesario que la designación de los recursos preventivos se realice documentalmente y con el consentimiento expreso del trabajador. Se propone, a modo de ejemplo, el siguiente formato:**

**NOMBRAMIENTO DE RECURSO PREVENTIVO EN OBRA**

En _____ , a ___ de _____ de 202_.

Se designa como preventivo en la obra _____
_____pa
ra la actividad/tajo:_____

a D. _____ perteneciente a la empresa contratista /subcontratista _____ con D.N.I./N.I.F. _____.

En virtud de su designación deberá:

1. Vigilar de forma concreta el cumplimiento de las medidas preventivas incluidas en el Plan de Seguridad y Salud de la obra, y comprobar su eficacia (según la disposición adicional decimocuarta de la Ley 31/95 introducida por la Ley 54/03 de Reforma del Marco Normativo en Prevención de Riesgos Laborales).

2. Colaborar con los recursos preventivos de su empresa así como con otras presentes en el mismo centro de trabajo. (Artículo 32-bis de la Ley 31/95).

3. Promover en el trabajo comportamientos seguros y la correcta utilización de los equipos de trabajo y de protección, y fomentar el interés y cooperación de los trabajadores en la acción preventiva.

4. Promover, en particular, las actuaciones preventivas básicas en la obra, tales como el orden, la limpieza, la señalización y el mantenimiento general, y efectuar su seguimiento y control.

5. Promover las modificaciones al Plan de Seguridad y Salud que sean necesarias en función del proceso de ejecución de la obra, de la evolución de los trabajos y de las posibles incidencias o modificaciones que puedan surgir a lo largo de la obra.

6. Disponer de los conocimientos, la cualificación y la experiencia necesarios en las actividades y procesos desarrollados, así como de la formación preventiva correspondiente, como mínimo, al nivel básico.

Acepto el nombramiento — La empresa constructora

Fdo.: — Fdo.:

### 1.11.4- COORDINACIÓN DE ACTIVIDADES EMPRESARIALES

La empresa contratista ajustará su actuación en la obra conforme a los deberes de **coordinación de actividades empresariales establecidos en el artículo 24** de la Ley de Prevención de Riesgos Laborales, participando en cualquier medida de actuación coordinada que se hubiera establecido por parte del coordinador o de otros agentes implicados en la obra y/o afectados por las mismas.

Además, la coordinación de actividades empresariales se refiere también a que en caso de existir **otra obra en proximidad a la obra que nos ocupa**, se deben poner de acuerdo entre ambas contratas mediante una reunión de seguridad, tal como recoge el RD 171/2004 de Coordinación de actividades empresariales, dejando en dicho acta recogido quien se va a responsabilizar de la seguridad en cada tramo de obra donde se produzca la coexistencia. Esto se llevará a cabo también cuando sea necesaria la coordinación empresarial con otros organismos de compañías de servicios afectados en nuestra zona de trabajo.

Se realizarán **reuniones periódicas entre las empresas concurrentes**, pudiendo participar en ellas los Técnicos de prevención y/o vigilantes de seguridad designados, así como miembros del Comité de S y S y/o los Delegados de Prevención si los hubiera, con el fin de:

- Informar a las empresas concurrentes de los riesgos derivados de dicha concurrencia de actividades empresariales, y establecer el conjunto de medidas específicas, procedimientos de trabajo y protocolos de actuación.
- Establecer los recursos preventivos que aporta cada una de las empresas.
- Informar a todos los empresarios, de los accidentes de trabajo acaecidos como consecuencia de las actividades concurrentes.

Cada empresario deberá informar a sus trabajadores respectivos, de los riesgos derivados de la concurrencia de actividades empresariales, y de las medidas tomadas en dichas reuniones.

### 1.11.5- DOCUMENTACIÓN PREVENTIVA

La empresa contratista está legalmente obligada a formar en el método de trabajo seguro a todo el personal a su cargo, de tal forma, que todos los trabajadores tendrán conocimiento de los riesgos propios de su actividad laboral, de las conductas a observar en determinadas maniobras, del uso correcto de las protecciones colectivas y del de los equipos de protección individual necesarios para su protección.

Así mismo exigirá el cumplimiento de esta obligación a las empresas y autónomos que intervengan en esta obra, teniendo la obligación de entregar la siguiente documentación:

- Seguro de accidentes colectivos de la empresa y de Responsabilidad civil.
- Organización preventiva asumida (Contrato SPA, SPP, SPM, trabajadores designados).
- Evaluación de riesgos, planificación preventiva y plan de prevención.
- Inscripción en la seguridad Social.

- Contratos de trabajo del personal operario que se encuentra trabajando en dicha obra.
- Información y Formación (curso mínimo de 8 horas según convenio de la construcción) de los trabajadores y entrega de EPI´S.
- Reconocimientos médicos de dichos trabajadores. (Certificación de aptitud).
- Seguros Sociales TC1 y TC2.
- Seguros de las máquinas, Documentación en regla de los vehículos, Libro de revisiones.
- Certificado art. 43.1 de la Ley General Tributaria.
- Certificado de estar al corriente de pago en la Seguridad Social.
- Declaración de conformidad C.E.
- REA.
- En caso de aportar maquinaria la subcontrata en cuestión a la obra, se exigirá además:
- Marcado CE de la máquina.
- Autorización de uso por parte del maquinista si éste dispone de la formación exigida para su manejo.
- ITV de la máquina en vigor.
- Manual de instrucciones y de revisiones periódicas.
- Seguro al corriente de pago.
- Carné de conducir.

## 1.12.- CONCLUSIONES.

Con todo lo especificado en la presente Memoria, así como en el resto de documentos que componen el presente ESTUDIO DE SEGURIDAD Y SALUD, se considera ajustado al R.D. 1627/97 de 24 de Octubre.



REDACTOR DEL PROYECTO
D. José Antonio Segura Sánchez
Procaver Soluciones Urbanas, S.L.

## *2.- PLIEGO*

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## 2.1.- DISPOSICIONES LEGALES DE APLICACIÓN

Son de obligado cumplimiento las disposiciones contenidas en:

- Real Decreto 337/2010, de 19 de marzo por el que se modifica el Real Decreto 39/1997, de 17 de Enero, por el que se aprueba el reglamento de los Servicios de Prevención; el Real decreto 1109/2007, de 24 de agosto, por el que se desarrolla la Ley 32/2006, de 18 de octubre, reguladora de la subcontratación en el sector de la construcción y el real decreto 1627/1997, de 24 de octubre, por el que se establecen disposiciones mínimas de seguridad y salud en obras de construcción.

- Orden TIN71071/2010, de 27 de abril, sobre los requisitos y datos que deben reunir las comunicaciones de apertura o de reanudación de actividades en los centros de trabajo.

- Real Decreto 105/2008 de 1 de febrero, por el que se regula la producción y gestión de los residuos de construcción y demolición.

- Real Decreto 1109/2007, de 24 de agosto que se desarrolla la Ley 327 2006 de 18 de octubre, reguladora de la subcontratación en el sector de la construcción.

- Real Decreto 1299/ 2006, de 10 de Noviembre por el que se aprueba el cuadro de enfermedades profesionales en el sistema de la Seguridad Social y se establecen criterios para su notificación y registro.

- Real Decreto 604/2006, de 19 de mayo, por el que se modifican el Real Decreto 39/1997, de 17 de enero, por el que se aprueba el Reglamento de los Servicios de prevención, y el Real Decreto 1627/1997, de 24 de Octubre por el que se establecen las disposiciones mínimas de seguridad y salud en las obras de construcción.

- Real Decreto 286/2006 de 10 de Marzo sobre la protección de la salud y la seguridad de los trabajadores frente a los riesgos derivados o que puedan derivarse de la exposición al ruido.

- Ley 32/2006 de 18 de Octubre reguladora de la subcontratación en el sector de la Construcción. Su entrada en vigor ha sido el día 19 de abril de 2007.

- Real Decreto 1311/2005, del 4 de noviembre, sobre la protección de la salud y la seguridad de los trabajadores frente a los riesgos derivados o que puedan derivarse de la exposición a vibraciones mecánicas.

- R.D. 2177/2004 de 12 de noviembre, por el que se modifica RD 1215/ 1997 por el que se modifican las disposiciones mínimas de seguridad para los equipos de trabajo en materia de trabajos temporales en altura.

- R.D. 171/2004 de 30 de Enero por el que se desarrolla el artículo 24 de la Ley de Prevención de Riesgos Laborales, en materia de coordinación de actividades empresariales.

- Real Decreto 1169/2003, de 12 de septiembre, por el que se modifica el anexo I del Real Decreto 1971/1999, de 23 de diciembre, de procedimiento para el reconocimiento, declaración y calificación del grado de minusvalía.

- Real Decreto 837/ 2003, de 27 de junio, por el que se aprueba el nuevo texto modificado y refundido de la instrucción técnica complementaria del reglamento MIE-AEM-4 del reglamento de aparatos de elevación y manipulación, referente a grúas móviles autopropulsados.

- R.D. 349/ 2003, de 21 de marzo, por el que se modifica el Real Decreto 665/1997, de 12 de mayo, sobre la protección de los trabajadores contra los riesgos relacionados con la exposición a agentes cancerígenos durante el trabajo, y por el que se amplía su ámbito de aplicación a los agentes mutágenos.

- Real Decreto 117/2003, de 31 de enero, sobre limitación de emisiones de compuestos orgánicos volátiles debidas al uso de disolventes en determinadas actividades.

- Real Decreto 99/2003, de 24 de enero, por el que se modifica el reglamento sobre notificación de sustancias nuevas y clasificación, envasado y etiquetado de sustancias peligrosas, aprobadas por el Real decreto 363/ 1995, de 10 de marzo.

- Ley 54/2003 de 12 de Diciembre sobre Reforma de la Ley de Prevención de Riesgos Laborales 31/95.

- R.D. 842/2002, de 2 de agosto, por el que se aprueba el Reglamento electrotécnico para baja tensión. (B.O.E. nº224 de 18 de Septiembre).

- Resolución de 26 de noviembre de 2002, de la Subsecretaria, por la que se regulan la utilización del Sistema de Declaración Electrónica de Accidentes de Trabajo (Delta) que posibilita la transmisión por procedimiento electrónico de los nuevos modelos para la notificación de accidentes de trabajo, aprobados por la Orden TAS7 2926/2002, de 19 de noviembre.

- Orden TAS/2926/ 2002, de 19 de noviembre de 2002, por la que se establecen nuevos modelos para la notificación de accidentes de trabajo y se posibilita su transmisión por procedimiento electrónico.

- R.D. 786/ 2001, de 8 de junio, sobre disposiciones mínimas para la protección de la salud y seguridad de los trabajadores frente el riesgo electrónico.

- Real Decreto 783/2001, de 6 de julio, por el que se aprueba el reglamento sobre la protección sanitaria contra radiaciones ionizantes.

- Real Decreto 614/2001, de 8 de junio, sobre disposiciones mínimas para la protección y la seguridad y salud en las obras de construcción.

- Real Decreto 379/2001, de 6 de abril, por el que se aprueba el reglamento de almacenamiento de productos químicos y sus instrucciones técnicas complementarias.

- Real Decreto 374/2001, de 6 de abril, sobre protección de la seguridad y salud de los

trabajadores contra los riesgos relacionados con los agentes químicos durante el trabajo.

- R.D. 1124/ 2000, de 16 junio, por el que se modifica el Real Decreto 665/1997, de 12 de mayo, sobre la protección de los trabajadores contra el riesgo relacionados con la exposición a agentes cancerígenos durante el trabajo.

- Real Decreto 1254/1999, de 16 de julio, por el que se aprueban las medidas de control de los riesgos inherentes a los accidentes.

- Ley 10/1998, de 21 de abril de Residuos.

- Orden 2988/1998 de la Comunidad de Madrid sobre utilización de andamios tubulares.

- R.D. 1627/1997, de 24 de Octubre (B.O.E. de 27/10/97), por el que se establecen Disposiciones Mínimas de Seguridad y Salud en las obras de construcción

- R.D. 1215/97, de 18 de Julio (BOE 7/8/97) sobre utilización de equipos de trabajo.

- R.D. 773/1997 de 30 de Mayo, sobre disposiciones mínimas de seguridad y salud relativas a la utilización de los equipos de protección individual por los trabajadores (BOE nº 140 de 12 de Junio.).

- R.D. 665/1997 de 12 de Mayo, (BOE 24/5/97), sobre la protección de los trabajadores contra los riesgos relacionados con la exposición a agentes cancerígenos durante el trabajo.

- R.D. 664/1997, de 12 de Mayo, (BOE 24/5/97), sobre la protección a los trabajadores frente a la exposición a agentes biológicos durante el trabajo.

- R.D. 39/1997, de 17 de Enero (B.O.E. de 31/01/97), por el que se aprueba el Reglamento de los Servicios de Prevención.

- R.D. 488/1997, de 14 de Abril sobre disposiciones mínimas de seguridad y salud relativas al trabajo con equipos de pantallas de visualización.

- R.D. 487/1997, de 14 de Abril, sobre disposiciones mínimas de seguridad y salud relativas a la manipulación manual de cargas que entrañe riesgos dorsolumbares para los trabajadores.

- R.D. 486/1997, de 14 de Abril, (B.O.E. de 23/4/97) sobre lugares de trabajo.

- R.D. 485/1997, de 14 de Abril, (B.O.E. de 23/4/97) sobre señalización de lugares de trabajo.

- Ley 42/1997 de 14 de Noviembre, Ordenadora de la Inspección de Trabajo y Seguridad Social (BOE 15/11/1997).

- R.D. 2177/1996 de 4 de Octubre, por el que se aprueba la Norma Básica de la Edificación NBE-CPI 96, de protección contra incendios en los edificios.

- Orden de 30 de junio de 1996 por la que se aprueba el texto revisado del Reglamento de Aparatos Elevadores.

- Ley 31/1995, de 8 de Noviembre (B.O.E. de 10/11/95), de Prevención de Riesgos Laborales.

- R.D. Legislativo nº 1/1995, de 24 de Marzo (B.O.E. 29/03/95), por el que se aprueba el Texto Refundido del Estatuto de los Trabajadores.

- R.D. 53/ 1992 de 24 de Enero, por el que se aprueba el Reglamento sobre Protección Sanitaria contra Radiaciones Ionizantes.

- R.D. 1435/1992 de 27 de Noviembre, por el que se dictan las disposiciones de aplicación de la Directiva del Consejo 89/392/CEE, relativa sobre Requisitos de Seguridad y Salud en Máquinas, modificada por el R.D. 56/1995 de 20 de Enero.

- RD 1407/ 1992, de 20 de Noviembre que regula las condiciones para la comercialización y libre circulación intracomunitaria de los equipos de protección individuales.

- Reales decretos por los que se aprueban los Reglamentos sobre clasificación, envasado y etiquetado de sustancias peligrosas.

- O.M. de 21 de Julio de 1992 (B.O.E. de 14/08/92), por la que se aprueba la Instrucción Técnica Complementaria MIE-APQ-005 del Reglamento de Almacenamiento de Productos Químicos, referente a almacenamiento de botellas y botellones de gases comprimidos, licuados y disueltos a presión.

- O.M. de 18 de Julio de 1991 (B.O.E. de 30/07/91 y 14/10/1991), por la que se modifica la Instrucción Técnica Complementaria MIE-APQ 001, referente al almacenamiento de líquidos inflamables y combustibles (O.M. de 9/03/82).

- R.D. 1.316/1989 de 27 de Octubre (B.O.E. de 2/11/89, 2/12/89 y 26/05/90) sobre Protección de los trabajadores frente a los riesgos derivados de la exposición al ruido.

- Orden de 28 de Junio de 1988, por la que se aprueba la Instrucción Técnica Complementaria MIE-API 7 del Reglamento de Aparatos de Elevación y Manutención, referente a grúas torre desmontables para obras (BOE de 7/7/88).

- R.D. 2295/1985 de 9 de Octubre (B.O.E. de 12/12/85), por el que se modifica y amplía el Reglamento Electrotécnico de Baja Tensión.

- Resolución del 30 de abril de 1984 sobre las verificaciones de las instalaciones eléctricas antes de su puesta en marcha.

- Reglamento sobre Condiciones Técnicas y Garantías de Seguridad en Centrales Eléctricas, Subestaciones y Centros de Transformación (R.D. 3275/1982 de 12 de Noviembre) e Instrucciones Técnicas Complementarias

- O.M. de 6 de Octubre de 1980 (B.O.E. de 4/11/80), por la que se aprueba la Instrucción

Técnica complementaria MIE-AP2 correspondiente a tuberías para fluidos relativos a calderas.

- R.D. 1.244/1979 de 4 de Abril (B.O.E. de 29/05/79), por el que se aprueba el Reglamento de aparatos a presión.
- Norma de armonización Europea HD 1000 y HD 1039 para andamios tubulares.
- RD 2413/ 1973, de 20 de septiembre, por el que se aprueba el Reglamento Electrotécnico para baja tensión e instrucciones técnicas complementarias.
- Reglamento técnico de líneas eléctricas aéreas de alta tensión.

Además de las citadas en los precedentes textos legales, serán de aplicación, en cuanto pueda afectar a las obras objeto del presente Estudio de Seguridad y Salud, los siguientes textos normativos:

- Pliego General de Condiciones Facultativas y Pliegos de Condiciones particulares correspondientes a las obras objeto del presente Proyecto.
- Normativa sobre Señalización y Balizamiento del Ayuntamiento de Madrid, en caso de no existir normativa propia del municipio de la obra referente.

## 2.2.- CONDICIONES DE LOS MEDIOS DE PROTECCIÓN

Todas las prendas de protección personal o elementos de protección colectiva, tendrán fijado un período de vida útil, desechándose a su término. Cuando por las circunstancias del trabajo se produzca un deterioro más rápido en una determinada prenda o equipo, se repondrá ésta, independientemente de la duración o fecha de entrega.

Toda prenda o equipo de protección que haya sufrido un trato límite, es decir, el máximo para el que fue concebido (por ejemplo, por un accidente), será desechado y repuesto al momento. Aquellas prendas que por su uso hayan adquirido más holguras o tolerancias de las admitidas por el fabricante, serán repuestas de inmediato. El uso de una prenda o equipo de protección, nunca representará un riesgo en sí mismo.

### 2.2.1.- PROTECCIONES PERSONALES

El uso de cada uno de estos equipos de protección se regirá por lo estipulado en el R.D. 773/1997 de disposiciones mínimas sobre utilización y uso de los equipos de protección individual.

**Condiciones generales.**

Como norma general, se han elegido equipos de protección individual cómodos y operativos, con el fin de evitar las negativas a su uso. Por lo expuesto, se especifica como condición expresa que: todos los equipos de protección individual utilizables en esta obra cumplirán las siguientes condiciones generales:

1º Tendrán la marca "CE", según las normas EPI, tras superar examen “CE tipo” especifico de cada equipo, así como tendrán manual de instrucciones para su uso y conservación.

2º Los equipos de protección individual que cumplan con la indicación expresada en el punto anterior, tienen autorizado su uso durante su período de vigencia. Llegando a la fecha de caducidad, se constituirá un acopio ordenado, que será revisado por el coordinador en materia de seguridad y salud durante la ejecución de la obra, para que autorice su eliminación de la obra.

3º Los equipos de protección individual en uso que estén rotos, serán reemplazados de inmediato, quedando constancia en la oficina de obra del motivo del cambio y el nombre de la empresa y de la persona que recibe el nuevo equipo de protección individual, con el fin de dar la máxima seriedad posible a la utilización de estas protecciones.

4º Todo elemento de protección personal se ajustará a las normas de control vigente R.D.1407/92 y R.D.159/95. En los casos en que no exista Norma Técnica de Homologación oficial española para una prenda o elemento de protección determinado, se utilizarán elementos de marcas homologadas específicamente por el Ministerio de Trabajo. En caso de que tampoco existiera esa posibilidad, podrá considerarse válida la homologación oficial de países de la Unión Europea y, en último caso, la promulgada por organismos oficiales de otros países, previa autorización del Coordinador.

5º En caso de que no exista homologación oficial de ningún tipo, las prendas y elementos de protección personal deberán ser de la calidad adecuada a sus respectivas prestaciones, si bien en tal caso, el Director Facultativo de las Obras podrá exigir, a petición del Coordinador, que se realicen ensayos adecuados con carácter previo a la aceptación de tales elementos.

6º Todos aquellos elementos de protección personal, incluso ropa y calzado de trabajo, que sean entregados al trabajador serán de uso exclusivo del mismo en tanto éste se

encuentre asignado al tajo o trabajo para el cual se le haya dotado de dichos elementos. El trabajador cuidará y mantendrá el equipo y será responsable de su estado; no intercambiará con otros ningún elemento o equipo de seguridad y en caso de ser trasladado a otro trabajo en el que no se requiera el equipo que tiene asignado (excepto ropa y calzado de trabajo), devolverá a la empresa los elementos recibidos, en perfecto estado de conservación.

7º Aquellas prendas o elementos de protección personal que hayan sido utilizados por un trabajador y devueltos por éste antes de finalizar la vida útil del material, serán retirados e inutilizados, salvo que fuesen a ser asignados a otro trabajador, en cuyo caso se revisarán y desinfectarán previamente, de forma que sólo podrán entregarse de nuevo, para su uso durante el resto de su vida útil, si las condiciones del equipo o prenda son óptimas.

### 2.2.2.- PROTECCIONES COLECTIVAS

**Condiciones generales**

El Contratista adjudicatario es el responsable de que en la obra, cumplan todos ellos, con las siguientes condiciones generales:

1. La protección colectiva de esta obra, ha sido diseñada en los Planos de Seguridad y Salud. El Plan de seguridad y salud los respetará fidedignamente, salvo si existiese una propuesta diferente previamente aprobada.

2. Las posibles propuestas alternativas que se presenten en el Plan de Seguridad y Salud, requieren para poder ser aprobadas, seriedad y una representación técnica de calidad en forma de Planos de ejecución de obra.

3. Las protecciones colectivas de esta obra, estarán en acopio disponible para uso inmediato, dos días antes de la fecha decidida para su montaje, según lo previsto en el Plan de ejecución de obra.

4. Serán nuevas, a estrenar, si sus componentes tienen caducidad de uso reconocida, o si así se especifica en su apartado correspondiente dentro de este "pliego de condiciones técnicas y particulares de Seguridad y Salud". Idéntico principio al descrito, se aplicará a los componentes de madera.

5. Antes de ser necesario su uso, estarán en acopio real en la obra con las condiciones idóneas de almacenamiento para su buena conservación. Serán examinadas por el

Coordinador en materia de seguridad y salud, o en su caso, por la Dirección Facultativa, para comprobar si su calidad se corresponde con la definida en este Estudio de Seguridad y Salud o con la del Plan de seguridad y salud que llegue a aprobarse.

6. Serán instaladas previamente al inicio de cualquier trabajo que requiera su montaje. Queda prohibida la iniciación de un trabajo o actividad que requiera protección colectiva, hasta que esta esté montada por completo en el ámbito del riesgo que neutraliza o elimina.

7. Será desmontada de inmediato, toda protección colectiva en uso en la que se aprecien deterioros con merma efectiva de su calidad real. Se sustituirá a continuación el componente deteriorado y se volverá a montar la protección colectiva una vez resuelto el problema. Entre tanto se realiza esta operación, se suspenderán los trabajos protegidos por el tramo deteriorado y se aislará eficazmente la zona para evitar accidentes. Estas operaciones quedarán protegidas mediante el uso de equipos de protección individual.

8. Durante la realización de la obra, puede ser necesario variar el modo o la disposición de la instalación de la protección colectiva prevista en el Plan de Seguridad y Salud aprobado. Si esto ocurre, la nueva situación será definida en los planos de seguridad y salud, para concretar exactamente la nueva disposición o forma de montaje. Estos Planos deberán ser aprobados por el Coordinador en materia de seguridad y salud.

9. Las protecciones colectivas proyectadas en este trabajo, están destinadas a la protección de los riesgos de todos los trabajadores y visitantes de la obra; es decir: trabajadores de la empresa principal, los de las empresas subcontratistas, empresas colaboradoras, trabajadores autónomos y visitas de los técnicos de dirección de obra o de la Propiedad; visitas de las inspecciones de organismos oficiales o de invitados por diversas causas.

10. El Contratista adjudicatario, en virtud de la legislación vigente, está obligado al montaje, mantenimiento en buen estado y retirada de la protección colectiva por sus medios o mediante subcontratación, respondiendo ante la Propiedad de la obra, según las cláusulas penalizadoras del contrato de adjudicación de obra y del pliego de condiciones técnicas y particulares del proyecto.

11. El montaje y uso correcto de la protección colectiva definida en este Estudio de Seguridad y Salud, es preferible al uso de equipos de protección individual para defenderse de idéntico riesgo; en consecuencia, no se admitirá el cambio de uso de

protección colectiva por el de equipos de protección individual.

12. El Contratista adjudicatario, queda obligado a conservar en la posición de uso prevista y montada, las protecciones colectivas que fallen por cualquier causa, hasta que se realice la investigación con la asistencia expresa del Coordinador en materia de seguridad y salud En caso de fallo por accidente de persona o personas, se procederá según las normas legales vigentes, avisando además sin demora, inmediatamente, tras ocurrir los hechos, al Coordinador en materia de seguridad y salud durante la ejecución de la obra, y en su caso, a la Dirección Facultativa la obra.

13. Los elementos de protección colectiva no deberán constituir en sí mismos un riesgo para las personas ni para las máquinas y su instalación tampoco deberá implicar merma alguna en la resistencia o aptitud de las unidades de obra.

**Condiciones específicas que deberán cumplir los medios de protección colectiva.**

- Vallas de limitación y protección:

Tendrán como mínimo 90 cm., estando construidas a base de tubo metálico, y dispondrán de patas de forma que mantengan su estabilidad. Los elementos de delimitación y cierre de las obras serán preferentemente vallas construidas de tubo metálico, con altura no inferior a 90 cm y patas de sujeción fijas, que aseguren su estabilidad. Se pueden utilizar vallas normalizadas de 2,5 m de longitud y 1,10 m de altura.

Para el vallado perimetral de la obra se dispondrá de cerramiento realizado con postes cada 3 metros de perfiles tubulares galvanizados de 50 mm de diámetro y malla de acero galvanizado de simple torsión sobre peanas de hormigón que servirán de base de cimentación o fijos en el terreno. Todos los elementos metálicos de las vallas estarán debidamente tratados en superficie para evitar la oxidación.

- Señalización y balizamiento:

Las señales, cintas, balizas y boyas, estarán de acuerdo con la normativa vigente, tanto lo estipulado en el R.D. 485/1997 de Señalización en lugares de trabajo y en la Norma de Señalización y Balizamiento del Ayuntamiento de Madrid. Las señales de circulación en el interior de la obra y en el entorno de ésta se ajustarán a la vigente normativa de Señalización y Balizamiento del Ayuntamiento. La velocidad máxima permitida para vehículos en cualquier punto de la obra en ningún momento deberá ser superior a 20 Km./hora.

Todas las señales serán reflectantes y tanto por su tipo como por su colocación, regularán de forma inequívoca las condiciones y los circuitos de tráfico vehicular en el ámbito de influencia de las obras. Las cintas, bandas, cordones y conos de balizamiento dispondrán de coloración alternada con colores rojo y blanco u otros destacables aceptados previamente por la Dirección Facultativa de las obras. La altura de colocación de cintas, bandas y cordones no será inferior a 80 centímetros ni superior a 120 centímetros y en ningún caso estos elementos constituirán peligro por sí solos.

- Sistemas de protección de borda:

Deberán adecuarse a los requisitos de la Norma UNE 13374, entre los que se cita la altura superior será de 100 cm de altura respecto al suelo.

- Tapas para pequeños huecos y arquetas:

Sus características y colocación impedirán con garantía la caída de personas y objetos. Las características de los elementos citados serán tales que permitan impedir con toda garantía la caída de objetos y personas. En caso de estar expuestos al paso de maquinaria, los huecos serán tapados con planchas de resistencia suficiente para soportar el paso del máximo camión previsible en obra, cargado con un peso no inferior a 1,25 veces el correspondiente a su carga máxima.

- Extintores:

Serán adecuados en características de agente extintor y tamaño al tipo de incendio previsible, revisando como máximo cada 6 meses. Los extintores serán adecuados al tipo de incendio previsible, tanto en sus características como en cuanto se refiere a la clase de material extintor.

Para esta obra se dispone de extintores manuales de polvo seco polivalente de 12 Kg. para fuegos de clases A, B, C y E, colocados sobre soportes fijados sobre paramento vertical. Serán comprobados y revisados con una periodicidad no superior a seis meses, marcando en el propio aparato la fecha de la última revisión.

Se situarán extintores en todos aquellos lugares donde pueda existir peligro de incendio, en los de almacenamiento y utilización de sustancias inflamables y asimismo se situarán en comedores, vestuarios, y oficinas. Los extintores a montar en la obra serán nuevos, a estrenar. Extintores móviles para trabajos de soldaduras capaces de originar incendios.

*Mantenimiento de los extintores de incendios*:

- Los extintores serán revisados y retimbrados según el mantenimiento oportuno recomendado por su fabricante, que deberá concertar el contratista principal de la obra con una empresa especializada.

*Normas de seguridad para la instalación y uso de los extintores de incendios:*

- Se instalarán sobre patillas de cuelgue ó sobre carro, según las necesidades de extinción previstos.
- En cualquier caso, sobre la vertical del lugar donde se ubique el extintor y en tamaño grande, se instalará una señal normalizada con la palabra "EXTINTOR".

## 2.3.- OBLIGACIONES DE LAS PARTES IMPLICADAS.

En cumplimiento de la legislación aplicable y, de manera específica, de lo establecido en la Ley 31/1995 de Prevención de Riesgos Laborales, en el Real Decreto 39/97 por el que se aprueba el Reglamento de los Servicios de Prevención y en el Real Decreto 1627/1997 sobre disposiciones mínimas de seguridad y salud en las obras de construcción, corresponde al promotor la designación del coordinador de seguridad y salud de la obra que deberá informar el Plan de Seguridad y Salud propuesto por el contratista de la obra, previamente a la aprobación del mismo por parte del promotor.

En cuanto al contratista de la obra, viene éste obligado a redactar y presentar, con anterioridad al comienzo de los trabajos, el Plan de Seguridad y Salud de la obra, en aplicación y desarrollo del presente Estudio y de acuerdo con lo establecido en el artículo 7 del citado Real Decreto 1627/1997. El Plan de Seguridad y Salud contendrá, como mínimo, una breve descripción de la obra y la relación de sus principales unidades y actividades a desarrollar, así como el programa de los trabajos con indicación de los trabajadores concurrentes en cada fase y la evaluación de los riesgos esperables en la obra. Además, específicamente, el Plan expresará resumidamente las medidas preventivas previstas en el presente Estudio que el contratista admita como válidas y suficientes para evitar o proteger los riesgos evaluados y presentará las alternativas a aquéllas que considere conveniente modificar, justificándolas técnicamente. Finalmente, el plan contemplará la valoración económica de tales alternativas o expresará la validez del Presupuesto del presente estudio de Seguridad y Salud. El plan presentado por el contratista no reiterará obligatoriamente los contenidos ya incluidos en este Estudio, aunque sí deberá hacer referencia concreta a los mismos y desarrollarlos específicamente, de modo que aquéllos serán directamente aplicables a la obra, excepto en aquellas alternativas preventivas definidas y con los contenidos desarrollados en el Plan, una vez aprobado éste reglamentariamente.

Las normas y medidas preventivas contenidas en este Documento y en el correspondiente Plan de Seguridad y Salud, constituyen las obligaciones que el contratista viene obligado a cumplir durante la ejecución de la obra, sin perjuicio de los principios y normas legales y reglamentarias que le obligan como empresario. En particular, corresponde al contratista cumplir y hacer cumplir el Plan de Seguridad y Salud de la obra, así como la normativa vigente en materia de prevención de riesgos laborales y la coordinación de actividades preventivas entre las empresas y trabajadores autónomos concurrentes en la obra, en los términos previstos en el artículo 24 de la Ley de Prevención, informando y vigilando su cumplimiento por parte de los subcontratistas y de los trabajadores autónomos sobre los riesgos y medidas a adoptar, emitiendo las instrucciones internas que estime necesarias

para velar por sus responsabilidades en la obra, incluidas las de carácter solidario, establecidas en el artículo 42.2 de la mencionada Ley.

Los subcontratistas y trabajadores autónomos, sin perjuicio de las obligaciones legales y reglamentarias que les afectan, vendrán obligados a cumplir cuantas medidas establecidas en este Estudio o en el Plan de Seguridad y Salud les afecten, a proveer y velar por el empleo de los equipos de protección individual y de las protecciones colectivas o sistemas preventivos que deban aportar, en función de las normas aplicables y, en su caso, de las estipulaciones contractuales que se incluyan en el Plan de Seguridad y Salud o en documentos jurídicos particulares.

En cualquier caso, las empresas contratista, subcontratistas y trabajadores autónomos presentes en la obra estarán obligados a atender cuantas indicaciones y requerimientos les formule el coordinador de seguridad y salud, en relación con la función que a éste corresponde de seguimiento del Plan de Seguridad y Salud de la obra y, de manera particular, aquéllos que se refieran a incumplimientos de dicho Plan y a supuestos de riesgos graves e inminentes en el curso de ejecución de la obra.

## 2.4.- CONDICIONES DE SEGURIDAD Y SALUD DE MÁQUINAS, MEDIOS AUXILIARES Y EQUIPOS.

Se prohíbe el montaje de los medios auxiliares, máquinas y equipos, de forma parcial; es decir, omitiendo el uso de alguno o varios de los componentes con los que se comercializan para su función.

El uso, montaje y conservación de los medios auxiliares, máquinas y equipos, se hará siguiendo estrictamente las condiciones de montaje y utilización segura, contenidas en el manual de uso editado por su fabricante.

Todos los medios auxiliares, máquinas y equipos a utilizar en esta obra, tendrán incorporados sus propios dispositivos de seguridad exigibles por aplicación de la legislación vigente. Se prohíbe expresamente la introducción en el recinto de la obra, de medios auxiliares, máquinas y equipos que no cumplan la condición anterior.

Si el mercado de los medios auxiliares, máquinas y equipos, ofrece productos con la marca "CE", el Contratista adjudicatario, en el momento de efectuar el estudio para presentación de la oferta de ejecución de la obra, debe tenerlos presentes e intentar incluirlos, porque son por sí mismos, más seguros que los que no la poseen.

Se cumplirán los requisitos exigidos en la normativa vigente del R.D.1435/1992 y del R.D 1215/97 sobre equipos de trabajo.

## 2.5.- NORMAS DE AUTORIZACIÓN DE USO DE MAQUINARIA Y HERRAMIENTAS

Está demostrado por la experiencia, que muchos de los accidentes de las obras ocurren entre otras causas, por el voluntarismo mal entendido, la falta de experiencia o de formación ocupacional y la impericia. Para evitar en lo posible estas situaciones, se implanta en esta obra la obligación real de estar autorizado a utilizar una máquina o una determinada máquina herramienta.

1º El Contratista adjudicatario, queda obligado a componer según su estilo el siguiente documento recogerlo en su plan de seguridad y ponerlo en práctica:

**DOCUMENTO DE AUTORIZACIÓN DE UTILIZACIÓN DE LAS MÁQUINAS Y DE LAS MÁQUINAS HERRAMIENTA.**

Fecha:

Nombre del interesado que queda autorizado:

Se le autoriza el uso de las siguientes máquinas por estar capacitado para ello:

Lista de máquinas que puede usar:

Firmas: El interesado. El jefe de obra.

Sello de constructor adjudicatario.

2º Estos documentos se firmarán por triplicado. El original quedará archivado en la oficina de la obra. La copia, se entregará firmada y sellada en original al Coordinador en materia de seguridad y salud durante la ejecución de la obra; la tercera copia, se entregará firmada y sellada en original al interesado.

## 2.6.- PLAN DE SEGURIDAD Y SALUD

El contratista elaborará un Plan de Seguridad y Salud en el que se analicen, estudien, desarrollen y complementen, de acuerdo con su propio sistema de ejecución de la obra, las previsiones contenidas en el presente estudio. En dicho Plan se incluirán, en su caso, las propuestas de medidas alternativas de prevención que la Empresa adjudicataria proponga, con la correspondiente valoración económica de las mismas, que no podrá implicar disminución alguna del importe económico total previsto en Proyecto.

Se debe cumplir lo estipulado en el R.D 1627/97 sobre disposiciones mínimas de seguridad en obras de construcción.

El Plan será presentado, antes del comienzo de las obras, al Director Facultativo de las mismas y al Coordinador de Seguridad y Salud durante la ejecución de las obras, quienes, si el documento es aceptado, suscribirán su conformidad de forma conjunta, quedándose

con copia de la misma. Otra copia del Plan aprobado se entregará Al Instituto Regional de Seguridad y Salud en el Trabajo, junto a la Apertura del centro de Trabajo, y otra copia se expondrá en lugar visible y accesible para todos los trabajadores, para posibilitar la presentación razonada de sugerencias. El documento original aprobado se devolverá al Contratista.

El Plan podrá ser modificado de acuerdo con el proceso de ejecución de la obra y de las posibles incidencias que puedan surgir a lo largo del mismo, pero siempre con la aprobación previa del Director Facultativo de la obra y del Coordinador, así como con la necesaria información al Comité de Seguridad y Salud, si existe, y a los trabajadores.

Es responsabilidad del contratista o constructor la ejecución correcta de las medidas preventivas fijadas en el Plan de Seguridad y Salud y responderá ante el Director Facultativo y el Coordinador de cuantas consecuencias se deriven de la inobservancia de las medidas previstas en el Plan, sin perjuicio de la responsabilidad solidaria que corresponda a los subcontratistas, destajistas o similares en su caso.

La empresa contratista deberá asumir formalmente en el Plan el compromiso de adecuar de forma permanente el mismo, en función del proceso de ejecución de la obra, de la evolución de los trabajos, de las posibles incidencias o modificaciones que puedan surgir en la obra o cuando una de las empresas subcontratistas lo soliciten por considerar que algunos o todos los riesgos que entraña su forma de realizar las actividades subcontratadas no están contempladas en el Plan.

Además, garantizará que solamente los trabajadores que hayan recibido información suficiente y adecuada puedan acceder a las zonas de riesgo grave y específico. Así mismo, sólo podrán utilizar los equipos de trabajo aquellos trabajadores que cuenten con la debida habilitación para ello.

Se comprometerá que, antes del inicio de un tajo, tanto sus trabajadores, como los de empresas subcontratistas dispongan de los equipos de protección individual y colectiva previstos en el Plan, para el desempeño de sus funciones y de vigilar de modo especial, a través de su organización preventiva en obra, que se hace un uso efectivo de los mismos. Igualmente, se comprometerá a no emplear en las obras trabajadores provenientes de empresas de trabajo temporal.

Deberá informar e investigar acerca de accidentes. Se comprometerá que los responsables de seguridad de la obra procedan a facilitar al promotor en el plazo máximo de cinco días un informe sobre los accidentes leves e incidencias graves que se hayan producido en obra. Idéntico compromiso, a cumplimentar en el plazo más inmediato que se pueda desde el momento de su producción, los accidentes graves y muy graves (según criterio de los recursos preventivos) así como los mortales, utilizando vía telefónica y, en el plazo improrrogable de 24 horas, el informe escrito correspondiente de tales accidentes. Además, la organización preventiva del contratista deberá facilitar mensualmente los índices de siniestralidad de la obra.

Finalmente, se comprometerá a elaborar y conservar a disposición de la autoridad laboral la documentación establecidos acreditativa del cumplimiento de los compromisos asumidos en el Plan de Seguridad y Salud.

## 2.7.- LIBRO DE INCIDENCIAS

Lo suministrará a la obra la Propiedad o el colegio oficial que vise el estudio de seguridad y Salud, tal y como se recoge en el Real Decreto 1627/1997 de 24 de Octubre.

En él solo se anotarán por las personas autorizadas legalmente para ello, los incumplimientos de las previsiones contenidas en el plan de seguridad y Salud aprobado, debiendo avisar a la Autoridad Laboral en 24 h de la anotación efectuada en el libro de incidencias por parte del coordinador de seguridad y salud.

El Coordinador en materia de seguridad y salud está legalmente obligado a tenerlo a disposición de: Dirección Facultativa de la obra, Encargado de Seguridad, Comité de Seguridad y Salud, Inspección de Trabajo y Técnicos de los Centros o Gabinetes de Seguridad y Salud en el Trabajo.

Efectuada una anotación en el Libro de Incidencias, el Coordinador de Seguridad en fase de ejecución de obra estará obligado a remitir, en el plazo de 24 horas, una copia a la Inspección de Trabajo y Seguridad Social de la provincia en que se realiza la obra, solo en los casos regulados por el Real Decreto 1109/2007. Disposición final tercera que recoge las modificaciones del Real Decreto 1627/1997, en cuánto a incumplimientos de advertencias previamente anotadas en el Libro de Incidencias, las cuales sólo deben ser comunicadas a las empresas que sean responsables de este incumplimiento previo, o en casos de riesgo grave e inminente que provoquen la paralización de los trabajos.

Asimismo, el Coordinador de Seguridad y Salud en fase de ejecución de obra deberá notificar de inmediato (< 24 horas) las anotaciones del Libro de Incidencias a las empresas Contratistas y a los representantes de los trabajadores afectados en ambos casos.

## 2.8.- LIBRO DE SUBCONTRATACIÓN

En cumplimiento de la Ley 32/2006 y de los siguientes artículos:

Artículo 13. **Obligatoriedad del libro de subcontratación.**

Cada contratista, con carácter previo a la subcontratación con un subcontratista o trabajador autónomo de parte de la obra que tenga contratada, deberá obtener un libro de subcontratación habilitado que se ajuste al modelo que se inserta como anexo II.

Artículo 14. **Habilitación del libro de subcontratación.**

1.- El libro de subcontratación será habilitado por la autoridad laboral correspondiente al territorio en que se ejecute la obra. La habilitación consistirá en la verificación de que el libro reúne los requisitos mínimos establecidos en este real decreto.

2.- En el caso de que un contratista necesite la habilitación de un segundo libro para una misma obra de construcción, deberá presentar a la autoridad laboral el libro anterior para justificar el agotamiento de sus hojas. En los casos en que haya sido

requerida la aportación del libro a un proceso judicial, se solicitará a la autoridad laboral la habilitación de una copia legalizada del mismo con carácter previo a la remisión del original al órgano jurisdiccional. En caso de pérdida o destrucción del libro anterior u otra circunstancia similar, tal hecho se justificará mediante declaración escrita del empresario o de su representante legal comprensiva de la no presentación y pruebas de que disponga.

Artículo 15. **Contenido del libro de subcontratación.**

1.- El contratista deberá llevar el libro de subcontratación en orden, al día y con arreglo a las disposiciones contenidas en este real decreto.

2.- En dicho libro el contratista deberá reflejar, por orden cronológico desde el comienzo de los trabajos, todas y cada una de las subcontrataciones realizadas en la obra con empresas subcontratistas y trabajadores autónomos incluidos en el ámbito de ejecución de su contrato.

Artículo 16. **Obligaciones y derechos derivados del libro de subcontratación.**

1.- Con ocasión de cada subcontratación, el contratista deberá proceder del siguiente modo: a) En todo caso, deberá comunicar la subcontratación al coordinador de seguridad y salud, con objeto de que este disponga de la información y la transmita a las demás empresas contratistas de la obra, en caso de existir, a efectos de que, entre otras actividades de coordinación, éstas puedan dar cumplimiento a lo dispuesto en el artículo 9.1 de la ley 32/2006, de 18 de octubre, en cuanto a la información a los representantes de los trabajadores de las empresas de sus respectivas cadenas de subcontratación. b) También en todo caso, deberá comunicar la subcontratación a los representantes de los trabajadores de las diferentes empresas incluidas en el ámbito de ejecución de su contrato que figuren identificados en el libro de subcontratación. c) Cuando la anotación efectuada suponga la ampliación excepcional de la subcontratación prevista en el artículo 5.3 de la ley 32/2006, de 18 de octubre, además de lo previsto en las dos letras anteriores, el contratista deberá ponerlo en conocimiento de la autoridad laboral competente mediante la remisión, en el plazo de los cinco días hábiles siguientes a su aprobación por la dirección facultativa, de un informe de esta en el que se indiquen las circunstancias de su necesidad y de una copia de la anotación efectuada en el libro de subcontratación.

2.- El contratista deberá conservar el libro de subcontratación en la obra de construcción hasta la completa terminación del encargo recibido del promotor. Asimismo, deberá conservarlo durante los cinco años posteriores a la finalización de su participación en la obra.

## 2.9.- CRITERIOS DE MEDICIÓN, ABONO E IMPUTACIÓN DE COSTES PREVENTIVOS

Las normas presupuestarias que se deben observar a la hora de redactar el presupuesto del Estudio de Seguridad y Salud se deben compaginar con lo establecido al respecto tanto en el Texto Refundido de la Ley de Contratos de las Administraciones Públicas y en el Reglamento General de la Ley de Contratos de las Administraciones Públicas como en la normativa preventiva, básicamente en la Ley 31/95 y en el Real Decreto 1627/97. De la mera consulta de dichos textos legales se deducen, a este respecto, las siguientes implicaciones:

Que existen una serie de obligaciones legales comunes a todos los empresarios, ya pertenezcan al sector de la construcción o a cualquier otro, que deben cumplir por el mero hecho de operar en su mercado correspondiente. Se está haciendo referencia, por ejemplo, a la formación general que debe recibir todo trabajador en materia preventiva, a los reconocimientos médicos ordinarios, al servicio de prevención de la empresa, a sus técnicos de prevención y otros similares. Lógicamente, los costes asociados al cumplimiento de dichas obligaciones no pueden, ni deben, retribuirse con cargo a una obra o proyecto en particular pues se trata de obligaciones que el empresario deberá cumplir acometa o no la obra en cuestión. Por lo tanto, los citados gastos, siempre y cuando no tengan carácter específico y vengan demandados por la obra en cuestión, se deberán considerar incluidos en la partida consignada en el presupuesto para cubrir los gastos generales del empresario.

Que en aras de la necesaria integración de la prevención en la actividad productiva de cada empresario y de acuerdo con lo establecido al respecto en el art. 5.3. del Real Decreto 1627/97, se deberían establecer como exigencias de carácter mínimo el uso de aquellos equipos y sistemas de trabajo “exigibles para la correcta ejecución de los trabajos”.

Que los costes relacionados con la implantación y explotación de la instalaciones generales para los trabajadores, al menos las existentes en los campamentos centrales, deben ser considerados como gastos generales o, a lo sumo, como costes indirectos.

Que los costes derivados de la utilización de los medios auxiliares adecuados que sean necesarios para ejecutar una determinada unidad de obra deberían repercutirse en dicha unidad de obra como una parte más de la justificación del precio de la citada unidad.

Que dado que no existe en la actualidad una definición de las medidas necesarias para “la correcta ejecución de la obra”, se deben considerar como tales, con carácter mínimo, los equipos de protección individual necesarios para la ejecución de cada unidad de obra. De esta forma, el coste de dichos equipos, o la parte proporcional correspondiente, deberá ser repercutido en la unidad presupuestaria que exige su utilización como un coste directo más de la misma.

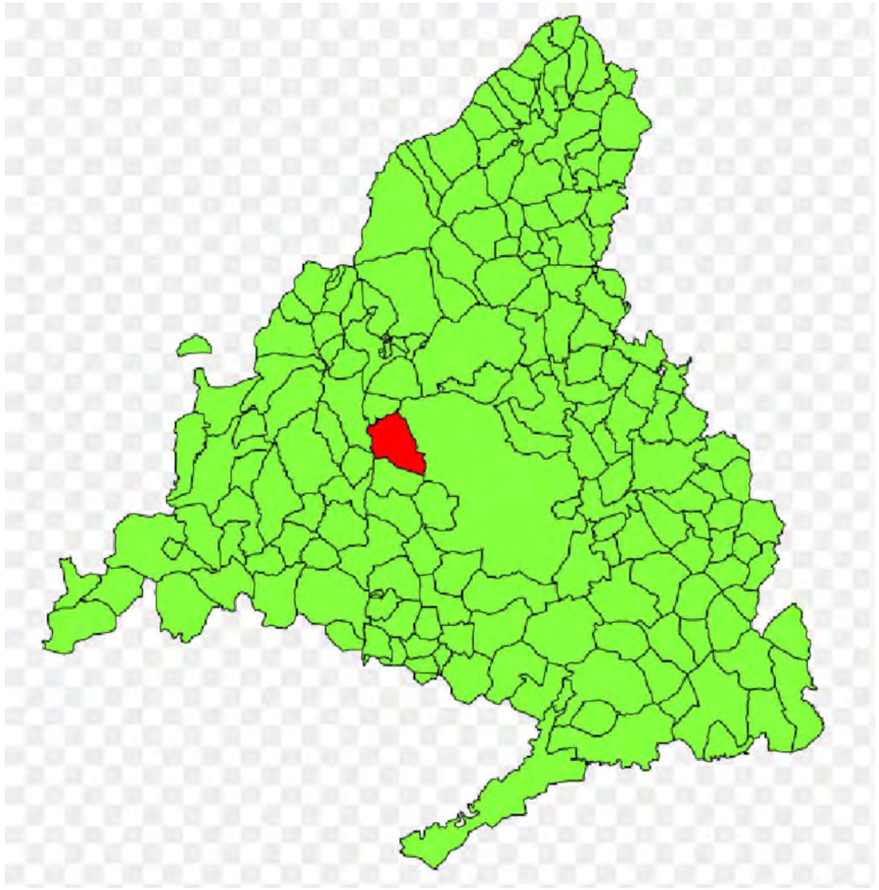
Que no deberían abonarse con cargo al estudio costes relacionados con el cumplimiento de las obligaciones legales del empresario de carácter general. Así, se deberán considerar incluidos en el porcentaje de gastos generales del proyecto los costes relacionados con la formación mínima (que no la específica para algún trabajo en particular) de los trabajadores y de los miembros de la organización preventiva, con los reconocimientos médicos ordinarios o con los técnicos del servicio de prevención del empresario o las reuniones a celebrar para coordinar su acción preventiva en la obra con el resto de empresarios.

SEGURA SANCHEZ JOSE ANTONIO - 07237123N

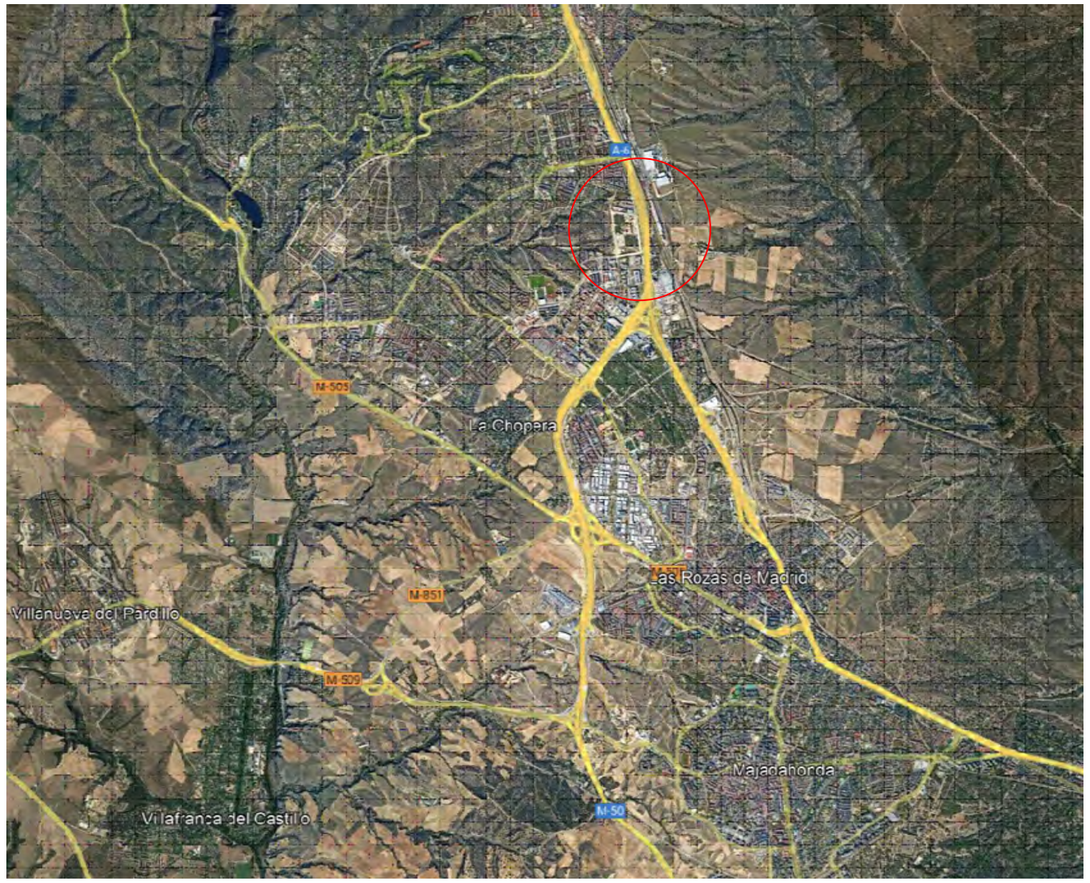
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REDACTOR DEL PROYECTO
D. José Antonio Segura Sánchez
Procaver Soluciones Urbanas, S.L.

## *2.- PLANOS*



LOCALIZACION EN LA COMUNIDAD DE MADRID

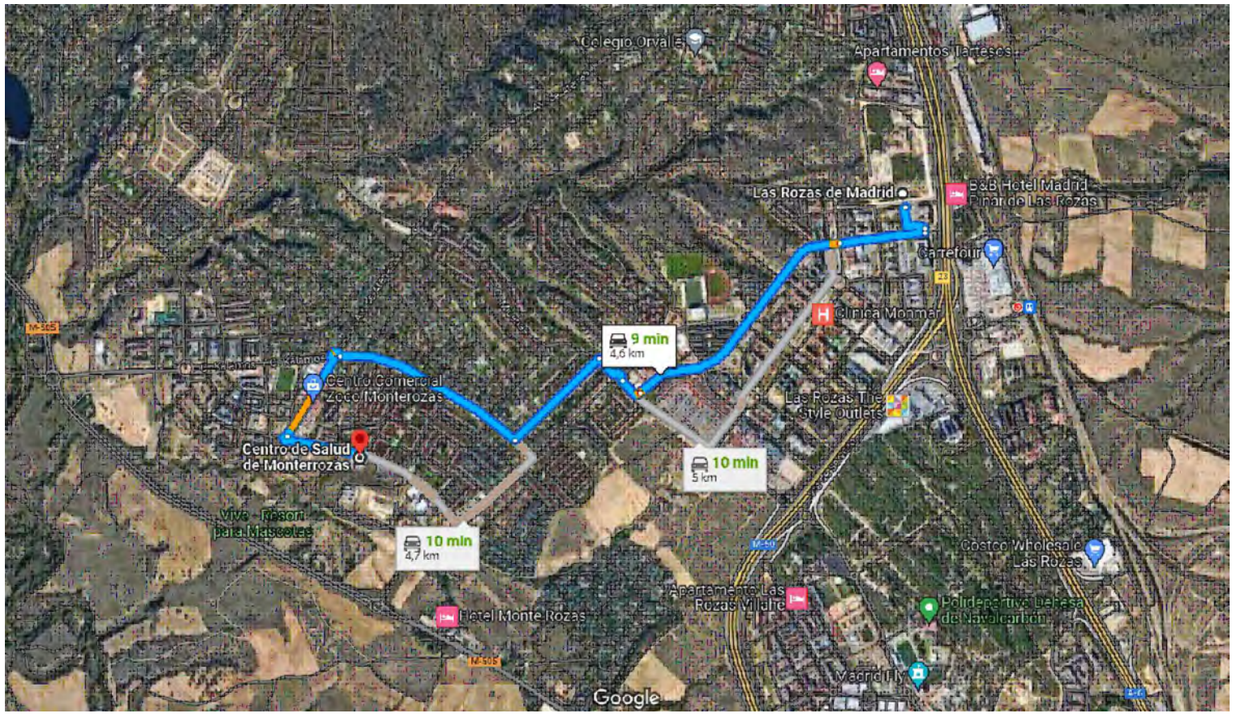



ORTOFOTO ZONA DE OBRA

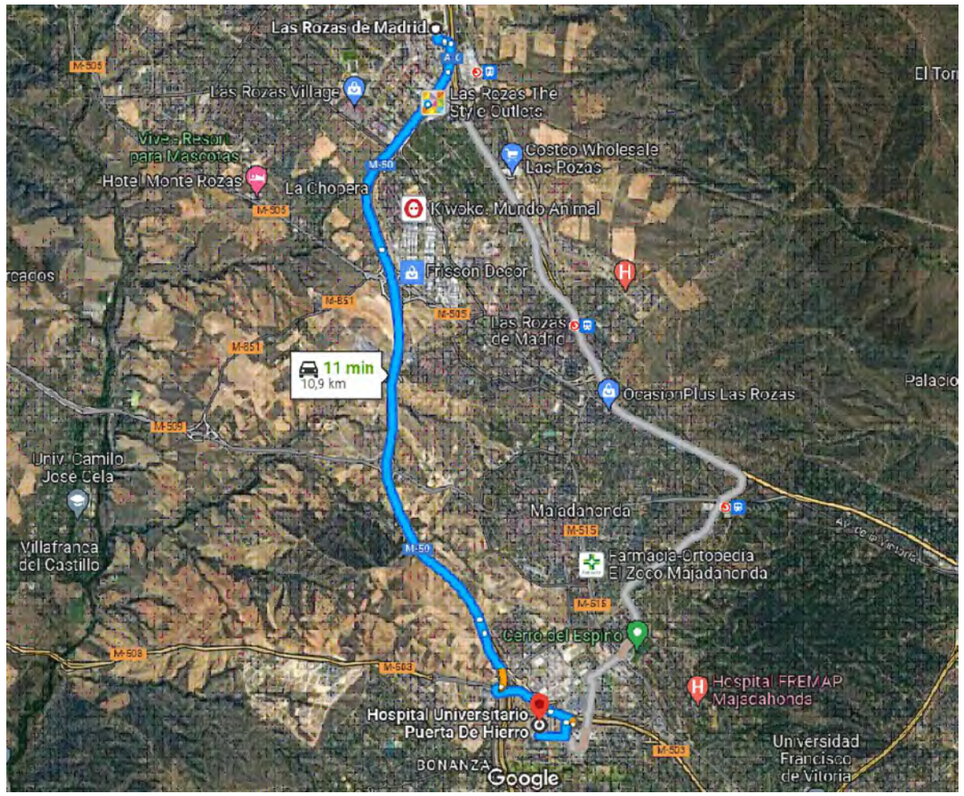
PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

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| PLANO | ESTUDIO DE SEGURIDAD Y SALUD<br>PLANO DE SITUACION | 1 |
| PROMOTOR | JUNTA DE COMPENSACIÓN DE LA UNIDAD DE EJECUCIÓN UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID. | |
| AUTOR DEL PLANO | PROCAVER SOLUCIONES URBANAS, S.L. | PROCAVER SOLUCIONES URBANAS, S.L. |
| ESCALA: S:E | FEBRERO DE 2024 | |

## ITINERARIO A CENTRO DE SALUD

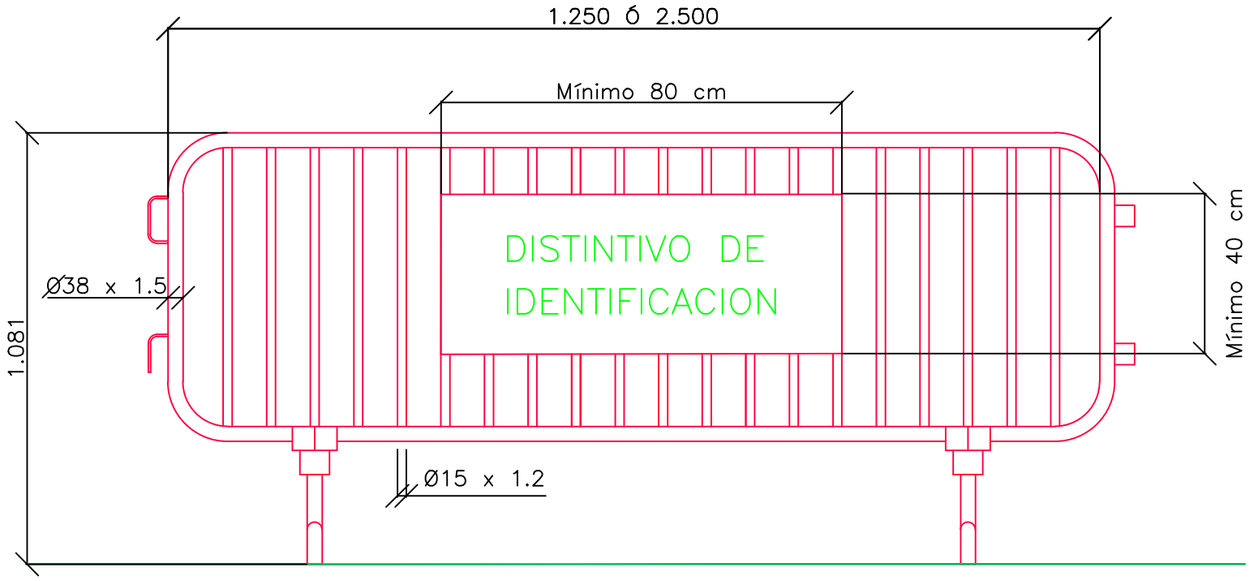


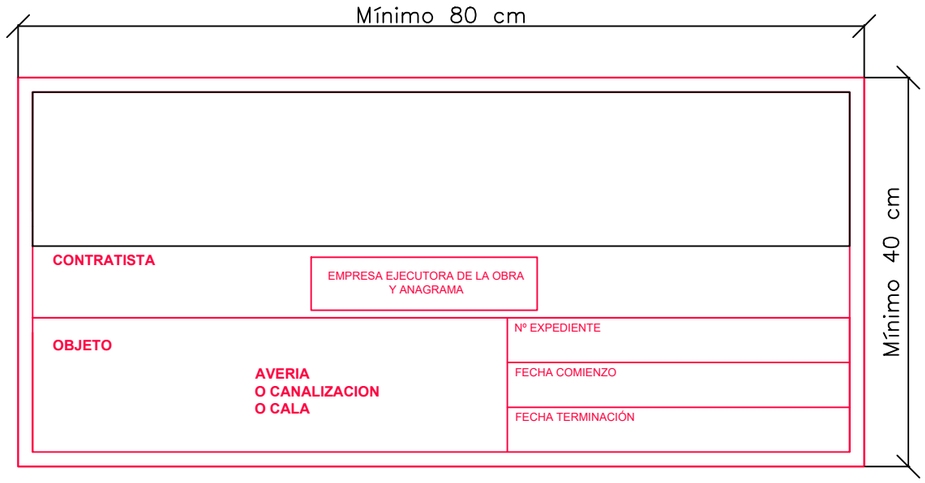

## ITINERARIO A HOSPITAL




PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

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| PLANO | ESTUDIO DE SEGURIDAD Y SALUD<br>ITINERARIO HOSPITAL / CENTRO ASISTENCIAL PROXIMO | 2 |
| PROMOTOR | JUNTA DE COMPENSACIÓN DE LA UNIDAD DE EJECUCIÓN UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID. | |
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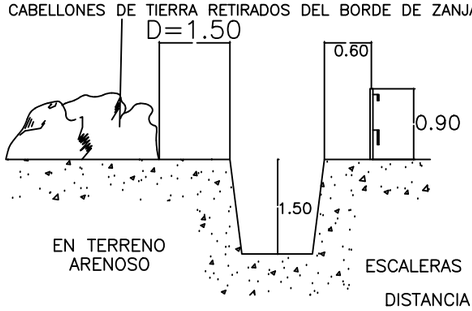




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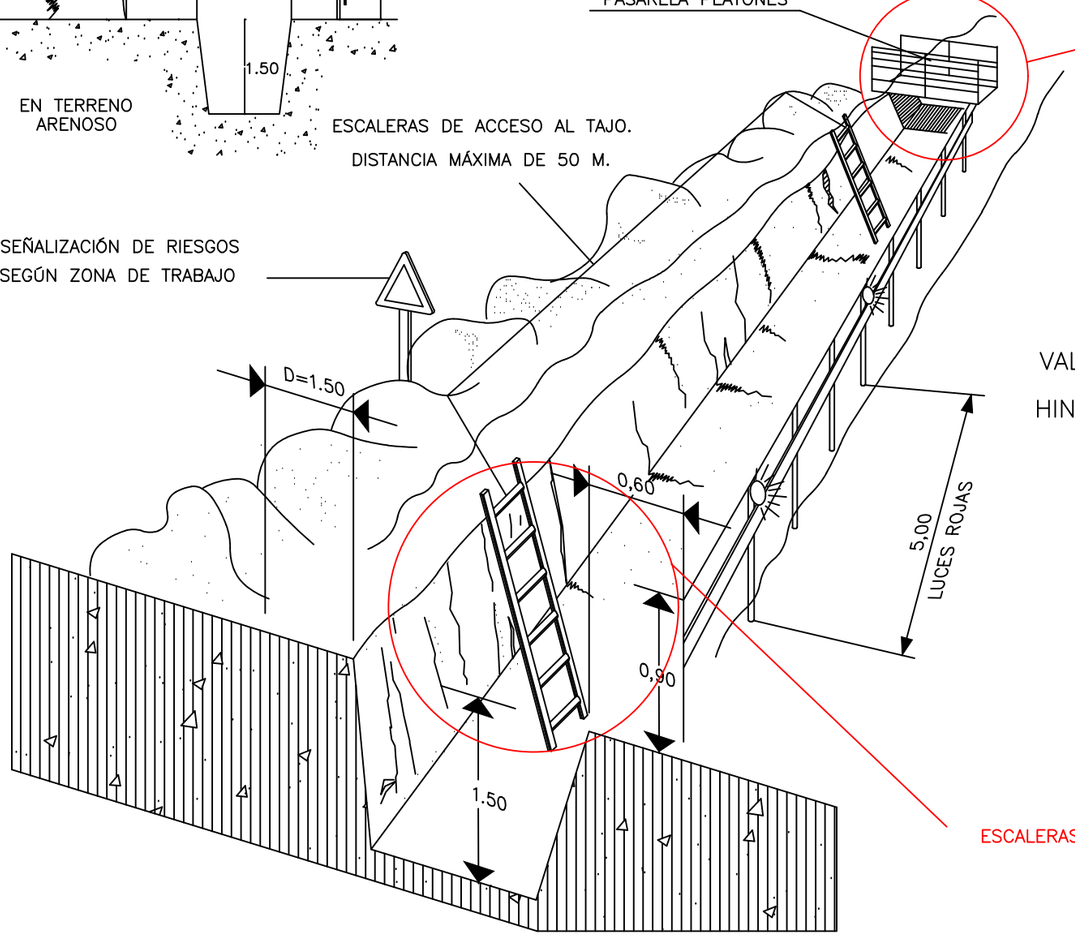
PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

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| PLANO | ESTUDIO DE SEGURIDAD Y SALUD<br>PLANO MODELO DE VALLA | 3 |
| PROMOTOR | JUNTA DE COMPENSACIÓN DE LA UNIDAD DE EJECUCIÓN UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID. | |
| AUTOR DEL PLANO | PROCAVER SOLUCIONES URBANAS, S.L. | PROCAVER SOLUCIONES URBANAS, S.L. |
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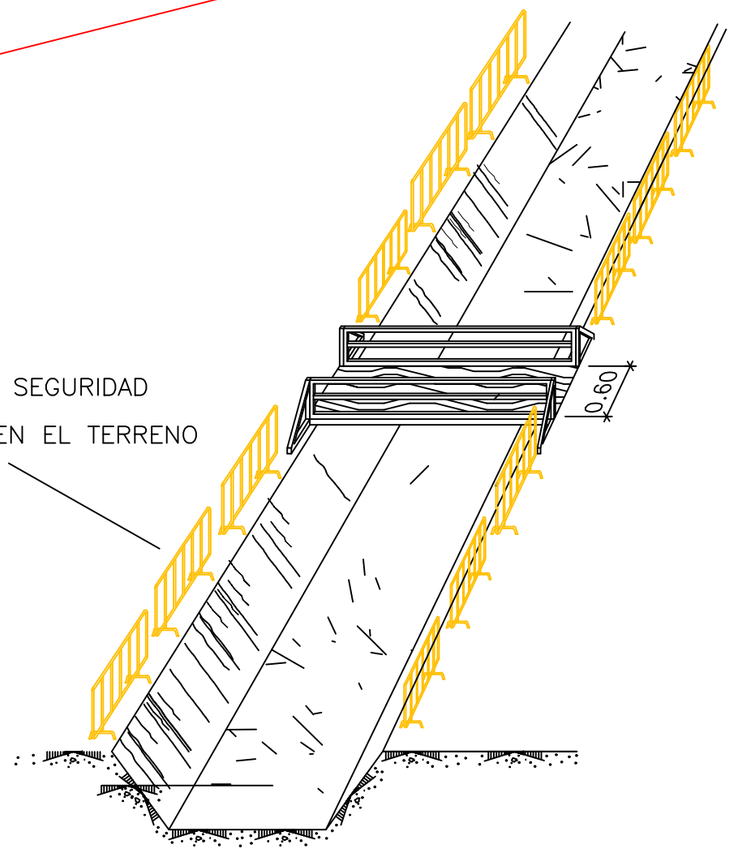
CABELLONES DE TIERRA RETIRADOS DEL BORDE DE ZANJA



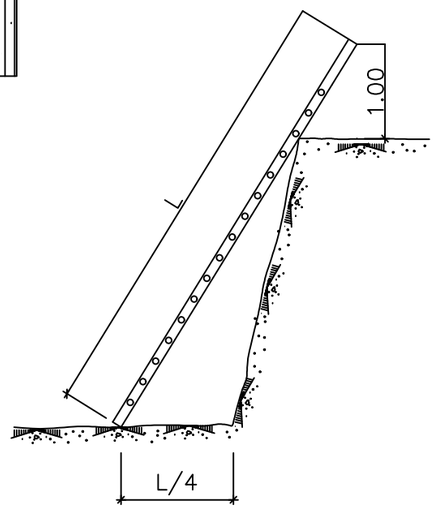

EN TERRENO ARENOSO




PASO EN ZANJAS



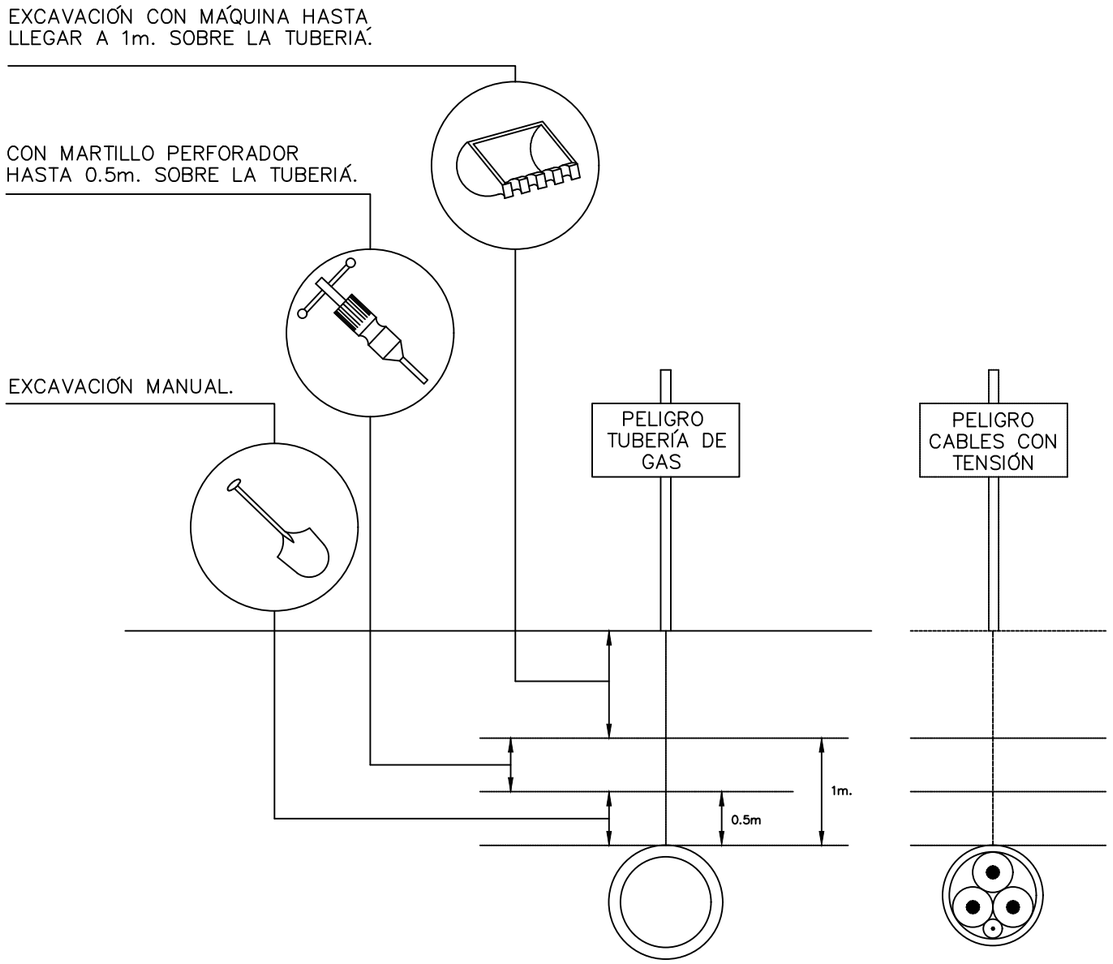

ESCALERAS DE MANO



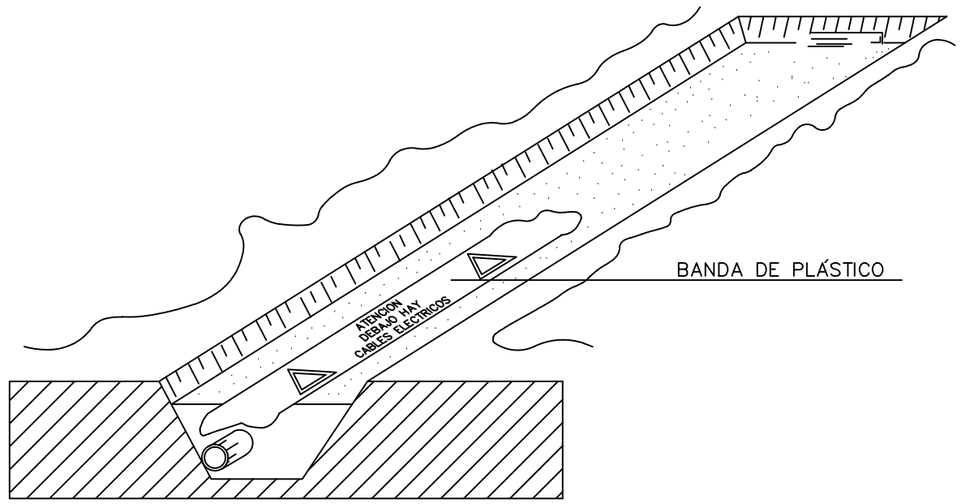

PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

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| PLANO | ESTUDIO DE SEGURIDAD Y SALUD<br>PROTECCION DE ZANJA | 4 |
| PROMOTOR | JUNTA DE COMPENSACIÓN DE LA UNIDAD DE EJECUCIÓN UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID. | |
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| ESCALA: S:E | FEBRERO DE 2024 | |

DISTANCIAS MÁXIMAS DE SEGURIDAD RECOMENDABLES EN TRABAJOS DE EXCAVACIÓN SOBRE CONDUCCIONES DE GAS Y ELECTRICIDAD.



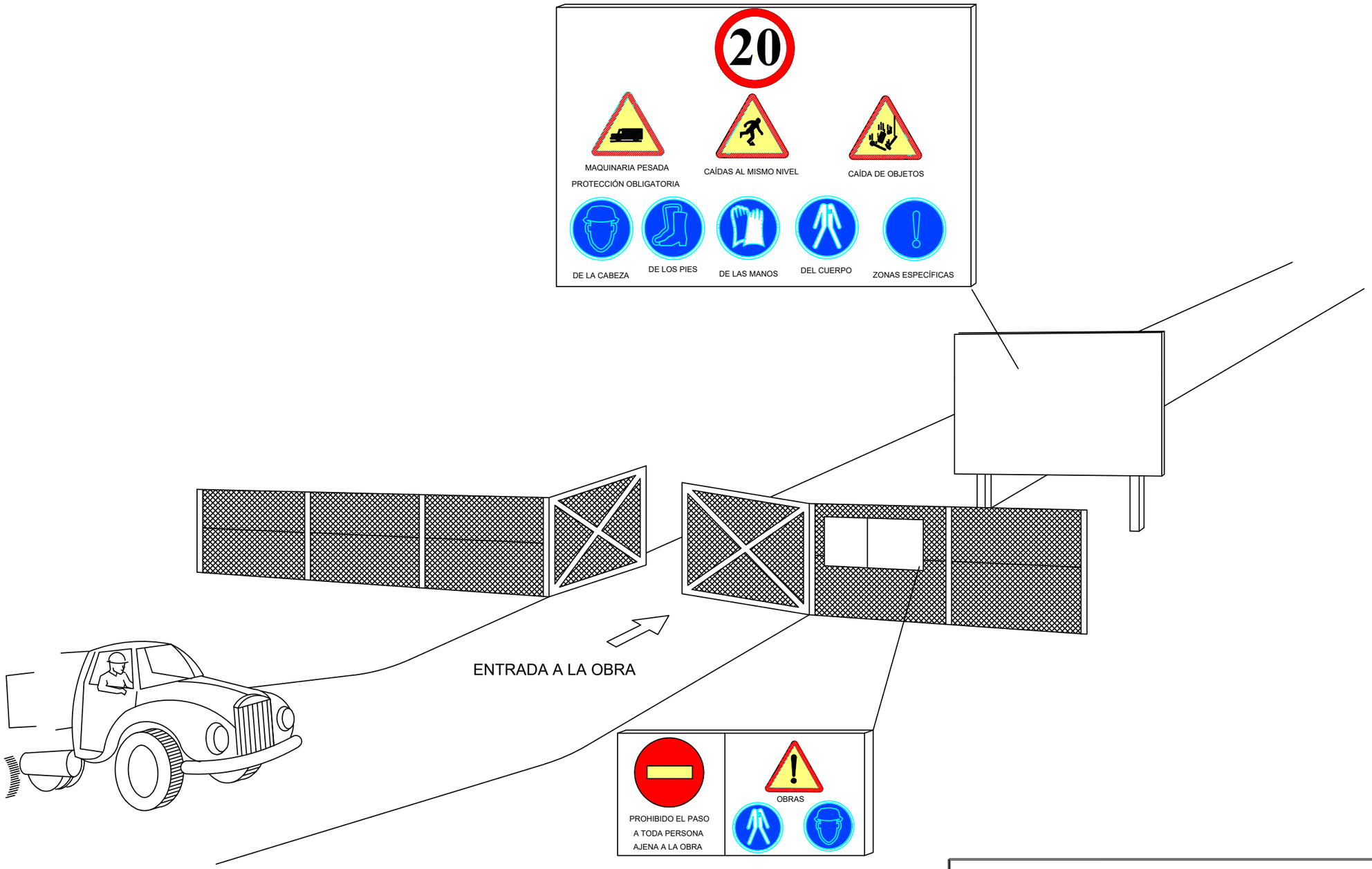

FORMAS MAS USUALES DE SEÑALIZACIÓN INTERIOR Y PROTECCIÓN EMPLEADAS EN CONSTRUCCIONES ELÉCTRICAS




NOTA: DADAS LAS CARACTERÍSTICAS DE LA OBRA, LOS SERVICIOS AFECTADOS DEBERÁN DE IDENTIFICARSE POR PARTE DE LA EMPRESA CONTRATISTA MEDIANTE LA REALIZACIÓN DE CALAS PREVIA RECOPILACIÓN DE LOS PLANOS POR PARTE DEL ORGANISMO PERTINENTE

PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

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| PLANO | ESTUDIO DE SEGURIDAD Y SALUD<br>SERVICIOS AFECTADOS | 5 |
| PROMOTOR | JUNTA DE COMPENSACIÓN DE LA UNIDAD DE EJECUCIÓN UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID. | |
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PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

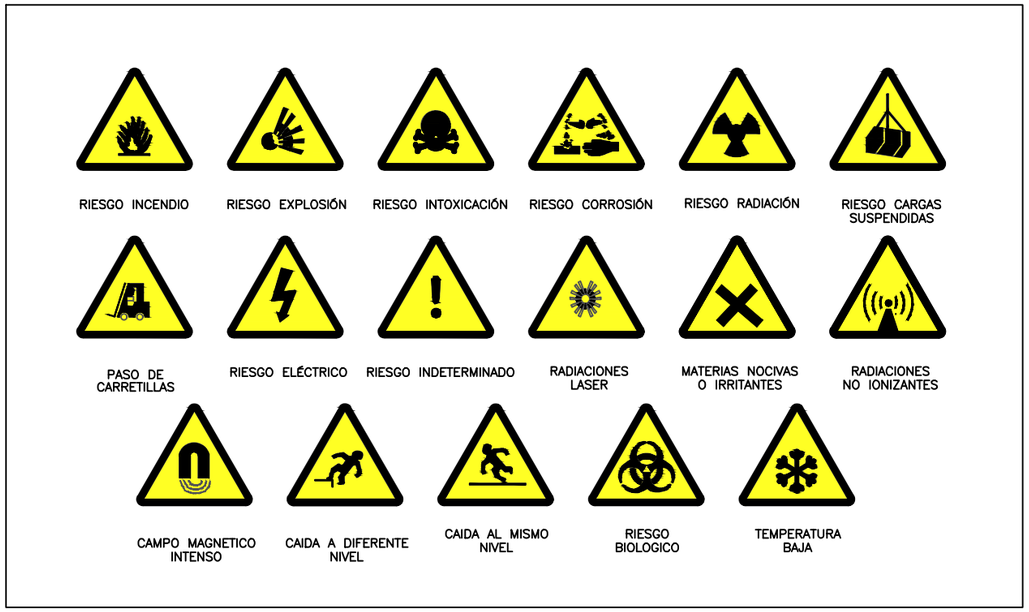
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| PLANO | ESTUDIO DE SEGURIDAD Y SALUD<br>CERRAMIENTOS Y BALIZAMIENTOS | 6 |
| PROMOTOR | JUNTA DE COMPENSACIÓN DE LA UNIDAD DE EJECUCIÓN UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID. | |
| AUTOR DEL PLANO | PROCAVER SOLUCIONES URBANAS, S.L. | PROCAVER SOLUCIONES URBANAS, S.L. |
| ESCALA: S:E | FEBRERO DE 2024 | |



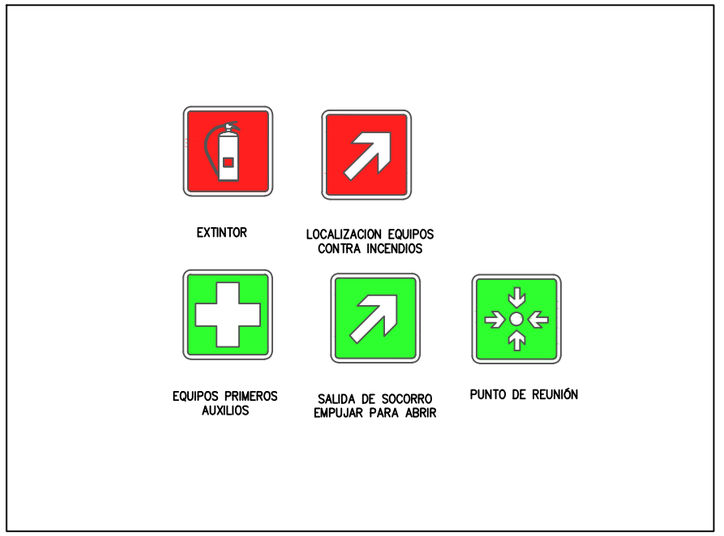

SEÑALES OBLIGACIÓN




SEÑALES PROHIBICIÓN




SEÑALES DE ADVERTENCIA



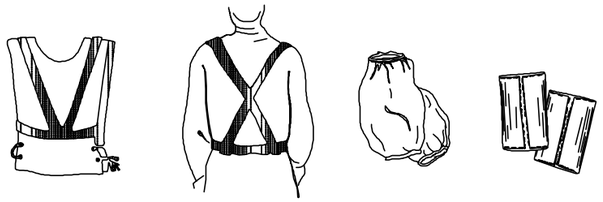

SEÑALIZACIÓN DE EMERGENCIA

PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

| | | |
|---|---|---|
| PLANO | ESTUDIO DE SEGURIDAD Y SALUD<br>SEÑALIZACION | 7 |
| PROMOTOR | JUNTA DE COMPENSACIÓN DE LA UNIDAD DE EJECUCIÓN UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID. | |
| AUTOR DEL PLANO | PROCAVER SOLUCIONES URBANAS, S.L. | PROCAVER SOLUCIONES URBANAS, S.L. |
| ESCALA: S:E | FEBRERO DE 2024 | |

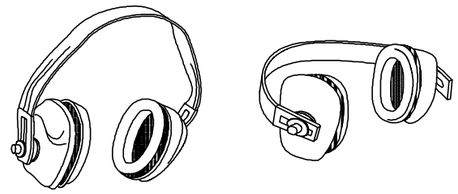
# PROTECCIONES INDIVIDUALES

## ELEMENTOS DE SEÑALIZACIÓN PERSONAL



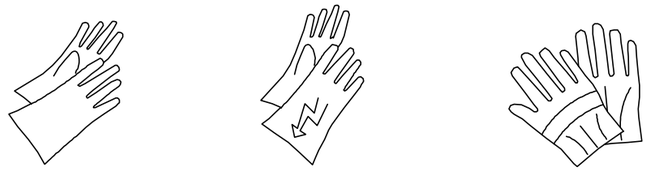
*CHALECOS* *CORREAJE* *MANGUITOS* *POLAINAS*

## PROTECCIONES DE OIDOS



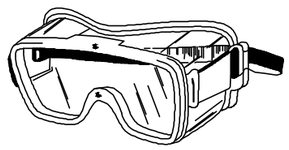
*CLASE "A" arnes en la cabeza* *CLASE "B" arnes en la nuca*

## GUANTES PROTECTORES

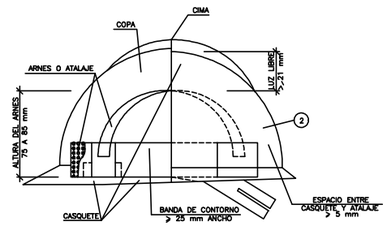


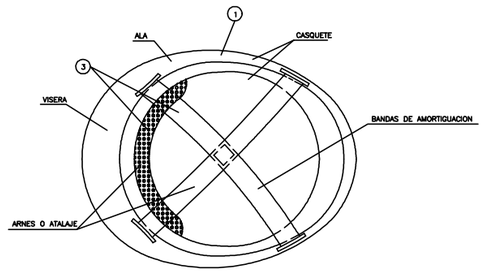
*GUANTES GOMA FINA* *GUANTES DIELECTRICOS* *GUANTES DE USO GENERAL*

## GAFAS DE MONTURA UNIVERSAL CONTRA IMPACTOS



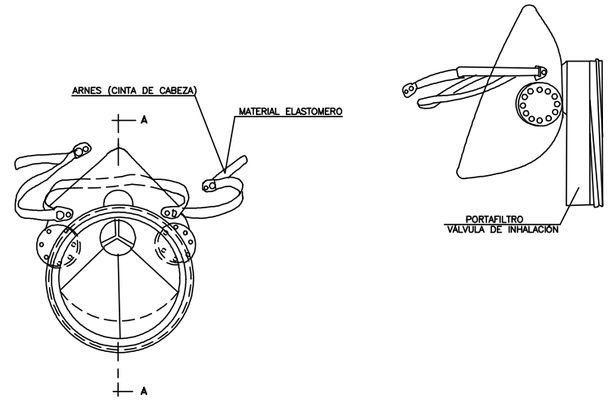
## CASCO DE SEGURIDAD NO METÁLICO



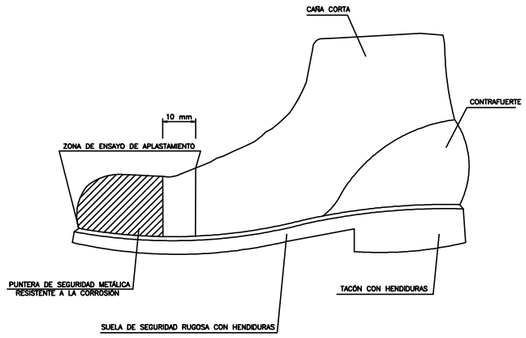



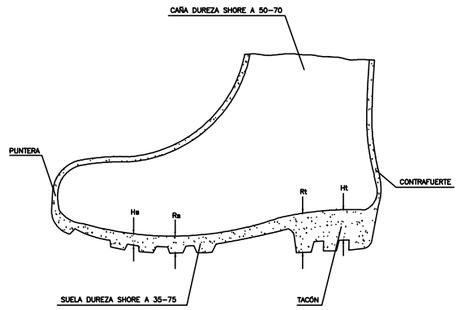

1. MATERIAL INCOMBUSTIBLE, RESISTENTE A GRASAS, SALES Y AGUA
2. CLASE N AISLANTE A 1000v. CLASE E-AT AISLANTE A 25000v.
3. MATERIAL NO RÍGIDO HIDRÓFUGO, FÁCIL LIMPIEZA Y DESINFECCIÓN

## MASCARILLA ANTIPOLVO




## BOTA DE SEGURIDAD CLASE III CON PUNTERA Y PLANTILLA DE ACERO

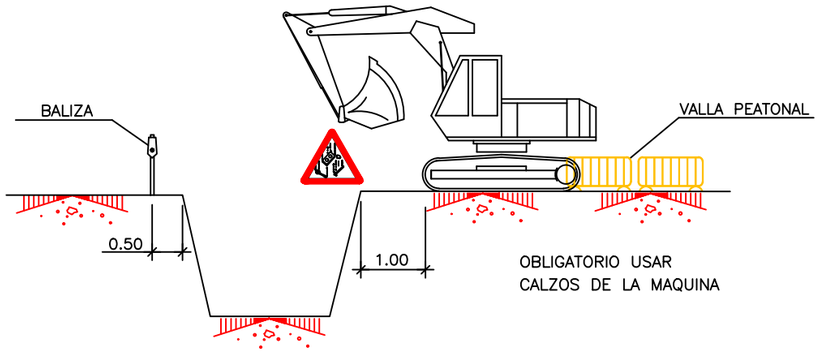


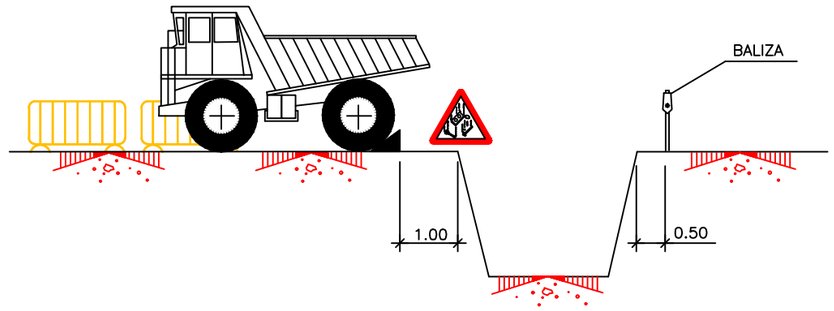

PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

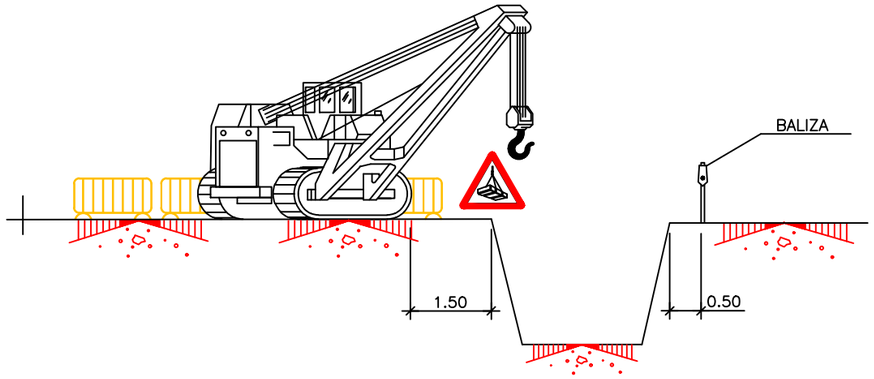
| | | |
|---|---|---|
| PLANO | ESTUDIO DE SEGURIDAD Y SALUD<br>EPIS | 8 |
| PROMOTOR | JUNTA DE COMPENSACIÓN DE LA UNIDAD DE EJECUCIÓN UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID. | |
| AUTOR DEL PLANO | PROCAVER SOLUCIONES URBANAS, S.L. | PROCAVER SOLUCIONES URBANAS, S.L. |
| ESCALA: S:E | FEBRERO DE 2024 | |

## EXCAVACION

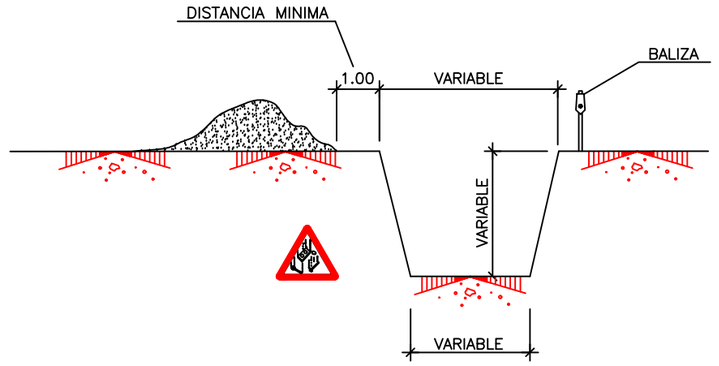


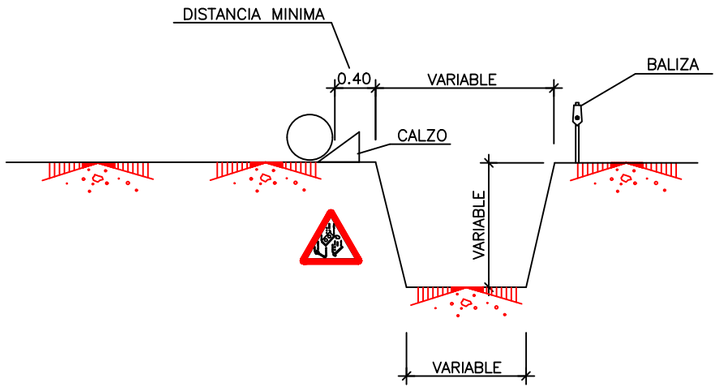

## CARGA Y DESCARGA




## ACOPIOS

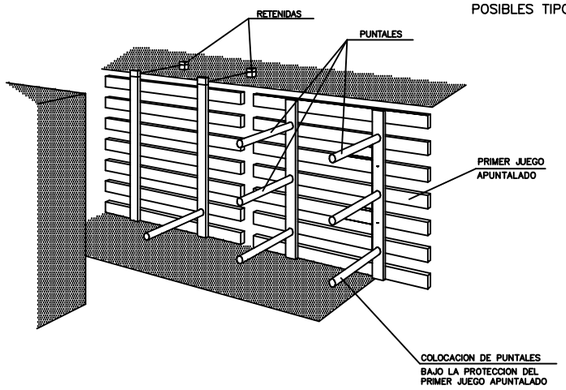


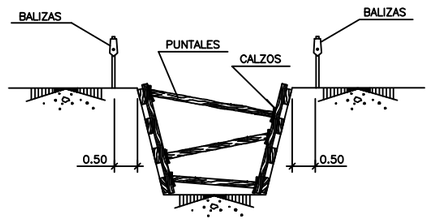

PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID).

| | | |
|---|---|---|
| PLANO | ESTUDIO DE SEGURIDAD Y SALUD<br>RIESGOS Y MEDIDAS. TRABAJOS EN ZANJAS | 9 |
| PROMOTOR | JUNTA DE COMPENSACIÓN DE LA UNIDAD DE EJECUCIÓN UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID. | |
| AUTOR DEL PLANO | PROCAVER SOLUCIONES URBANAS, S.L. | PROCAVER SOLUCIONES URBANAS, S.L. |
| ESCALA: S:E | FEBRERO DE 2024 | |

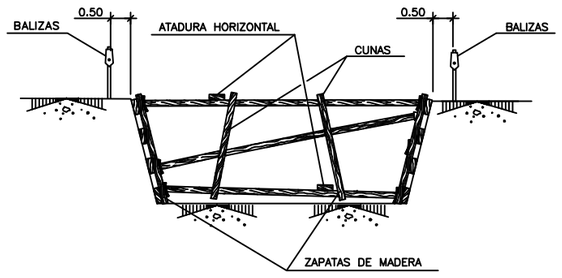
## POSIBLES TIPOS DE ENTIBACION




ANCHURA < 3,00m.

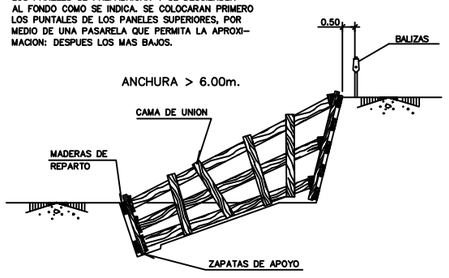



ANCHURA ≤ 6.00m.




LOS PANELES SE PREFABRICAN Y SE DESCIENDEN AL FONDO COMO SE INDICA. SE COLOCARAN PRIMERO LOS PUNTALES DE LOS PANELES SUPERIORES, POR MEDIO DE UNA PASARELA QUE PERMITA LA APROXI-MACION: DESPUES LOS MAS BAJOS.

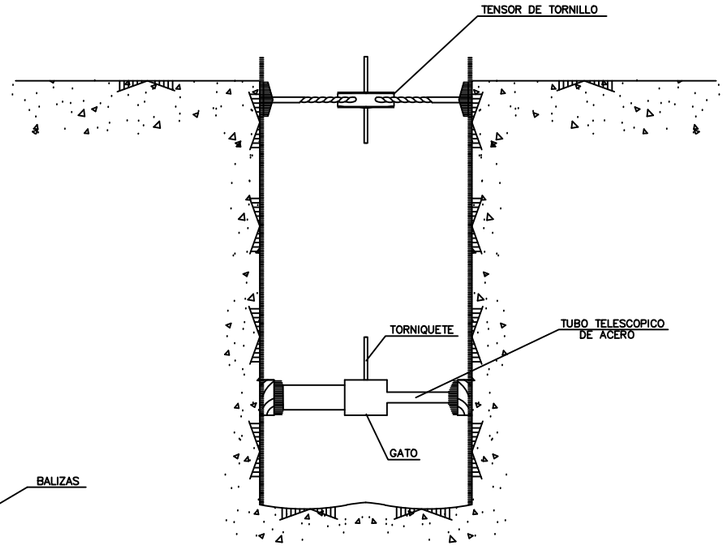
ANCHURA > 6.00m.

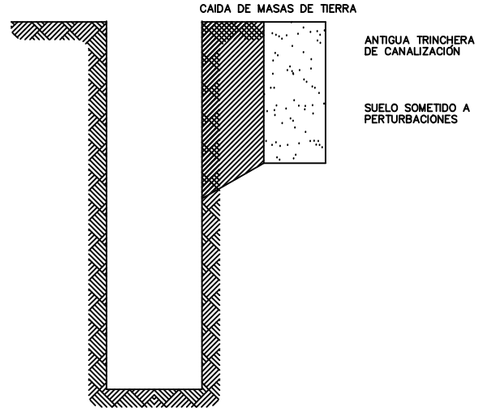



SE ENTIBARAN LOS TALUDES QUE SEAN NECESARIOS.

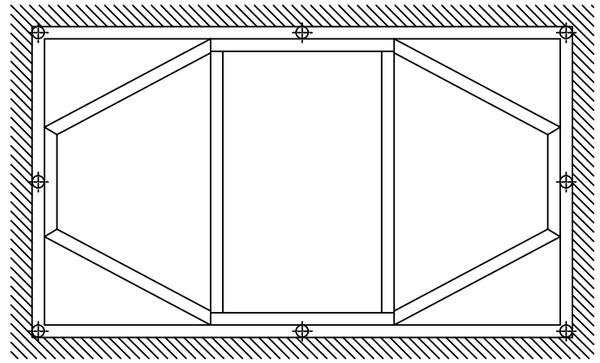
POR LOS POSIBLES DESPRENDIMIENTOS DE TIERRAS, SE EXTREMARAN LAS PRECAUCIONES A LA RETIRADA DEE LAS ENTIBACIONES

## ENTIBACION DE ZANJAS Y POZOS




CUADROS INDEFORMABLES EN POZOS



| | | |
|---|---|---|
| PROYECTO DE CONSTRUCCION DE TANQUE DE TORMENTAS NORTE EN UNIDAD DE EJECUCION UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID (MADRID). | | |
| PLANO | ESTUDIO DE SEGURIDAD Y SALUD<br>ENTIBACIONES | 10 |
| PROMOTOR | JUNTA DE COMPENSACIÓN DE LA UNIDAD DE EJECUCIÓN UE-VII.1 "SISTEMAS GENERALES P.E.+ KODAK" DE SUELO URBANO NO CONSOLIDADO DEL P.G.O.U. DE LAS ROZAS DE MADRID. | |
| AUTOR DEL PLANO | PROCAVER SOLUCIONES URBANAS, S.L. | PROCAVER SOLUCIONES URBANAS, S.L. |
| ESCALA: S:E | FEBRERO DE 2024 | |