

1 priedas

Vėjo apkrovos skaičiavimas

Project: Subject: Designer: Date:

Eurocode 1

Wind load on building side walls (external and internal pressure coefficients)

Description:

Calculation of wind load action effects on vertical side walls of building. The net effect of external and internal wind pressure for zones A, B, C, D, E on the wall surface are calculated from the corresponding pressure coefficients

According to:

EN 1991-1-4:2005+A1:2010 Section 7.2.2

Applicable for:

Vertical walls of rectangular plan buildings, flat or inclined roof, and height h less than five times the width b perpendicular to the wind direction, consisting of one skin

Supported

National

Annexes:

A) Calculation of pressure coefficients: Apart from countries that adopt CEN recommended values for section 7.2.2 of EN1991-1-4, the following National Annexes are supported: Croatia. B) Peak velocity pressure: The value can be specified manually. Otherwise automatic calculation of peak velocity pressure is supported for countries that adopt the CEN recommended values for the related NDPs, and also for the following National Annexes: Finland, Portugal. The National Annexes of Germany, Norway, Spain, Sweden, Switzerland are NOT supported.

Input

Terrain category	= II	▼
Basic wind velocity	$V_b = 24$	m/s
Horizontal dimension of rectangular plan parallel to the wind direction	$d = 52$	m
Horizontal dimension of rectangular plan perpendicular to the wind direction (crosswind dimension)	$b = 17$	m
Height of building from ground up to roof level	$h = 9$	m
Size of loaded area that produces the wind action for the examined verification	= $>10\text{m}^2$ (Cpe,10)	▼

Orography factor at reference height z_e	$C_0(z_e) = 1$
Building with a dominant face in terms of openings	= No ☒
Minimum value of internal pressure coefficient	$C_{pi,min} = -0.3$
Maximum value of internal pressure coefficient	$C_{pi,max} = 0.2$

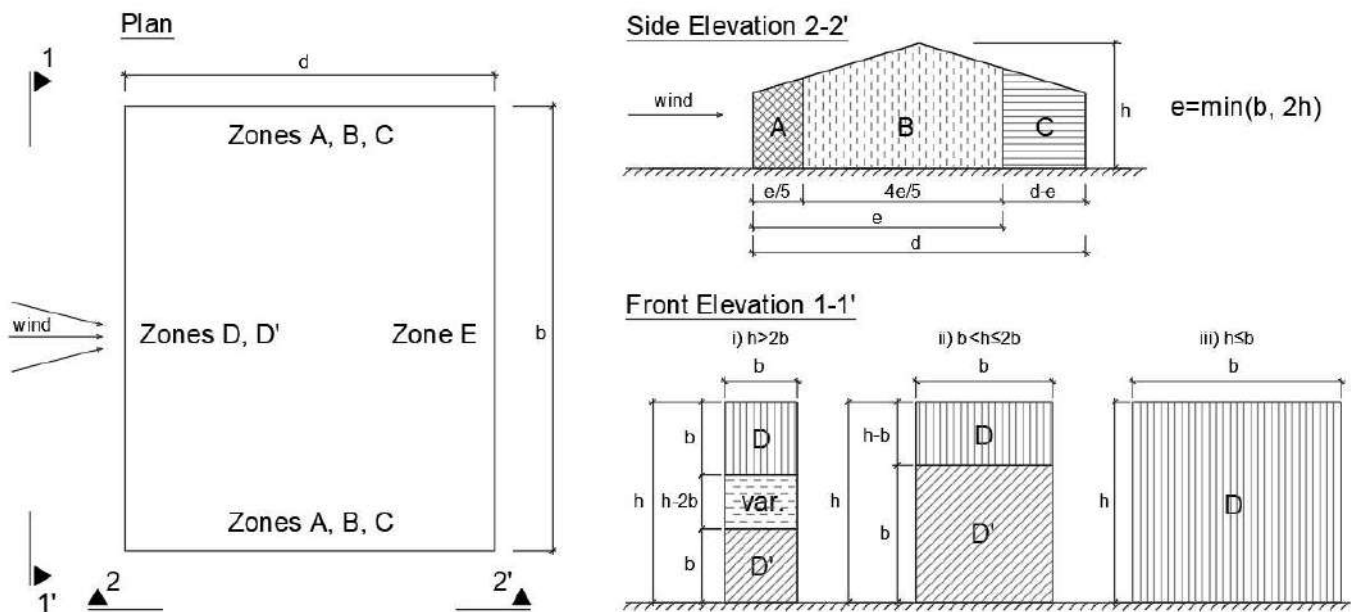
Nationally Defined Parameters

Air density	$\rho = 1.25$	kg/m ³
Additional rules defined in the National Annex for the calculation of peak velocity pressure $q_p(z_e)$	= None	☒
External pressure coefficients c_{pe}	= Default	☒

Results

Net wind pressure on zone A	$w_{net,A} = -1.152 \text{ kN/m}^2$
Net wind pressure on zone B	$w_{net,B} = -0.823 \text{ kN/m}^2$
Net wind pressure on zone C	$w_{net,C} = -0.576 \text{ kN/m}^2$
Net wind pressure on zone D	$w_{net,D} = 0.823 \text{ kN/m}^2$
Net wind pressure on zone D'	$w_{net,D'} = \text{N/A}$
Net wind pressure on zone E	$w_{net,E} = -0.411 \text{ kN/m}^2$

Characteristic length e	$e = \min(b, 2h) = 17.000$ m



Pressure zones for side walls of building (see also EN1991-1-4 Figures 7.4 and 7.5)

Notes

1. The calculated net wind pressure w_{net} corresponds to the overall wind effect on the surface including both the external wind pressure and the internal wind pressure.
2. Pressure zones that are not applicable for the examined structure are denoted by N/A.
3. The sign convention for the net pressure is the same as its external pressure part. Negative pressure values correspond to suction directed away from the surface i.e. towards the exterior of the building.
4. The calculated wind action effects are characteristic values (unfactored). Appropriate load factors should be applied for the relevant design situation. For ULS verifications the partial load factor $\gamma_Q = 1.50$ is applicable for variable actions.
5. According to EN1991-1-4 §7.2.1(1) for intermediate loaded areas A between 1m^2 and 10m^2 the external pressure coefficient c_{pe} may be calculated between the values $c_{pe,1}$ and $c_{pe,10}$ with logarithmic interpolation: $c_{pe} = c_{pe,1} - (c_{pe,1} - c_{pe,10}) \cdot \log_{10} A$.
6. According to EN1991-1-4 §7.2.9(2) when in at least two sides of the building (facades or roof) the total area of openings is more than 30% of the area of that side, the wind action should be calculated in accordance with EN1991-1-4 §7.3 and §7.4 instead (canopy roofs and free-standing walls)

Details

Input Data

- Terrain category: = II
- Basic wind velocity: $v_b = 24 \text{ m/s}$
- Horizontal dimension of rectangular plan parallel to the wind direction: $d = 52 \text{ m}$
- Horizontal dimension of rectangular plan perpendicular to the wind direction (crosswind dimension): $b = 17 \text{ m}$
- Height of building from ground up to roof level: $h = 9 \text{ m}$

- Size of loaded area that produces the wind action for the examined verification: $= >10\text{m}^2$ ($C_{pe,10}$)
- Orography factor at reference height z_e : $c_0(z_e) = 1$
- Building with a dominant face in terms of openings: = No
- Minimum value of internal pressure coefficient: $c_{pi,min} = -0.3$
- Maximum value of internal pressure coefficient: $c_{pi,max} = 0.2$

Nationally Defined Parameters

- Air density: $\rho = 1.25 \text{ kg/m}^3$
- Additional rules defined in the National Annex for the calculation of peak velocity pressure $q_p(z_e)$: = None
- External pressure coefficients c_{pe} : = Default

Calculation of peak velocity pressure

Reference height

The reference height for the wind action z_e is equal to the upper height of the different wall parts for the windward wall (zone D) and maximum height above ground of the building h for leeward wall (zone E) and sidewalls (zones A, B, C), as specified in [EN1991-1-4 §7.2.2\(1\)](#). Therefore:

$$z_e = h = 9.000 \text{ m}$$

Basic wind velocity

The basic wind velocity v_b is defined in [EN1991-1-4 §4.2\(2\)P](#) as a function of the wind direction and time of year at 10 m above ground of terrain category II. The value of v_b includes the effects of the directional factor c_{dir} and the seasonal factor c_{season} and it is provided in the National Annex. In the following calculations the basic wind velocity is considered as $v_b = 24.00 \text{ m/s}$.

Terrain roughness

The roughness length z_0 and the minimum height z_{min} are specified in [EN1991-1-4 Table 4.1](#) as a function of the terrain category. For terrain category II the corresponding values are: $z_0 = 0.050 \text{ m}$ and $z_{min} = 2.0 \text{ m}$.

The terrain factor k_r depending on the roughness length $z_0 = 0.050 \text{ m}$ is calculated in accordance with [EN1991-1-4 equation \(4.5\)](#):

$$k_r = 0.19 \cdot (z_0 / z_{0,II})^{0.07} = 0.19 \cdot (0.050 \text{ m} / 0.050 \text{ m})^{0.07} = 0.1900$$

The roughness factor $c_r(z_e)$ at the reference height z_e accounts for the variability of the mean wind velocity at the site. It is calculated in accordance with [EN1991-1-4 equation 4.4](#). For the examined case $z_e \geq z_{min}$:

$$c_r(z_e) = k_r \cdot \ln(\max\{z_e, z_{min}\} / z_0) = 0.1900 \cdot \ln(\max\{9.000 \text{ m}, 2.0 \text{ m}\} / 0.050 \text{ m}) = 0.9867$$

Orography factor

Where orography (e.g. hills, cliffs etc.) is significant its effect in the wind velocities should be taken into account using an orography factor $c_0(z_e)$ different than 1.0, as specified in [EN1994-1-1 §4.3.3](#). The recommended procedure in [EN1994-1-1 §4.3.3](#) for calculation of the orography factor $c_0(z_e)$ is described in [EN1994-1-1 §A.3](#).

In the following calculations the orography factor is considered as $c_0(z_e) = 1.000$.

Mean wind velocity

The mean wind velocity $v_m(z_e)$ at reference height z_e depends on the terrain roughness, terrain orography and the basic wind velocity v_b . It is determined using [EN1991-1-4 equation \(4.3\)](#):

$$v_m(z_e) = c_r(z_e) \cdot c_0(z_e) \cdot v_b = 0.9867 \cdot 1.000 \cdot 24.00 \text{ m/s} = 23.68 \text{ m/s}$$

Wind turbulence

The turbulence intensity $I_v(z_e)$ at reference height z_e is defined as the standard deviation of the turbulence divided by the mean wind velocity. It is calculated in accordance with [EN1991-1-4 equation 4.7](#). For the examined case $z_e \geq z_{\min}$.

$$I_v(z_e) = k_1 / [c_0(z_e) \cdot \ln(\max\{z_e, z_{\min}\} / z_0)] = 1.000 / [1.000 \cdot \ln(\max\{9.000 \text{ m}, 2.0 \text{ m}\} / 0.050 \text{ m})] = 0.1926$$

Basic velocity pressure

The basic velocity pressure q_b is the pressure corresponding to the wind momentum determined at the basic wind velocity v_b . The basic velocity pressure is calculated according to the fundamental relation specified in [EN1991-1-4 §4.5\(1\)](#):

$$q_b = (1/2) \cdot \rho \cdot v_b^2 = (1/2) \cdot 1.25 \text{ kg/m}^3 \cdot (24.00 \text{ m/s})^2 = 360 \text{ N/m}^2 = 0.360 \text{ kN/m}^2$$

where ρ is the density of the air in accordance with [EN1991-1-4 §4.5\(1\)](#). In this calculation the following value is considered: $\rho = 1.25 \text{ kg/m}^3$. Note that by definition $1 \text{ N} = 1 \text{ kg} \cdot \text{m/s}^2$.

Peak velocity pressure

The peak velocity pressure $q_p(z_e)$ at reference height z_e includes mean and short-term velocity fluctuations. It is determined according to [EN1991-1-4 equation 4.8](#):

$$q_p(z_e) = (1 + 7 \cdot I_v(z_e)) \cdot (1/2) \cdot \rho \cdot v_m(z_e)^2 = (1 + 7 \cdot 0.1926) \cdot (1/2) \cdot 1.25 \text{ kg/m}^3 \cdot (23.68 \text{ m/s})^2 = 823 \text{ N/m}^2 \\ \Rightarrow q_p(z_e) = 0.823 \text{ kN/m}^2$$

Note that by definition $1 \text{ N} = 1 \text{ kg} \cdot \text{m/s}^2$.

Calculation of the distribution of external wind pressure on the walls

Pressure coefficient type

The external pressure coefficients are divided into overall coefficients $c_{pe,10}$ and local coefficients $c_{pe,1}$ as described in [EN1991-1-4 §7.1.1\(1\) and §7.2.1\(1\)](#). Local coefficients $c_{pe,1}$ correspond to wind pressure for loaded areas $\leq 1 \text{ m}^2$ and they may be used for the design of small elements and fixings with an area per element of 1 m^2 or less such as cladding elements and roofing elements. Overall coefficients $c_{pe,10}$ correspond to wind pressure for loaded areas $\geq 10 \text{ m}^2$ and they may be used for the design of the overall load bearing structure.

According to [EN1991-1-4 §7.2.1\(1\)](#) for intermediate loaded areas A between 1 m^2 and 10 m^2 the external pressure coefficient c_{pe} may be calculated between the values $c_{pe,1}$ and $c_{pe,10}$ with logarithmic interpolation as follows:

$$c_{pe} = c_{pe,1} - (c_{pe,1} - c_{pe,10}) \cdot \log_{10} A$$

In the examined calculation the provided external pressure corresponds to coefficient $c_{pe,10}$ i.e. the results are applicable for global verifications.

Pressure zones and external pressure coefficients

The wind load on the structure is expressed in terms of external pressure coefficients for five zones A, B, C, D, E as defined in [EN1991-1-4 Figures 7.4 and 7.5](#) that are reproduced above. The extent of the zones

depends on the length e that is defined as:

$$e = \min(b, 2h) = \min(17.000 \text{ m}, 2 \cdot 9.000 \text{ m}) = 17.000 \text{ m}$$

- Pressure zones for sidewalls:

The most adverse Zone A extends from the front corners for length $e/5$. Zone B extends for length from $e/5$ to e . Zone C extends for length beyond e . For the examined case where $e = 17.000 \text{ m}$ the applicable zones are zones A, B, C.

- Pressure zone for windward wall:

The pressure zone corresponding to the windward wall is zone D.

For buildings with height $h \leq b$, where b is the width of the building perpendicular to the wind direction, the windward wall is considered to be one part denoted as zone D in the figure.

- Pressure zone for leeward wall:

The pressure zone corresponding to the leeward wall is zone E.

- External pressure coefficients

The external pressure coefficient c_{pe} for each of zones A, B, C, D, E is defined in [EN1991-1-4 Table 7.1](#) as a function of the ratio h/d . For the examined case: $h/d = 9.000 \text{ m} / 52.000 \text{ m} = 0.173$. Moreover, for the examined case the pressure coefficient $c_{pe,10}$ is examined that corresponds to the wind effects on loaded areas in the order of 10m^2 that are appropriate for global effects of the structure. Therefore according to [EN1991-1-4 Table 7.1](#) the following external pressure coefficient are obtained, using linear interpolation where appropriate:

Zone	External pressure coefficient
Zone A	$c_{pe,A} = -1.200$
Zone B	$c_{pe,B} = -0.800$
Zone C	$c_{pe,C} = -0.500$
Zone D	$c_{pe,D} = 0.700$
Zone E	$c_{pe,E} = -0.300$

Negative values for the external pressure coefficient correspond to suction directed away from the wall surface towards the exterior.

Internal pressure coefficients

Internal pressure coefficients c_{pi} are specified in [EN1991-1-4 §7.2.9](#) depending on the size and distribution of the openings of the building and background permeability due to leakage paths. A face of the building is considered dominant when the area of openings at that face is at least two times the area of openings and leakages in the remaining faces of the building.

For building without a dominant face and where it is not possible or not justified to estimate the effect of opening distribution in a more accurate manner then the most onerous internal pressure coefficient $c_{pi} = +0.2$ or $c_{pi} = -0.3$ should be considered, as specified in [EN1991-1-4 §7.2.9\(6\), Note 2](#). In this calculation the following value of the internal pressure coefficient are considered:

$$c_{pi,min} = -0.300 \text{ and } c_{pi,max} = 0.200$$

Negative values for the internal pressure coefficient correspond to suction directed away from the internal surface inducing forces towards the interior of the building.

External wind pressure

The external wind pressure on the structure w_e corresponds to the pressure effect on the exterior surface of the side walls. The external pressure on the surfaces is derived from the calculated value of the peak velocity pressure $q_p(z_e) = 0.823 \text{ kN/m}^2$ by application of the appropriate external pressure coefficient c_{pe} as specified in [EN1991-1-4 §5.2\(1\)](#).

$$w_e = q_p(z_e) \cdot c_{pe}$$

Internal wind pressure

The internal wind pressure on the structure w_i corresponds to the pressure effect on the interior surface of the side walls. The internal pressure on the surfaces is derived from the value of the peak velocity pressure $q_p(z_i)$ by application of the appropriate internal pressure coefficient c_{pi} as specified in [EN1991-1-4 §5.2\(2\)](#).

$$w_i = q_p(z_i) \cdot c_{pi}$$

The peak velocity pressure $q_p(z_i)$ corresponds to the reference height for internal pressure z_i . The reference height for the internal pressure is specified in [EN1991-1-4 §7.2.9\(7\)](#) equal to the reference height z_e corresponding to the faces which contribute with their openings to the creation of the internal pressure. In this calculation it is assumed that $z_i = z_e = 9.000 \text{ m}$ and $q_p(z_i) = q_p(z_e) = 0.823 \text{ kN/m}^2$.

Net wind pressure

The net wind pressure on the surfaces of the structure w_{net} corresponds to the combined effects of external wind pressure and internal wind pressure.

For structural surfaces consisting of only one skin the net pressure effect is determined as:

$$w_{net} = w_e - w_i = q_p(z_e) \cdot c_{pe} - q_p(z_i) \cdot c_{pi}$$

For structural surfaces consisting of more than one skin [EN1991-1-4 §7.2.10](#) is applicable.

Net wind pressure on pressure zones

For the case where no dominant face in terms of openings is present, the most unfavorable net wind pressure for each pressure zone is obtained by combining the corresponding external pressure coefficient c_{pe} with the most unfavorable value of the internal pressure coefficient $c_{pi,min} = -0.300$ or $c_{pi,max} = 0.200$. When c_{pe} is positive then $c_{pi,min} = -0.300$ is most onerous. When c_{pe} is negative then $c_{pi,max} = 0.200$ is most onerous.

For the different pressure zones on the side walls the following net pressures are obtained:

For the different pressure zones on the building walls the following net pressures are obtained:

Zone	Net wind pressure
Zone A	$w_{net,A} = -1.152 \text{ kN/m}^2$
Zone B	$w_{net,B} = -0.823 \text{ kN/m}^2$

Zone C $w_{\text{net,C}} = -0.576 \text{ kN/m}^2$

Zone D $w_{\text{net,D}} = 0.823 \text{ kN/m}^2$

Zone D' Not applicable

Zone E $w_{\text{net,E}} = -0.411 \text{ kN/m}^2$

- Zone A start at the front corners of the sidewalls and extends for length $e/5 = 3.400 \text{ m}$.
- Zone B extends for length from $e/5 = 3.400 \text{ m}$ to $e = 17.000 \text{ m}$.
- Zone C extends for length from $e = 17.000 \text{ m}$ up to the full length $d = 52.000 \text{ m}$ along the wind direction.
- Zone D starts from ground level up to the full height of the windward wall $h = 9.000 \text{ m}$.
- Zone D' is not applicable for the examined structure
- Zone E corresponds to the leeward wall.

Negative net pressure values correspond to suction directed away from the external surface towards the exterior.

Additional notes

- If significant openings exist on the structure then internal wind pressure may need to be determined accurately as described in [EN1991-1-4 §5.2](#).
- Lack of correlation between the windward size (zone D) and the leeward side (zone E) may be taken into account by application of a reduction coefficient to the resulting force as described in [EN1991-1-4 §7.2.2\(3\)](#).
- The calculated wind action effects are characteristic values (unfactored). Appropriate load factors should be applied for the relevant design situation. For ULS verifications the partial load factor $\gamma_Q = 1.50$ is applicable for variable actions according to EN1990.



Project:

Subject:

Designer:

Date:

Eurocode 1

Wind load on building side walls (external and internal pressure coefficients)

Description:

Calculation of wind load action effects on vertical side walls of building. The net effect of external and internal wind pressure for zones A, B, C, D, E on the wall surface are calculated from the corresponding pressure coefficients

According to:

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Applicable for:

Vertical walls of rectangular plan buildings, flat or inclined roof, and height h less than five times the width b perpendicular to the wind direction, consisting of one skin

Supported

National

Annexes:

A) Calculation of pressure coefficients: Apart from countries that adopt CEN recommended values for section 7.2.2 of EN1991-1-4, the following National Annexes are supported: Croatia. B) Peak velocity pressure: The value can be specified manually. Otherwise automatic calculation of peak velocity pressure is supported for countries that adopt the CEN recommended values for the related NDPs, and also for the following National Annexes: Finland, Portugal. The National Annexes of Germany, Norway, Spain, Sweden, Switzerland are NOT supported.

Input

Terrain category	= II	▼
Basic wind velocity	$V_b = 24$	m/s
Horizontal dimension of rectangular plan parallel to the wind direction	$d = 17$	m
Horizontal dimension of rectangular plan perpendicular to the wind direction (crosswind dimension)	$b = 52$	m
Height of building from ground up to roof level	$h = 9$	m
Size of loaded area that produces the wind action for the examined verification	= $>10\text{m}^2$ (Cpe,10)	▼

Orography factor at reference height z_e	$C_0(z_e) = 1$
Building with a dominant face in terms of openings	= No ☒
Minimum value of internal pressure coefficient	$C_{pi,min} = -0.3$
Maximum value of internal pressure coefficient	$C_{pi,max} = 0.2$

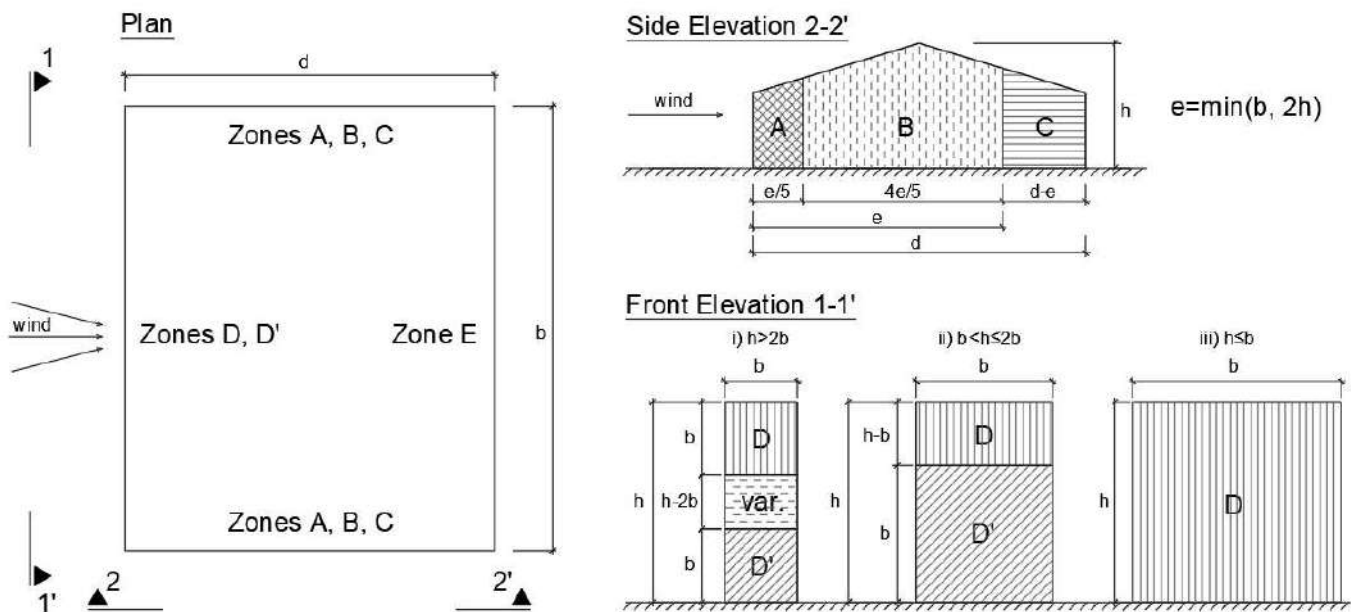
Nationally Defined Parameters

Air density	$\rho = 1.25$	kg/m ³
Additional rules defined in the National Annex for the calculation of peak velocity pressure $q_p(z_e)$	= None	☒
External pressure coefficients c_{pe}	= Default	☒

Results

Net wind pressure on zone A	$w_{net,A} = -1.152 \text{ kN/m}^2$
Net wind pressure on zone B	$w_{net,B} = -0.823 \text{ kN/m}^2$
Net wind pressure on zone C	$w_{net,C} = \text{N/A}$
Net wind pressure on zone D	$w_{net,D} = 0.854 \text{ kN/m}^2$
Net wind pressure on zone D'	$w_{net,D'} = \text{N/A}$
Net wind pressure on zone E	$w_{net,E} = -0.473 \text{ kN/m}^2$

Characteristic length e	$e = \min(b, 2h) = 18.000$ m



Pressure zones for side walls of building (see also EN1991-1-4 Figures 7.4 and 7.5)

Notes

1. The calculated net wind pressure w_{net} corresponds to the overall wind effect on the surface including both the external wind pressure and the internal wind pressure.
2. Pressure zones that are not applicable for the examined structure are denoted by N/A.
3. The sign convention for the net pressure is the same as its external pressure part. Negative pressure values correspond to suction directed away from the surface i.e. towards the exterior of the building.
4. The calculated wind action effects are characteristic values (unfactored). Appropriate load factors should be applied for the relevant design situation. For ULS verifications the partial load factor $\gamma_Q = 1.50$ is applicable for variable actions.
5. According to EN1991-1-4 §7.2.1(1) for intermediate loaded areas A between 1m^2 and 10m^2 the external pressure coefficient c_{pe} may be calculated between the values $c_{pe,1}$ and $c_{pe,10}$ with logarithmic interpolation: $c_{pe} = c_{pe,1} - (c_{pe,1} - c_{pe,10}) \cdot \log_{10} A$.
6. According to EN1991-1-4 §7.2.9(2) when in at least two sides of the building (facades or roof) the total area of openings is more than 30% of the area of that side, the wind action should be calculated in accordance with EN1991-1-4 §7.3 and §7.4 instead (canopy roofs and free-standing walls)

Details

Input Data

- Terrain category: = II
- Basic wind velocity: $v_b = 24 \text{ m/s}$
- Horizontal dimension of rectangular plan parallel to the wind direction: $d = 17 \text{ m}$
- Horizontal dimension of rectangular plan perpendicular to the wind direction (crosswind dimension): $b = 52 \text{ m}$
- Height of building from ground up to roof level: $h = 9 \text{ m}$

- Size of loaded area that produces the wind action for the examined verification: $= >10\text{m}^2$ ($C_{pe,10}$)
- Orography factor at reference height z_e : $c_0(z_e) = 1$
- Building with a dominant face in terms of openings: = No
- Minimum value of internal pressure coefficient: $c_{pi,min} = -0.3$
- Maximum value of internal pressure coefficient: $c_{pi,max} = 0.2$

Nationally Defined Parameters

- Air density: $\rho = 1.25 \text{ kg/m}^3$
- Additional rules defined in the National Annex for the calculation of peak velocity pressure $q_p(z_e)$: = None
- External pressure coefficients c_{pe} : = Default

Calculation of peak velocity pressure

Reference height

The reference height for the wind action z_e is equal to the upper height of the different wall parts for the windward wall (zone D) and maximum height above ground of the building h for leeward wall (zone E) and sidewalls (zones A, B, C), as specified in [EN1991-1-4 §7.2.2\(1\)](#). Therefore:

$$z_e = h = 9.000 \text{ m}$$

Basic wind velocity

The basic wind velocity v_b is defined in [EN1991-1-4 §4.2\(2\)P](#) as a function of the wind direction and time of year at 10 m above ground of terrain category II. The value of v_b includes the effects of the directional factor c_{dir} and the seasonal factor c_{season} and it is provided in the National Annex. In the following calculations the basic wind velocity is considered as $v_b = 24.00 \text{ m/s}$.

Terrain roughness

The roughness length z_0 and the minimum height z_{min} are specified in [EN1991-1-4 Table 4.1](#) as a function of the terrain category. For terrain category II the corresponding values are: $z_0 = 0.050 \text{ m}$ and $z_{min} = 2.0 \text{ m}$.

The terrain factor k_r depending on the roughness length $z_0 = 0.050 \text{ m}$ is calculated in accordance with [EN1991-1-4 equation \(4.5\)](#):

$$k_r = 0.19 \cdot (z_0 / z_{0,II})^{0.07} = 0.19 \cdot (0.050 \text{ m} / 0.050 \text{ m})^{0.07} = 0.1900$$

The roughness factor $c_r(z_e)$ at the reference height z_e accounts for the variability of the mean wind velocity at the site. It is calculated in accordance with [EN1991-1-4 equation 4.4](#). For the examined case $z_e \geq z_{min}$:

$$c_r(z_e) = k_r \cdot \ln(\max\{z_e, z_{min}\} / z_0) = 0.1900 \cdot \ln(\max\{9.000 \text{ m}, 2.0 \text{ m}\} / 0.050 \text{ m}) = 0.9867$$

Orography factor

Where orography (e.g. hills, cliffs etc.) is significant its effect in the wind velocities should be taken into account using an orography factor $c_0(z_e)$ different than 1.0, as specified in [EN1994-1-1 §4.3.3](#). The recommended procedure in [EN1994-1-1 §4.3.3](#) for calculation of the orography factor $c_0(z_e)$ is described in [EN1994-1-1 §A.3](#).

In the following calculations the orography factor is considered as $c_0(z_e) = 1.000$.

Mean wind velocity

The mean wind velocity $v_m(z_e)$ at reference height z_e depends on the terrain roughness, terrain orography and the basic wind velocity v_b . It is determined using [EN1991-1-4 equation \(4.3\)](#):

$$v_m(z_e) = c_r(z_e) \cdot c_0(z_e) \cdot v_b = 0.9867 \cdot 1.000 \cdot 24.00 \text{ m/s} = 23.68 \text{ m/s}$$

Wind turbulence

The turbulence intensity $I_v(z_e)$ at reference height z_e is defined as the standard deviation of the turbulence divided by the mean wind velocity. It is calculated in accordance with [EN1991-1-4 equation 4.7](#). For the examined case $z_e \geq z_{\min}$.

$$I_v(z_e) = k_1 / [c_0(z_e) \cdot \ln(\max\{z_e, z_{\min}\} / z_0)] = 1.000 / [1.000 \cdot \ln(\max\{9.000 \text{ m}, 2.0 \text{ m}\} / 0.050 \text{ m})] = 0.1926$$

Basic velocity pressure

The basic velocity pressure q_b is the pressure corresponding to the wind momentum determined at the basic wind velocity v_b . The basic velocity pressure is calculated according to the fundamental relation specified in [EN1991-1-4 §4.5\(1\)](#):

$$q_b = (1/2) \cdot \rho \cdot v_b^2 = (1/2) \cdot 1.25 \text{ kg/m}^3 \cdot (24.00 \text{ m/s})^2 = 360 \text{ N/m}^2 = 0.360 \text{ kN/m}^2$$

where ρ is the density of the air in accordance with [EN1991-1-4 §4.5\(1\)](#). In this calculation the following value is considered: $\rho = 1.25 \text{ kg/m}^3$. Note that by definition $1 \text{ N} = 1 \text{ kg} \cdot \text{m/s}^2$.

Peak velocity pressure

The peak velocity pressure $q_p(z_e)$ at reference height z_e includes mean and short-term velocity fluctuations. It is determined according to [EN1991-1-4 equation 4.8](#):

$$q_p(z_e) = (1 + 7 \cdot I_v(z_e)) \cdot (1/2) \cdot \rho \cdot v_m(z_e)^2 = (1 + 7 \cdot 0.1926) \cdot (1/2) \cdot 1.25 \text{ kg/m}^3 \cdot (23.68 \text{ m/s})^2 = 823 \text{ N/m}^2 \\ \Rightarrow q_p(z_e) = 0.823 \text{ kN/m}^2$$

Note that by definition $1 \text{ N} = 1 \text{ kg} \cdot \text{m/s}^2$.

Calculation of the distribution of external wind pressure on the walls

Pressure coefficient type

The external pressure coefficients are divided into overall coefficients $c_{pe,10}$ and local coefficients $c_{pe,1}$ as described in [EN1991-1-4 §7.1.1\(1\) and §7.2.1\(1\)](#). Local coefficients $c_{pe,1}$ correspond to wind pressure for loaded areas $\leq 1 \text{ m}^2$ and they may be used for the design of small elements and fixings with an area per element of 1 m^2 or less such as cladding elements and roofing elements. Overall coefficients $c_{pe,10}$ correspond to wind pressure for loaded areas $\geq 10 \text{ m}^2$ and they may be used for the design of the overall load bearing structure.

According to [EN1991-1-4 §7.2.1\(1\)](#) for intermediate loaded areas A between 1 m^2 and 10 m^2 the external pressure coefficient c_{pe} may be calculated between the values $c_{pe,1}$ and $c_{pe,10}$ with logarithmic interpolation as follows:

$$c_{pe} = c_{pe,1} - (c_{pe,1} - c_{pe,10}) \cdot \log_{10} A$$

In the examined calculation the provided external pressure corresponds to coefficient $c_{pe,10}$ i.e. the results are applicable for global verifications.

Pressure zones and external pressure coefficients

The wind load on the structure is expressed in terms of external pressure coefficients for five zones A, B, C, D, E as defined in [EN1991-1-4 Figures 7.4 and 7.5](#) that are reproduced above. The extent of the zones

depends on the length e that is defined as:

$$e = \min(b, 2h) = \min(52.000 \text{ m}, 2 \cdot 9.000 \text{ m}) = 18.000 \text{ m}$$

- Pressure zones for sidewalls:

The most adverse Zone A extends from the front corners for length $e/5$. Zone B extends for length from $e/5$ to e . Zone C extends for length beyond e . For the examined case where $e = 18.000 \text{ m}$ the applicable zones are zones A, B.

- Pressure zone for windward wall:

The pressure zone corresponding to the windward wall is zone D.

For buildings with height $h \leq b$, where b is the width of the building perpendicular to the wind direction, the windward wall is considered to be one part denoted as zone D in the figure.

- Pressure zone for leeward wall:

The pressure zone corresponding to the leeward wall is zone E.

- External pressure coefficients

The external pressure coefficient c_{pe} for each of zones A, B, C, D, E is defined in [EN1991-1-4 Table 7.1](#) as a function of the ratio h/d . For the examined case: $h/d = 9.000 \text{ m} / 17.000 \text{ m} = 0.529$. Moreover, for the examined case the pressure coefficient $c_{pe,10}$ is examined that corresponds to the wind effects on loaded areas in the order of 10m^2 that are appropriate for global effects of the structure. Therefore according to [EN1991-1-4 Table 7.1](#) the following external pressure coefficient are obtained, using linear interpolation where appropriate:

Zone	External pressure coefficient
Zone A	$c_{pe,A} = -1.200$
Zone B	$c_{pe,B} = -0.800$
Zone C	$c_{pe,C} = -0.500$
Zone D	$c_{pe,D} = 0.737$
Zone E	$c_{pe,E} = -0.375$

Negative values for the external pressure coefficient correspond to suction directed away from the wall surface towards the exterior.

Internal pressure coefficients

Internal pressure coefficients c_{pi} are specified in [EN1991-1-4 §7.2.9](#) depending on the size and distribution of the openings of the building and background permeability due to leakage paths. A face of the building is considered dominant when the area of openings at that face is at least two times the area of openings and leakages in the remaining faces of the building.

For building without a dominant face and where it is not possible or not justified to estimate the effect of opening distribution in a more accurate manner then the most onerous internal pressure coefficient $c_{pi} = +0.2$ or $c_{pi} = -0.3$ should be considered, as specified in [EN1991-1-4 §7.2.9\(6\), Note 2](#). In this calculation the following value of the internal pressure coefficient are considered:

$$c_{pi,min} = -0.300 \text{ and } c_{pi,max} = 0.200$$

Negative values for the internal pressure coefficient correspond to suction directed away from the internal surface inducing forces towards the interior of the building.

External wind pressure

The external wind pressure on the structure w_e corresponds to the pressure effect on the exterior surface of the side walls. The external pressure on the surfaces is derived from the calculated value of the peak velocity pressure $q_p(z_e) = 0.823 \text{ kN/m}^2$ by application of the appropriate external pressure coefficient c_{pe} as specified in [EN1991-1-4 §5.2\(1\)](#).

$$w_e = q_p(z_e) \cdot c_{pe}$$

Internal wind pressure

The internal wind pressure on the structure w_i corresponds to the pressure effect on the interior surface of the side walls. The internal pressure on the surfaces is derived from the value of the peak velocity pressure $q_p(z_i)$ by application of the appropriate internal pressure coefficient c_{pi} as specified in [EN1991-1-4 §5.2\(2\)](#).

$$w_i = q_p(z_i) \cdot c_{pi}$$

The peak velocity pressure $q_p(z_i)$ corresponds to the reference height for internal pressure z_i . The reference height for the internal pressure is specified in [EN1991-1-4 §7.2.9\(7\)](#) equal to the reference height z_e corresponding to the faces which contribute with their openings to the creation of the internal pressure. In this calculation it is assumed that $z_i = z_e = 9.000 \text{ m}$ and $q_p(z_i) = q_p(z_e) = 0.823 \text{ kN/m}^2$.

Net wind pressure

The net wind pressure on the surfaces of the structure w_{net} corresponds to the combined effects of external wind pressure and internal wind pressure.

For structural surfaces consisting of only one skin the net pressure effect is determined as:

$$w_{net} = w_e - w_i = q_p(z_e) \cdot c_{pe} - q_p(z_i) \cdot c_{pi}$$

For structural surfaces consisting of more than one skin [EN1991-1-4 §7.2.10](#) is applicable.

Net wind pressure on pressure zones

For the case where no dominant face in terms of openings is present, the most unfavorable net wind pressure for each pressure zone is obtained by combining the corresponding external pressure coefficient c_{pe} with the most unfavorable value of the internal pressure coefficient $c_{pi,min} = -0.300$ or $c_{pi,max} = 0.200$. When c_{pe} is positive then $c_{pi,min} = -0.300$ is most onerous. When c_{pe} is negative then $c_{pi,max} = 0.200$ is most onerous.

For the different pressure zones on the side walls the following net pressures are obtained:

For the different pressure zones on the building walls the following net pressures are obtained:

Zone	Net wind pressure
Zone A	$w_{net,A} = -1.152 \text{ kN/m}^2$
Zone B	$w_{net,B} = -0.823 \text{ kN/m}^2$

Zone C Not applicable

Zone D $w_{\text{net,D}} = 0.854 \text{ kN/m}^2$

Zone D' Not applicable

Zone E $w_{\text{net,E}} = -0.473 \text{ kN/m}^2$

- Zone A start at the front corners of the sidewalls and extends for length $e/5 = 3.600 \text{ m}$.
- Zone B extends for length from $e/5 = 3.600 \text{ m}$ up to the full length $d = 17.000 \text{ m}$ along the wind direction.
- Zone C is not applicable for the examined structure.
- Zone D starts from ground level up to the full height of the windward wall $h = 9.000 \text{ m}$.
- Zone D' is not applicable for the examined structure
- Zone E corresponds to the leeward wall.

Negative net pressure values correspond to suction directed away from the external surface towards the exterior.

Additional notes

- If significant openings exist on the structure then internal wind pressure may need to be determined accurately as described in [EN1991-1-4 §5.2](#).
- Lack of correlation between the windward size (zone D) and the leeward side (zone E) may be taken into account by application of a reduction coefficient to the resulting force as described in [EN1991-1-4 §7.2.2\(3\)](#).
- The calculated wind action effects are characteristic values (unfactored). Appropriate load factors should be applied for the relevant design situation. For ULS verifications the partial load factor $\gamma_Q = 1.50$ is applicable for variable actions according to EN1990.

2 priedas

Polio armavimas

Project: Subject: Designer: Date:

Eurocode 2

ULS design of circular (or tubular) reinforced concrete cross-section for bending and axial force

Description:

ULS design of circular or tubular reinforced concrete cross-section for bending and axial force (calculation of required reinforcement for given bending moment / axial force, maximum moment resistance MRd for given axial force, or complete M-N interaction diagram for given reinforcement layout)

According to:

EN 1992-1-1:2004+AC2:2010 Section 6.1

Supported

National

Annexes:

Nationally Defined Parameters (NDPs) automatically filled for supported countries

Input

Concrete characteristic strength	$f_{ck} = 25$	MPa
Steel characteristic yield strength	$f_{yk} = 500$	MPa
Type of reinforcement stress-strain law	= No hardening (Perfectly plastic) ▼	

External diameter of cross-section	$D_{ext} = 0.6$	m

Internal diameter (for hollow tube sections)	$D_{int} = 0$	m

Initial reinforcement: When the required reinforcement is requested the initial reinforcement will be modified accordingly.

Number of bars of external reinforcement layer 1	$n_{bars,1} = 6$

Diameter of bars of external reinforcement layer 1	$\phi_1 = 16$	mm

Distance from centroid of external reinforcement layer 1 to external concrete edge

$$c'_1 = 0.091 \quad \text{m}$$

Number of bars of internal reinforcement layer 2

$$n_{\text{bars},2} = 0$$

Diameter of bars of internal reinforcement layer 2

$$\phi_2 = 1 \quad \text{mm}$$

Distance from centroid of internal reinforcement layer 2 to external concrete edge

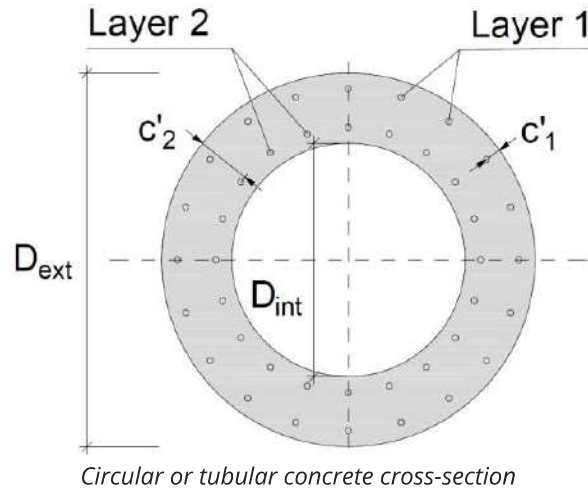
$$c'_2 = 0.175 \quad \text{m}$$

Type of analysis

= Bending resistance MRd ▼

Design value of the axial force - ULS factored loads (compression negative)

$$N_{\text{Ed}} = -437 \quad \text{kN}$$



Nationally Defined Parameters

Coefficient taking account of long term effects and loading effects on the compressive strength of concrete (for bending)

$$\alpha_{\text{cc}} = 0.9$$

Concrete partial material safety factor

$$\gamma_c = 1.5$$

Reinforcement steel partial material safety factor

$$\gamma_s = 1.15$$

Design value of reinforcement ultimate strain

$$\epsilon_{\text{ud}} = 0.9\epsilon_{\text{uk}} \quad \checkmark$$

Results

Maximum design bending moment
resistance for given design axial force

$$M_{Rd} = 195.79 \text{ kNm}$$

Reinforcement - Layer 1 (external)

$$A_{s,1} = 12.06 \text{ cm}^2$$

Reinforcement - Layer 2 (internal)

$$A_{s,2} = 0.00 \text{ cm}^2$$

Reinforcement - Total

$$A_{s,tot} = 12.06 \text{ cm}^2 (0.43\%)$$

Check of total axial force convergence

$$|\Delta N| = 0.00 \text{ N} \leq 1 \text{ N} \Rightarrow \text{ok}$$

Check of bending moment convergence

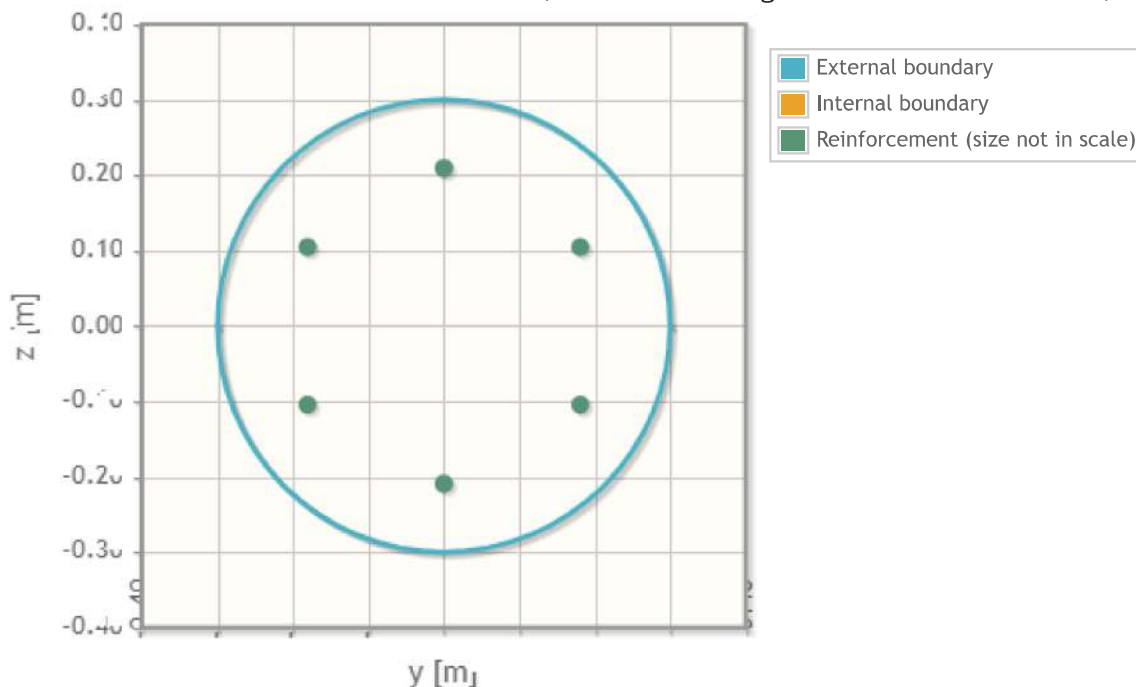
$$|\Delta M| = 0.00 \text{ Nm} \leq 1 \text{ Nm} \Rightarrow \text{ok}$$

Notes

1. Positive bending moment produces tension at the bottom side. Negative bending moment produces tension at the top side.
2. According to EN1992-1-1 § 6.1(4) when the axial force N_{Ed} is compressive the absolute value of the design bending moment should be at least $|M_{Ed}| \geq e_0 \times |N_{Ed}|$ where e_0 is the minimum assumed eccentricity of the compressive load which is equal to $e_0 = \max(h/30, 20 \text{ mm})$, where h is the total depth of the cross-section.

Charts

Cross-section (hover=value, drag=zoom, double-click=reset)



Tables

Internal equilibrium state of cross-section

	N-M interaction		Lever arm & neutral axis				
#	Design axial force resistance N_{Rd} [kN]	Design bending moment resistance M_{Rd} [kNm]	Location of neutral axis from centroid y_n [m]	Lever arm of internal forces z [m]	Normalized level arm z/d [-]	Depth of compressive zone x [m]	Normalized depth of compressive zone x/d [-]
1	-437.00	195.79	0.137	0.314	0.617	0.163	0.319

Details

Input Data

- Concrete characteristic strength: $f_{ck} = 25$ MPa
- Steel characteristic yield strength: $f_{yk} = 500$ MPa
- Type of reinforcement stress-strain law: = No hardening (Perfectly plastic)
- Ratio of characteristic ultimate strength to characteristic yield strength: $(f_t/f_y)_k = 1$
- Characteristic value of ultimate strain: $\epsilon_{uk} = 75$ ‰
- External diameter of cross-section: $D_{ext} = 0.6$ m
- Internal diameter (for hollow tube sections): $D_{int} = 0$ m
- Number of bars of external reinforcement layer 1: $n_{bars,1} = 6$
- Diameter of bars of external reinforcement layer 1: $\Phi_1 = 16$ mm
- Distance from centroid of external reinforcement layer 1 to external concrete edge: $c'_1 = 0.091$ m
- Number of bars of internal reinforcement layer 2: $n_{bars,2} = 0$
- Diameter of bars of internal reinforcement layer 2: $\Phi_2 = 1$ mm
- Distance from centroid of internal reinforcement layer 2 to external concrete edge: $c'_2 = 0.175$ m
- Type of analysis: = Bending resistance M_{Rd}
- Design value of the bending moment - ULS factored loads (positive when tension at bottom side): $M_{Ed} = 55$ kNm
- Design value of the axial force - ULS factored loads (compression negative): $N_{Ed} = -437$ kN
- Variable reinforcement layers to be modified: = Layers 1 & 2

Nationally Defined Parameters

- Coefficient taking account of long term effects and loading effects on the compressive strength of concrete (for bending): $\alpha_{cc} = 0.9$
- Concrete partial material safety factor: $\gamma_c = 1.5$
- Reinforcement steel partial material safety factor: $\gamma_s = 1.15$
- Design value of reinforcement ultimate strain: $\epsilon_{ud} = 0.9\epsilon_{uk}$

Properties of circular (or tubular) concrete cross-section

The following geometric properties are obtained from basic theory of mechanics. The values of the reinforcement areas, reinforcement ratios and axial resistances of the cross-section correspond to the final reinforcement if different than the initially specified reinforcement.

- Area of gross cross-section: $A = 0.2827$ m²
- Second moment of the area of gross cross-section: $I = 0.006362$ m⁴
- Total height of cross-section: $h = 0.600$ m
- Location of centroid of gross cross-section (from top): $z_{cm} = 0.300$ m
- Total area of longitudinal reinforcement: $A_{s,tot} = 12.06$ cm²

- Geometric reinforcement ratio: $\rho_l = A_{s,tot} / A = 0.0043 = 0.43 \%$
- Mechanical reinforcement ratio: $\omega = \rho_l \cdot f_{yd} / f_{cd} = 0.1237$
- Compressive axial force resistance (ULS): $N_{Rd,compression} = -4723.70 \text{ kN}$
- Tensile axial force resistance (ULS): $N_{Rd,tension} = 524.51 \text{ kN}$

Stress-strain law at the Ultimate Limit State (ULS)

Assumptions

The design ULS bending moment resistance M_{Rd} of reinforced concrete cross-section is covered in [EN1992-1-1 §6.1](#). This analysis is applicable for undisturbed regions of beams, columns, slabs and other similar types of members for which sections remain plane before and after loading. Discontinuity regions are not covered in this calculation, see [EN 1992-1-1 §6.5](#) instead.

The following assumptions are made in [EN1992-1-1 §6.1\(2\)P](#):

- Plane sections remain plane after loading.
- The strain in bonded reinforcement or bonded prestressing tendons, whether in tension or in compression, is the same as that in the surrounding concrete.
- The tensile strength of the concrete is ignored.
- The initial strain in prestressing tendons is taken into account when assessing the stresses in the tendons.

Stress-strain relation for concrete

The stresses in the concrete in compression σ_c are obtained from the design curves in [EN1992-1-1 §3.1.7](#) and [EN1992-1-1 Figure 3.3](#) as a function of the concrete strain ϵ_c :

$$\begin{aligned} \sigma_c &= 0 \text{ for tensile strain} \\ \sigma_c &= f_{cd} \cdot [1 - (1 - \epsilon_c / \epsilon_{c2})^n] \text{ for compressive strain } 0 \leq \epsilon_c \leq \epsilon_{c2} \\ \sigma_c &= f_{cd} \text{ for compressive strain } \epsilon_{c2} < \epsilon_c \leq \epsilon_{cu2} \end{aligned}$$

The value of the design compressive strength of concrete f_{cd} is calculated as specified in [EN1992-1-1 §3.1.6\(1\)P](#):

$$f_{cd} = \alpha_{cc} \cdot f_{ck} / \gamma_C = 0.90 \cdot 25.00 \text{ MPa} / 1.50 = 15.00 \text{ MPa}$$

The strains ϵ_{c2} , ϵ_{cu2} and the exponent n are defined in [EN1992-1-1 Table 3.1](#) depending on the concrete class. For characteristic strength $f_{ck} = 25.00 \text{ MPa}$ the corresponding values are $\epsilon_{c2} = 2.00 \text{ ‰}$, $\epsilon_{cu2} = 3.50 \text{ ‰}$ and $n = 2.00$.

Stress-strain relation for reinforcement steel

The stresses in reinforcement steel σ_s are obtained from the design curves in [EN1992-1-1 §3.2.7](#) and [EN1992-1-1 Figure 3.8](#) as a function of the steel strain ϵ_s :

$$\begin{aligned} \sigma_s &= E \cdot \epsilon_s \text{ for strains below the design yield point } -\epsilon_{yd} \leq \epsilon_s \leq \epsilon_{yd} \\ \sigma_s &= +f_{yd} \cdot [1 + ((f_t/f_y)_k - 1) \cdot (\epsilon_s - \epsilon_{yd}) / (\epsilon_{uk} - \epsilon_{yd})] \text{ for tensile strain } \epsilon_{yd} < \epsilon_s \leq \epsilon_{ud} \\ \sigma_s &= -f_{yd} \cdot [1 + ((f_t/f_y)_k - 1) \cdot (|\epsilon_s| - \epsilon_{yd}) / (\epsilon_{uk} - \epsilon_{yd})] \text{ for compressive strain } \epsilon_s < -\epsilon_{yd} \end{aligned}$$

The value of the design yield strength of reinforcement steel f_{yd} is calculated as specified in [EN1992-1-1 §3.2](#):

$$f_{yd} = f_{yk} / \gamma_s = 500.0 \text{ MPa} / 1.15 = 434.78 \text{ MPa}$$

The design yield strain of the reinforcement steel ϵ_{yd} is calculated based on the modulus of elasticity specified in [EN1992-1-1 §3.2.7\(4\)](#):

$$\epsilon_{yd} = f_{yd} / E = 434.78 \text{ MPa} / 200000 \text{ MPa} = 2.17 \text{ ‰}$$

The characteristic values of the ultimate strain ϵ_{uk} and the ratio $(f_t/f_y)_k$ are defined in [EN1992-1-1 Annex C](#) depending on the steel ductility class. The design ultimate strain ϵ_{ud} is specified in [EN1992-1-1 §3.2.7\(2\)](#) and the National Annex.

According to [EN1992-1-1 §3.2.7\(2\)](#) the stress-strain law of reinforcement steel can be approximated by either of the following:

- An inclined top branch with a strain limit of ϵ_{ud} and a maximum stress of $(f_t/f_y)_k \cdot (f_{yk} / \gamma_s)$ at ϵ_{uk} ,
- A horizontal top branch (i.e. $(f_t/f_y)_k = 1$) without the need to check the strain limit.

In this calculation the stress-strain law for reinforcement steel is considered with a horizontal top branch (i.e. $(f_t/f_y)_k = 1$). According to [EN1992-1-1 §3.2.7\(2\)](#) for this case there is no need to check the strain limit. For numerical reasons the design value of the tensile strain limit $\epsilon_{ud} = 67.50 \text{ ‰}$ is assumed in the calculations.

The following values are assumed:

- Characteristic tensile strain limit: $\epsilon_{uk} = 75.00 \text{ ‰}$.
- Design tensile strain limit: $\epsilon_{ud} = 67.50 \text{ ‰}$
- Characteristic ratio of ultimate strength to yield strength: $(f_t/f_y)_k = 1.00$

Permitted range of strain distributions

The permitted range of strain distributions is shown in [EN1992-1-1 Figure 6.1](#). The range of permitted strain distributions correspond to linear strain profiles that are defined by the following rules:

- Limitation of tensile strain in reinforcement steel to $\epsilon_{ud} = 67.50 \text{ ‰}$
- Limitation of compressive strain in concrete edges to $\epsilon_{cu2} = 3.50 \text{ ‰}$
- Limitation of compressive strain in concrete central region to $\epsilon_{c2} = 2.00 \text{ ‰}$

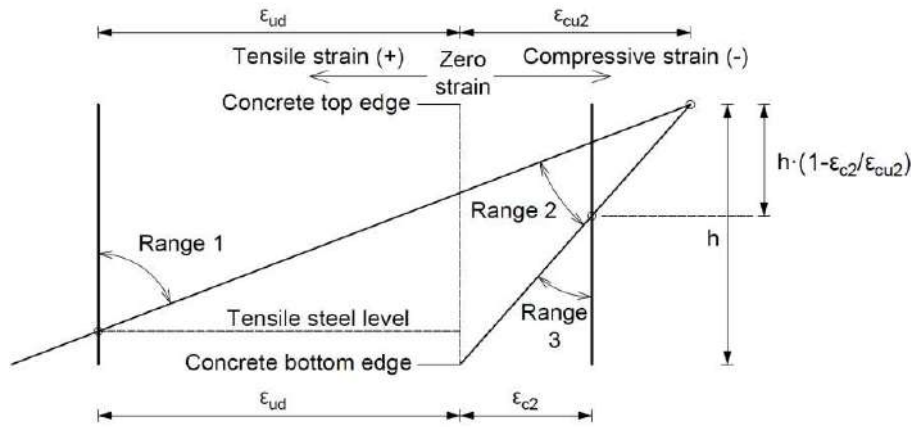
For a cross-section subjected to bending moment inducing tension at the bottom edge and if d is the static depth from most distant reinforcement to the upper concrete edge then the following strain distribution ranges are established:

- Range 1: Constant tensile strain ϵ_{ud} at reinforcement level ($z=d$). Varying strain at top edge ($z=0$) from ϵ_{ud} to $-\epsilon_{cu2}$.
- Range 2: Constant compressive strain $-\epsilon_{cu2}$ at top edge ($z=0$). Varying strain at lower part from ϵ_{ud} at level $z=d$ to 0 at level $z=h$.
- Range 3: Constant compressive strain $-\epsilon_{c2}$ at level $z = (1 - \epsilon_{c2} / \epsilon_{cu2}) \cdot h$. Varying strain at bottom edge ($z=h$) from 0 to $-\epsilon_{c2}$.

Where h is the full height of the cross-section and d is the static depth from most distant reinforcement to the upper concrete edge.

For a cross-section subjected to bending moment inducing tension at the top edge the aforementioned ranges are similar with the top and bottom edges swapped.

The permitted range of strain distributions are shown in the following figure (reproduced from EN 1992-1-1 Figure 6.1).



Permitted range of strain distributions for ULS design of concrete cross-sections (according to EN 1992-1-1 Figure 6.1)

The depth of the compressive zone x is determined from depth where the strain profile becomes zero.

$$x = h \cdot \varepsilon_{c,top} / (\varepsilon_{c,top} - \varepsilon_{c,bot})$$

The curvature of the cross-section φ corresponding to the strain profile is:

$$\varphi = (\varepsilon_{c,bot} - \varepsilon_{c,top}) / h$$

where $\varepsilon_{c,top}$, $\varepsilon_{c,bot}$ are the strains of the concrete at the top edge and bottom edge respectively (assuming that the bending moment induces tension on the bottom side).

Calculation of internal forces and moments

Discretization of concrete and steel areas

The concrete part of the cross-section is discretized in 200 horizontal strips with each strip having height $dh = h / 200$, where h the full height of the examined cross-section. The width of the i -th strip b_i is established from geometry of the outer boundary and the inner boundaries of the cross-section. The area of the strip A_i is equal to $A_i = b_i \cdot dh$. The area of reinforcement bars within the concrete strip height is not subtracted from the area of the concrete strip in order to simplify calculations. This leads to a small discrepancy that is generally acceptable. For each strip the strain ε_i is assumed constant and taken equal to the corresponding strain at mid-height of the strip, as established from the examined linear strain profile.

The rebars are considered as concentrated point forces at their center. The area of each rebar is $A_i = \pi \phi_i^2 / 4$. When non-integer number of bars is specified the next integer number of bars is applied with a suitably reduced area for each rebar.

The force F_i of each component of the cross-section (concrete strip or rebar) is $F_i = A_i \cdot \sigma_i$, where σ_i the stress at the center of the component that corresponds to the relevant strain ε_i . The total axial force N is the summation of all force components F_i .

The moment M_i of each component of the cross-section (concrete strip or rebar) is $M_i = F_i \cdot (z_i - z_{cm})$, where z_i is the location of the center of the component (measured from top) and z_{cm} the location of the centroid of the gross cross-section. The total bending moment M is the summation of all moment components M_i .

Pair of internal forces

The total force of the cross-section is divided in a tensile component F_T (from rebars in tension) and a compressive component F_C (from concrete in compression and rebars in compression). The internal

force components are located at depths z_T and z_C respectively. The internal moment components are $M_T = F_T \cdot (z_T - z_{cm})$ and $M_C = F_C \cdot (z_C - z_{cm})$. The lever arm z of the internal forces is:

$$z = z_T - z_C$$

Effective bending stiffness of cross-section

The effective bending stiffness of the cross-section $(EI)_{\text{eff}}$ for a given axial force $N = N_{\text{Ed}}$ is the cracked secant stiffness obtained when the bending moment is equal to moment resistance $M = M_{\text{Rd}}$.

$$(EI)_{\text{eff}} = M / \varphi$$

The uncracked bending stiffness of the gross cross-section $(EI)_{\text{gross}}$ is:

$$(EI)_{\text{gross}} = E_{\text{cm}} \cdot I$$

where E_{cm} is the secant modulus of elasticity of concrete in accordance with [EN1992-1-1 Table 3.1](#) and I is the second moment of the area of gross cross-section.

Calculation of cross-section resistance

Calculation of bending moment resistance M_{Rd} for given axial force N_{Ed} and given reinforcement layout

The bending moment resistance M_{Rd} for given axial force N_{Ed} and reinforcement layout is calculated by finding the strain diagram where the internal axial force N becomes equal to N_{Ed} . The appropriate strain profile is obtained by the method of bisection until the required convergence is achieved. The solution method proceeds as follows:

1. The axial force at the ends of each strain range are evaluated and the correct strain range is identified.
2. The variation of the strain profile is considered by considering the variable strain at a suitable depth of the cross-section as a single unknown variable.
3. Three values of the variable strain are considered at start, center, and end of the examined strain range, separating the examined stress range in two halves.
4. The axial force is estimated from the strain profile that corresponds to the three values of the variable strain.
5. The target axial force is compared with the estimated axial force at the start, center and end of the examined strain range. The correct half of the examined strain range is identified.
6. The examined strain range is set to the correct half and the algorithm is repeated from step 3 until the difference between the determined axial force and the target axial force is smaller than the desired tolerance.

Calculation of $M - N$ interaction diagram

The interaction diagram between bending moment M and axial force N ($M - N$ interaction) is calculated by examining all the permitted strain distributions with sufficient discretization in each strain range. For each strain range the variation of the strain profile is considered by considering the variable strain at a suitable depth of the cross-section. The number of the considered intermediate strain profiles is 20 for strain ranges 1, 3 and 100 for strain range 2.

Calculation of required reinforcement for given bending moment M_{Ed} and axial force N_{Ed}

The required reinforcement area A_s is calculated in order to obtain a bending moment resistance M_{Rd} at least equal to the bending moment M_{Ed} for given axial force N_{Ed} . A common factor is calculated that multiplies the reinforcement areas of the selected reinforcement layers. The rest of the reinforcement layers are not affected. The value of the multiplication factor is obtained by a root finding algorithm

based on the ITP method so that the bending moment resistance M_{Rd} becomes equal to the specified bending moment M_{Ed} for given and axial force N_{Ed} .

It is noted that when two or more layers are modified to obtain the required reinforcement the resulting reinforcement distribution may not be the optimal (i.e. corresponding to the least amount of reinforcement). This is because the variable reinforcement layers are all multiplied by a common factor.



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Project: Subject: Designer: Date:

Eurocode 2

ULS design of circular (or tubular) reinforced concrete cross-section for bending and axial force

Description:

ULS design of circular or tubular reinforced concrete cross-section for bending and axial force (calculation of required reinforcement for given bending moment / axial force, maximum moment resistance MRd for given axial force, or complete M-N interaction diagram for given reinforcement layout)

According to:

EN 1992-1-1:2004+AC2:2010 Section 6.1

Supported

National

Annexes:

Nationally Defined Parameters (NDPs) automatically filled for supported countries

Input

Concrete characteristic strength	$f_{ck} = 25$	MPa
Steel characteristic yield strength	$f_{yk} = 500$	MPa
Type of reinforcement stress-strain law	= No hardening (Perfectly plastic) ▼	

External diameter of cross-section	$D_{ext} = 0.6$	m

Internal diameter (for hollow tube sections)	$D_{int} = 0$	m

Initial reinforcement: When the required reinforcement is requested the initial reinforcement will be modified accordingly.

Number of bars of external reinforcement layer 1	$n_{bars,1} = 6$

Diameter of bars of external reinforcement layer 1	$\phi_1 = 16$	mm

Distance from centroid of external reinforcement layer 1 to external concrete edge

$$c'_1 = 0.091 \quad \text{m}$$

Number of bars of internal reinforcement layer 2

$$n_{\text{bars},2} = 0$$

Diameter of bars of internal reinforcement layer 2

$$\phi_2 = 1 \quad \text{mm}$$

Distance from centroid of internal reinforcement layer 2 to external concrete edge

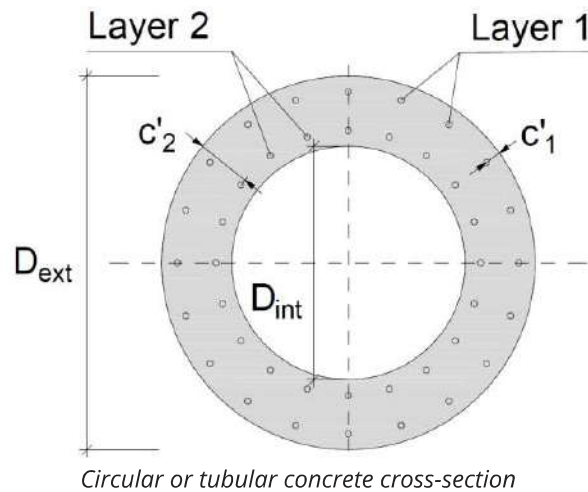
$$c'_2 = 0.175 \quad \text{m}$$

Type of analysis

= Bending resistance MRd ▼

Design value of the axial force - ULS factored loads (compression negative)

$$N_{\text{Ed}} = -110 \quad \text{kN}$$



Nationally Defined Parameters

Coefficient taking account of long term effects and loading effects on the compressive strength of concrete (for bending)

$$\alpha_{\text{cc}} = 0.9$$

Concrete partial material safety factor

$$\gamma_c = 1.5$$

Reinforcement steel partial material safety factor

$$\gamma_s = 1.15$$

Design value of reinforcement ultimate strain

$$\epsilon_{\text{ud}} = 0.9\epsilon_{\text{uk}} \quad \checkmark$$

Results

Maximum design bending moment
resistance for given design axial force

$$M_{Rd} = 143.88 \text{ kNm}$$

Reinforcement - Layer 1 (external)

$$A_{s,1} = 12.06 \text{ cm}^2$$

Reinforcement - Layer 2 (internal)

$$A_{s,2} = 0.00 \text{ cm}^2$$

Reinforcement - Total

$$A_{s,tot} = 12.06 \text{ cm}^2 (0.43\%)$$

Check of total axial force convergence

$$|\Delta N| = 0.00 \text{ N} \leq 1 \text{ N} \Rightarrow \text{ok}$$

Check of bending moment convergence

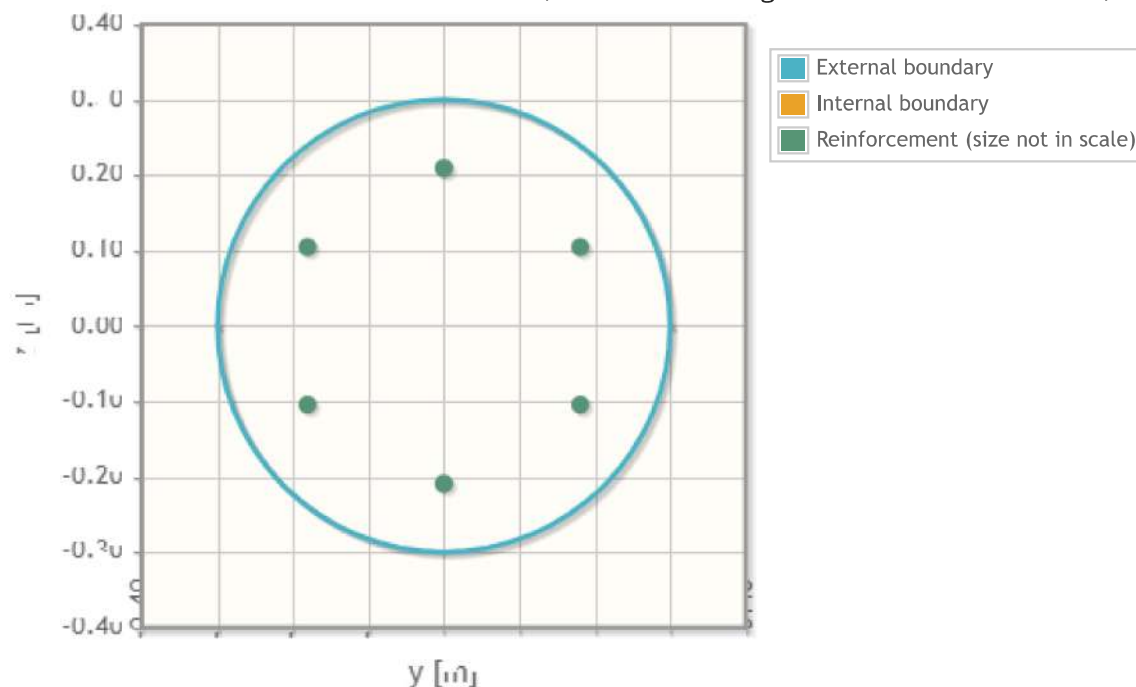
$$|\Delta M| = 0.00 \text{ Nm} \leq 1 \text{ Nm} \Rightarrow \text{ok}$$

Notes

1. Positive bending moment produces tension at the bottom side. Negative bending moment produces tension at the top side.
2. According to EN1992-1-1 § 6.1(4) when the axial force N_{Ed} is compressive the absolute value of the design bending moment should be at least $|M_{Ed}| \geq e_0 \times |N_{Ed}|$ where e_0 is the minimum assumed eccentricity of the compressive load which is equal to $e_0 = \max(h/30, 20 \text{ mm})$, where h is the total depth of the cross-section.

Charts

Cross-section (hover=value, drag=zoom, double-click=reset)



Tables

Internal equilibrium state of cross-section

	N-M interaction		Lever arm & neutral axis				
#	Design axial force resistance N_{Rd} [kN]	Design bending moment resistance M_{Rd} [kNm]	Location of neutral axis from centroid y_n [m]	Lever arm of internal forces z [m]	Normalized level arm z/d [-]	Depth of compressive zone x [m]	Normalized depth of compressive zone x/d [-]
1	-110.00	143.88	0.173	0.284	0.558	0.127	0.249

Details

Input Data

- Concrete characteristic strength: $f_{ck} = 25$ MPa
- Steel characteristic yield strength: $f_{yk} = 500$ MPa
- Type of reinforcement stress-strain law: = No hardening (Perfectly plastic)
- Ratio of characteristic ultimate strength to characteristic yield strength: $(f_t/f_y)_k = 1$
- Characteristic value of ultimate strain: $\epsilon_{uk} = 75$ ‰
- External diameter of cross-section: $D_{ext} = 0.6$ m
- Internal diameter (for hollow tube sections): $D_{int} = 0$ m
- Number of bars of external reinforcement layer 1: $n_{bars,1} = 6$
- Diameter of bars of external reinforcement layer 1: $\Phi_1 = 16$ mm
- Distance from centroid of external reinforcement layer 1 to external concrete edge: $c'_1 = 0.091$ m
- Number of bars of internal reinforcement layer 2: $n_{bars,2} = 0$
- Diameter of bars of internal reinforcement layer 2: $\Phi_2 = 1$ mm
- Distance from centroid of internal reinforcement layer 2 to external concrete edge: $c'_2 = 0.175$ m
- Type of analysis: = Bending resistance M_{Rd}
- Design value of the bending moment - ULS factored loads (positive when tension at bottom side): $M_{Ed} = 55$ kNm
- Design value of the axial force - ULS factored loads (compression negative): $N_{Ed} = -110$ kN
- Variable reinforcement layers to be modified: = Layers 1 & 2

Nationally Defined Parameters

- Coefficient taking account of long term effects and loading effects on the compressive strength of concrete (for bending): $\alpha_{cc} = 0.9$
- Concrete partial material safety factor: $\gamma_c = 1.5$
- Reinforcement steel partial material safety factor: $\gamma_s = 1.15$
- Design value of reinforcement ultimate strain: $\epsilon_{ud} = 0.9\epsilon_{uk}$

Properties of circular (or tubular) concrete cross-section

The following geometric properties are obtained from basic theory of mechanics. The values of the reinforcement areas, reinforcement ratios and axial resistances of the cross-section correspond to the final reinforcement if different than the initially specified reinforcement.

- Area of gross cross-section: $A = 0.2827$ m²
- Second moment of the area of gross cross-section: $I = 0.006362$ m⁴
- Total height of cross-section: $h = 0.600$ m
- Location of centroid of gross cross-section (from top): $z_{cm} = 0.300$ m
- Total area of longitudinal reinforcement: $A_{s,tot} = 12.06$ cm²

- Geometric reinforcement ratio: $\rho_l = A_{s,tot} / A = 0.0043 = 0.43 \%$
- Mechanical reinforcement ratio: $\omega = \rho_l \cdot f_{yd} / f_{cd} = 0.1237$
- Compressive axial force resistance (ULS): $N_{Rd,compression} = -4723.70 \text{ kN}$
- Tensile axial force resistance (ULS): $N_{Rd,tension} = 524.51 \text{ kN}$

Stress-strain law at the Ultimate Limit State (ULS)

Assumptions

The design ULS bending moment resistance M_{Rd} of reinforced concrete cross-section is covered in [EN1992-1-1 §6.1](#). This analysis is applicable for undisturbed regions of beams, columns, slabs and other similar types of members for which sections remain plane before and after loading. Discontinuity regions are not covered in this calculation, see [EN 1992-1-1 §6.5](#) instead.

The following assumptions are made in [EN1992-1-1 §6.1\(2\)P](#):

- Plane sections remain plane after loading.
- The strain in bonded reinforcement or bonded prestressing tendons, whether in tension or in compression, is the same as that in the surrounding concrete.
- The tensile strength of the concrete is ignored.
- The initial strain in prestressing tendons is taken into account when assessing the stresses in the tendons.

Stress-strain relation for concrete

The stresses in the concrete in compression σ_c are obtained from the design curves in [EN1992-1-1 §3.1.7](#) and [EN1992-1-1 Figure 3.3](#) as a function of the concrete strain ϵ_c :

$$\begin{aligned}\sigma_c &= 0 \text{ for tensile strain} \\ \sigma_c &= f_{cd} \cdot [1 - (1 - \epsilon_c / \epsilon_{c2})^n] \text{ for compressive strain } 0 \leq \epsilon_c \leq \epsilon_{c2} \\ \sigma_c &= f_{cd} \text{ for compressive strain } \epsilon_{c2} < \epsilon_c \leq \epsilon_{cu2}\end{aligned}$$

The value of the design compressive strength of concrete f_{cd} is calculated as specified in [EN1992-1-1 §3.1.6\(1\)P](#):

$$f_{cd} = a_{cc} \cdot f_{ck} / \gamma_c = 0.90 \cdot 25.00 \text{ MPa} / 1.50 = 15.00 \text{ MPa}$$

The strains ϵ_{c2} , ϵ_{cu2} and the exponent n are defined in [EN1992-1-1 Table 3.1](#) depending on the concrete class. For characteristic strength $f_{ck} = 25.00 \text{ MPa}$ the corresponding values are $\epsilon_{c2} = 2.00 \text{ ‰}$, $\epsilon_{cu2} = 3.50 \text{ ‰}$ and $n = 2.00$.

Stress-strain relation for reinforcement steel

The stresses in reinforcement steel σ_s are obtained from the design curves in [EN1992-1-1 §3.2.7](#) and [EN1992-1-1 Figure 3.8](#) as a function of the steel strain ϵ_s :

$$\begin{aligned}\sigma_s &= E \cdot \epsilon_s \text{ for strains below the design yield point } -\epsilon_{yd} \leq \epsilon_s \leq \epsilon_{yd} \\ \sigma_s &= +f_{yd} \cdot [1 + ((f_t/f_y)_k - 1) \cdot (\epsilon_s - \epsilon_{yd}) / (\epsilon_{uk} - \epsilon_{yd})] \text{ for tensile strain } \epsilon_{yd} < \epsilon_s \leq \epsilon_{ud} \\ \sigma_s &= -f_{yd} \cdot [1 + ((f_t/f_y)_k - 1) \cdot (|\epsilon_s| - \epsilon_{yd}) / (\epsilon_{uk} - \epsilon_{yd})] \text{ for compressive strain } \epsilon_s < -\epsilon_{yd}\end{aligned}$$

The value of the design yield strength of reinforcement steel f_{yd} is calculated as specified in [EN1992-1-1 §3.2](#):

$$f_{yd} = f_{yk} / \gamma_s = 500.0 \text{ MPa} / 1.15 = 434.78 \text{ MPa}$$

The design yield strain of the reinforcement steel ϵ_{yd} is calculated based on the modulus of elasticity specified in [EN1992-1-1 §3.2.7\(4\)](#):

$$\epsilon_{yd} = f_{yd} / E = 434.78 \text{ MPa} / 200000 \text{ MPa} = 2.17 \text{ ‰}$$

The characteristic values of the ultimate strain ϵ_{uk} and the ratio $(f_t/f_y)_k$ are defined in [EN1992-1-1 Annex C](#) depending on the steel ductility class. The design ultimate strain ϵ_{ud} is specified in [EN1992-1-1 §3.2.7\(2\)](#) and the National Annex.

According to [EN1992-1-1 §3.2.7\(2\)](#) the stress-strain law of reinforcement steel can be approximated by either of the following:

- An inclined top branch with a strain limit of ϵ_{ud} and a maximum stress of $(f_t/f_y)_k \cdot (f_{yk} / \gamma_s)$ at ϵ_{uk} ,
- A horizontal top branch (i.e. $(f_t/f_y)_k = 1$) without the need to check the strain limit.

In this calculation the stress-strain law for reinforcement steel is considered with a horizontal top branch (i.e. $(f_t/f_y)_k = 1$). According to [EN1992-1-1 §3.2.7\(2\)](#) for this case there is no need to check the strain limit. For numerical reasons the design value of the tensile strain limit $\epsilon_{ud} = 67.50 \text{ ‰}$ is assumed in the calculations.

The following values are assumed:

- Characteristic tensile strain limit: $\epsilon_{uk} = 75.00 \text{ ‰}$.
- Design tensile strain limit: $\epsilon_{ud} = 67.50 \text{ ‰}$
- Characteristic ratio of ultimate strength to yield strength: $(f_t/f_y)_k = 1.00$

Permitted range of strain distributions

The permitted range of strain distributions is shown in [EN1992-1-1 Figure 6.1](#). The range of permitted strain distributions correspond to linear strain profiles that are defined by the following rules:

- Limitation of tensile strain in reinforcement steel to $\epsilon_{ud} = 67.50 \text{ ‰}$
- Limitation of compressive strain in concrete edges to $\epsilon_{cu2} = 3.50 \text{ ‰}$
- Limitation of compressive strain in concrete central region to $\epsilon_{c2} = 2.00 \text{ ‰}$

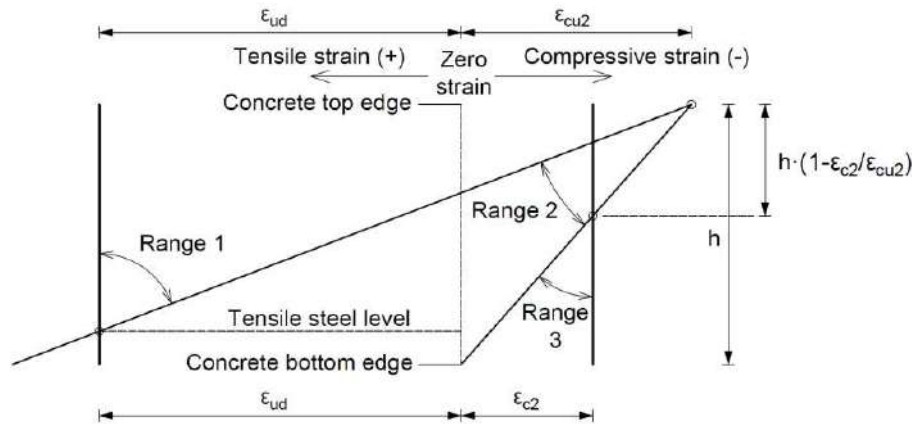
For a cross-section subjected to bending moment inducing tension at the bottom edge and if d is the static depth from most distant reinforcement to the upper concrete edge then the following strain distribution ranges are established:

- Range 1: Constant tensile strain ϵ_{ud} at reinforcement level ($z=d$). Varying strain at top edge ($z=0$) from ϵ_{ud} to $-\epsilon_{cu2}$.
- Range 2: Constant compressive strain $-\epsilon_{cu2}$ at top edge ($z=0$). Varying strain at lower part from ϵ_{ud} at level $z=d$ to 0 at level $z=h$.
- Range 3: Constant compressive strain $-\epsilon_{c2}$ at level $z = (1 - \epsilon_{c2} / \epsilon_{cu2}) \cdot h$. Varying strain at bottom edge ($z=h$) from 0 to $-\epsilon_{c2}$.

Where h is the full height of the cross-section and d is the static depth from most distant reinforcement to the upper concrete edge.

For a cross-section subjected to bending moment inducing tension at the top edge the aforementioned ranges are similar with the top and bottom edges swapped.

The permitted range of strain distributions are shown in the following figure (reproduced from EN 1992-1-1 Figure 6.1).



Permitted range of strain distributions for ULS design of concrete cross-sections (according to EN 1992-1-1 Figure 6.1)

The depth of the compressive zone x is determined from depth where the strain profile becomes zero.

$$x = h \cdot \varepsilon_{c,top} / (\varepsilon_{c,top} - \varepsilon_{c,bot})$$

The curvature of the cross-section φ corresponding to the strain profile is:

$$\varphi = (\varepsilon_{c,bot} - \varepsilon_{c,top}) / h$$

where $\varepsilon_{c,top}$, $\varepsilon_{c,bot}$ are the strains of the concrete at the top edge and bottom edge respectively (assuming that the bending moment induces tension on the bottom side).

Calculation of internal forces and moments

Discretization of concrete and steel areas

The concrete part of the cross-section is discretized in 200 horizontal strips with each strip having height $dh = h / 200$, where h the full height of the examined cross-section. The width of the i -th strip b_i is established from geometry of the outer boundary and the inner boundaries of the cross-section. The area of the strip A_i is equal to $A_i = b_i \cdot dh$. The area of reinforcement bars within the concrete strip height is not subtracted from the area of the concrete strip in order to simplify calculations. This leads to a small discrepancy that is generally acceptable. For each strip the strain ε_i is assumed constant and taken equal to the corresponding strain at mid-height of the strip, as established from the examined linear strain profile.

The rebars are considered as concentrated point forces at their center. The area of each rebar is $A_i = \pi \phi_i^2 / 4$. When non-integer number of bars is specified the next integer number of bars is applied with a suitably reduced area for each rebar.

The force F_i of each component of the cross-section (concrete strip or rebar) is $F_i = A_i \cdot \sigma_i$, where σ_i the stress at the center of the component that corresponds to the relevant strain ε_i . The total axial force N is the summation of all force components F_i .

The moment M_i of each component of the cross-section (concrete strip or rebar) is $M_i = F_i \cdot (z_i - z_{cm})$, where z_i is the location of the center of the component (measured from top) and z_{cm} the location of the centroid of the gross cross-section. The total bending moment M is the summation of all moment components M_i .

Pair of internal forces

The total force of the cross-section is divided in a tensile component F_T (from rebars in tension) and a compressive component F_C (from concrete in compression and rebars in compression). The internal

force components are located at depths z_T and z_C respectively. The internal moment components are $M_T = F_T \cdot (z_T - z_{cm})$ and $M_C = F_C \cdot (z_C - z_{cm})$. The lever arm z of the internal forces is:

$$z = z_T - z_C$$

Effective bending stiffness of cross-section

The effective bending stiffness of the cross-section $(EI)_{\text{eff}}$ for a given axial force $N = N_{\text{Ed}}$ is the cracked secant stiffness obtained when the bending moment is equal to moment resistance $M = M_{\text{Rd}}$.

$$(EI)_{\text{eff}} = M / \varphi$$

The uncracked bending stiffness of the gross cross-section $(EI)_{\text{gross}}$ is:

$$(EI)_{\text{gross}} = E_{\text{cm}} \cdot I$$

where E_{cm} is the secant modulus of elasticity of concrete in accordance with [EN1992-1-1 Table 3.1](#) and I is the second moment of the area of gross cross-section.

Calculation of cross-section resistance

Calculation of bending moment resistance M_{Rd} for given axial force N_{Ed} and given reinforcement layout

The bending moment resistance M_{Rd} for given axial force N_{Ed} and reinforcement layout is calculated by finding the strain diagram where the internal axial force N becomes equal to N_{Ed} . The appropriate strain profile is obtained by the method of bisection until the required convergence is achieved. The solution method proceeds as follows:

1. The axial force at the ends of each strain range are evaluated and the correct strain range is identified.
2. The variation of the strain profile is considered by considering the variable strain at a suitable depth of the cross-section as a single unknown variable.
3. Three values of the variable strain are considered at start, center, and end of the examined strain range, separating the examined stress range in two halves.
4. The axial force is estimated from the strain profile that corresponds to the three values of the variable strain.
5. The target axial force is compared with the estimated axial force at the start, center and end of the examined strain range. The correct half of the examined strain range is identified.
6. The examined strain range is set to the correct half and the algorithm is repeated from step 3 until the difference between the determined axial force and the target axial force is smaller than the desired tolerance.

Calculation of $M - N$ interaction diagram

The interaction diagram between bending moment M and axial force N ($M - N$ interaction) is calculated by examining all the permitted strain distributions with sufficient discretization in each strain range. For each strain range the variation of the strain profile is considered by considering the variable strain at a suitable depth of the cross-section. The number of the considered intermediate strain profiles is 20 for strain ranges 1, 3 and 100 for strain range 2.

Calculation of required reinforcement for given for given bending moment M_{Ed} and axial force N_{Ed}

The required reinforcement area A_s is calculated in order to obtain a bending moment resistance M_{Rd} at least equal to the bending moment M_{Ed} for given and axial force N_{Ed} . A common factor is calculated that multiplies the reinforcement areas of the selected reinforcement layers. The rest of the reinforcement layers are not affected. The value of the multiplication factor is obtained by a root finding algorithm

based on the ITP method so that the bending moment resistance M_{Rd} becomes equal to the specified bending moment M_{Ed} for given and axial force N_{Ed} .

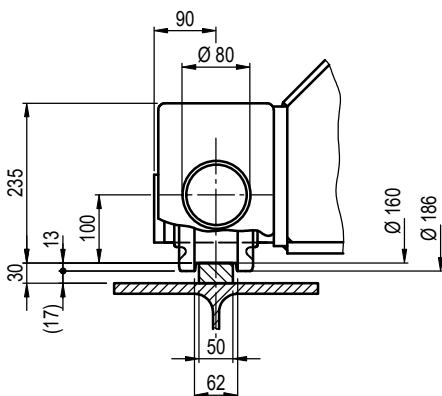
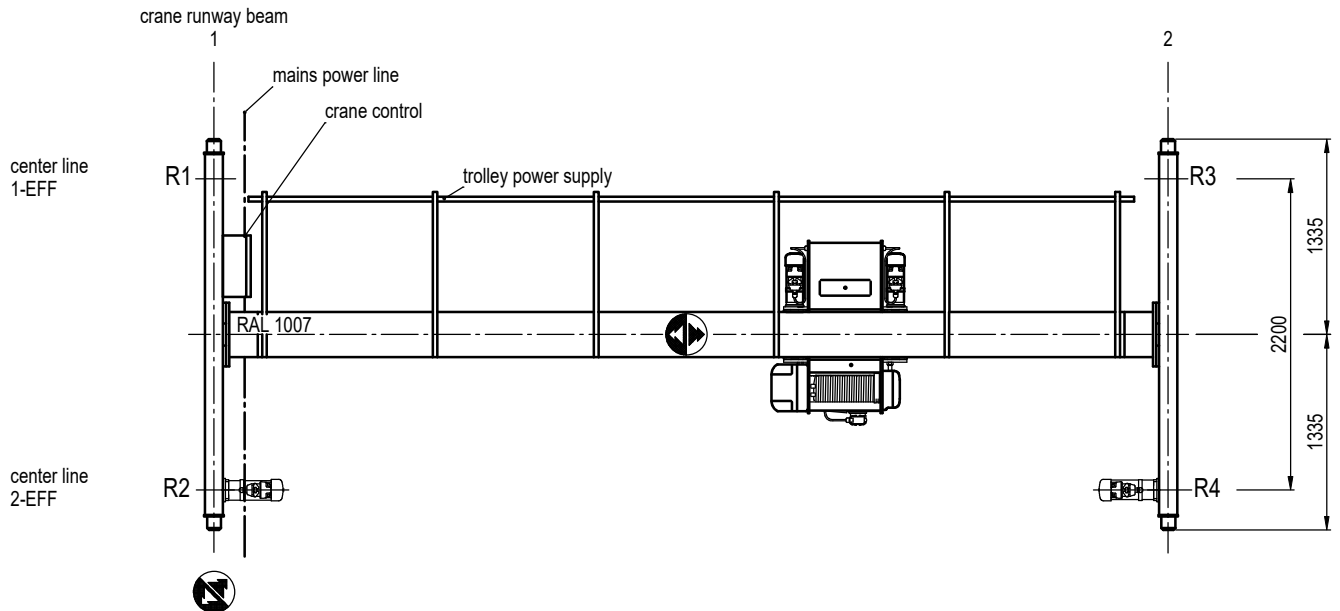
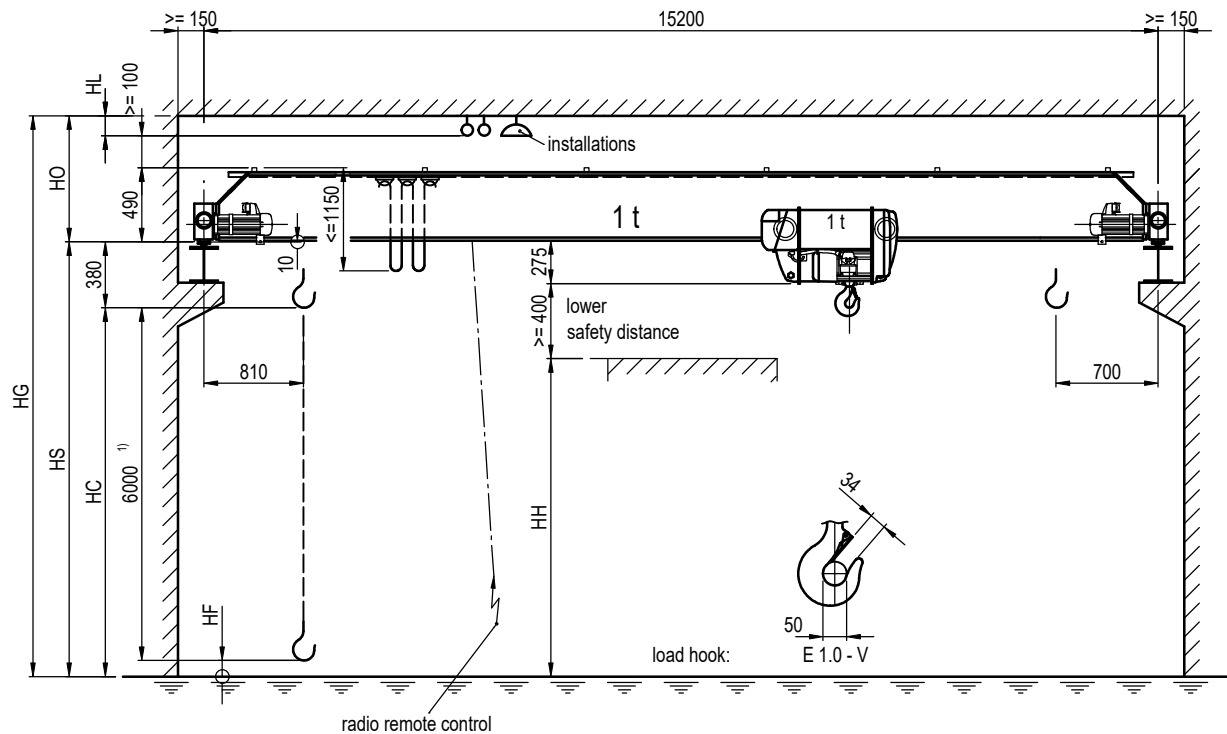
It is noted that when two or more layers are modified to obtain the required reinforcement the resulting reinforcement distribution may not be the optimal (i.e. corresponding to the least amount of reinforcement). This is because the variable reinforcement layers are all multiplied by a common factor.



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3 priedas

Informacija apie tiltinius kranus



crane		ELK 1 t x 15200 mm		
design basis		DIN 15018, H2/B3		
hoist + trolley		GM 800.1000 L-204.41.6000.4.E 100.20		
FEM group		4m / M7		
operation location		indoor operation		
ambient conditions		-5° C up to +40° C, without special requirements		
crane travel		7.5 / 30 m/min		
trolley travelling		5 / 20 m/min		
hoisting		0.8 / 5 m/min		
total weight		1970 kg (thereof hoist + trolley 242 kg)		
mains voltage; admissible voltage swing		3/PE ~50 Hz 380 V (TN-S); -3% / +5%		
total power consumption		4.9 kVA (starting current * cos phi: 21 A) +SKR-F1 = 20 A gG		
load data	wheel loads (kN)	crane axis 1 (min/max)	4.6	9.9
	(without vibration coefficient)	crane axis 2 (min/max)	4.6	10.2
	lateral loads (kN)	mass forces crane travel (min/max)	0.8	1.8
	skewing force on guide side (coefficient of frictional contact <= 0,3)		3.8	-
	horizontal loads from skewing	front crane axis in driving direction	1.2	2.6
	(guide side/opposite side)	back crane axis in driving direction	0.0	0.0
	longitudinal loads (kN)	mass forces crane travel (max.)	1.0	
	(per crane runway beam)	collision forces (max.) (motion limiter taken into account)	6.8	

¹⁾ maximum hook path of hoist 6 m, actual use according to conditions on site

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crane ELK

021600-0000000-20250507-12 / 1

ABUS

person in charge: Dranseika, K.

Date: 07/05/2025

Load data according to DIN EN 1991-3

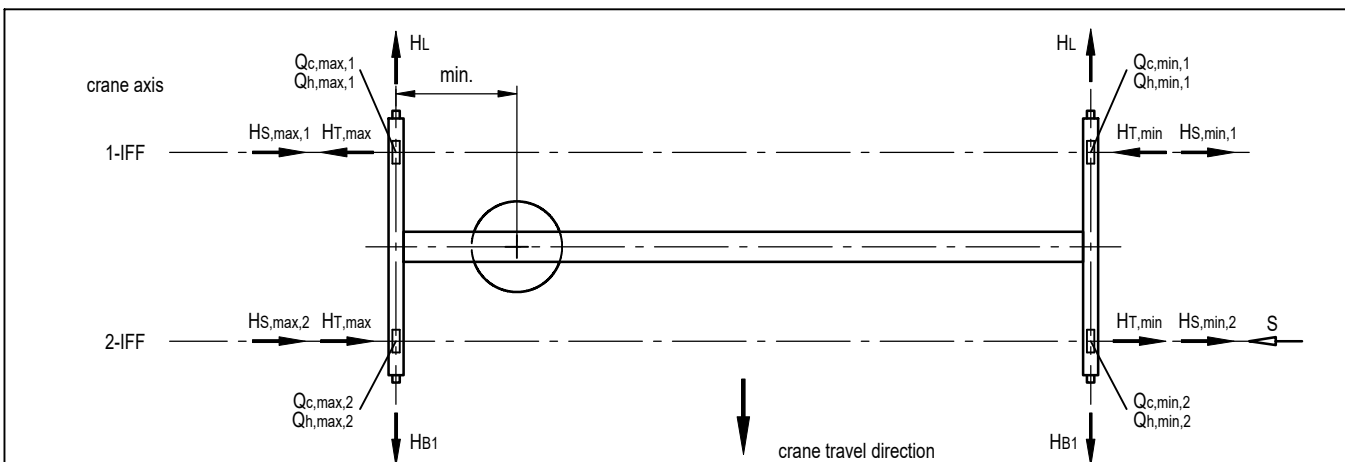
Classification of crane	S3	(for the verification of the runway beam)

Dynamic coefficients ϕ :

ϕ_1	1.10	Acceleration (resulting from lifting and gravitation) acting on the mass of the crane
ϕ_2	1.16	inertia and gravitation when lifting an unrestricted load from off the floor
ϕ_3	1.00	inertia and gravitation when suddenly releasing a part of the lifted load
ϕ_4	1.00	Loads resulting from travelling across uneven surfaces
$\phi_{5,Kr}$	1.80	Loads resulting from acceleration of crane travel drives
$\phi_{6,dyn}$	1.08	Dynamic test load
$\phi_{6,stat}$	1.00	static test load
$\phi_{7,Kr}$	1.25	Loads resulting from buffer forces

Load effects and relevant force components:

Wheel loads (vertical)	Force component from the mass of the crane and the hoist(s) per crane axis	$Q_{c,min,1}$	4.3	$Q_{c,max,1}$	5.2	[kN]
		$Q_{c,min,2}$	4.3	$Q_{c,max,2}$	5.5	[kN]
	Force component from mass of hoist load per crane axis	$Q_{h,min,1}$	0.3	$Q_{h,max,1}$	4.7	[kN]
		$Q_{h,min,2}$	0.3	$Q_{h,max,2}$	4.7	[kN]
Lateral loads (horizontal)	Force from the acceleration of the crane with hoist load (mass force)	$H_{T,min}$	0.5	$H_{T,max}$	1.2	[kN]
	skewing force (coefficient of frictional contact $\leq 0,3$)	S			3.8	[kN]
	Horizontal force from skewing per crane axis	$H_{S,min,1}$	0.0	$H_{S,max,1}$	0.0	[kN]
		$H_{S,min,2}$	1.2	$H_{S,max,2}$	2.6	[kN]
Longitudinal loads (horizontal) (per runway beam)	Force from the acceleration of the crane with hoist load (mass force)	HL			0.6	[kN]
	Force from impact on buffer (collision force) (motion limiter taken into account)	HB1			5.4	[kN]



The drawing shows the crane travel situation for the purpose of generating minimum and maximum loads.
The decisive crane travel situation may vary depending on the crane version (travel direction, trolley position and / or means of guidance).

All load effects constitute characteristic static force components and have to have the corresponding dynamic coefficient ϕ applied to them.
Crane track tolerances DIN EN 1090-2, tolerance class 2
tolerance of the track centre dimension of the crane rails ± 5 mm

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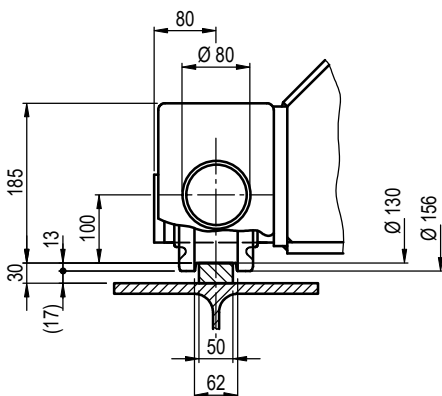
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crane ELK

021600-0000000-20250507-12 / 1

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person in charge: Dranseika, K.
Date: 07/05/2025



¹⁾ maximum hook path of hoist 6 m, actual use according to conditions on site

Load data according to DIN EN 1991-3

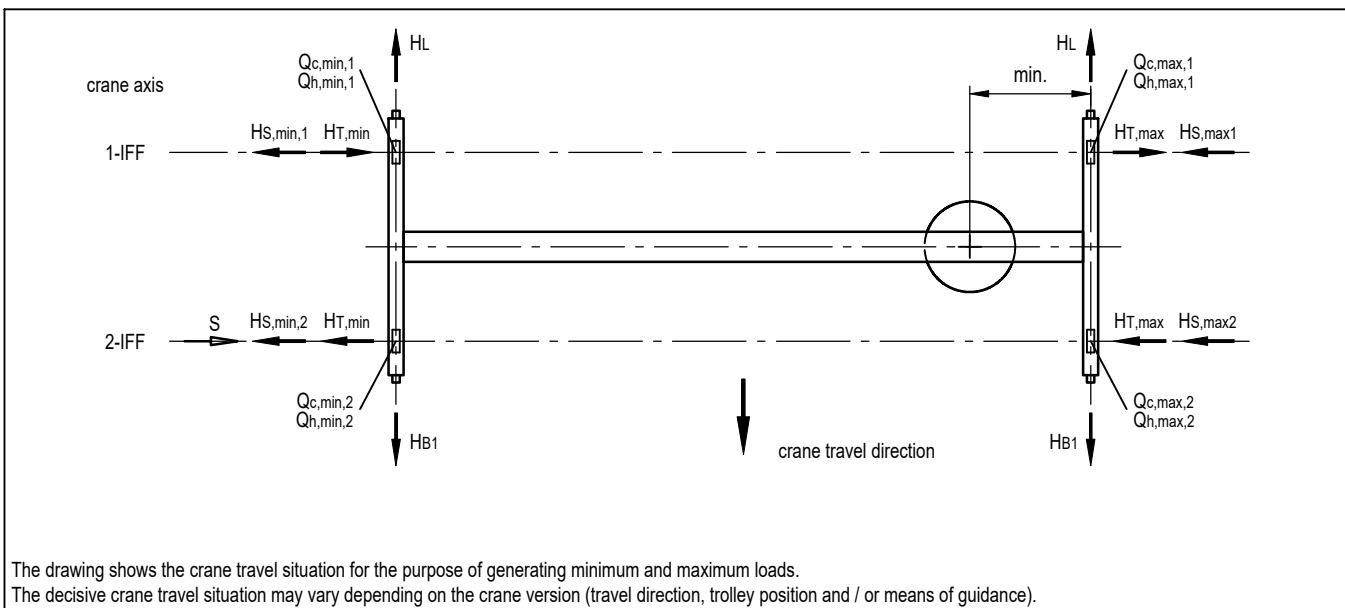
Classification of crane	S3	(for the verification of the runway beam)

Dynamic coefficients ϕ_i :

ϕ_1	1.10	Acceleration (resulting from lifting and gravitation) acting on the mass of the crane
ϕ_2	1.10	inertia and gravitation when lifting an unrestricted load from off the floor
ϕ_3	1.00	inertia and gravitation when suddenly releasing a part of the lifted load
ϕ_4	1.00	Loads resulting from travelling across uneven surfaces
$\phi_{5,Kr}$	1.80	Loads resulting from acceleration of crane travel drives
$\phi_{6,dyn}$	1.05	Dynamic test load
$\phi_{6,stat}$	1.00	static test load
$\phi_{7,Kr}$	1.25	Loads resulting from buffer forces

Load effects and relevant force components:

Wheel loads (vertical)	Force component from the mass of the crane and the hoist(s) per crane axis	$Q_{c,min,1}$	2.5	$Q_{c,max,1}$	3.2	[kN]
		$Q_{c,min,2}$	2.5	$Q_{c,max,2}$	3.4	[kN]
	Force component from mass of hoist load per crane axis	$Q_{h,min,1}$	1.0	$Q_{h,max,1}$	11.3	[kN]
		$Q_{h,min,2}$	1.0	$Q_{h,max,2}$	11.3	[kN]
Lateral loads (horizontal)	Force from the acceleration of the crane with hoist load (mass force)	$H_{T,min}$	0.2	$H_{T,max}$	0.6	[kN]
	skewing force (coefficient of frictional contact $\leq 0,3$)	S			4.8	[kN]
	Horizontal force from skewing per crane axis	$H_{S,min,1}$	0.0	$H_{S,max,1}$	0.0	[kN]
		$H_{S,min,2}$	0.9	$H_{S,max,2}$	3.9	[kN]
Longitudinal loads (horizontal) (per runway beam)	Force from the acceleration of the crane with hoist load (mass force)	HL			0.3	[kN]
	Force from impact on buffer (collision force) (motion limiter taken into account)	HB1			5.7	[kN]



The drawing shows the crane travel situation for the purpose of generating minimum and maximum loads.
The decisive crane travel situation may vary depending on the crane version (travel direction, trolley position and / or means of guidance).

All load effects constitute characteristic static force components and have to have the corresponding dynamic coefficient ϕ applied to them.
Crane track tolerances DIN EN 1090-2, tolerance class 2
tolerance of the track centre dimension of the crane rails ± 5 mm

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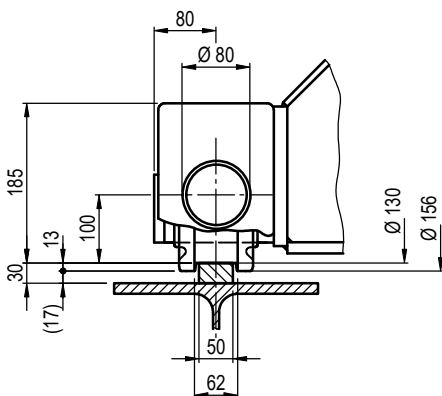
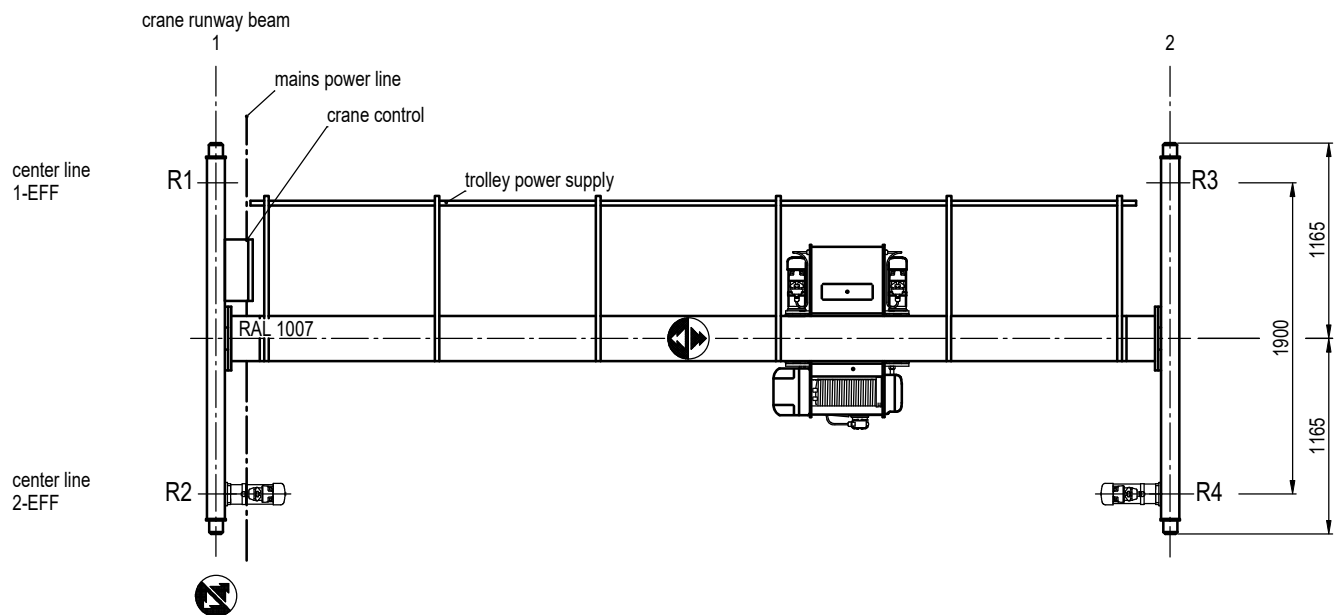
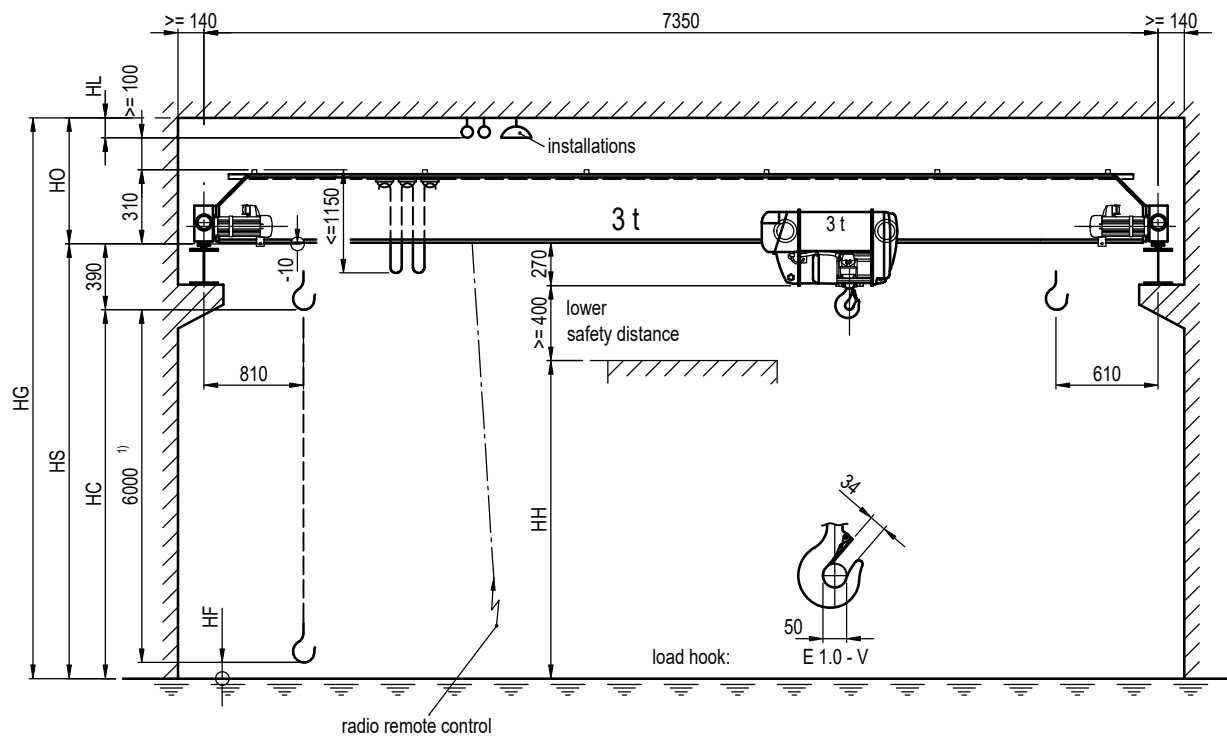
crane ELV

021600-0000000-20250507-14 / 1

ABUS

person in charge: Dranseika, K.

Date: 07/05/2025



crane	ELV 3 t x 7350 mm		
design basis	DIN 15018, H2/B3		
hoist + trolley	GM 800.3200 H-202.41.6000.4.E 100.20		
FEM group	2m / M5		
operation location	indoor operation		
ambient conditions	-5° C up to +40° C, without special requirements		
crane travel	7.5 / 30 m/min		
trolley travelling	5 / 20 m/min		
hoisting	0.8 / 5 m/min		
total weight	1250 kg (thereof hoist + trolley 246 kg)		
mains voltage; admissible voltage swing	3/PE ~50 Hz 380 V (TN-S); -3% / +5%		
total power consumption	6.3 kVA (starting current * cos phi: 32 A) +SKR-F1 = 20 A gG		
load data	wheel loads (kN)	crane axis 1 (min/max)	3.9 / 17.0
	(without vibration coefficient)	crane axis 2 (min/max)	3.8 / 17.1
	lateral loads (kN)	mass forces crane travel (min/max)	0.3 / 1.2
	skewing force on guide side (coefficient of frictional contact <= 0,3)		5.6 / -
	horizontal loads from skewing	front crane axis in driving direction	1.0 / 4.6
	(guide side/opposite side)	back crane axis in driving direction	0.0 / 0.0
	longitudinal loads (kN)	mass forces crane travel (max.)	0.6
	(per crane runway beam)	collision forces (max.)	7.6
		(motion limiter taken into account)	

¹⁾ maximum hook path of hoist 6 m, actual use according to conditions on site

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crane ELV

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person in charge: Dranseika, K.

Date: 07/05/2025

Load data according to DIN EN 1991-3

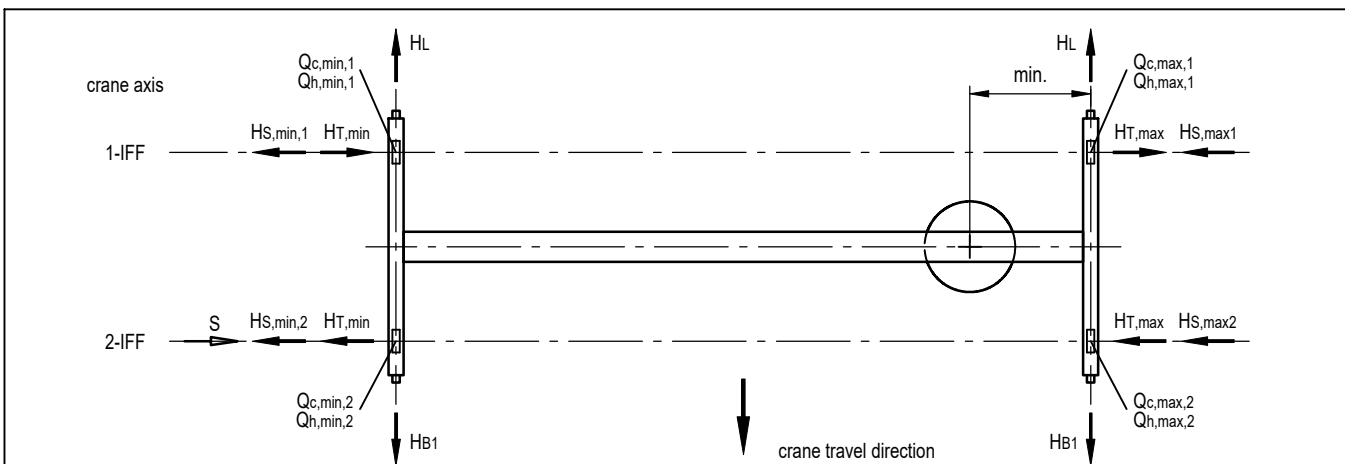
Classification of crane	S3	(for the verification of the runway beam)

Dynamic coefficients ϕ :

ϕ_1	1.10	Acceleration (resulting from lifting and gravitation) acting on the mass of the crane
ϕ_2	1.10	inertia and gravitation when lifting an unrestricted load from off the floor
ϕ_3	1.00	inertia and gravitation when suddenly releasing a part of the lifted load
ϕ_4	1.00	Loads resulting from travelling across uneven surfaces
$\phi_{5,Kr}$	1.80	Loads resulting from acceleration of crane travel drives
$\phi_{6,dyn}$	1.05	Dynamic test load
$\phi_{6,stat}$	1.00	static test load
$\phi_{7,Kr}$	1.25	Loads resulting from buffer forces

Load effects and relevant force components:

Wheel loads (vertical)	Force component from the mass of the crane and the hoist(s) per crane axis	$Q_{c,min,1}$	2.7	$Q_{c,max,1}$	3.4	[kN]
		$Q_{c,min,2}$	2.6	$Q_{c,max,2}$	3.5	[kN]
	Force component from mass of hoist load per crane axis	$Q_{h,min,1}$	1.2	$Q_{h,max,1}$	13.6	[kN]
		$Q_{h,min,2}$	1.2	$Q_{h,max,2}$	13.6	[kN]
Lateral loads (horizontal)	Force from the acceleration of the crane with hoist load (mass force)	$H_{T,min}$	0.2	$H_{T,max}$	0.7	[kN]
	skewing force (coefficient of frictional contact $\leq 0,3$)	S			5.6	[kN]
	Horizontal force from skewing per crane axis	$H_{S,min,1}$	0.0	$H_{S,max,1}$	0.0	[kN]
		$H_{S,min,2}$	1.0	$H_{S,max,2}$	4.6	[kN]
Longitudinal loads (horizontal) (per runway beam)	Force from the acceleration of the crane with hoist load (mass force)	HL			0.4	[kN]
	Force from impact on buffer (collision force) (motion limiter taken into account)	HB1			6.1	[kN]



The drawing shows the crane travel situation for the purpose of generating minimum and maximum loads.
The decisive crane travel situation may vary depending on the crane version (travel direction, trolley position and / or means of guidance).

All load effects constitute characteristic static force components and have to have the corresponding dynamic coefficient ϕ applied to them.
Crane track tolerances DIN EN 1090-2, tolerance class 2
tolerance of the track centre dimension of the crane rails ± 5 mm

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crane ELV

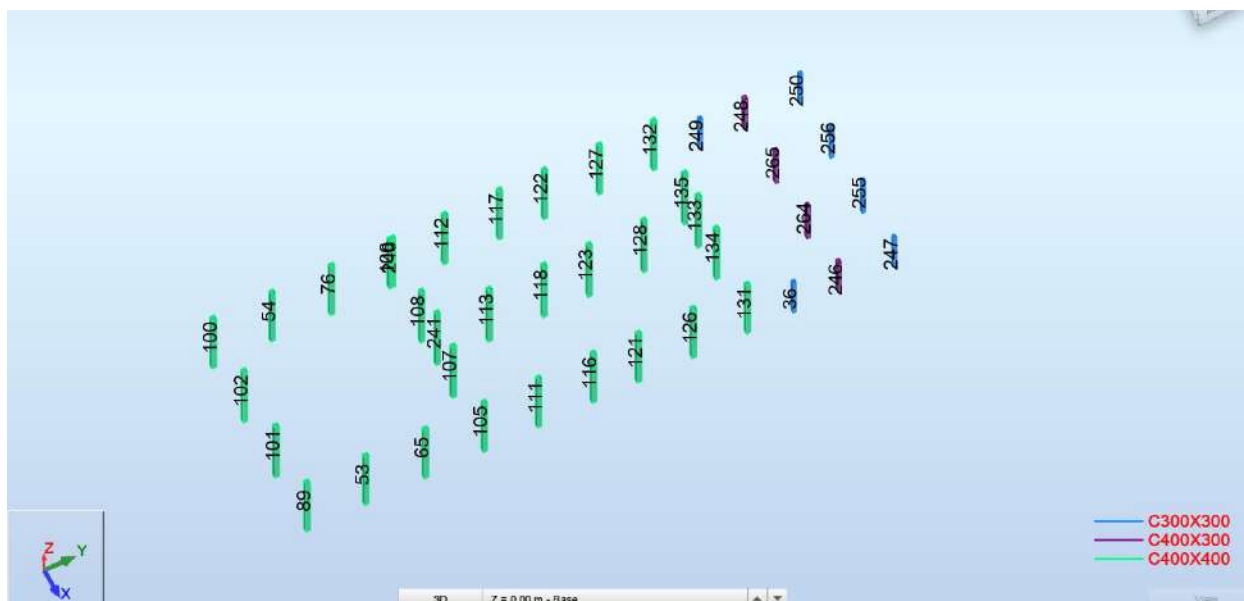
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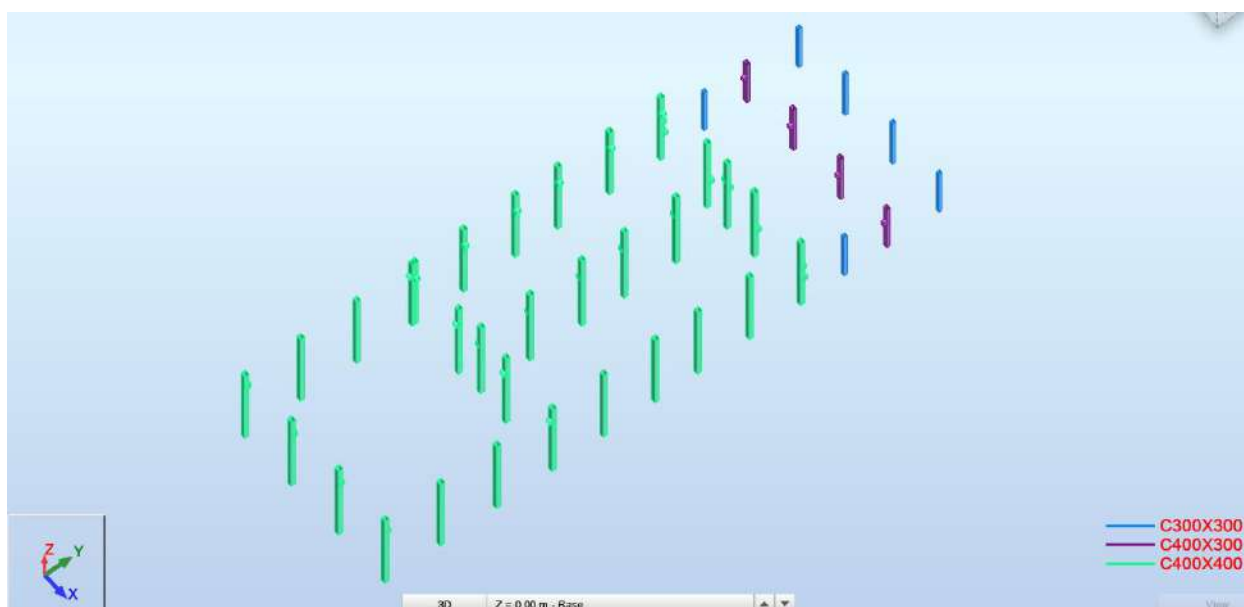
person in charge: Dranseika, K.
Date: 07/05/2025

4 priedas

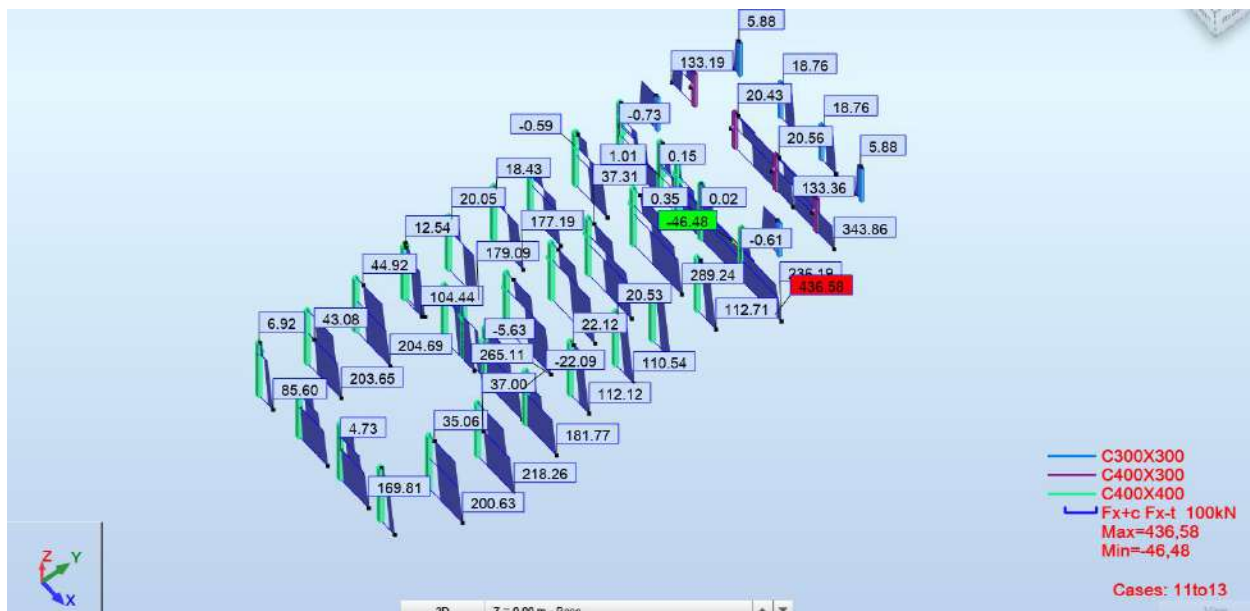
Užduotis gb kolonų projektavimui



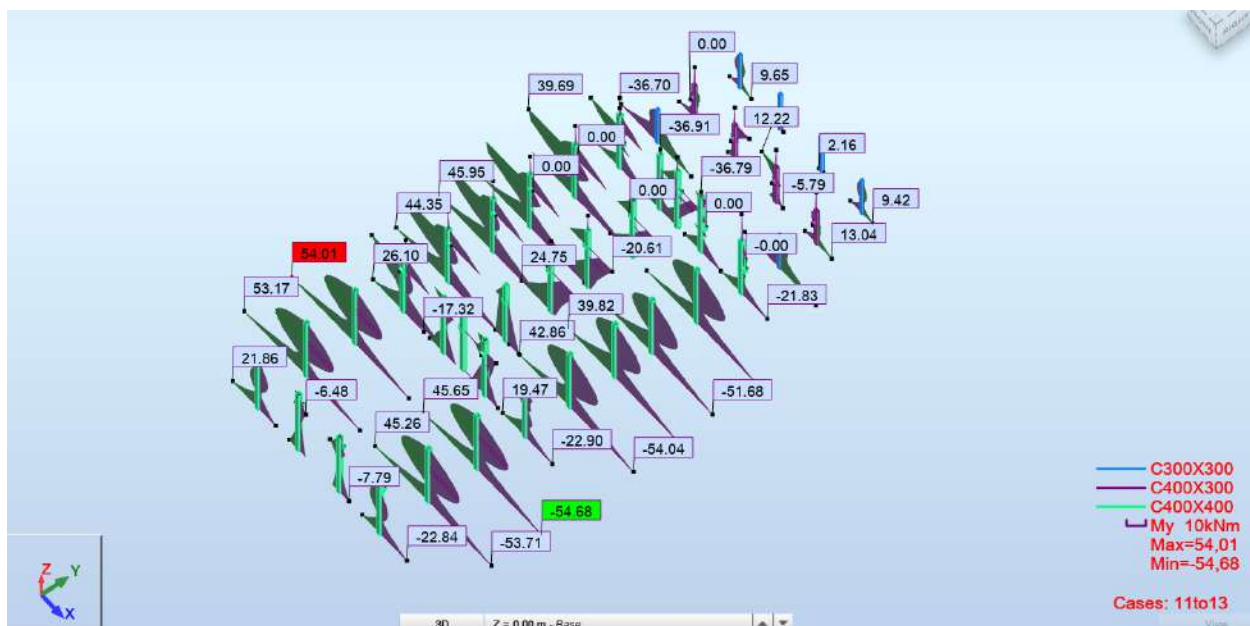
1 pav. Kolonų numeracija



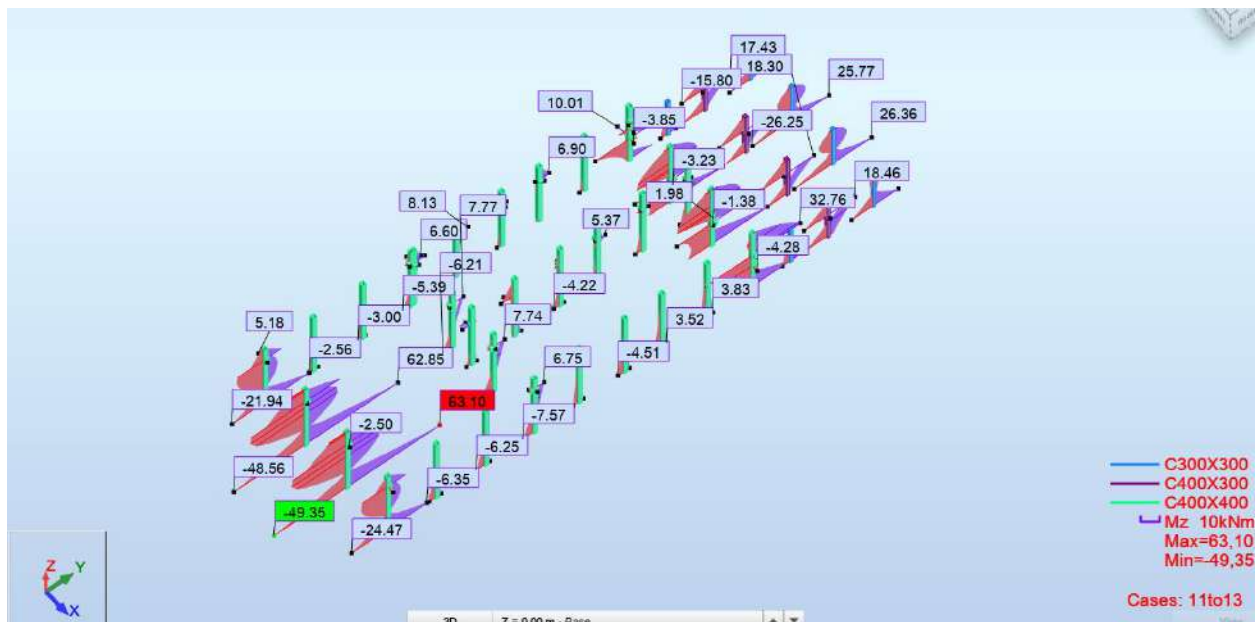
2 pav. Kolonų skerspjūviai



3 pav. Kolonų ašinių jėgų diagrama F_x , kN



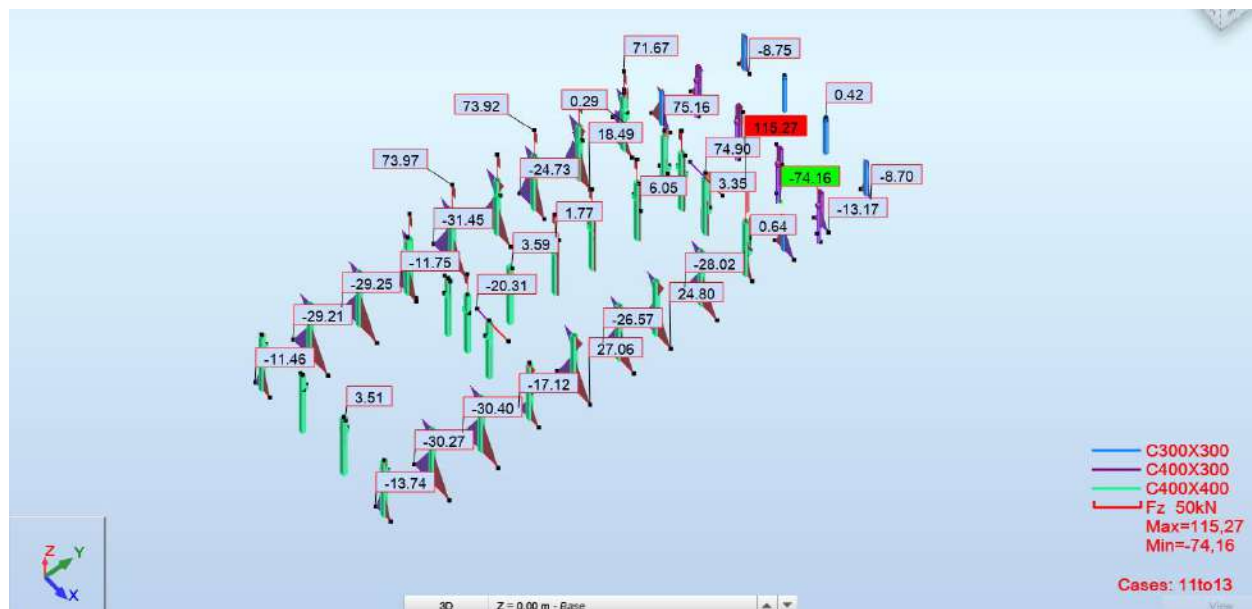
4 pav. Kolonų lenkimo momentų diagrama M_y , kNm



5 pav. Kolonų lenkimo momentų diagrama M_z , kNm



6 pav. Kolonų skersinių jėgų diagrama F_y , kN



7 pav. Kolonų skersinių jėgų diagrama Fz, kN

Member/Node/Case	FX (kN)	FY (kN)	FZ (kN)	MX (kNm)	MY (kNm)	MZ (kNm)
36/ 106/ ULS+	109,04	1,51	14,55	0,0	31,04	7,26
36/ 106/ ULS-	21,76	-1,20	-17,52	0,0	-29,40	-5,77
36/ 108/ ULS+	94,74	1,51	5,17	0,0	0,00	0,00
36/ 108/ ULS-	11,17	-1,20	-8,15	0,0	-0,00	-0,00
53/ 2/ ULS+	158,26	0,06	16,70	0,0	0,0	0,0
53/ 2/ ULS-	34,73	-0,61	-17,87	0,0	0,0	0,0
53/ 44/ ULS+	200,19	1,89	29,19	0,0	45,25	3,35
53/ 44/ ULS-	65,79	-0,79	-30,27	0,0	-53,73	-6,50
54/ 1/ ULS+	153,51	0,39	17,84	0,0	0,0	0,0
54/ 1/ ULS-	43,38	-0,14	-16,75	0,0	0,0	0,0
54/ 45/ ULS+	203,22	0,68	30,20	0,00	53,15	3,10
54/ 45/ ULS-	60,42	-0,98	-29,21	-0,00	-45,43	-2,61
65/ 50/ ULS+	154,96	0,09	16,57	0,0	0,0	0,0
65/ 50/ ULS-	49,02	-0,63	-17,87	0,0	0,0	0,0
65/ 66/ ULS+	219,26	1,69	29,24	0,0	45,63	2,76
65/ 66/ ULS-	55,40	-0,35	-30,40	0,0	-54,70	-6,38
76/ 51/ ULS+	157,40	0,13	17,82	0,0	0,0	0,0
76/ 51/ ULS-	45,03	-0,30	-16,60	0,0	0,0	0,0
76/ 67/ ULS+	205,10	0,89	30,31	0,00	53,99	1,81
76/ 67/ ULS-	65,93	-0,44	-29,25	-0,00	-45,73	-3,05
89/ 88/ ULS+	19,52	7,85	5,50	0,0	0,0	0,0
89/ 88/ ULS-	6,52	-10,28	-1,86	0,0	0,0	0,0
89/ 104/ ULS+	84,66	14,39	11,51	2,20	15,29	28,33
89/ 104/ ULS-	54,71	-16,89	-13,74	-4,88	-22,83	-24,54
100/ 89/ ULS+	20,46	7,62	1,49	0,42	2,40	-0,95
100/ 89/ ULS-	6,92	-10,99	-6,02	-0,44	0,87	-2,66
100/ 105/ ULS+	85,60	13,87	13,39	4,79	21,87	30,13
100/ 105/ ULS-	55,15	-17,39	-11,46	-1,87	-15,05	-21,96
101/ 122/ ULS+	78,79	15,05	3,50	0,55	0,51	-3,40
101/ 122/ ULS-	7,54	-20,46	-0,85	-0,86	-2,22	-12,07
101/ 123/ ULS+	169,87	29,91	1,14	0,06	5,97	63,01
101/ 123/ ULS-	22,43	-35,48	-2,15	-2,02	-7,78	-49,41
102/ 124/ ULS+	78,41	14,94	0,95	0,93	2,62	-3,39
102/ 124/ ULS-	7,67	-20,50	-3,56	-0,53	-0,31	-11,97
102/ 125/ ULS+	170,44	29,79	2,24	1,91	7,78	62,79
102/ 125/ ULS-	22,72	-35,46	-1,23	-0,52	-6,13	-48,60

Member/Node/Case	FX (kN)	FY (kN)	FZ (kN)	MX (kNm)	MY (kNm)	MZ (kNm)
105/ 127/ ULS+	57,42	2,50	9,87	0,0	0,0	0,0
105/ 127/ ULS-	-6,10	1,10	-4,53	0,0	0,0	0,0
105/ 129/ ULS+	181,76	2,09	15,69	2,69	19,47	0,15
105/ 129/ ULS-	-4,44	0,79	-17,12	-0,03	-22,91	-7,70
106/ 128/ ULS+	38,00	2,35	0,81	2,15	1,39	0,51
106/ 128/ ULS-	12,51	1,09	-6,32	-0,46	0,41	-0,84
106/ 130/ ULS+	104,40	1,81	14,55	3,28	26,10	-1,11
106/ 130/ ULS-	60,82	0,84	-11,75	-4,18	-17,32	-5,43
107/ 134/ ULS+	109,06	1,87	32,93	0,41	4,06	0,06
107/ 134/ ULS-	33,84	0,75	-20,30	-1,03	-0,35	-0,03
107/ 135/ ULS+	216,24	2,21	3,39	1,31	12,08	-0,39
107/ 135/ ULS-	12,05	1,02	-2,92	-1,23	-10,93	-7,32
108/ 136/ ULS+	110,12	1,67	3,93	0,47	7,90	0,11
108/ 136/ ULS-	31,95	0,80	-5,56	-0,97	-10,34	-0,01
108/ 137/ ULS+	178,77	2,15	3,24	0,27	11,95	-1,35
108/ 137/ ULS-	82,83	1,01	-2,29	-0,87	-9,92	-6,27
111/ 139/ ULS+	70,79	0,57	14,72	0,0	0,0	0,0
111/ 139/ ULS-	22,12	-0,38	-16,22	0,0	0,0	0,0
111/ 141/ ULS+	112,12	0,57	27,05	0,0	42,84	2,95
111/ 141/ ULS-	52,73	-0,38	-28,49	0,0	-54,05	-4,43
112/ 140/ ULS+	64,04	1,38	11,90	0,0	0,0	0,0
112/ 140/ ULS-	20,05	-4,06	-19,00	0,0	0,0	0,0
112/ 142/ ULS+	179,10	1,52	23,85	1,95	44,34	2,49
112/ 142/ ULS-	104,97	-0,74	-31,45	-1,83	-52,09	-3,51
113/ 146/ ULS+	146,17	3,77	3,59	0,0	0,0	0,0
113/ 146/ ULS-	44,52	-0,43	0,03	0,0	0,0	0,0
113/ 147/ ULS+	265,09	0,70	0,66	4,66	9,15	4,31
113/ 147/ ULS-	133,09	-1,30	-1,63	1,45	-10,82	-2,36
116/ 149/ ULS+	69,21	0,60	12,98	0,0	0,0	0,0
116/ 149/ ULS-	20,53	-0,41	-14,94	0,0	0,0	0,0
116/ 151/ ULS+	110,54	0,60	24,84	0,0	39,81	3,18
116/ 151/ ULS-	51,15	-0,41	-26,58	0,0	-53,35	-4,68
117/ 150/ ULS+	62,26	0,30	11,10	0,0	0,0	0,0
117/ 150/ ULS-	18,42	-1,40	-18,01	0,0	0,0	0,0
117/ 152/ ULS+	177,18	1,08	22,89	0,17	45,94	2,17
117/ 152/ ULS-	103,36	-0,60	-29,91	-0,23	-50,24	-3,37
118/ 153/ ULS+	143,04	1,58	6,67	0,0	0,0	0,0
118/ 153/ ULS-	42,96	-0,75	1,77	0,0	0,0	0,0
118/ 154/ ULS+	259,86	1,01	6,41	0,01	24,73	2,67
118/ 154/ ULS-	129,06	-0,69	2,21	-0,28	-3,90	-4,35

Member/Node/Case	FX (kN)	FY (kN)	FZ (kN)	MX (kNm)	MY (kNm)	MZ (kNm)
121/ 159/ ULS+	69,21	0,63	13,19	0,0	0,0	0,0
121/ 159/ ULS-	20,75	-0,43	-14,96	0,0	0,0	0,0
121/ 161/ ULS+	110,54	0,63	24,80	0,0	39,48	3,38
121/ 161/ ULS-	51,36	-0,43	-26,36	0,0	-51,71	-4,91
122/ 160/ ULS+	64,61	0,38	8,23	0,0	0,0	0,0
122/ 160/ ULS-	13,62	-3,44	-15,48	0,0	0,0	0,0
122/ 162/ ULS+	179,70	0,36	17,44	0,84	39,59	2,04
122/ 162/ ULS-	87,78	-0,61	-24,73	-2,29	-46,20	-1,84
123/ 163/ ULS+	141,10	0,24	6,39	0,0	0,0	0,0
123/ 163/ ULS-	37,06	-1,49	2,17	0,0	0,0	0,0
123/ 164/ ULS+	256,59	0,75	6,31	1,41	23,11	3,12
123/ 164/ ULS-	105,03	-0,91	2,34	-0,22	-2,61	-3,74
126/ 169/ ULS+	71,39	0,66	15,16	0,0	0,0	0,0
126/ 169/ ULS-	22,17	-0,47	-16,35	0,0	0,0	0,0
126/ 171/ ULS+	112,71	0,66	27,05	0,0	42,82	3,68
126/ 171/ ULS-	52,78	-0,47	-28,03	0,0	-50,48	-5,17
127/ 170/ ULS+	65,91	0,66	9,82	0,0	0,0	0,0
127/ 170/ ULS-	17,30	-2,37	-16,74	0,0	0,0	0,0
127/ 172/ ULS+	190,65	1,06	18,47	0,87	36,60	1,74
127/ 172/ ULS-	92,08	-0,43	-27,02	-2,59	-49,45	-3,37
128/ 173/ ULS+	157,29	0,60	5,34	0,0	0,0	0,0
128/ 173/ ULS-	43,36	-0,40	2,71	0,0	0,0	0,0
128/ 174/ ULS+	290,34	1,43	6,04	1,06	19,29	2,06
128/ 174/ ULS-	116,93	-0,36	2,87	-0,86	1,80	-5,16
131/ 179/ ULS+	39,44	4,71	4,18	0,00	0,00	0,00
131/ 179/ ULS-	-11,44	-15,09	-4,10	-0,00	-0,00	-0,00
131/ 181/ ULS+	234,37	2,03	11,21	1,88	17,58	26,56
131/ 181/ ULS-	30,37	-12,85	-16,14	-3,14	-21,86	-8,94
132/ 180/ ULS+	20,56	2,22	2,52	0,00	0,00	0,00
132/ 180/ ULS-	6,82	-4,42	-12,35	-0,00	-0,00	-0,00
132/ 182/ ULS+	253,28	-3,19	15,49	8,82	20,94	14,77
132/ 182/ ULS-	149,18	-12,13	-11,61	-0,54	-21,11	-2,14
133/ 183/ ULS+	10,14	2,20	5,42	0,0	0,0	0,0
133/ 183/ ULS-	-2,50	-1,90	3,01	0,0	0,0	0,0
133/ 184/ ULS+	128,48	1,39	5,25	2,01	15,28	3,85
133/ 184/ ULS-	85,17	-1,01	2,73	-2,44	2,01	-5,31

Member/Node/Case	FX (kN)	FY (kN)	FZ (kN)	MX (kNm)	MY (kNm)	MZ (kNm)
134/ 188/ ULS+	50,34	12,32	29,71	0,0	0,0	0,0
134/ 188/ ULS-	14,90	-13,53	-26,18	0,0	0,0	0,0
134/ 189/ ULS+	473,09	-0,50	15,52	1,35	23,73	38,20
134/ 189/ ULS-	103,27	-23,28	-0,08	-1,18	-8,49	-15,24
135/ 190/ ULS+	48,47	11,55	-0,69	0,0	0,0	0,0
135/ 190/ ULS-	15,47	-12,64	-2,40	0,0	0,0	0,0
135/ 191/ ULS+	437,32	-1,07	-0,05	-0,29	9,15	36,50
135/ 191/ ULS-	165,07	-22,93	-15,76	-4,51	-22,41	-14,15
240/ 245/ ULS+	2,36	0,21	4,39	0,0	0,0	0,0
240/ 245/ ULS-	-4,54	-4,02	-12,78	0,0	0,0	0,0
240/ 246/ ULS+	114,31	1,37	10,83	1,22	20,22	2,50
240/ 246/ ULS-	80,49	-0,72	-18,73	-1,97	-33,66	-3,10
241/ 247/ ULS+	-0,00	-0,00	0,00	0,0	-0,00	0,00
241/ 247/ ULS-	-0,00	-0,00	0,00	0,0	-0,00	-0,00
241/ 248/ ULS+	114,62	1,17	2,84	6,33	-7,26	3,34
241/ 248/ ULS-	83,58	-0,67	1,05	2,34	-18,15	-3,67
246/ 253/ ULS+	133,33	-3,51	11,47	2,49	13,01	3,70
246/ 253/ ULS-	78,34	-9,21	-13,15	-1,34	-9,80	-15,86
246/ 254/ ULS+	42,77	-3,67	7,05	0,0	0,00	0,00
246/ 254/ ULS-	11,42	-9,08	-5,24	0,0	-0,00	-0,00
247/ 255/ ULS+	38,34	10,85	8,82	0,0	9,41	16,36
247/ 255/ ULS-	16,45	-10,65	-8,70	0,0	-9,99	-15,42
247/ 256/ ULS+	24,04	4,65	4,94	0,0	0,00	0,00
247/ 256/ ULS-	5,85	-4,19	-4,96	0,0	-0,00	-0,00
248/ 257/ ULS+	133,16	-4,03	13,25	1,28	9,69	1,21
248/ 257/ ULS-	78,32	-9,05	-11,58	-2,32	-13,20	-15,10
248/ 258/ ULS+	42,61	-4,21	5,27	0,0	0,00	-0,00
248/ 258/ ULS-	11,40	-8,92	-7,09	0,0	-0,00	-0,00
249/ 259/ ULS+	109,26	1,09	17,58	0,0	28,55	5,24
249/ 259/ ULS-	21,61	-1,07	-14,43	0,0	-31,30	-5,12
249/ 260/ ULS+	94,96	1,09	8,15	0,0	0,00	0,00
249/ 260/ ULS-	11,01	-1,07	-5,00	0,0	-0,00	-0,00
250/ 261/ ULS+	38,34	10,45	8,60	0,0	9,71	14,43
250/ 261/ ULS-	16,45	-10,52	-8,76	0,0	-8,93	-14,77
250/ 262/ ULS+	24,04	4,86	5,04	0,0	0,00	0,00
250/ 262/ ULS-	5,85	-4,56	-5,04	0,0	0,00	-0,00
255/ 265/ ULS+	72,94	9,27	0,42	0,0	0,0	0,0
255/ 265/ ULS-	18,84	-9,09	-0,23	0,0	0,0	0,0
255/ 266/ ULS+	88,20	21,20	0,42	0,0	2,17	25,77
255/ 266/ ULS-	30,14	-20,99	-0,23	0,0	-1,16	-26,83
256/ 267/ ULS+	72,95	9,37	0,14	0,0	0,0	0,0
256/ 267/ ULS-	18,84	-9,20	-0,51	0,0	0,0	0,0
256/ 268/ ULS+	88,20	21,20	0,14	0,0	0,73	25,23
256/ 268/ ULS-	30,14	-20,89	-0,51	0,0	-2,59	-26,83
264/ 280/ ULS+	120,22	12,08	-1,49	2,55	12,31	0,30
264/ 280/ ULS-	20,48	-4,02	-6,71	-0,44	2,64	0,00
264/ 281/ ULS+	343,76	9,07	3,36	0,13	5,79	-0,23
264/ 281/ ULS-	111,02	4,46	-2,98	-0,54	-5,78	-14,95
265/ 282/ ULS+	120,24	12,31	6,46	0,26	-2,68	0,28
265/ 282/ ULS-	20,36	-3,92	1,60	-2,61	-12,48	0,01
265/ 283/ ULS+	343,54	8,83	2,97	0,40	5,76	-0,98
265/ 283/ ULS-	110,91	4,63	-3,32	-0,22	-5,71	-14,38

Eilės Nr.	Skaičiuotinis ilgis plokštumoje	Skaičiuotinis ilgis iš plokštumos	Ugnaatsparumas
K-4	1,2L	0,8L	Reikalavimai nekeliami
K-5	1,2L	0,8L	Reikalavimai nekeliami
K-6	1,2L	0,8L	Reikalavimai nekeliami
K-8	1,2L	0,8L	Reikalavimai nekeliami
K-9	1,2L	0,8L	Reikalavimai nekeliami
K-11	Pokraninė kolonos dalis 1,2L ₁ Virškraninė kolonos dalis 2L ₂	Pokraninė kolonos dalis 0,8L ₁ Virškraninė kolonos dalis 1,5L ₂	Reikalavimai nekeliami
K-12	Pokraninė kolonos dalis 1,2L ₁ Virškraninė kolonos dalis 2L ₂	Pokraninė kolonos dalis 0,8L ₁ Virškraninė kolonos dalis 1,5L ₂	Reikalavimai nekeliami
K-13	Pokraninė kolonos dalis 1,2L ₁ Virškraninė kolonos dalis 2L ₂	Pokraninė kolonos dalis 0,8L ₁ Virškraninė kolonos dalis 1,5L ₂	Reikalavimai nekeliami
K-14	Pokraninė kolonos dalis 1,2L ₁ Virškraninė kolonos dalis 2L ₂	Pokraninė kolonos dalis 0,8L ₁ Virškraninė kolonos dalis 1,5L ₂	R45
K-15	Pokraninė kolonos dalis 1,2L ₁ Virškraninė kolonos dalis 2L ₂	Pokraninė kolonos dalis 0,8L ₁ Virškraninė kolonos dalis 1,5L ₂	Reikalavimai nekeliami
K-17	Pokraninė kolonos dalis 1,2L ₁ Virškraninė kolonos dalis 2L ₂	Pokraninė kolonos dalis 0,8L ₁ Virškraninė kolonos dalis 1,5L ₂	Reikalavimai nekeliami
K-18	Pokraninė kolonos dalis 1,2L ₁ Virškraninė kolonos dalis 2L ₂	Pokraninė kolonos dalis 0,8L ₁ Virškraninė kolonos dalis 1,5L ₂	R45
K-20	Pokraninė kolonos dalis 1,2L ₁ Virškraninė kolonos dalis 2L ₂	Pokraninė kolonos dalis 0,8L ₁ Virškraninė kolonos dalis 1,5L ₂	R45
K-22	Pokraninė kolonos dalis 1,2L ₁ Virškraninė kolonos dalis 2L ₂	Pokraninė kolonos dalis 0,8L ₁ Virškraninė kolonos dalis 1,5L ₂	R45

K-24	Pokraninė kolonos dalis 1,2L ₁ Virškraninė kolonos dalis 2L ₂	Pokraninė kolonos dalis 0,8L ₁ Virškraninė kolonos dalis 1,5L ₂	R45
K-25	Pokraninė kolonos dalis 1,2L ₁ Virškraninė kolonos dalis 2L ₂	Pokraninė kolonos dalis 0,8L ₁ Virškraninė kolonos dalis 1,5L ₂	R45
K-26	Pokraninė kolonos dalis 1,2L ₁ Virškraninė kolonos dalis 2L ₂	Pokraninė kolonos dalis 0,8L ₁ Virškraninė kolonos dalis 1,5L ₂	R45
K-28			Reikalavimai nekeliami
K-31	Pokraninė kolonos dalis 1,2L ₁ Virškraninė kolonos dalis 2L ₂	Pokraninė kolonos dalis 0,8L ₁ Virškraninė kolonos dalis 1,5L ₂	Reikalavimai nekeliami
K-33	1,2L	0,8L	R45
K-34	1,2L	0,8L	Reikalavimai nekeliami
K-35	1,2L	0,8L	Reikalavimai nekeliami
K-36	1,2L	0,8L	Reikalavimai nekeliami
K-37	Pokraninė kolonos dalis 1,2L ₁ Virškraninė kolonos dalis 2L ₂	Pokraninė kolonos dalis 0,8L ₁ Virškraninė kolonos dalis 1,5L ₂	Reikalavimai nekeliami
K-41	Pokraninė kolonos dalis 1,2L ₁ Virškraninė kolonos dalis 2L ₂	Pokraninė kolonos dalis 0,8L ₁ Virškraninė kolonos dalis 1,5L ₂	Reikalavimai nekeliami
K-42	Pokraninė kolonos dalis 1,2L ₁ Virškraninė kolonos dalis 2L ₂	Pokraninė kolonos dalis 0,8L ₁ Virškraninė kolonos dalis 1,5L ₂	R45
K-43	Pokraninė kolonos dalis 1,2L ₁ Virškraninė kolonos dalis 2L ₂	Pokraninė kolonos dalis 0,8L ₁ Virškraninė kolonos dalis 1,5L ₂	R45
K-44	Pokraninė kolonos dalis 1,2L ₁ Virškraninė kolonos dalis 2L ₂	Pokraninė kolonos dalis 0,8L ₁ Virškraninė kolonos dalis 1,5L ₂	R45
K-47	Pokraninė kolonos dalis 1,2L ₁	Pokraninė kolonos dalis 0,8L ₁	R45

	Virškraninė kolonos dalis $2L_2$	Virškraninė kolonos dalis $1,5L_2$	
K-50	Pokraninė kolonos dalis $1,2L_1$ Virškraninė kolonos dalis $2L_2$	Pokraninė kolonos dalis $0,8L_1$ Virškraninė kolonos dalis $1,5L_2$	R45
K-51	$1,2L$	$0,8L$	R45
K-52	$1,2L$	$0,8L$	Reikalavimai nekeliami
K-53	Pokraninė kolonos dalis $1,2L_1$ Virškraninė kolonos dalis $2L_2$	Pokraninė kolonos dalis $0,8L_1$ Virškraninė kolonos dalis $1,5L_2$	Reikalavimai nekeliami
K-54	Pokraninė kolonos dalis $1,2L_1$ Virškraninė kolonos dalis $2L_2$	Pokraninė kolonos dalis $0,8L_1$ Virškraninė kolonos dalis $1,5L_2$	Reikalavimai nekeliami
K-55	Pokraninė kolonos dalis $1,2L_1$ Virškraninė kolonos dalis $2L_2$	Pokraninė kolonos dalis $0,8L_1$ Virškraninė kolonos dalis $1,5L_2$	R45
K-56	Pokraninė kolonos dalis $1,2L_1$ Virškraninė kolonos dalis $2L_2$	Pokraninė kolonos dalis $0,8L_1$ Virškraninė kolonos dalis $1,5L_2$	Reikalavimai nekeliami

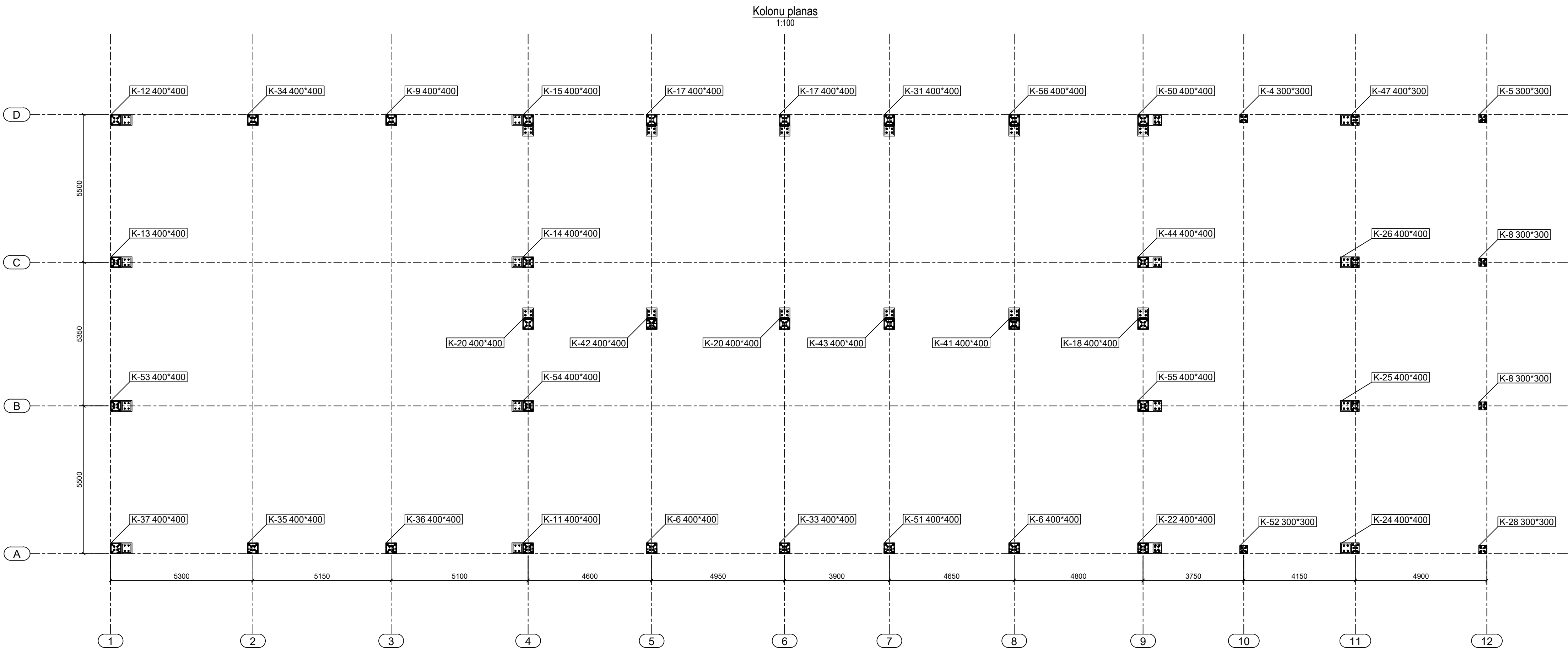
Pastabos:

1. l – visas kolonos aukštis nuo pamato viršaus iki horizontaliosios konstrukcijos apačios atitinkamoje plokštumoje;
2. l_1 – kolonos pokraninės dalies aukštis nuo pamato viršaus iki pokraninės sijos apačios;
3. l_2 – kolonos virškraninės dalies aukštis nuo kolonos pakopos iki horizontaliosios konstrukcijos atitinkamoje plokštumoje.

KITOS PASTABOS:

1. Apkrovos kolonų gembėms nurodytos kolonų klojininiuose brėžiniuose.
2. Įdėtinės detalės turi būti derinamos su armatūros karkasu. Esant kolozijoms – informuoti projektuotoją, dėl įdėtinių detalių korekcijos.

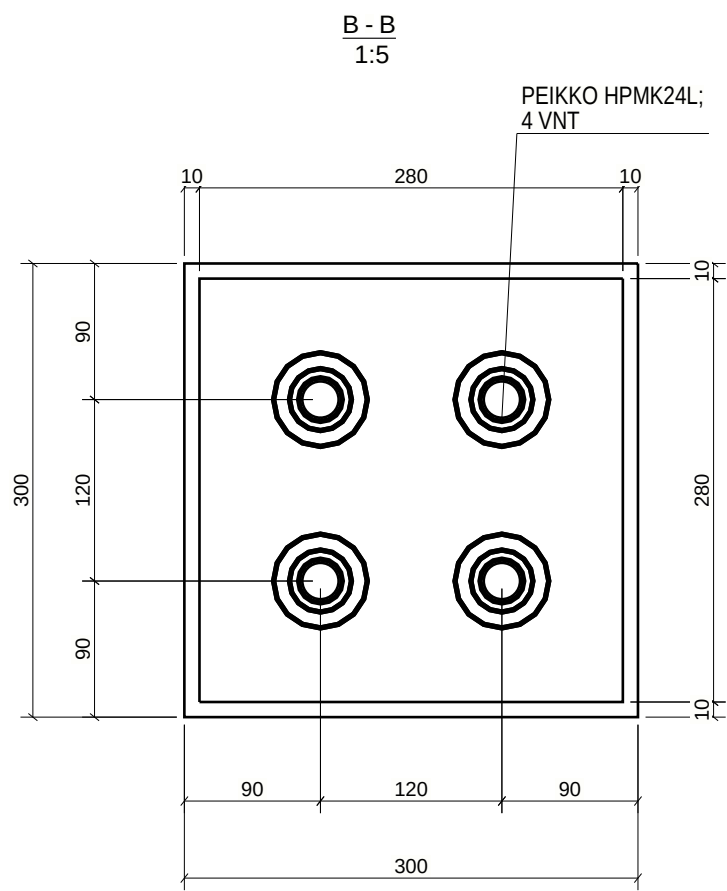
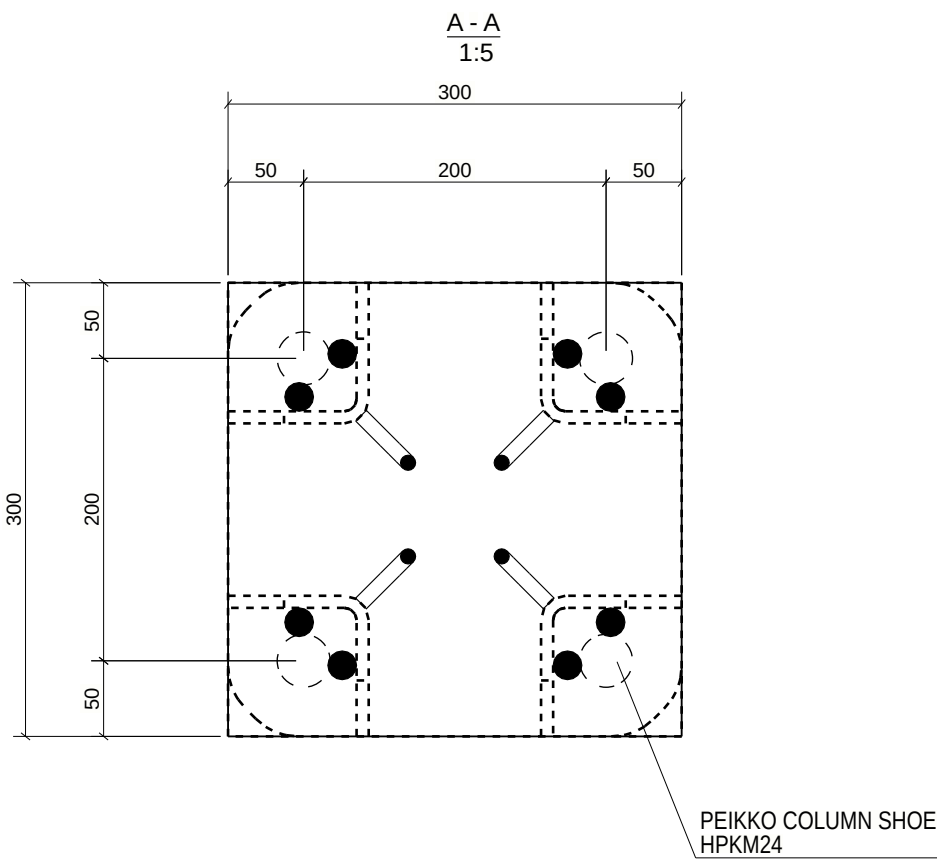
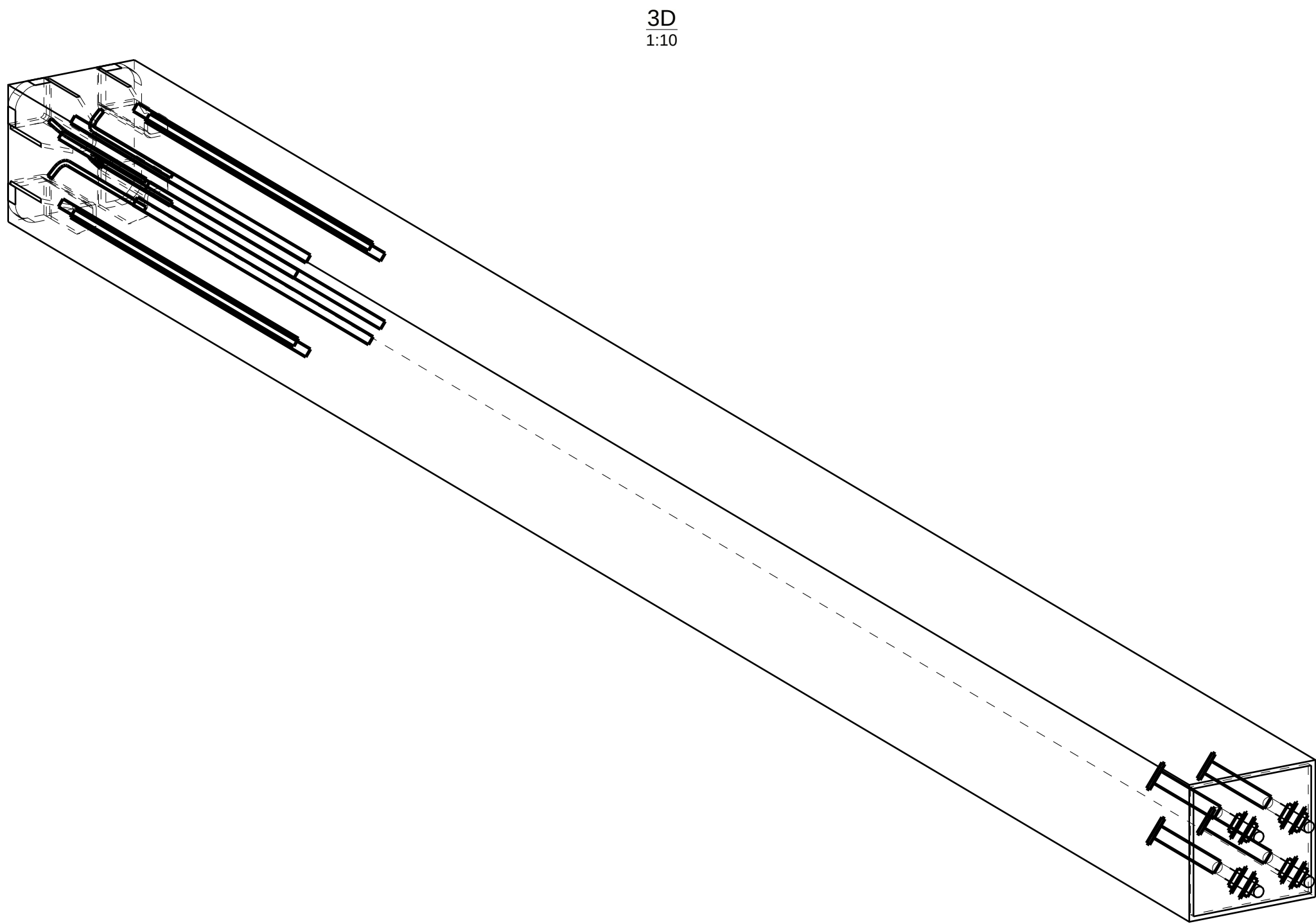
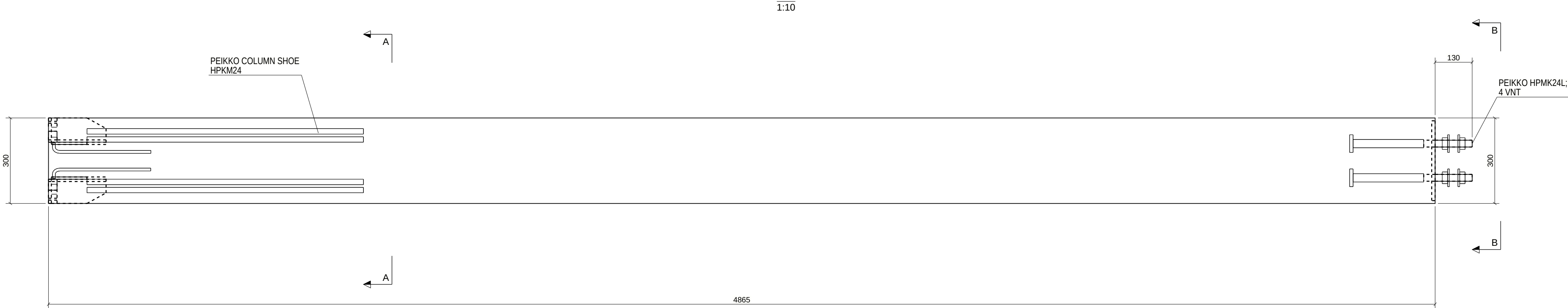
Betonas kolonoms: **C35/45; XC4)**



Sarasas				
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)
K-56	400*400	1	1.38	1.38
K-55	400*400	1	1.56	1.56
K-54	400*400	1	1.42	1.42
K-53	400*400	1	1.43	1.43
K-52	300*300	1	0.44	0.44
K-51	400*400	1	1.31	1.31
K-50	400*400	1	1.57	1.57
K-47	400*300	1	0.69	0.69
K-44	400*400	1	1.56	1.56
K-43	400*400	1	1.45	1.45
K-42	400*400	1	1.45	1.45
K-41	400*400	1	1.45	1.45
K-37	400*400	1	1.37	1.37
K-36	400*400	1	1.32	1.32
K-35	400*400	1	1.32	1.32
K-34	400*400	1	1.32	1.32
K-33	400*400	1	1.31	1.31
K-31	400*400	1	1.38	1.38
K-28	300*300	1	0.44	0.44
K-26	400*300	1	0.69	0.69
K-25	400*300	1	0.66	0.66
K-24	400*300	1	0.65	0.65
K-22	400*400	1	1.51	1.51
K-20	400*400	2	1.44	2.89
K-18	400*400	1	1.45	1.45
K-17	400*400	2	1.37	2.75
K-15	400*400	1	1.43	1.43
K-14	400*400	1	1.42	1.42
K-13	400*400	1	1.43	1.43
K-12	400*400	1	1.37	1.37
K-11	400*400	1	1.38	1.38
K-9	400*400	1	1.32	1.32
K-8	300*300	2	0.50	1.00
K-6	400*400	2	1.31	2.62
K-5	300*300	1	0.47	0.47
K-4	300*300	1	0.44	0.44
Viso:		40		48

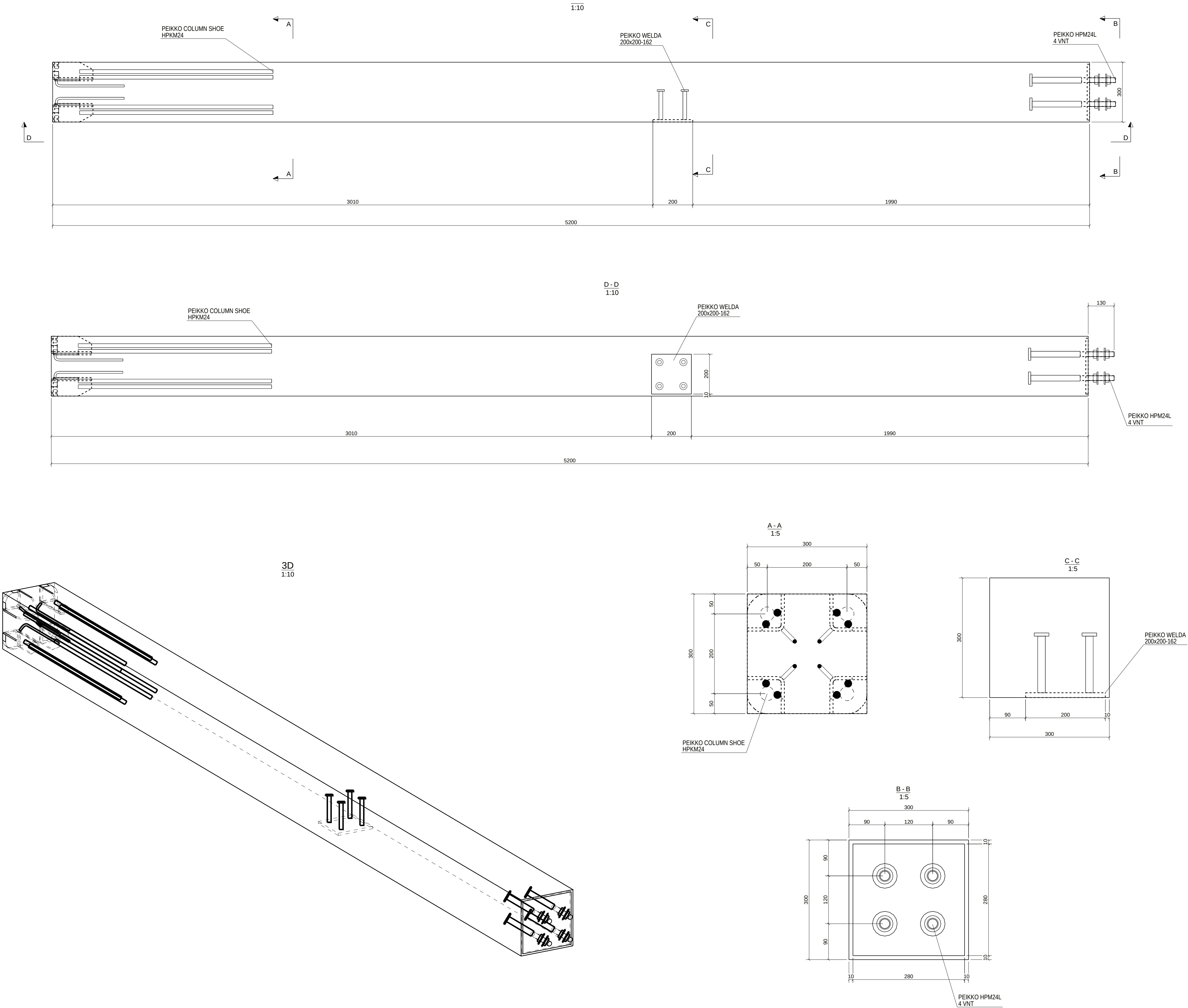
Sarasas				
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)
K-4	300*300	1	0.44	0.44
Viso:		1		0

I detiniu detaliu sarašas				
		K-4		
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	1 Gaminiu kiekis
	300*300	C35/45	1	4865.0
	BL12*280	S355J2	1	280.0
p-42				7.4
HPKM24			4	3.5
HPM24L			4	0.6
		Viso		0.44
				1058.9

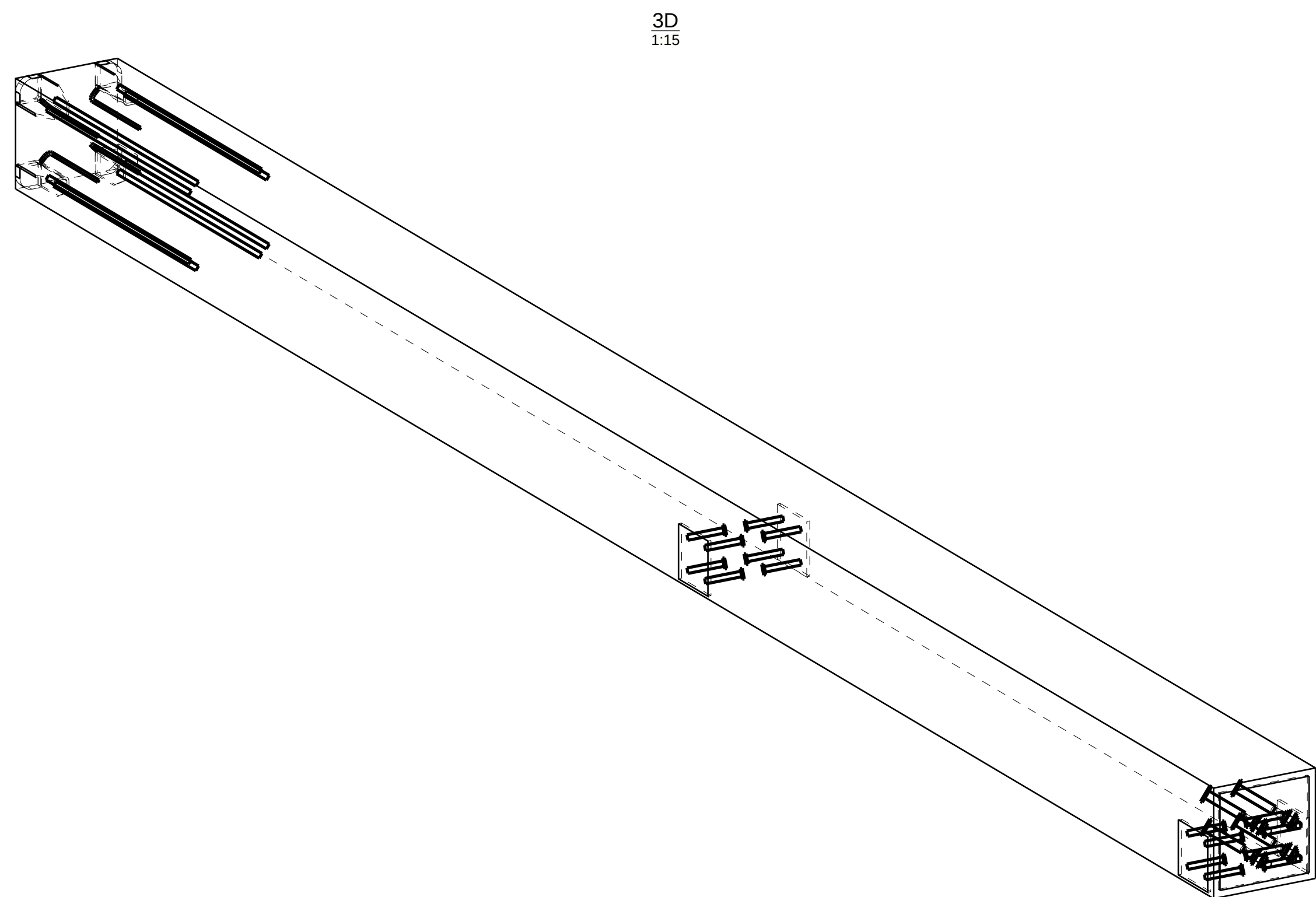
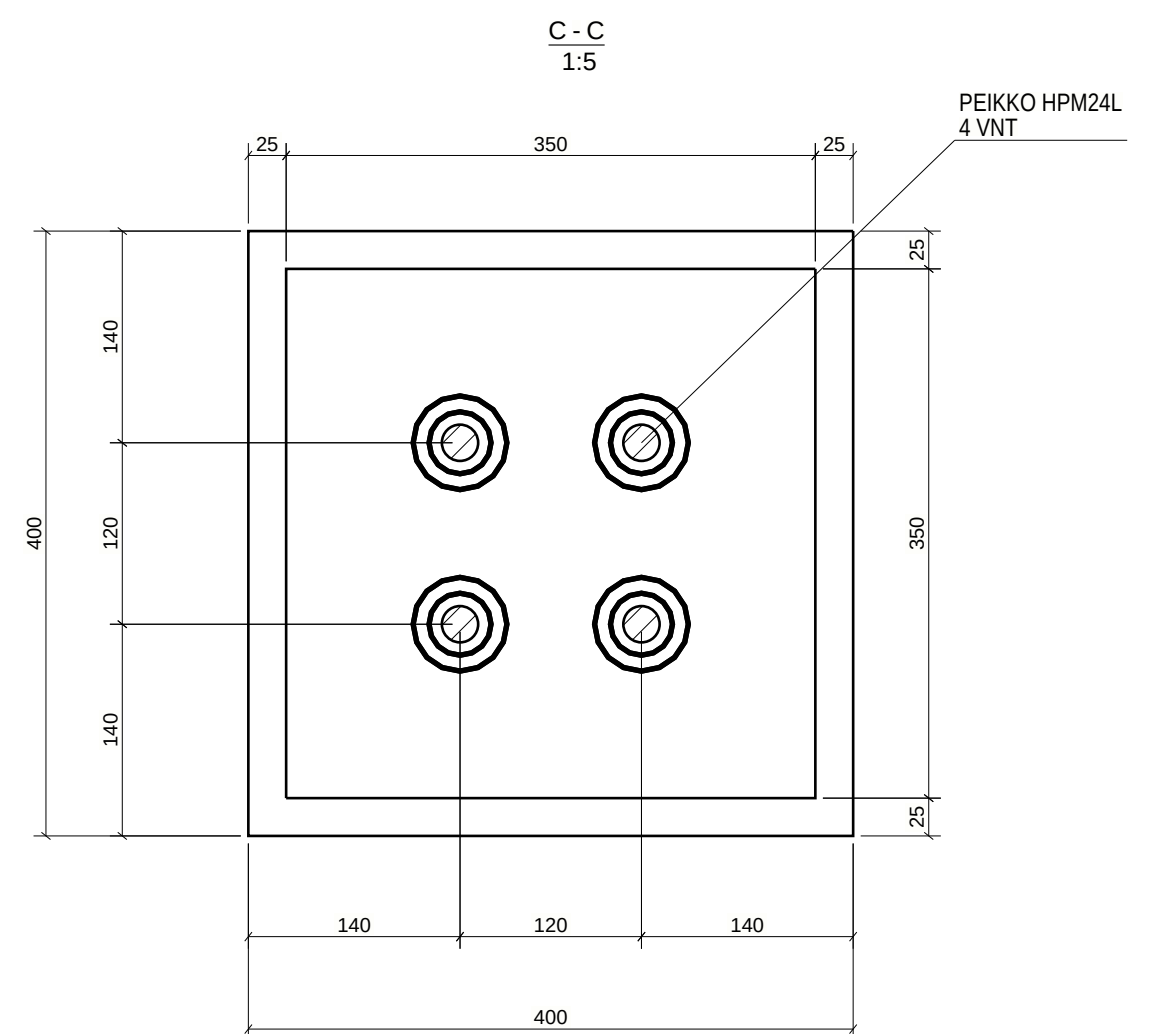


Sarasas				
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)
K-5	300*300	1	0.47	0.47
Viso:		1		0

I detiniu detaliu sarašas					K-5		1 Gaminiu kiekis	
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Turis (m³)	Svoris (kg)		
	300*300	C35/45	1	5200.0	0.47	1123.2		
p-42	BL12*280	S355J2	1	280.0		7.4		
HPKM24			4			3.5		
HPM24L			4			0.6		
WELDA200x200-162			1			3.8		
Viso					0.47	1133.9		

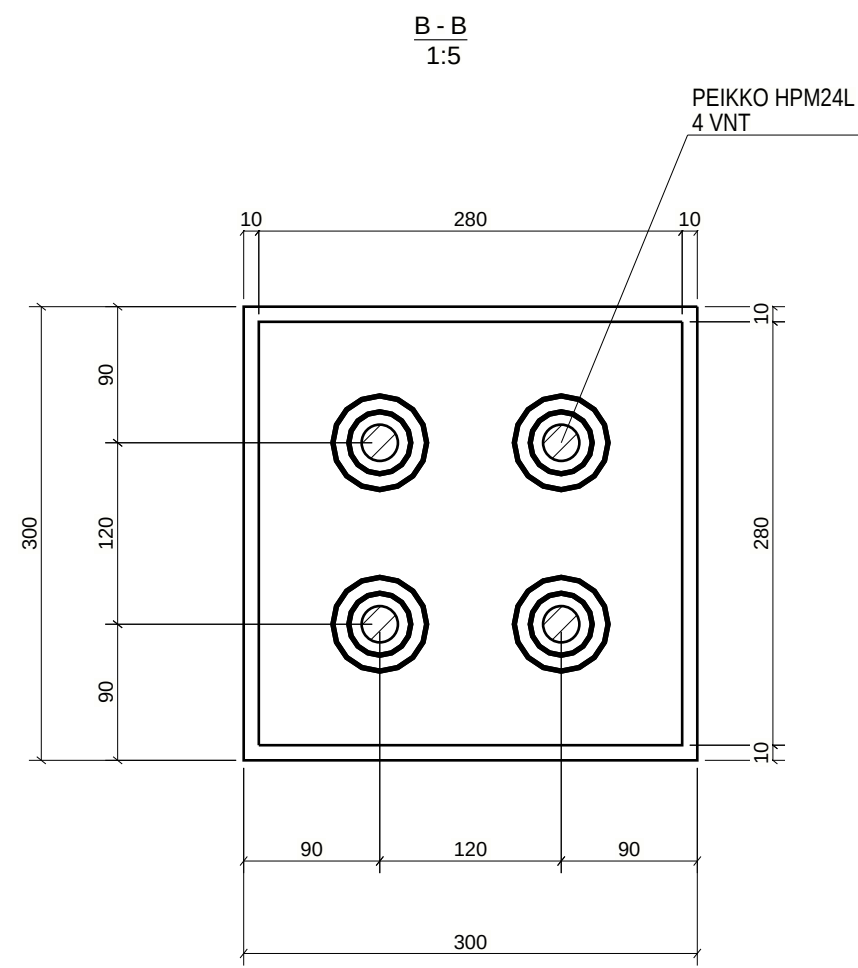
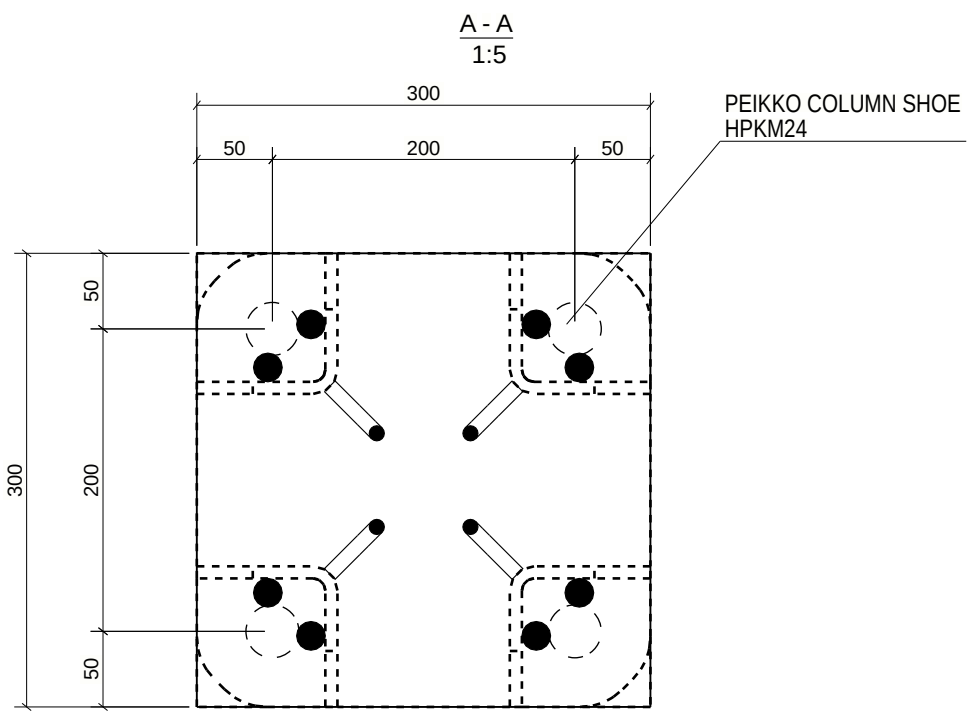
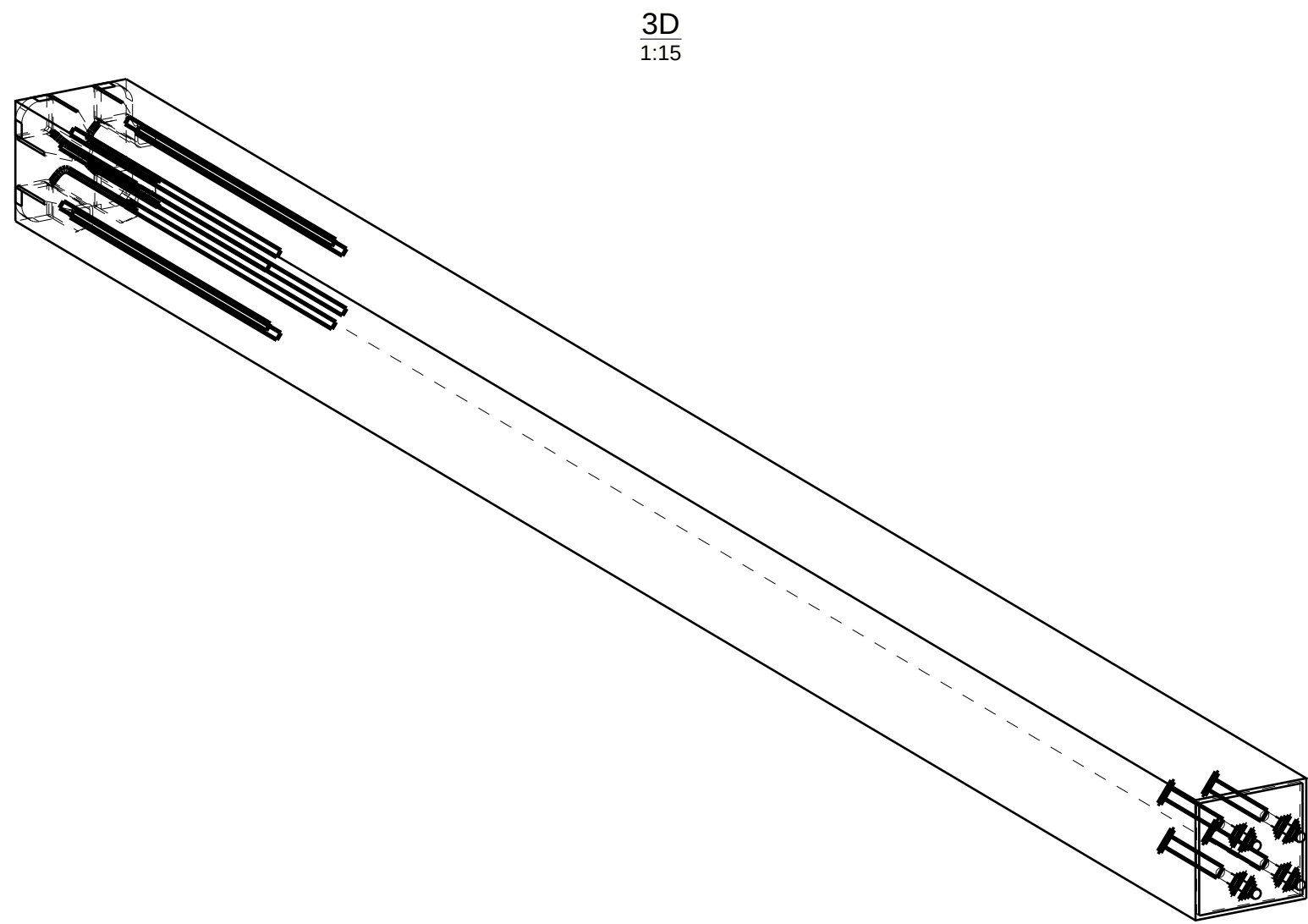
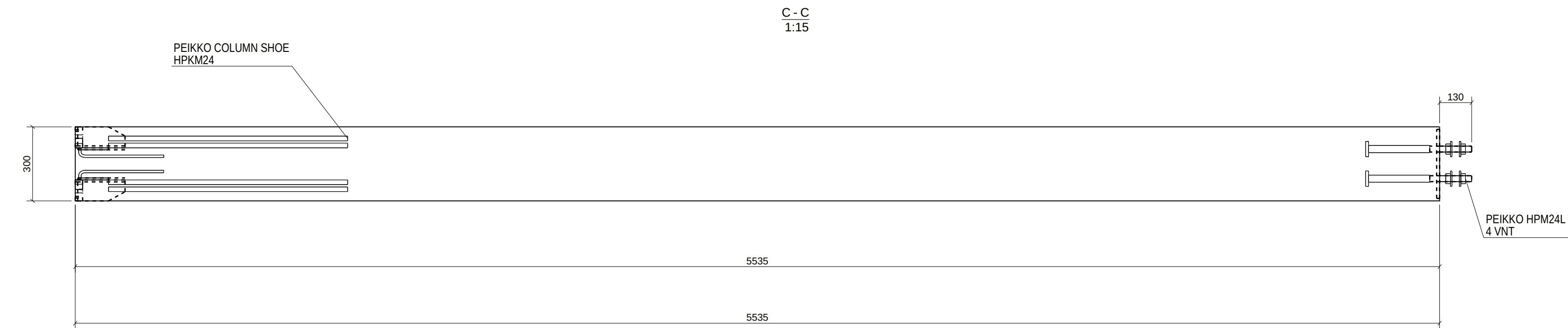
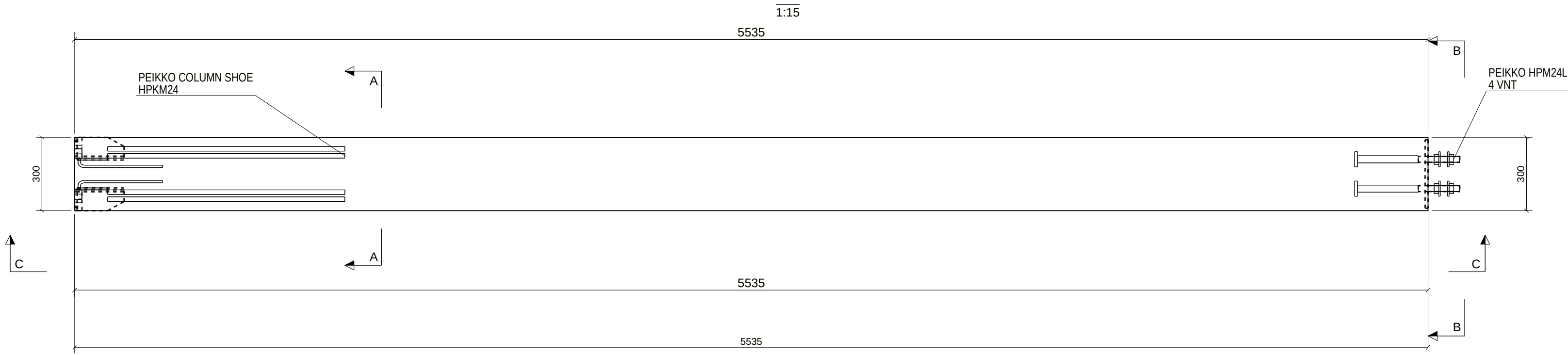


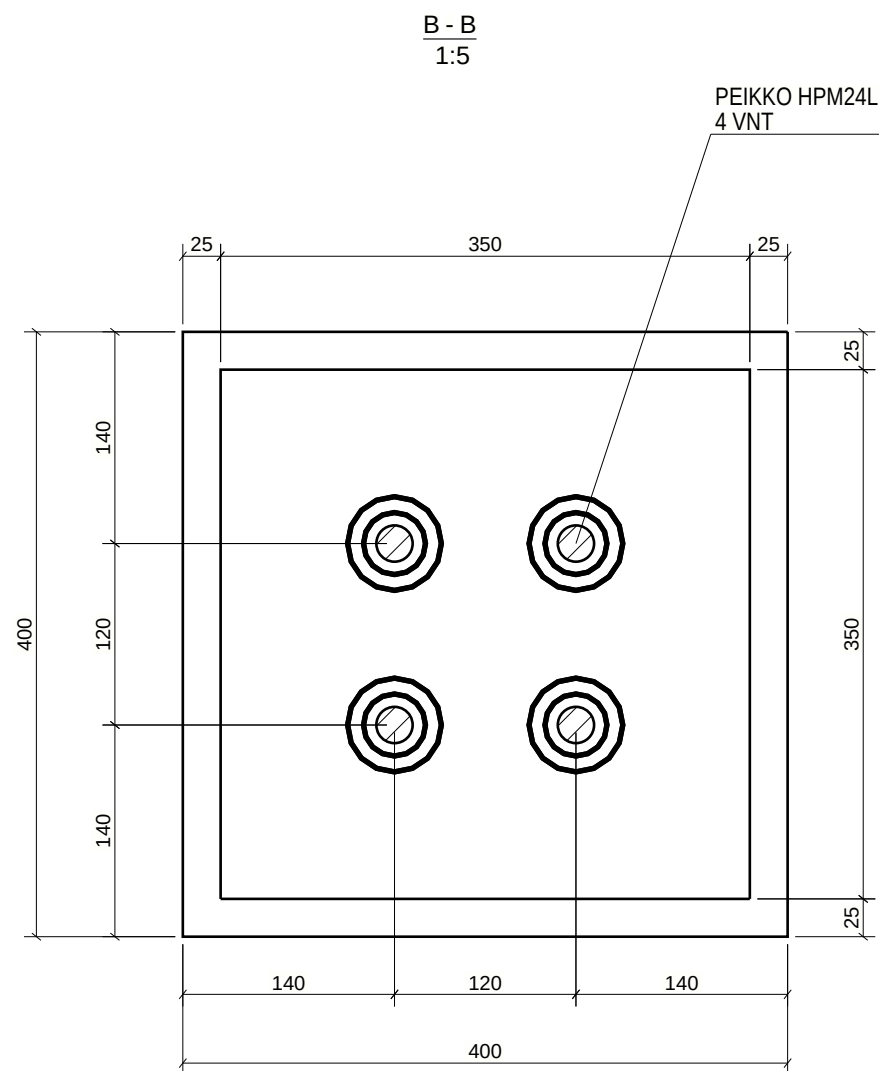
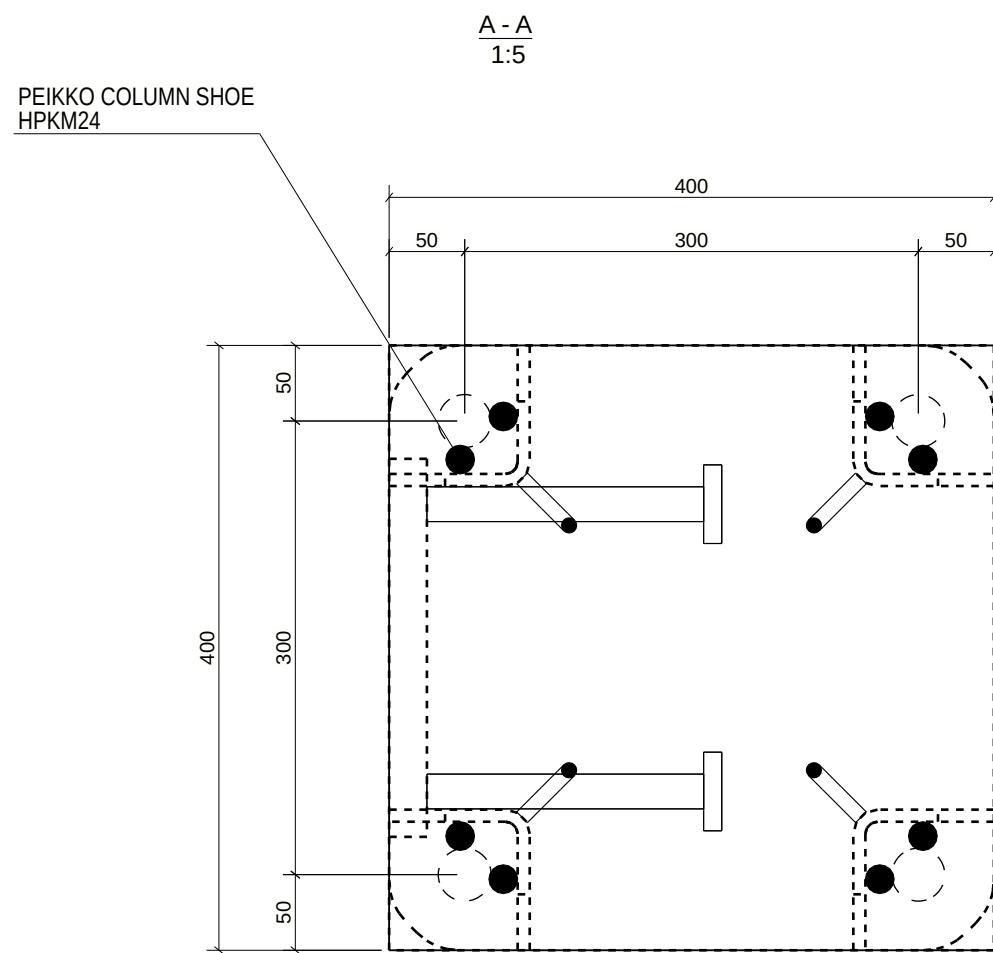
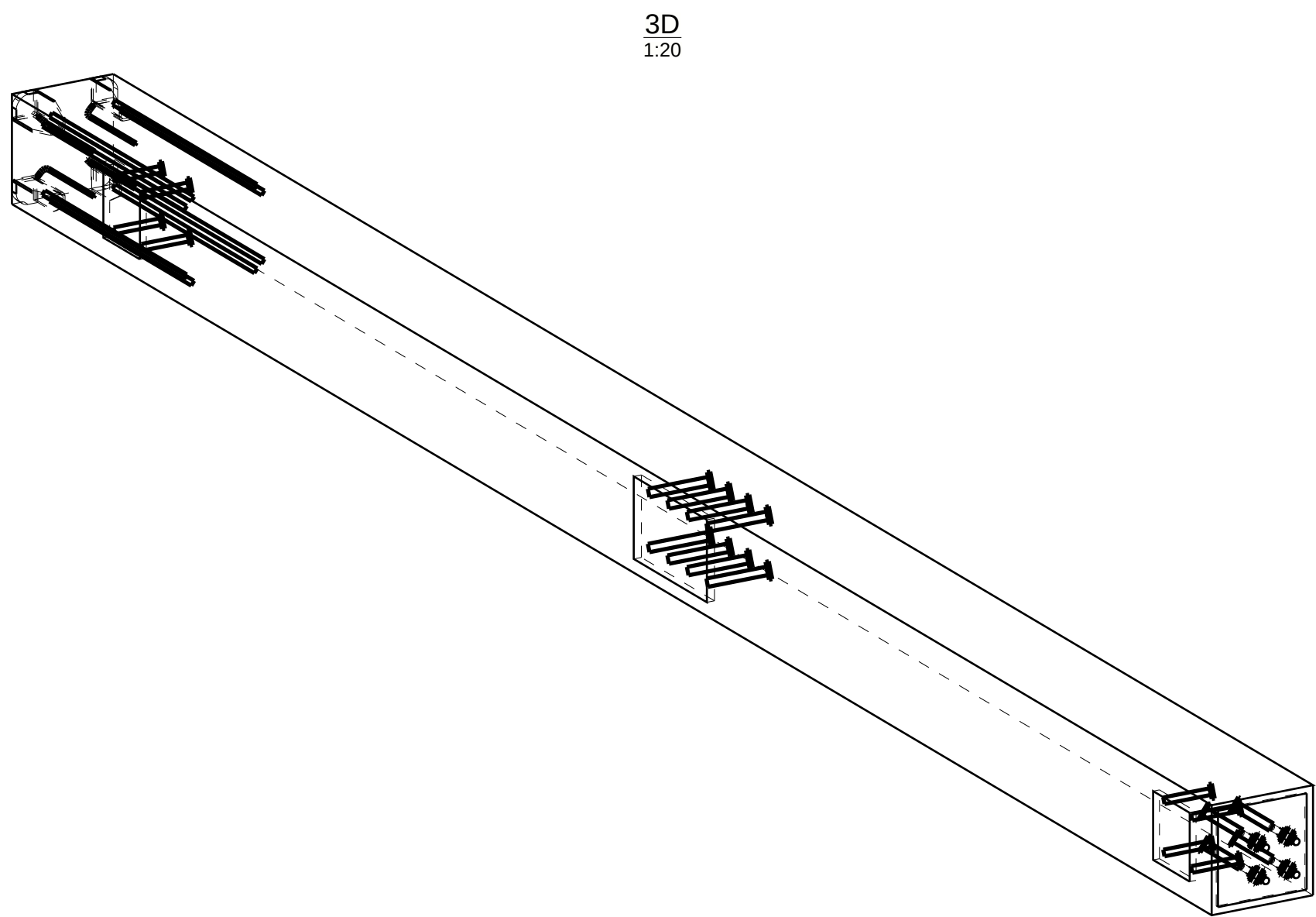
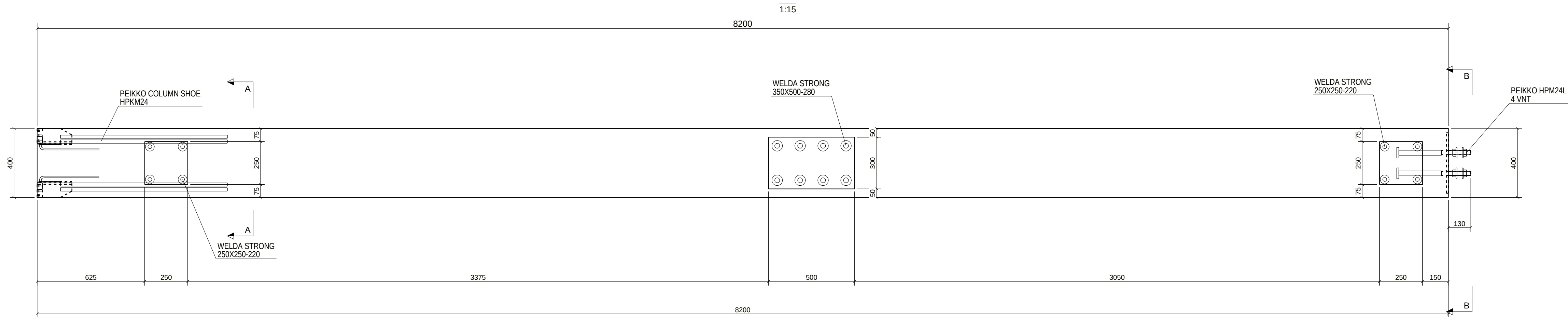
Išdėtinio detalės sąrašas			K-6		2 Gaminiui kiekis	
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Turis (m³)	Svoris (kg)
	400*400	C35/45	1	8150.0	1.30	3129.6
p-39	BL12*350	S355J2	1	350.0		11.5
HPKM24			4			3.5
HPM24L			4			0.6
WELDA200x200-162			4			3.8
				Viso	1.30	3143.2



Sarasas					
Zymuo	Skersmuo		Kiekis	Turis (m3)	B. turis (m3)
K-8	300*300		1	0.50	0.50
Viso:			1		1

I detiniu detaliu sarašas					
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	K-8	
				Ilgis (mm)	Turis (m³)
p-42	300*300	C35/45	1	5535.0	0.50
HPKM24	BL12*280	S355J2	1	280.0	7.4
HPKM24			4		3.5
HPM24L			4		0.6
Viso					1203.6



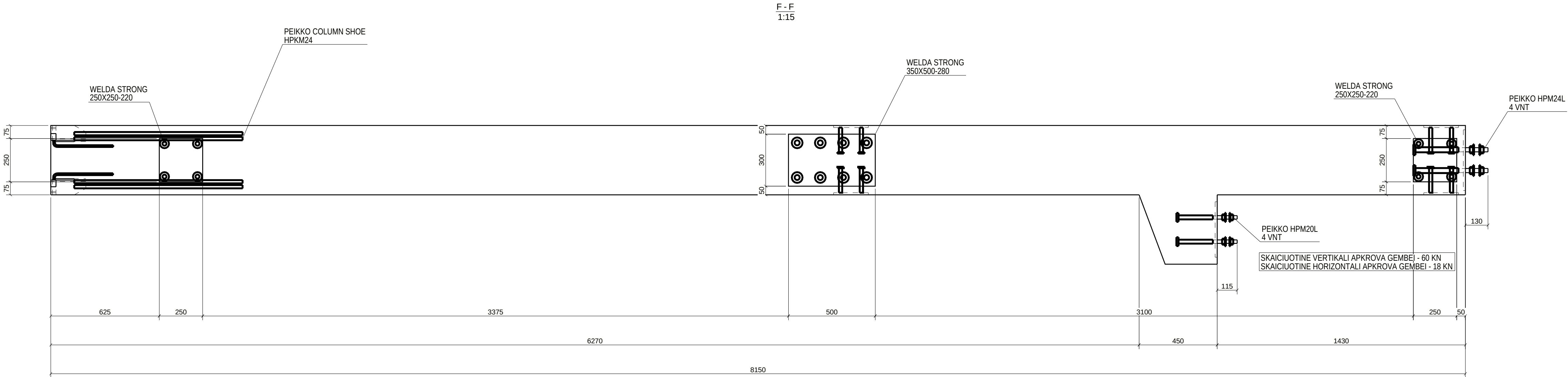
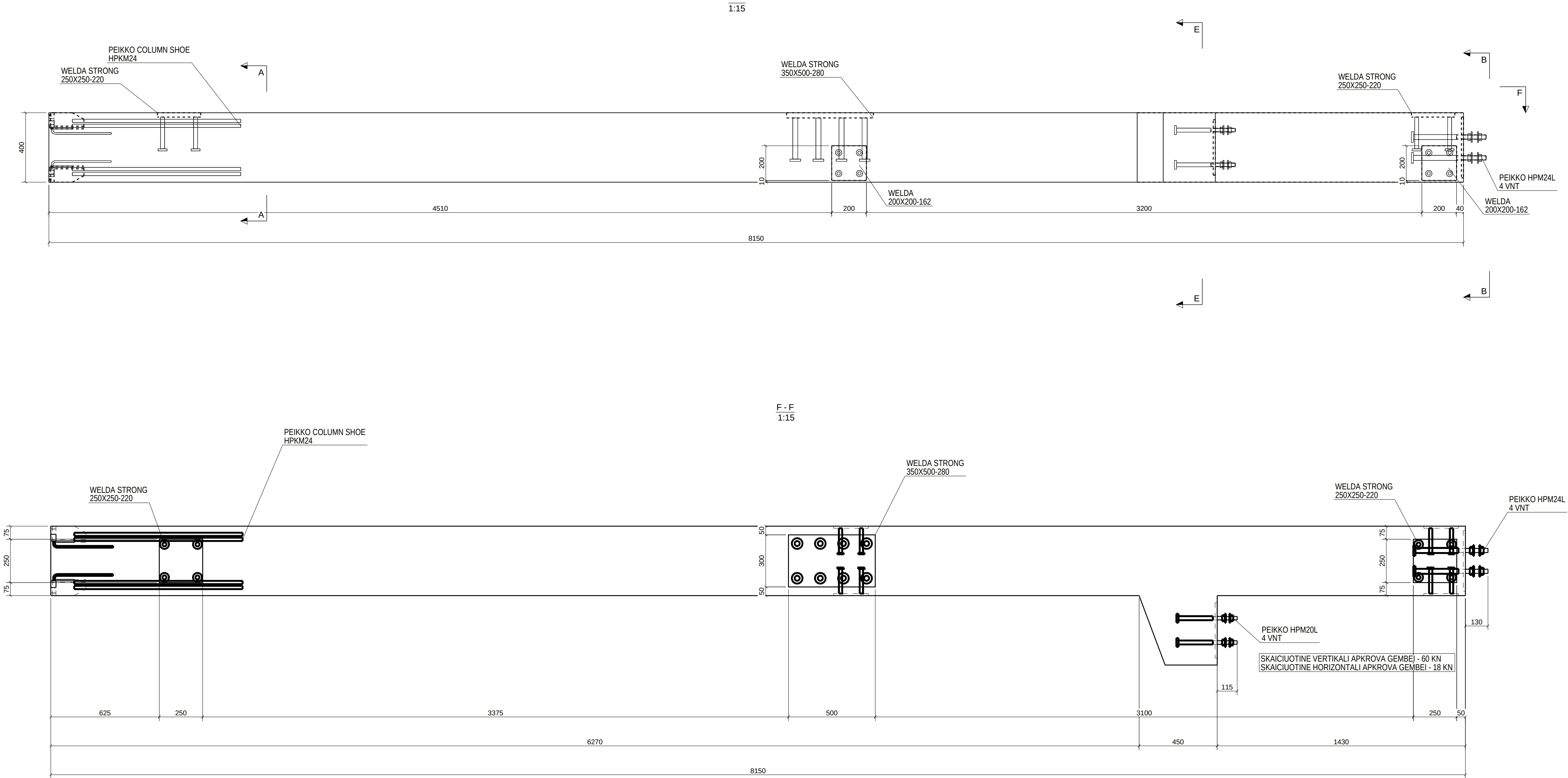
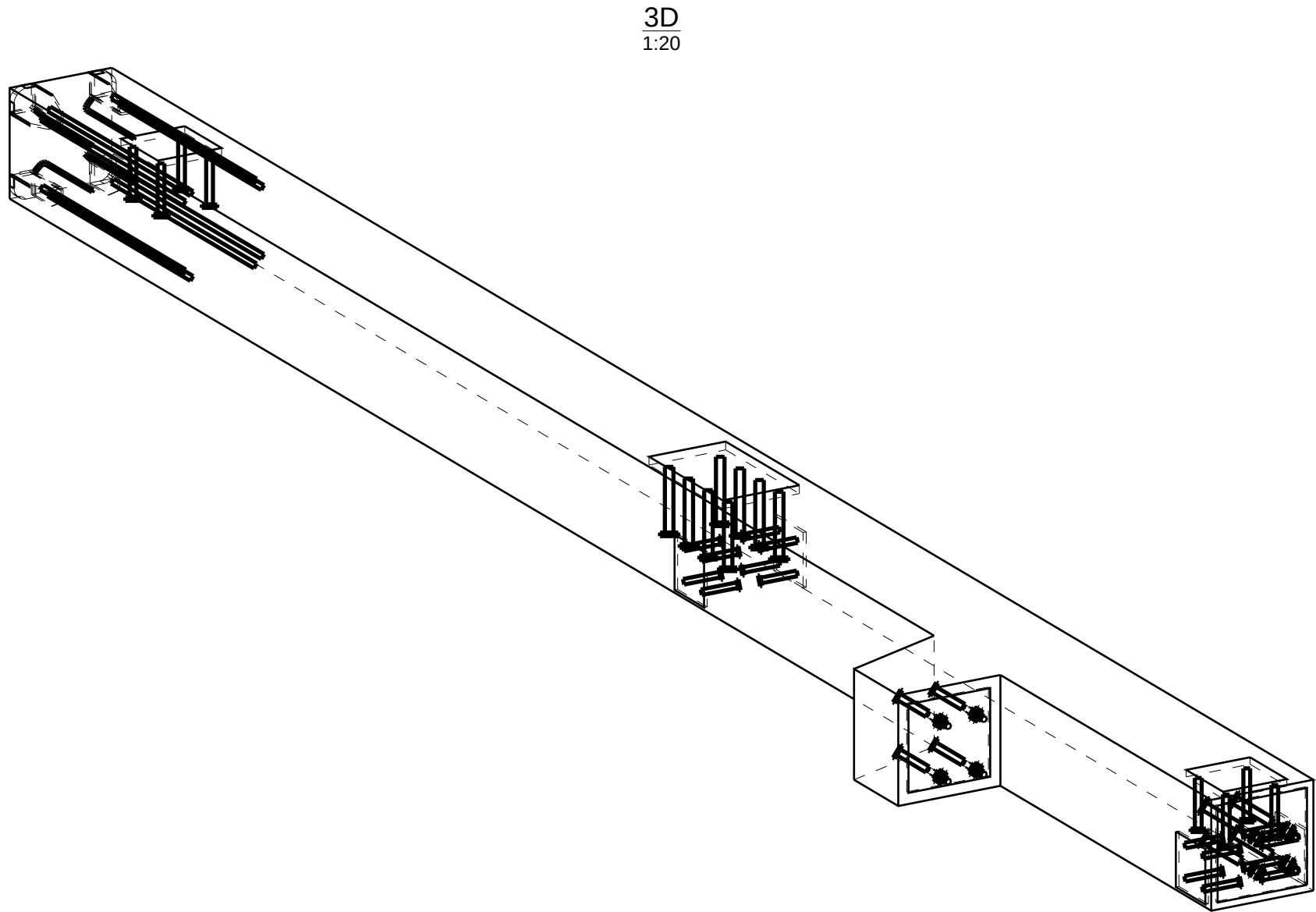
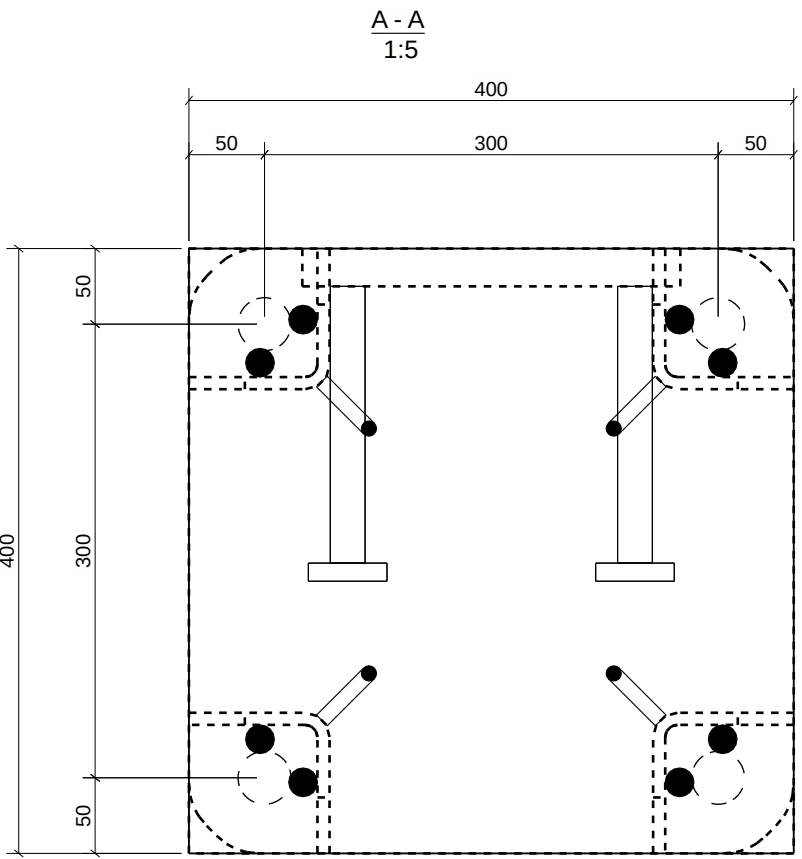
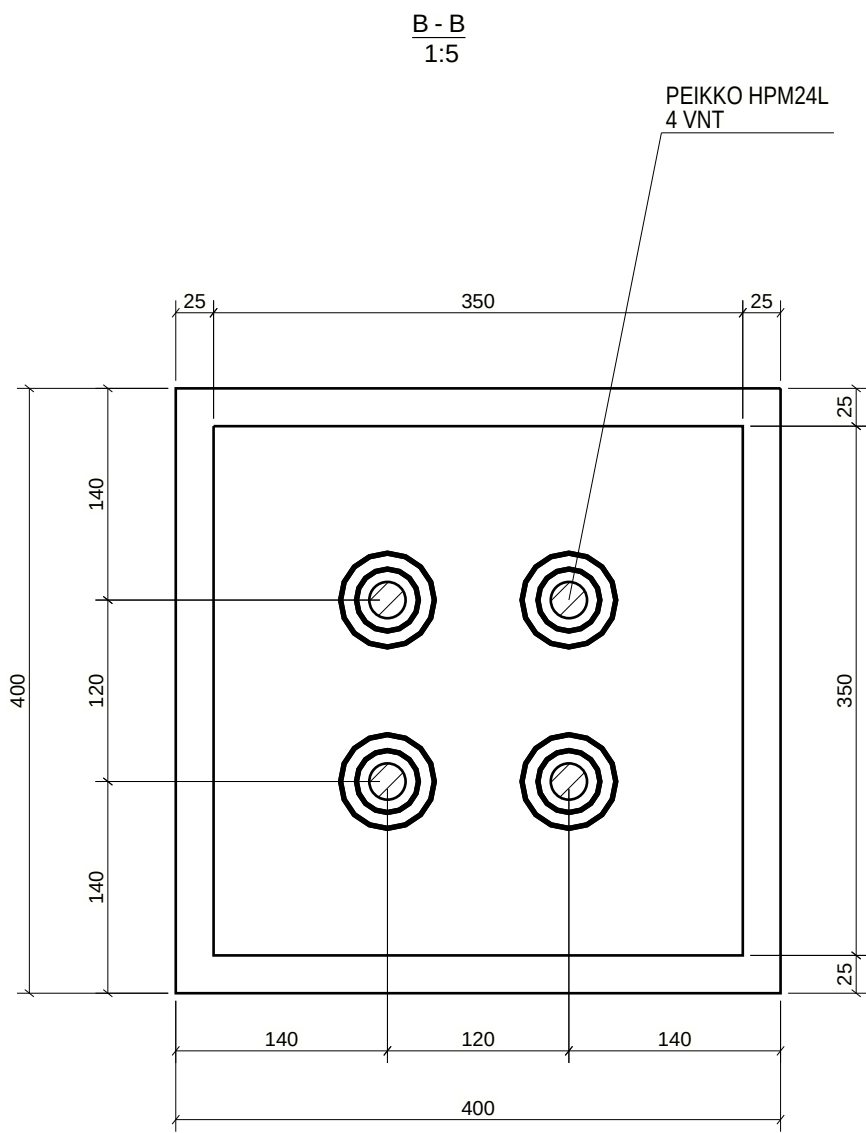
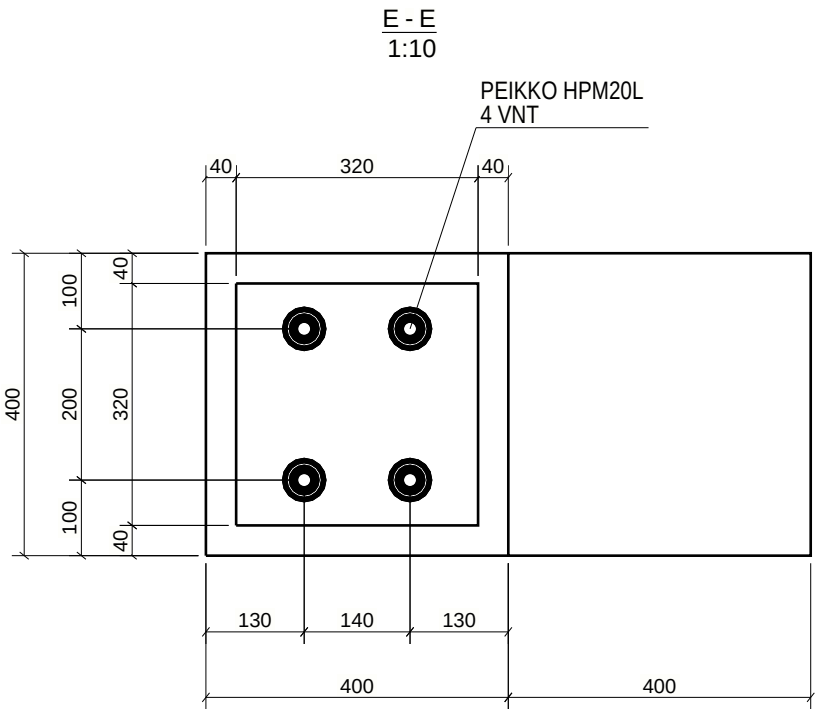


Sarasas				
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)
K-9	400*400	1	1.32	1.32
Viso:		1		1

I detinių detalių sąrašas			K-9		1 Gaminių kiekis	
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Turis (m³)	Svoris (kg)
	400*400	C35/45	1	8200.0	1.31	3148.8
p-39	BL12*350	S355J2	1	350.0		11.5
HPKM24			4			3.5
HPM24L			4			0.6
WS250x250-220			2			12.3
WS300x500-280			1			35.3
Viso					1.31	3193.0

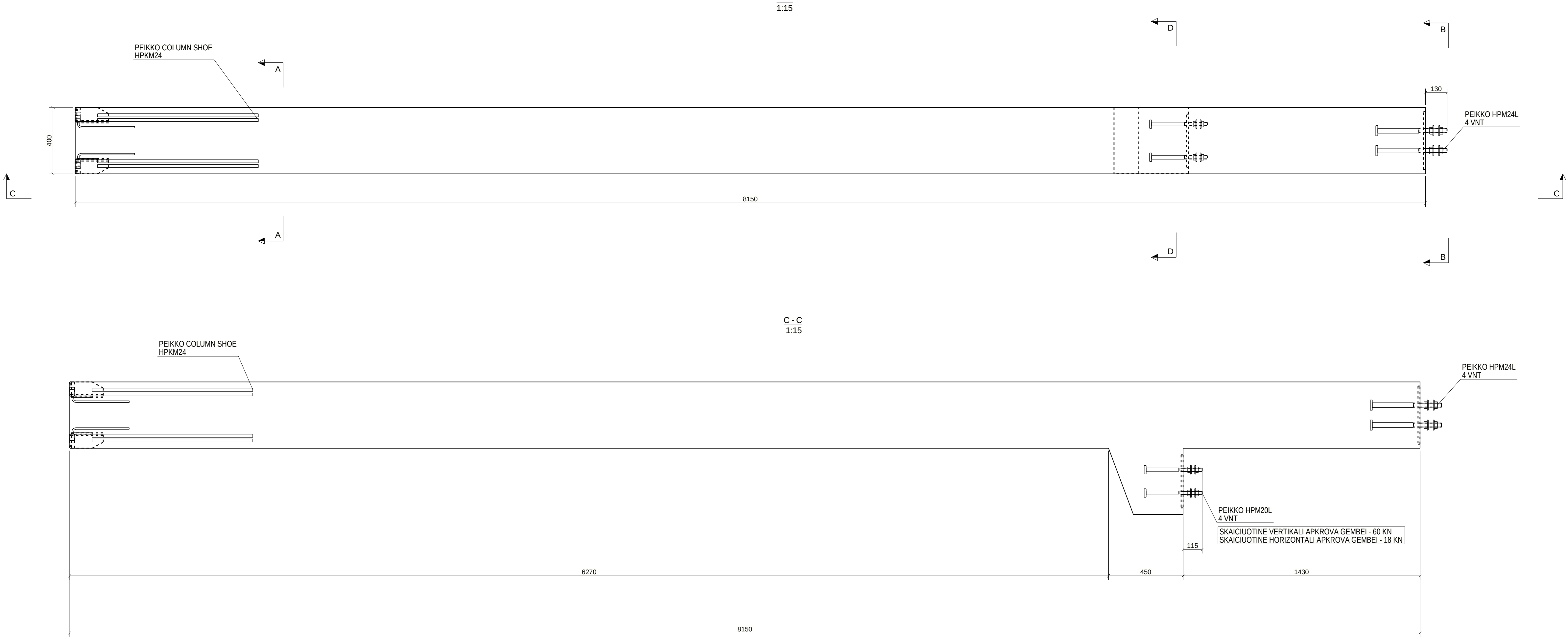
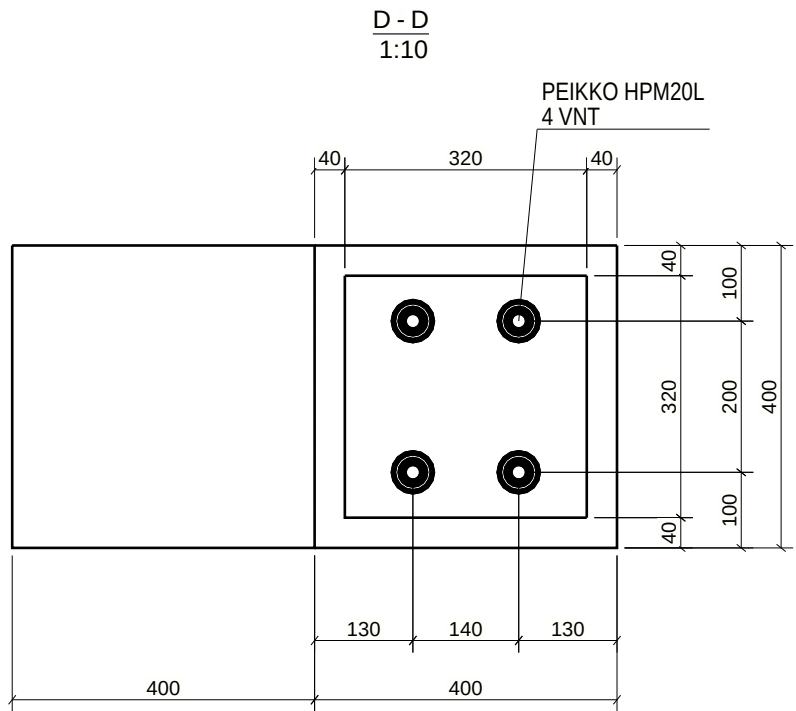
Sarasas					
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)	
K-11	400*400	1	1.38	1.38	
Viso:		1		1	

I detinių detalių sąrašas		K-11			
Detalė	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	1 Gaminių kiekis
	400*400	C35/45	1	8150.0	1.30
	400*400	C35/45	1	450.0	0.06
p-39	BL12*350	S355J2	1	350.0	11.5
pl-8	PL12*320	S355J2	1	320.0	9.6
HPKM24			4		3.5
HPM20L			4		0.3
HPM24L			4		0.6
WELDA200x200-162			4		3.8
WS250x250-220			2		12.3
WS300x500-280			1		35.3
Viso				1.36	3327.4

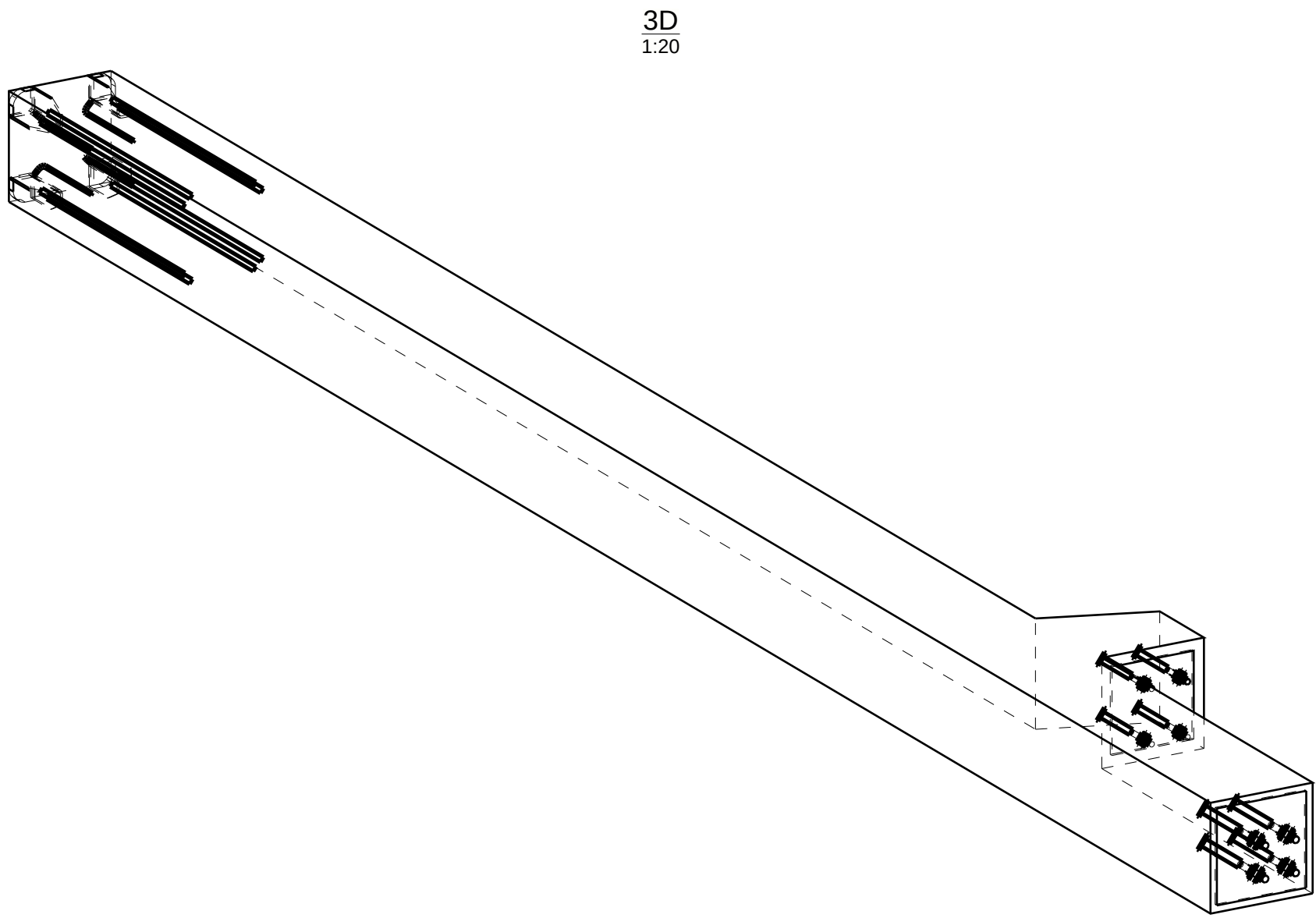
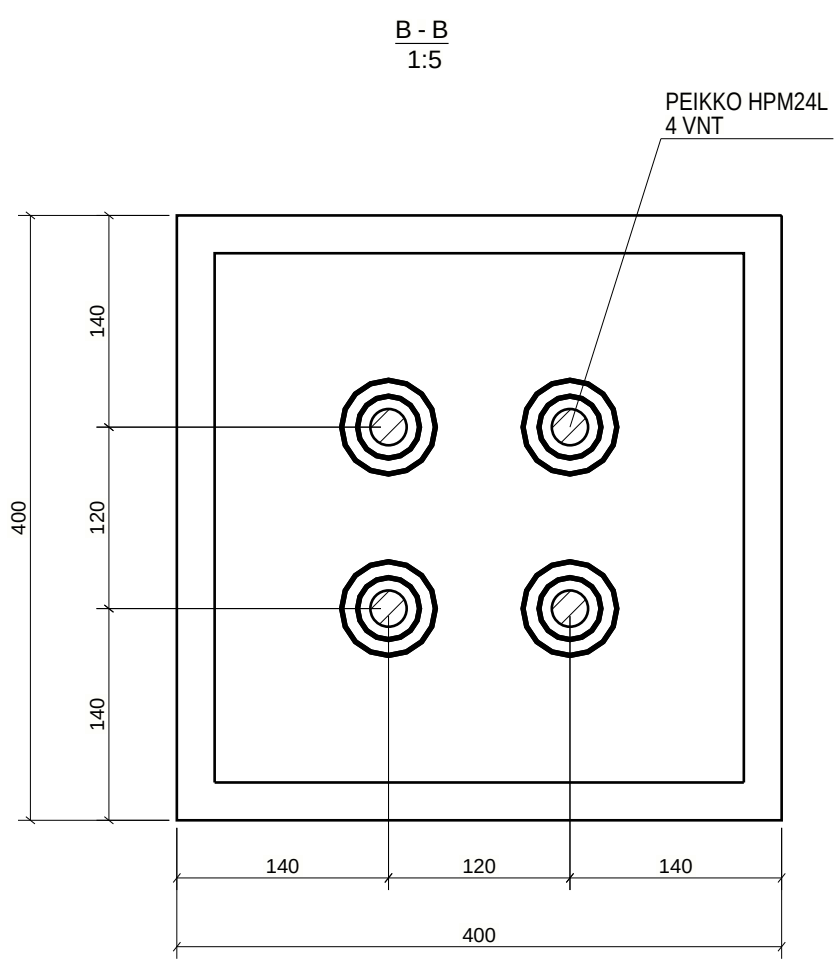
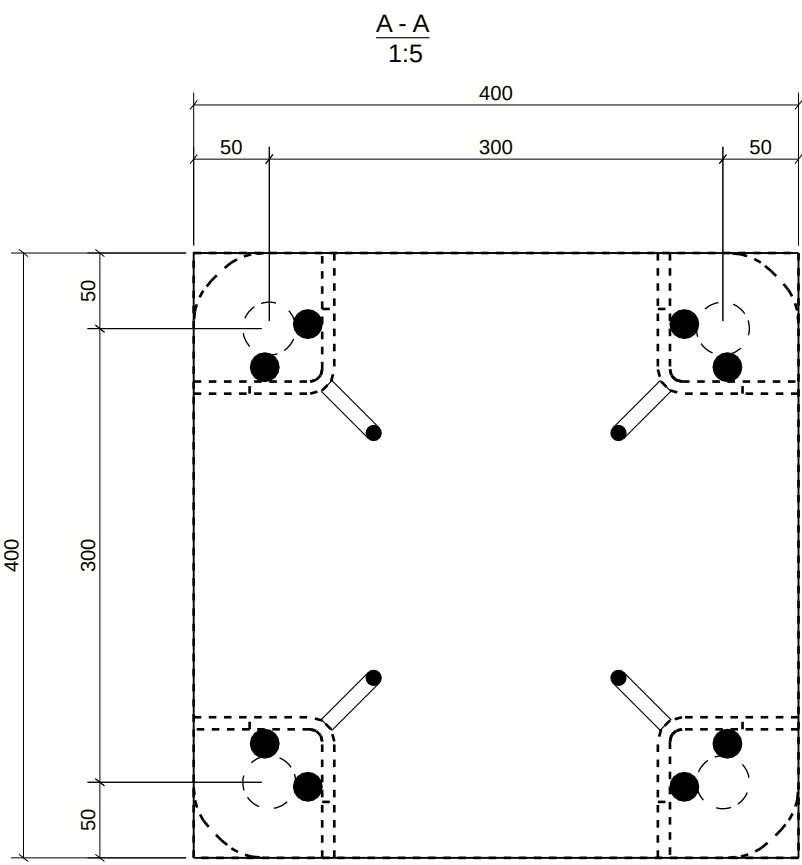
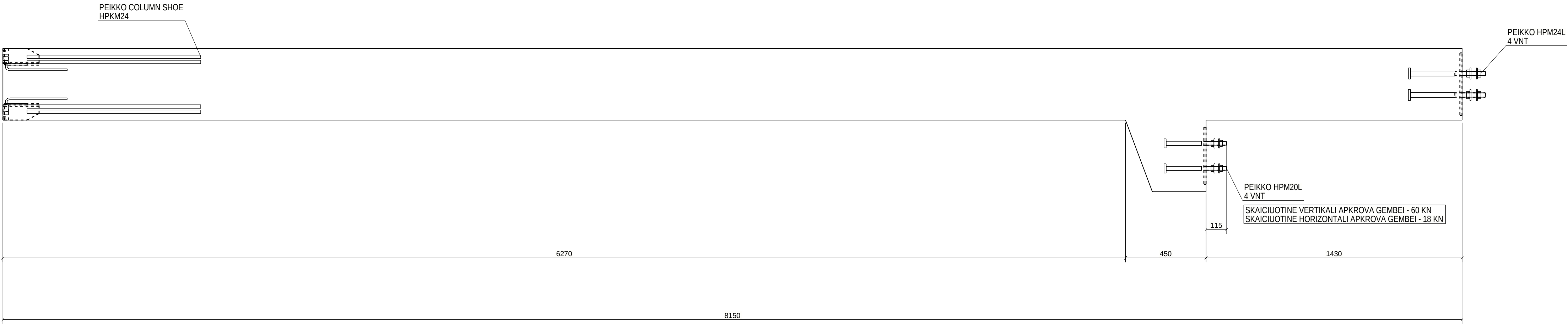


Sarasas				
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)
K-12	400*400	1	1.37	1.37
Viso:		1		1

I detiniu detaliu sarašas		K-12			
		1 Gaminiu kiekis			
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Turis (m³)
	400*400	C35/45	1	8150.0	1.30
	400*400	C35/45	1	450.0	0.06
p-39	BL12*350	S355J2	1	350.0	11.5
pl-8	PL12*320	S355J2	1	320.0	9.6
HPKM24			4		3.5
HPM20L			4		0.3
HPM24L			4		0.6
Viso				1.36	3291.5

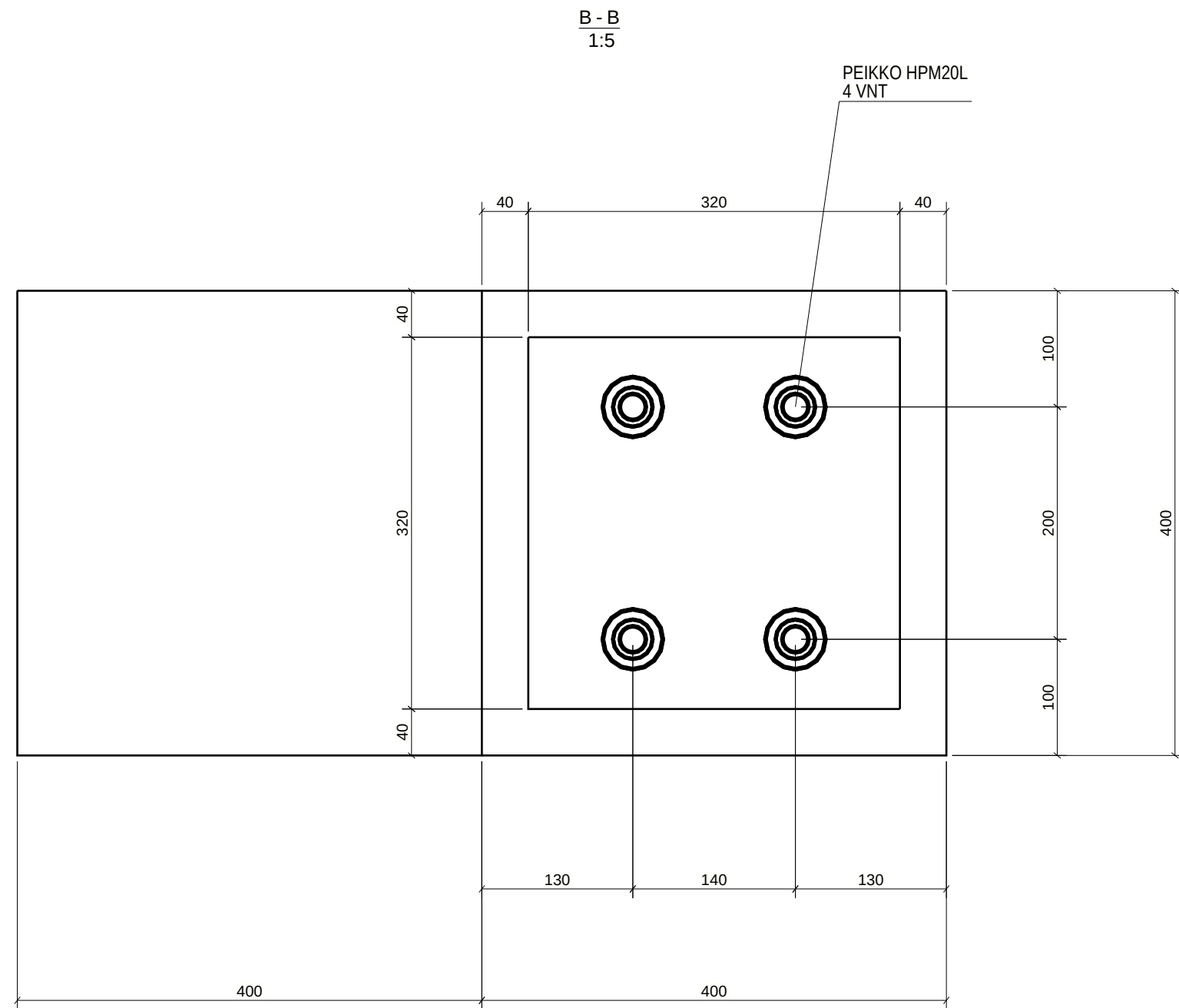
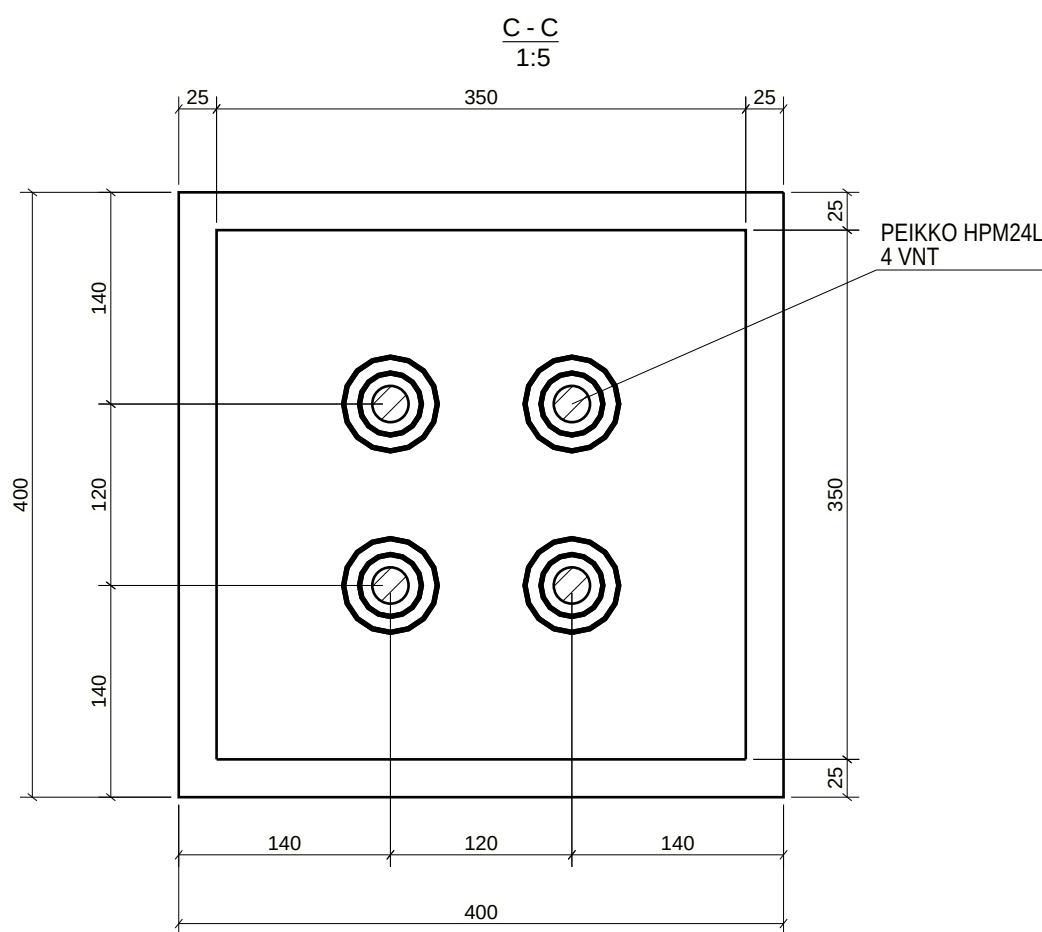
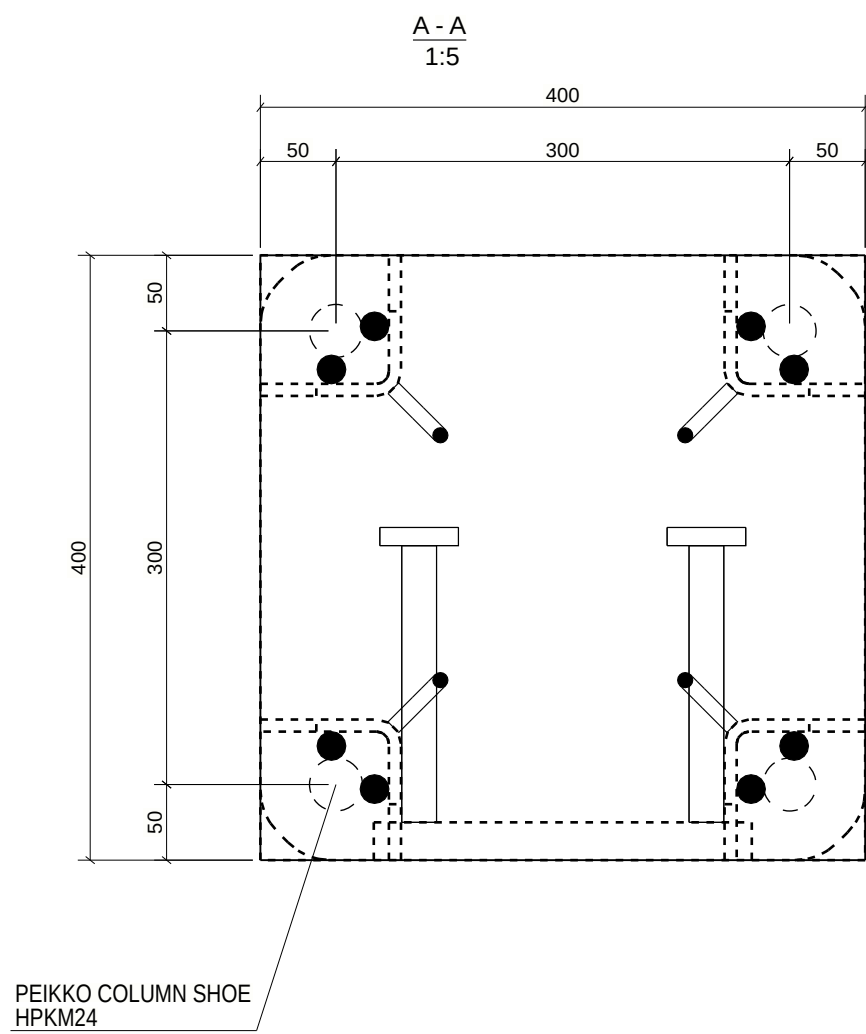
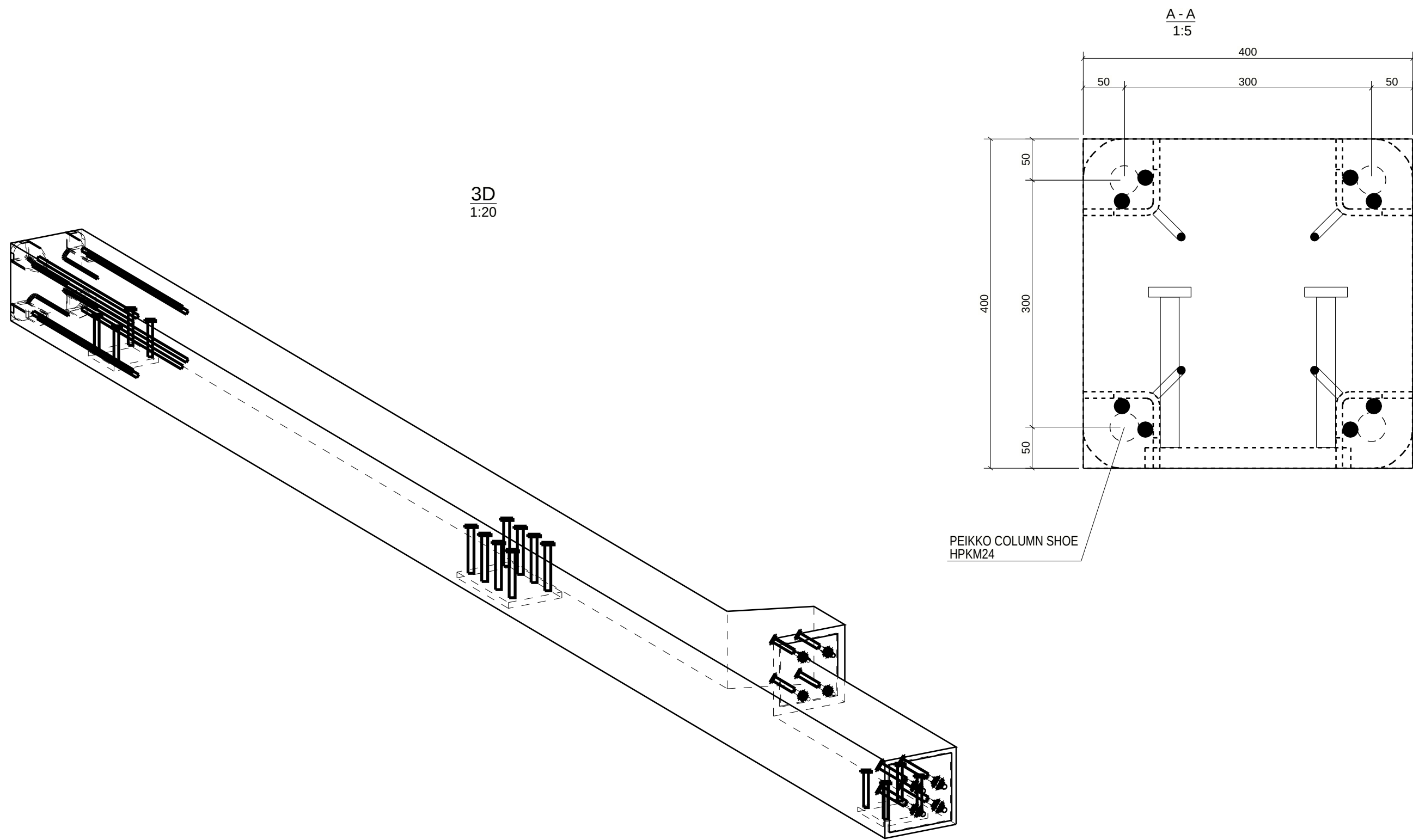
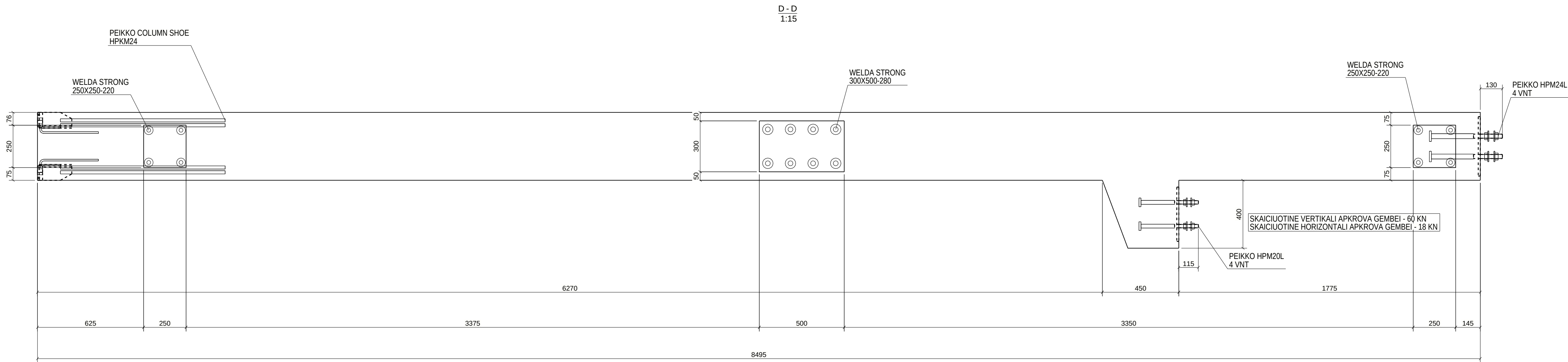
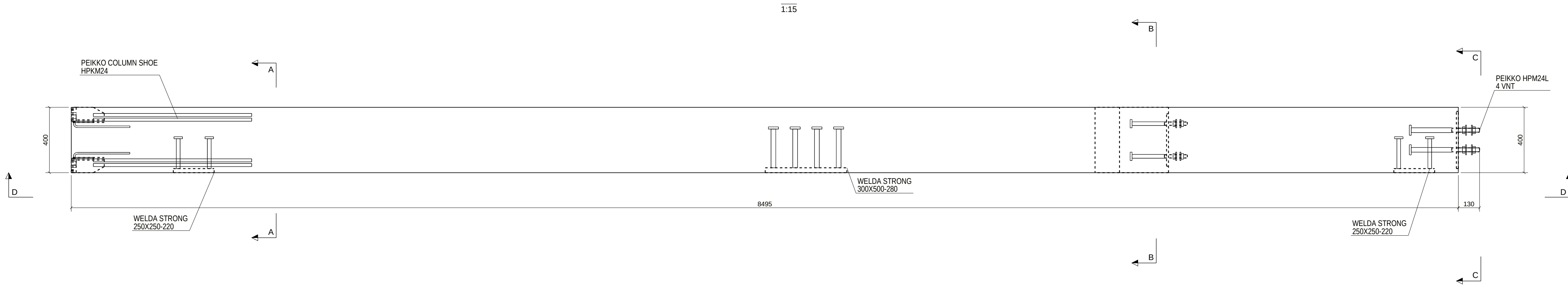


C - C
1:15



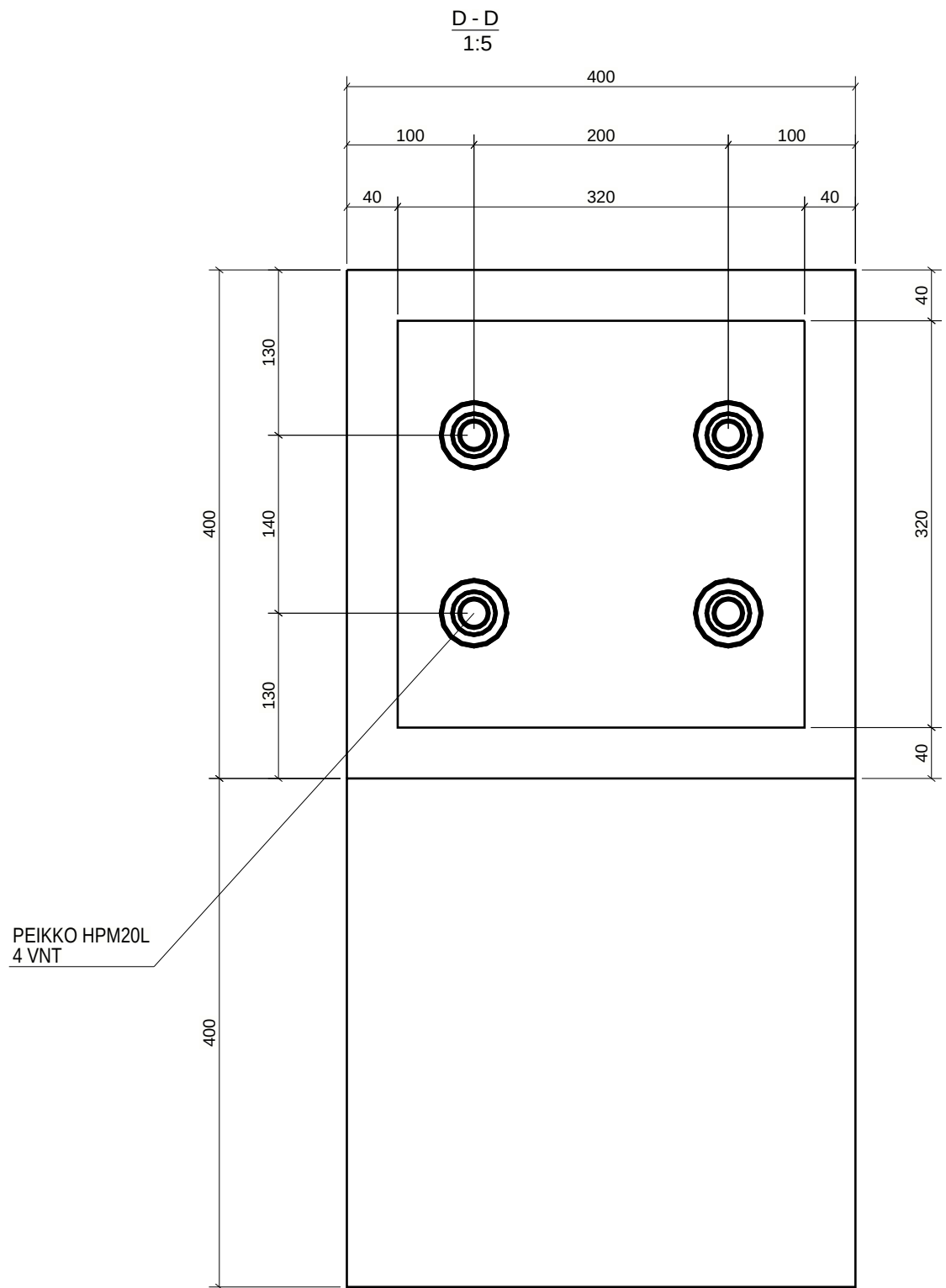
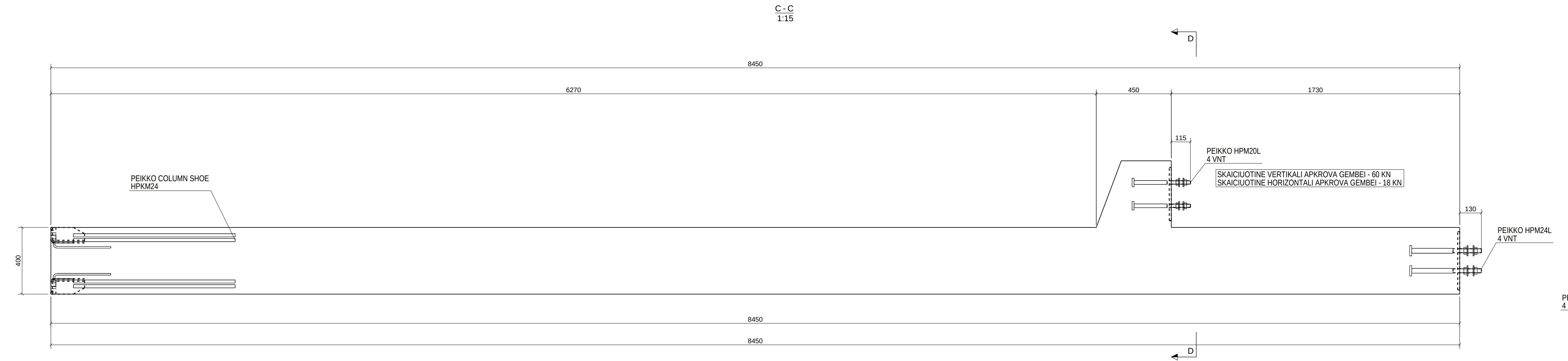
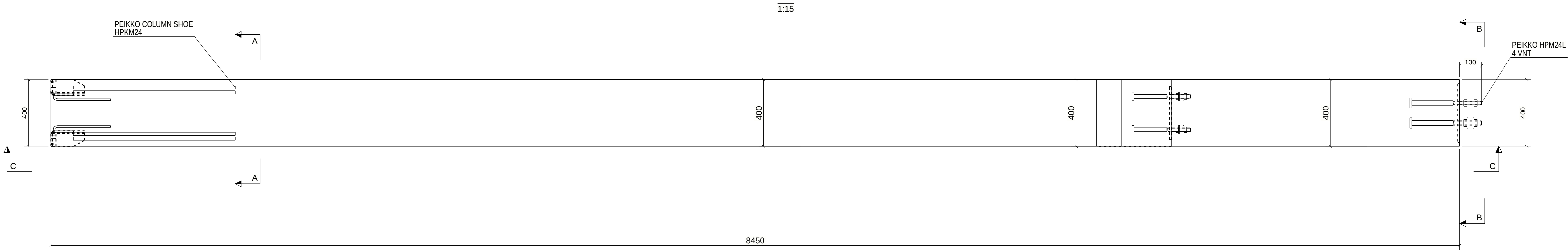
Sarasas				
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)
K-13	400*400	1	1.43	1.43
Viso:		1		1

I detiniu detaliu sarašas		K-13			
		1 Gaminiu kiekis			
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Turis (m³)
	400*400	C35/45	1	8495.0	1.36
	400*400	C35/45	1	450.0	0.06
p-39	BL12*350	S355J2	1	350.0	11.5
pl-8	PL12*320	S355J2	1	320.0	9.6
HPKM24			4		3.5
HPM20L			4		0.3
HPM24L			4		0.6
WS250x250-220			2		12.3
WS300x500-280			1		35.3
Viso				1.42	3457.3

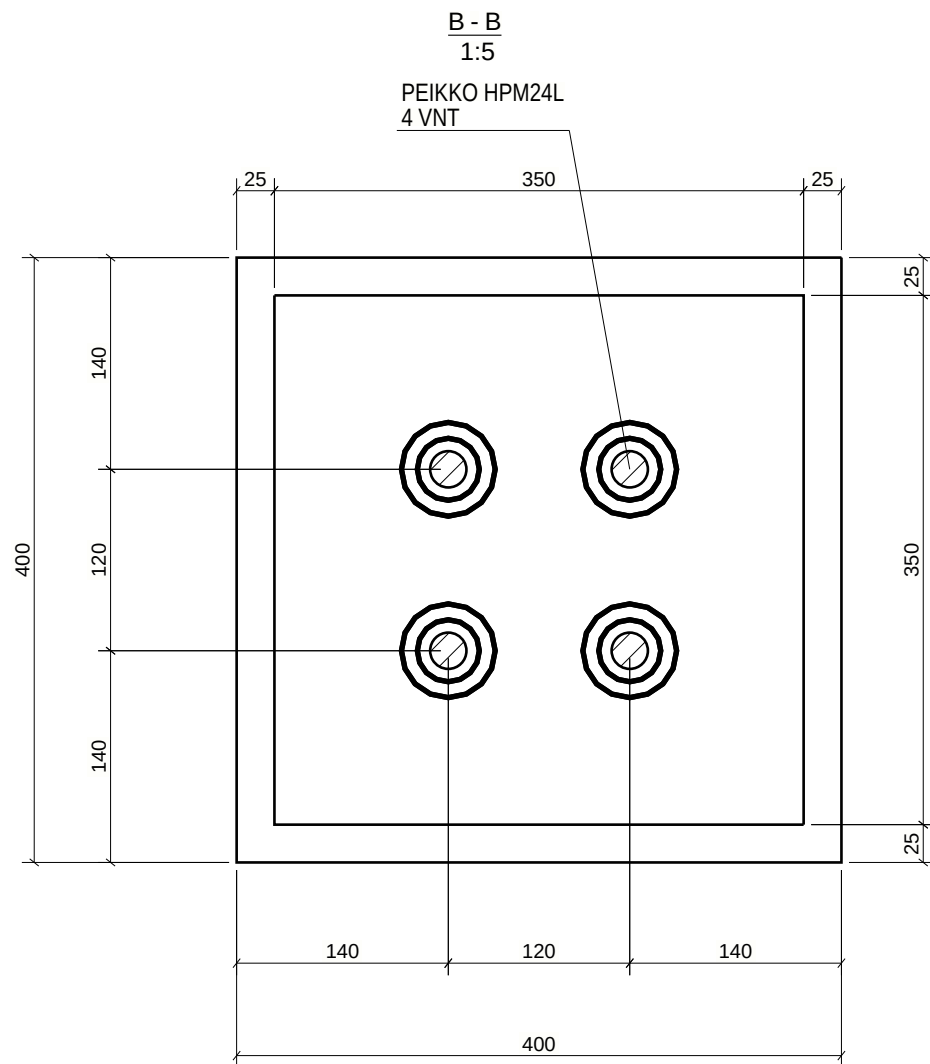
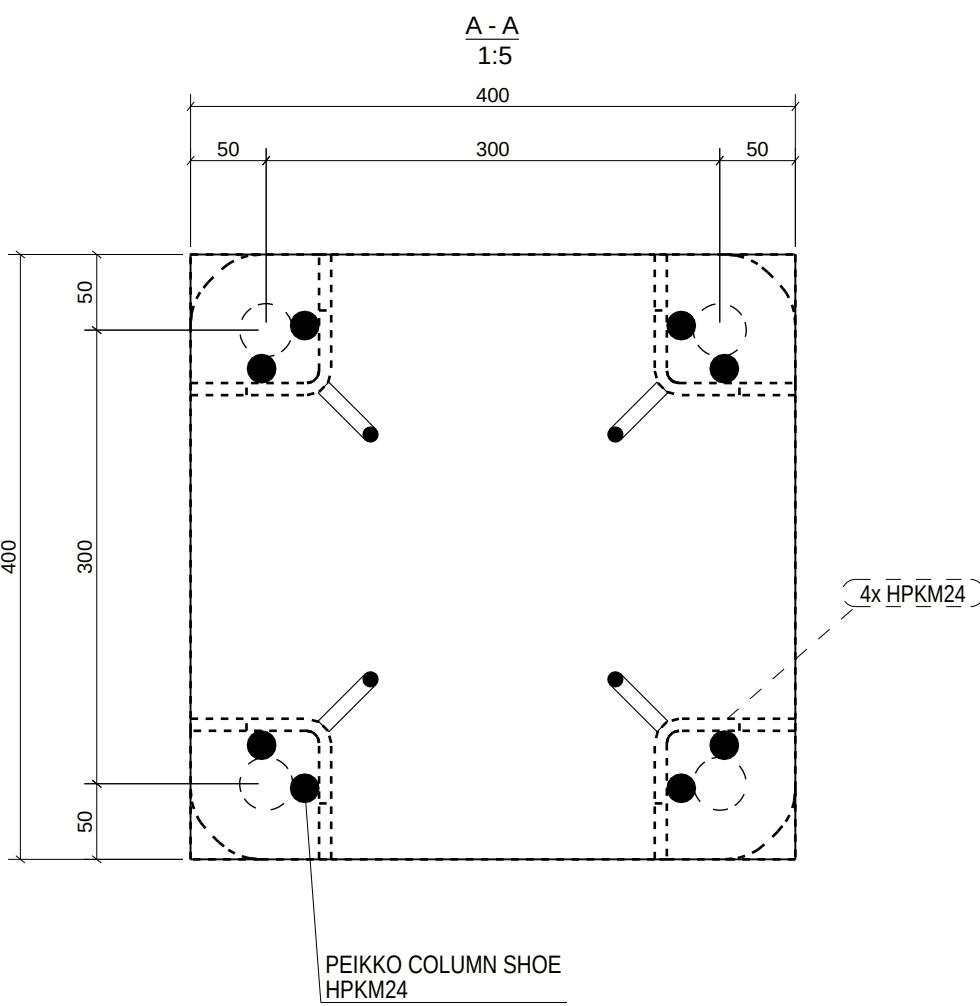
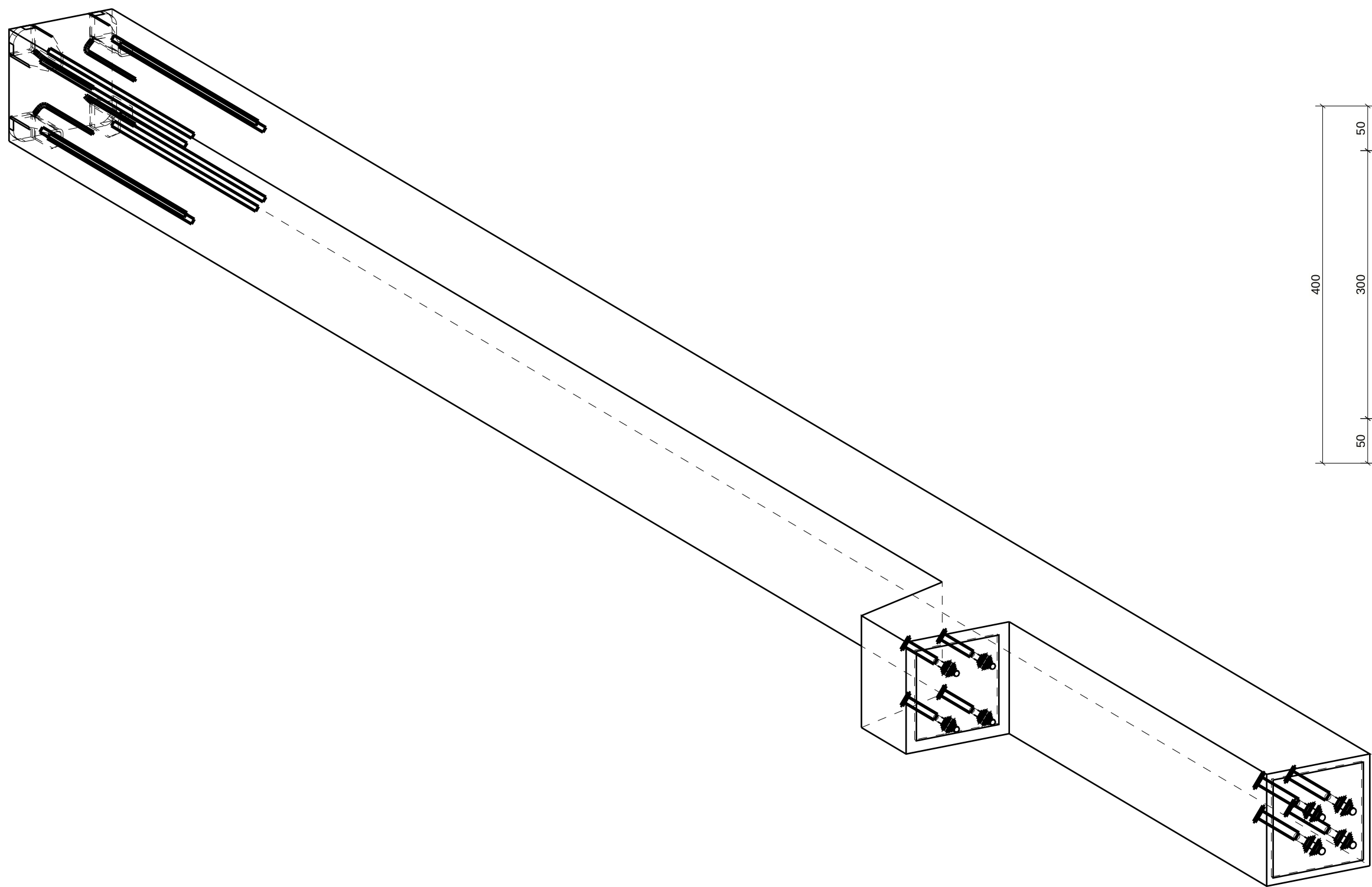


Sarasas				
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)
K-14	400*400	1	1.42	1.42
Viso:		1		1

I detinių detalių sąrašas		K-14			
		1 Gaminių kiekis			
Detalė	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Turis (m³)
	400*400	C35/45	1	8450.0	1.35
	400*400	C35/45	1	450.0	0.06
p-39	BL12*350	S355J2	1	350.0	11.5
pl-8	PL12*320	S355J2	1	320.0	9.6
HPKM24			4		3.5
HPM20L			4		0.3
HPM24L			4		0.6
Viso				1.41	3406.7

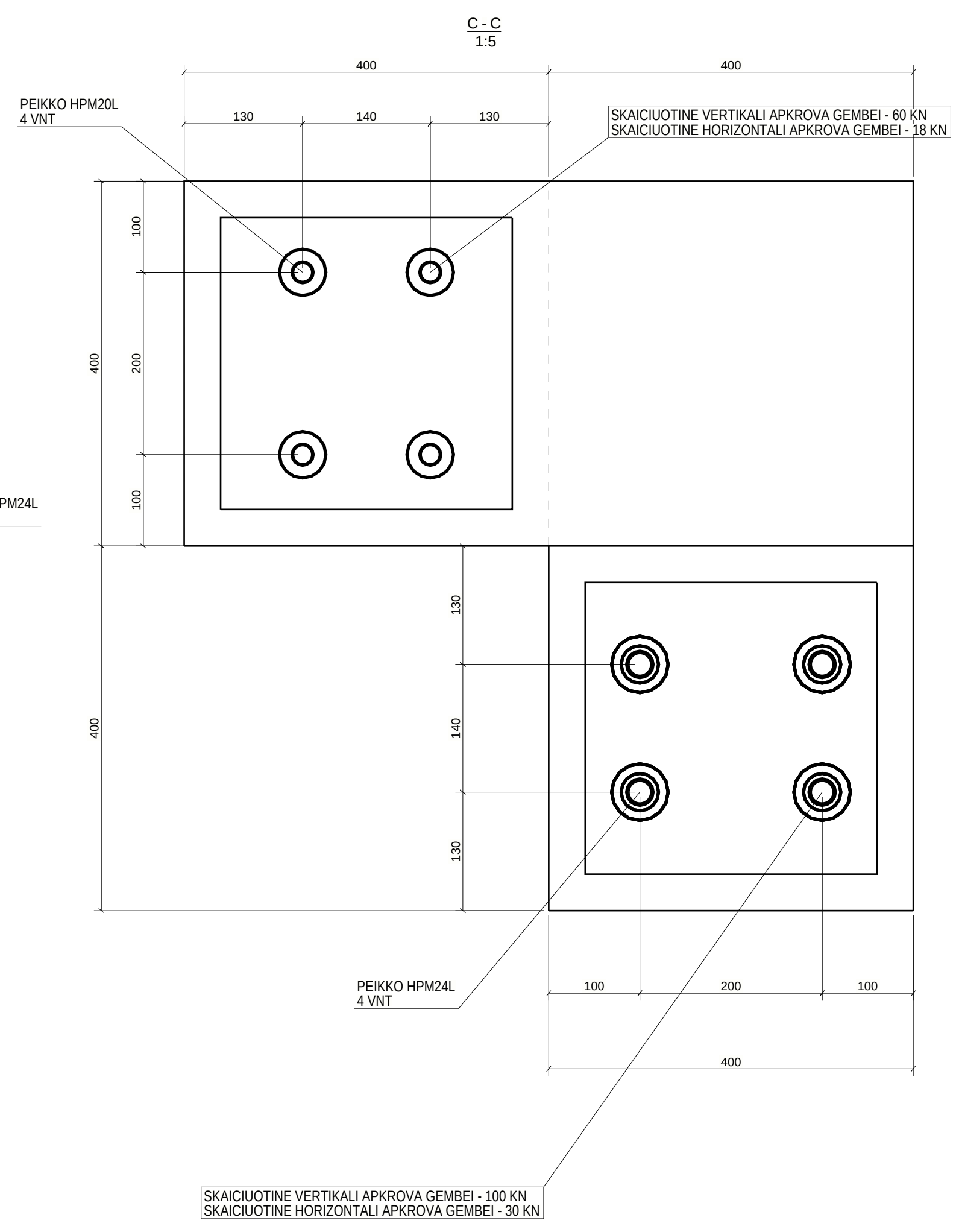
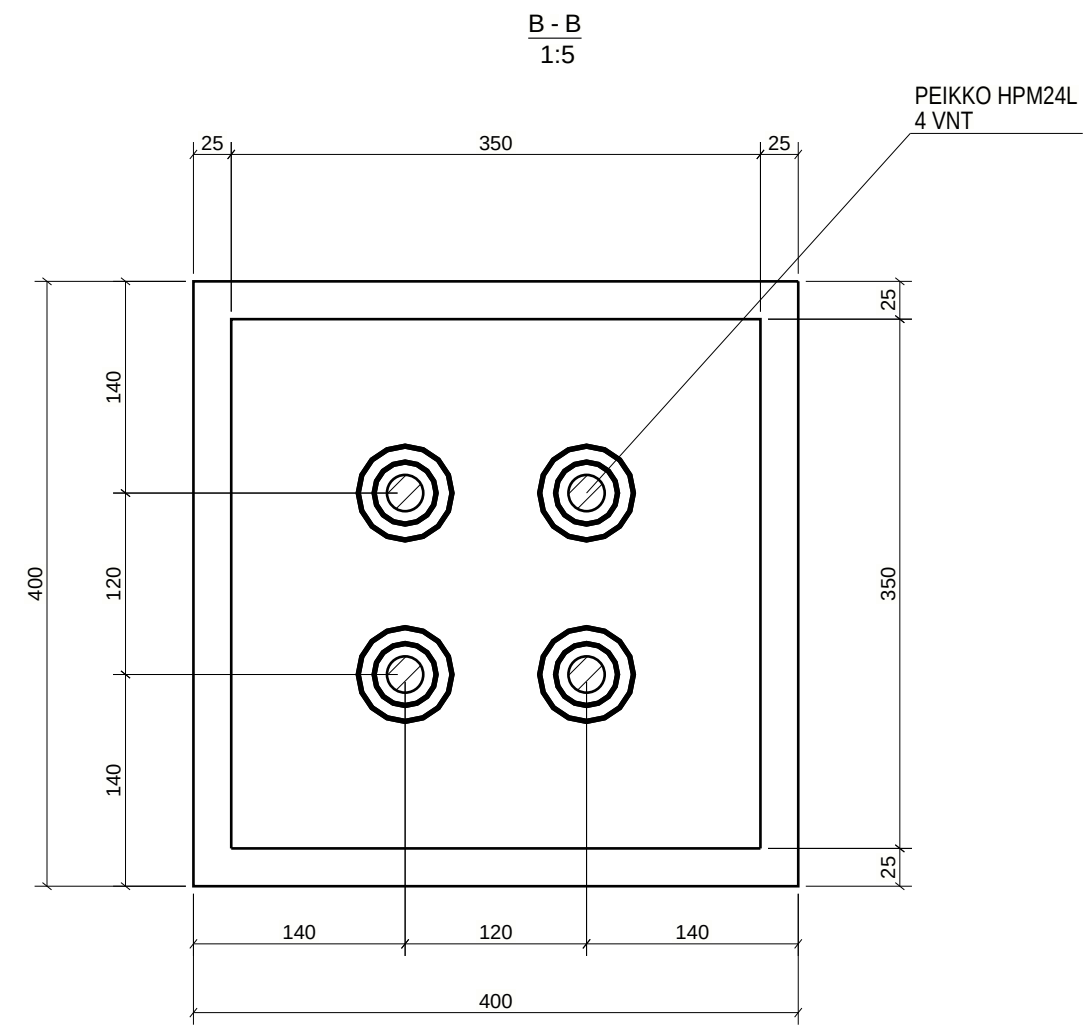
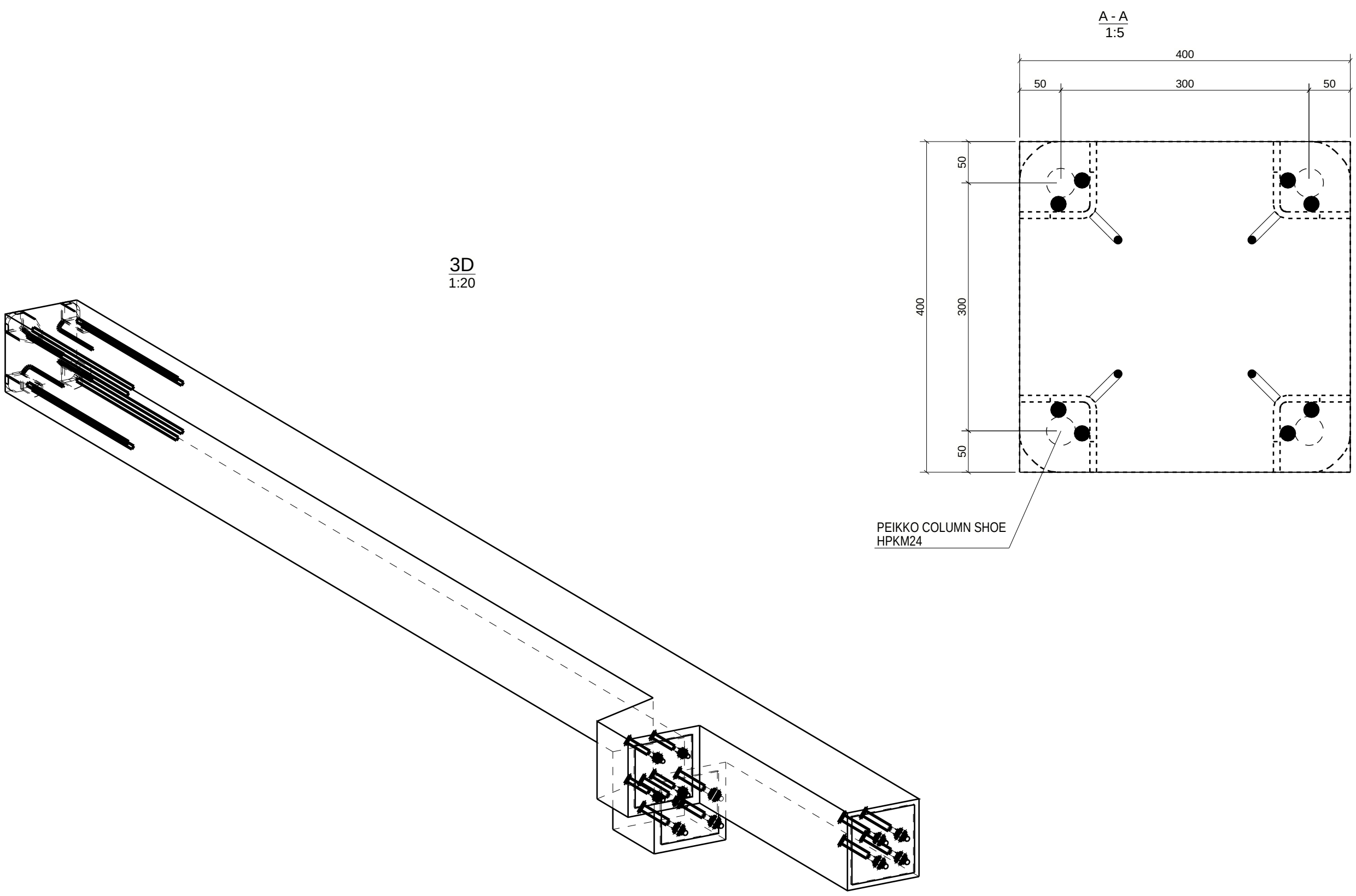
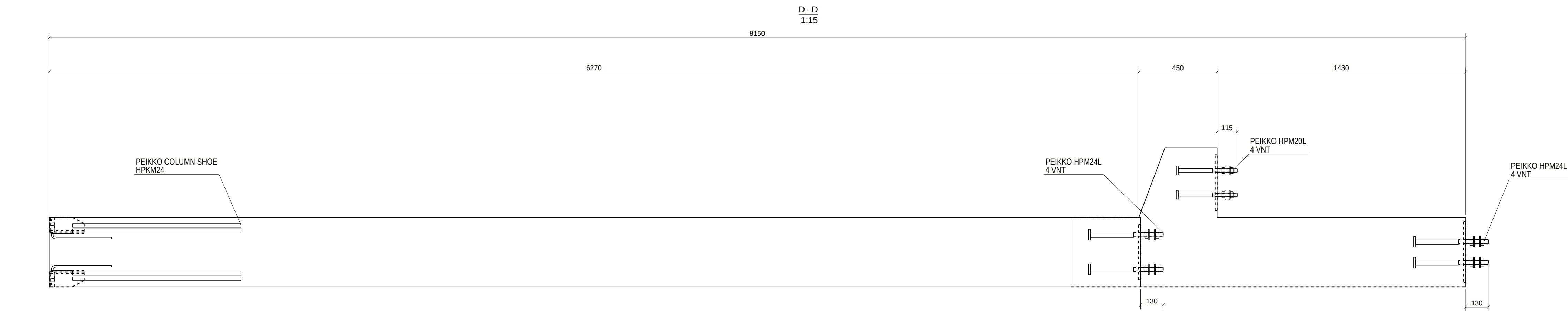


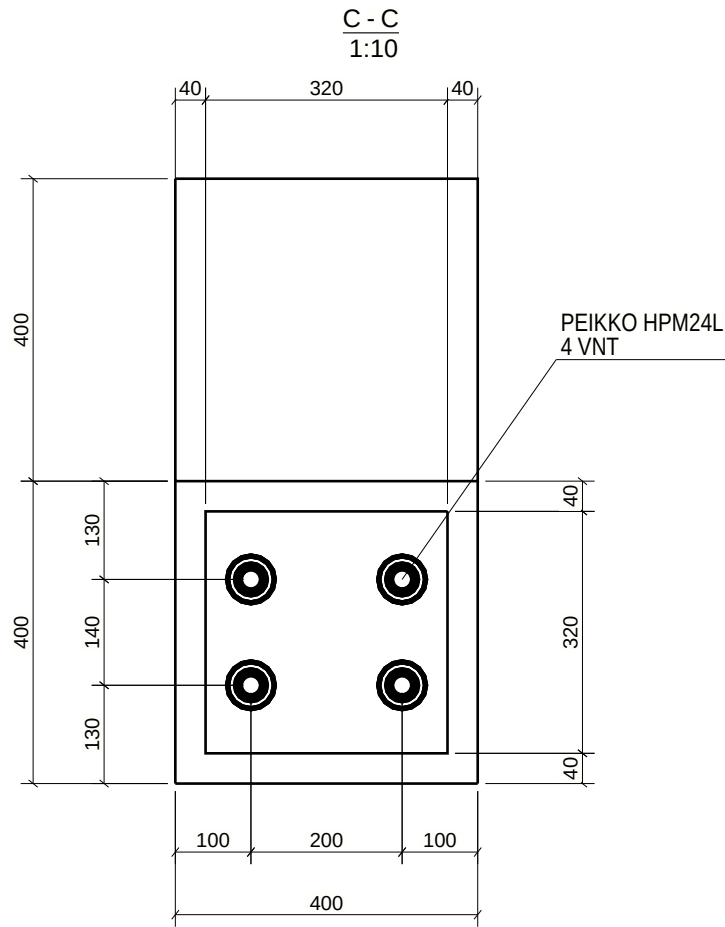
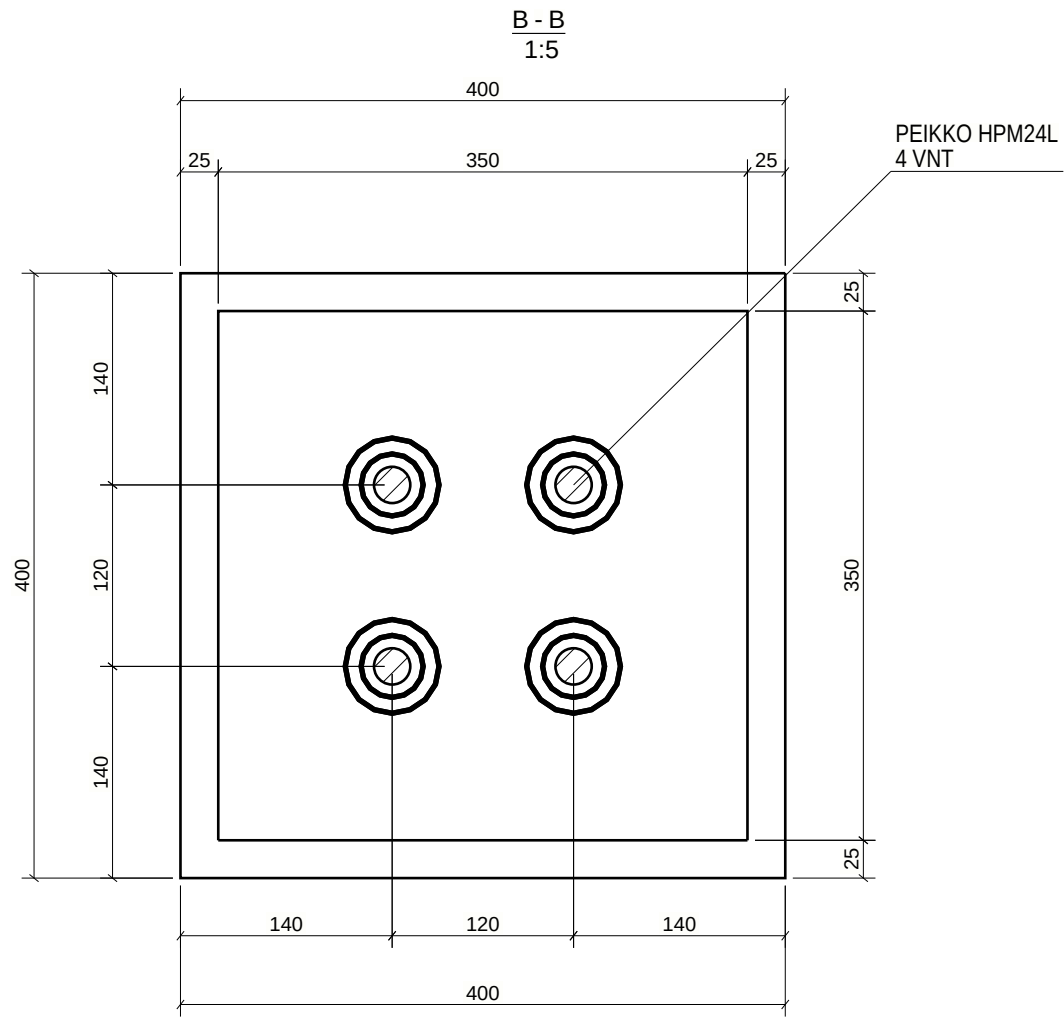
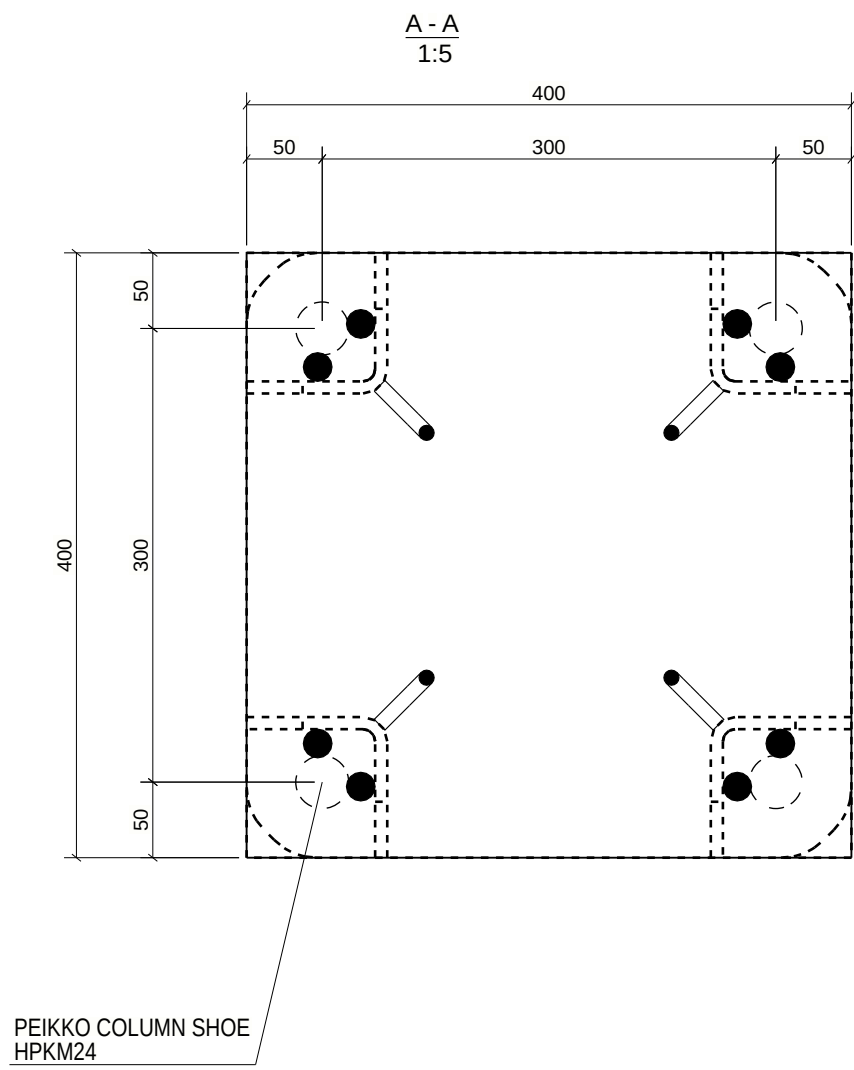
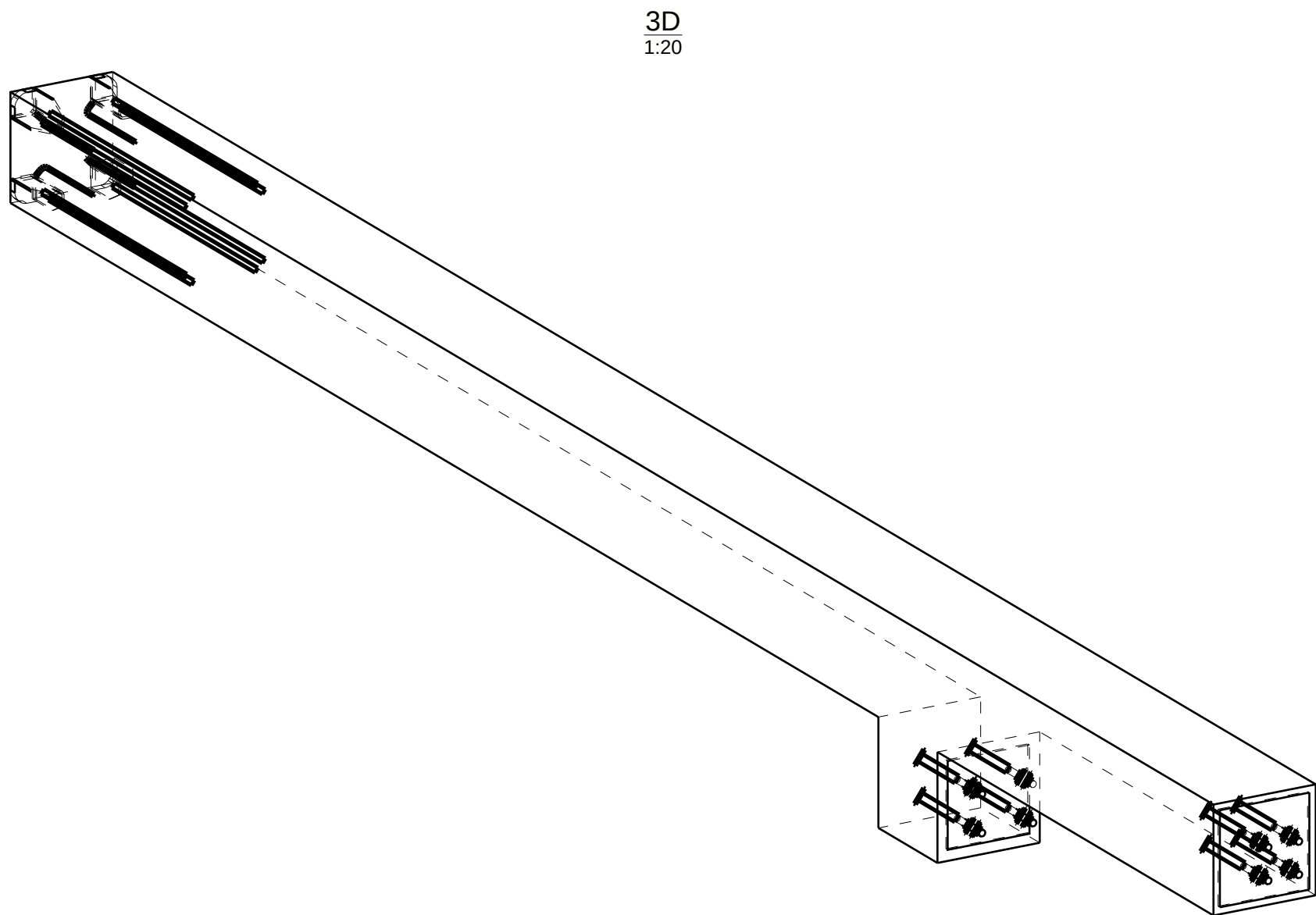
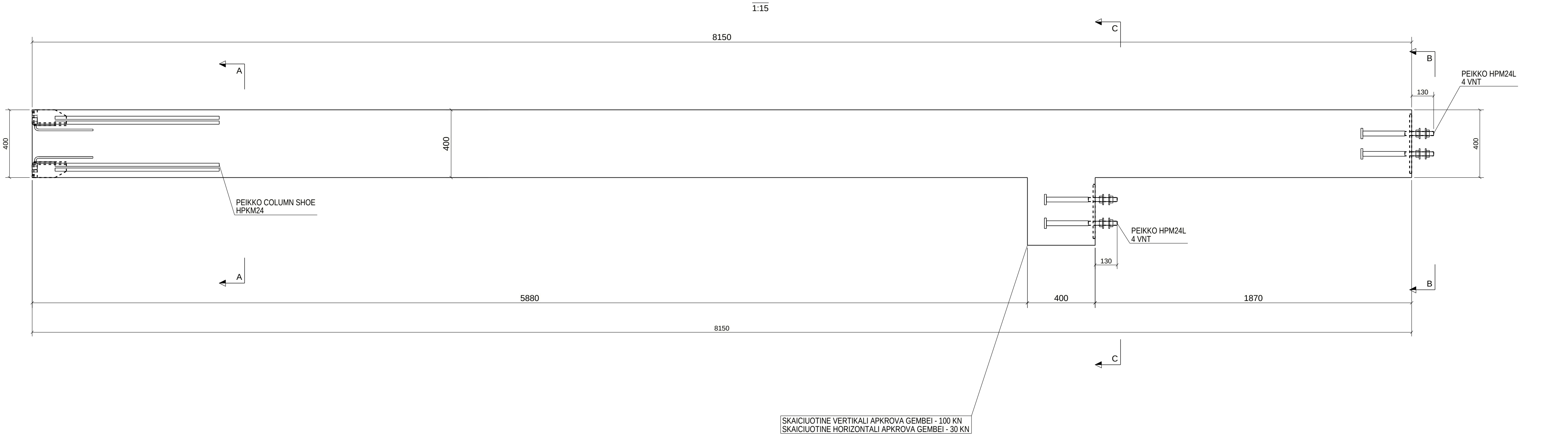
3D
1:15



Sarasas				
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)
K-15	400*400	1	1.43	1.43
Viso:		1		1

I detiniu detaliu sarašas		K-15				1 Gaminiu kiekis
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Turis (m³)	Svoris (kg)
	400*400	C35/45	1	8150.0	1.30	3129.6
	400*400	C35/45	1	450.0	0.06	144.0
	400*400	C35/45	1	400.0	0.06	153.6
p-39	BL12*350	S355J2	1	350.0		11.5
pl-8	PL12*320	S355J2	2	320.0		9.6
HPKM24			4			3.5
HPM20L			4			0.3
HPM24L			8			0.6
Viso					1.43	3445.1



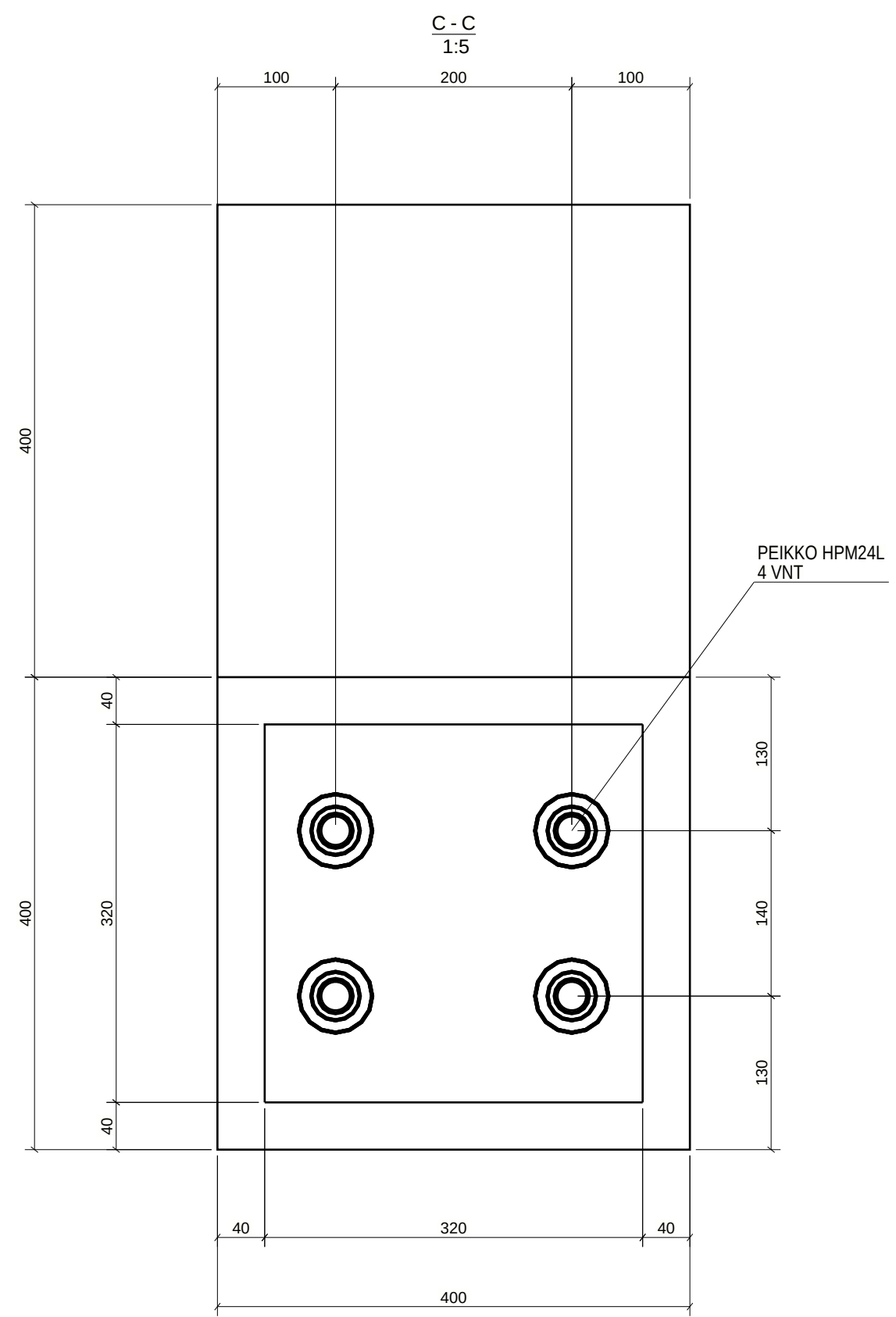
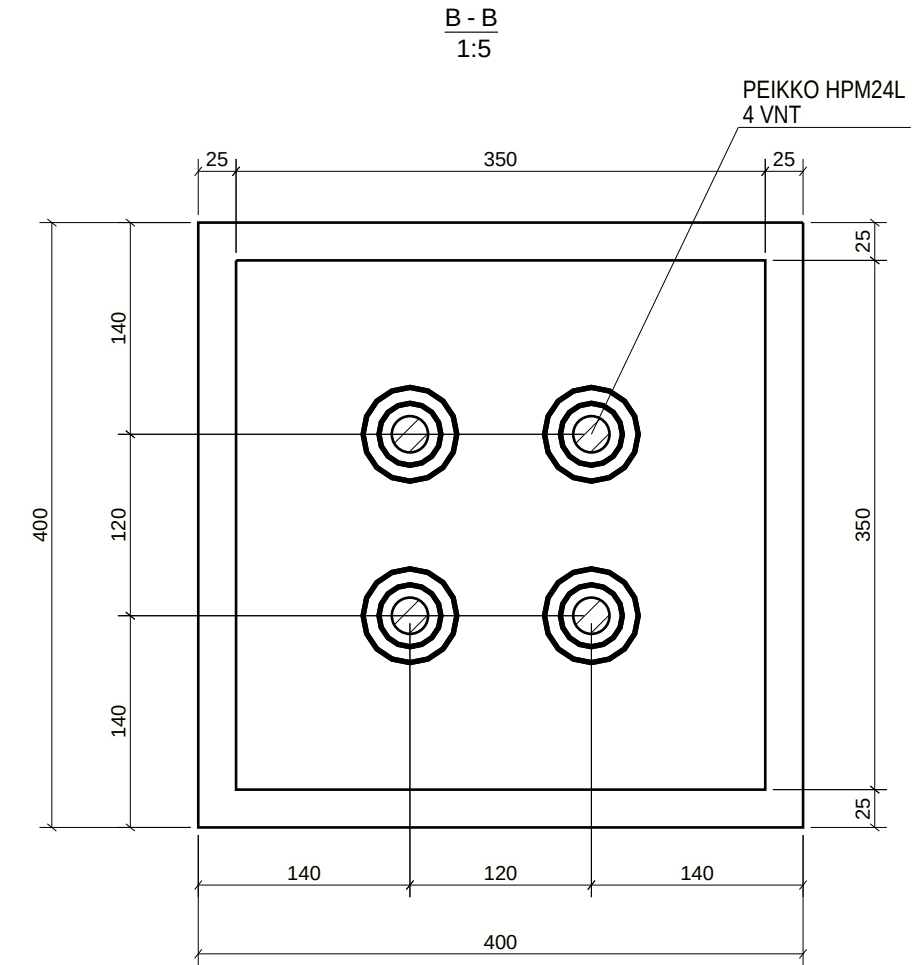
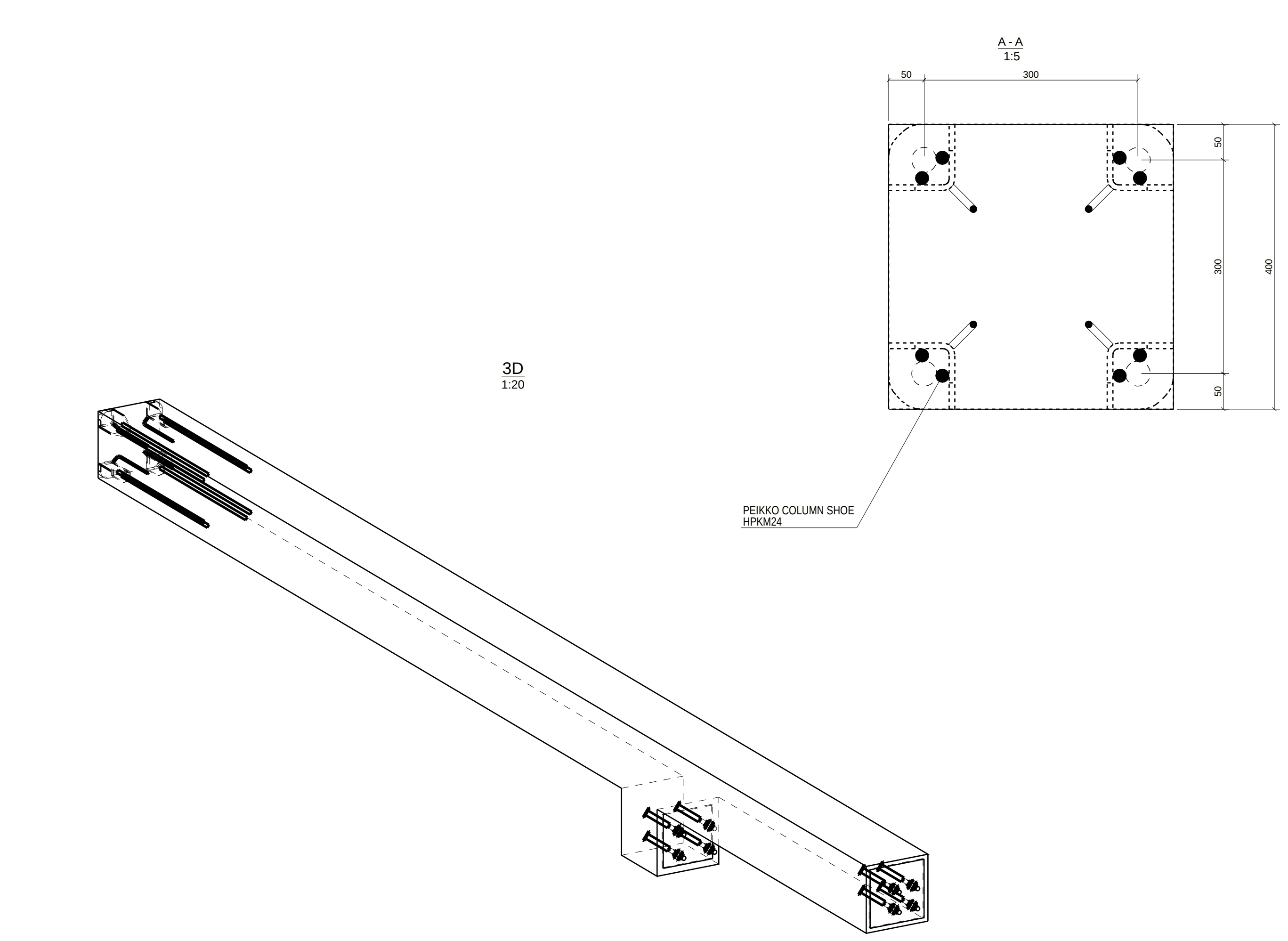
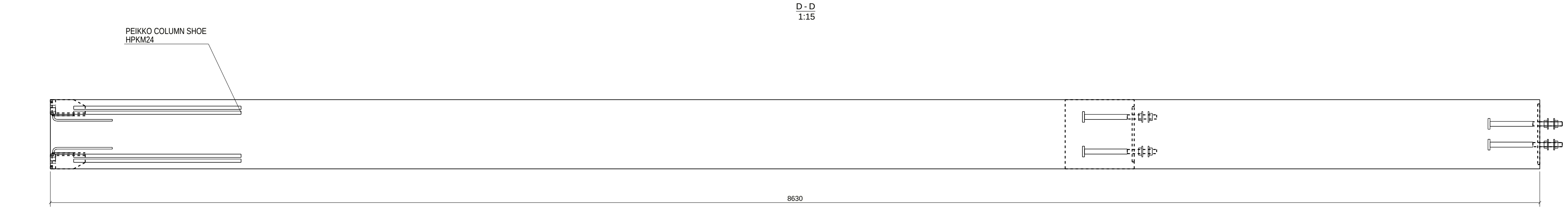
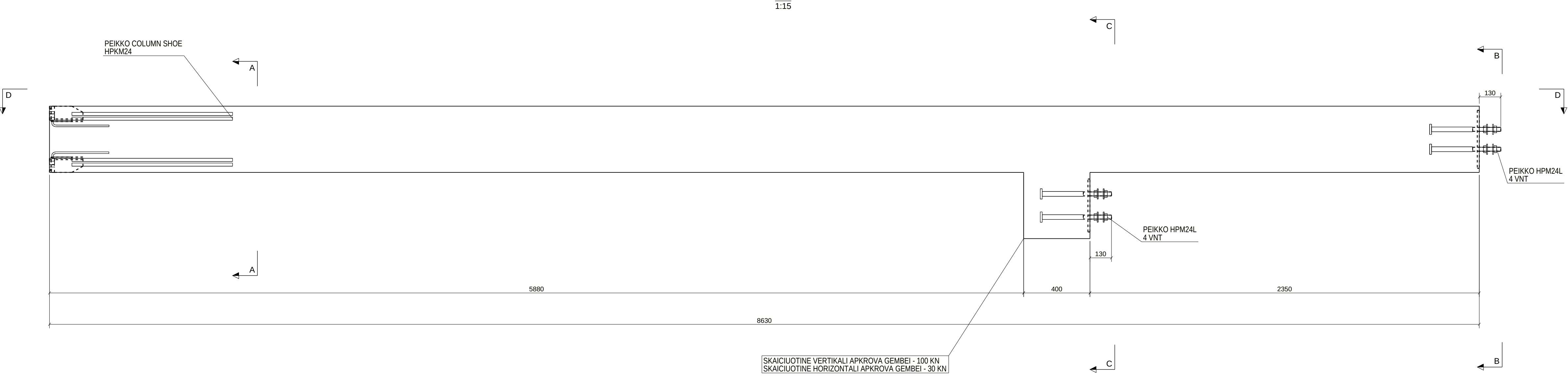


Sarasas					
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)	
K-17	400*400	1	1.37	1.37	
Viso:		1		1	

I detiniu detaliu sarašas					
		K-17		2 Gaminiu kiekis	
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Turis (m³)
	400*400	C35/45	1	8150.0	1.30
	400*400	C35/45	1	400.0	0.06
p-39	BL12*350	S355J2	1	350.0	
pl-8	PL12*320	S355J2	1	320.0	
HPKM24			4		
HPM24L			8		
Viso				1.37	3300.9

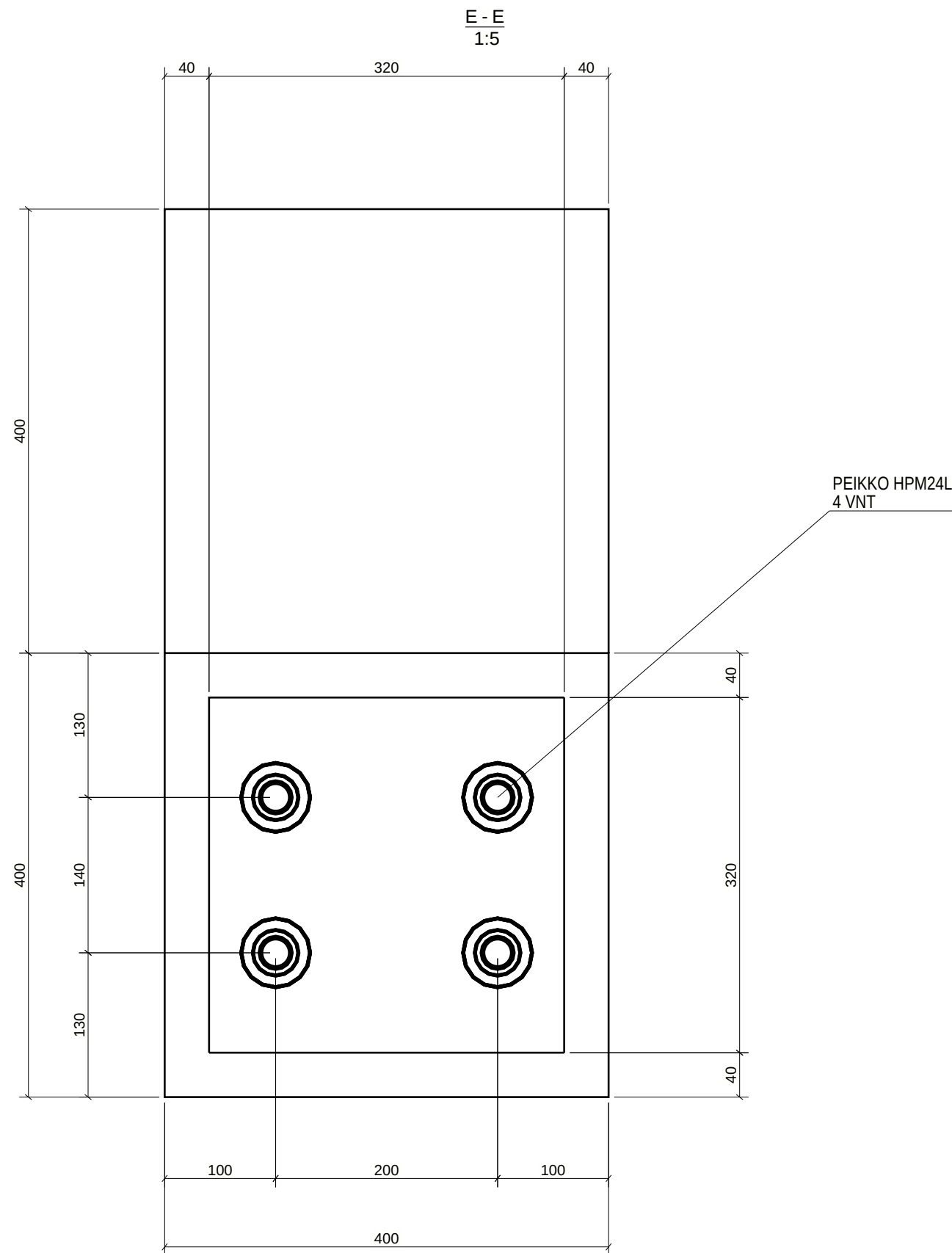
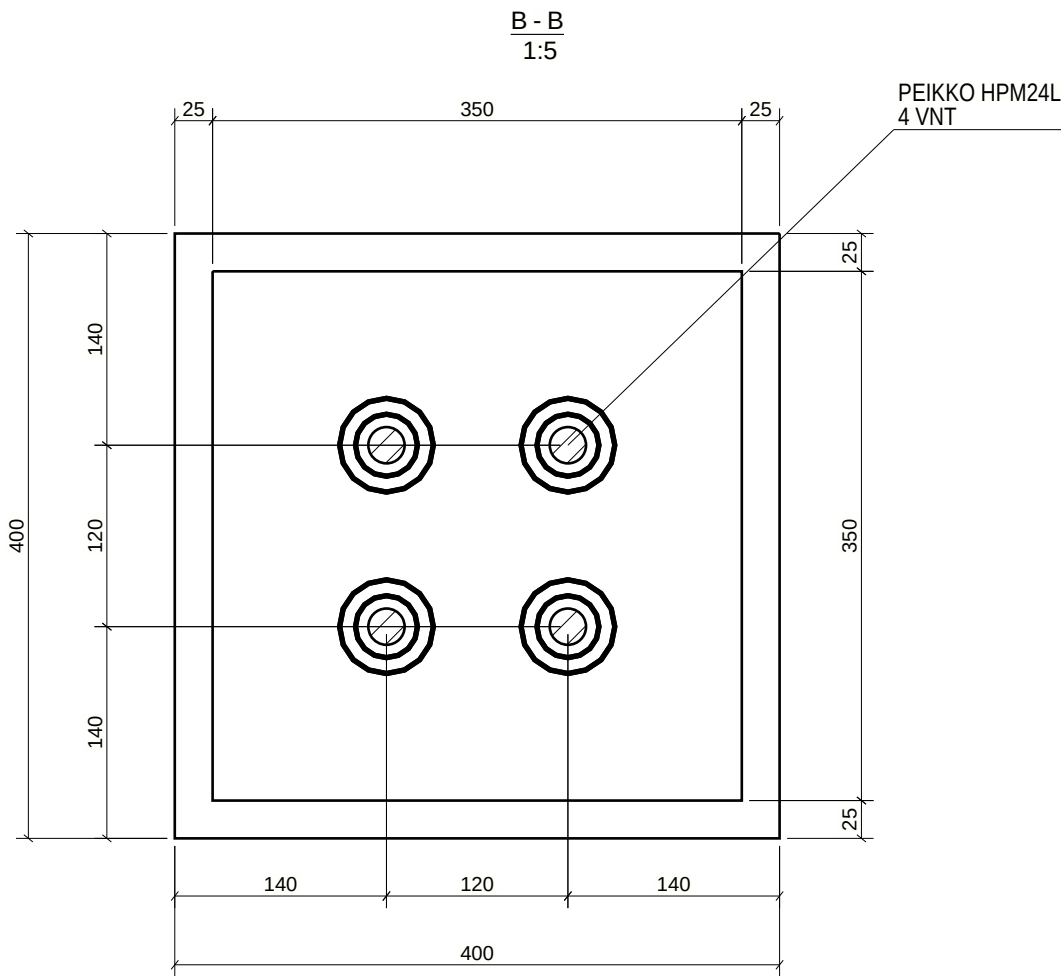
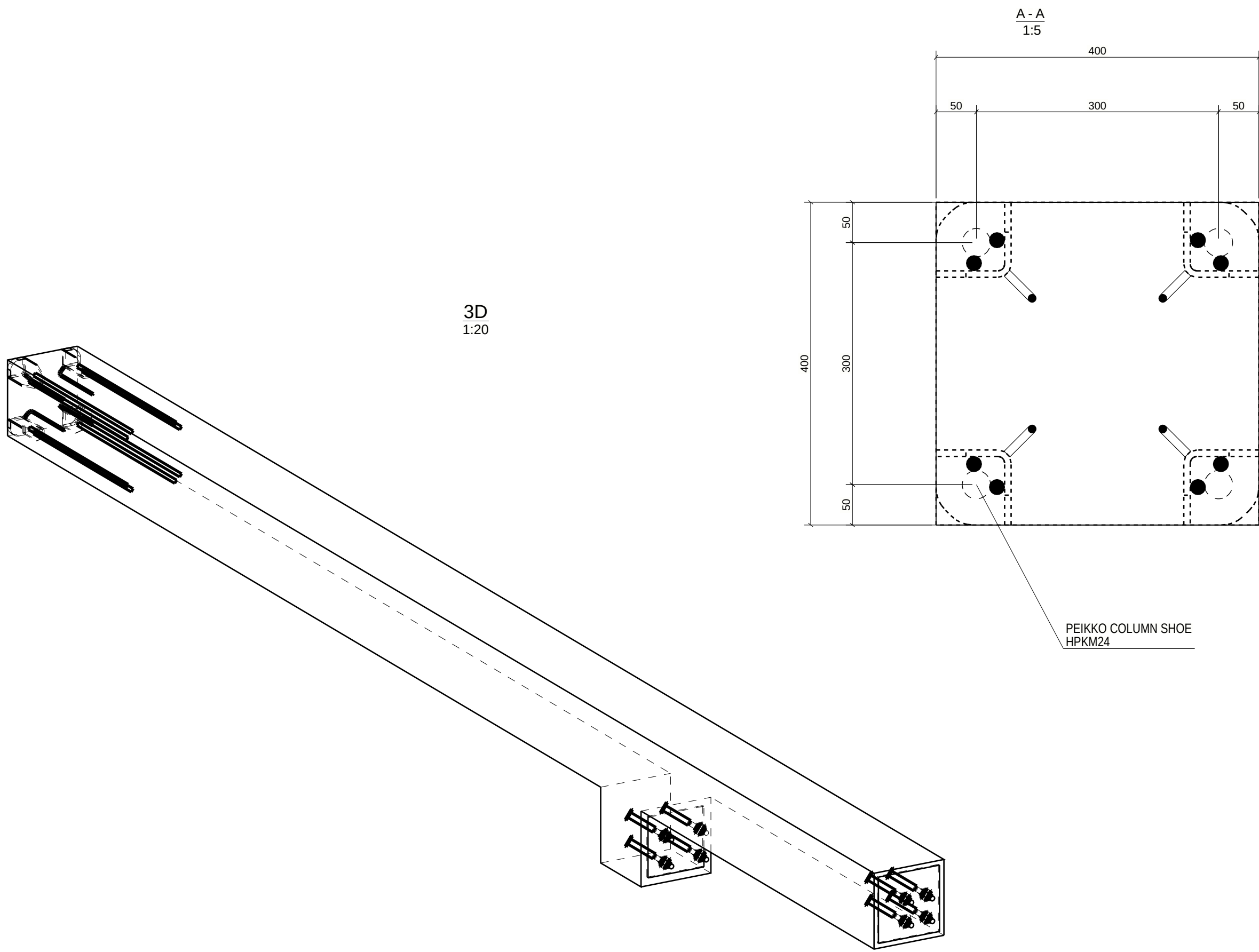
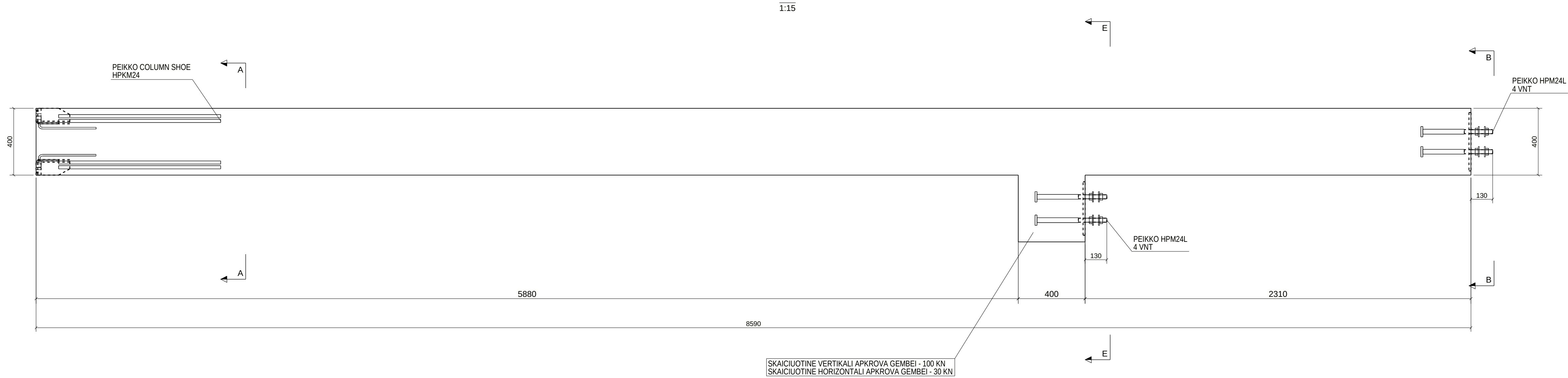
Sarasas					
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)	
K-18	400*400	1	1.45	1.45	
Viso:		1		1	

I detiniu detaliu sarašas					
		K-18		1 Gaminiu kiekis	
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Turis (m³)
	400*400	C35/45	1	8630.0	1.38
	400*400	C35/45	1	400.0	0.06
p-39	BL12*350	S355J2	1	350.0	
pl-8	PL12*320	S355J2	1	320.0	
HPKM24			4		
HPM24L			8		
Viso				1.44	3485.2



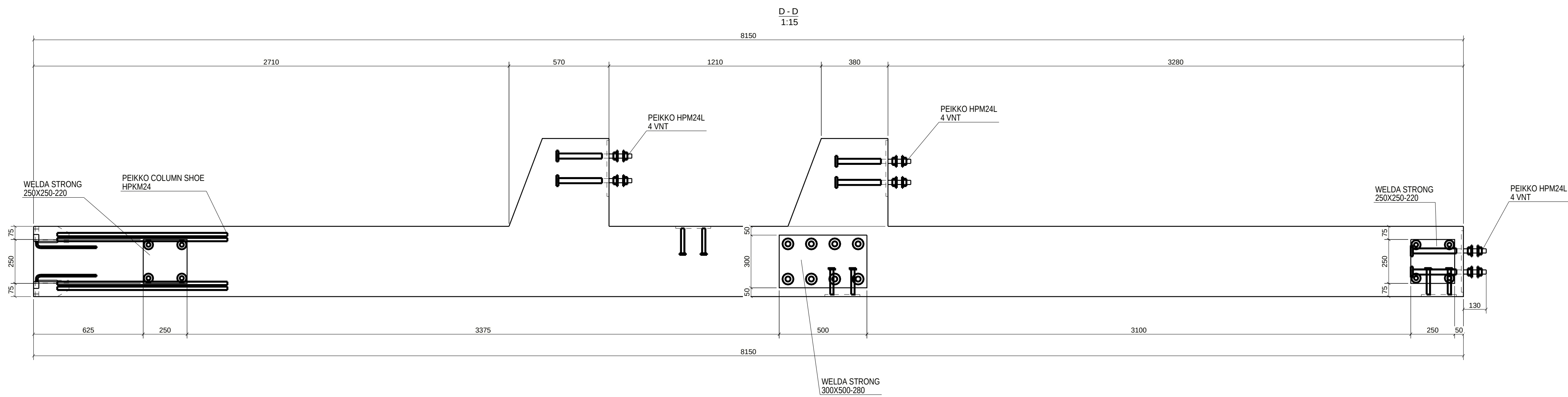
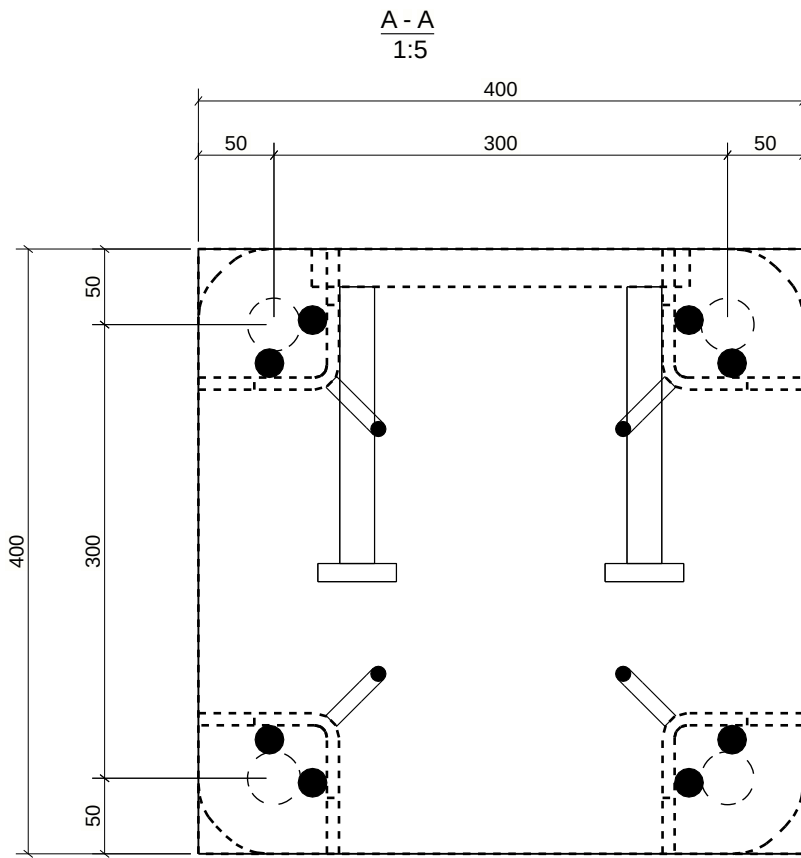
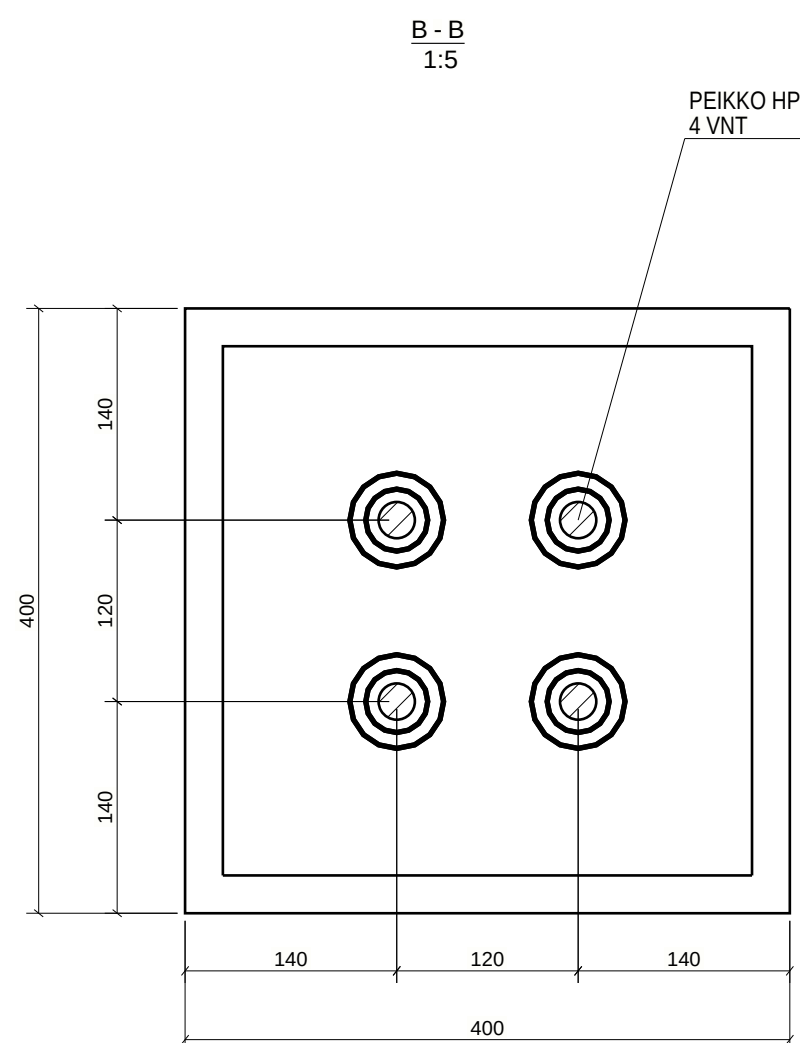
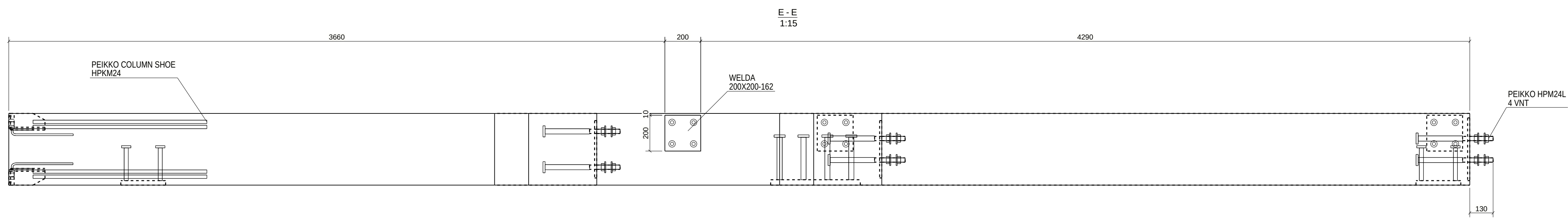
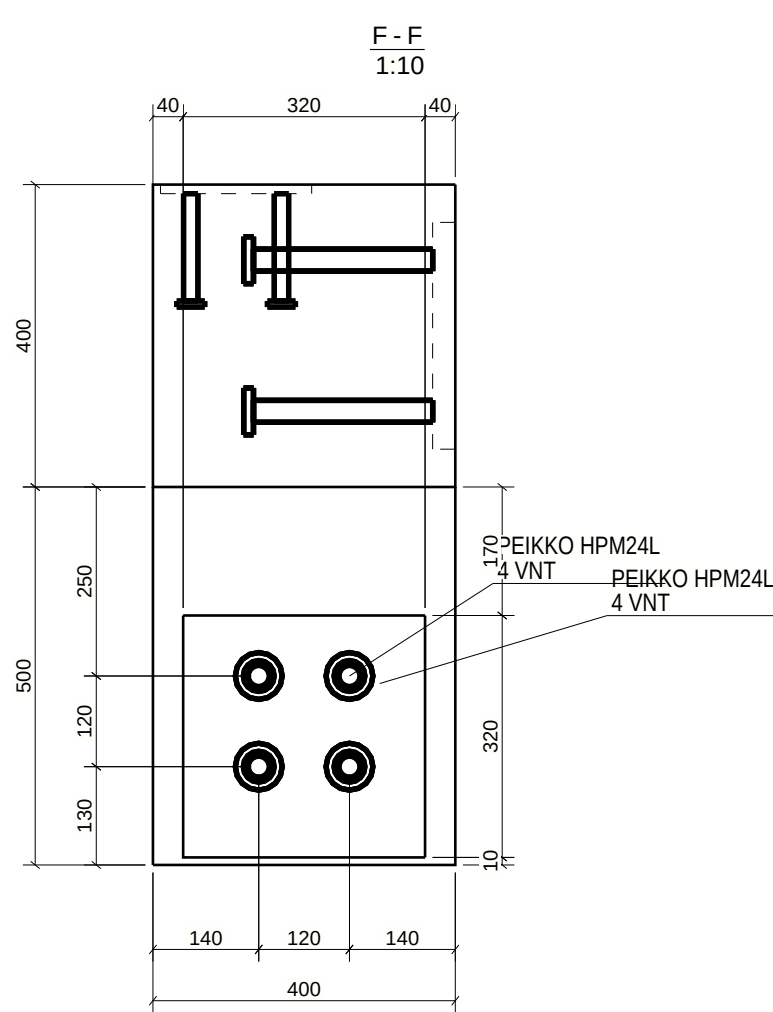
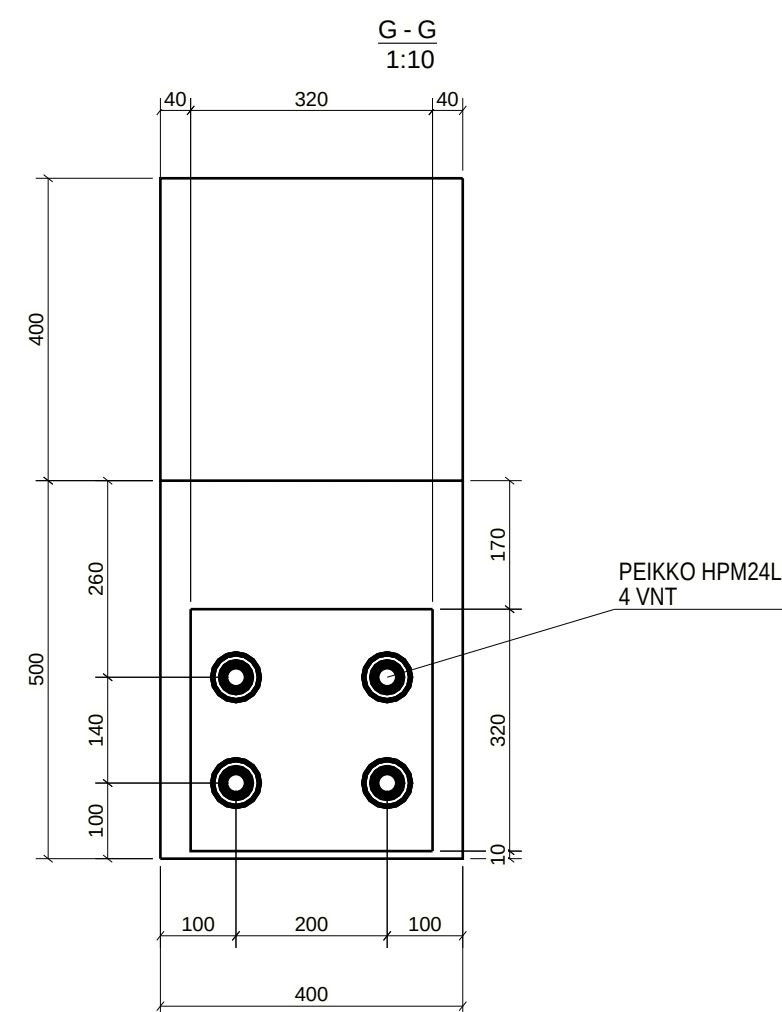
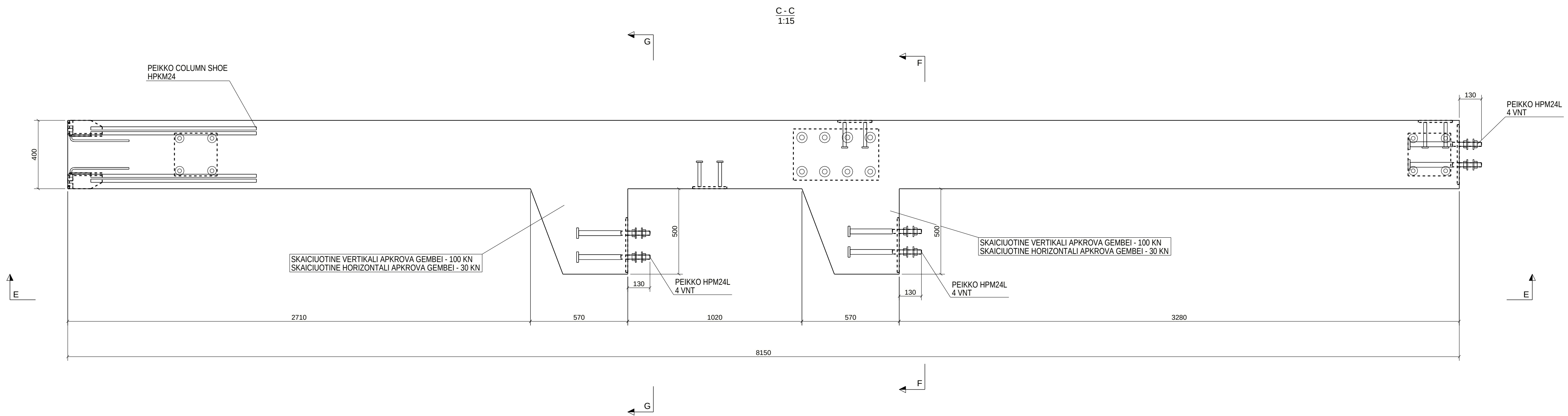
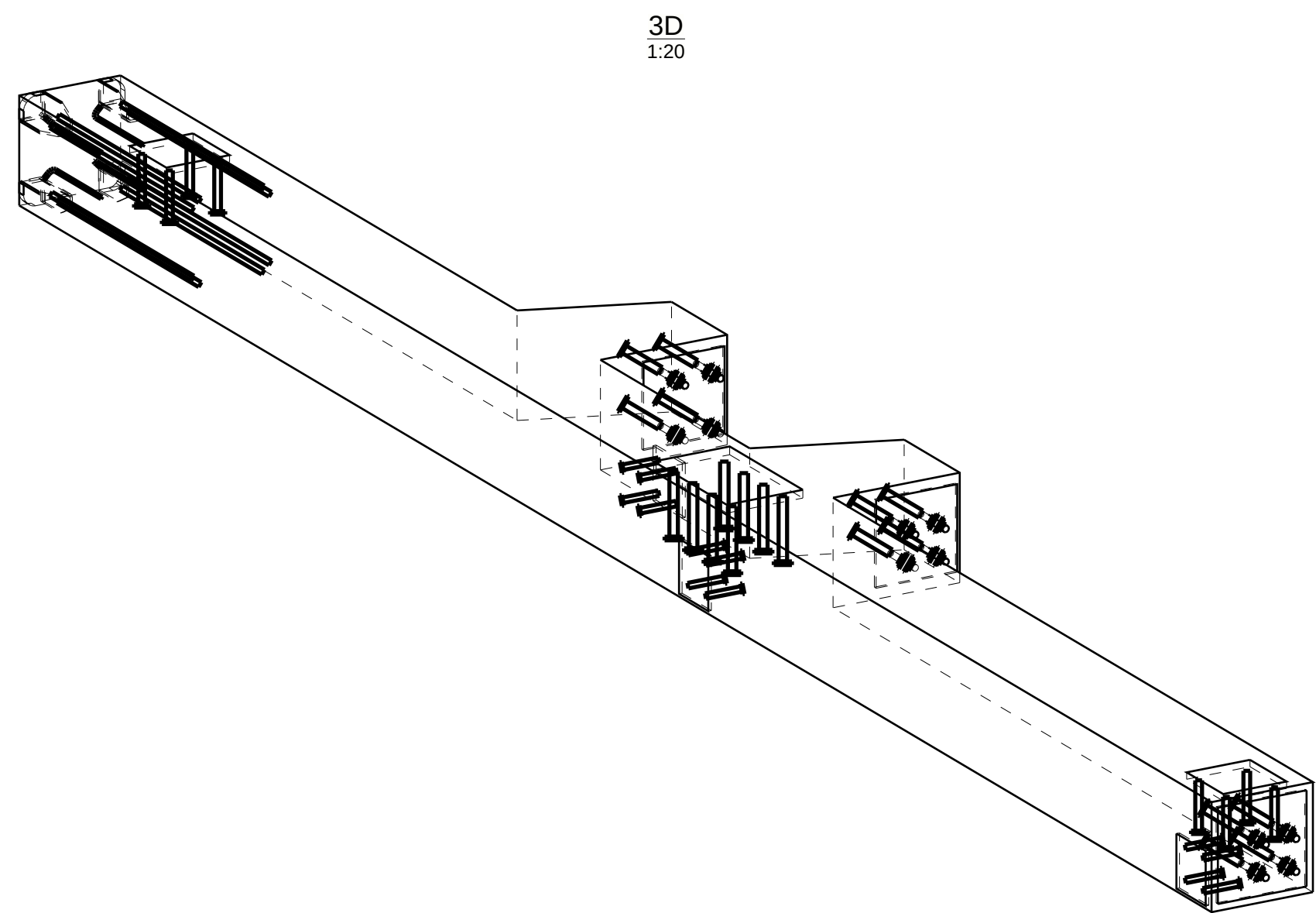
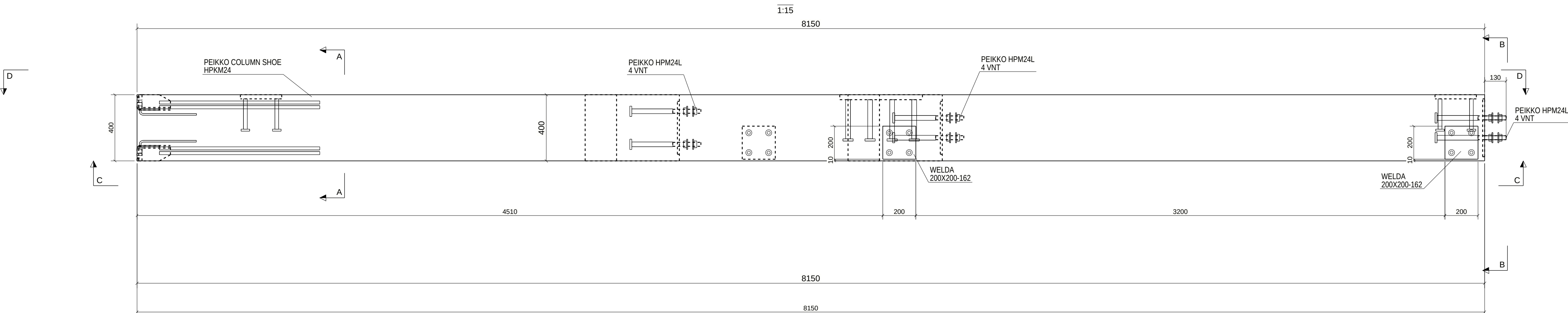
Sarasas				
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)
K-20	400*400	1	1.44	1.44
Viso:		1		1

I detiniu detaliu sarašas			K-20		2 Gaminiu kiekis	
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Turis (m³)	Svoris (kg)
	400*400	C35/45	1	8590.0	1.37	3298.6
	400*400	C35/45	1	400.0	0.06	153.6
p-39	BL12*350	S355J2	1	350.0		11.5
pl-8	PL12*320	S355J2	1	320.0		9.6
HPKM24			4			3.5
HPM24L			8			0.6
Viso					1.44	3469.8



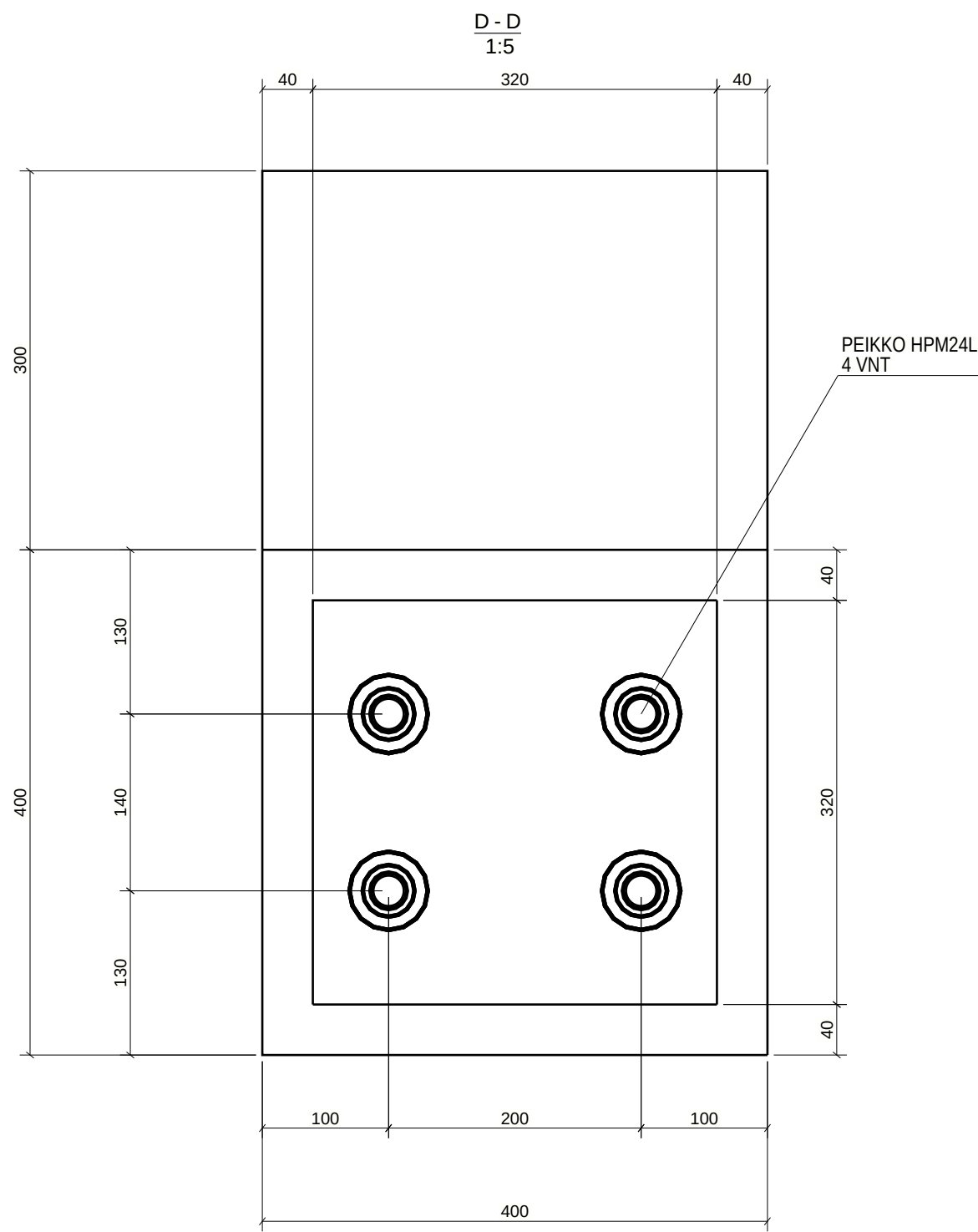
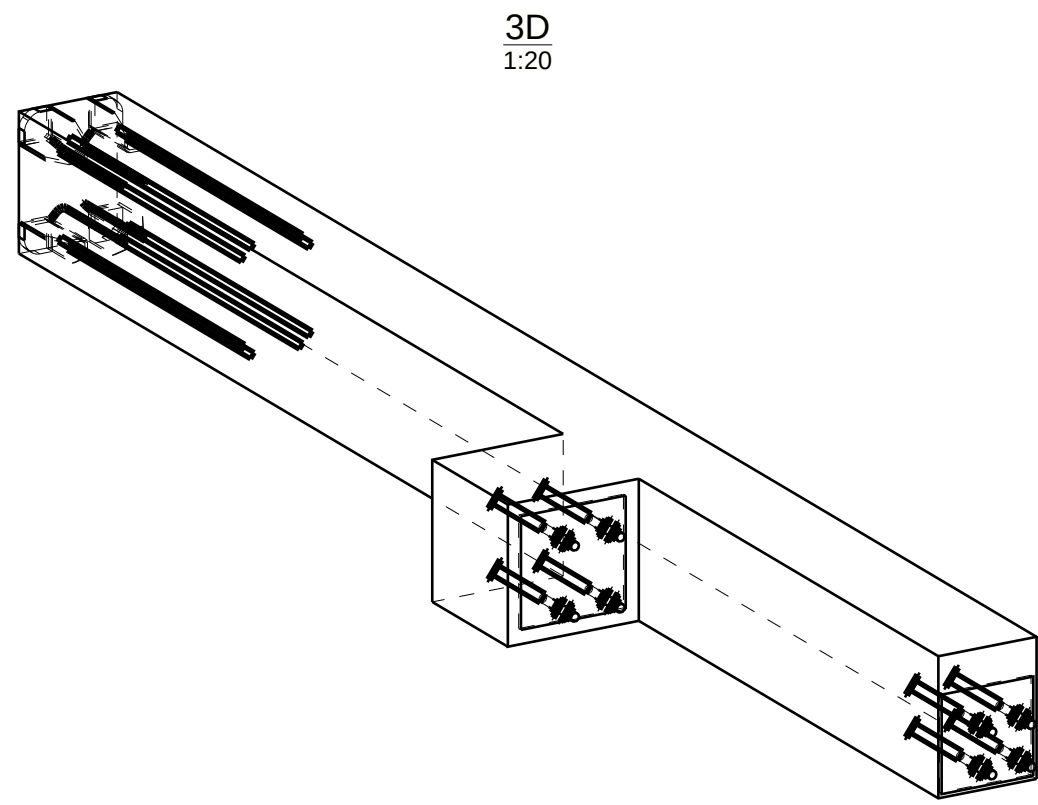
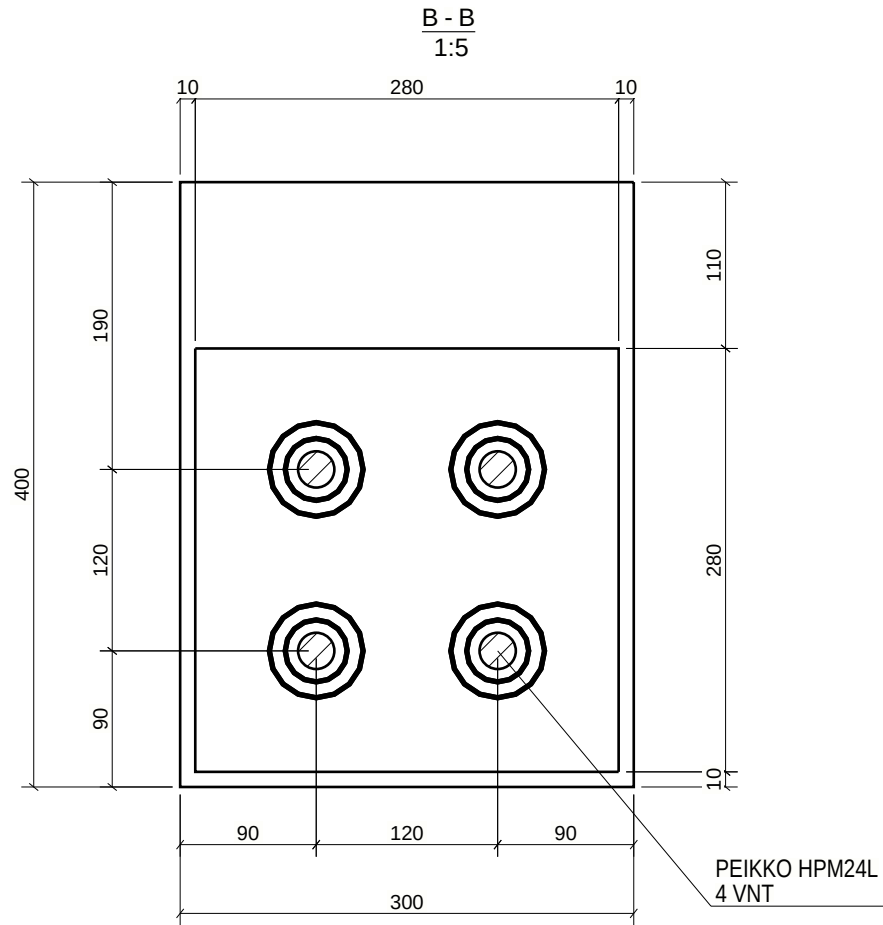
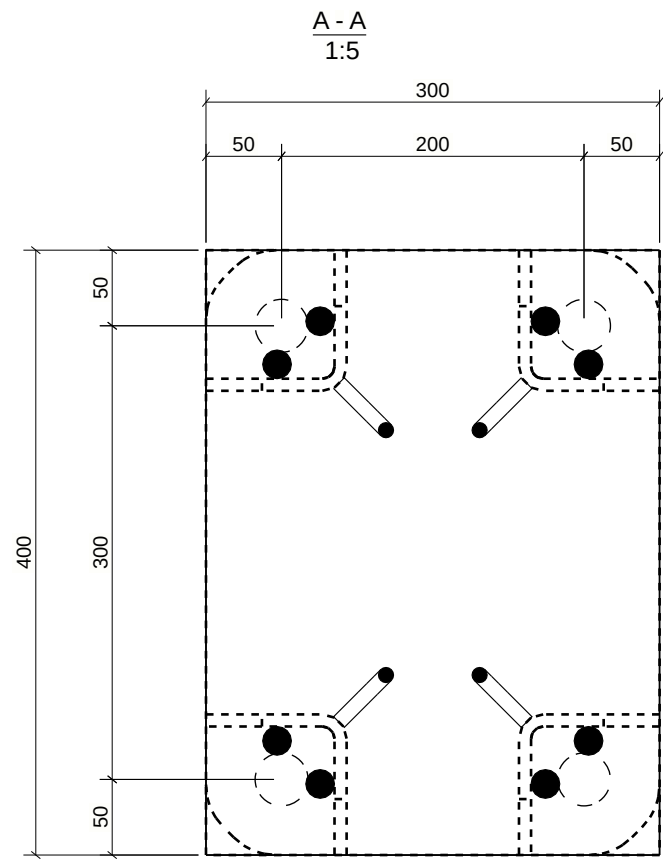
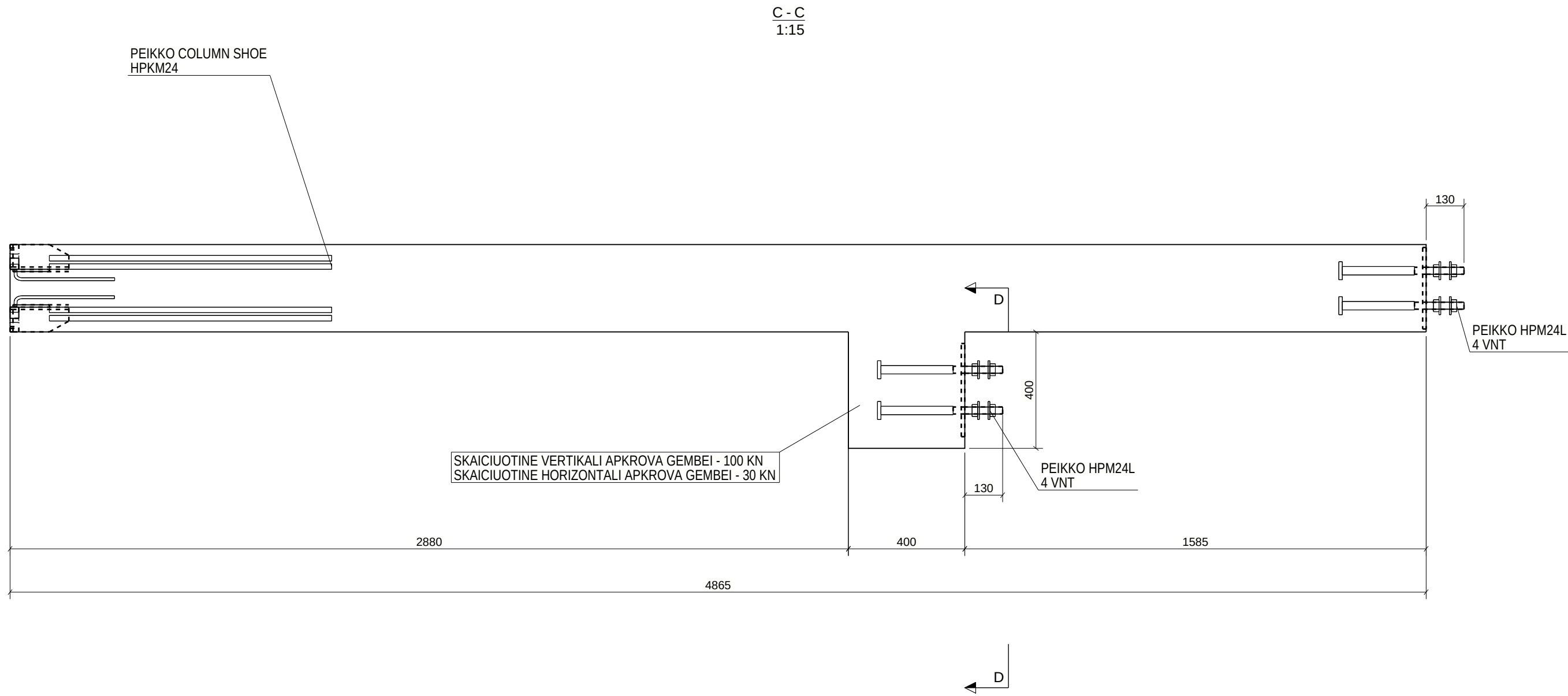
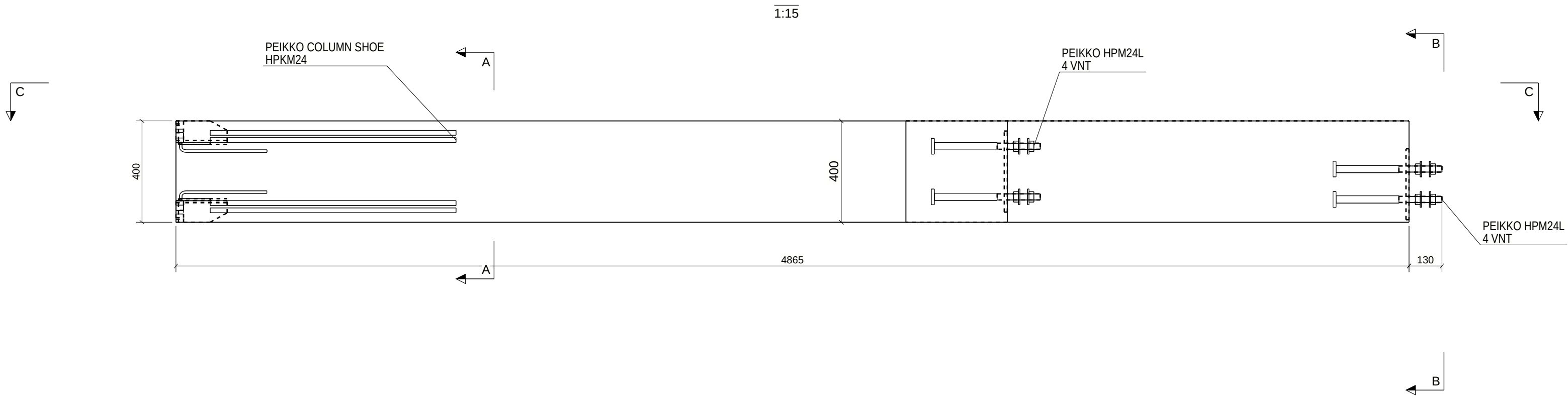
Sąrašas				
Žymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)
K-22	400*400	1	1.51	1.51
Viso:		1		2

Išdetinių detalių sąrašas			K-22		1. Gaminių kiekis	
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Turis (m³)	Svoris (kg)
400*400		C35/45	1	8150.0	1.30	3129.6
400*570		C35/45	2	500.0	0.10	228.0
p-39	BL12*350	S355J2	1	350.0		11.5
p18	PL12*320	S355J2	2	320.0		9.6
HPKM24			4			3.5
HPM24L			12			0.6
WELDA200x200-162			3			3.8
WS250x250-220			2			12.3
WS300x500-280			1			35.3
Viso:				1.40		3411.2



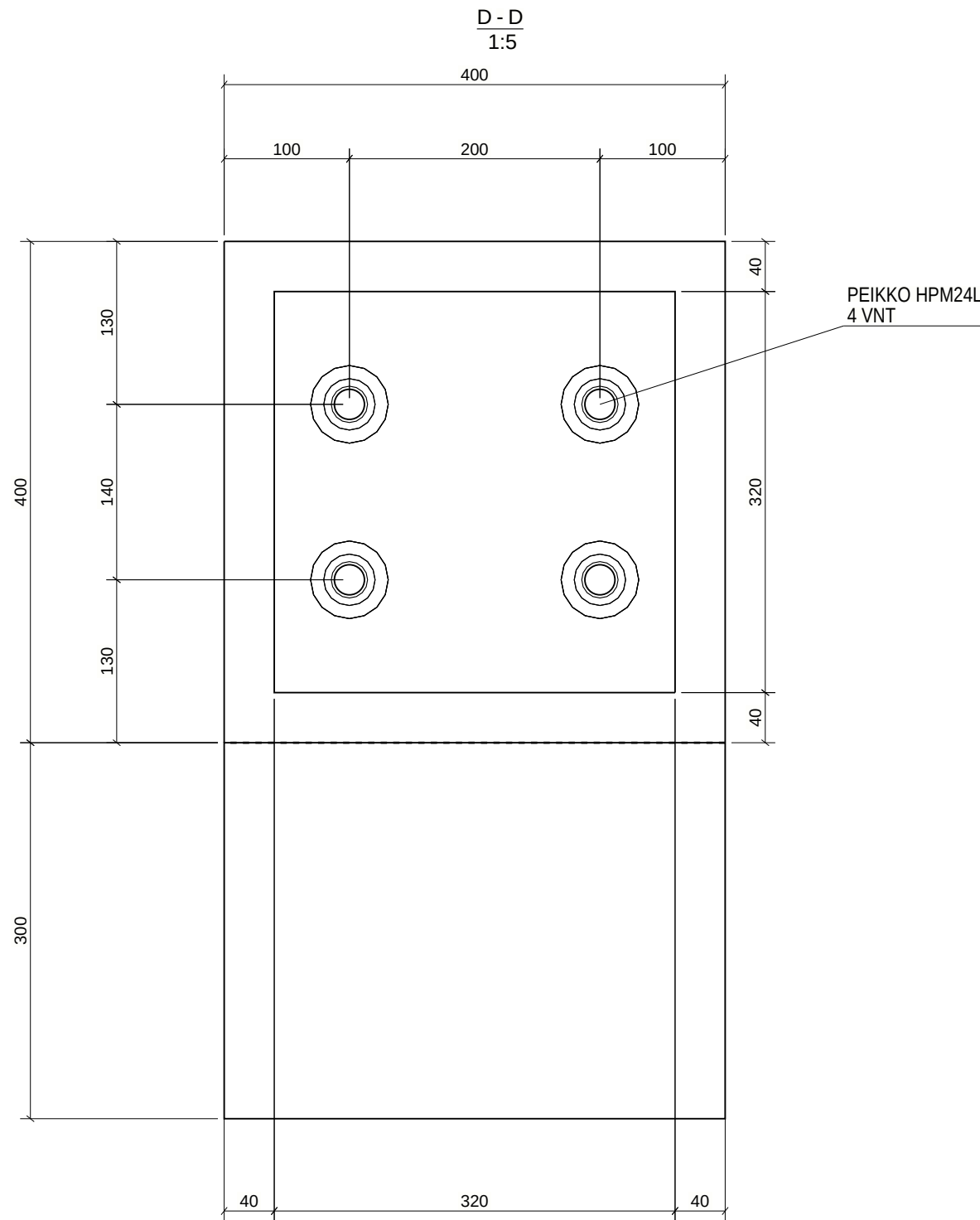
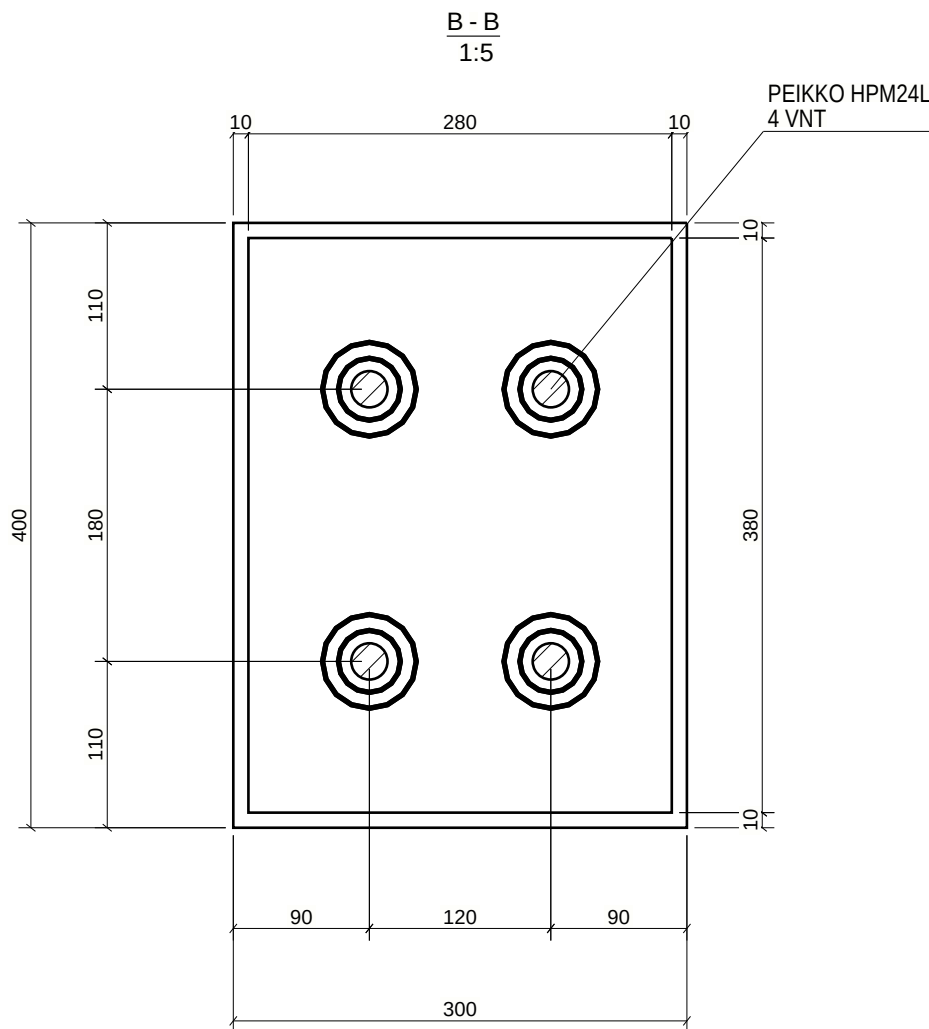
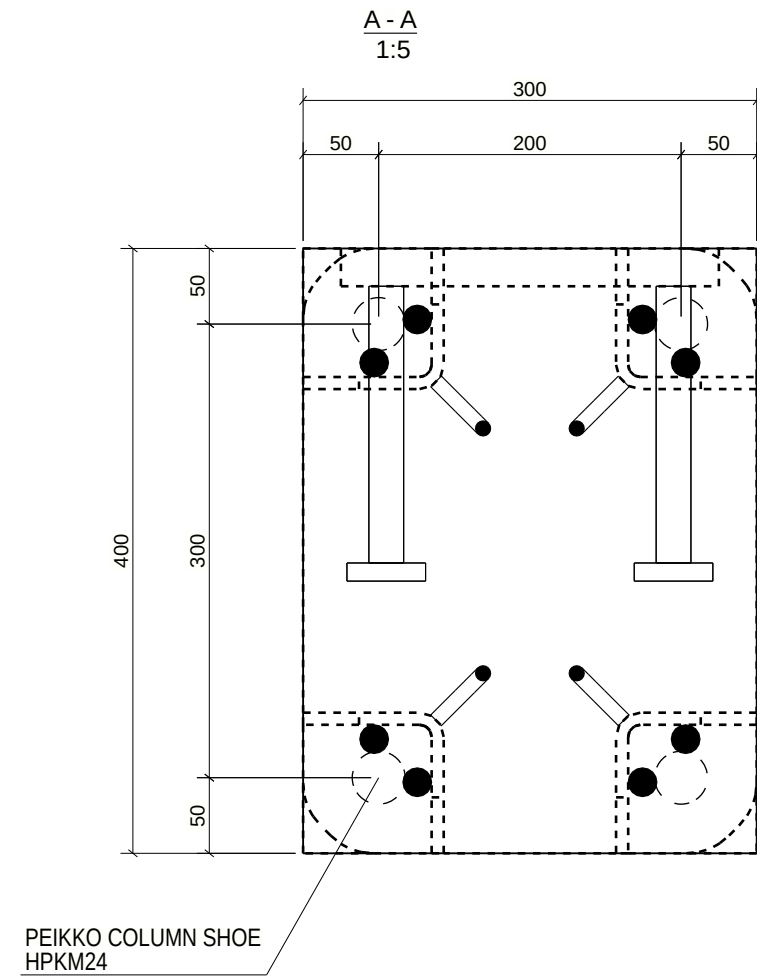
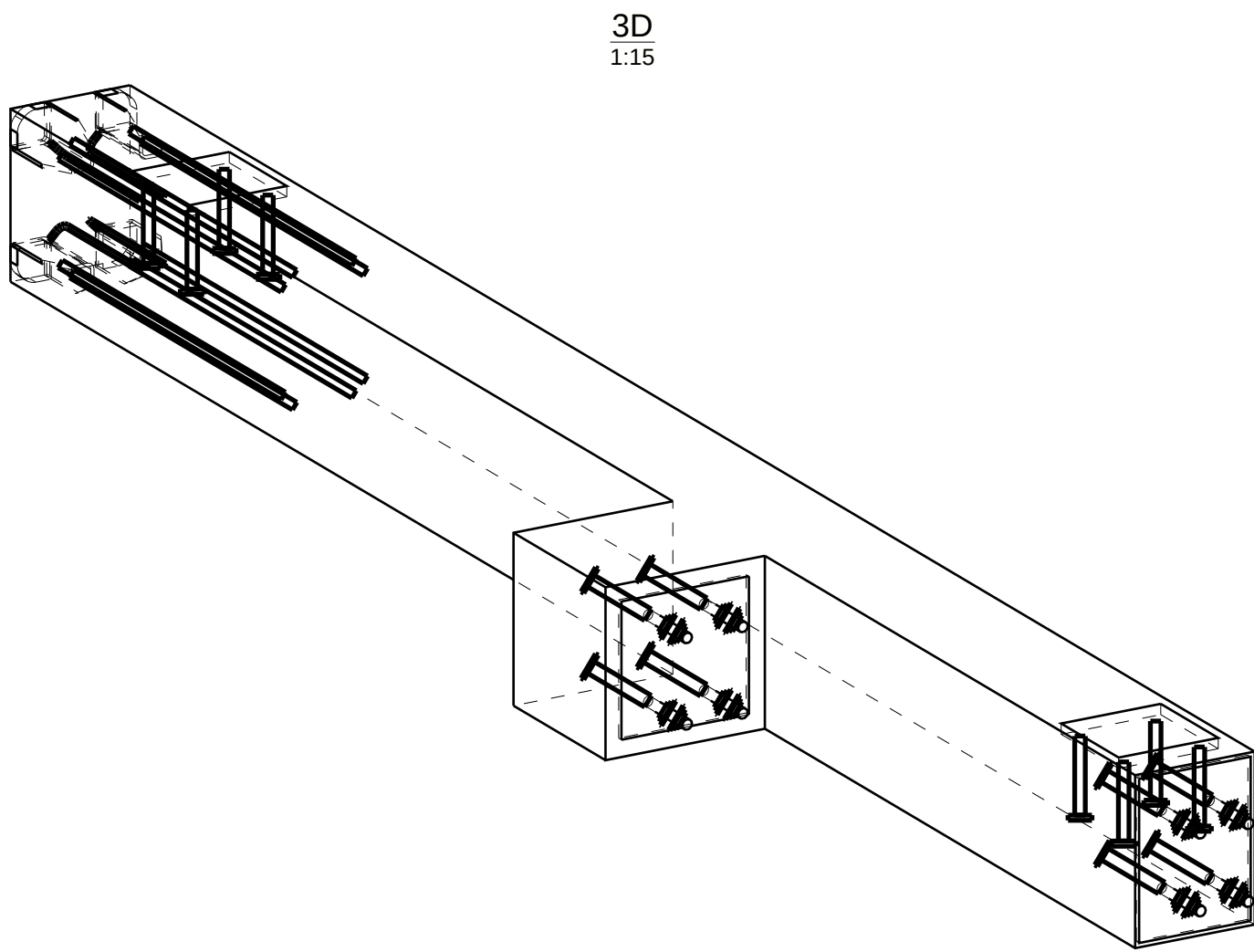
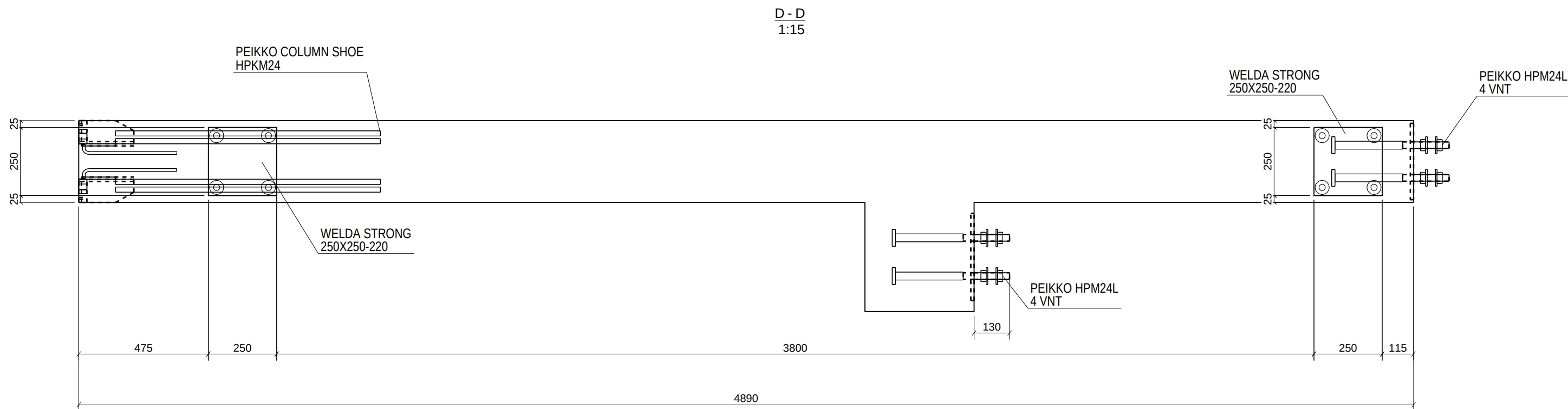
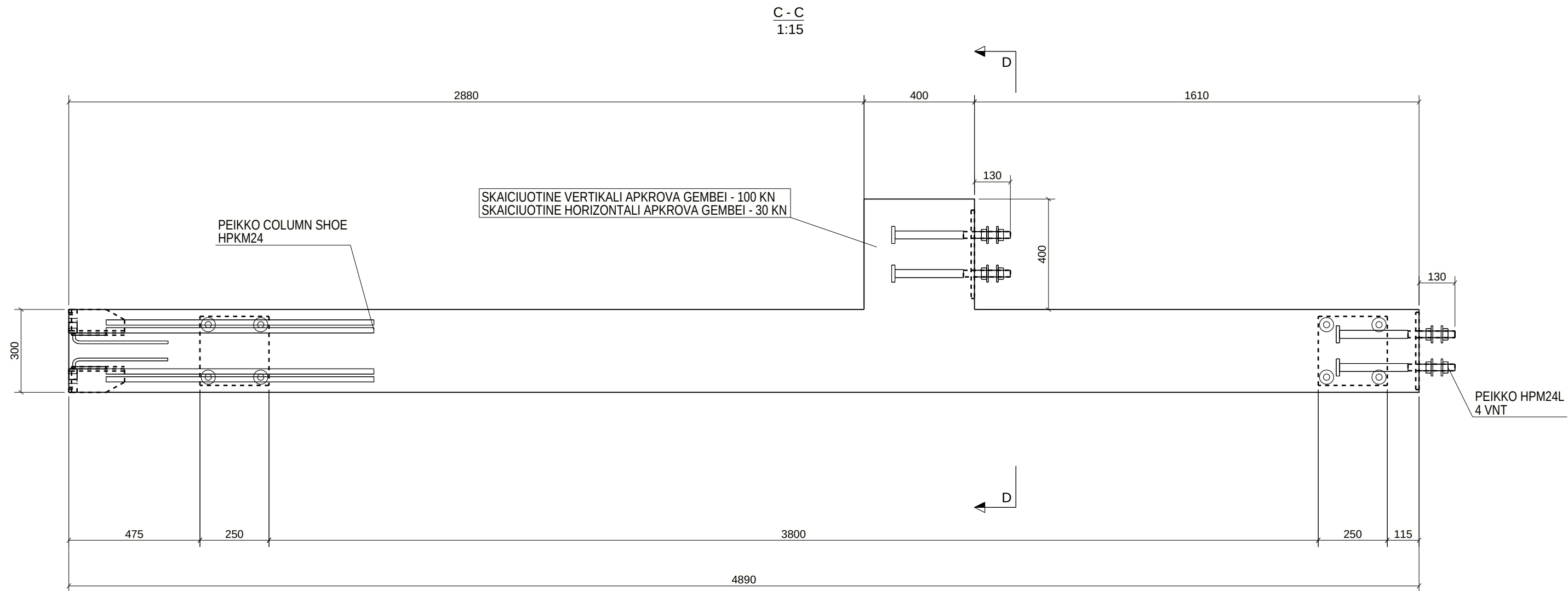
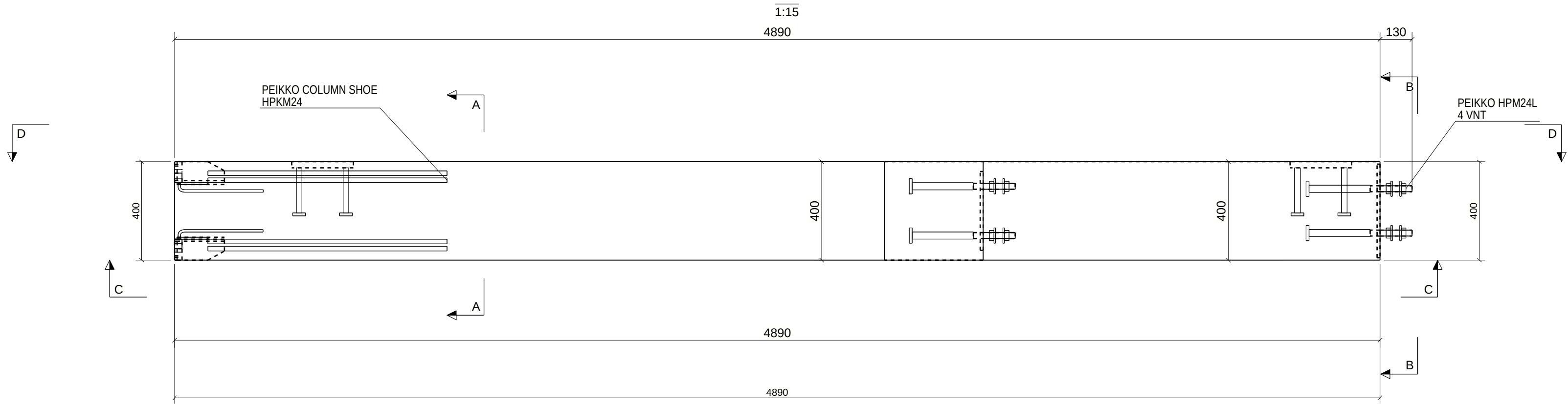
Sarasas					
Zymuo	Skersmuo		Kiekis	Turis (m3)	B. turis (m3)
K-24	400*300		1	0.65	0.65
Viso:		1			1

I detiniu detaliu sarašas					
			K-24		
			1 Gaminiu kiekis		
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Turis (m³)
	400*300	C35/45	1	4865.0	0.58
	400*400	C35/45	1	400.0	0.06
p-42	BL12*280	S355J2	1	280.0	7.4
pl-8	PL12*320	S355J2	1	320.0	9.6
HPKM24			4		3.5
HPM24L			8		0.6
Viso				0.65	1569.5



Sarasas				
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)
K-25	400*300	1	0.66	0.66
Viso:		1		1

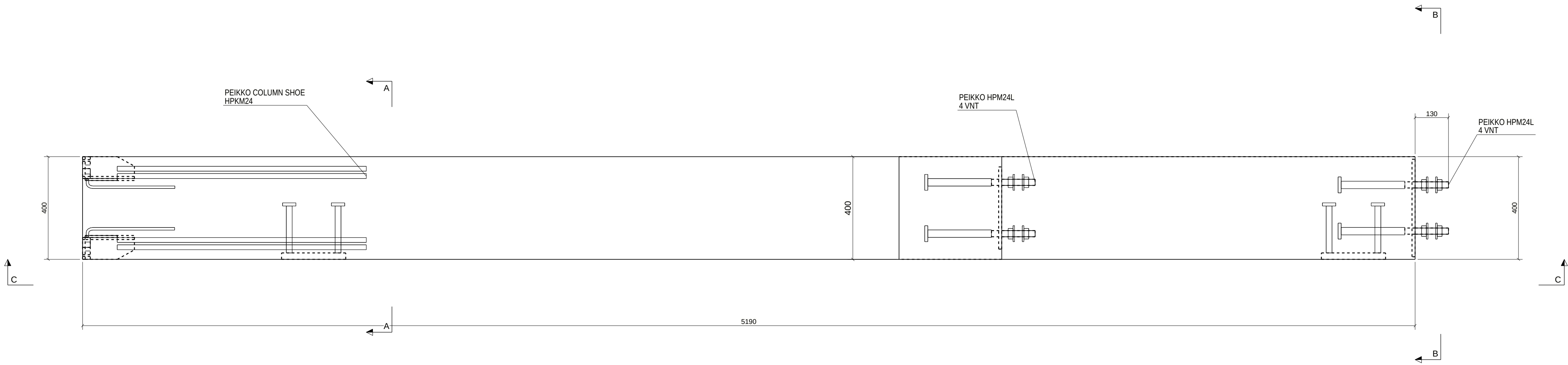
I detiniu detaliu sarašas			K-25 1 Gaminiu kiekis			
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Turis (m³)	Svoris (kg)
	400*300	C35/45	1	4890.0	0.59	1408.3
	400*400	C35/45	1	400.0	0.06	153.6
p-53	BL12*380	S355J2	1	280.0		10.0
pl-8	PL12*320	S355J2	1	320.0		9.6
HPKM24			4			3.5
HPM24L			8			0.6
WS250x250-220			2			12.3
Viso					0.65	1587.1



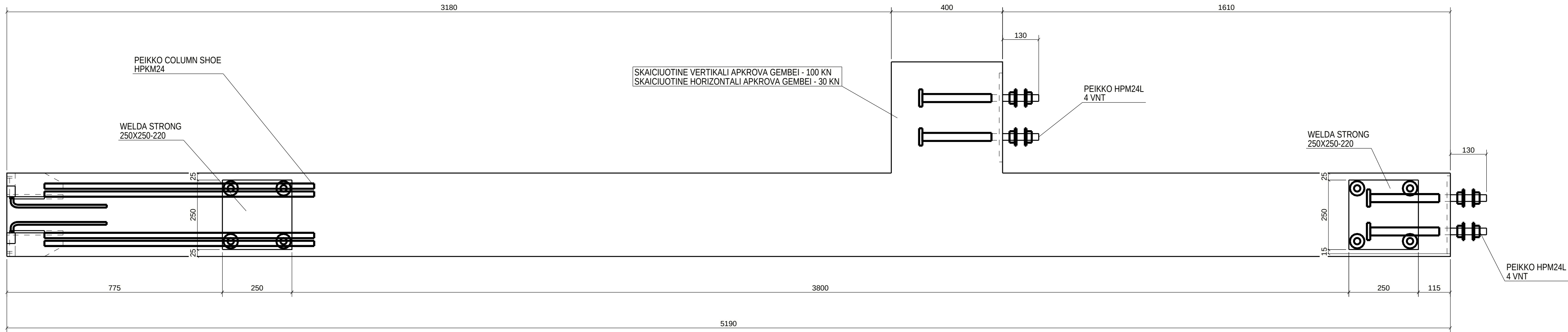
Sarasas				
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)
K-26	400*300	1	0.69	0.69
Viso:		1		1

I detiniu detaliu sarašas		K-26				1 Gaminiu kiekis
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Turis (m³)	Svoris (kg)
	400*300	C35/45	1	5190.0	0.62	1494.7
	400*400	C35/45	1	400.0	0.06	153.6
p-53	BL12*380	S355J2	1	280.0		10.0
pl-8	PL12*320	S355J2	1	320.0		9.6
HPKM24			4			3.5
HPM24L			8			0.6
WS250x250-220			2			12.3
Viso					0.69	1673.5

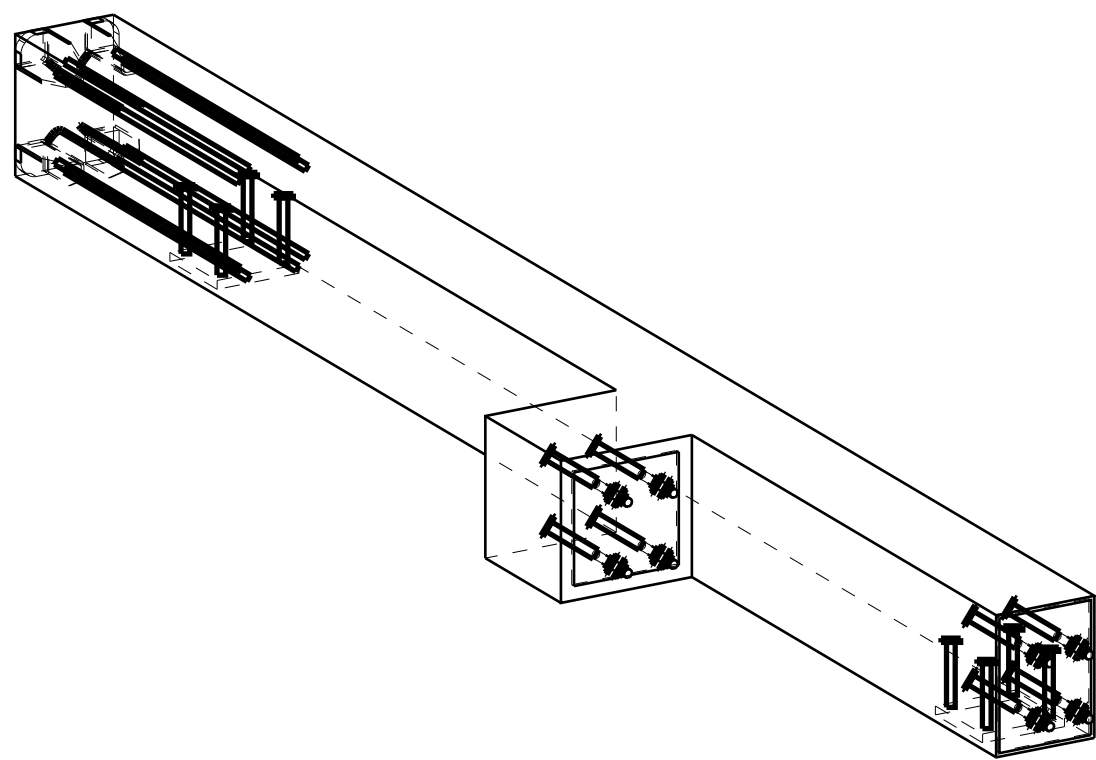
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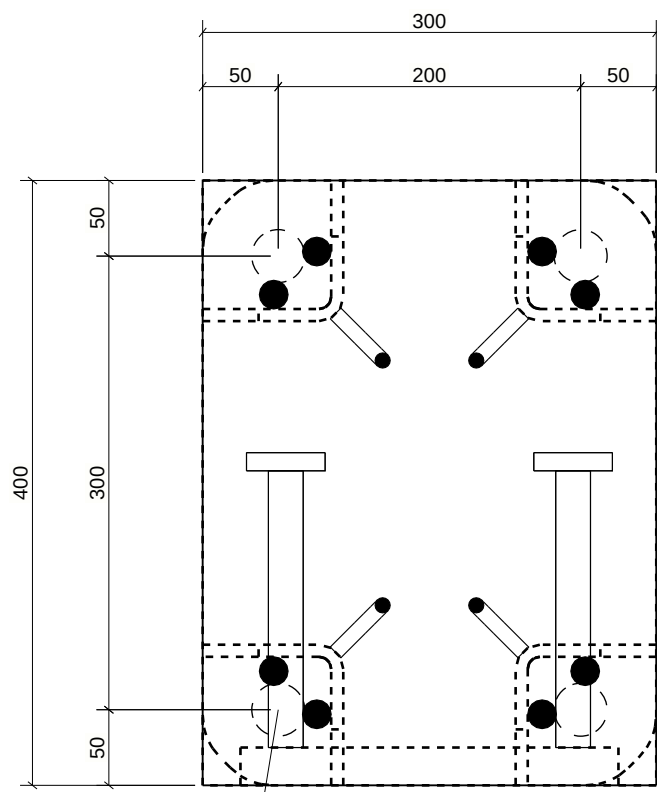
C - C
1:10



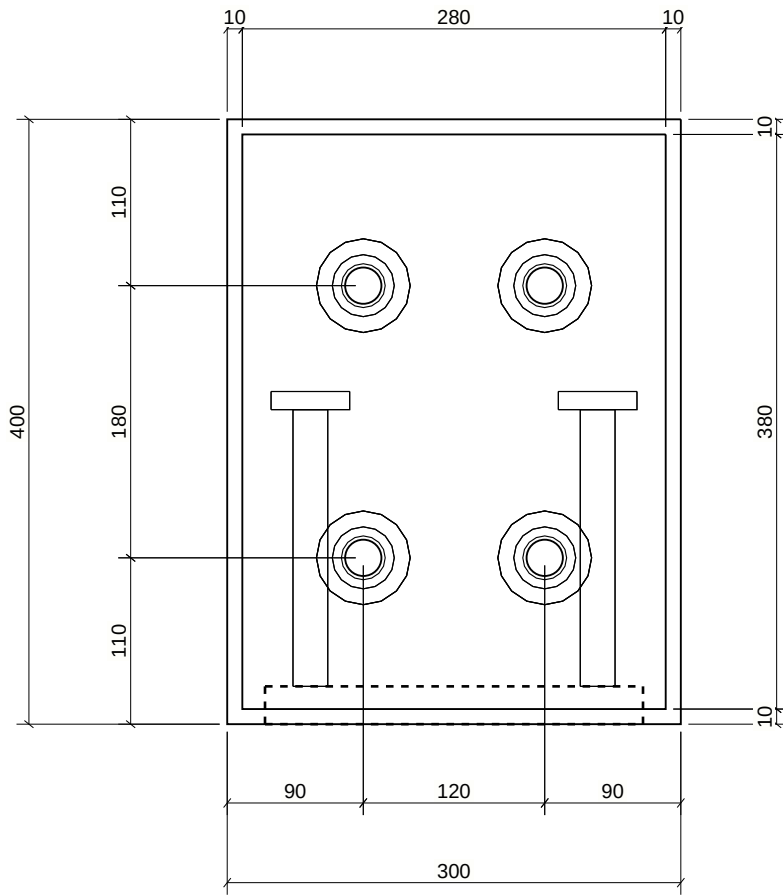
3D
1:20



A - A
1:5

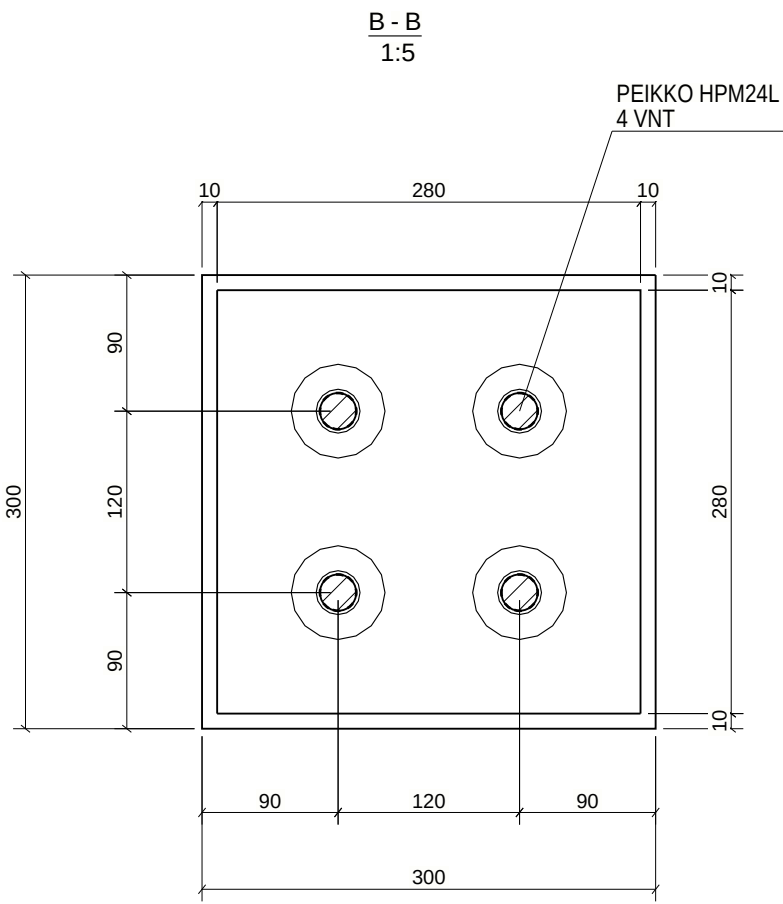
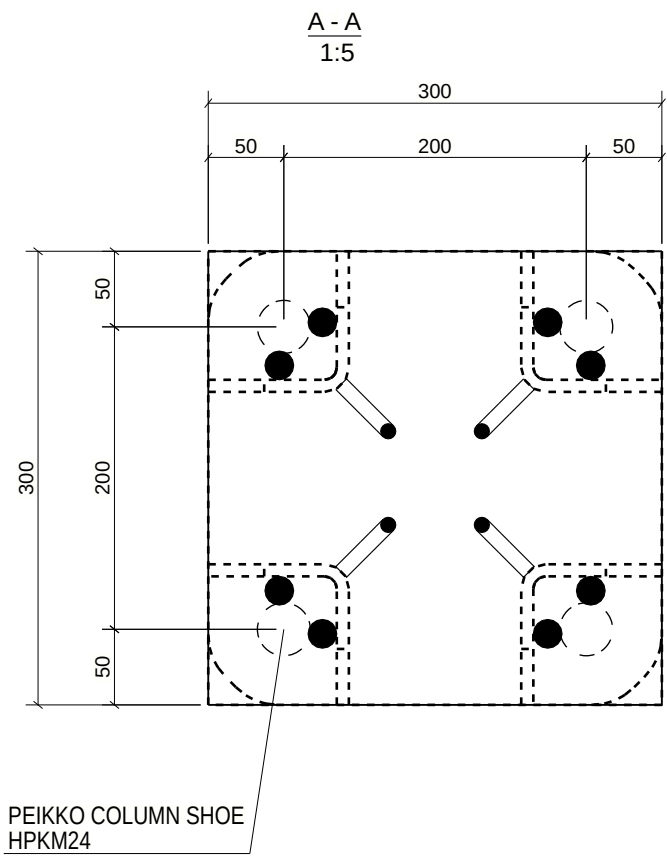
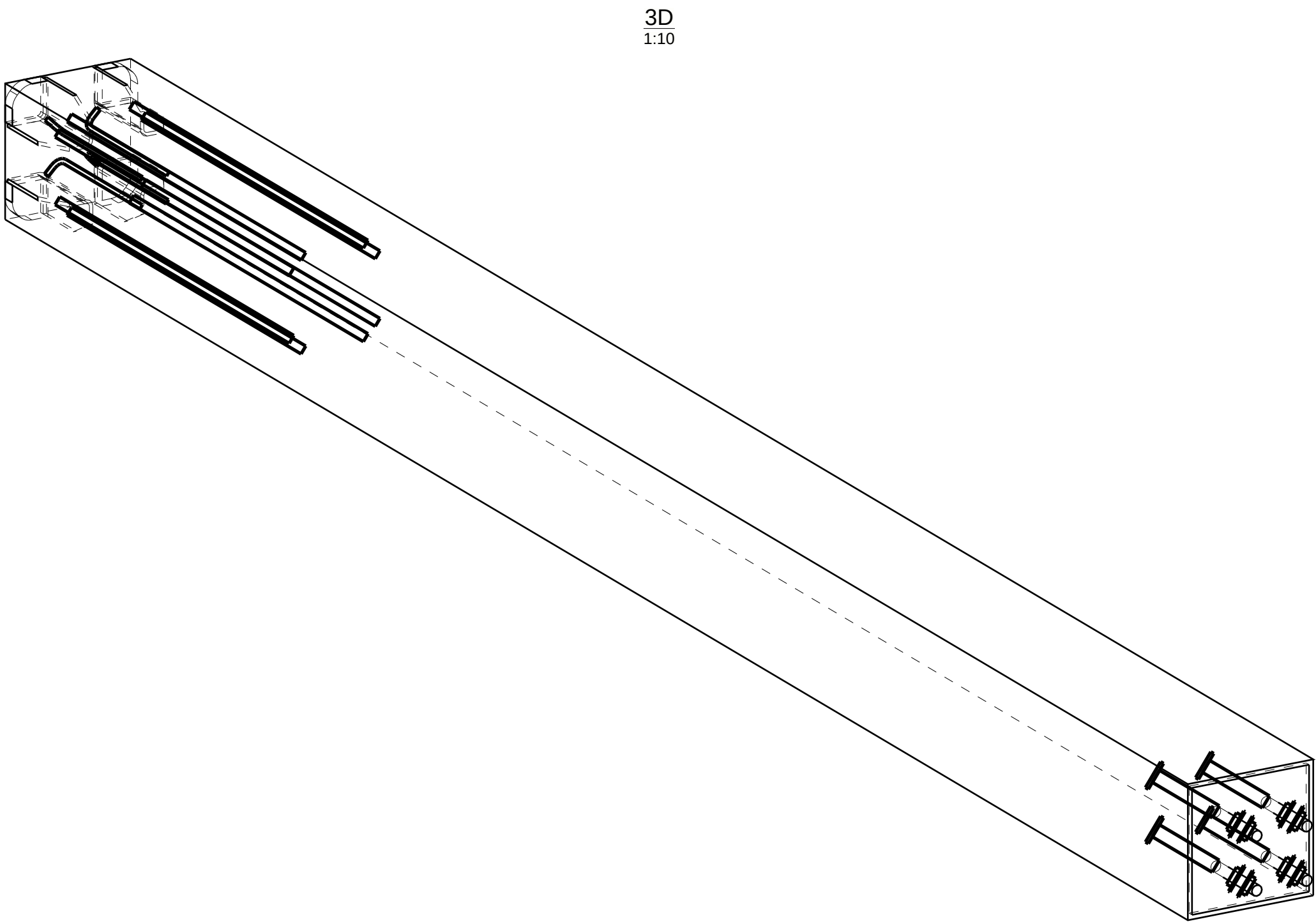
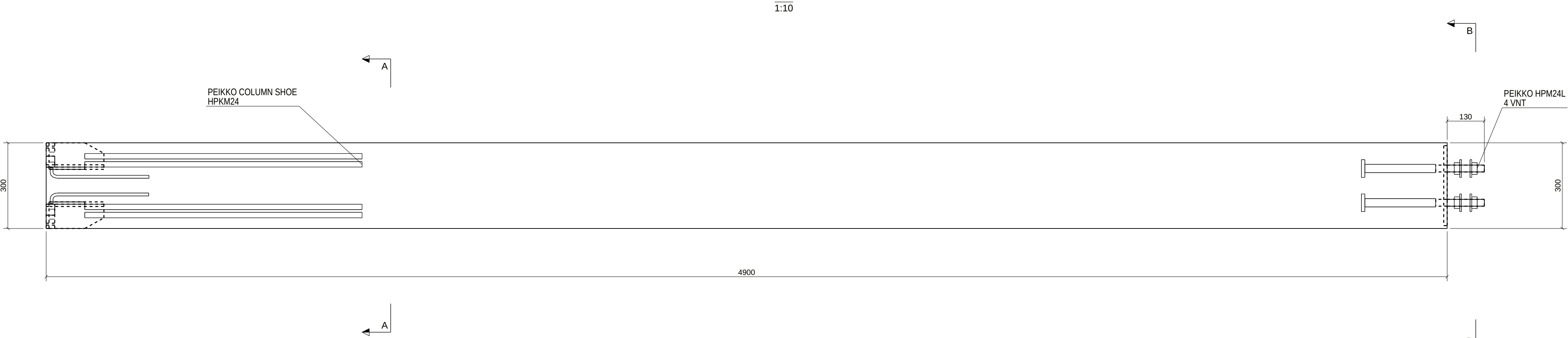


B - B
1:5

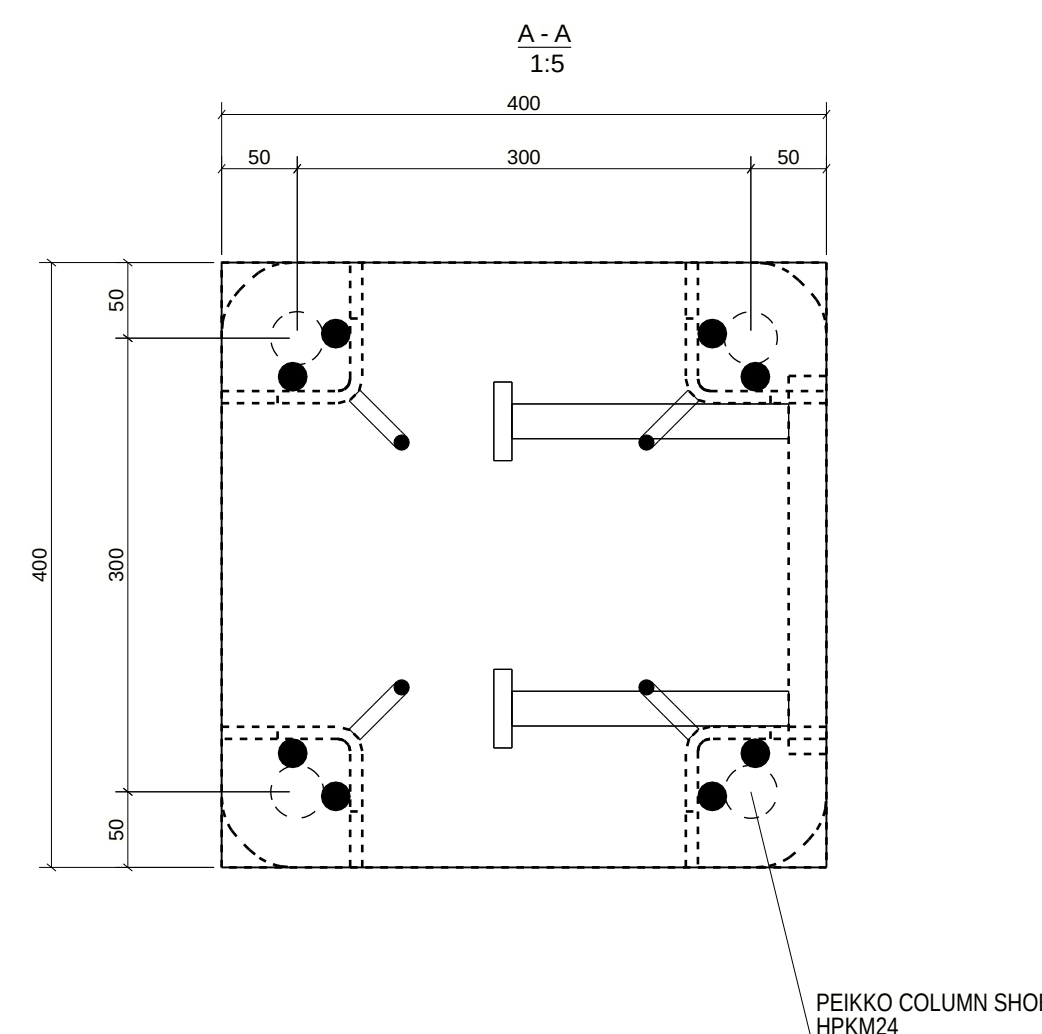
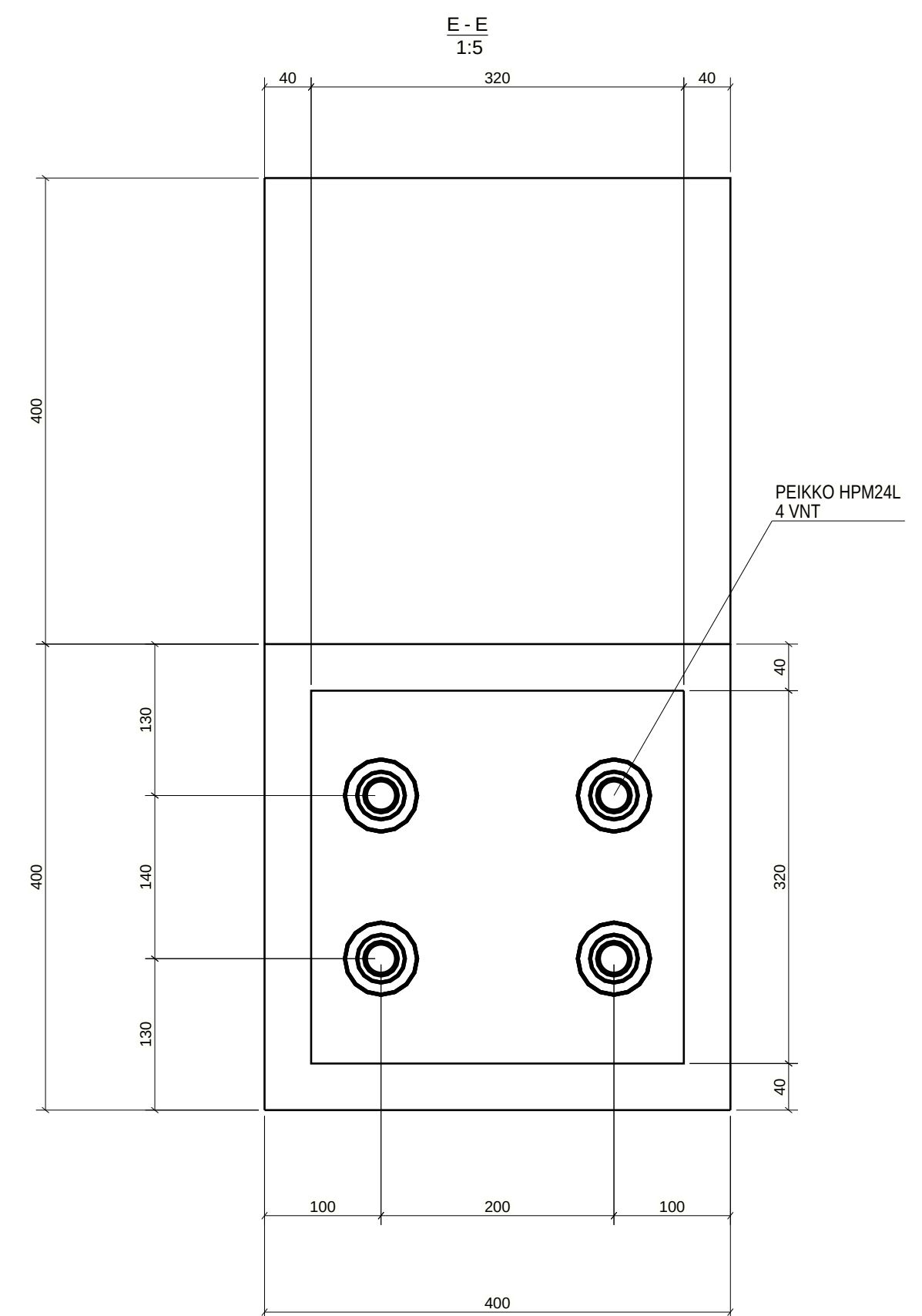


Sarasas				
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)
K-28	300*300	1	0.44	0.44
Viso:		1		0

I detiniu detaliu sarašas				
		K-28		1 Gaminiu kiekis
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Svoris (kg)
	300*300	C35/45	1	1058.4
p-42	BL12*280	S355J2	1	7.4
HPKM24			4	3.5
HPM24L			4	0.6
		Viso		1066.4

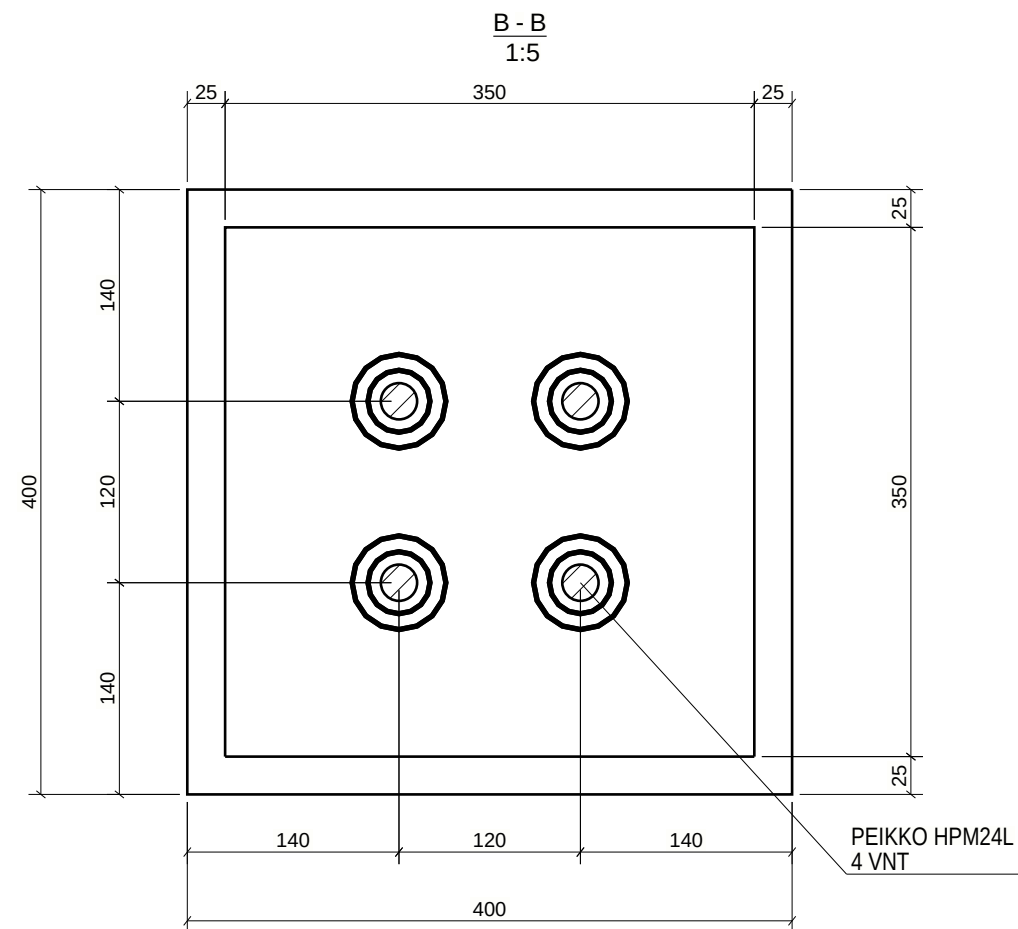
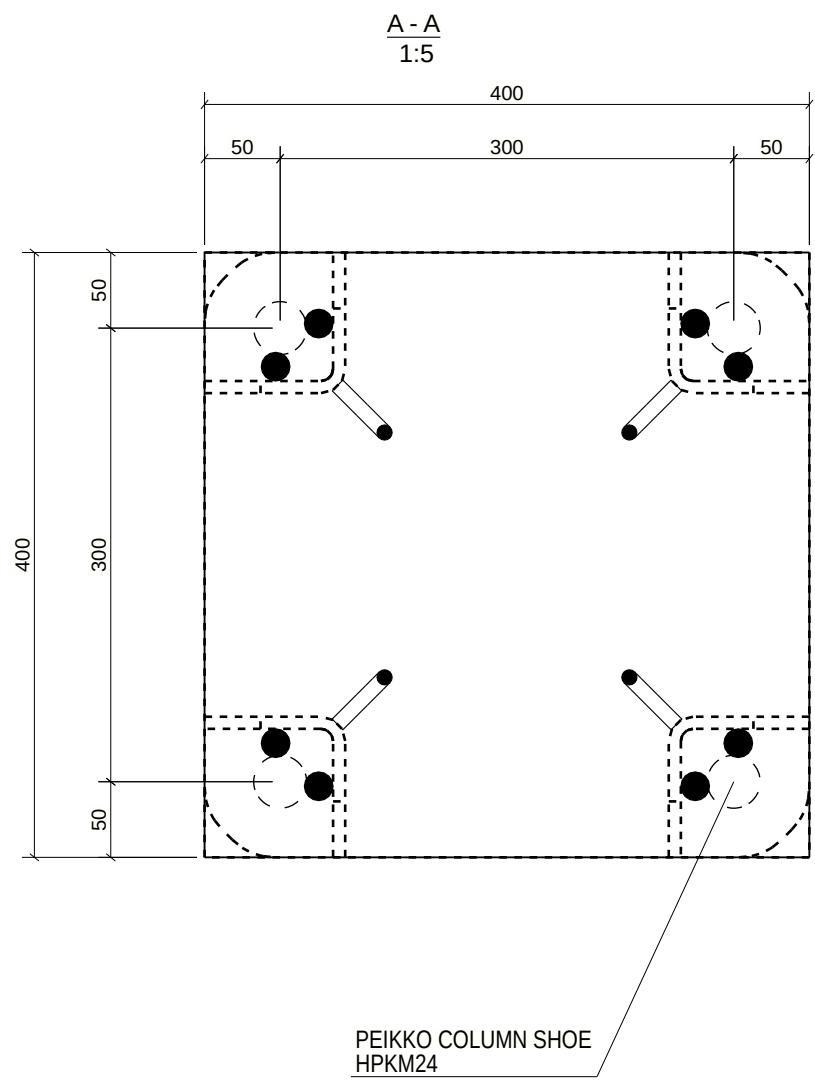
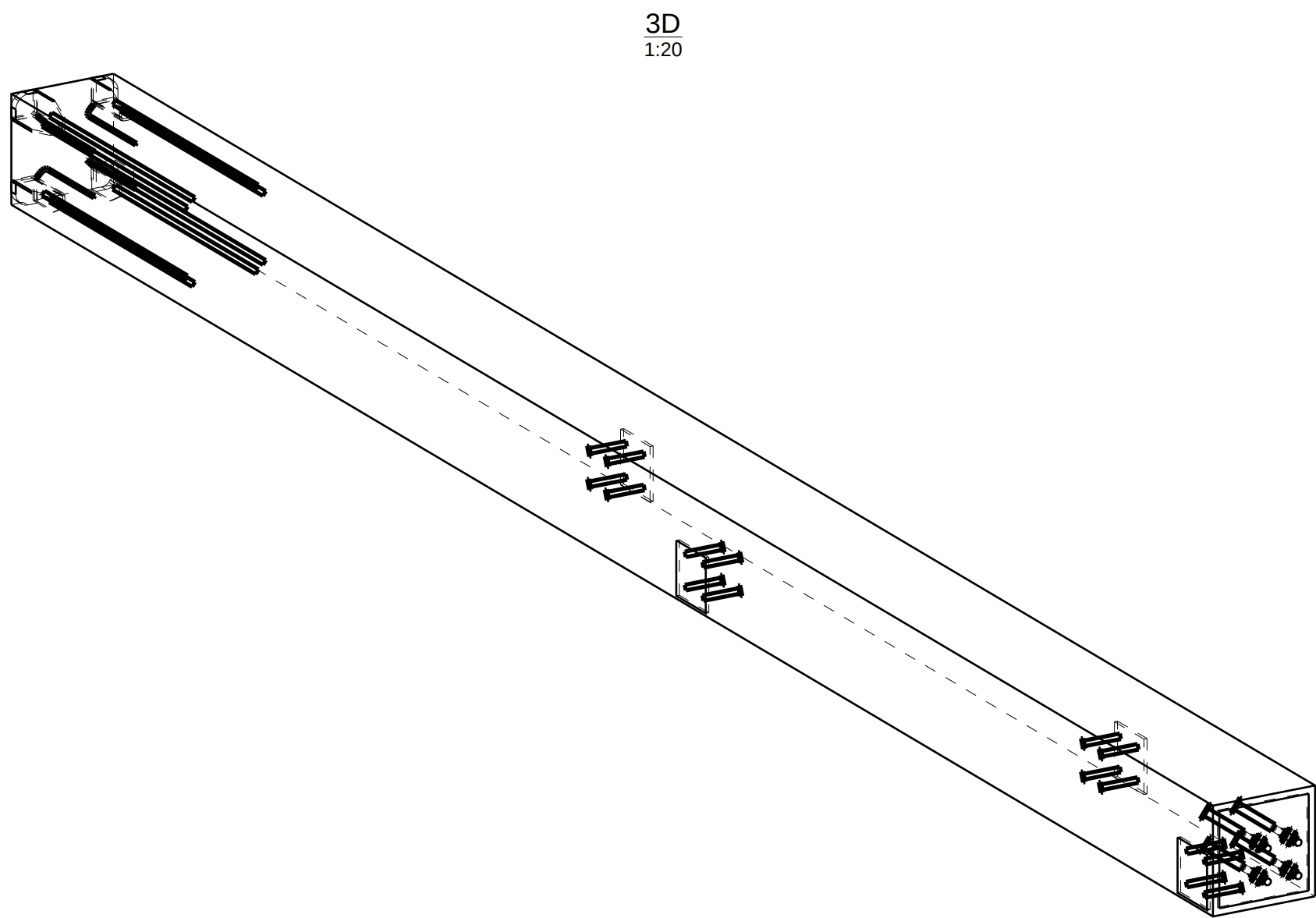
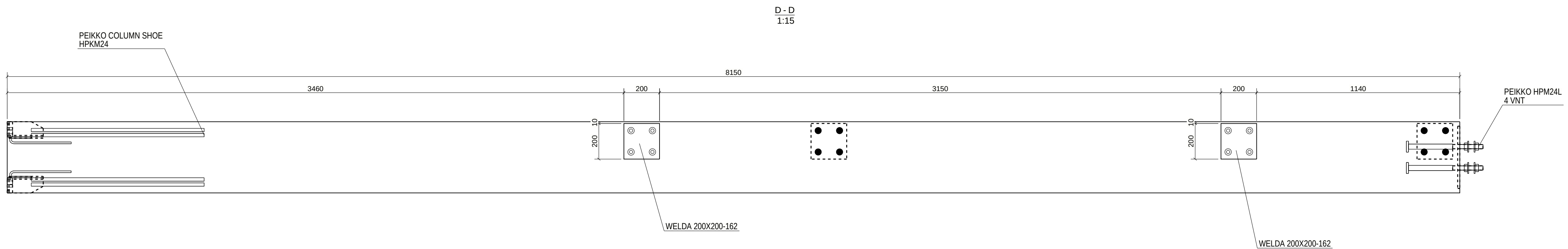
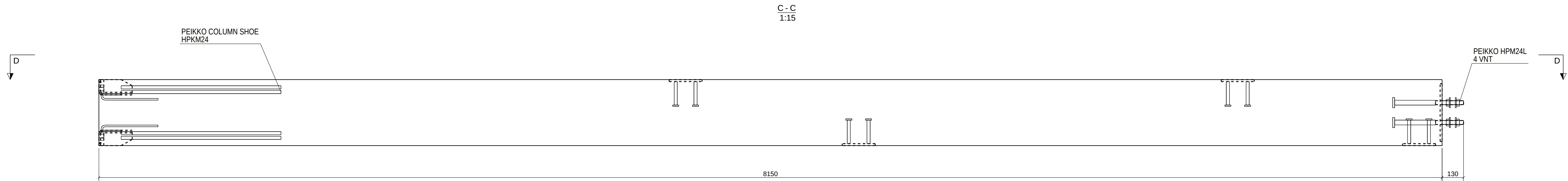
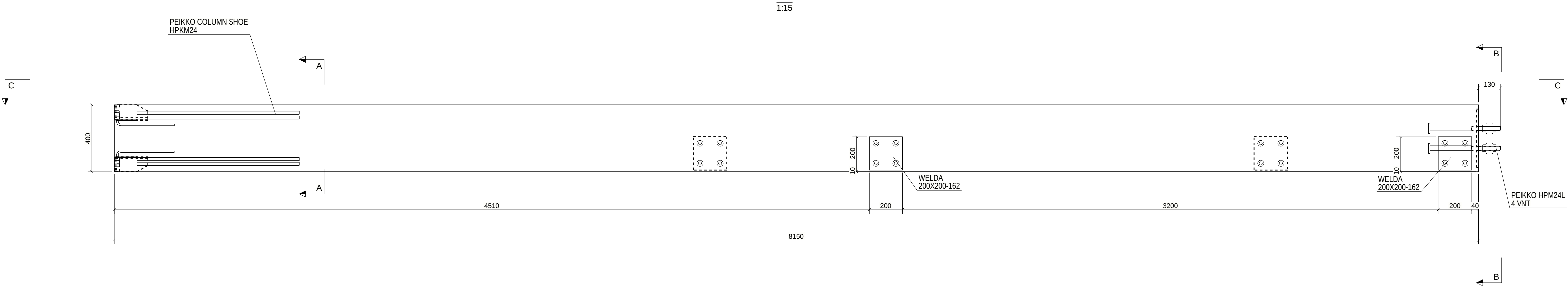


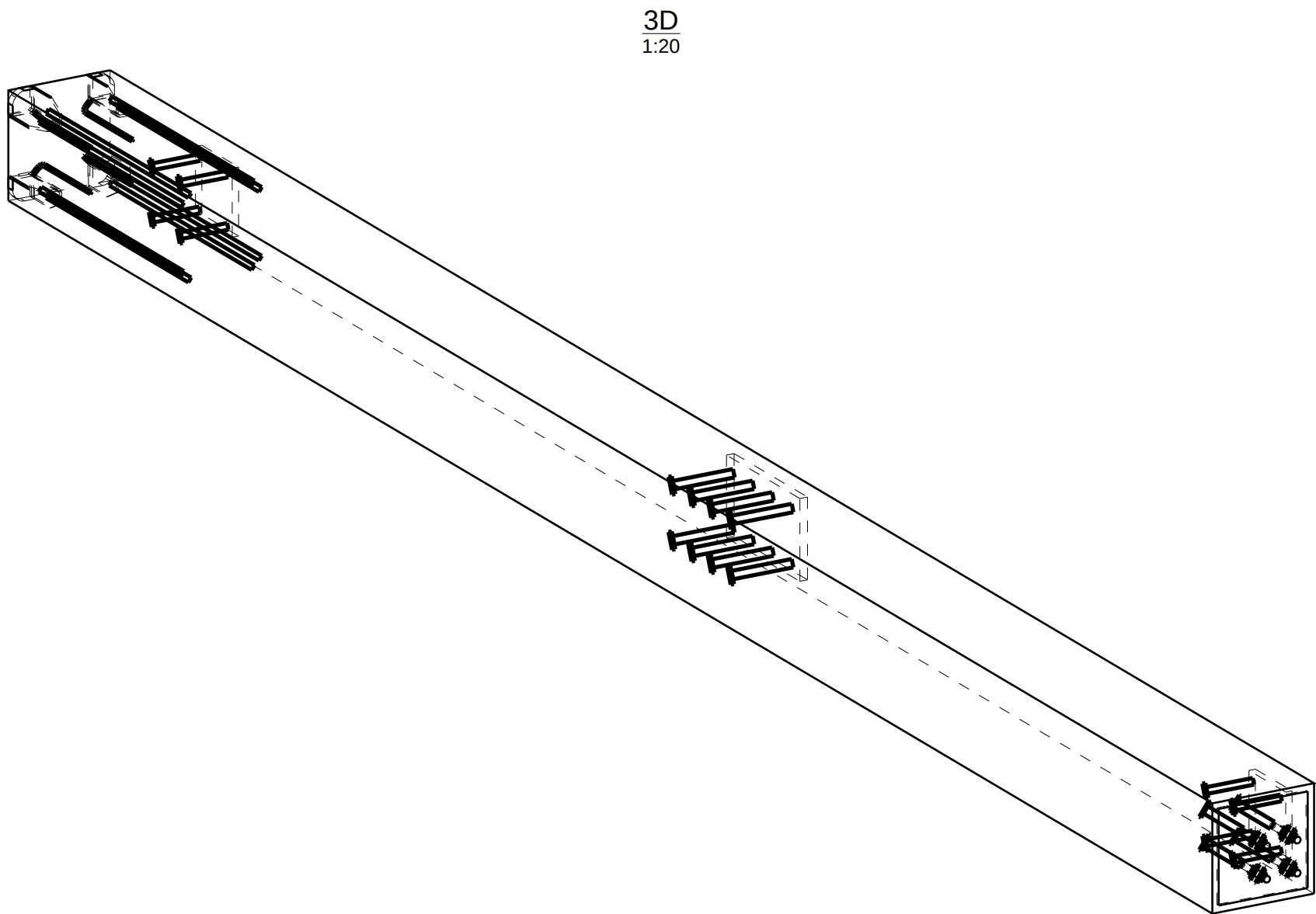
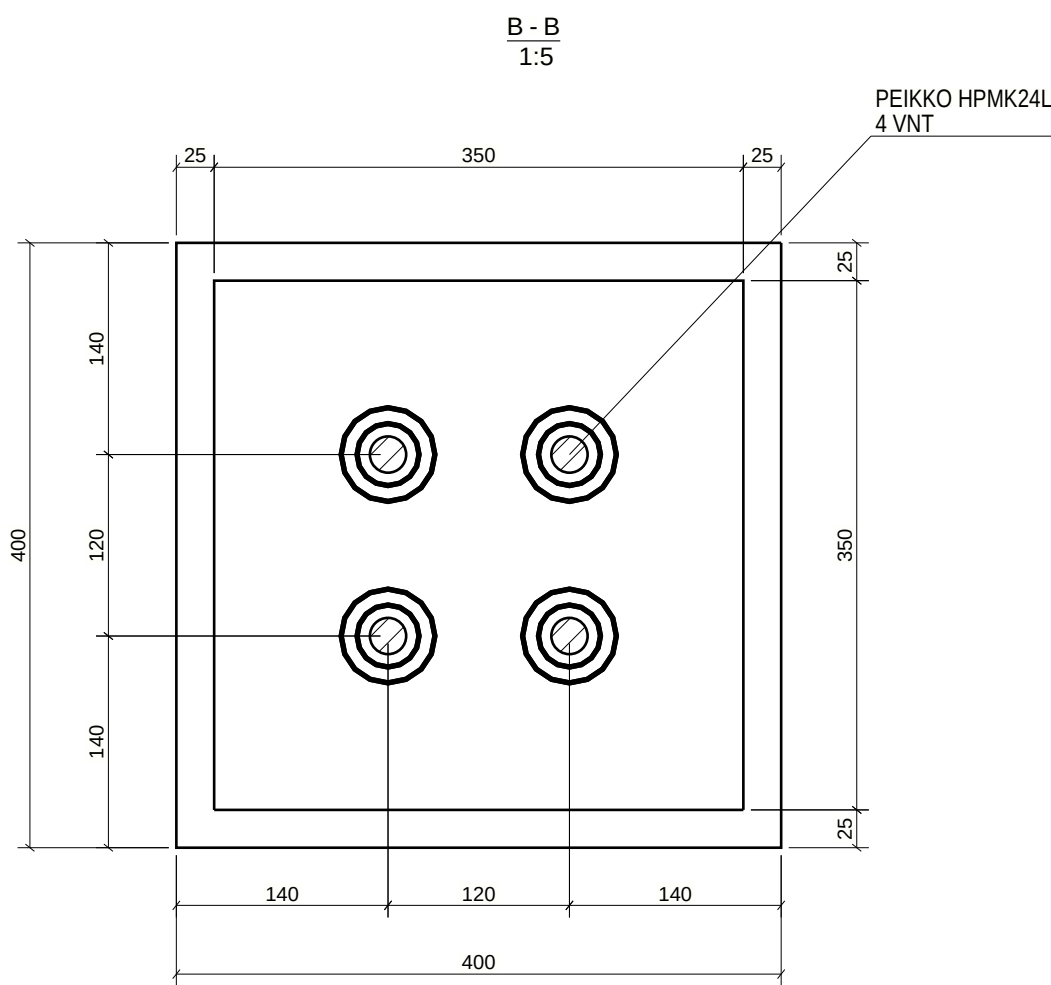
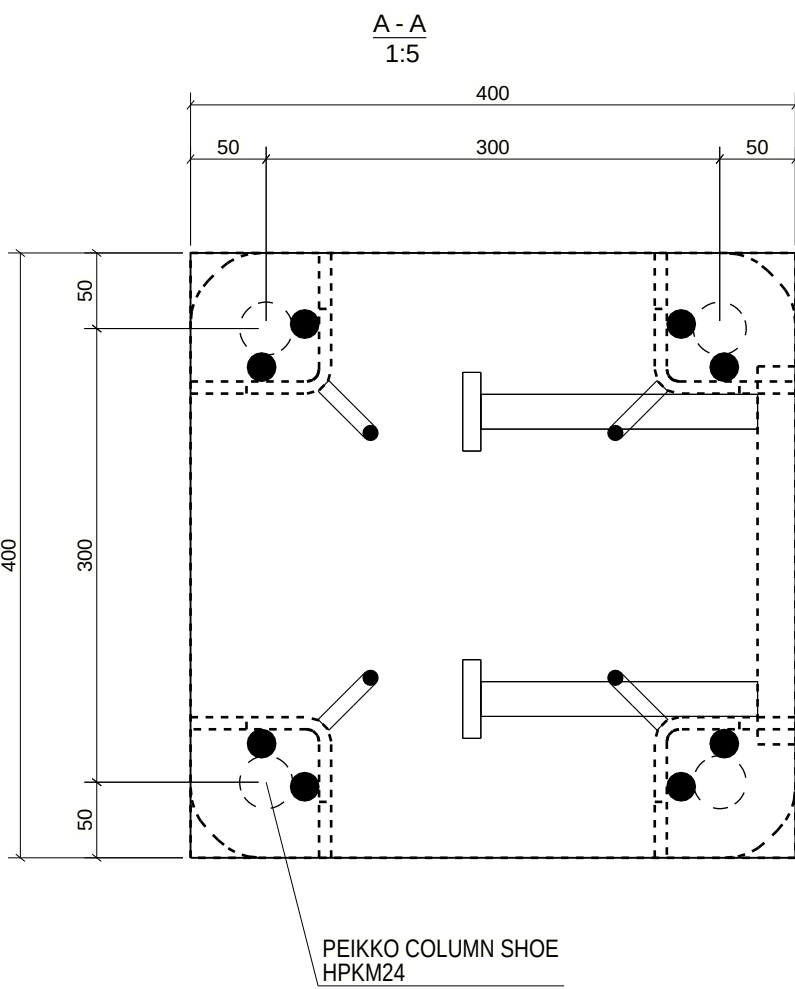
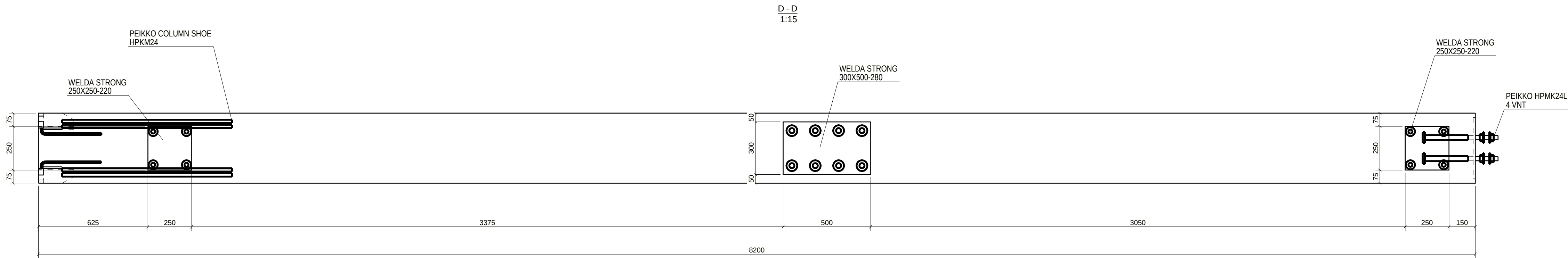
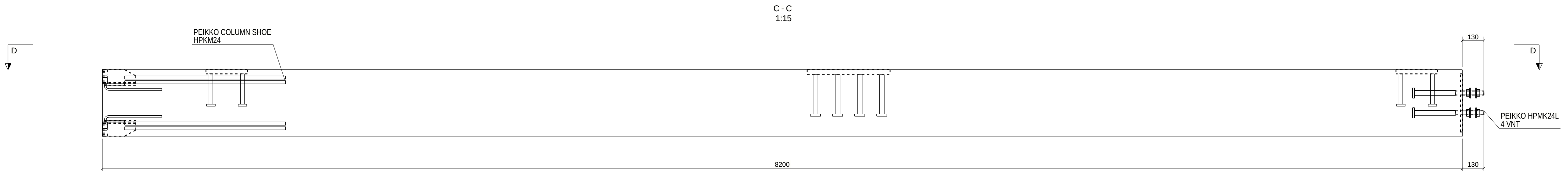
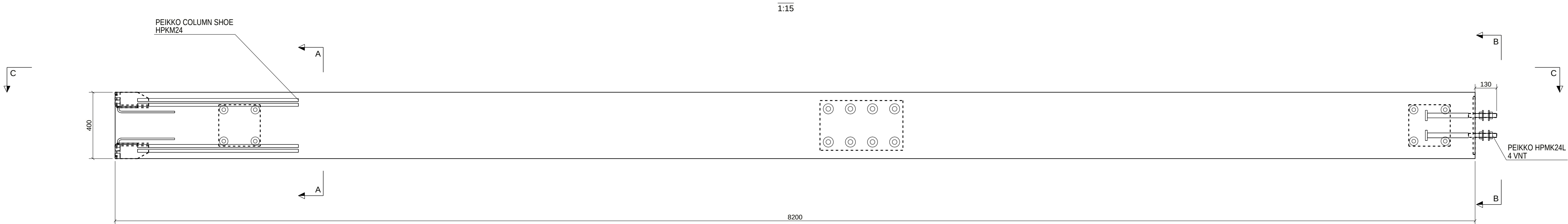
Išdetinui detalui sąrašas			K-31		1 Gaminiui kiekis	
Detales	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Turis (m³)	Svoris (kg)
	400*400	C35/45	1	8150.0	1.30	3129.6
	400*400	C35/45	1	400.0	0.06	153.6
p-39	BL12*350	S355J2	1	350.0		11.5
pl-8	PL12*320	S355J2	1	320.0		9.6
HPKM24			4			3.5
HPM24L			8			0.6
WS250x250-220			2			12.3
WS300x500-280			1			35.3
Viso					1.37	3334.2



Sarasas				
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)
K-33	400*400	1	1.31	1.31
Viso:		1		1

I detiniu detaliu sarašas						
		K-33				
		1 Gaminiu kiekis				
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Turis (m³)	Svoris (kg)
p-39	400*400	C35/45	1	8150.0	1.30	3129.6
	BL12*350	S355J2	1	350.0		
HPKM24			4			11.5
HPKM24L			4			3.5
			4			0.6
WELDA200x200-162			4			3.8
Viso					1.30	3143.2



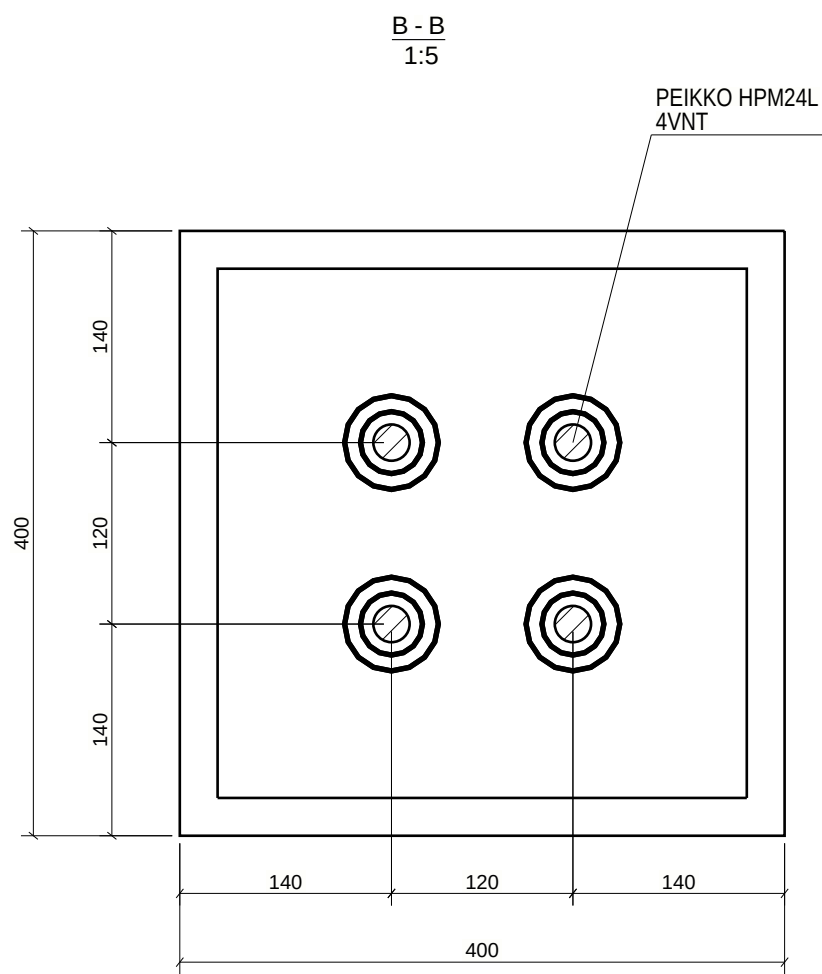
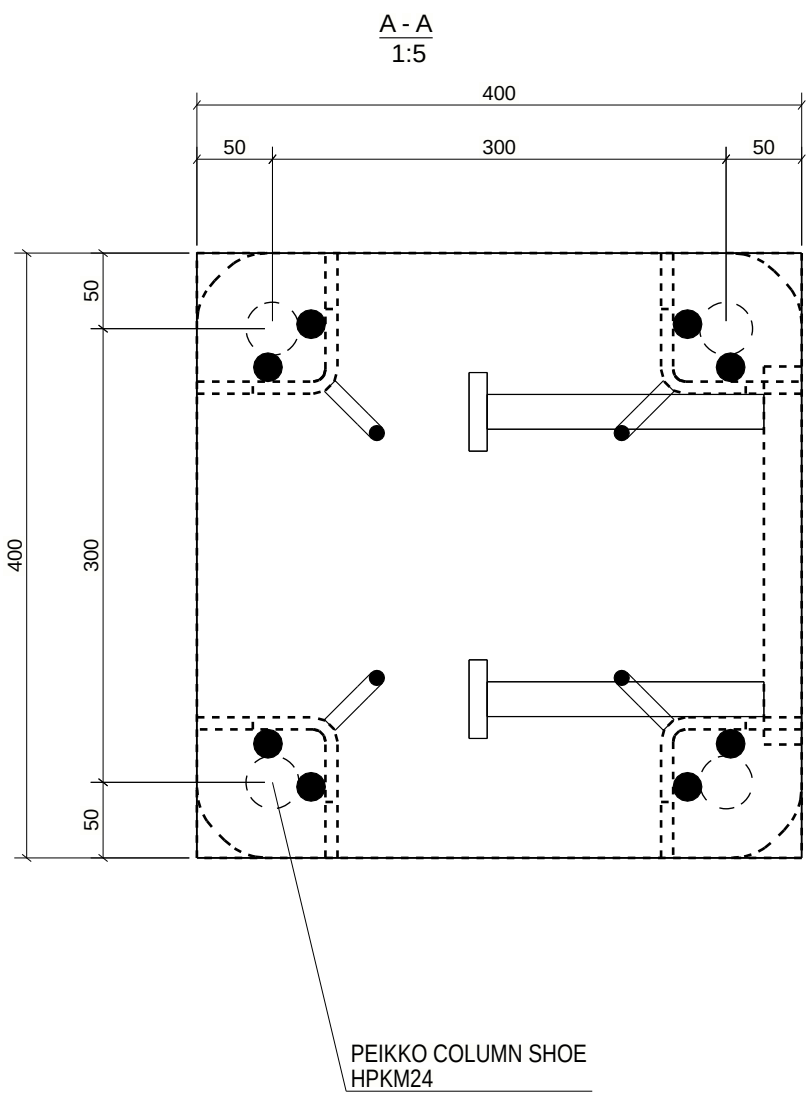
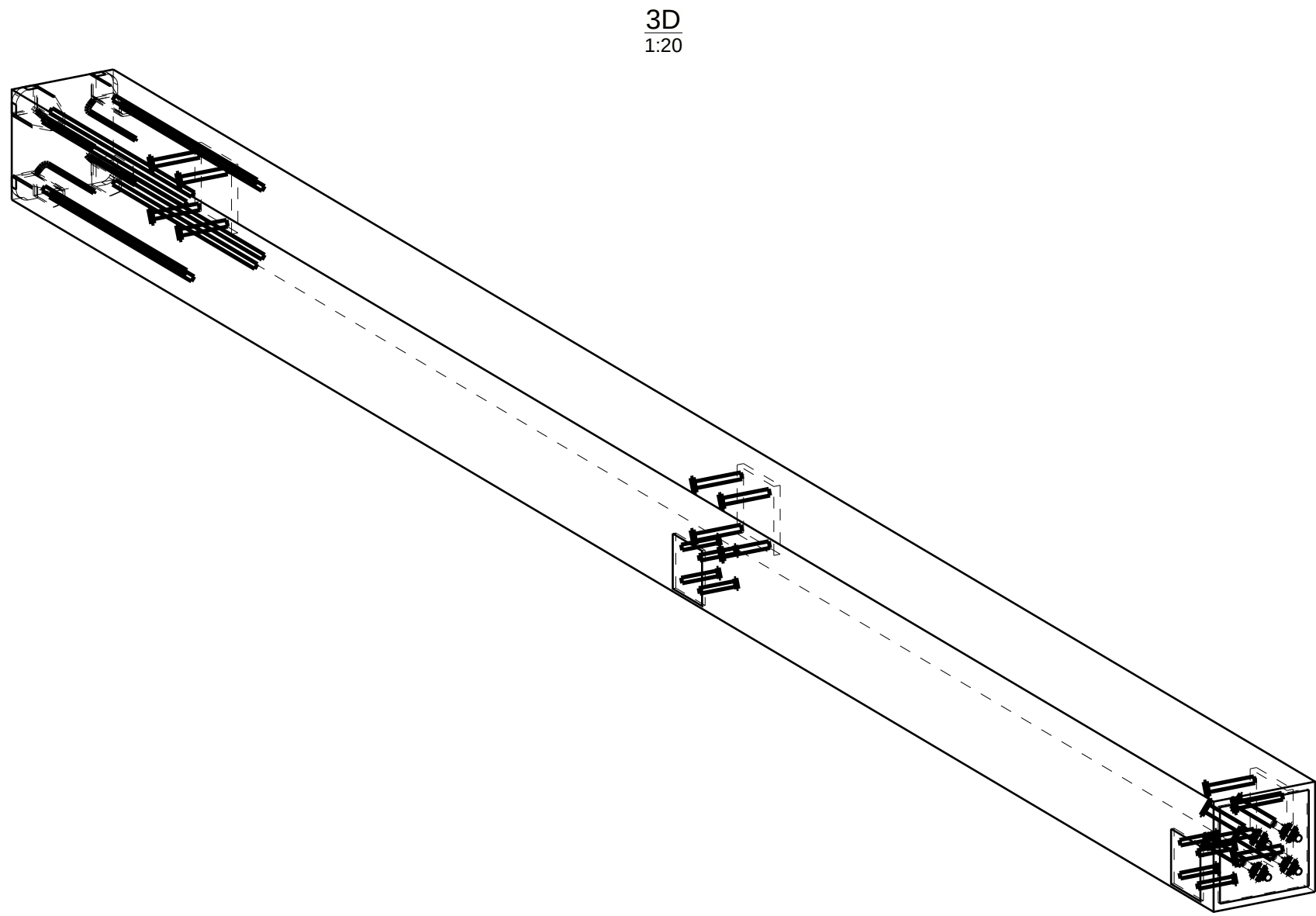
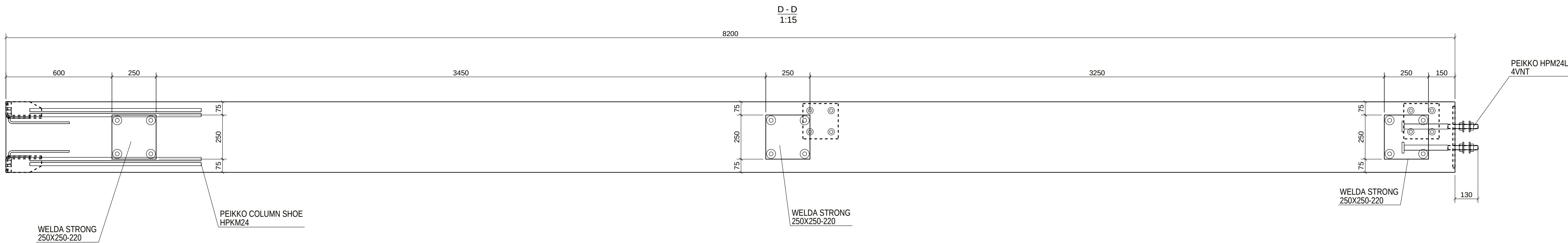
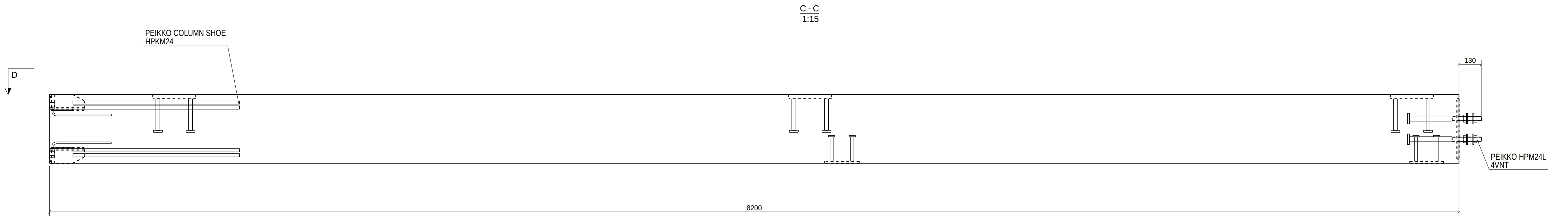
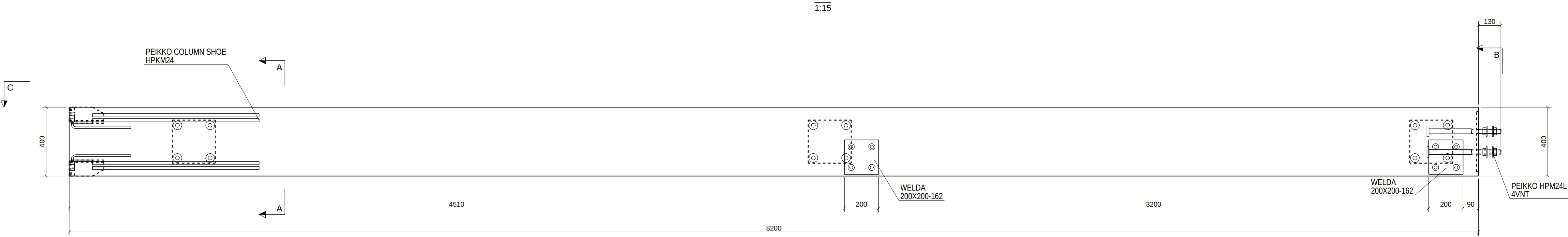


Sarasas					
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)	
K-34	400*400	1	1.32	1.32	
Viso:		1		1	

I detiniu detaliu sarašas		K-34				1 Gaminiu kiekis	
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Turis (m³)	Svoris (kg)	
	400*400	C35/45	1	8200.0	1.31	3148.8	
p-39	BL12*350	S355J2	1	350.0		11.5	
HPKM24			4			3.5	
HPM24L			4			0.6	
WS250x250-220			2			12.3	
WS300x500-280			1			35.3	
Viso					1.31	3193.0	

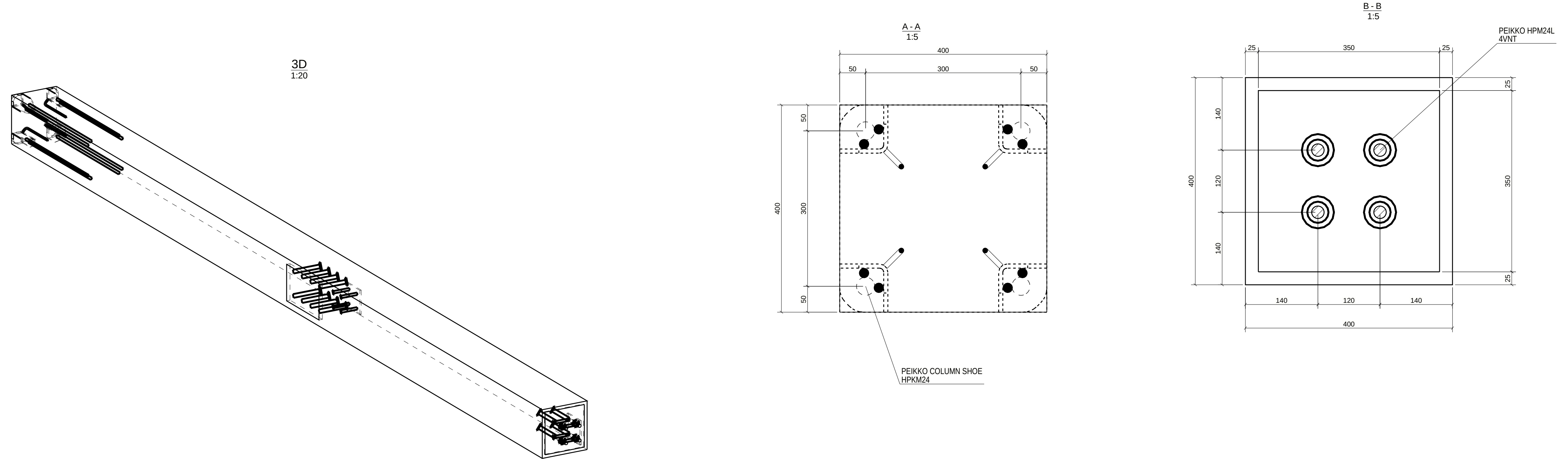
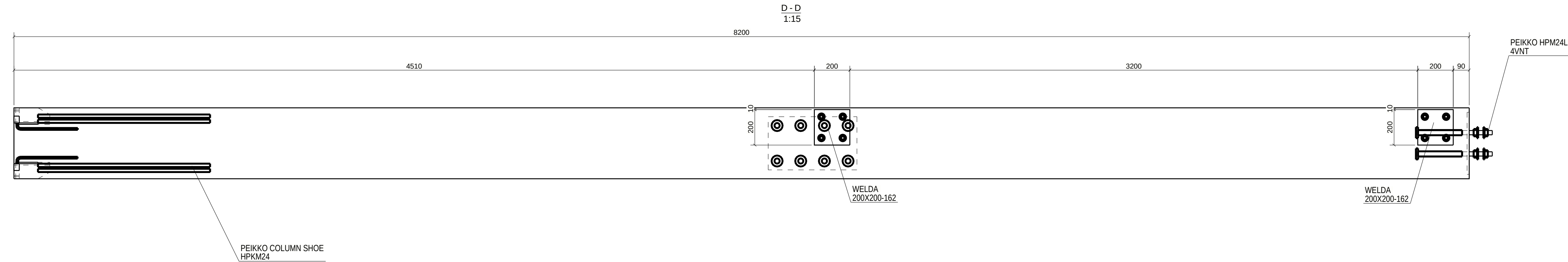
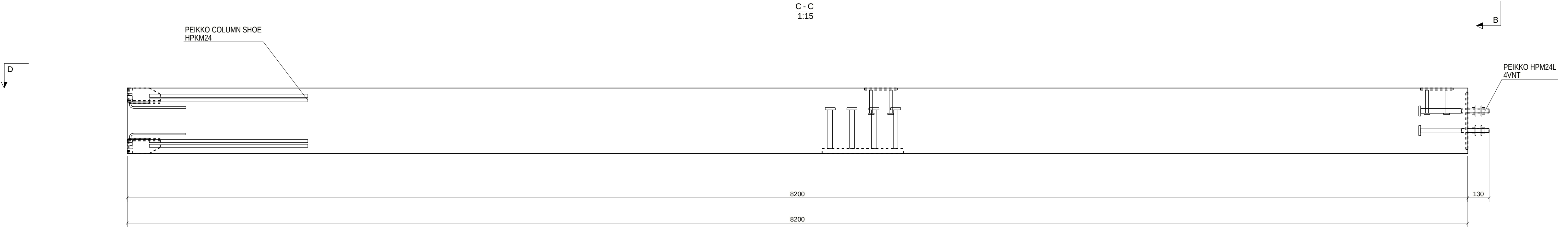
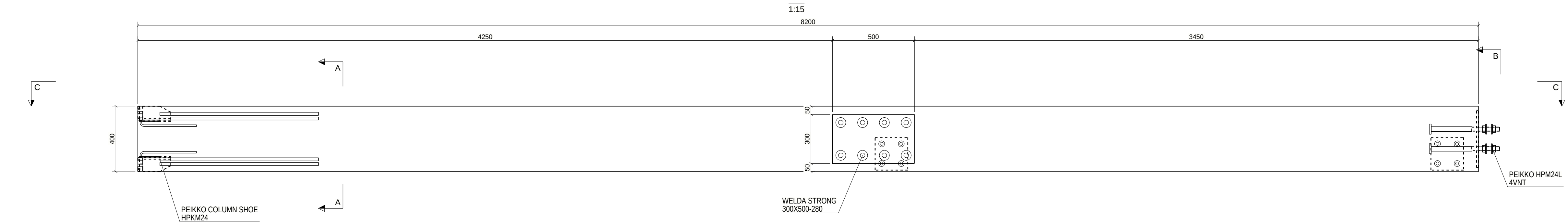
Sarasas				
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)
K-35	400*400	1	1.32	1.32
Viso:		1		1

I detiniu detaliu sarašas		K-35			
		1 Gaminiu kiekis			
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Turis (m³)
	400*400	C35/45	1	8200.0	1.31
p-39	BL12*350	S355J2	1	350.0	11.5
HPKM24			4		3.5
HPM24L			4		0.6
WELDA200x200-162			2		3.8
WS250x250-220			3		12.3
Viso					3170.9



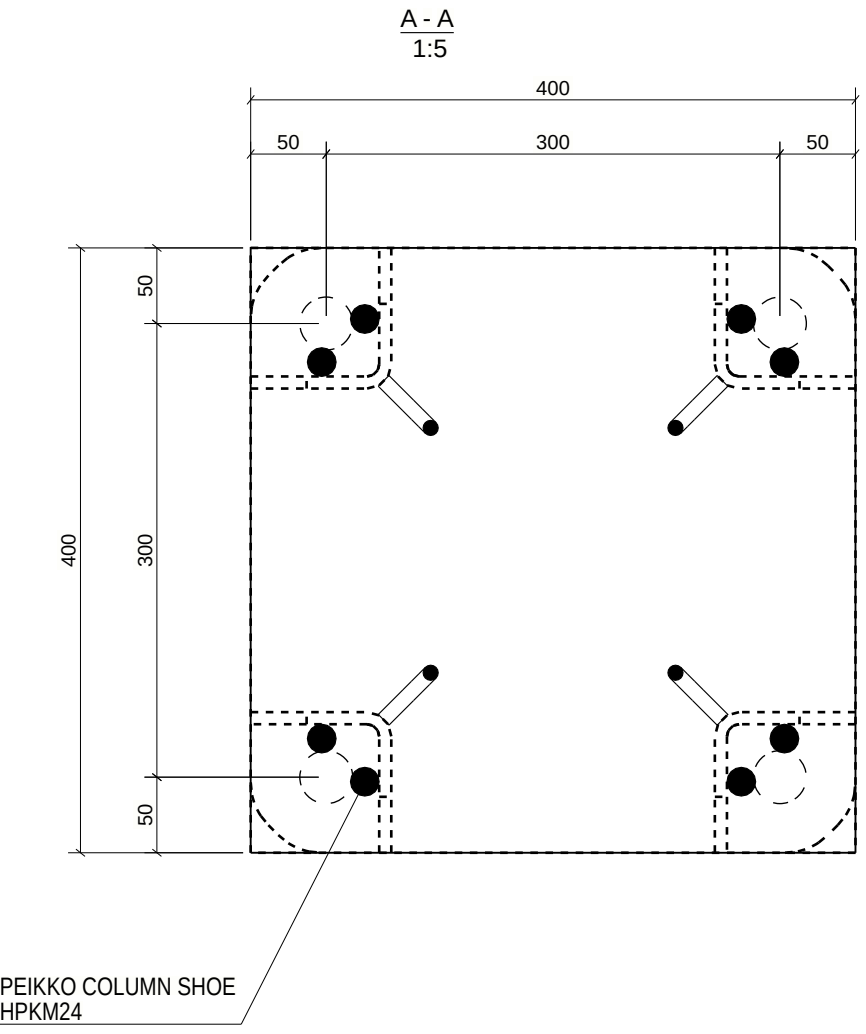
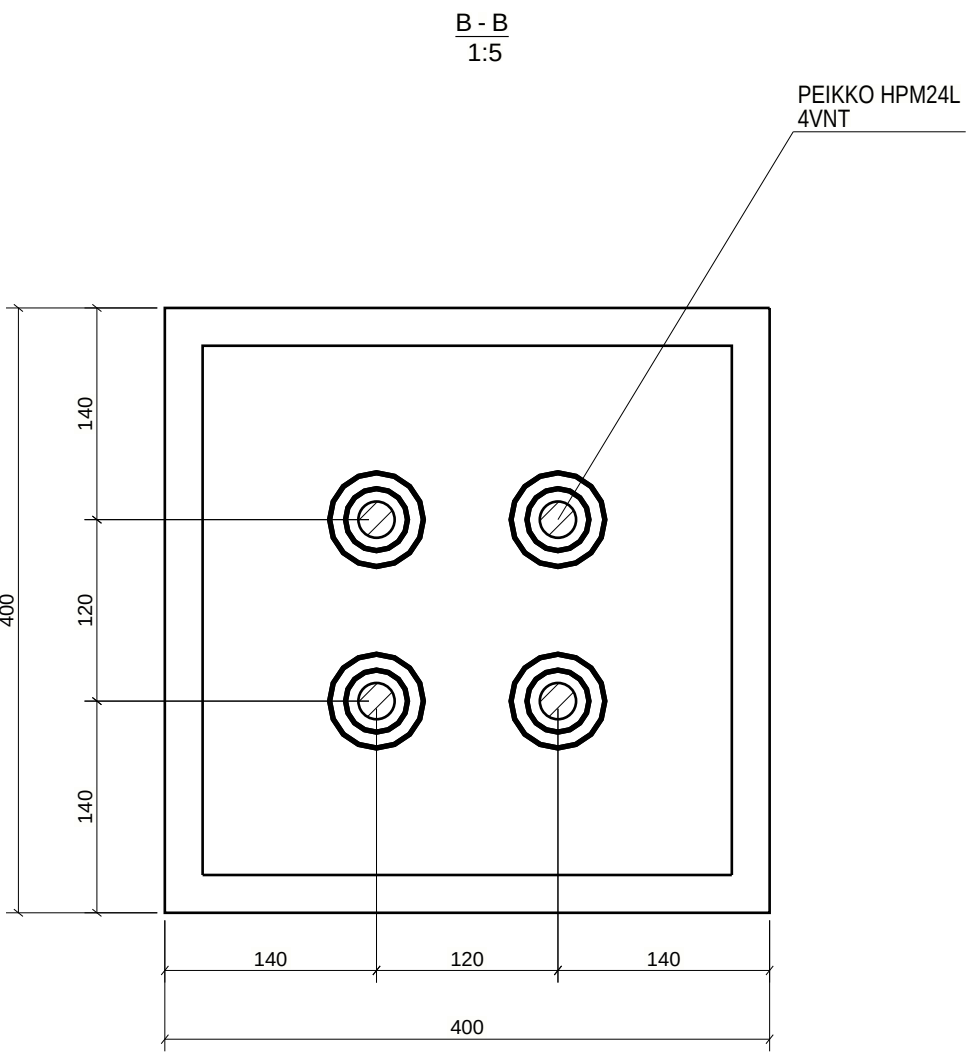
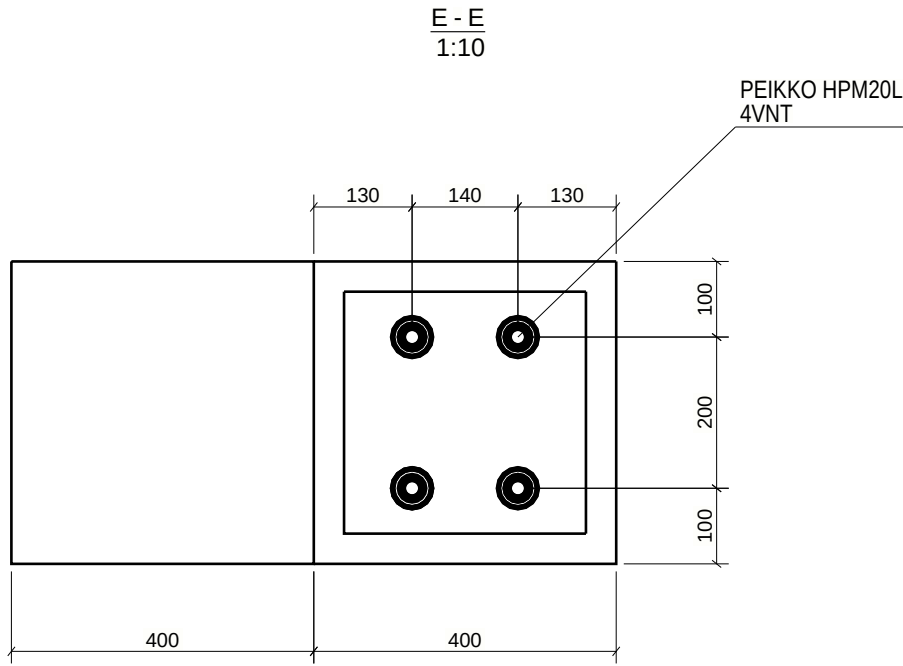
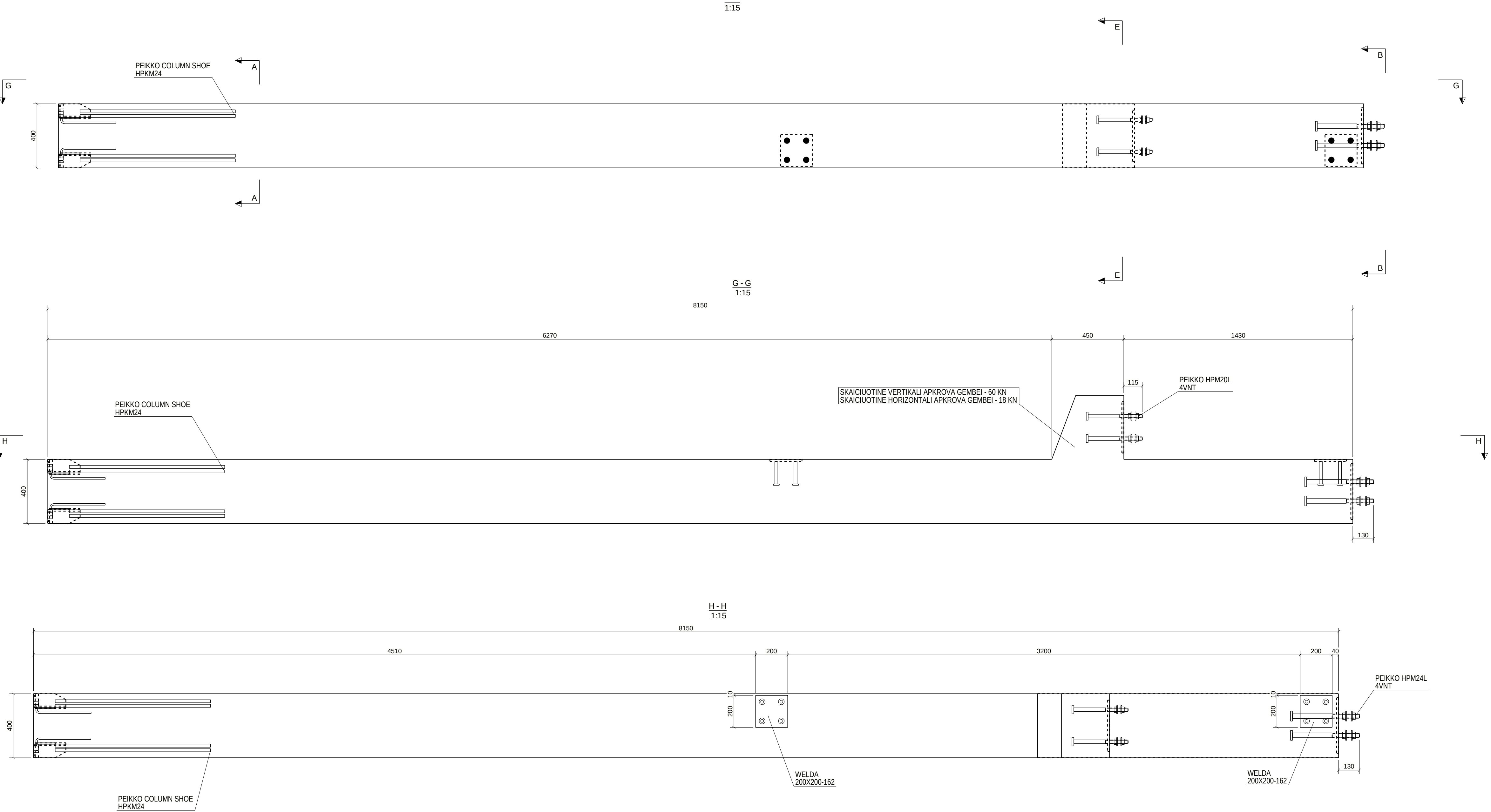
Sarasas				
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)
K-36	400*400	1	1.32	1.32
Viso:		1		1

I detiniu detaliu sarašas				
		K-36		
		1 Gaminiu kiekis		
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Svoris (kg)
	400*400	C35/45	1	8200.0
p-39	BL12*350	S355J2	1	350.0
HPKM24			4	3.5
HPM24L			4	0.6
WELDA200x200-162			2	3.8
WS300x500-280			1	35.3
Viso			1.31	3187.1

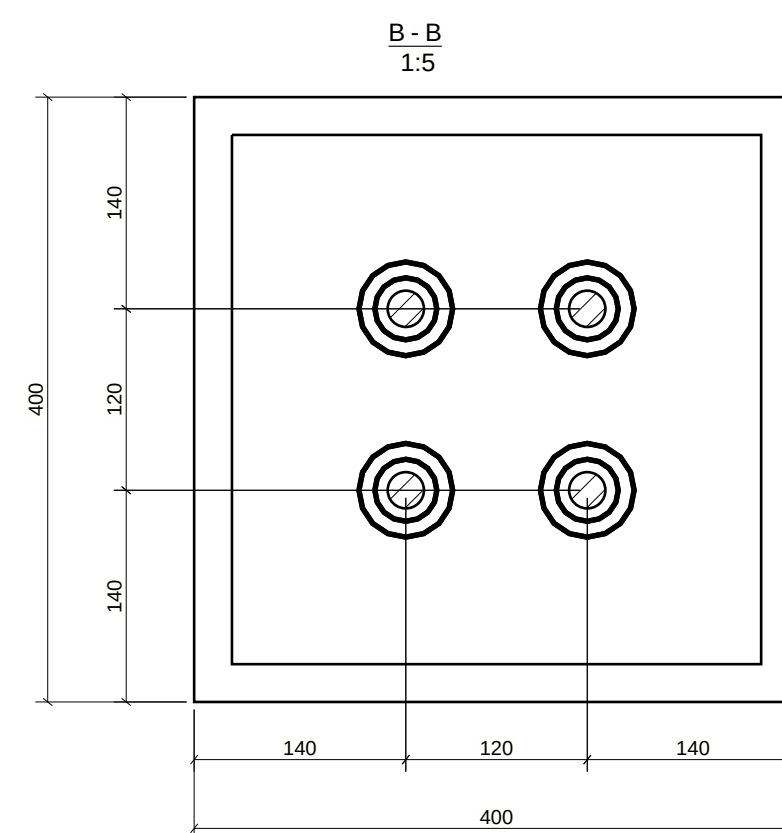
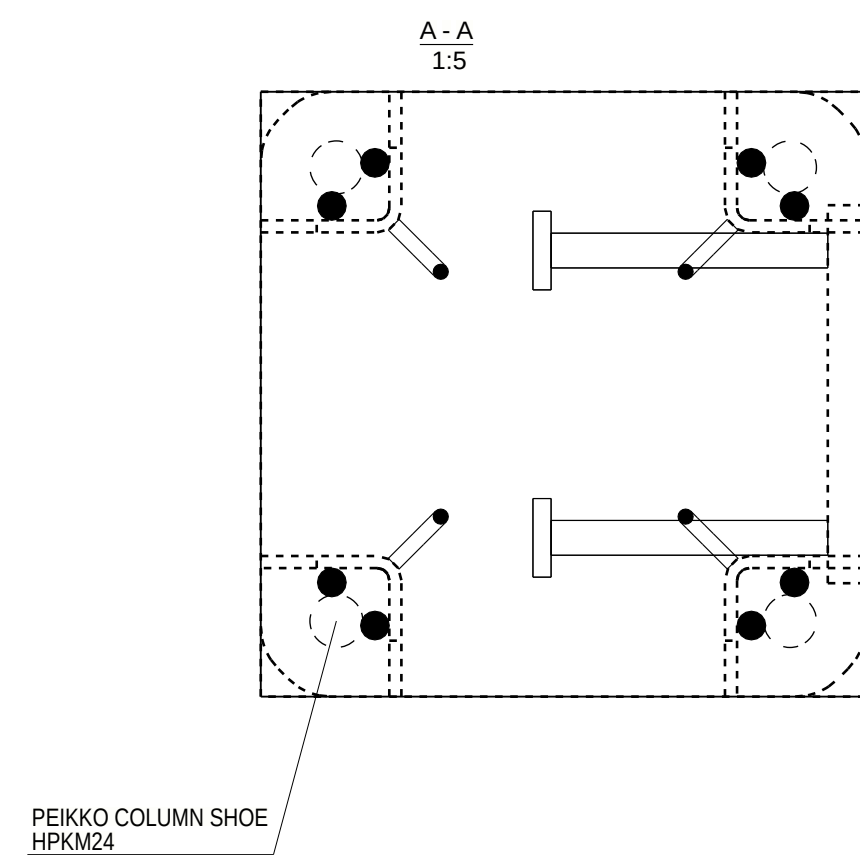
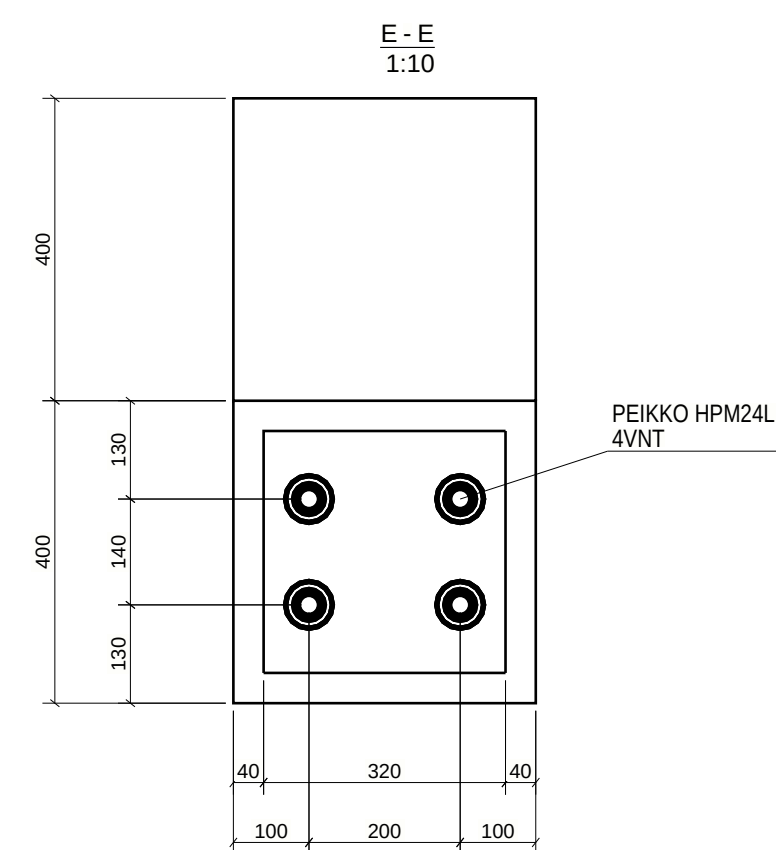


Sarasas				
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)
K-37	400*400	1	1.37	1.37
Viso:		1		1

I detiniu detaliu sarašas		K-37			
		1 Gaminiu kiekis			
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Svoris (kg)
	400*400	C35/45	1	8150.0	1.30
	400*400	C35/45	1	450.0	0.06
p-39	BL12*350	S355J2	1	350.0	11.5
pl-8	PL12*320	S355J2	1	320.0	9.6
HPKM24			4		3.5
HPM20L			4		0.3
HPM24L			4		0.6
WELDA200x200-162			2		3.8
Viso				1.36	3294.1

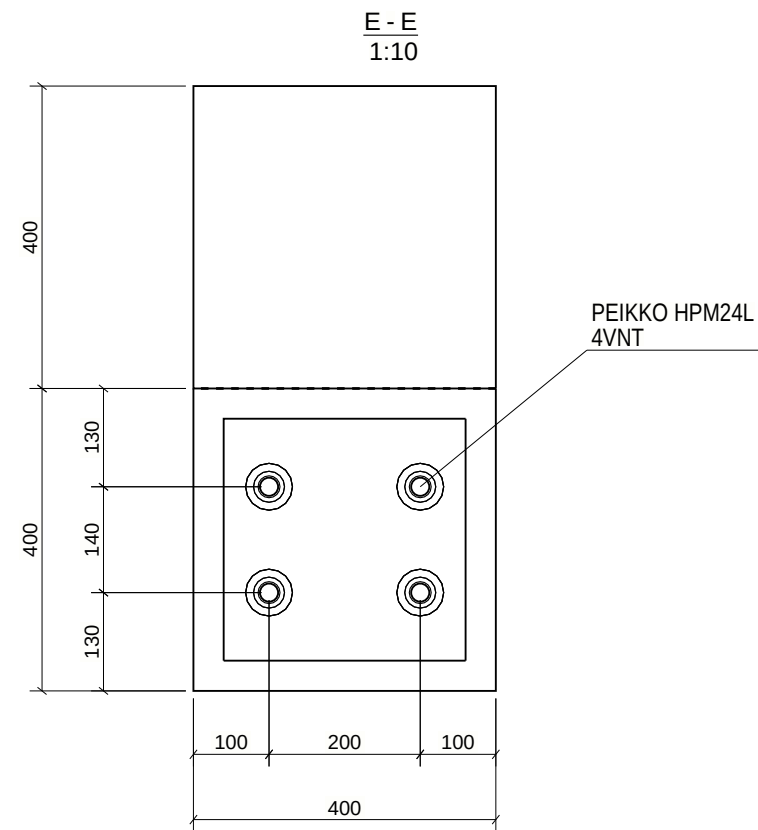
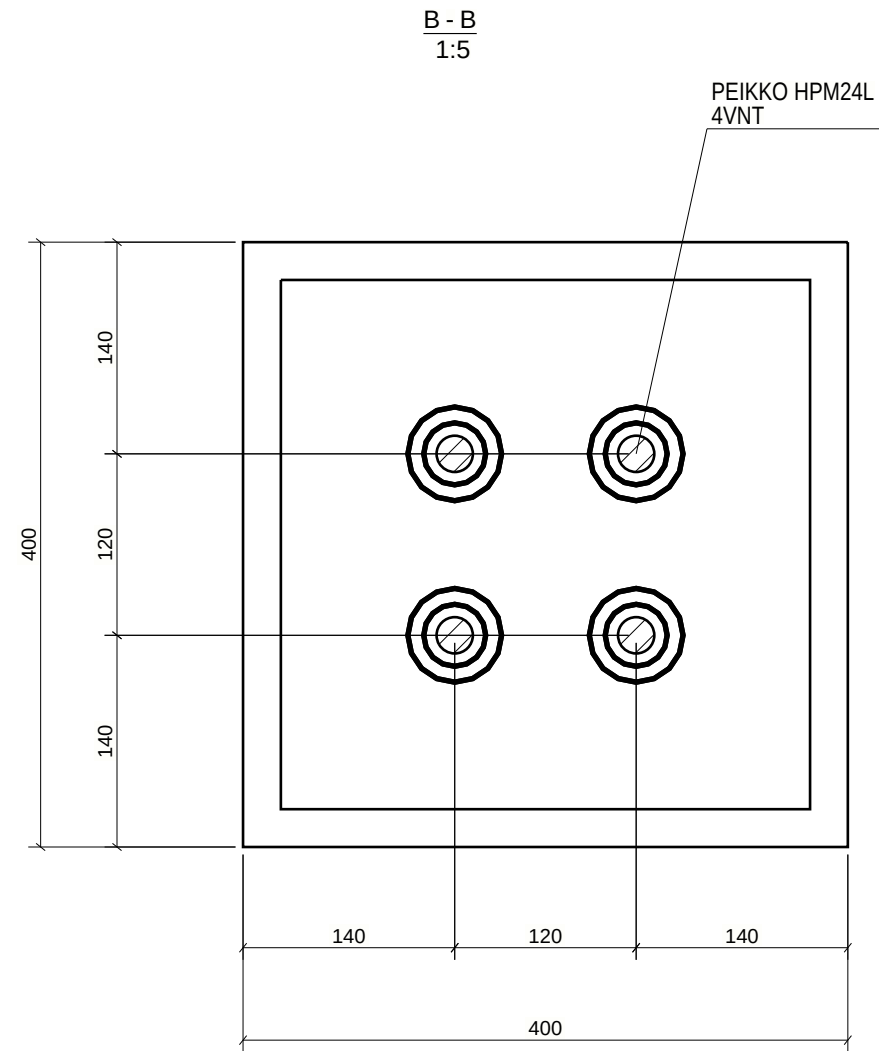
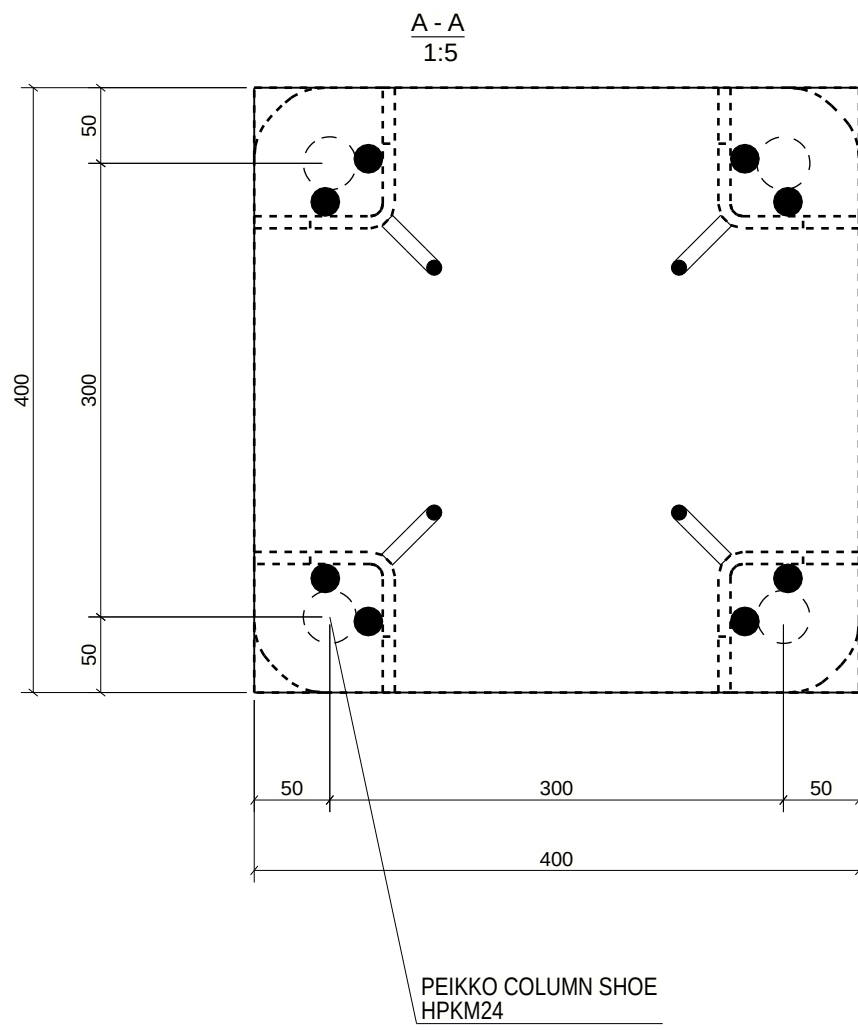
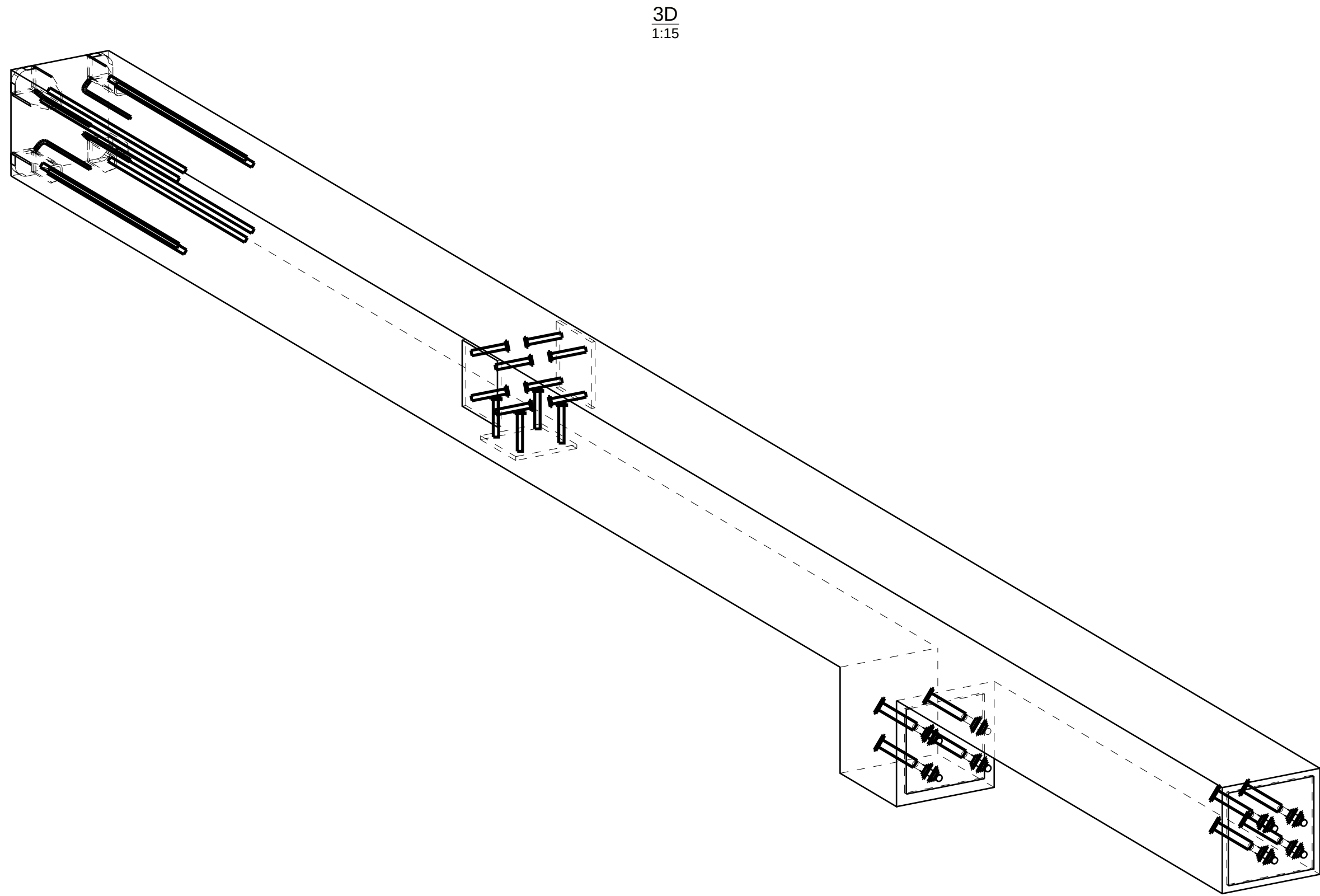
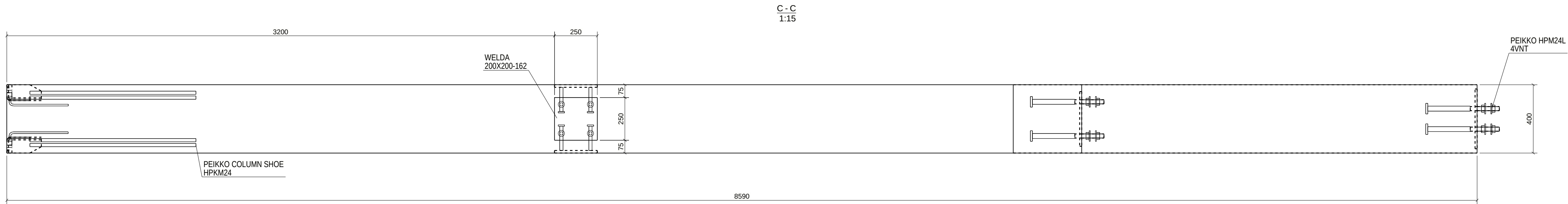
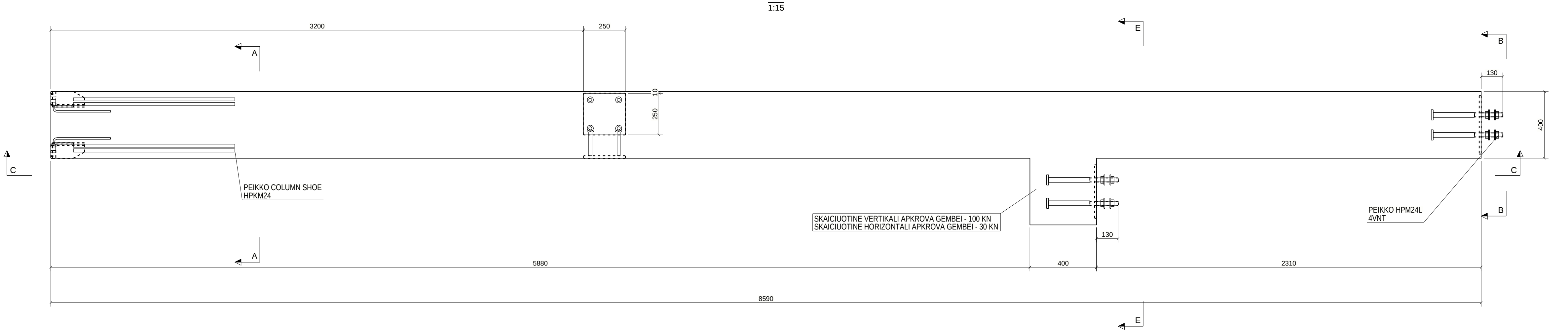


Išdetinui detalui sąrašas			K-41		1 Gaminiui kiekis	
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (m³)	Turis (m³)	Svoris (kg)
	400*400	C35/45	1	8590.0	1.37	3298.6
	400*400	C35/45	1	400.0	0.06	153.6
p-39	BL12*350	S355J2	1	350.0		11.5
pl-8	PL12*320	S355J2	1	320.0		9.6
HPKM24			4			3.5
HPM24L			8			0.6
WS250x250-220			2			12.3
WS300x500-280			1			35.3
Viso				1.44		3503.2

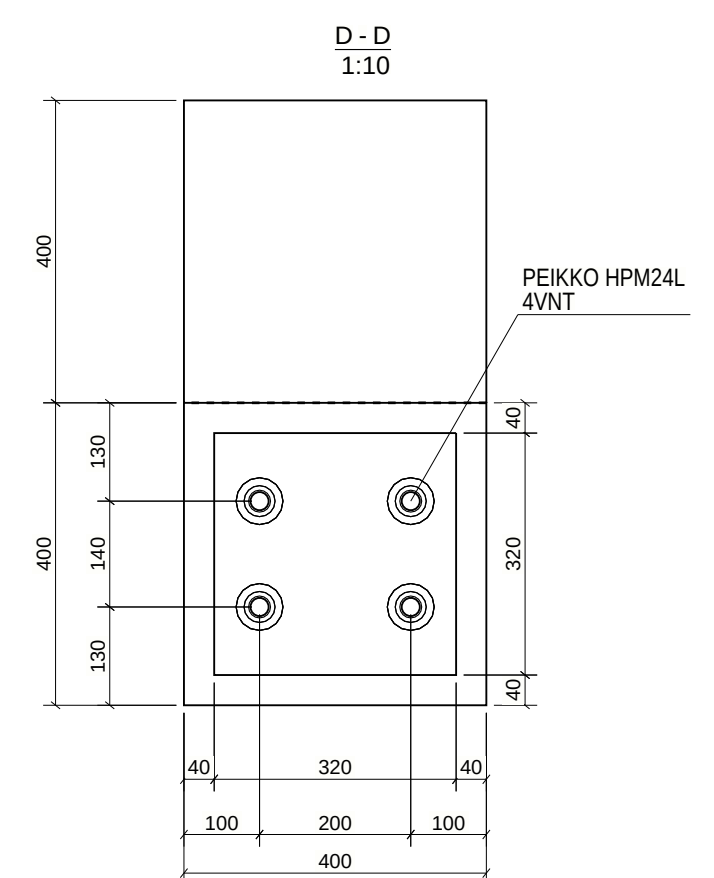
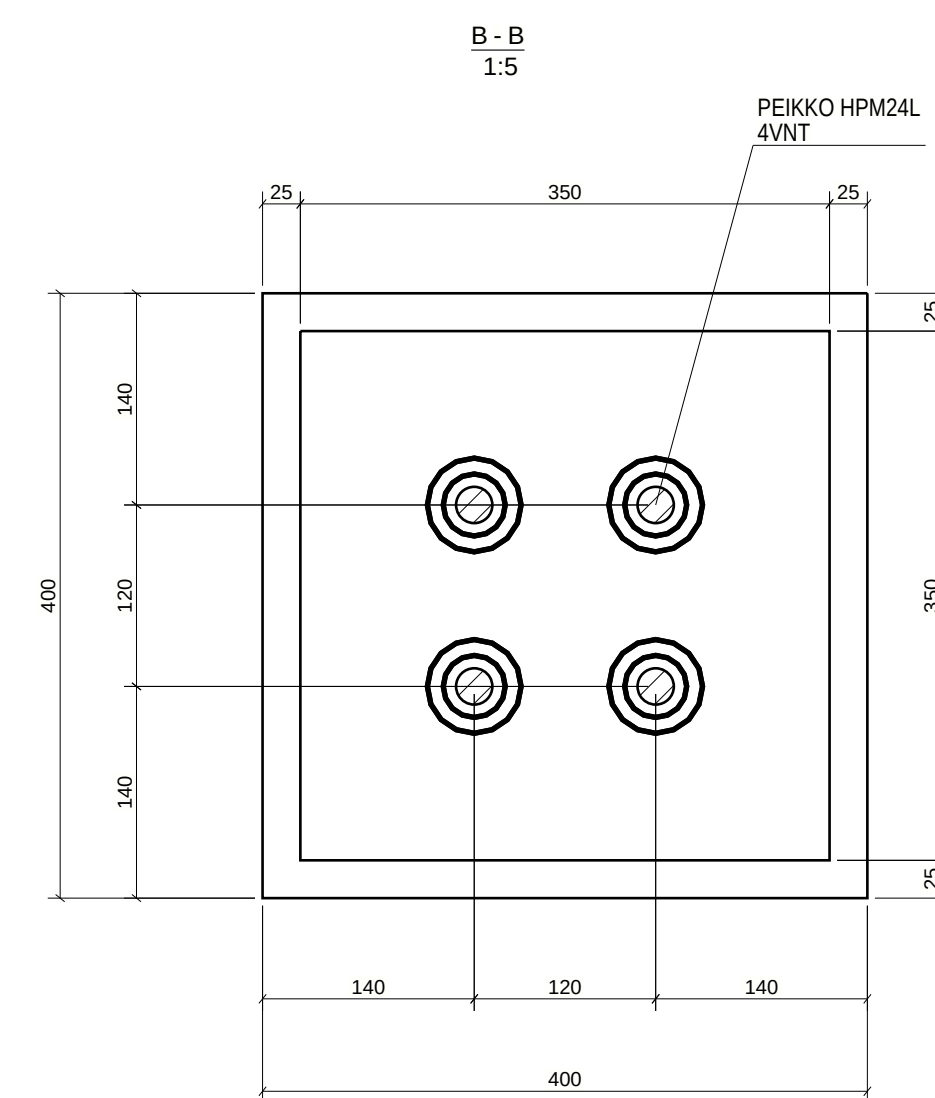
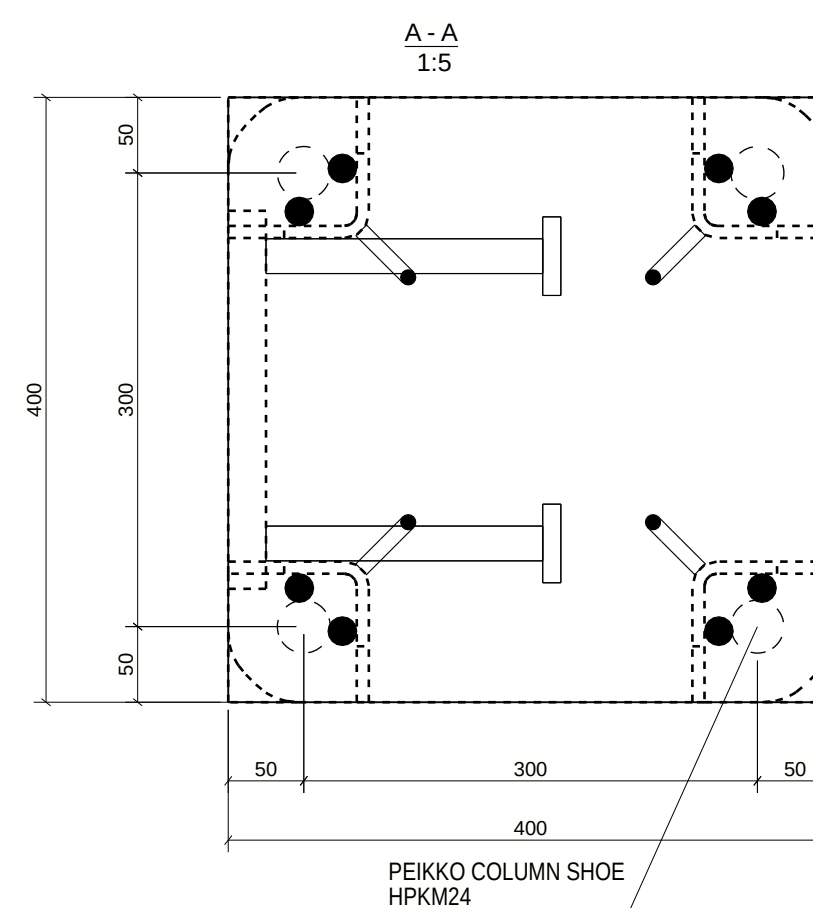
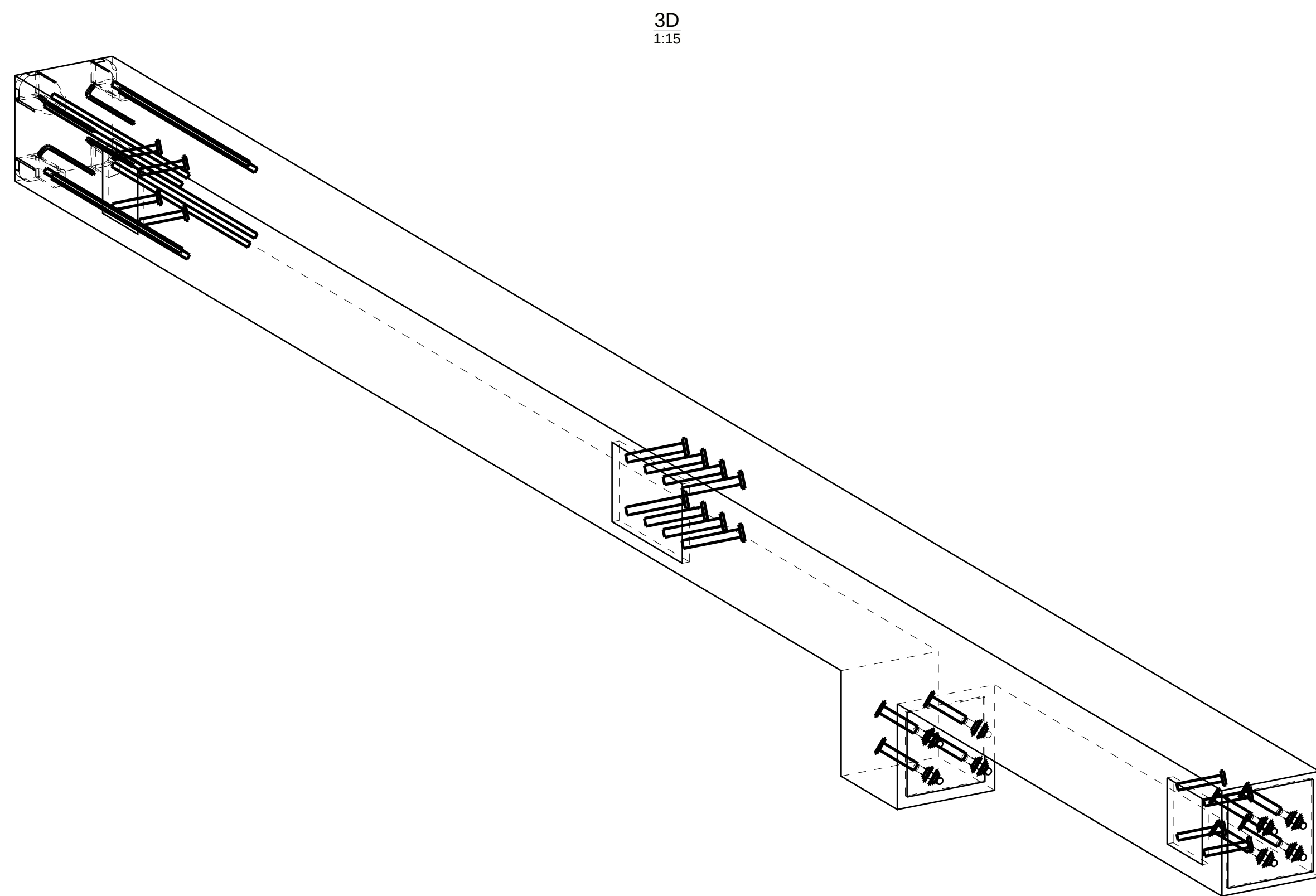
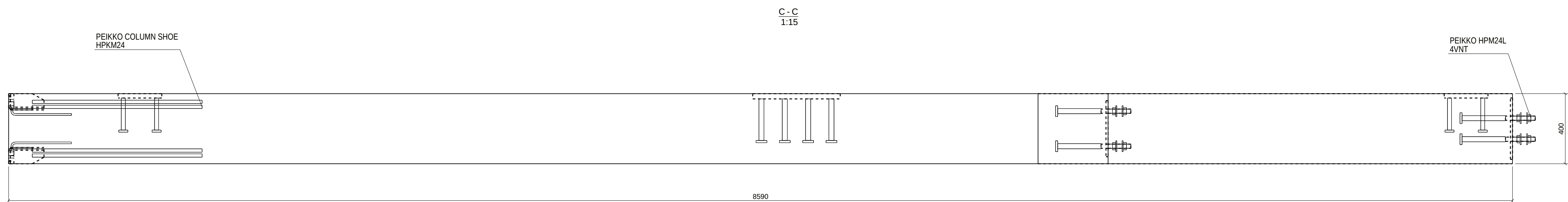


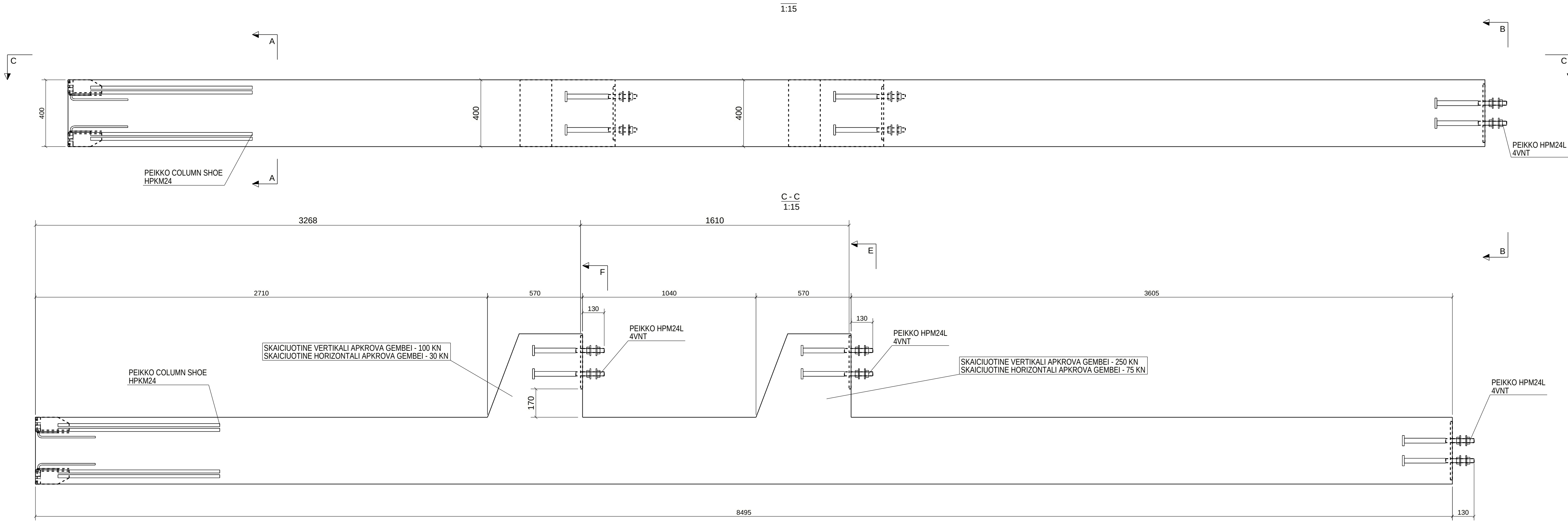
Sarasas				
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)
K-42	400*400	1	1.45	1.45
Viso:		1		1

I detiniu detalii sarašas		K-42			
		1 Gaminiu kiekis			
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Turis (m³)
	400*400	C35/45	1	8590.0	1.37
	400*400	C35/45	1	400.0	0.06
p-39	BL12*350	S355J2	1	350.0	11.5
pl-8	PL12*320	S355J2	1	320.0	9.6
HPKM24			4		3.5
HPM24L			8		0.6
WELDA250x250-165			3		7.4
Viso				1.44	3475.0



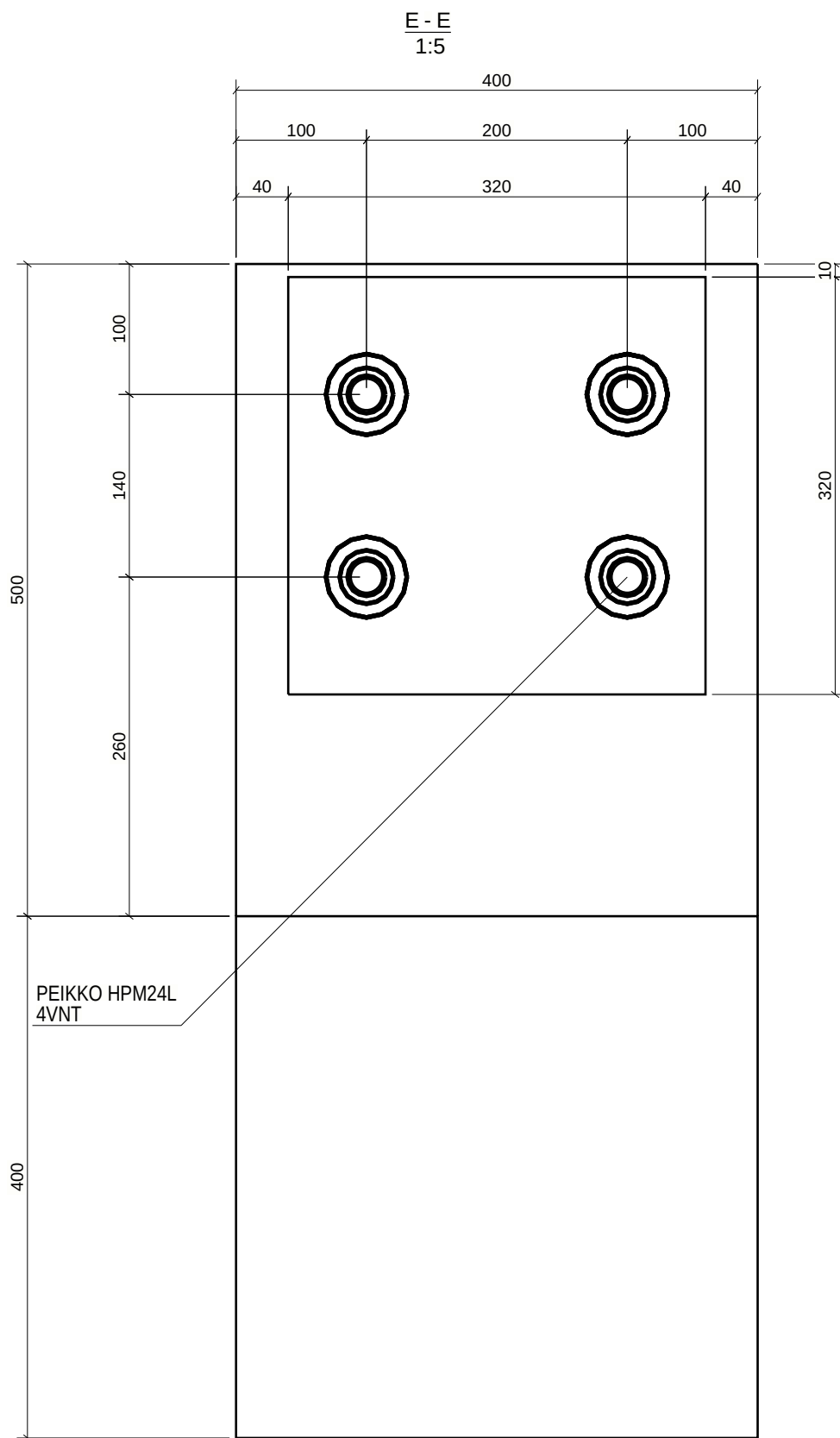
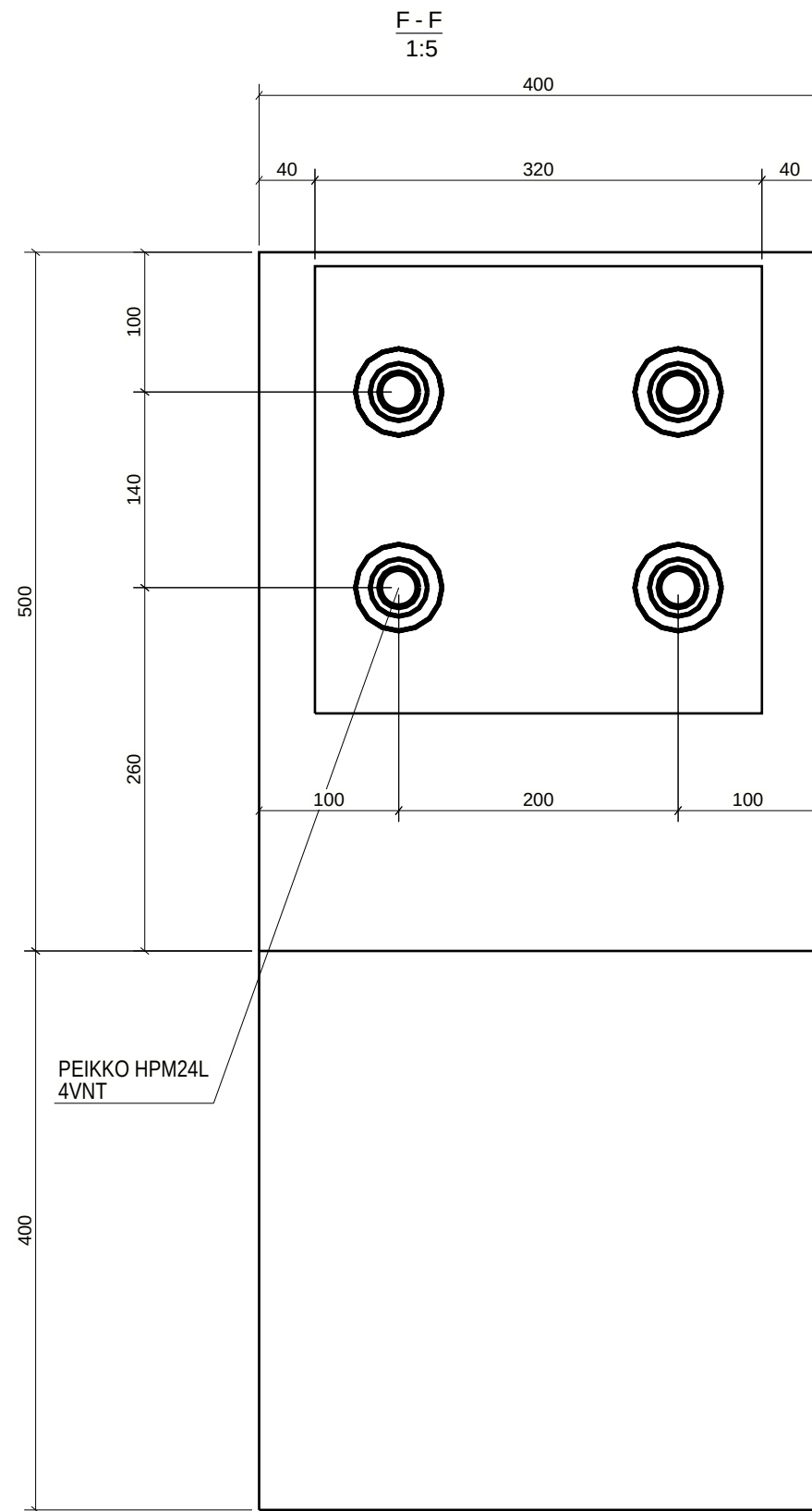
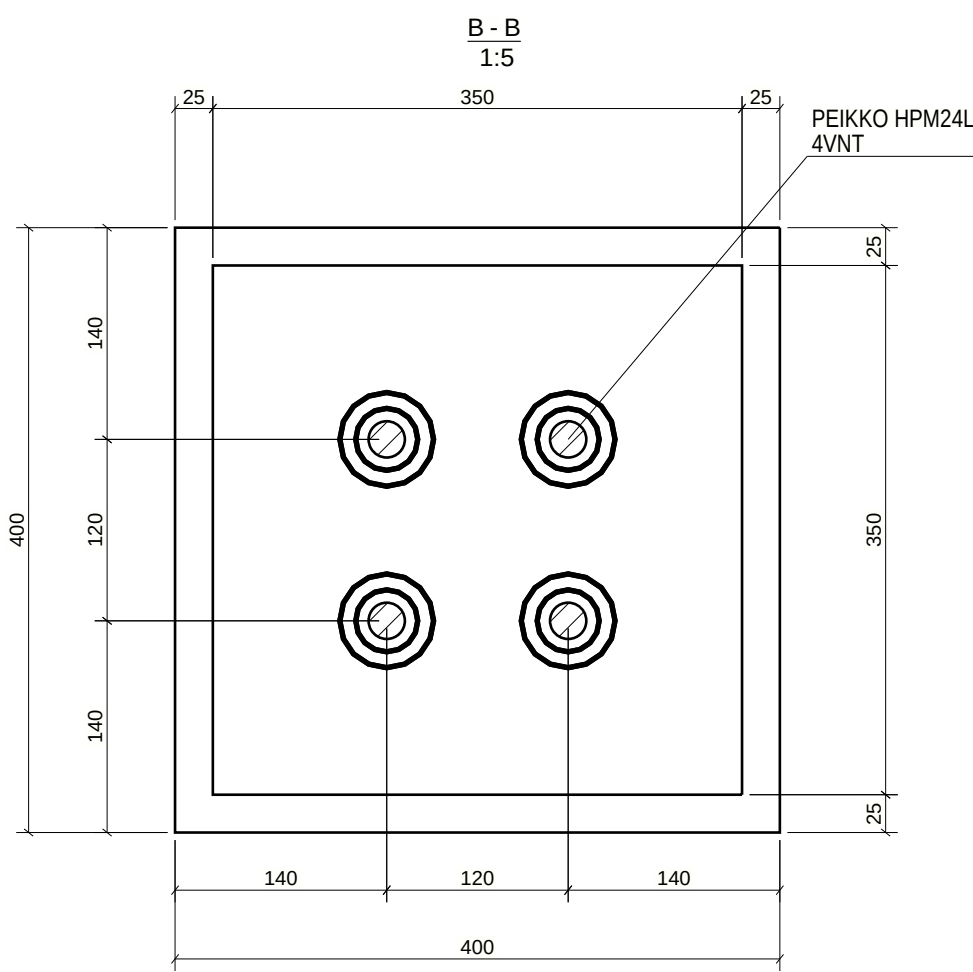
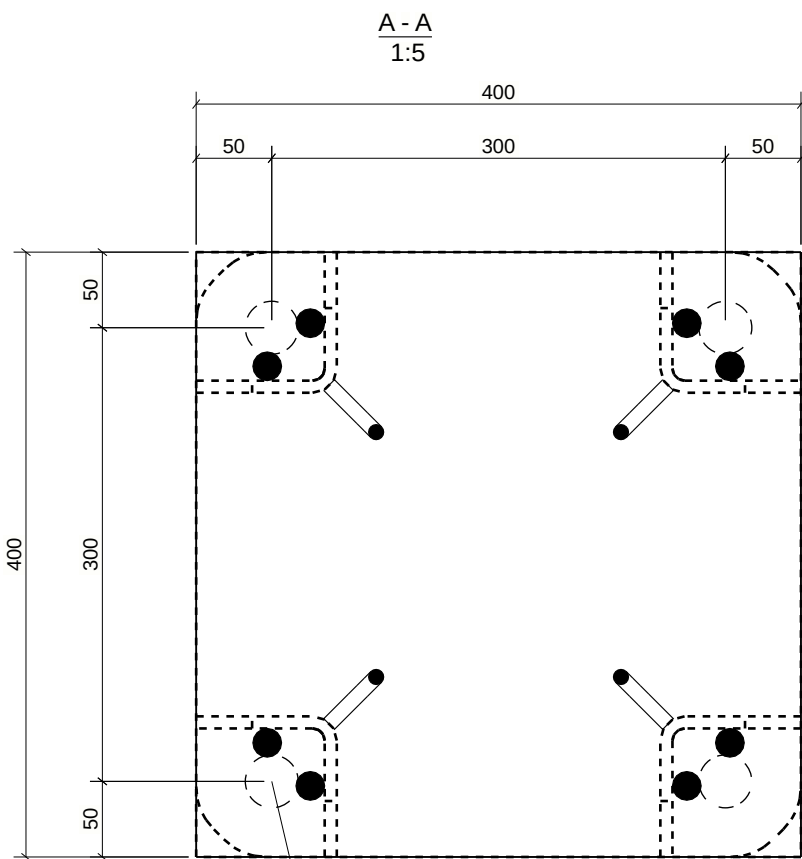
Išdetinu detalii sarařas		K-43		1 Gaminiu kiekis	
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (m³)	Svoris (kg)
	400*400	C35/45	1	8590.0	3298.6
	400*400	C35/45	1	400.0	153.6
p-39	BL12*350	S355J2	1	350.0	11.5
pl-8	PL12*320	S355J2	1	320.0	9.6
HPKM24			4		3.5
HPM24L			8		0.6
WS250x250-220			2		12.3
WS300x500-280			1		35.3
Viso				1.44	3503.2



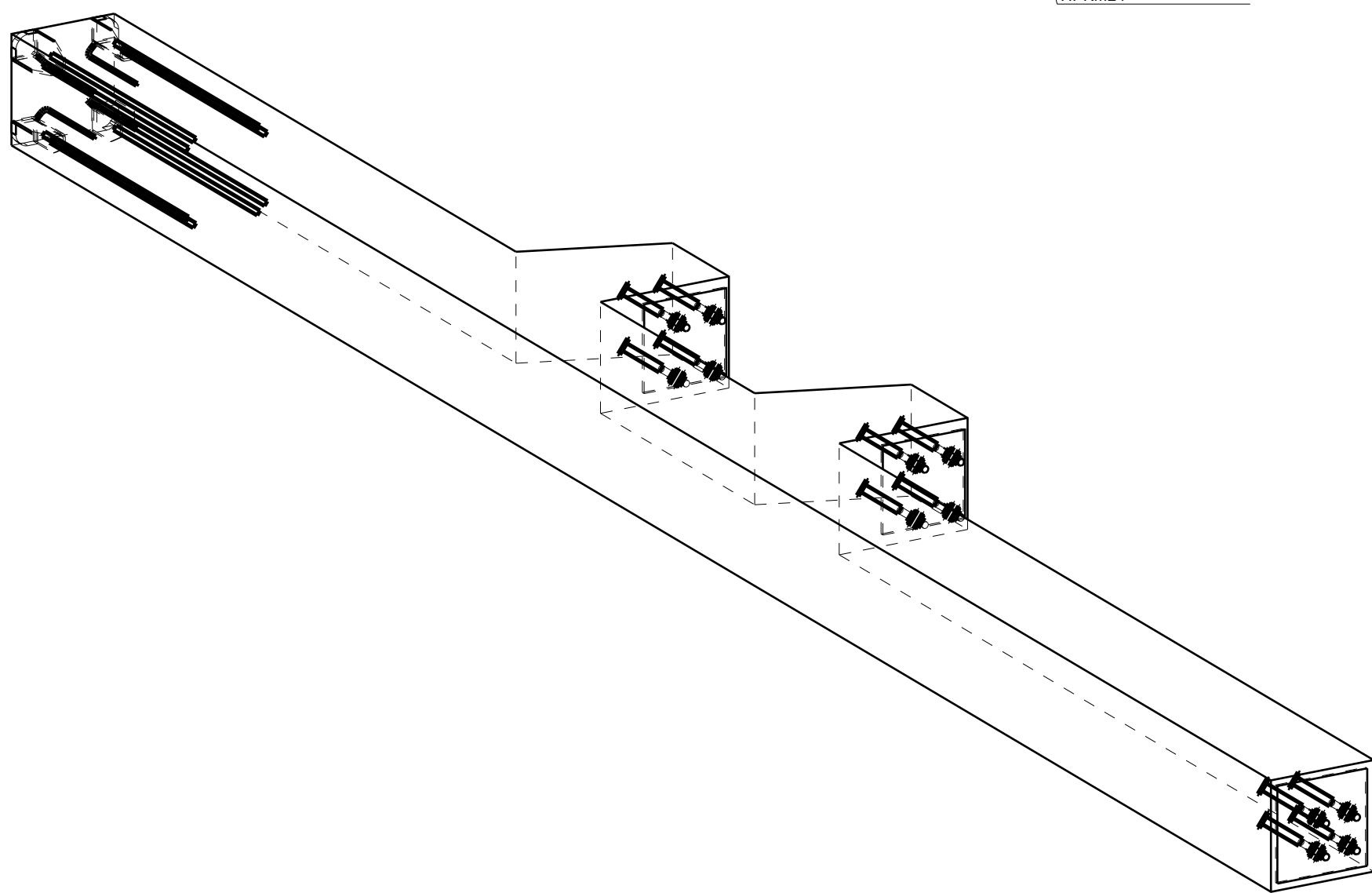


SKAICIUOTINE VERTIKALI APKROVA GEMBEI - 100 KN
SKAICIUOTINE HORIZONTALI APKROVA GEMBEI - 30 KN

SKAICIUOTINE VERTIKALI APKROVA GEMBEI - 250 KN
SKAICIUOTINE HORIZONTALI APKROVA GEMBEI - 75 KN



3D
1:20

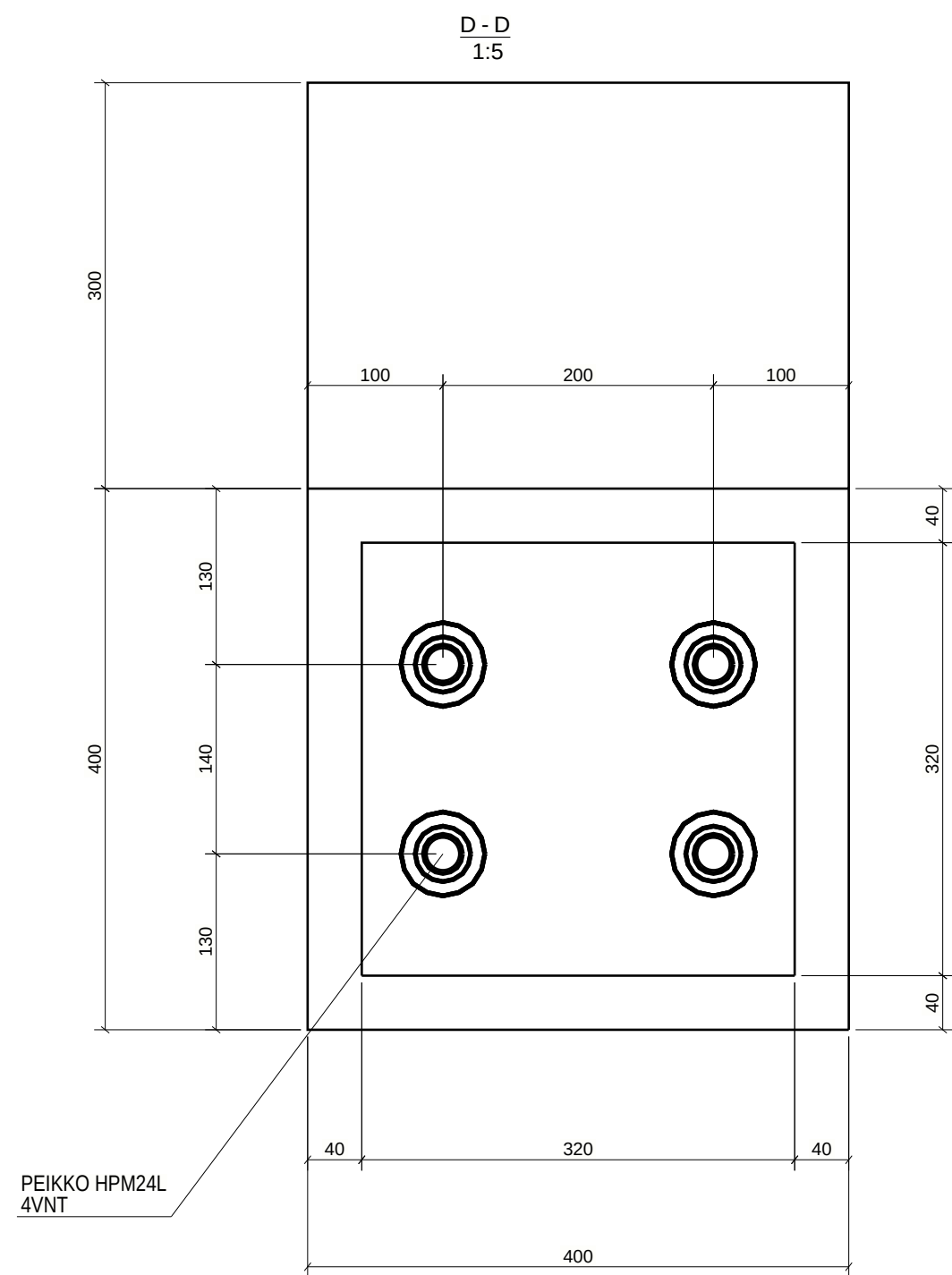
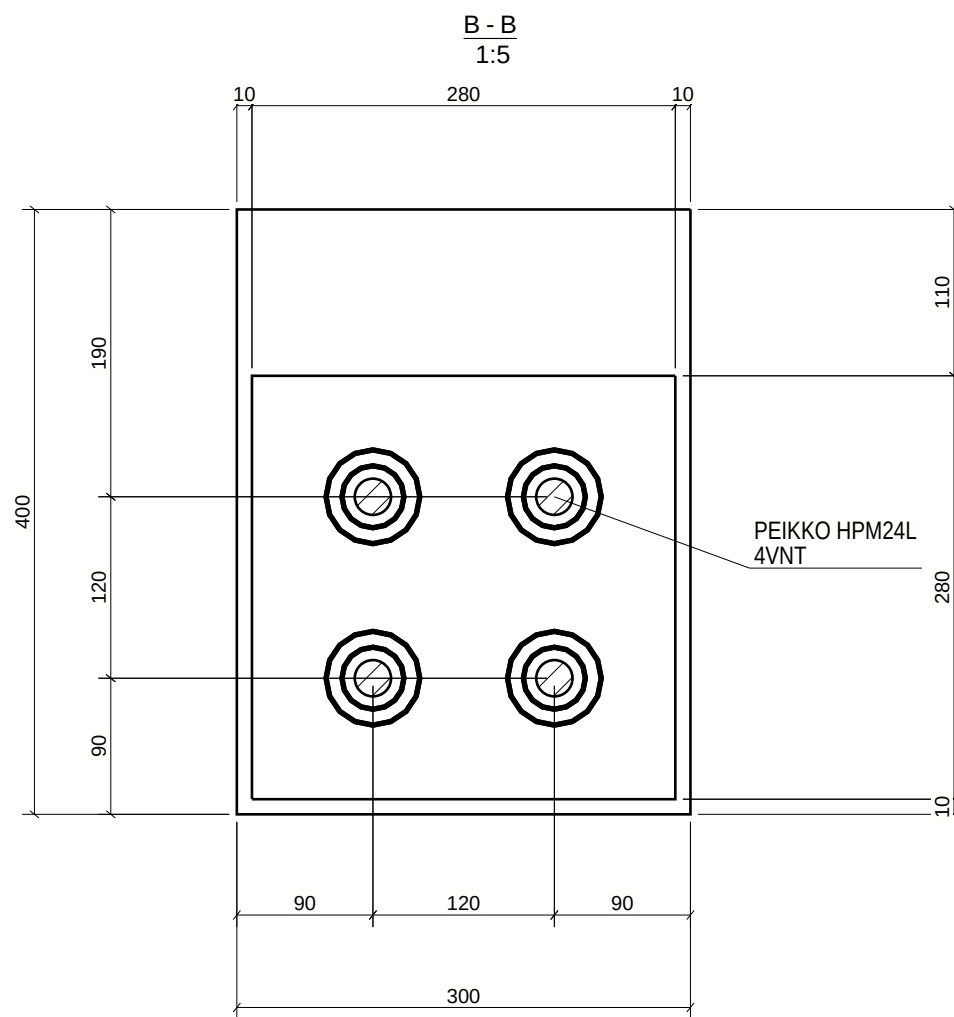
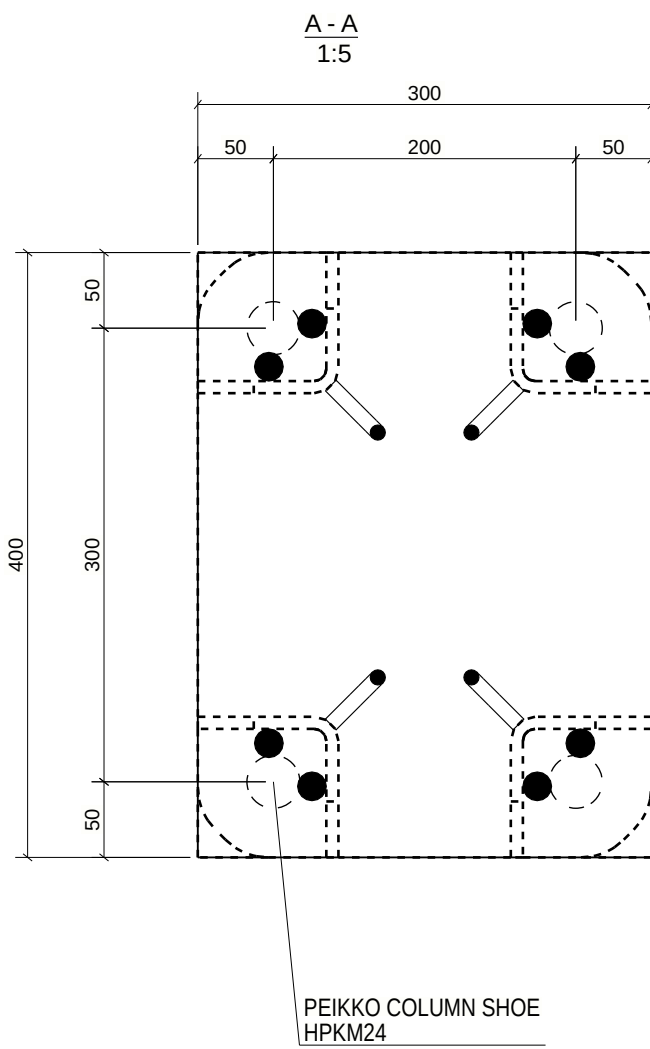
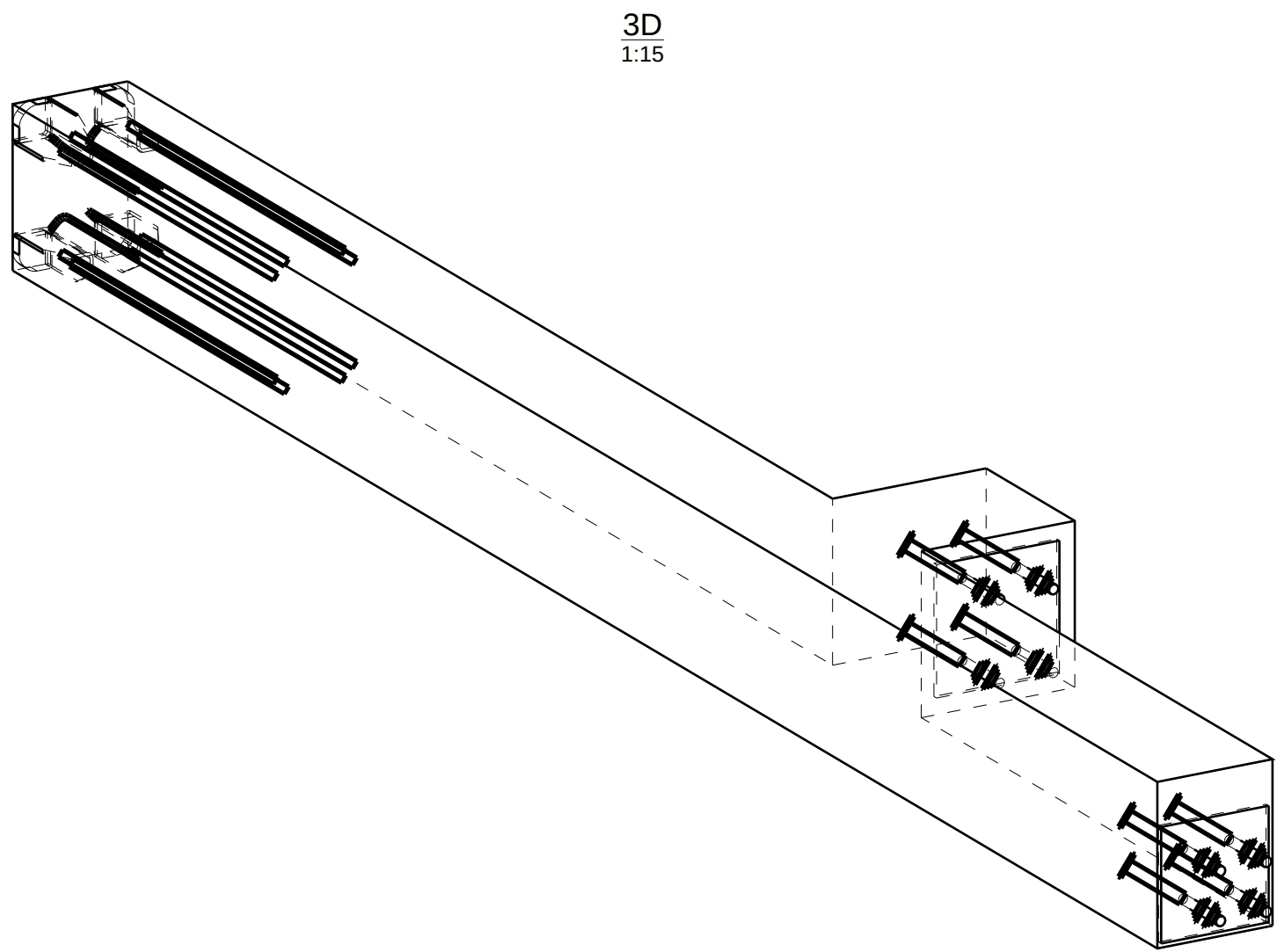
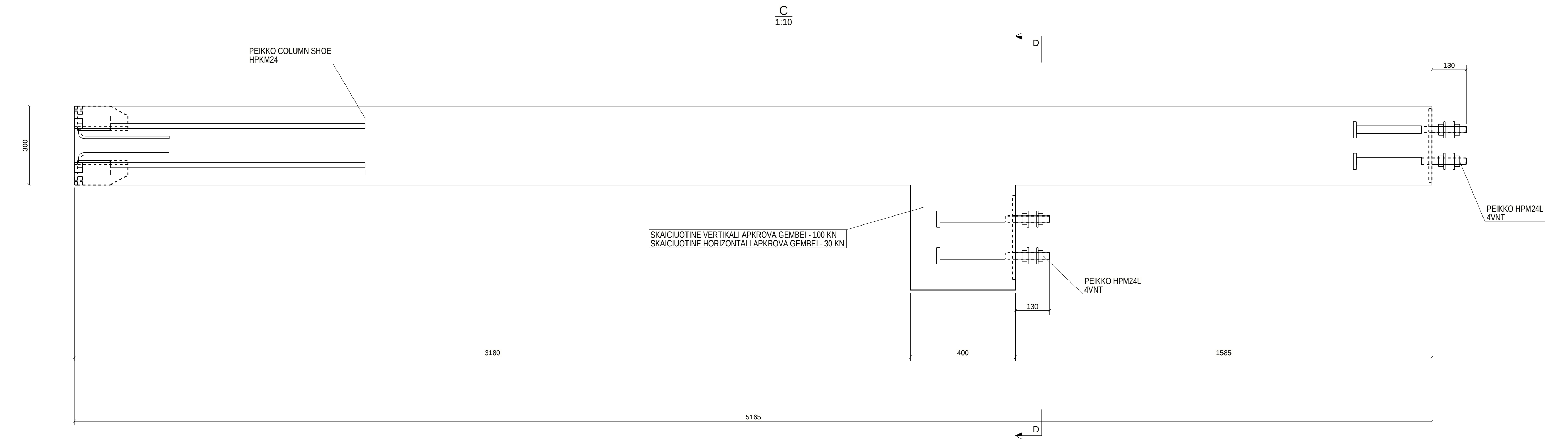
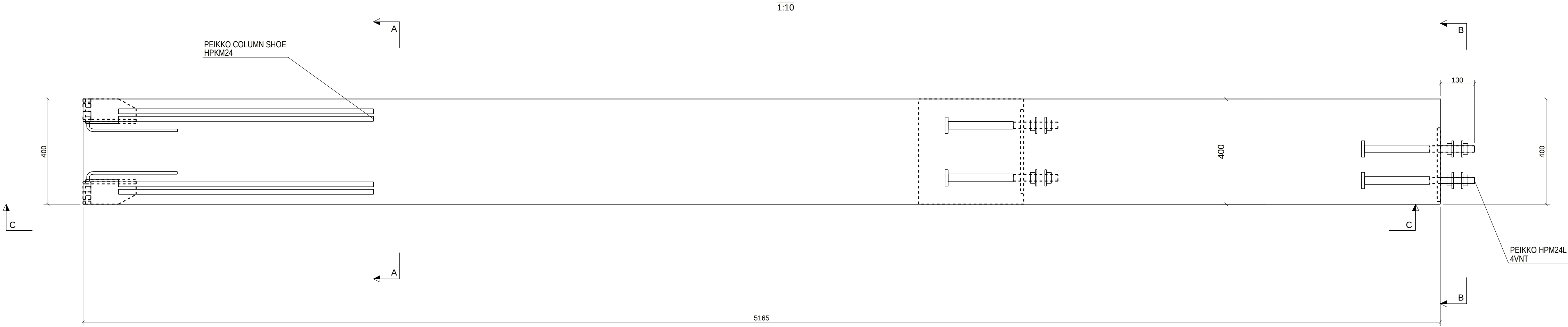


Sarasas					
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)	
K-44	400*400	1	1.56	1.56	
Viso:		1		2	

Idetiniu detaliu sarašas					
		K-44		1 Gaminiu kiekis	
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Svoris (kg)
	400*400	C35/45	1	8495.0	3262.1
	400*570	C35/45	2	500.0	228.0
p-39	BL12*350	S355J2	1	350.0	11.5
pl-8	PL12*320	S355J2	2	320.0	9.6
HPKM24			4		3.5
HPM24L			12		0.6
Viso				1.45	3507.8

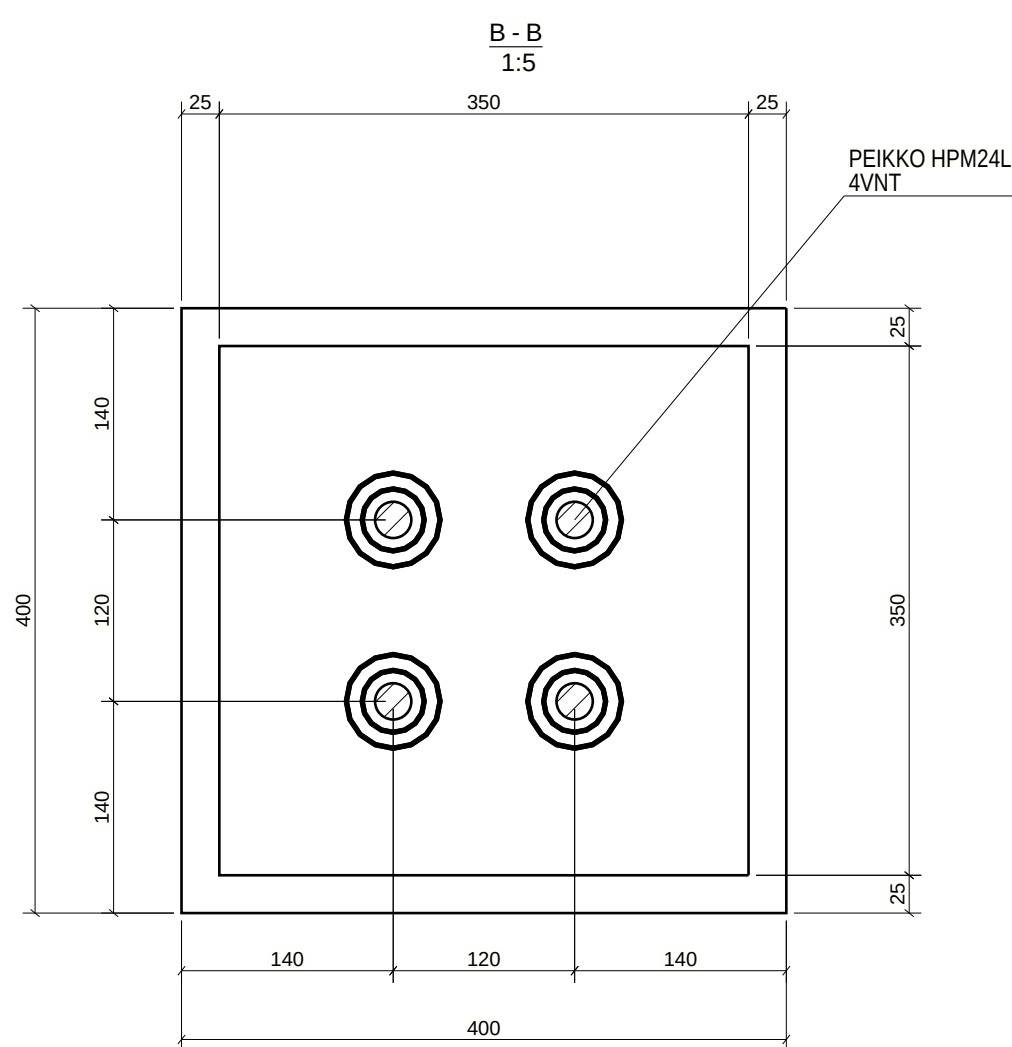
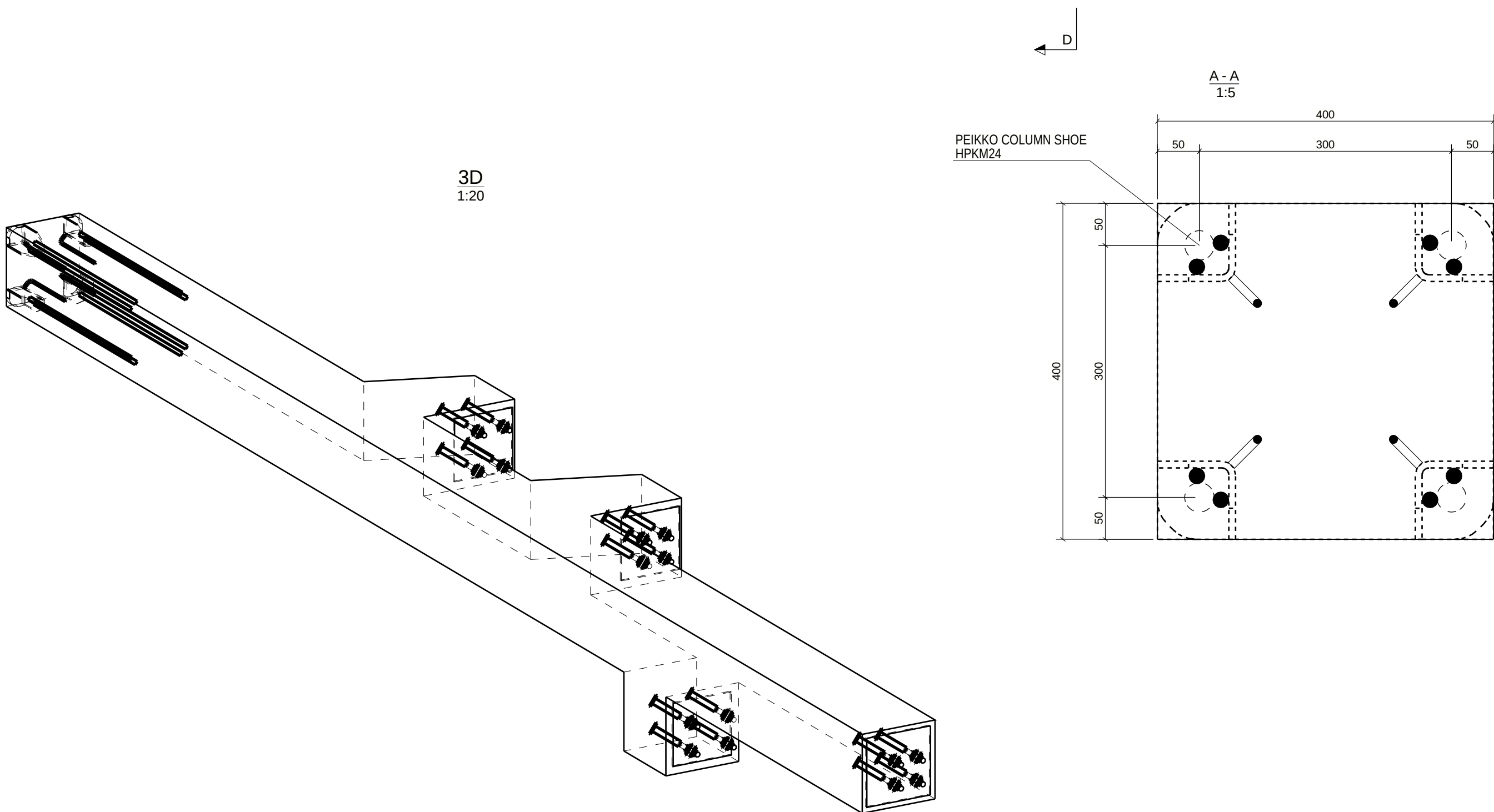
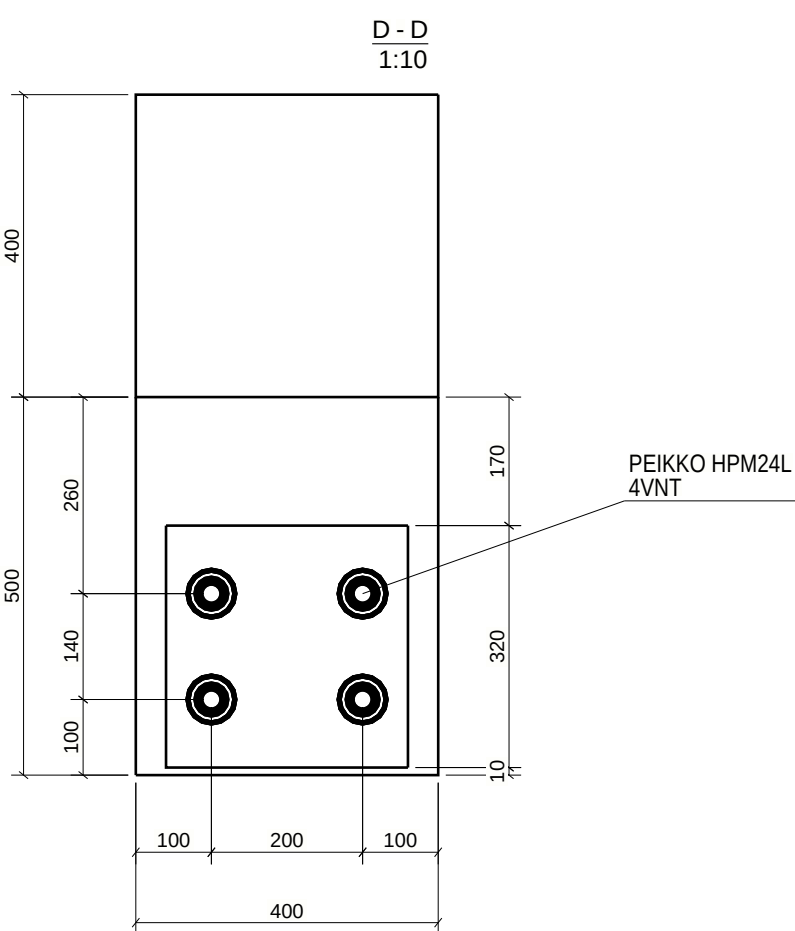
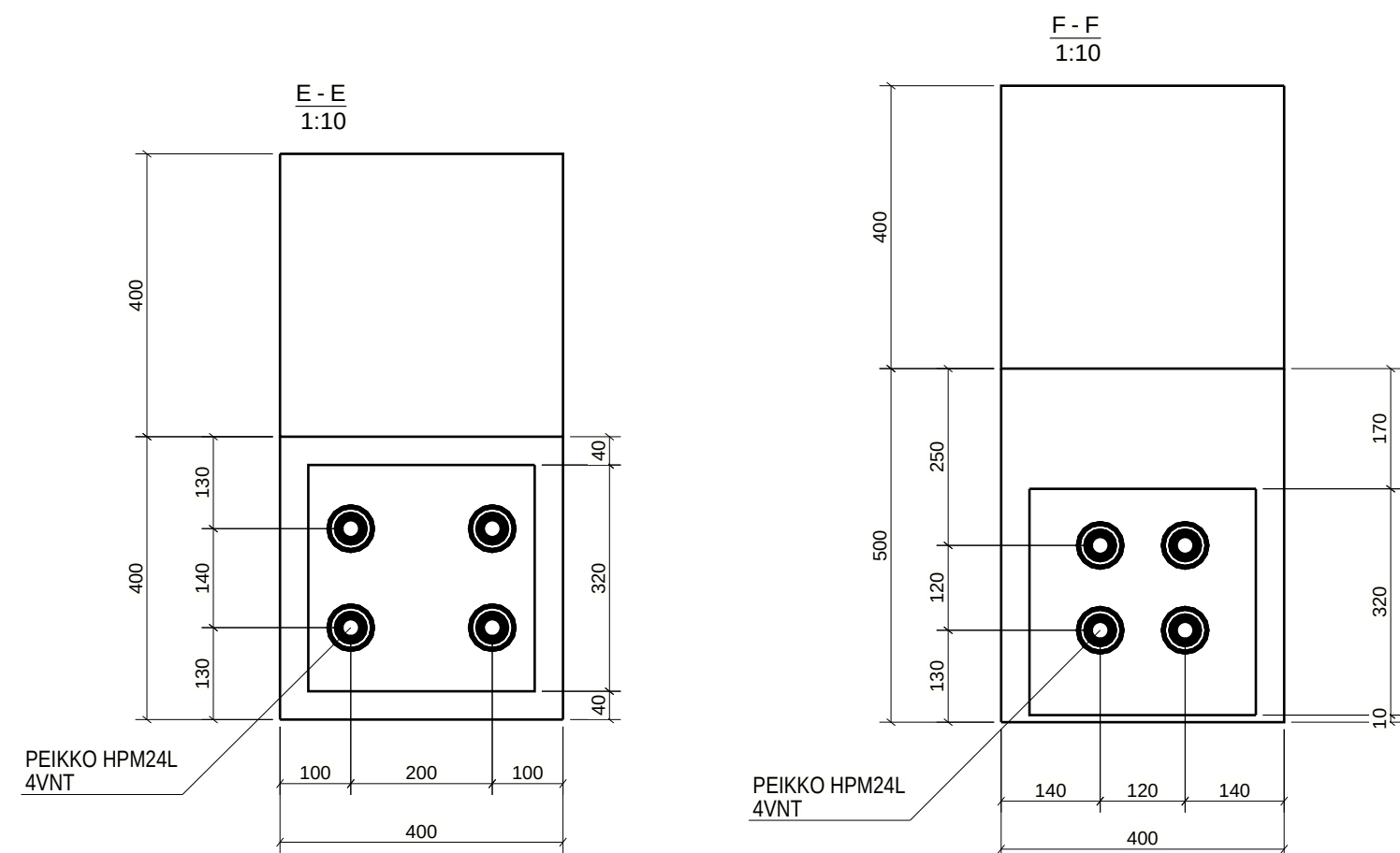
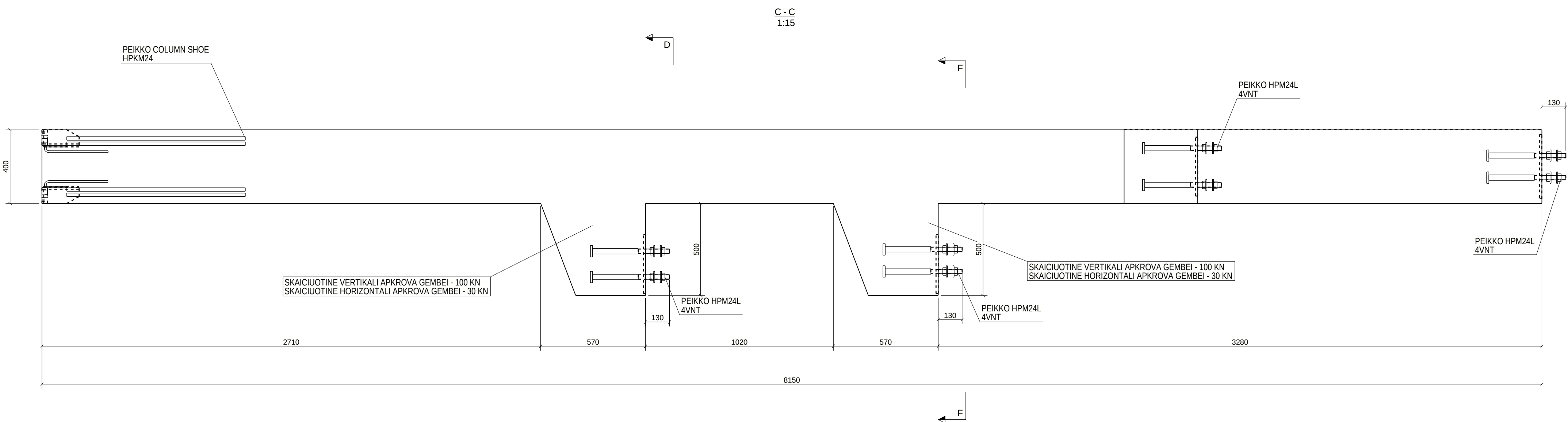
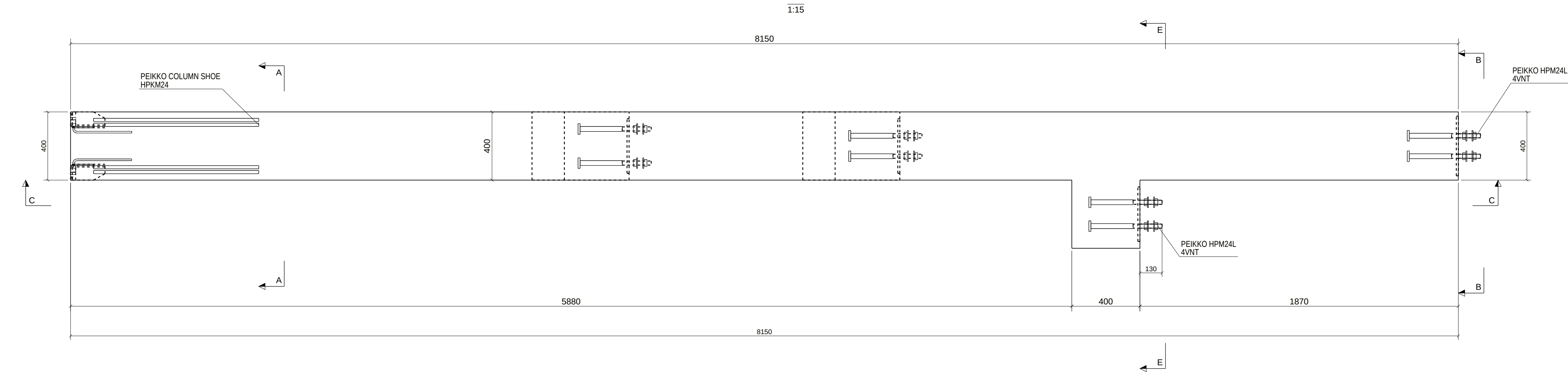
Sarasas				
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)
K-47	400*300	1	0.69	0.69
Viso:		1		1

I detiniu detaliu sarašas				
		K-47		
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	1 Gaminių kiekis
				Turis (m³)
				Svoris (kg)
	400*300	C35/45	1	5165.0
	400*400	C35/45	1	400.0
p-42	BL12*280	S355J2	1	280.0
pl-8	PL12*320	S355J2	1	320.0
HPKM24			4	
HPM24L			8	
Viso				0.68
				1655.9



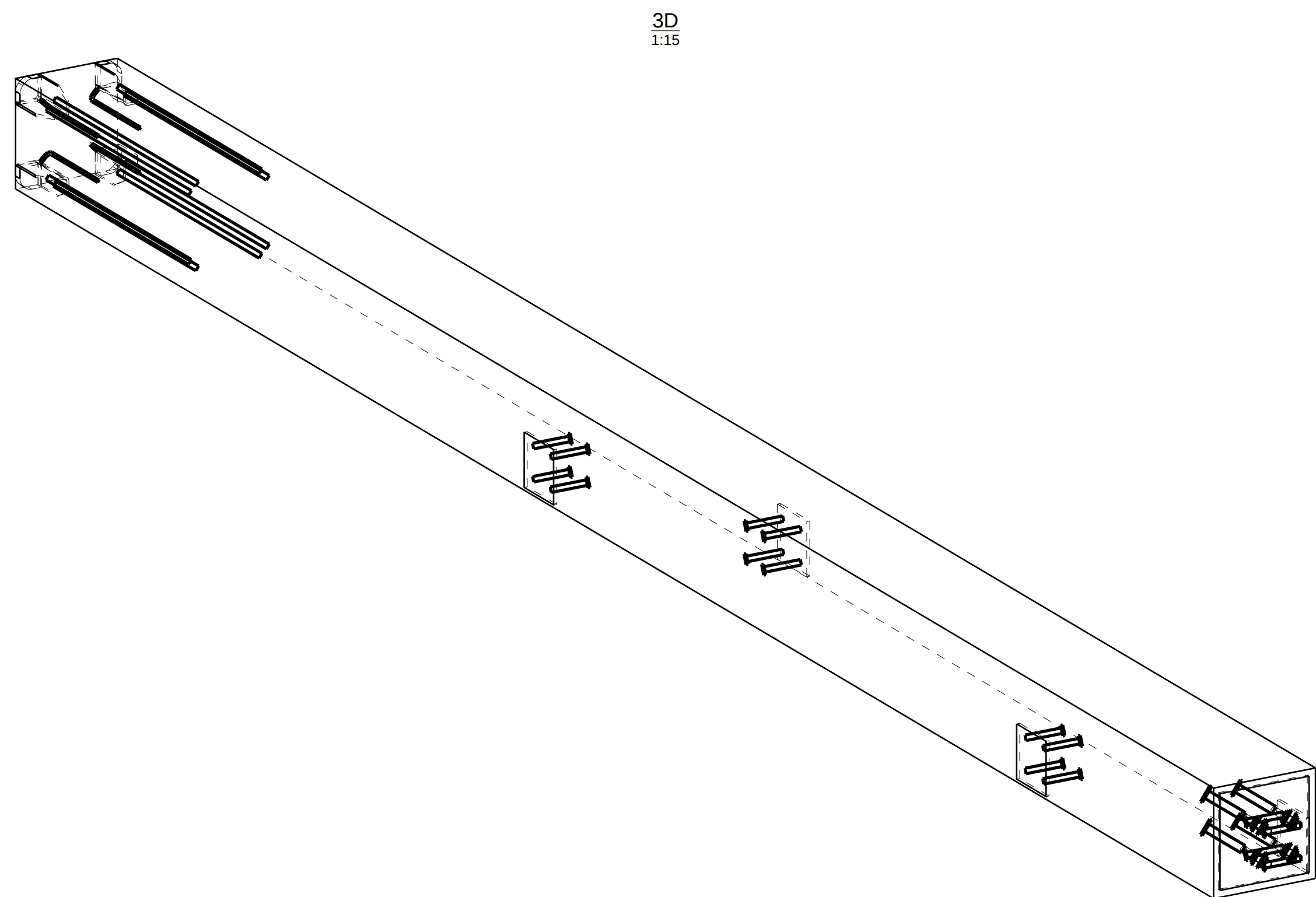
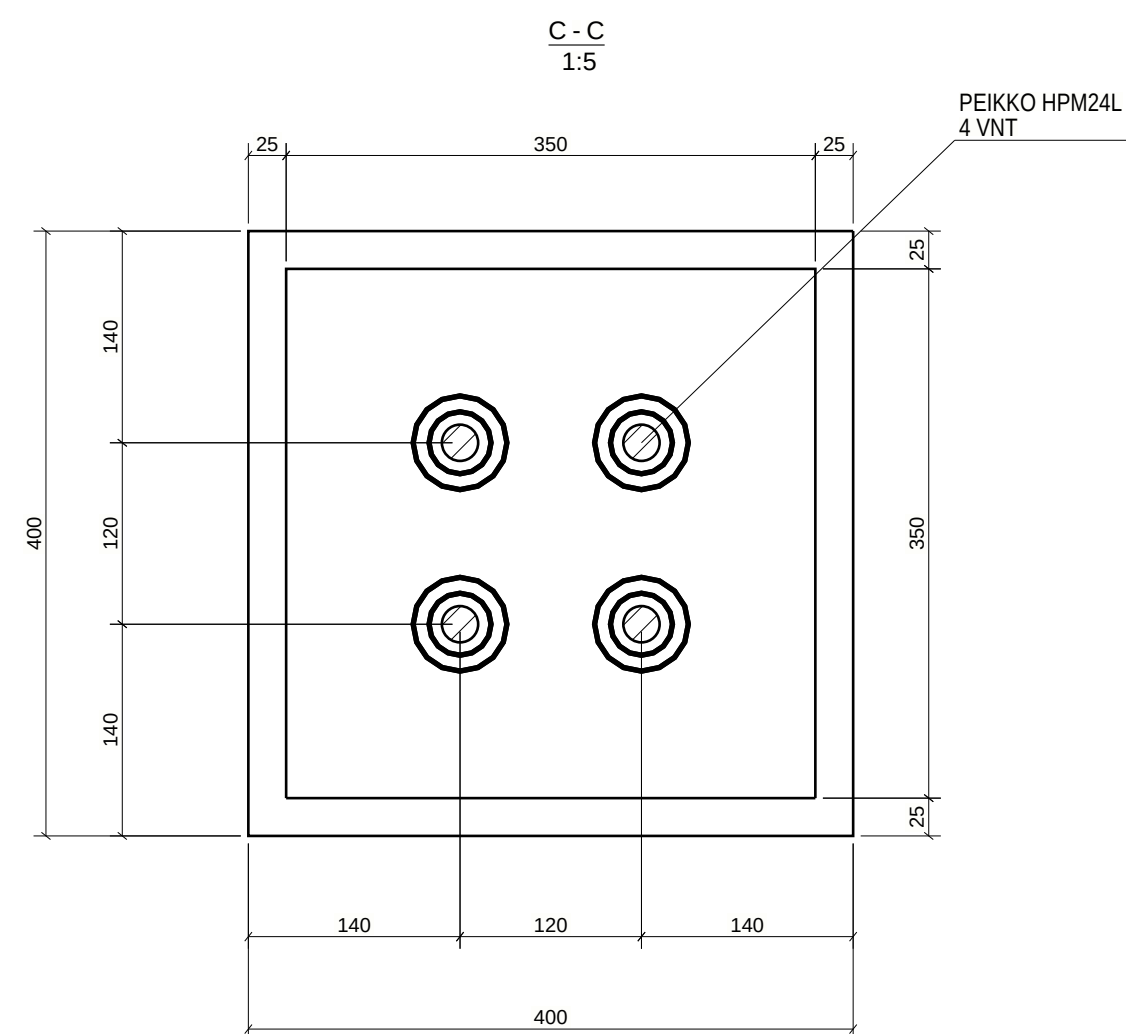
Sarasas				
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)
K-50	400*400	1	1.57	1.57
Viso:		1		2

I detiniu detaliu sarašas				
		K-50		
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	1 Gaminių kiekis
				Turis (m³)
				Svoris (kg)
	400*400	C35/45	1	8150.0
	400*570	C35/45	2	500.0
	400*400	C35/45	1	400.0
p-39	BL12*350	S355J2	1	350.0
pl-8	PL12*320	S355J2	3	320.0
HPKM24			4	
HPM24L			16	
Viso:				1.46
				3528.9



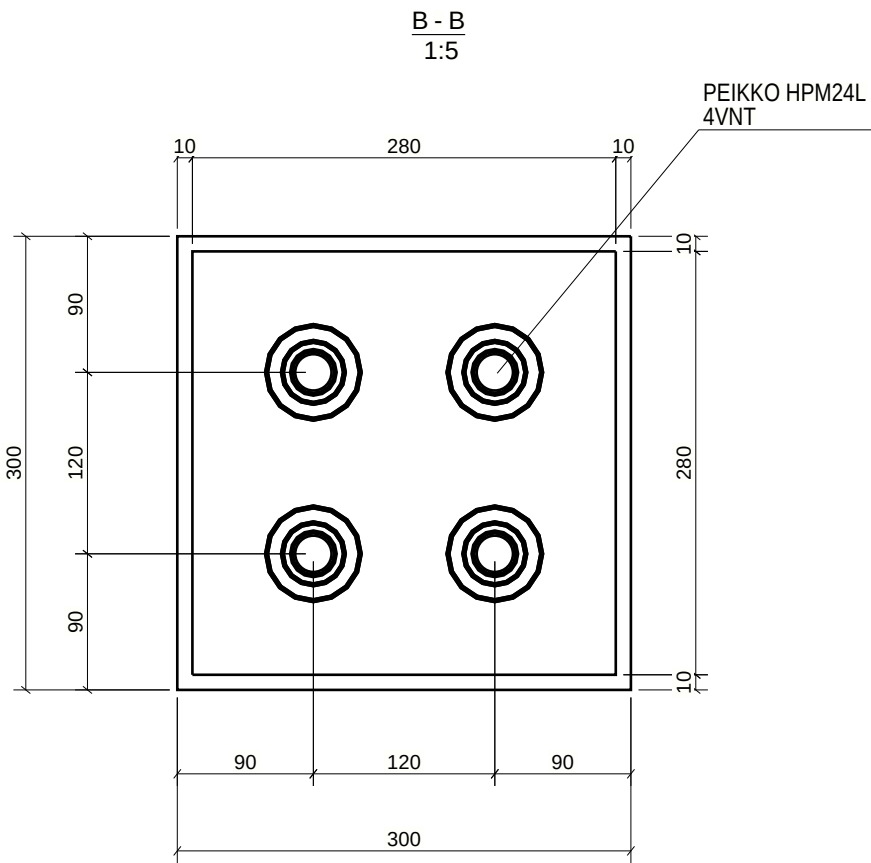
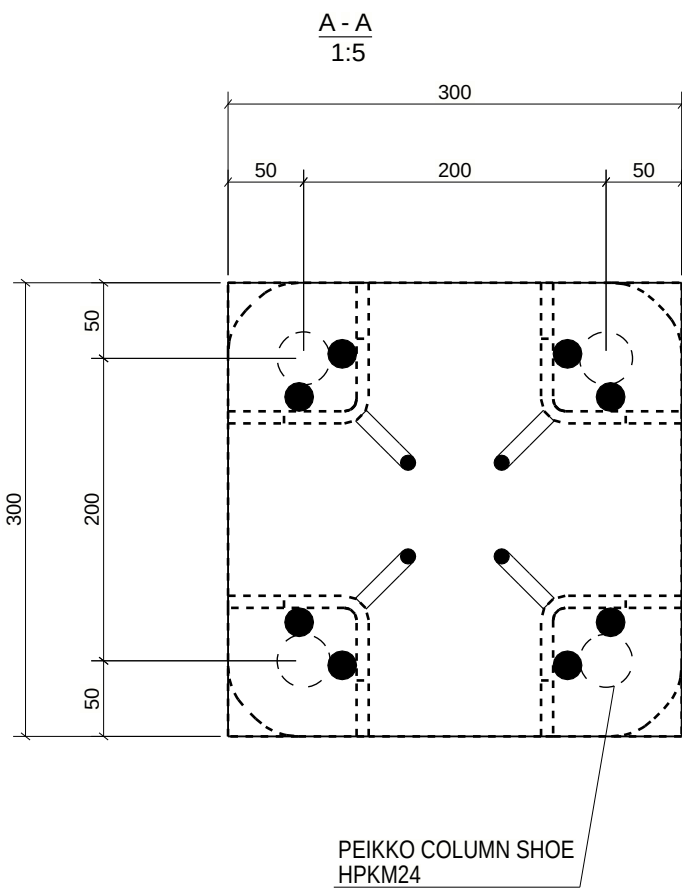
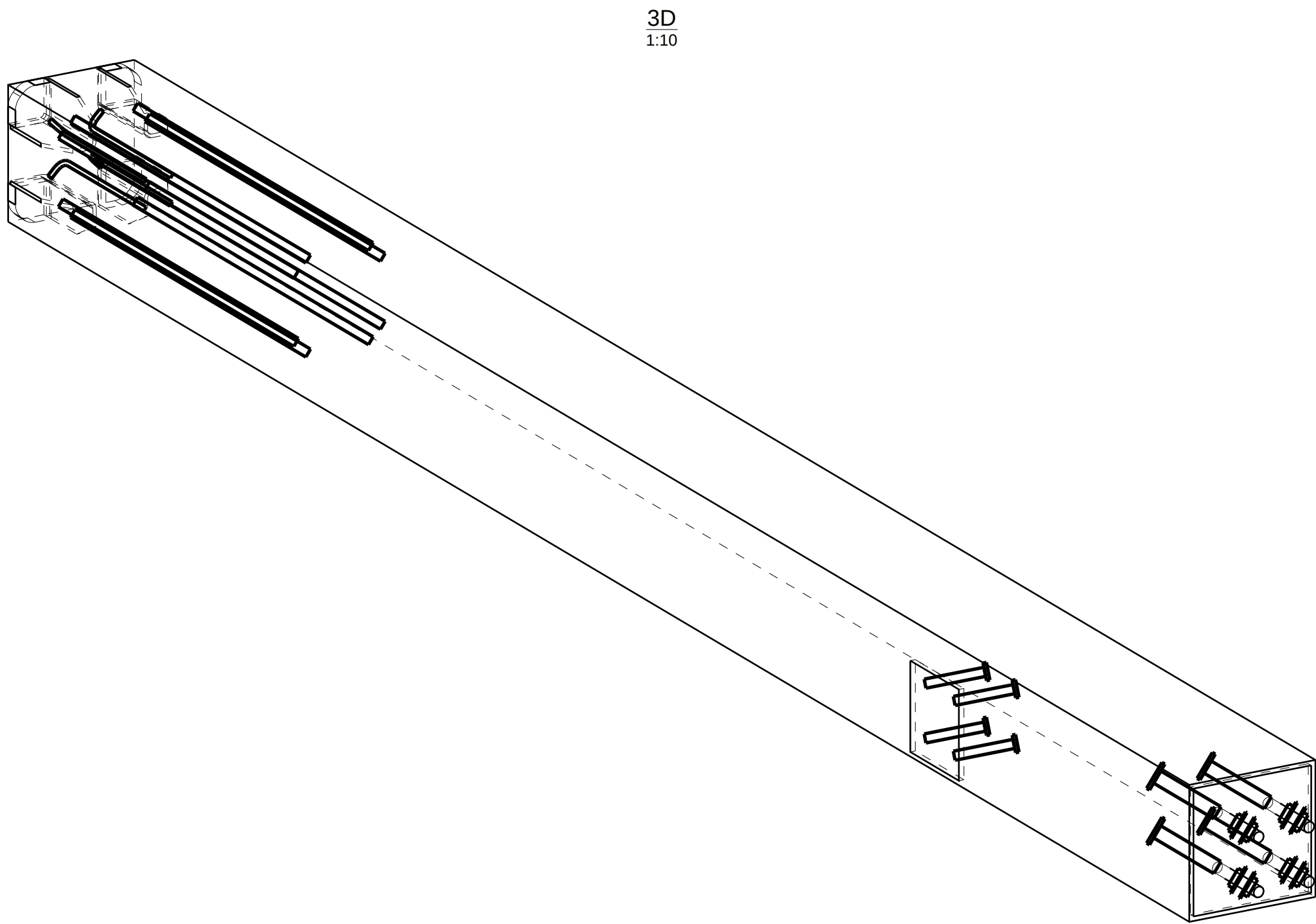
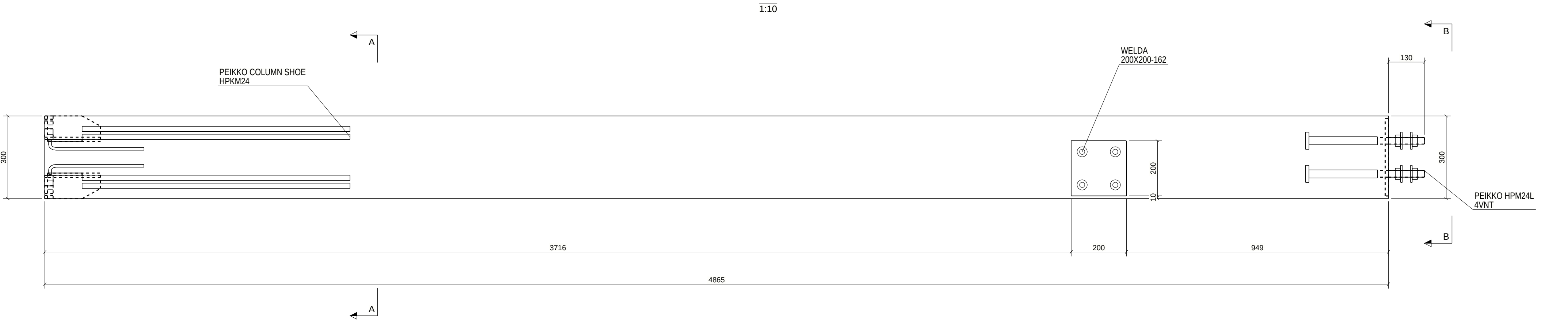
Išdėtinio detalės sąrašas			K-51		1 Gaminiui kiekis	
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Turis (m³)	Svoris (kg)
	400*400	C35/45	1	8150.0	1.30	3129.6
p-39	BL12*350	S355J2	1	350.0		11.5
HPKM24			4			3.5
HPM24L			4			0.6
WELDA200x200-162			4			3.8
Viso					1.30	3143.2

Išdėtinio detalės sąrašas			K-51		1 Gaminiui kiekis	
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Turis (m³)	Svoris (kg)
	400*400	C35/45	1	8150.0	1.30	3129.6
p-39	BL12*350	S355J2	1	350.0		11.5
HPKM24			4			3.5
HPM24L			4			0.6
WELDA200x200-162			4			3.8
Viso					1.30	3143.2



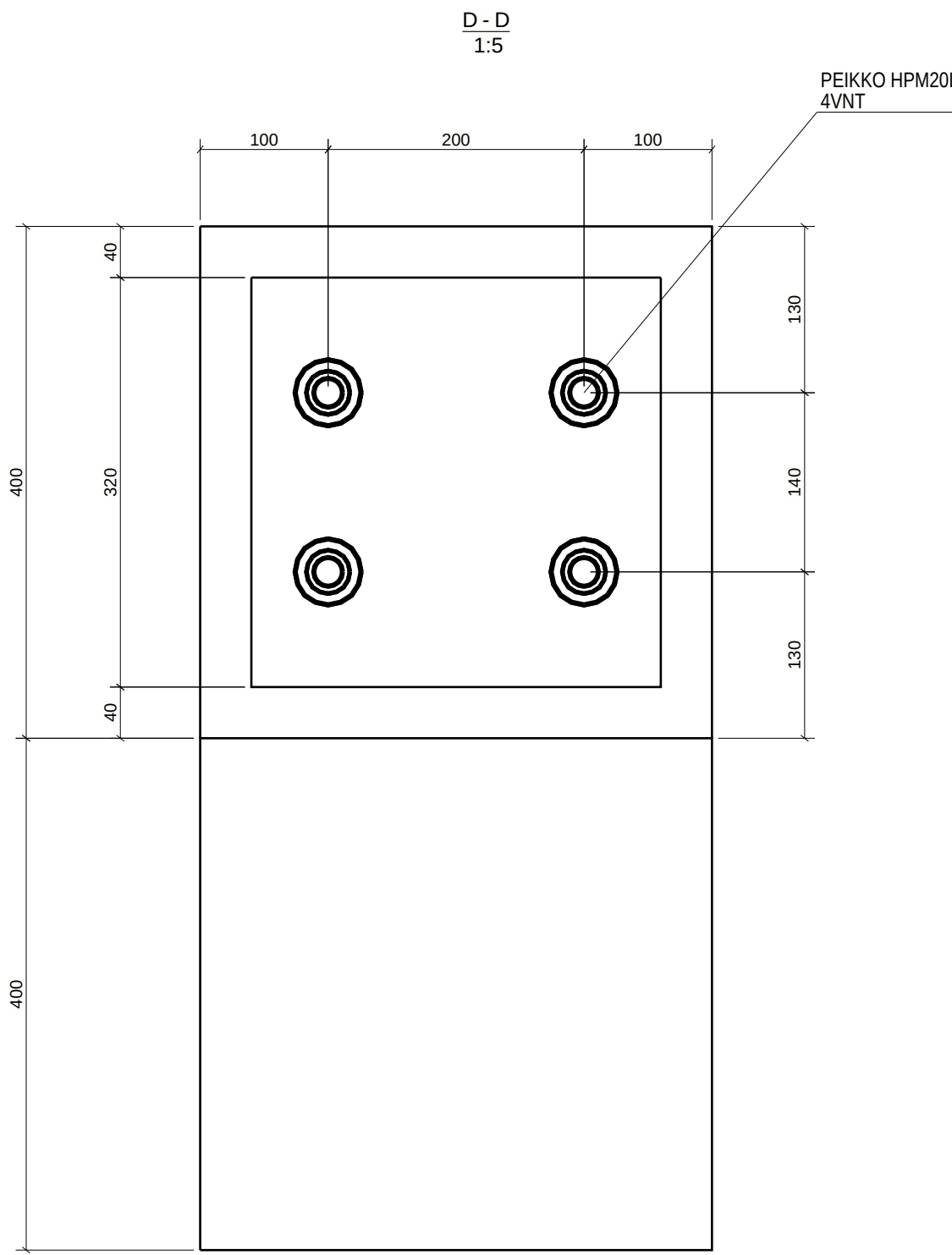
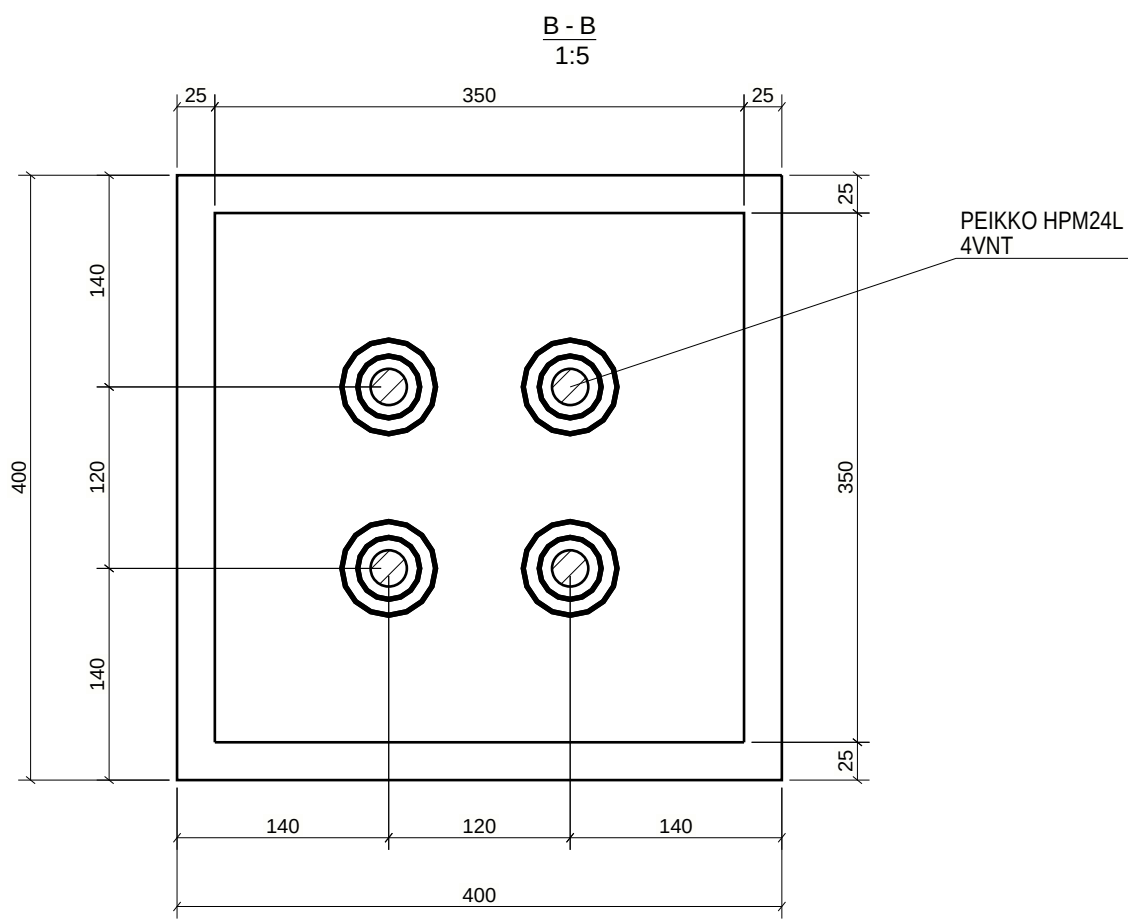
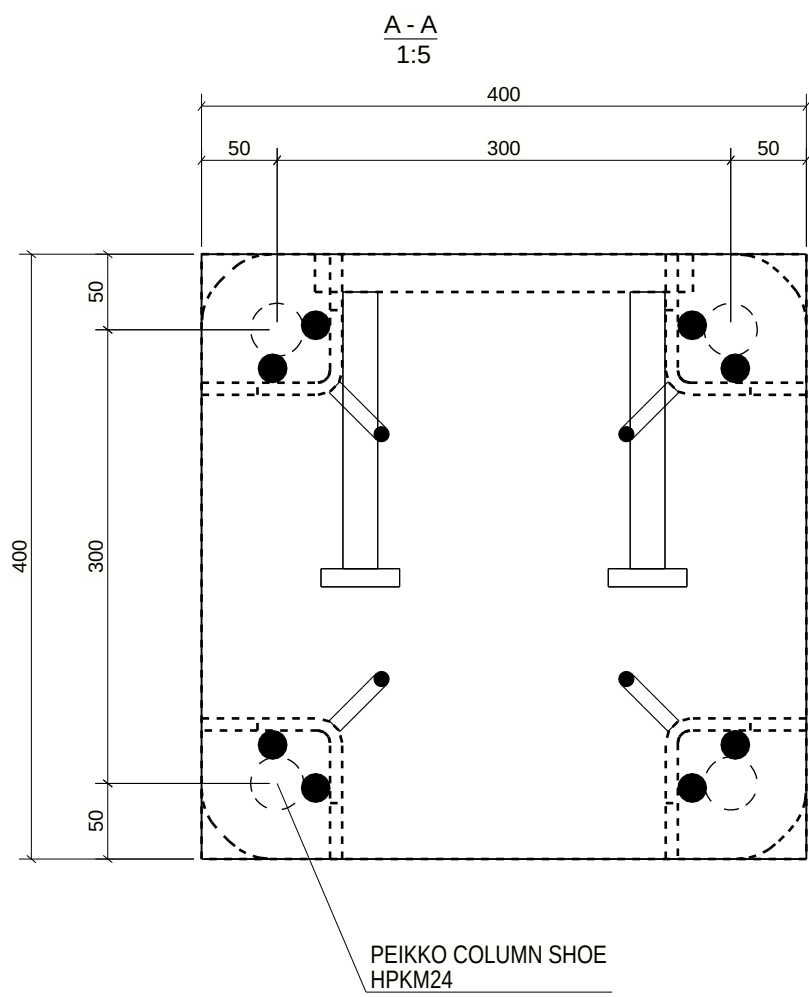
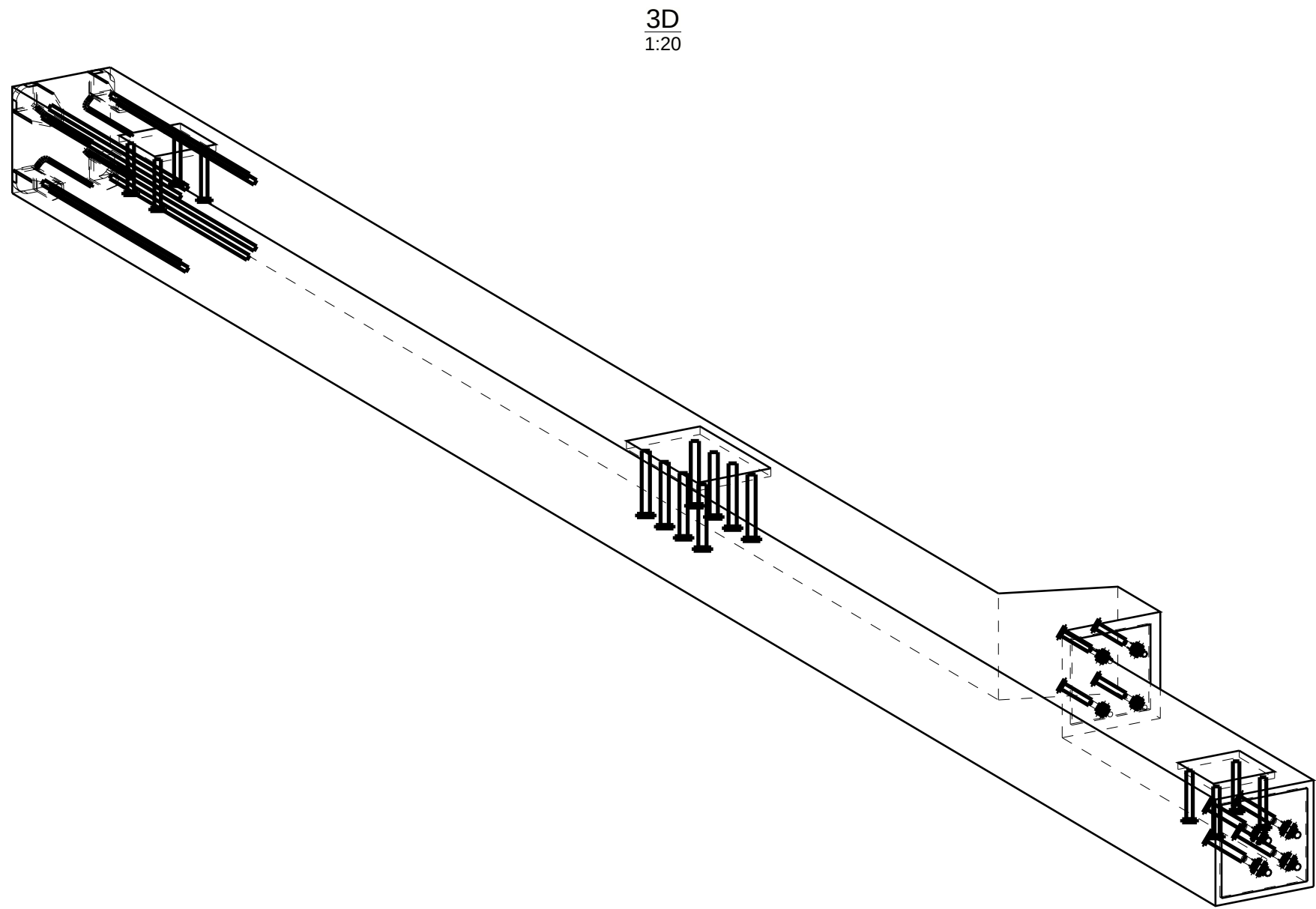
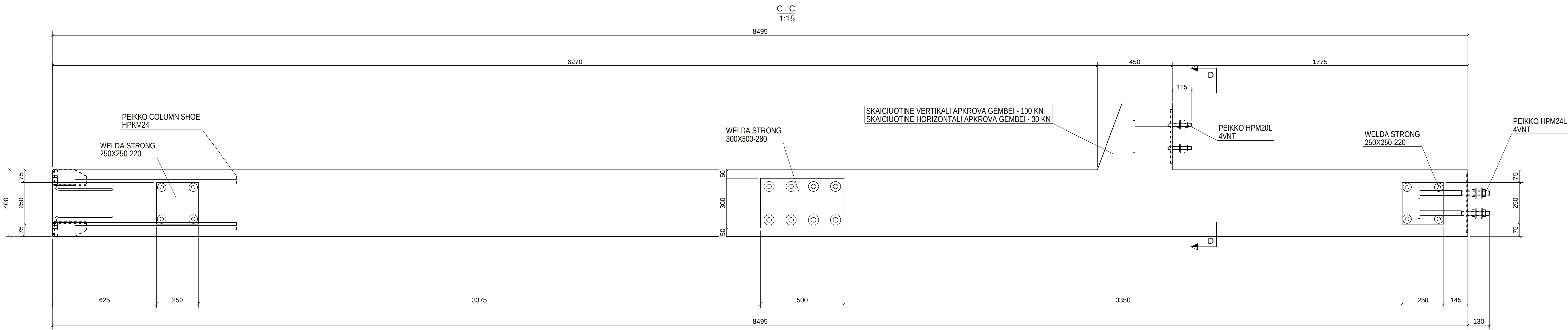
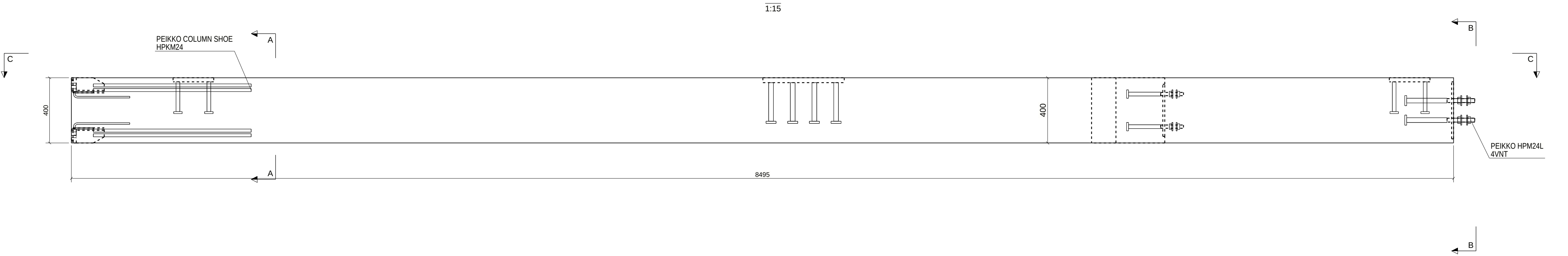
Sarasas					
Zymuo	Skersmuo		Kiekis	Turis (m3)	B. turis (m3)
K-52	300*300		1	0.44	0.44
Viso:			1		0

I detiniu detaliu sarašas					
			K-52		
			1 Gaminiu kiekis		
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Svoris (kg)
	300*300	C35/45	1	4865.0	1050.8
p-42	BL12*280	S355J2	1	280.0	7.4
HPKM24			4		3.5
HPM24L			4		0.6
WELDA200x200-162			1		3.8
Viso				0.44	1061.5

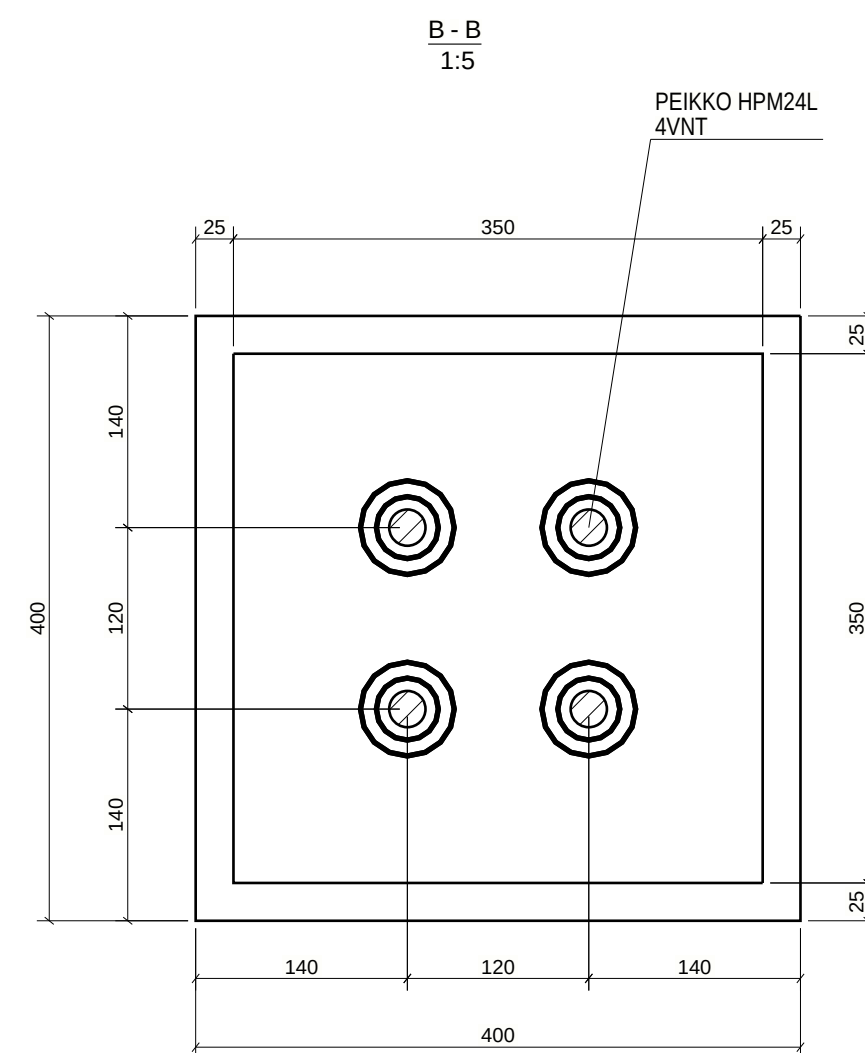
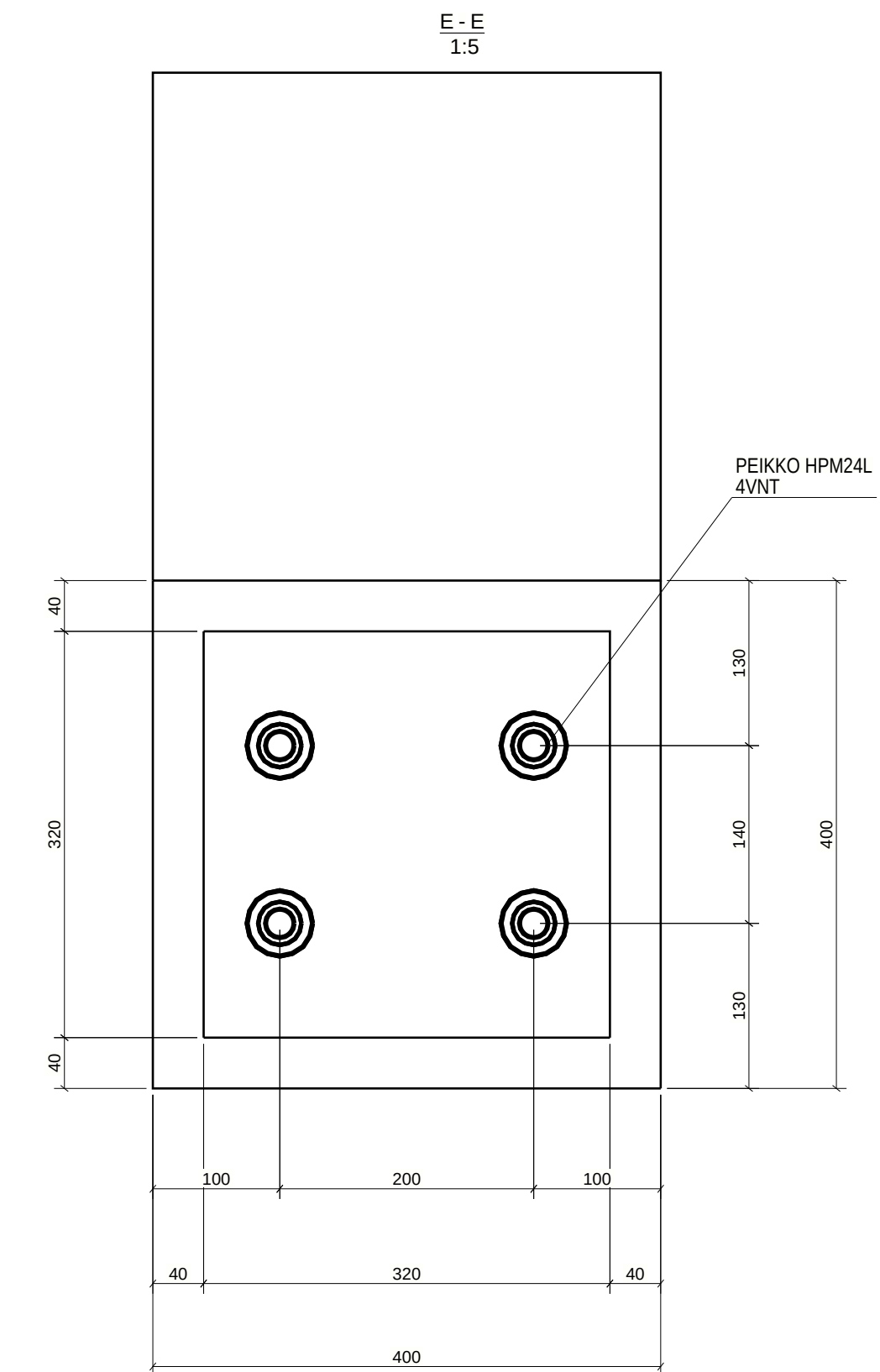


Sarasas				
Zymuo	Skersmuo	Kiekis	Turis (m3)	B. turis (m3)
K-53	400*400	1	1.43	1.43
Viso:		1		1

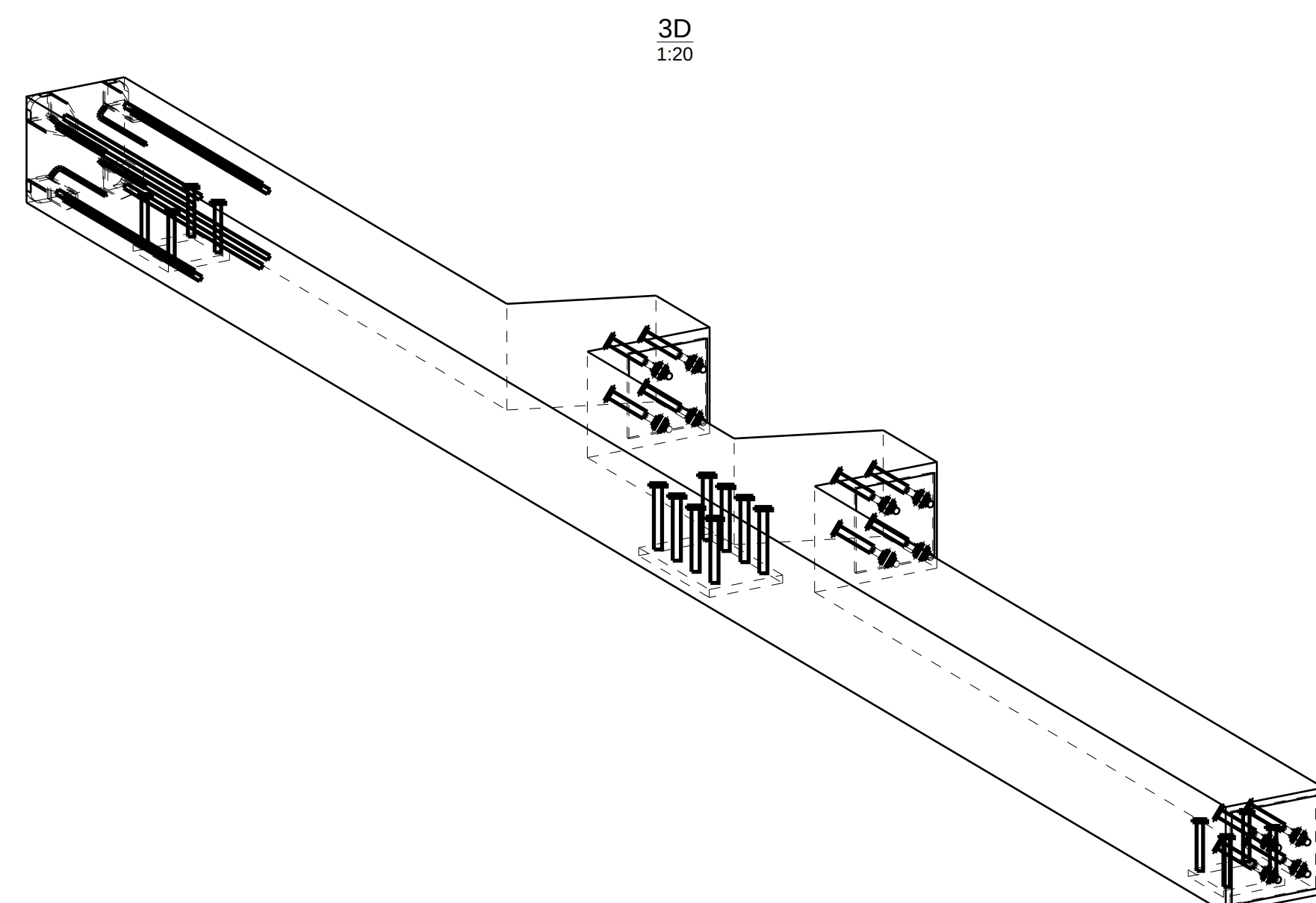
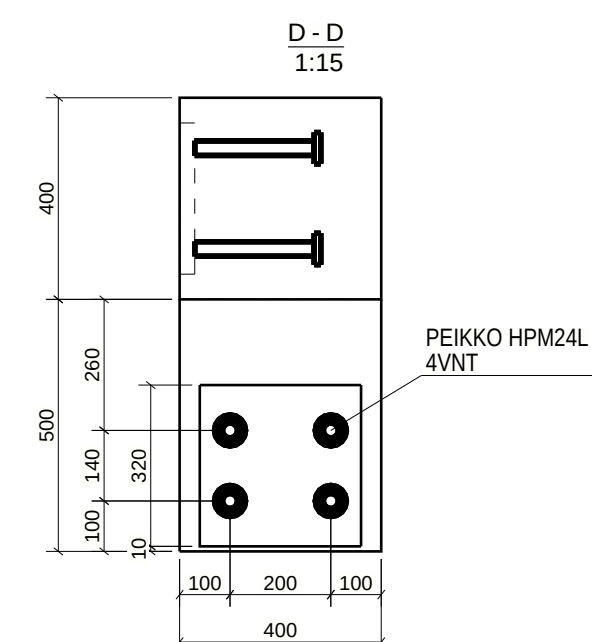
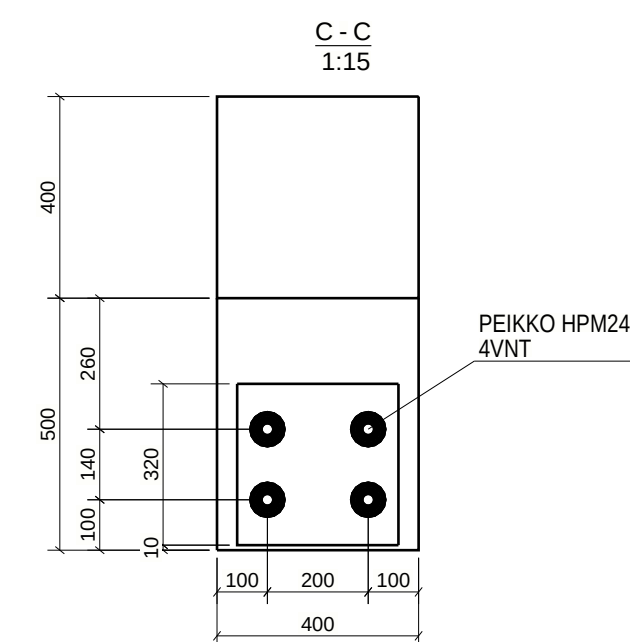
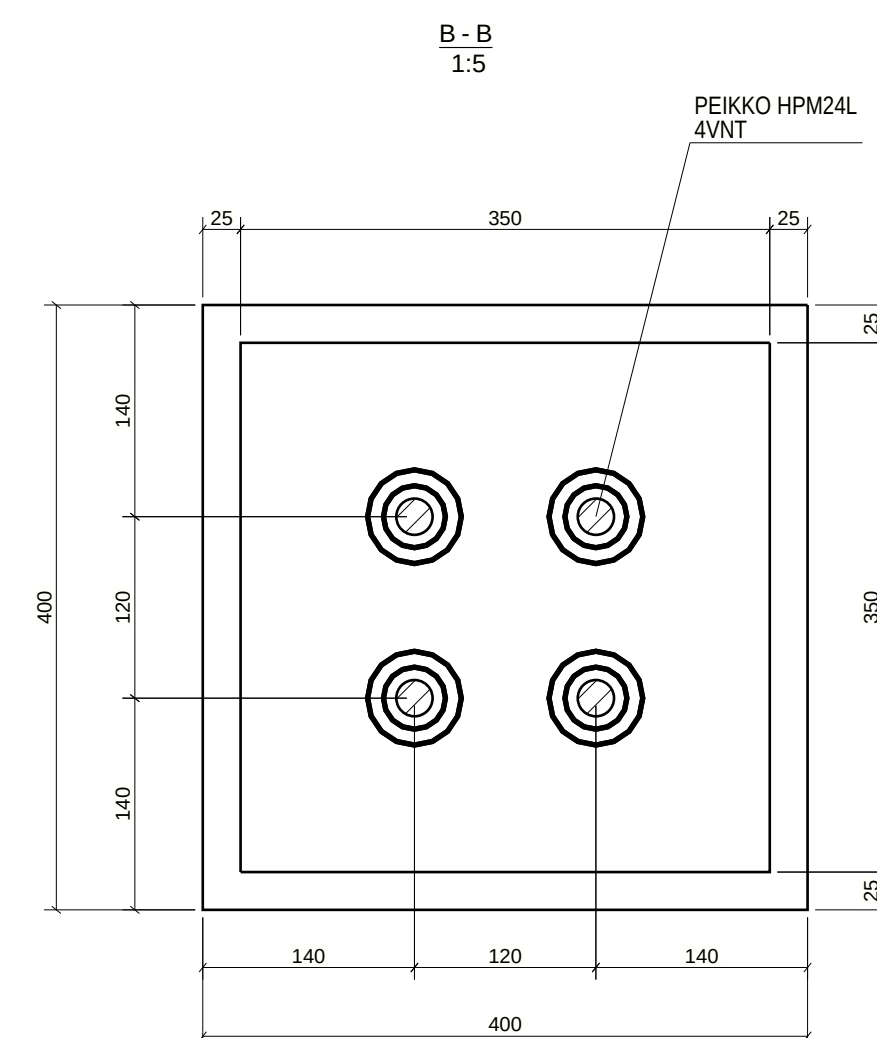
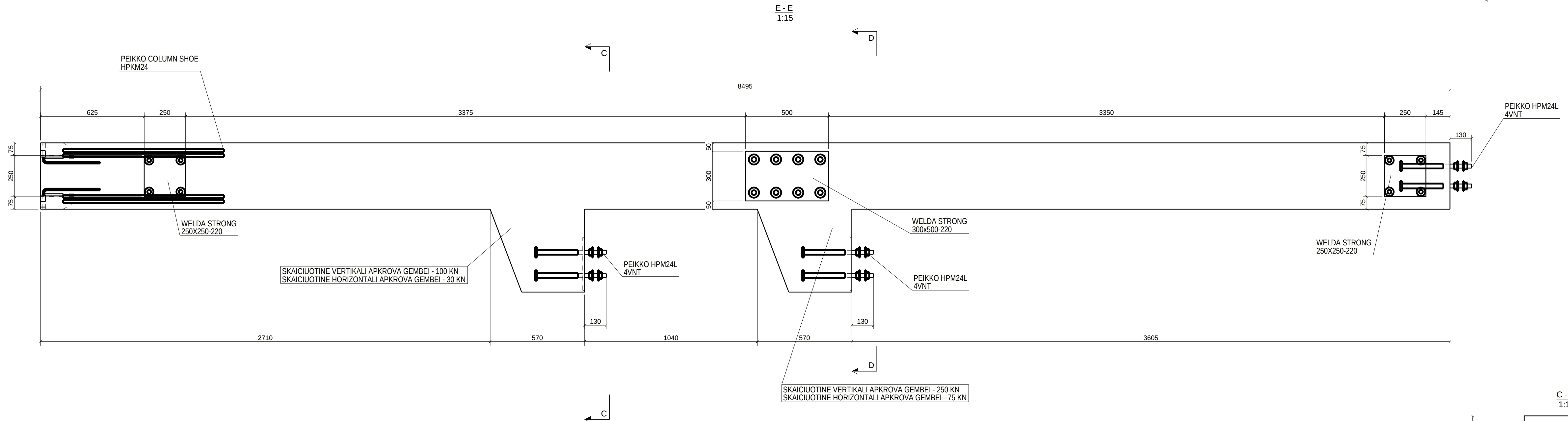
I detiniu detaliu sarašas		K-53			
Detale	Dydis (mm x mm)	Medžiaga	Kiekis	1 Gaminiu kiekis	
			Ilgis (mm)	Turis (m³)	Svoris (kg)
	400*400	C35/45	1	8495.0	1.36
	400*400	C35/45	1	450.0	0.06
p-39	BL12*350	S355J2	1	350.0	11.5
pl-8	PL12*320	S355J2	1	320.0	9.6
HPKM24			4		3.5
HPM20L			4		0.3
HPM24L			4		0.6
WS250x250-220			2		12.3
WS300x500-280			1		35.3
Viso				1.42	3457.3



Detinių detalių sąrašas			1 Gaminių kiekis			
Detale	Dydys (mm x mm)	Medžiaga	Kiekis	K-54 Ilgis (mm)	Turis (m³)	Svoris (kg)
	400*400	C35/45	1	8450,0	1.35	3244.8
	400*400	C35/45	1	450,0	0.06	144.0
p-39	BL12*350	S355J2	1	350,0		11.5
pl-8	PL12*320	S355J2	1	320,0		9.6
HPKM24			4			3.5
HPM20L			4			0.3
HPM24L			4			0.6
WS250x250-220			2			12.3
WS300x500-280			1			35.3
			Viso		1.41	3440.0



Idetiniu detalii sąrašas			K-55		1 Gaminiui kiekis	
Detales	Dydis (mm x mm)	Medžiaga	Kiekis	Ilgis (mm)	Turis (m³)	Svoris (kg)
	400*400	C35/45	1	8495.0	1.36	3262.1
	400*570	C35/45	2	500.0	0.10	228.0
p-39	BL12*350	S355J2	1	350.0		11.5
pl-8	PL12*320	S355J2	2	320.0		9.6
HPKM24			4			3.5
HPM24L			12			0.6
WS250x250-220			2			12.3
WS300x500-280			1			35.3
Viso					1.45	3541.1



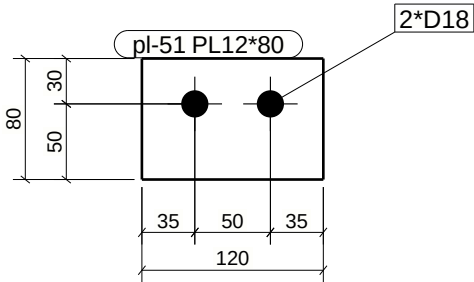
5 priedas

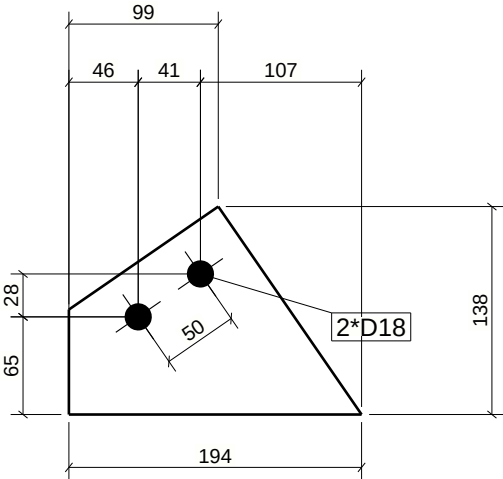
01 pastato metalo gaminių geometrinių brėžinių

PHASE	QUANTITY
111	27
119	1
129	1

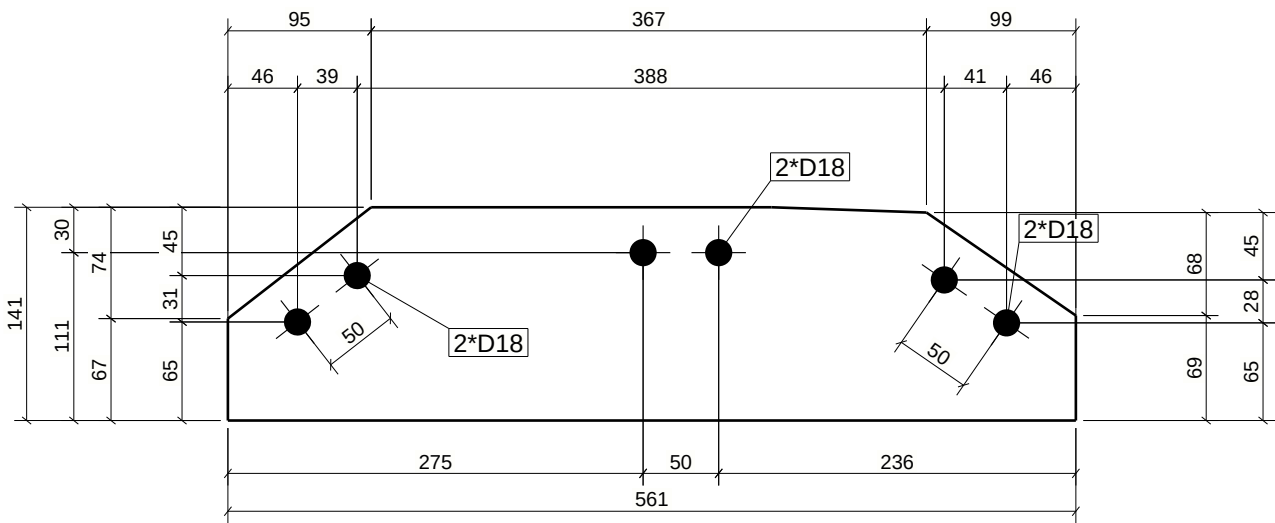
A-21 Kiekis 29

Zymuo	Profilis	Ilgis	Kiekis	Svoris
pl-51	PL12*80	120	1	0.9
Viso:				0.9





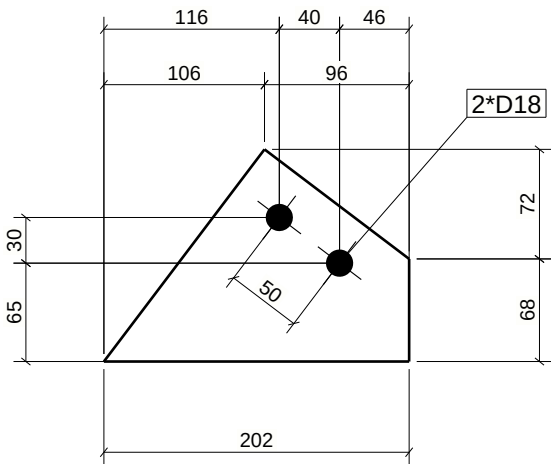
A-23 Kiekis 2



A-24 Kiekis 1

PHASE	QUANTITY
129	1

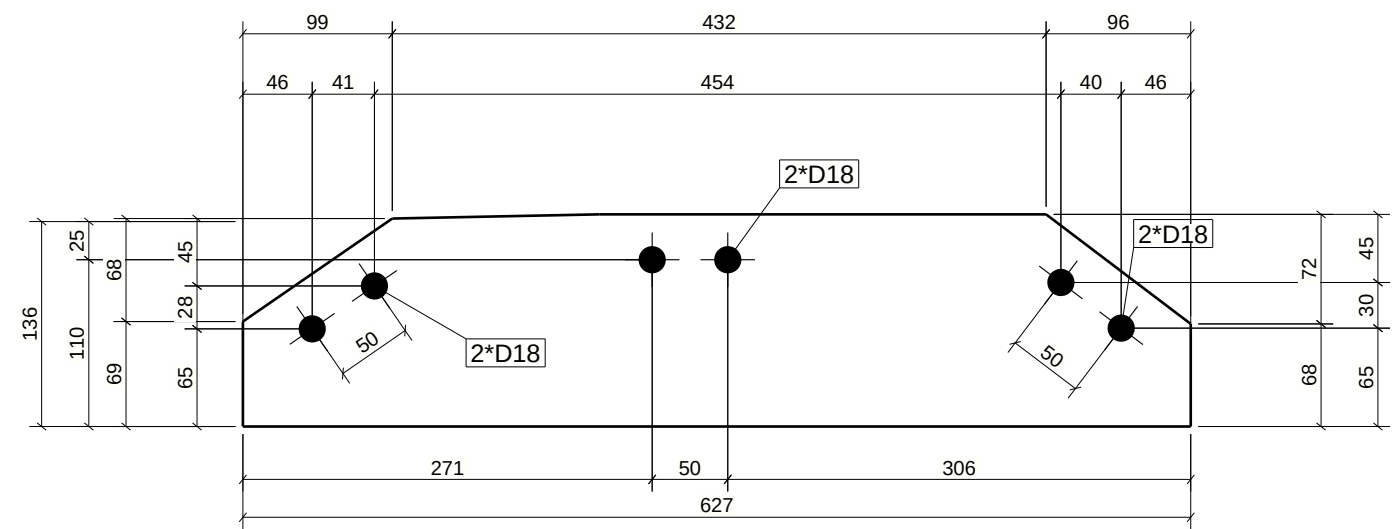
Zymuo	Profilis	Ilgis	Kiekis	Svoris
pl-29	PL12*141	561	1	6.8
Viso:				6.8



A-25 Kiekis 1

PHASE	QUANTITY
129	1

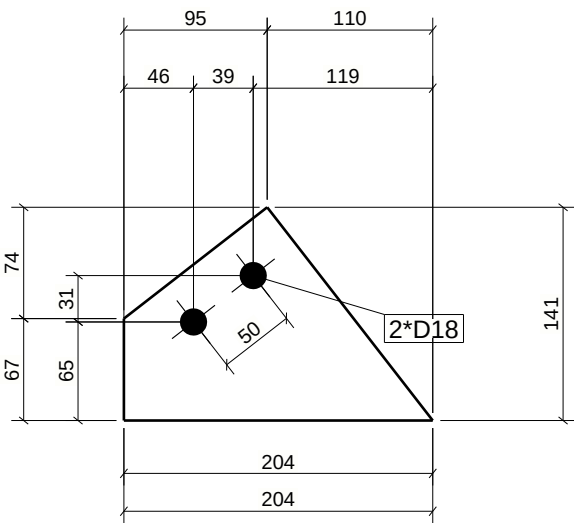
Zymuo	Profilis	Ilgis	Kiekis	Svoris
pl-30	PL12*140	202	1	1.6
Viso:				1.6



A-26	Kiekis	1

Zymuo	Profilis	Ilgis	Svoris
pl-31	PL12*140	627	7.6
Viso:			7.6

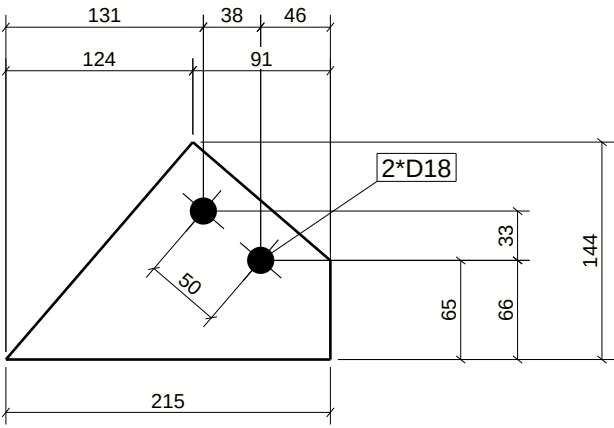
PHASE	QUANTITY
129	1



A-27 Kiekis 3

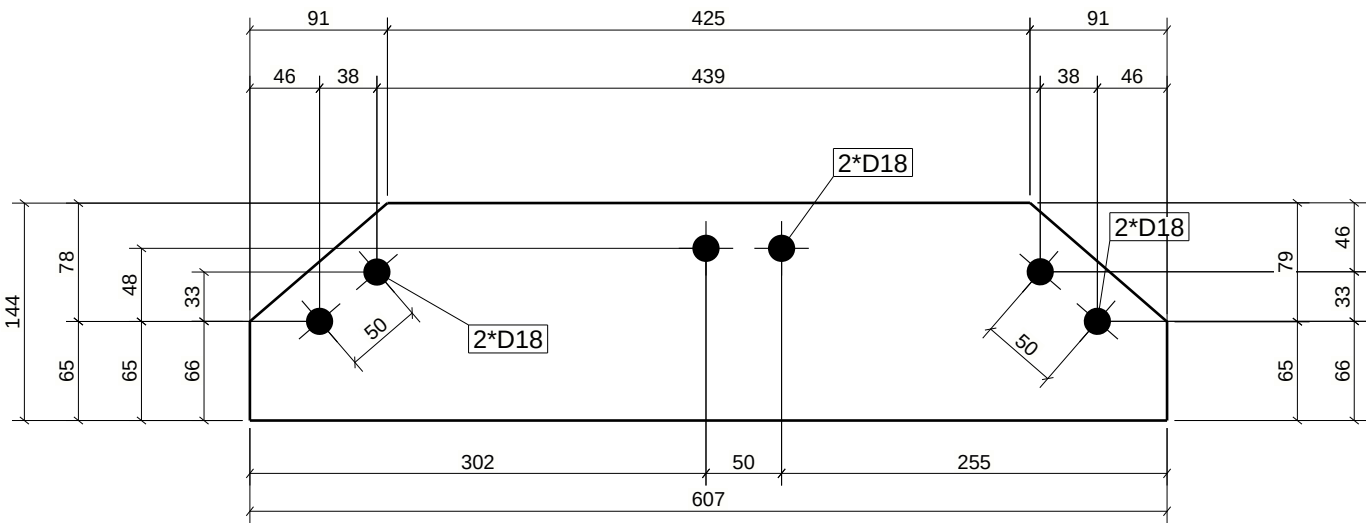
PHASE	QUANTITY
129	3

Zymuo	Profilis	Ilgis	Kiekis	Svoris
pl-34	PL12*141	204	1	1.7
			Viso:	1.7



A-28		Kiekis	4
Zymuo	Profilis	Ilgis	Svoris
pl-36	PL12*144	215	1.7
Viso:			1.7

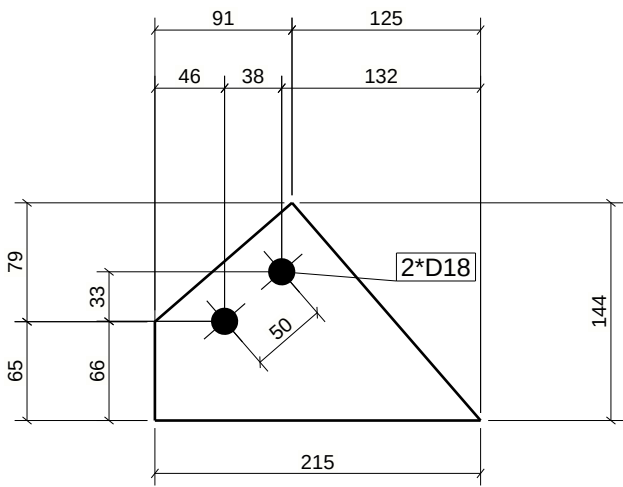
PHASE	QUANTITY
129	4



A-29 Kiekis 2

PHASE		QUANTITY	
129		2	

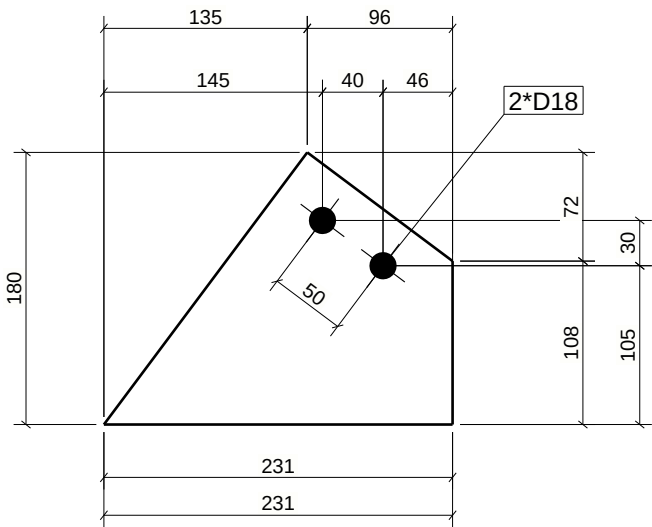
Zymuo	Profilis	Ilgis	Kiekis	
pl-39	PL12*144	607	1	
			Viso:	
				7.5



A-30 Kiekis 2

PHASE	QUANTITY
129	2

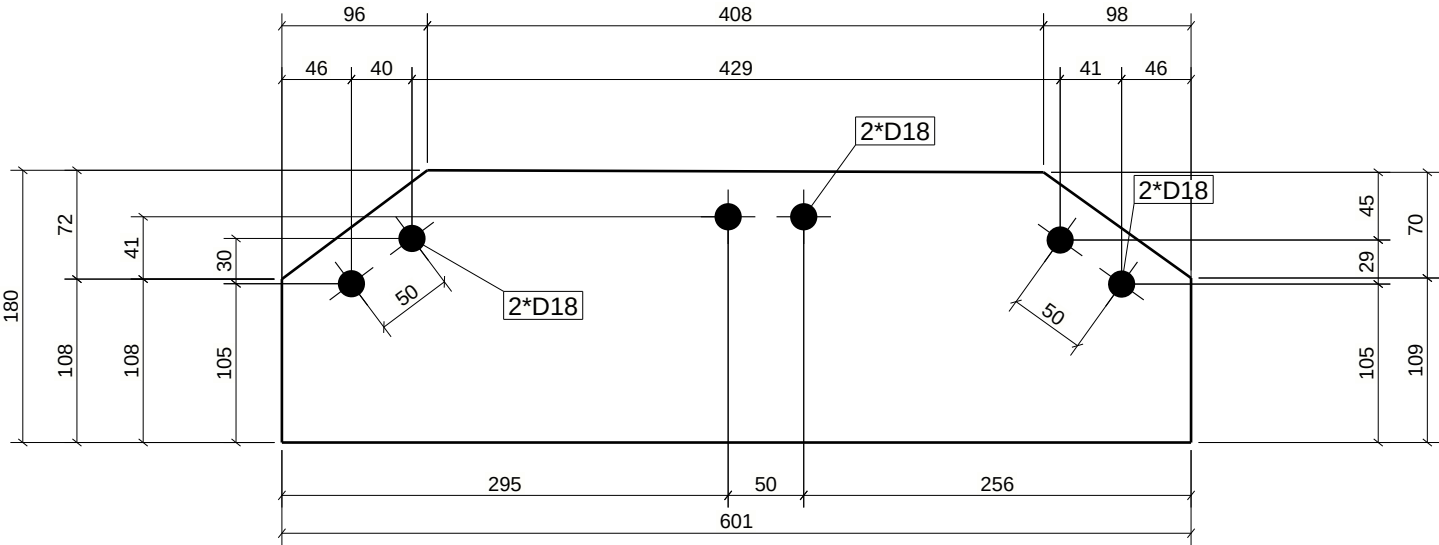
Zymuo	Profilis	Ilgis	Kiekis	Svoris
pl-40	PL12*144	215	1	1.7
			Viso:	1.7



A-32 Kiekis 6

PHASE	QUANTITY
129	6

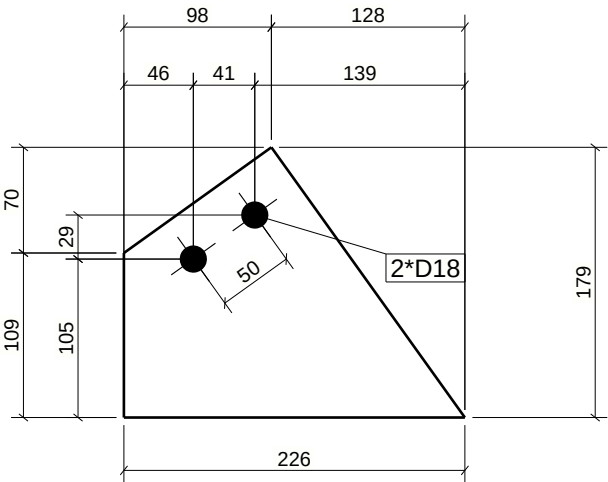
Zymuo	Profilis	Ilgis	Kiekis	Svoris
pl-20	PL12*180	231	1	2.4
			Viso:	2.4



A-33 Kiekis 2

PHASE	QUANTITY
129	2

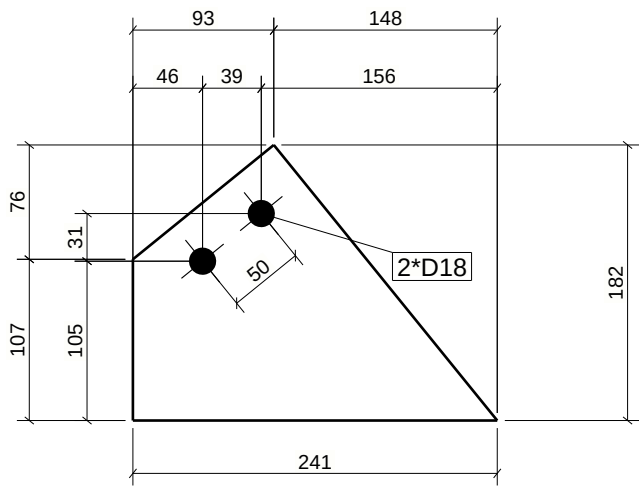
Zymuo	Profilis	Ilgis	Kiekis	Svoris
pl-21	PL12*180	601	1	9.5
Viso:				9.5



A-34 Kiekis 2

Zymuo	Profilis	Ilgis	Kiekis		Svoris
pl-22	PL12*179	226	1		2.4
		Viso:		2.4	

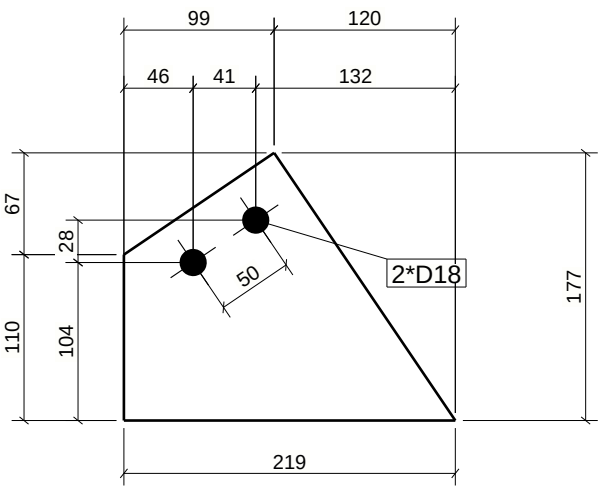
PHASE	QUANTITY
129	2



A-35 Kiekis 4

PHASE		QUANTITY	
129		4	

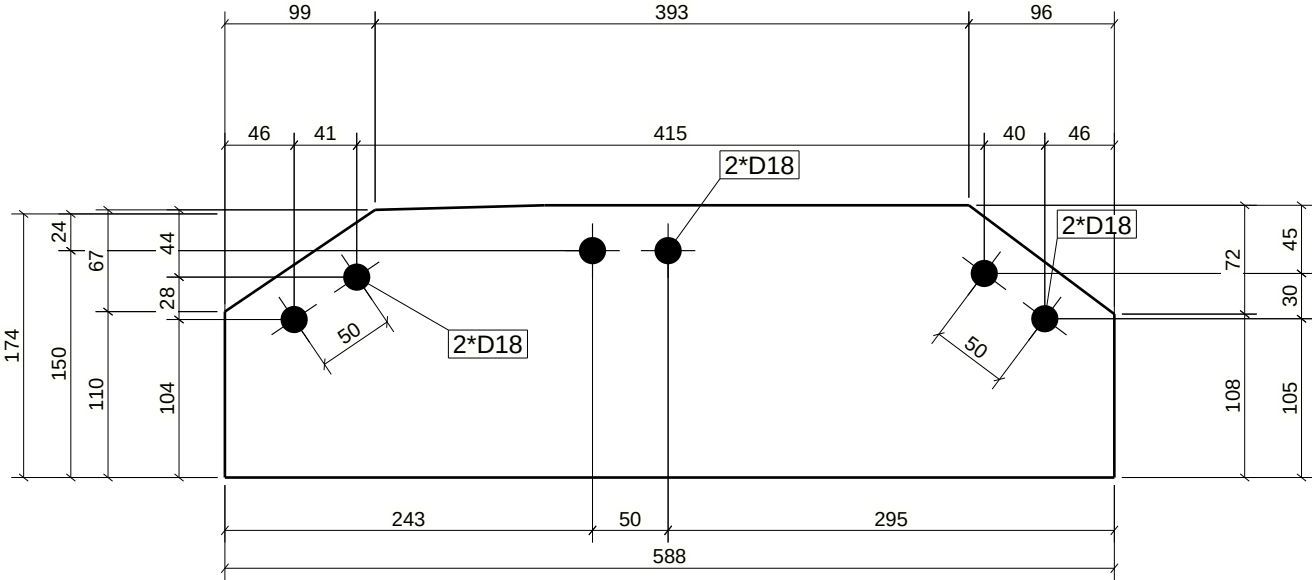
Zymuo	Profilis	Ilgis	Kiekis	Svoris
pl-17	PL12*182	241	1	2.5
			Viso:	2.5



A-38 Kiekis 2

PHASE	QUANTITY
129	2

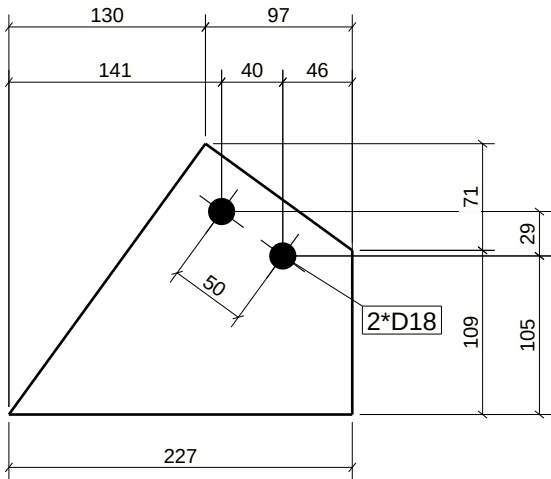
Zymuo	Profilis	Ilgis	Kiekis	Svoris
pl-23	PL12*177	219	1	2.3
			Viso:	2.3



A-39 Kiekis 2

Zymuo	Profilis Ilgis		Kiekis	Svoris
pl-24	PL12*180	588	1	9.3
			Viso:	9.3

PHASE	QUANTITY
129	2

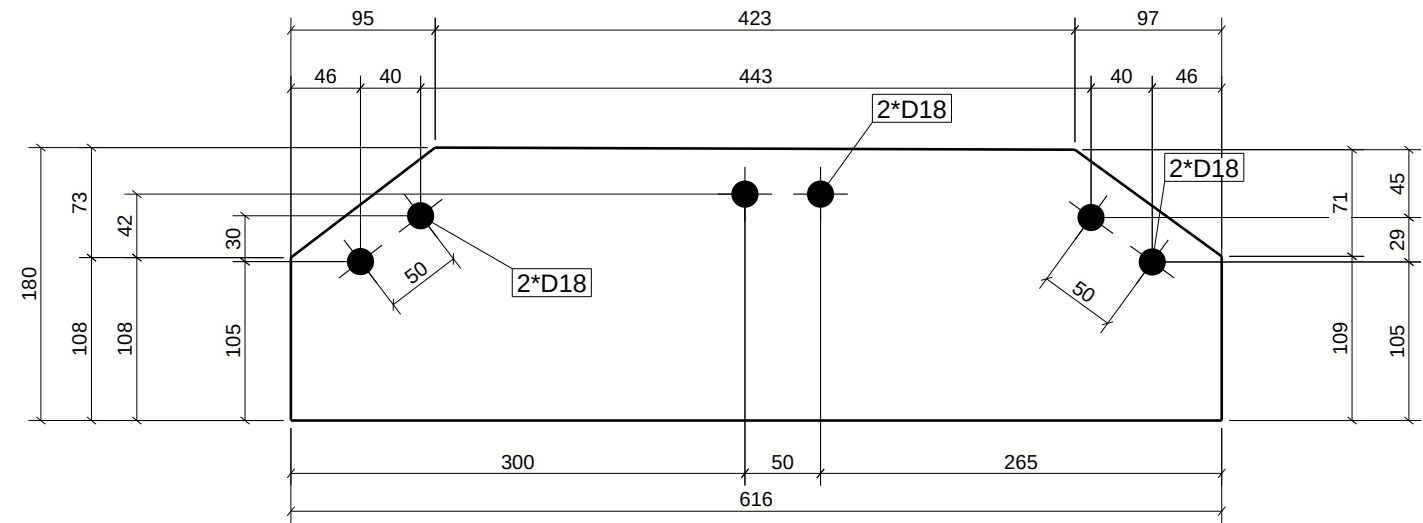


A-40 Kiekis 2

PHASE	QUANTITY
129	2

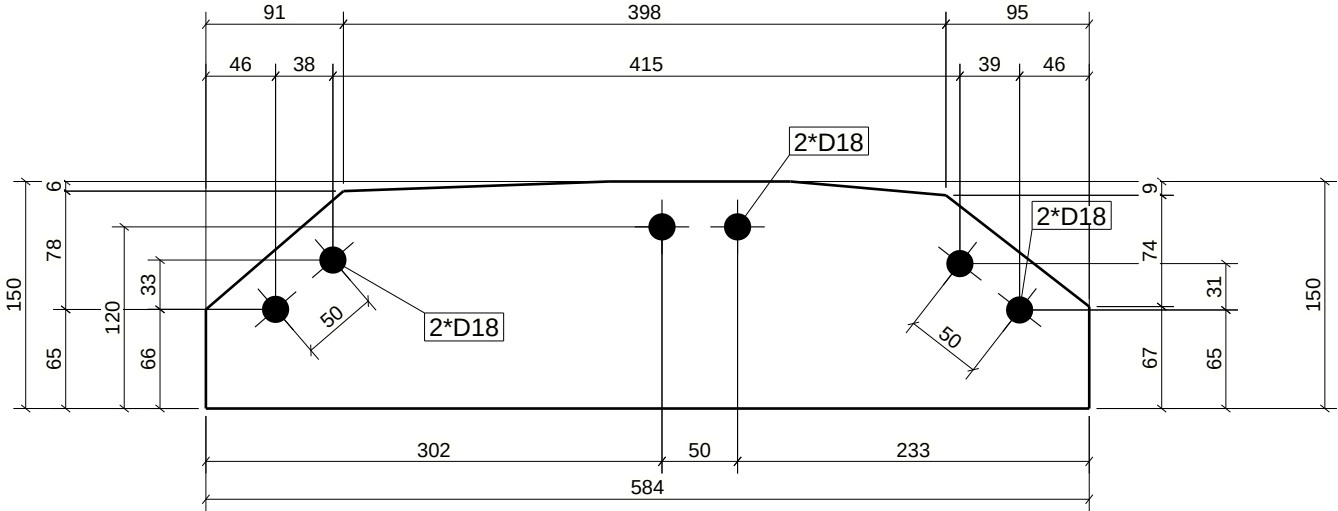
Zymuo	Profilis	Ilgis	Kiekis	Svoris
pl-25	PL12*179	227	1	2.4
			Viso:	2.4

PHASE	QUANTITY
129	2



A-41 Kiekis 2

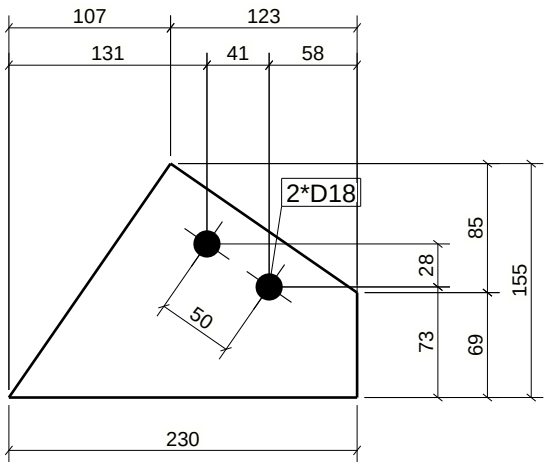
Zymuo	Profilis	Ilgis	Kiekis	Svoris
pl-27	PL12*180	616	1	9.8
			Viso:	9.8



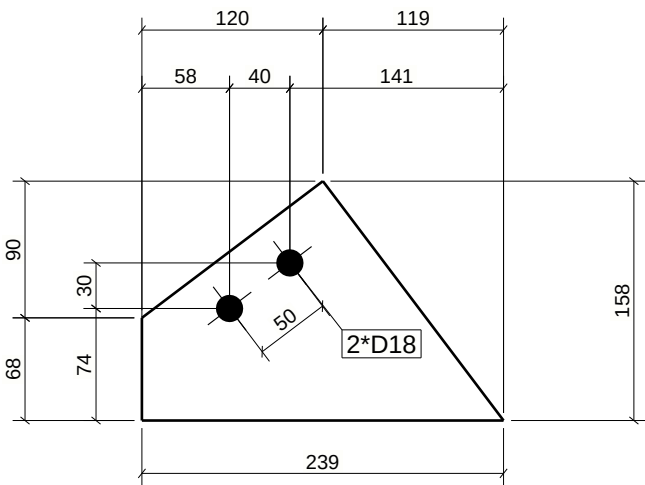
A-42 Kiekis 2

PHASE	QUANTITY
129	2

Zymuo	Profilis	Ilgis	Kiekis	Svoris
pl-35	PL12*150	584	1	7.4
Viso:				7.4



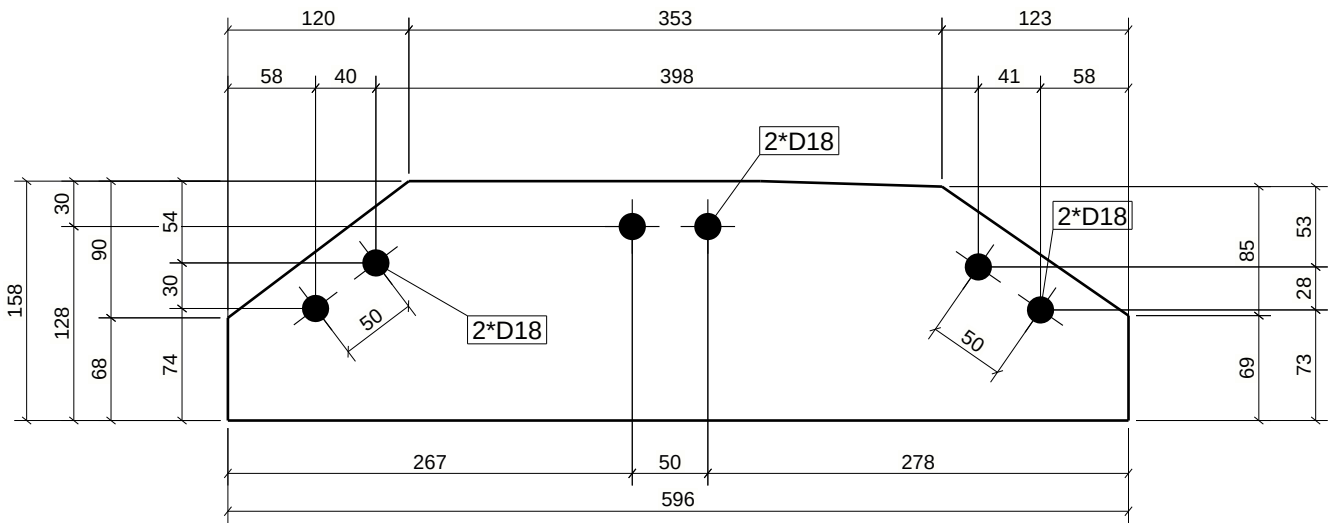
A-43 Kiekis 1



A-44 Kiekis 1

PHASE	QUANTITY
129	1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
pl-44	PL12*158	239	1	2.2
			Viso:	2.2

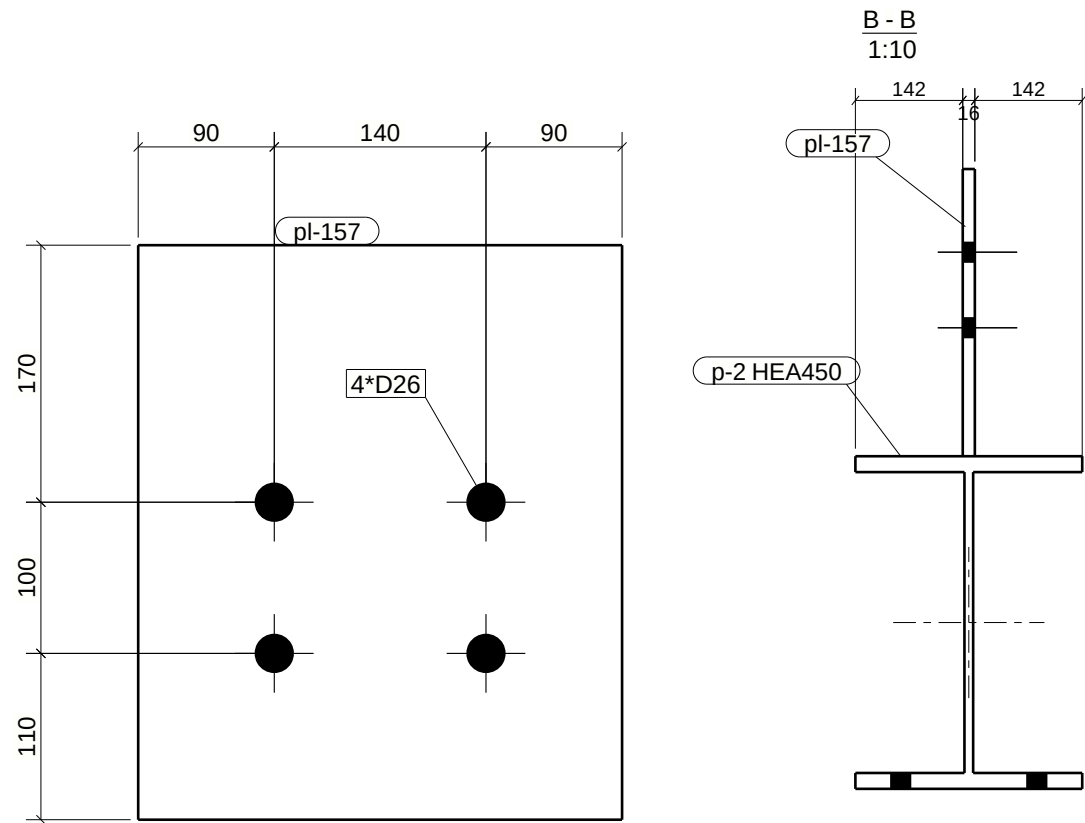
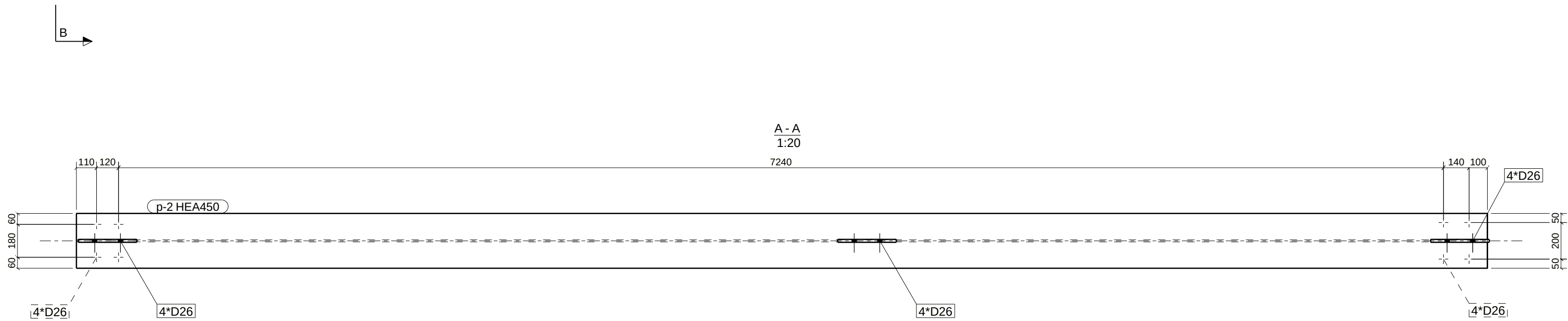
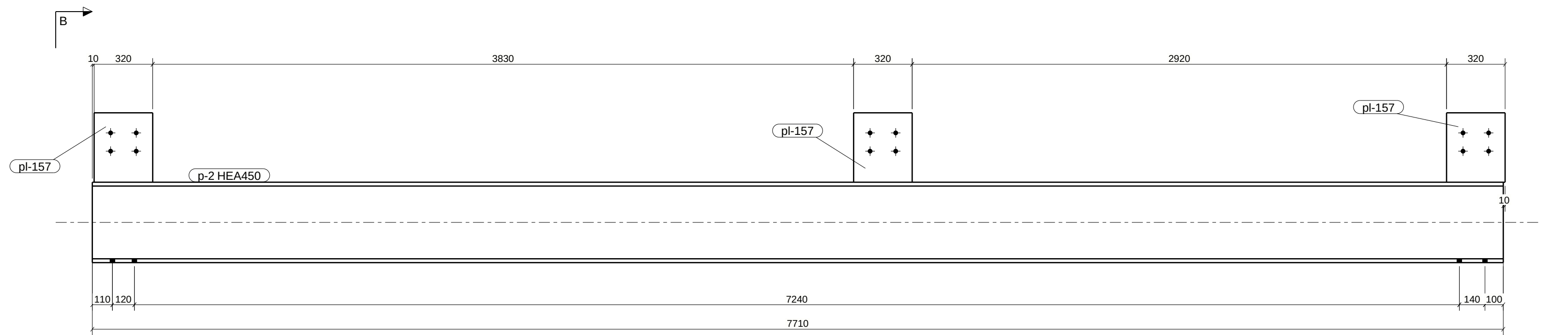


A-46 Kiekis 1

PHASE	QUANTITY
129	1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
pl-46	PL12*158	596	1	7.8
			Viso:	7.8

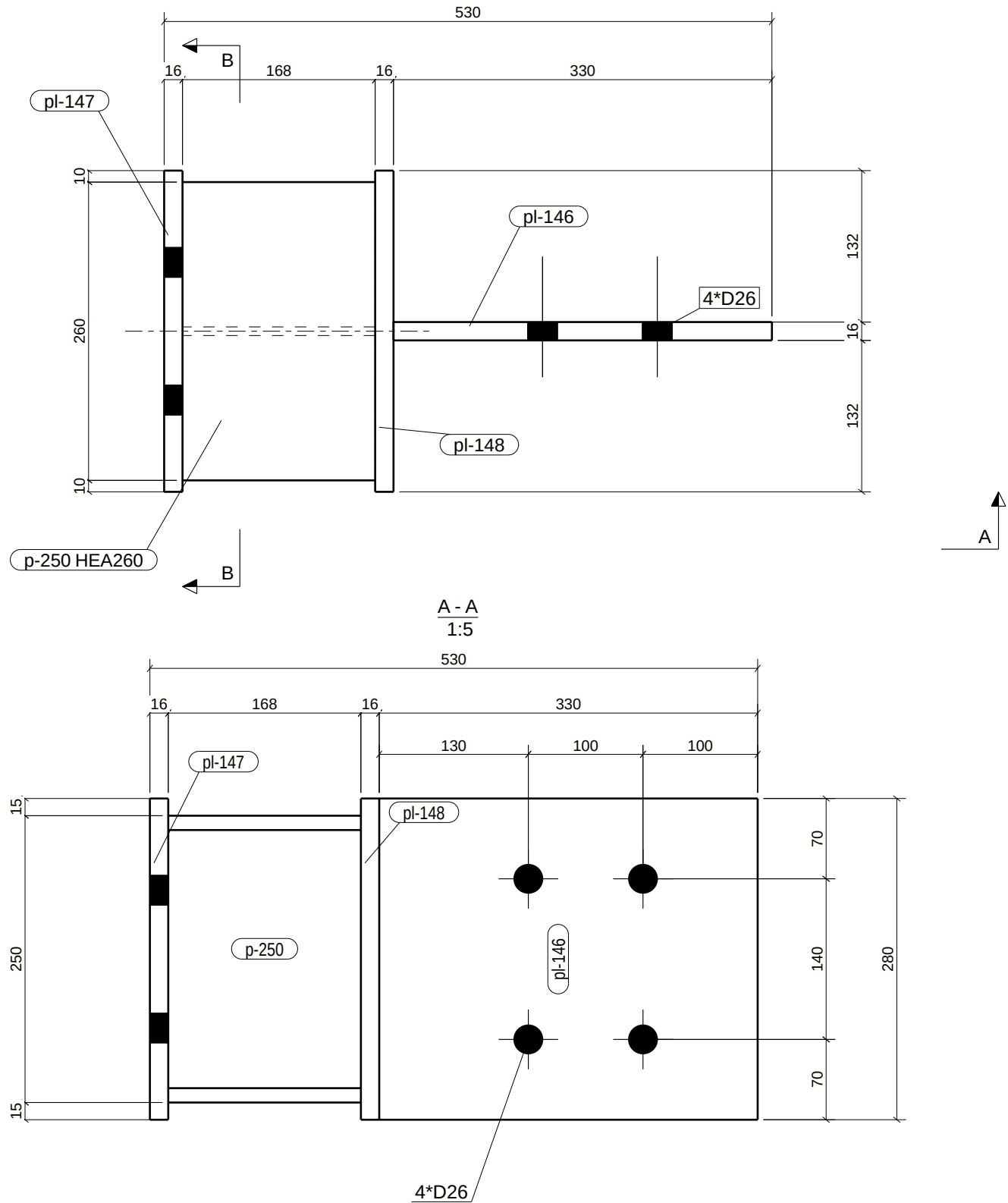
PHASE	QUANTITY
125	2



ADS-1 Kiekis 2

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-2	HEA450	7710	1	1077.3
pl-157	BL16*380	320	3	15.3
			Viso:	1123.1

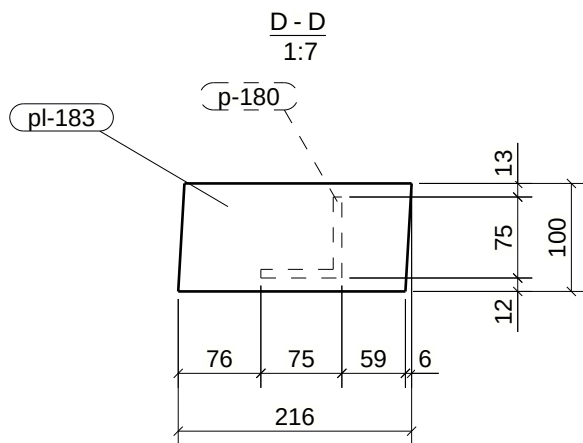
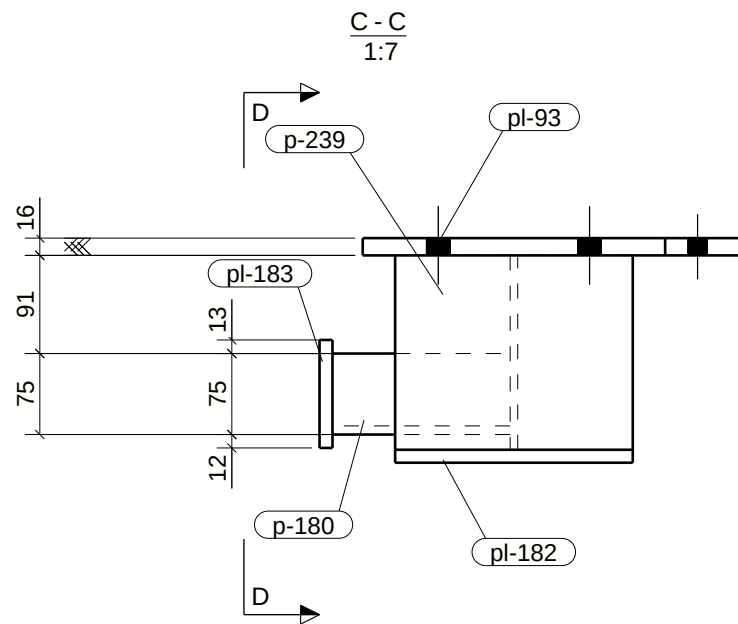
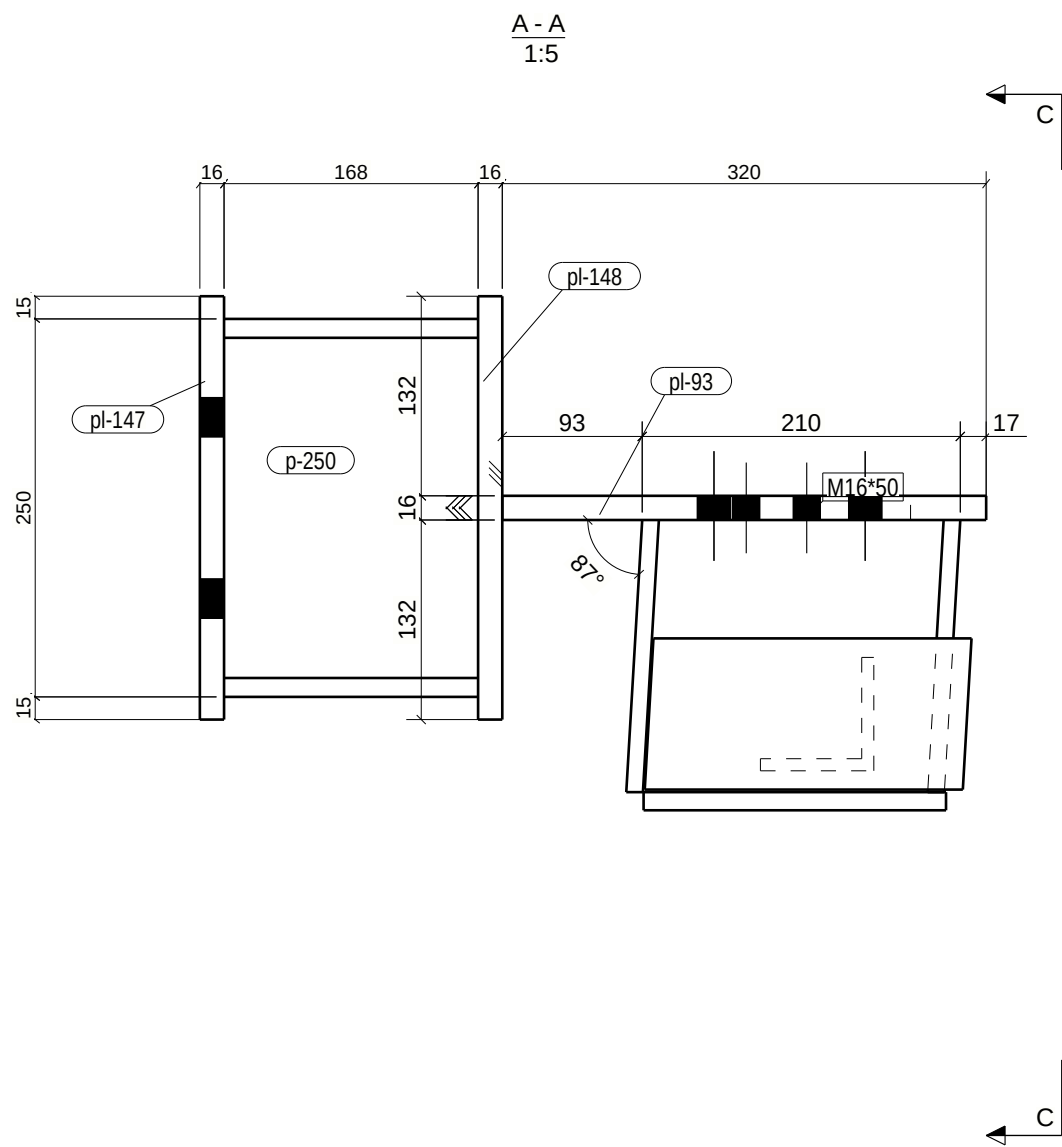
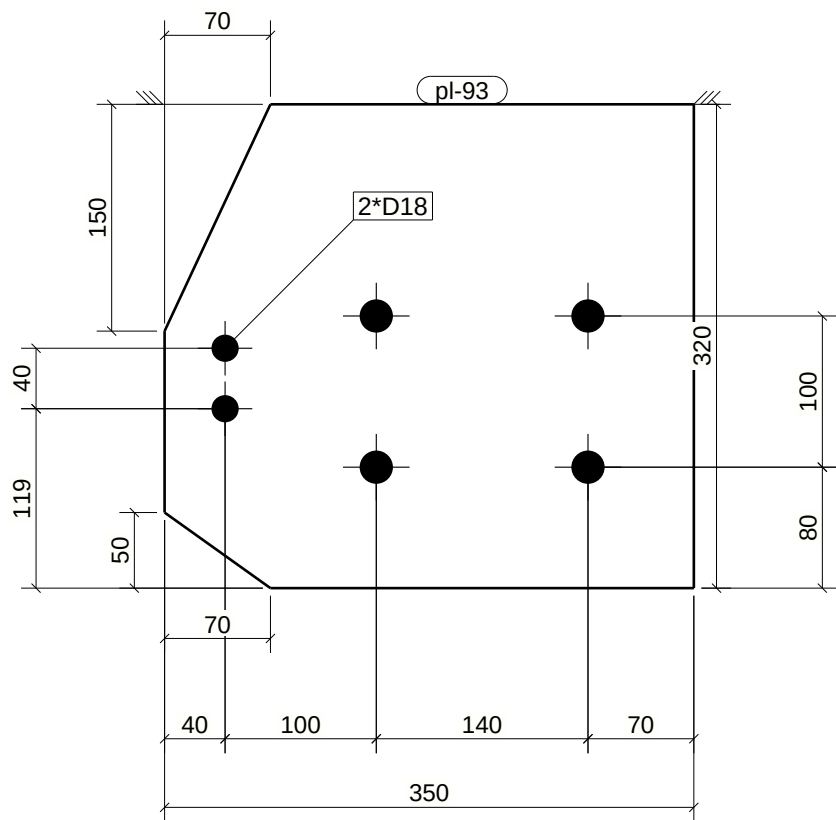
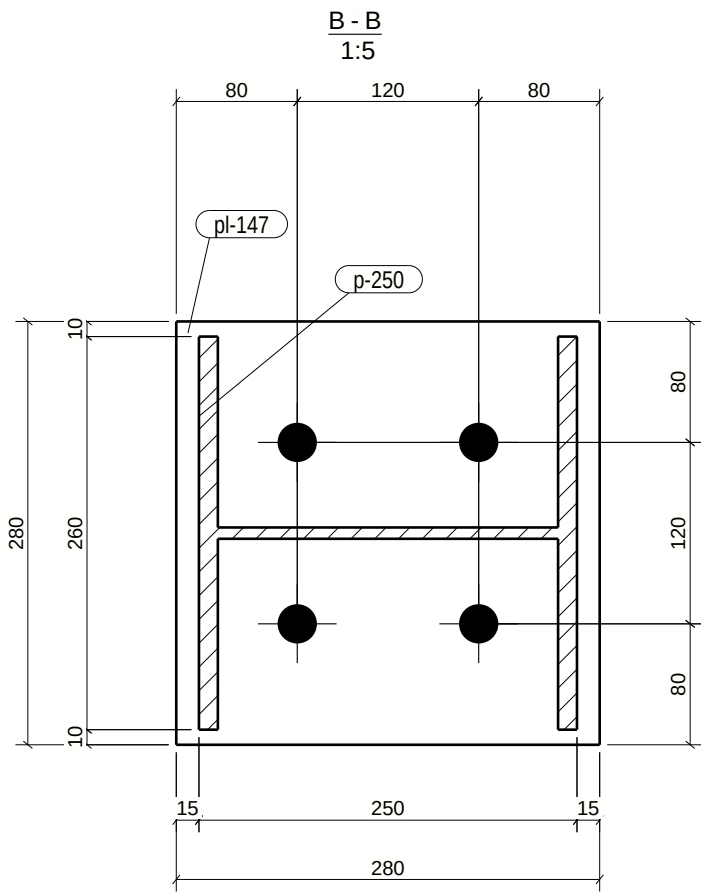
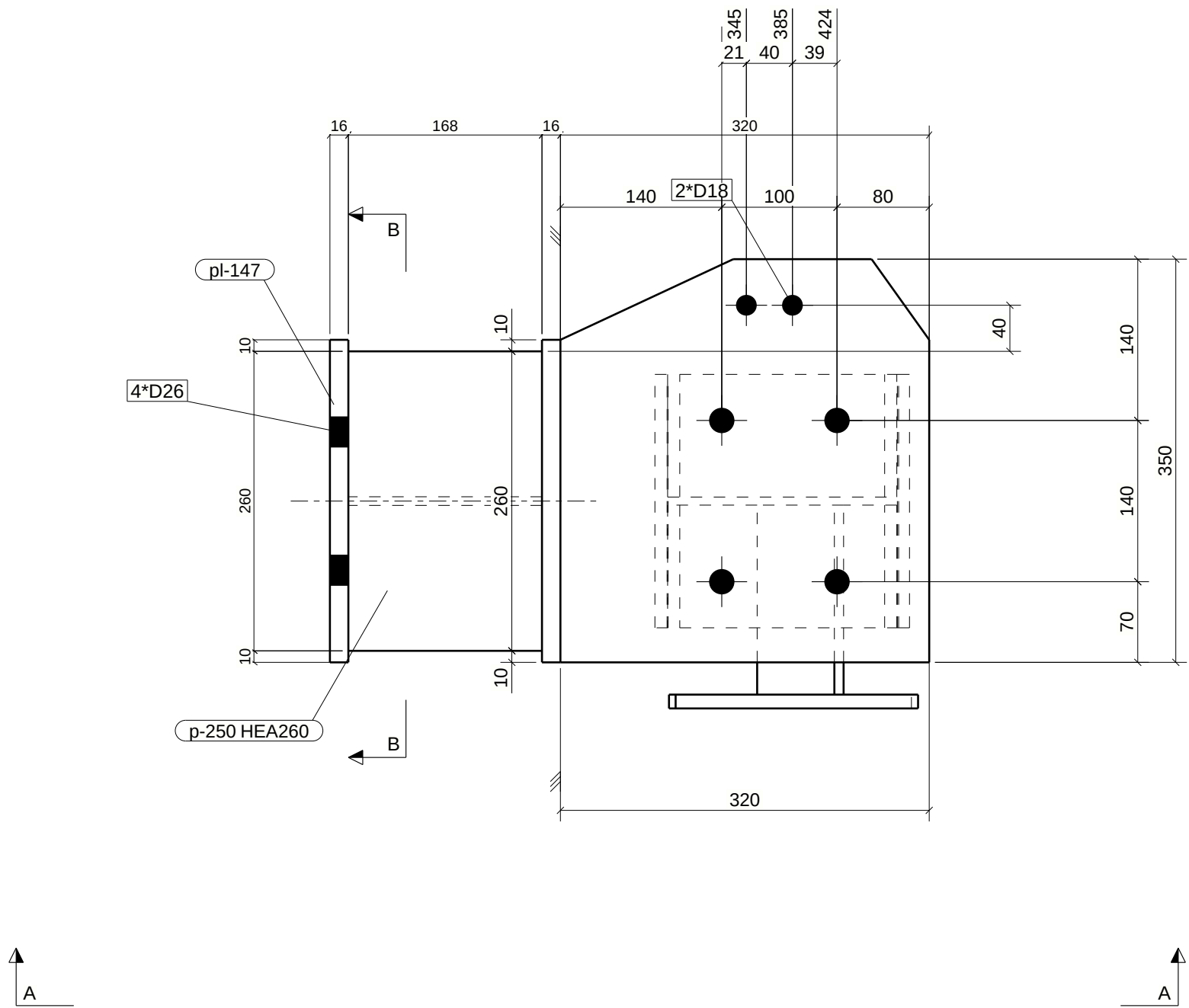
PHASE	QUANTITY
126	2



ANT-2 Kiekis 2

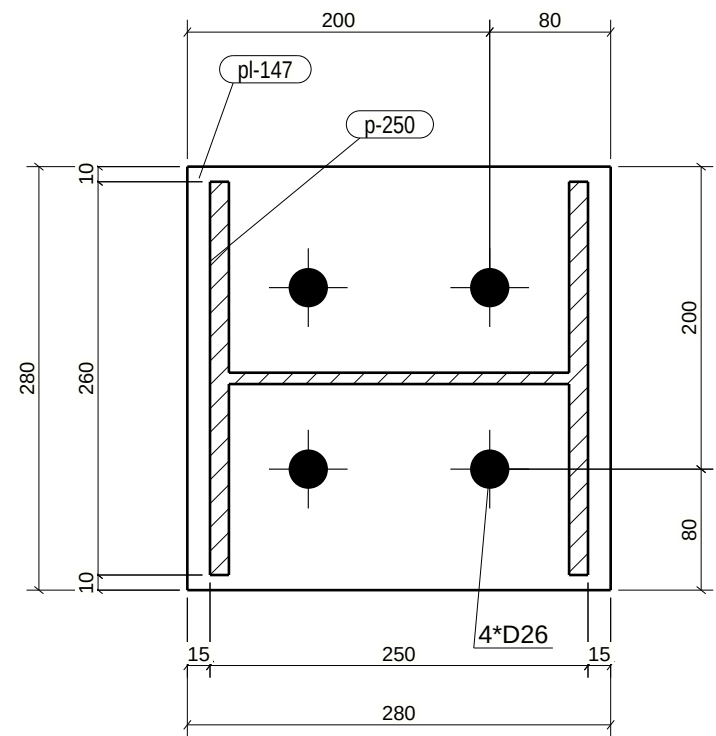
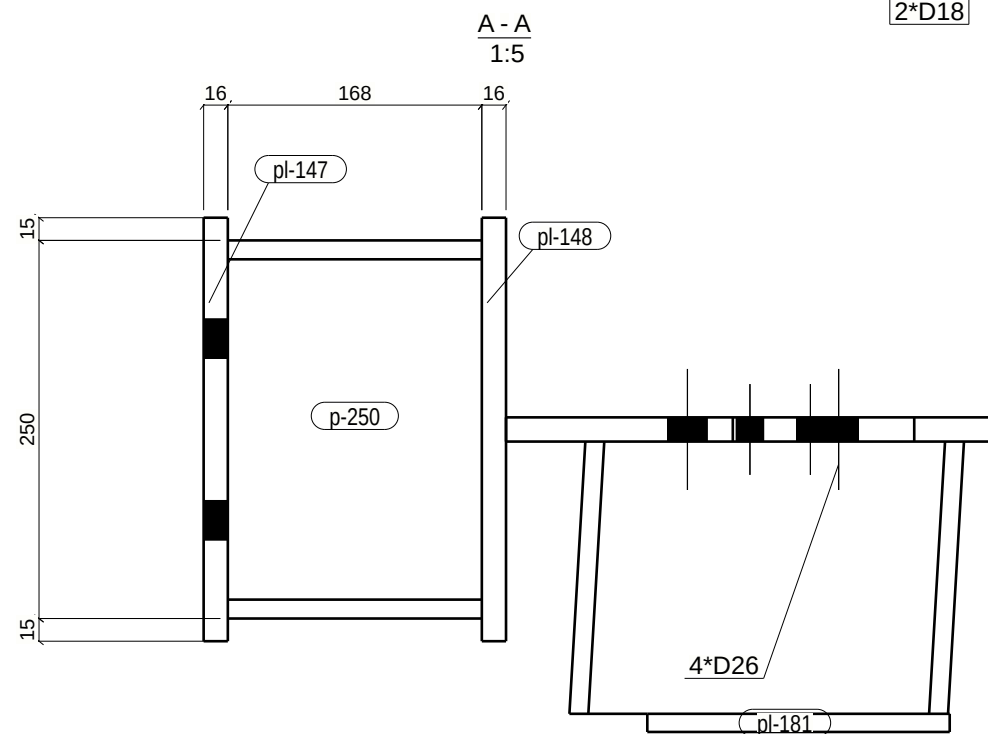
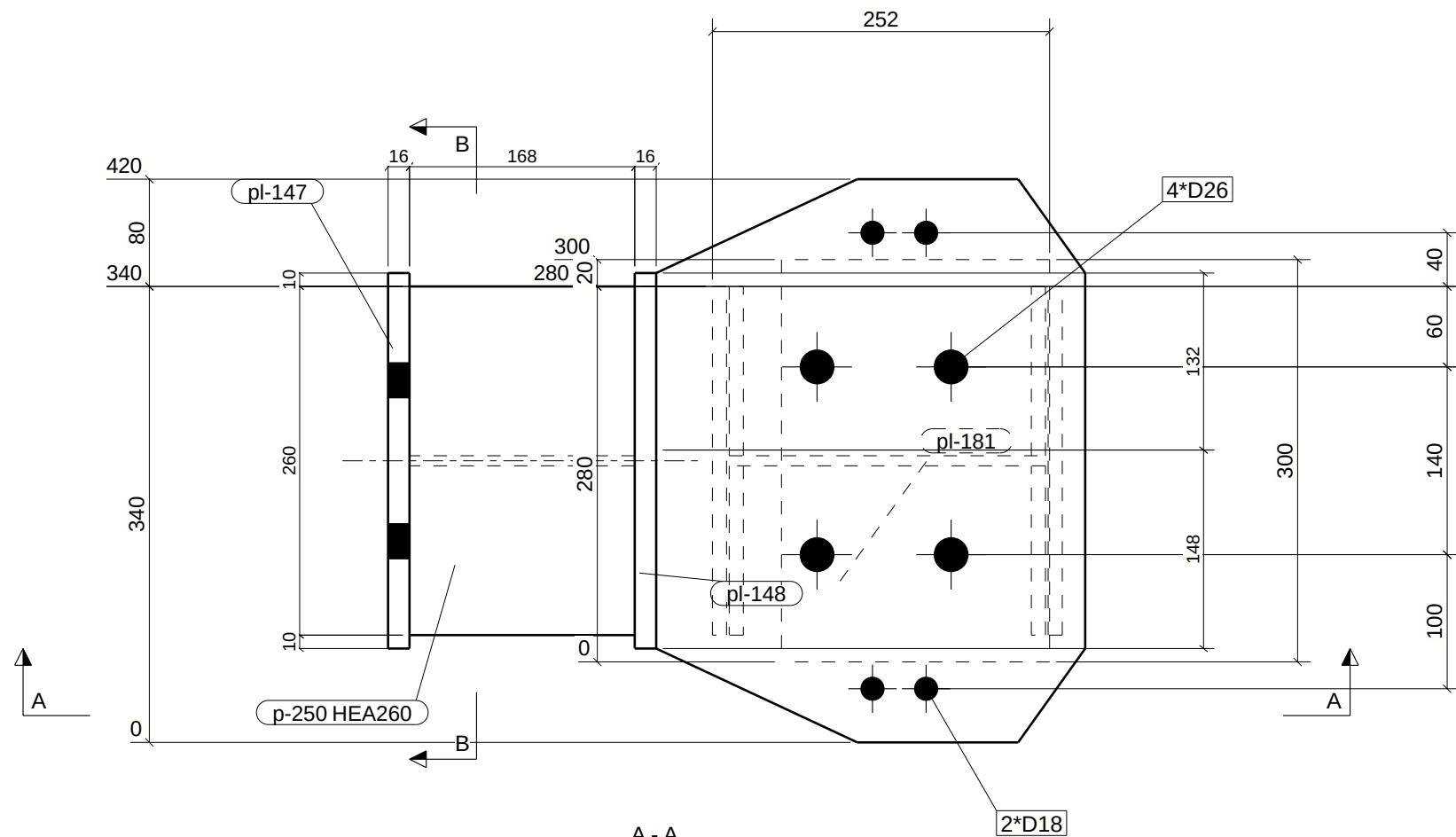
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-250	HEA260	168	1	11.4
pl-146	BL16*330	280	1	11.6
pl-147	PL16*280	280	1	9.8
pl-148	PL16*280	280	1	9.8
			Viso:	42.7

PHASE	QUANTITY
126	1



ANT-3 Kiekis 1

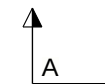
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-180	L75*75*8	164	1	1.5
p-239	HEA220	193	1	9.7
p-250	HEA260	168	1	11.4
pl-93	PL16*320	350	1	13.2
pl-147	PL16*280	280	1	9.8
pl-148	PL16*280	280	1	9.8
pl-182	BL12*200	220	1	4.1
pl-183	BL12*100	216	1	2.0
Viso:				61.7



ANT-4 Kiekis 9

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-54	HEA260	195	1	13.3
p-250	HEA260	168	1	11.4
pl-10	PL16*320	420	1	15.1
pl-147	PL16*280	280	1	9.8
pl-148	PL16*280	280	1	9.8
pl-181	BL12*200	300	1	5.7
			Viso:	65.2

PHASE	QUANTITY
126	9

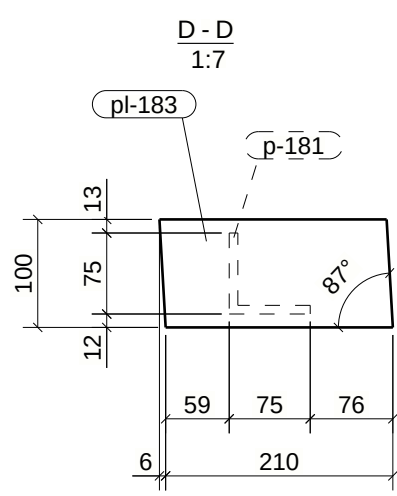
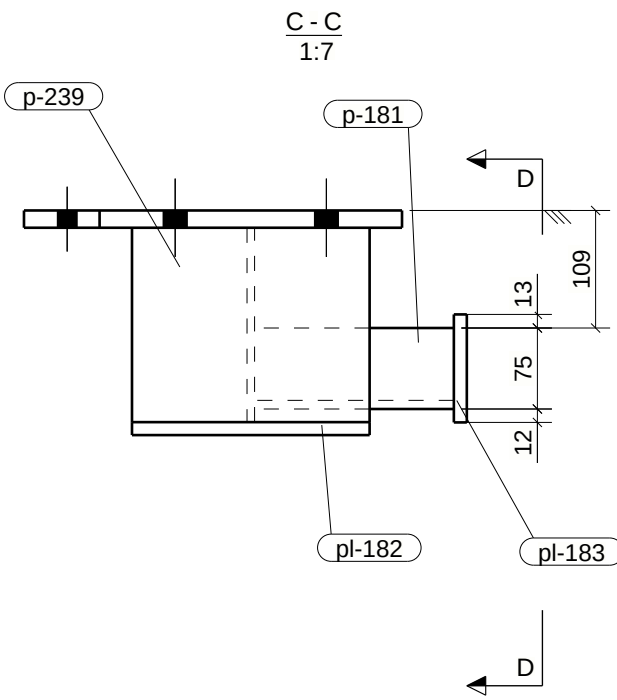
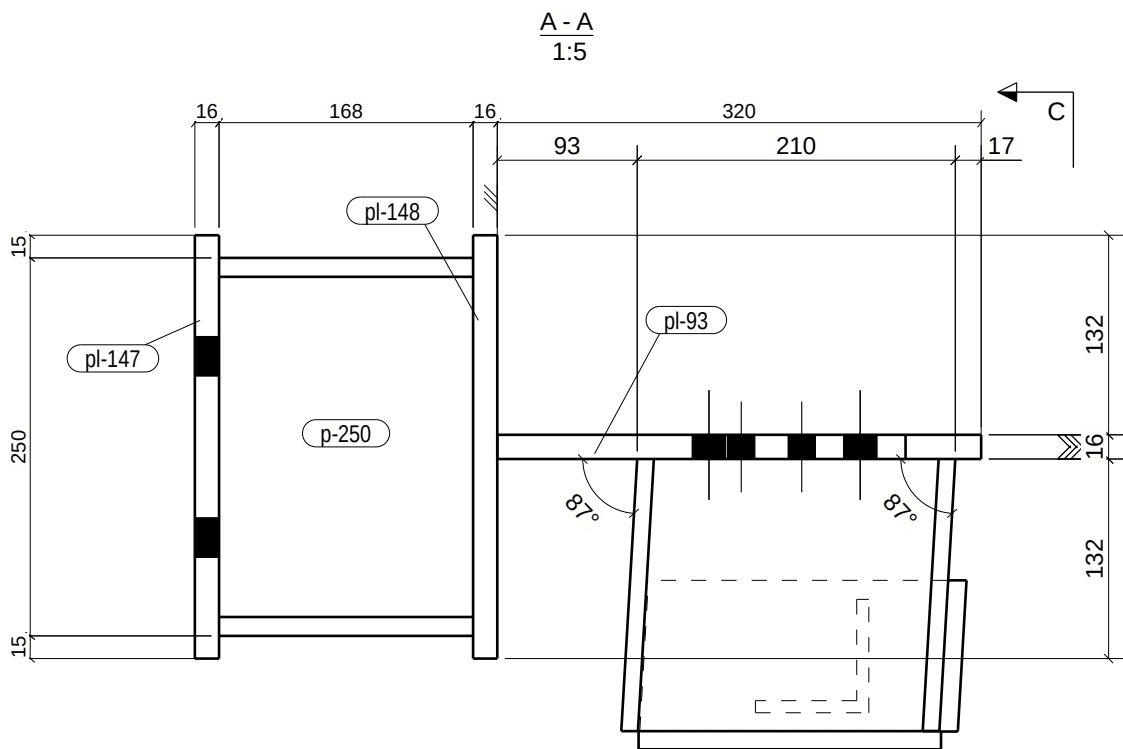
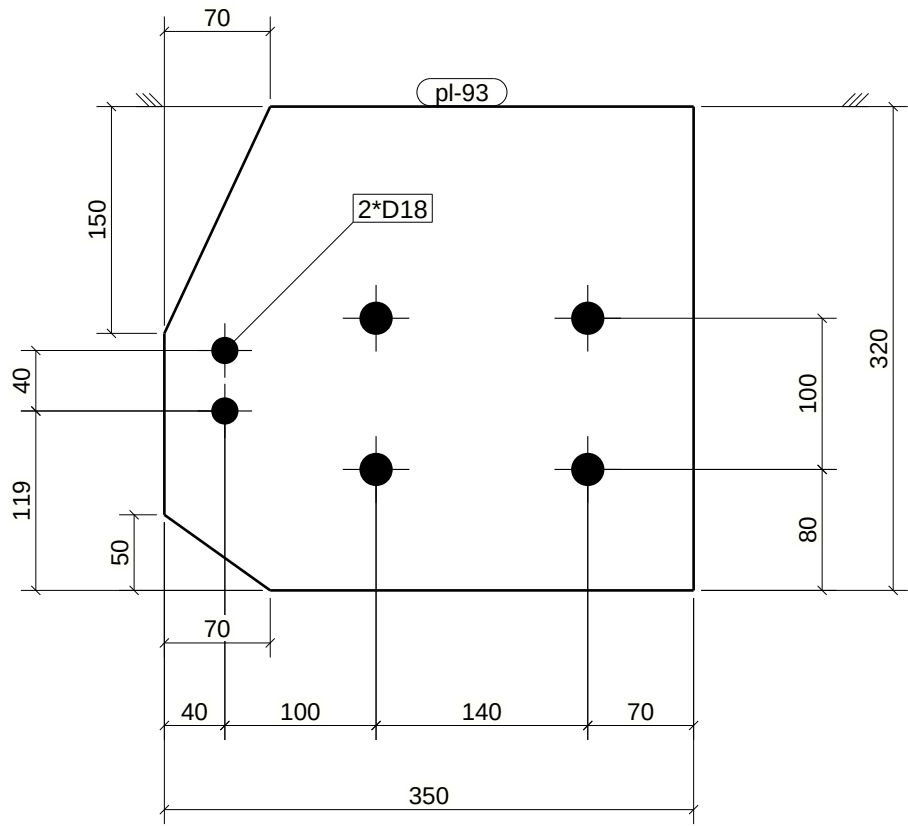
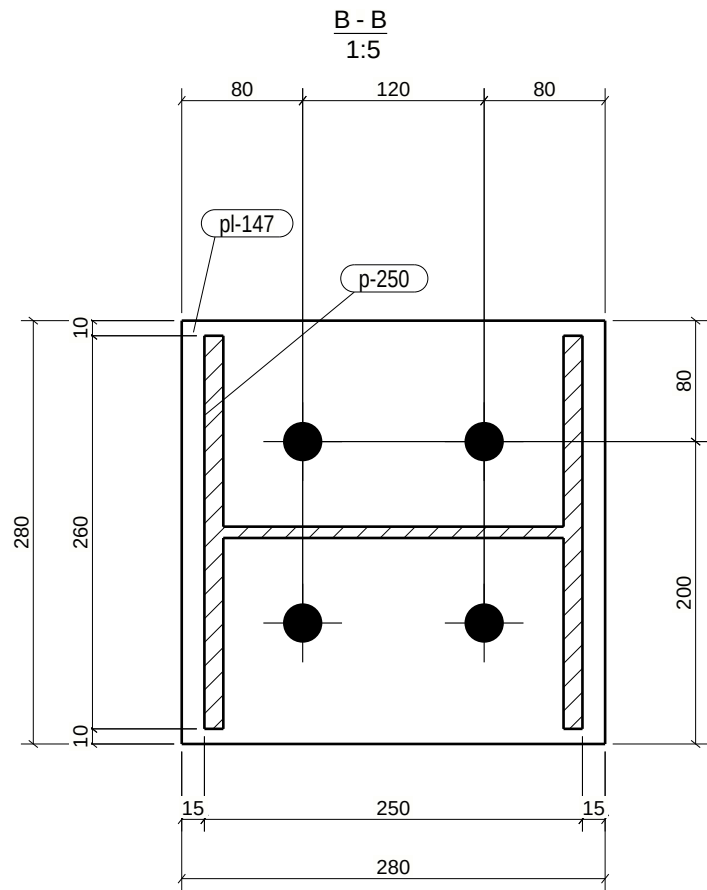
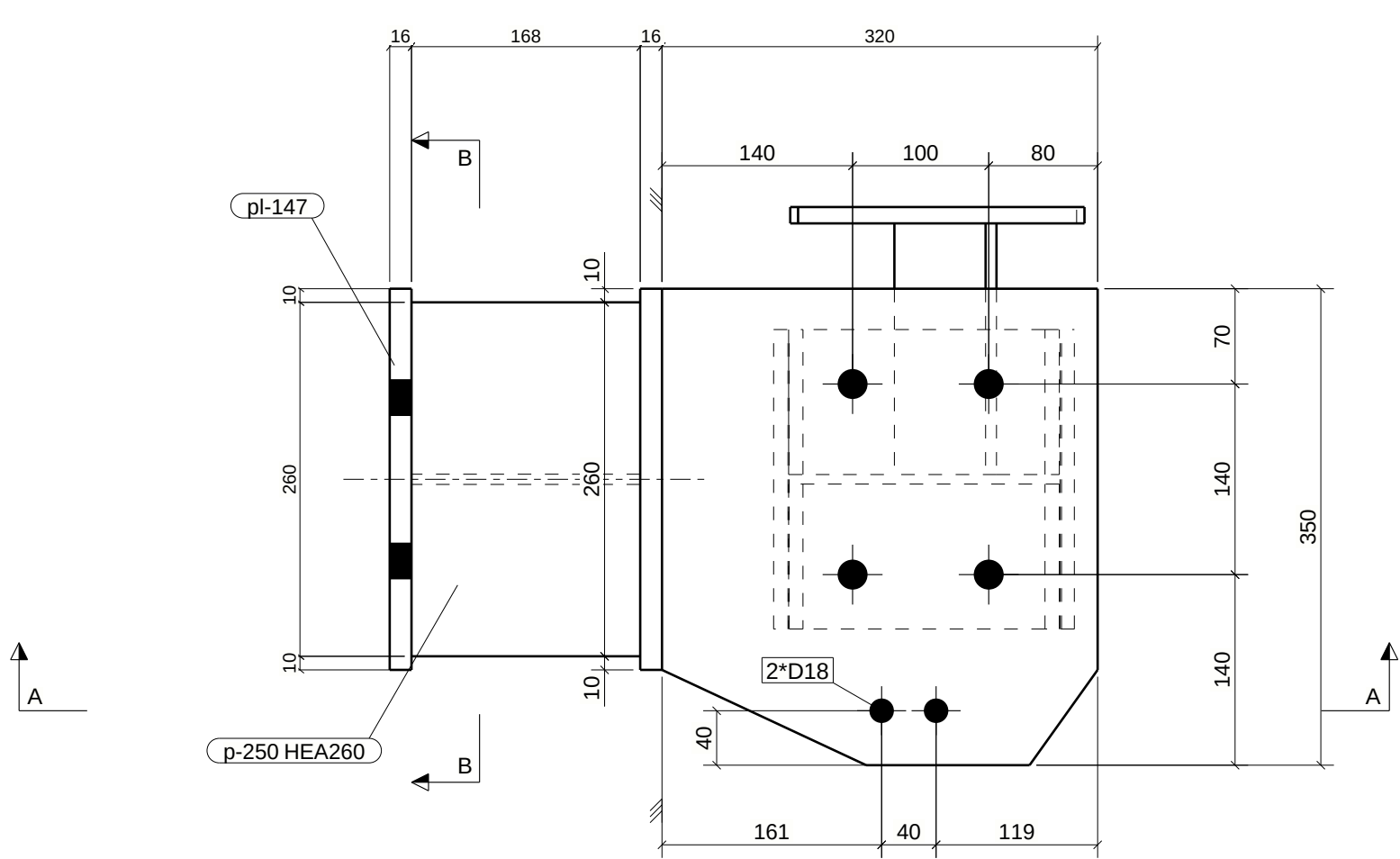


Kiekis 4

Viso:

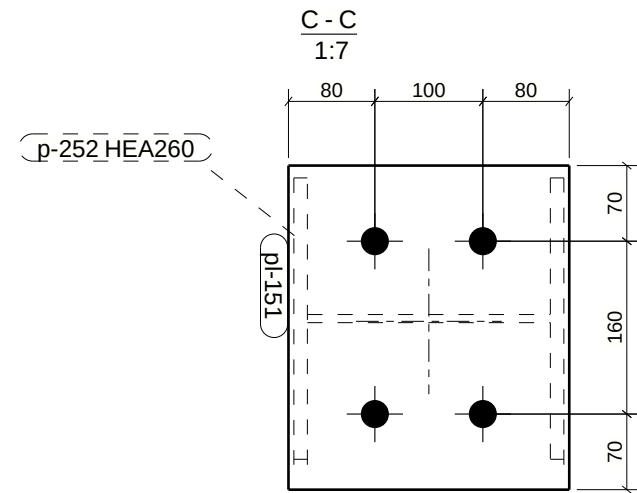
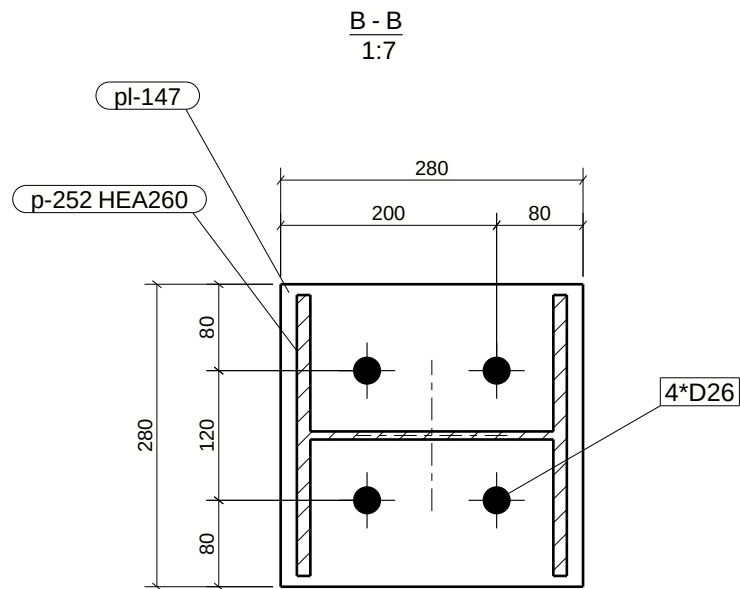
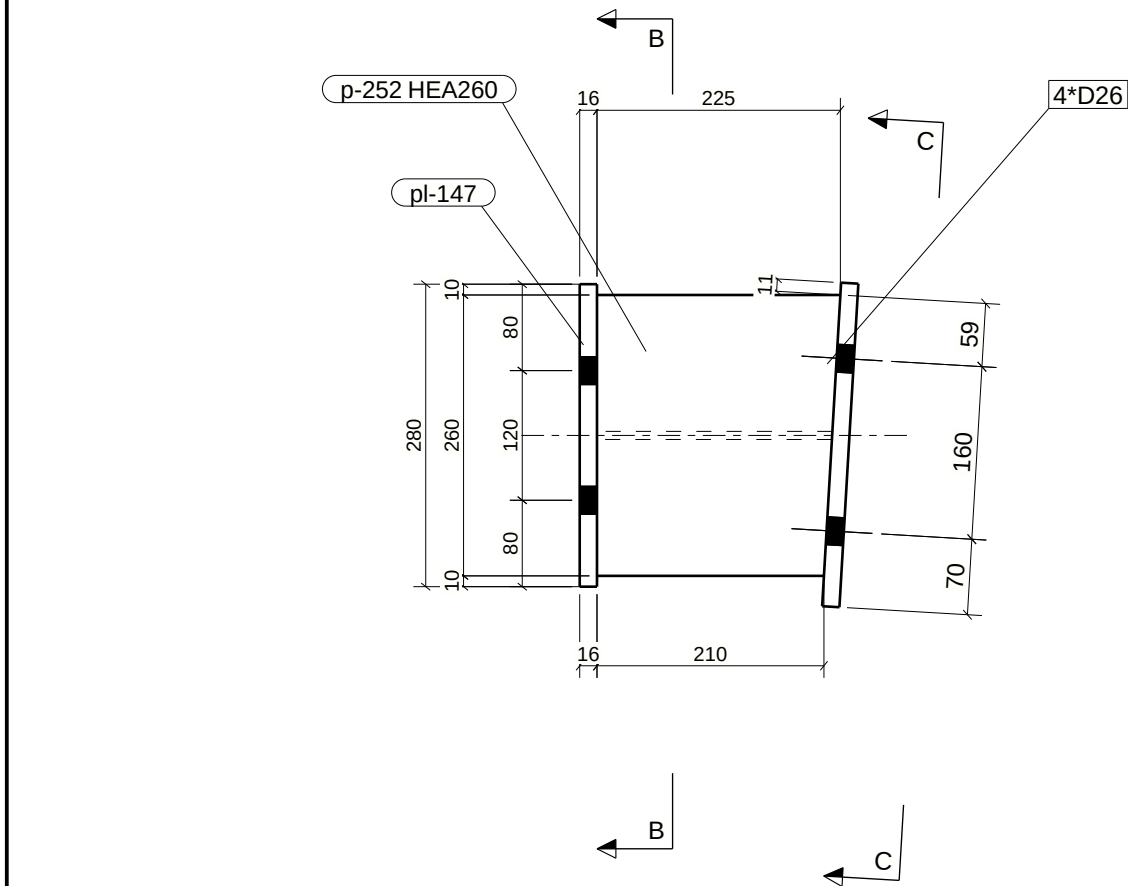
126

PHASE	QUANTITY
126	1



ANT-9 Kiekis 1

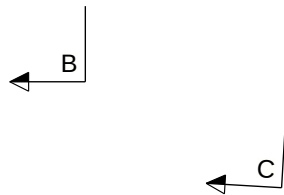
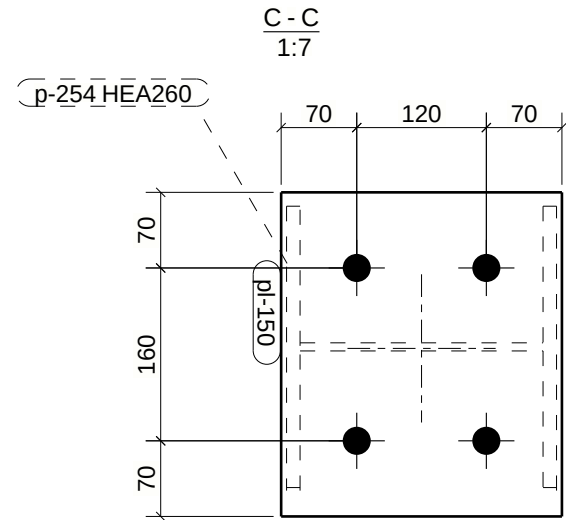
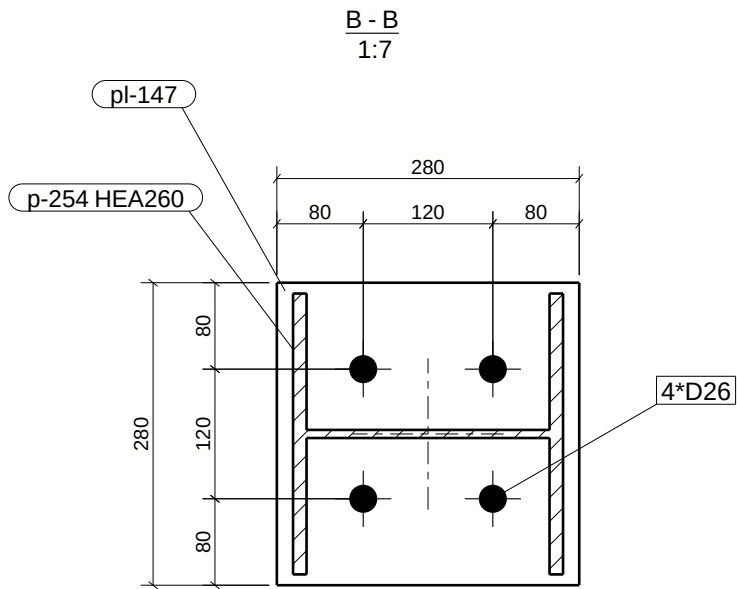
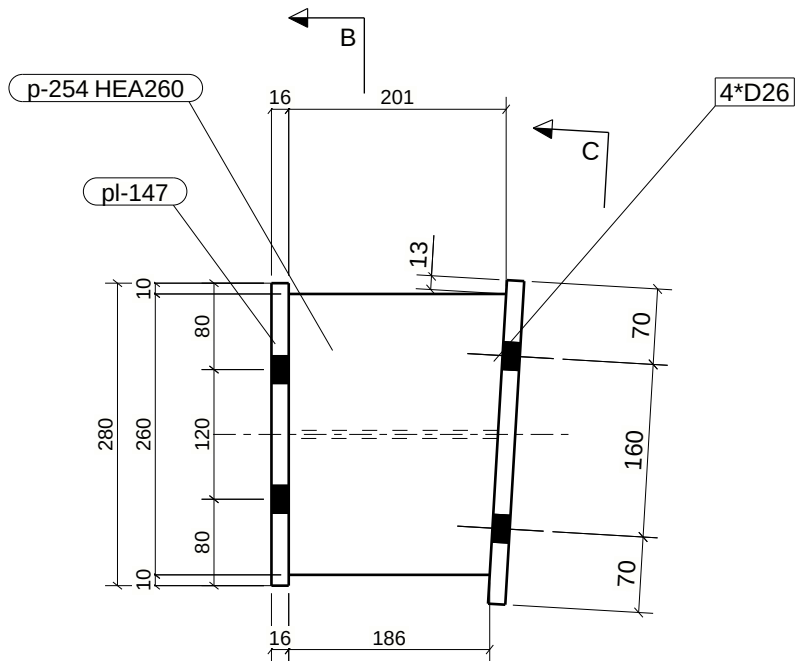
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-181	L75*75*8	184	1	1.6
p-239	HEA220	193	1	9.7
p-250	HEA260	168	1	11.4
pl-93	PL16*320	350	1	13.2
pl-147	PL16*280	280	1	9.8
pl-148	PL16*280	280	1	9.8
pl-182	BL12*200	220	1	4.1
pl-183	BL12*100	216	1	2.0
Viso:				61.8



ANT-13 Kiekis 2

PHASE	QUANTITY
126	2

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-252	HEA260	225	1	15.4
pl-147	PL16*280	280	1	9.8
pl-151	BL16*260	300	1	9.8
Viso:				35.0

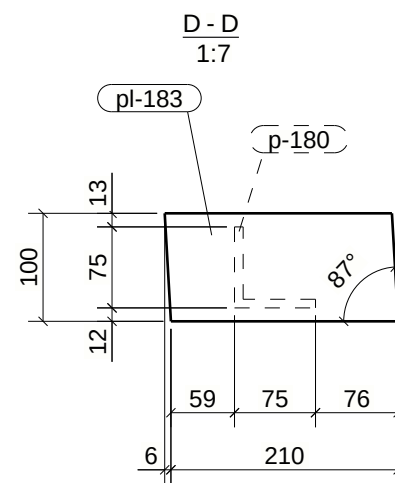
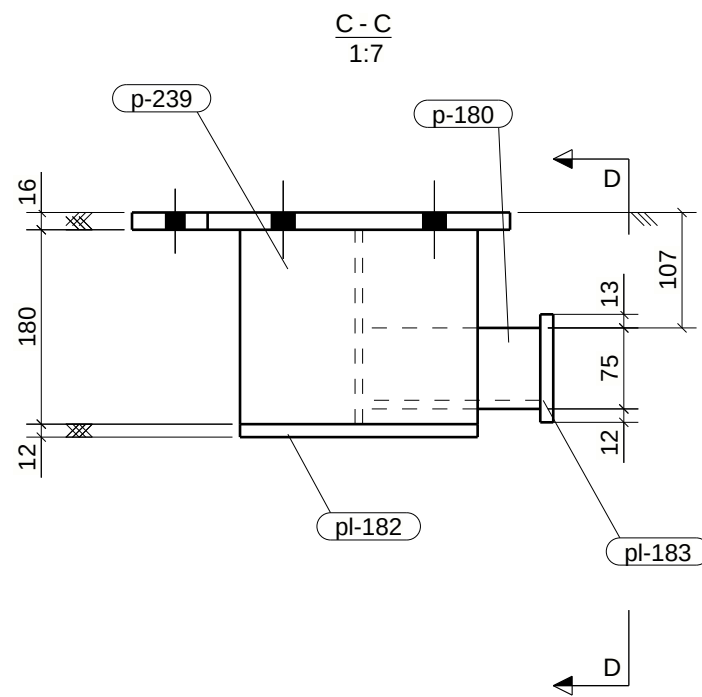
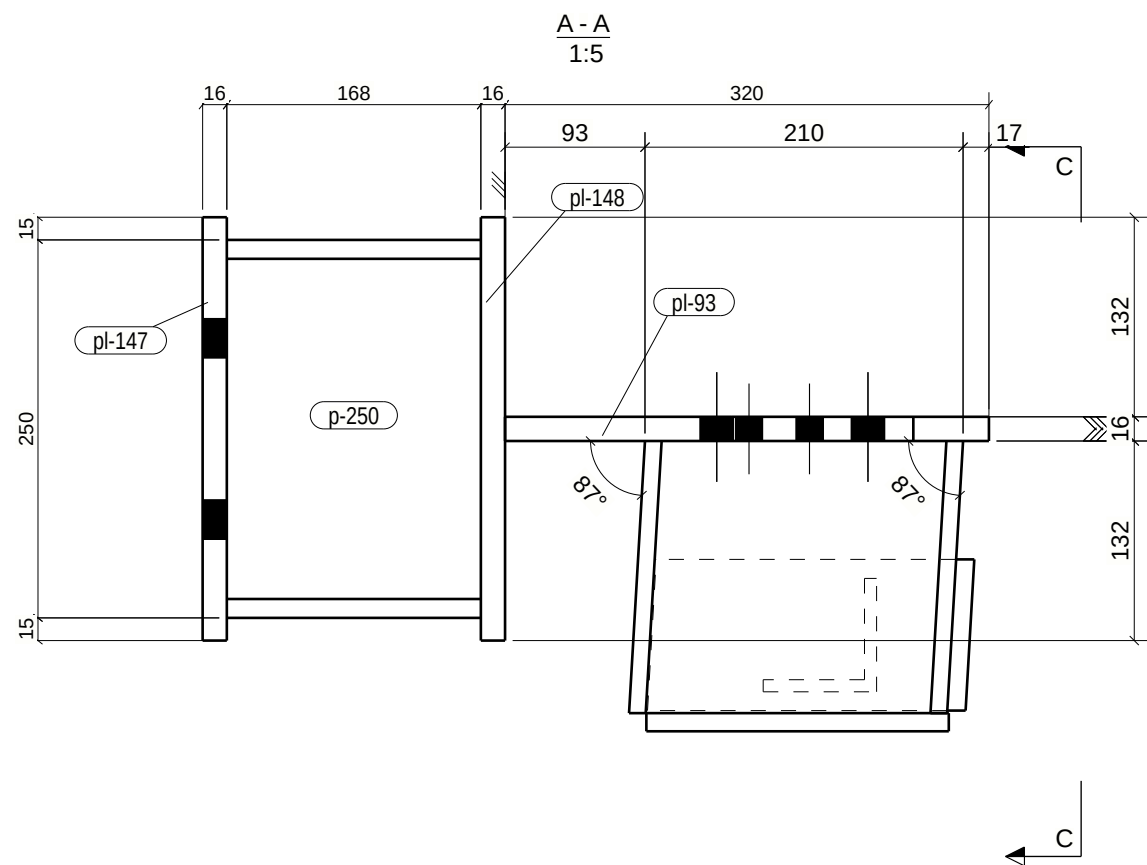
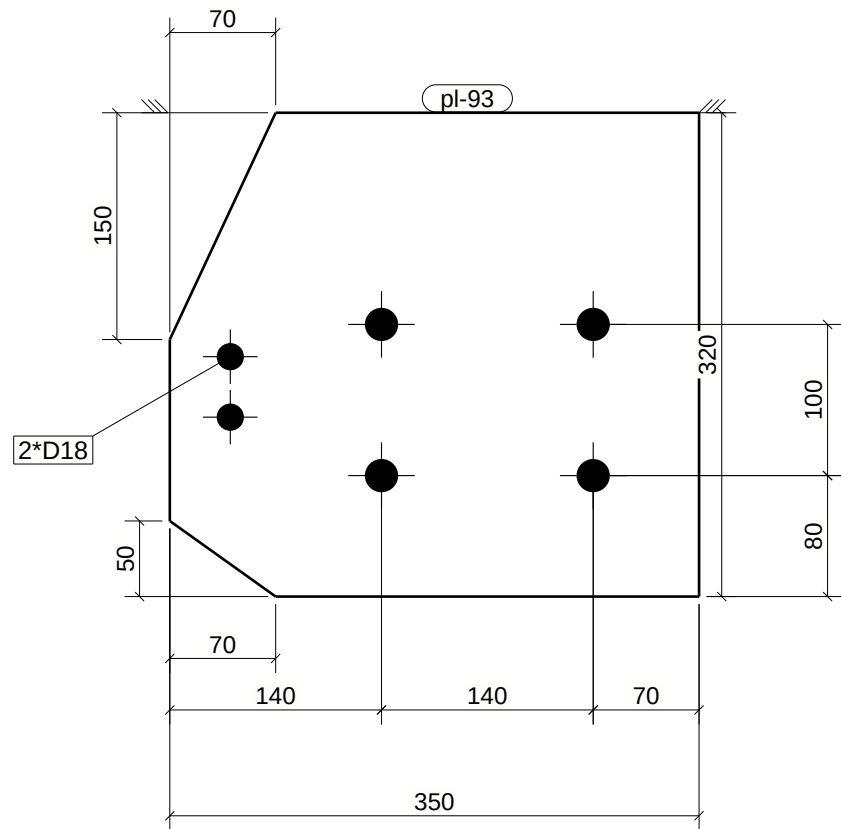
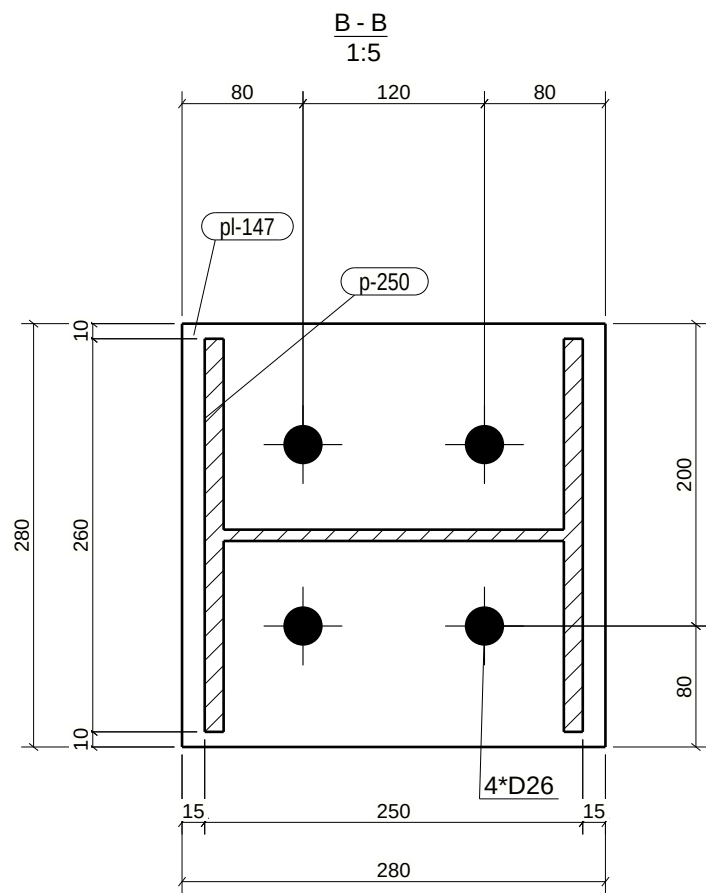
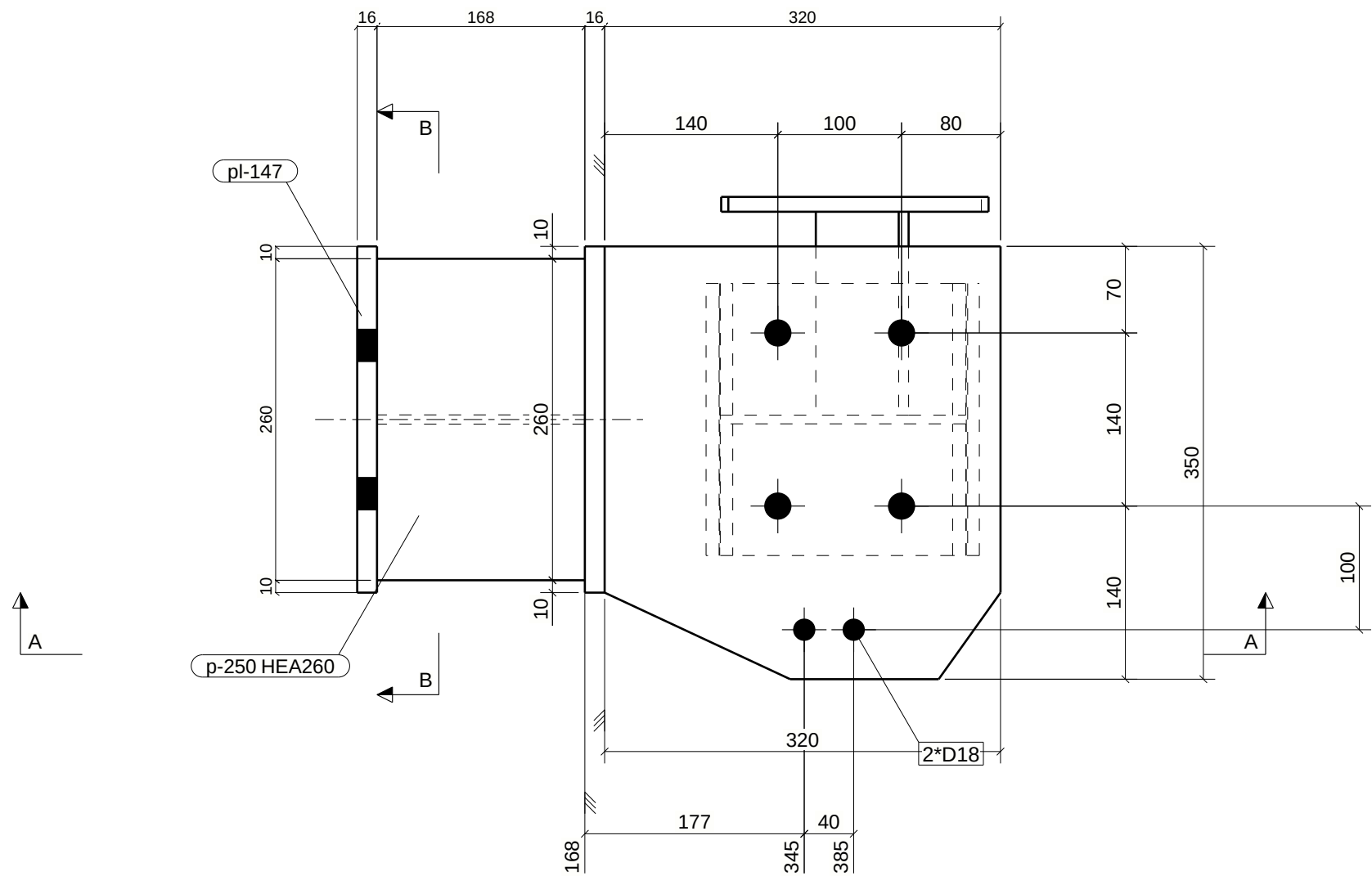


ANT-14 Kiekis 6

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-254	HEA260	201	1	13.7
pl-147	PL16*280	280	1	9.8
pl-150	BL16*260	300	1	9.8
Viso:				33.4

PHASE	QUANTITY
126	6

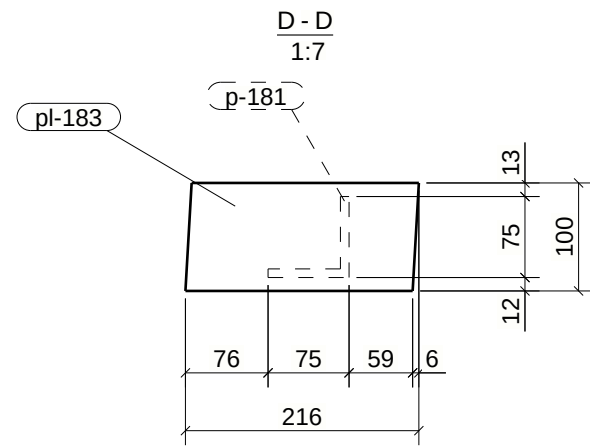
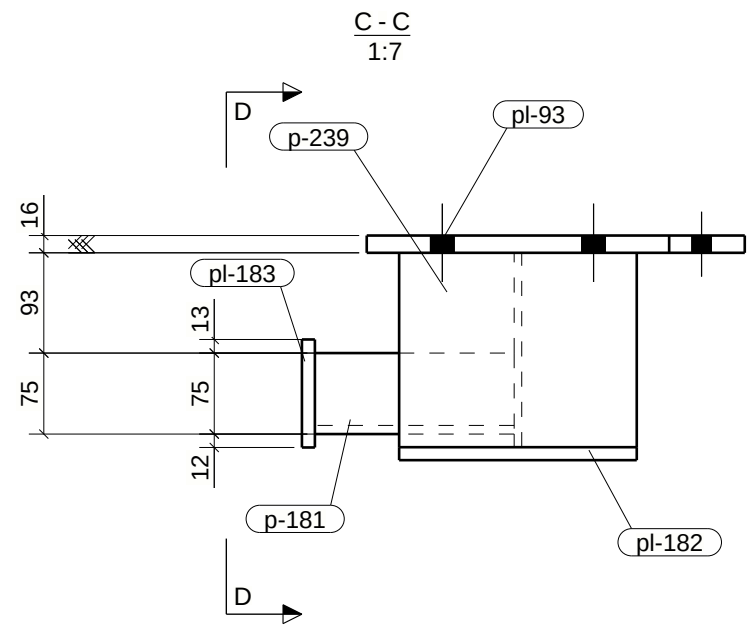
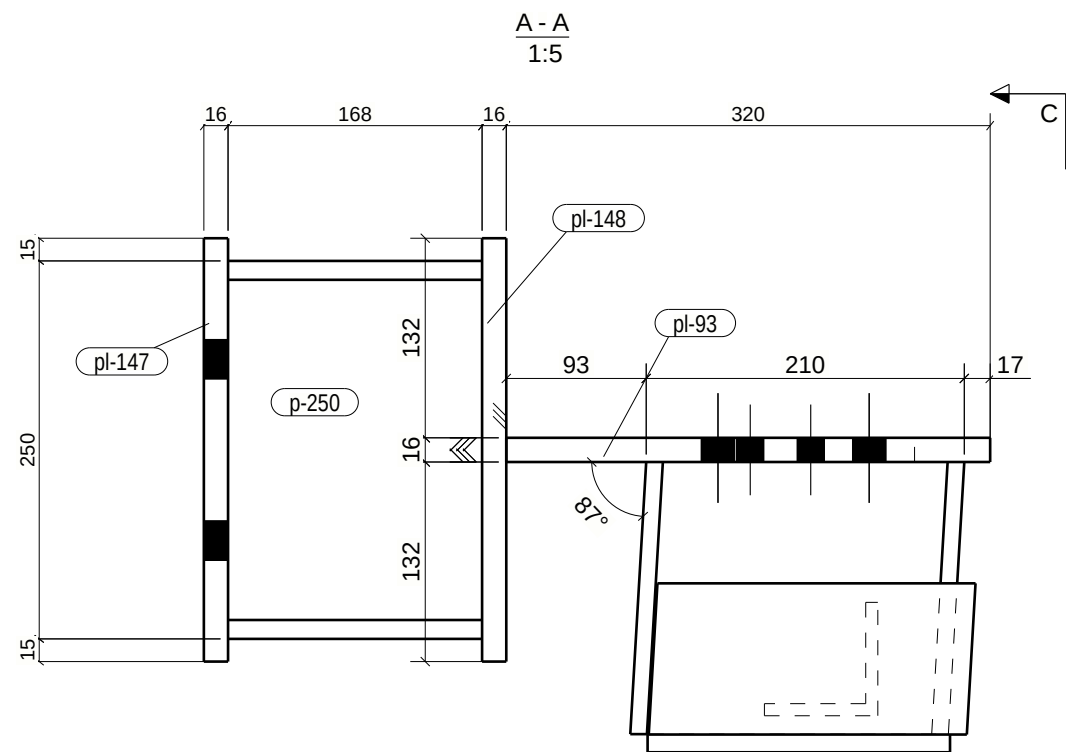
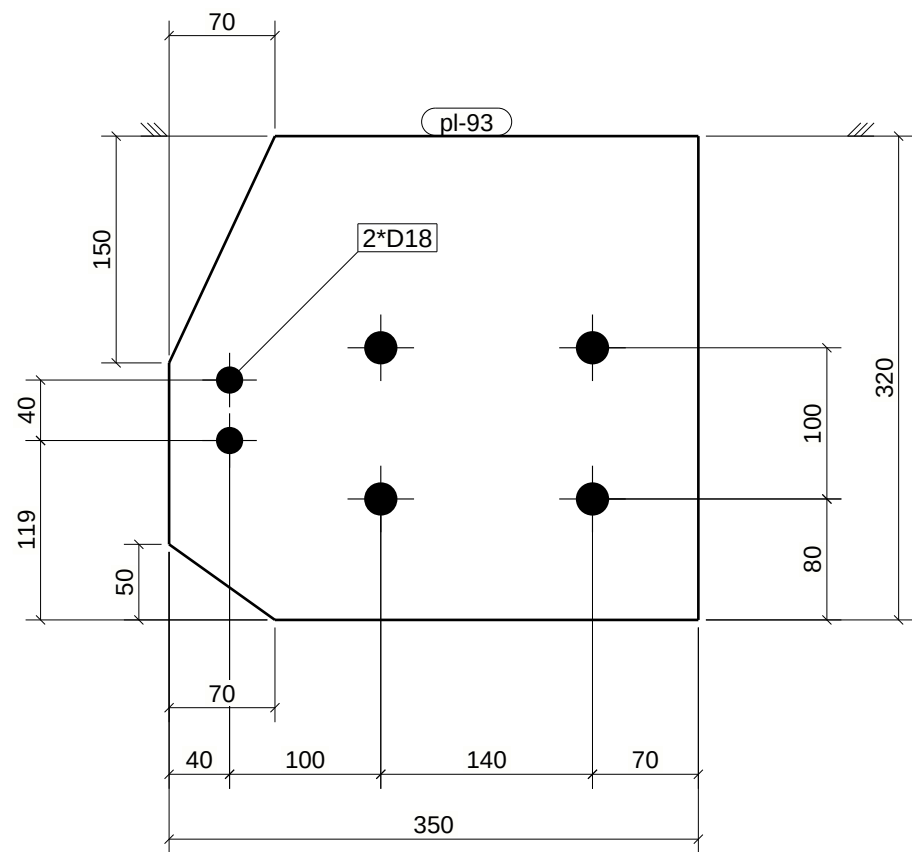
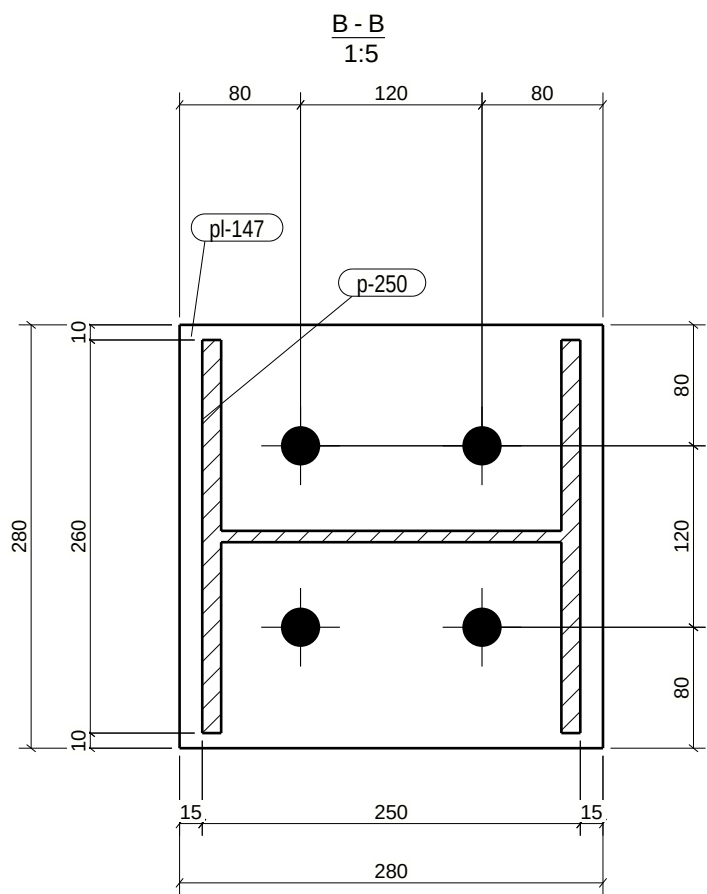
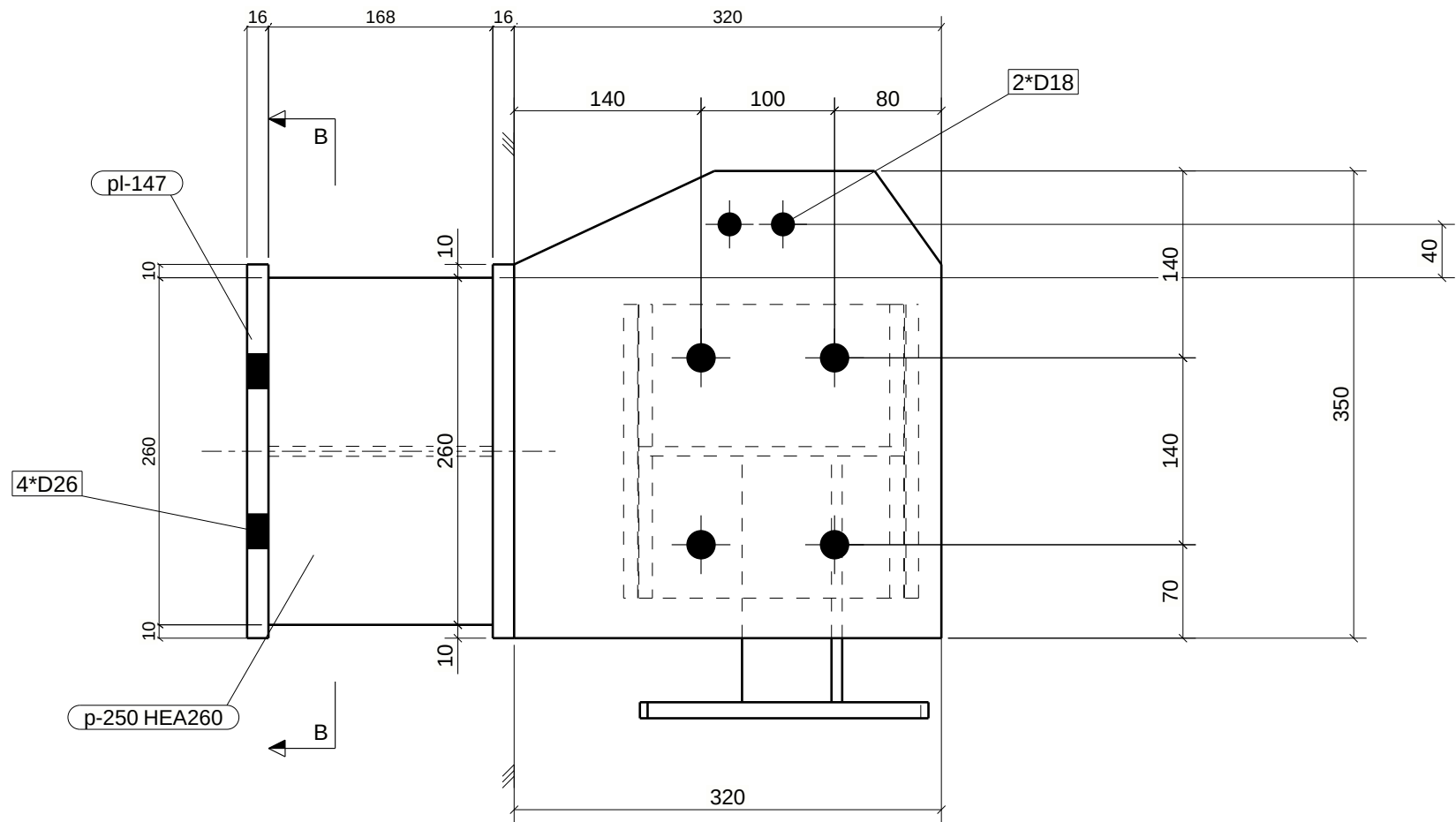
PHASE	QUANTITY
126	1



ANT-16 Kiekis 1

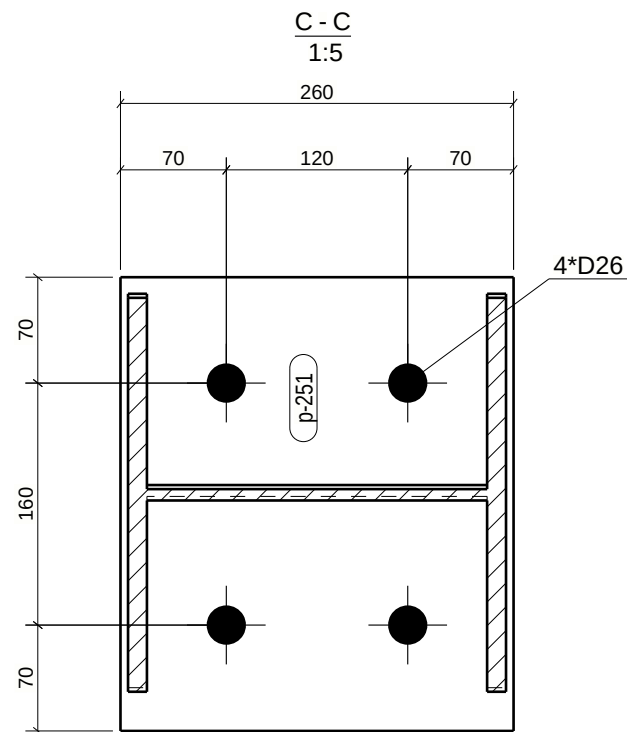
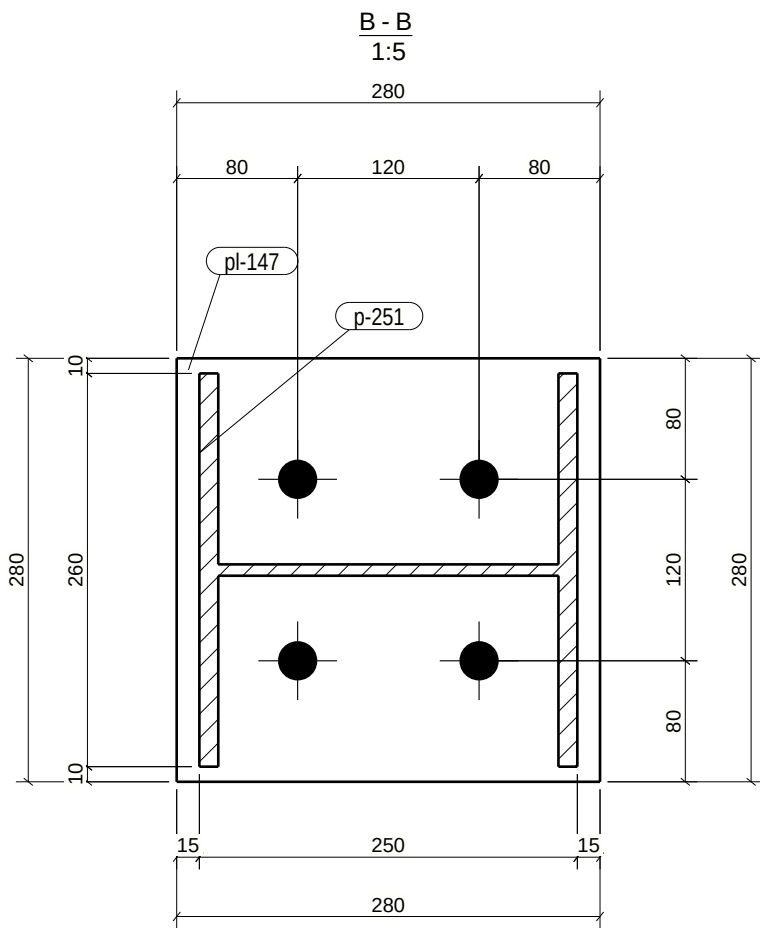
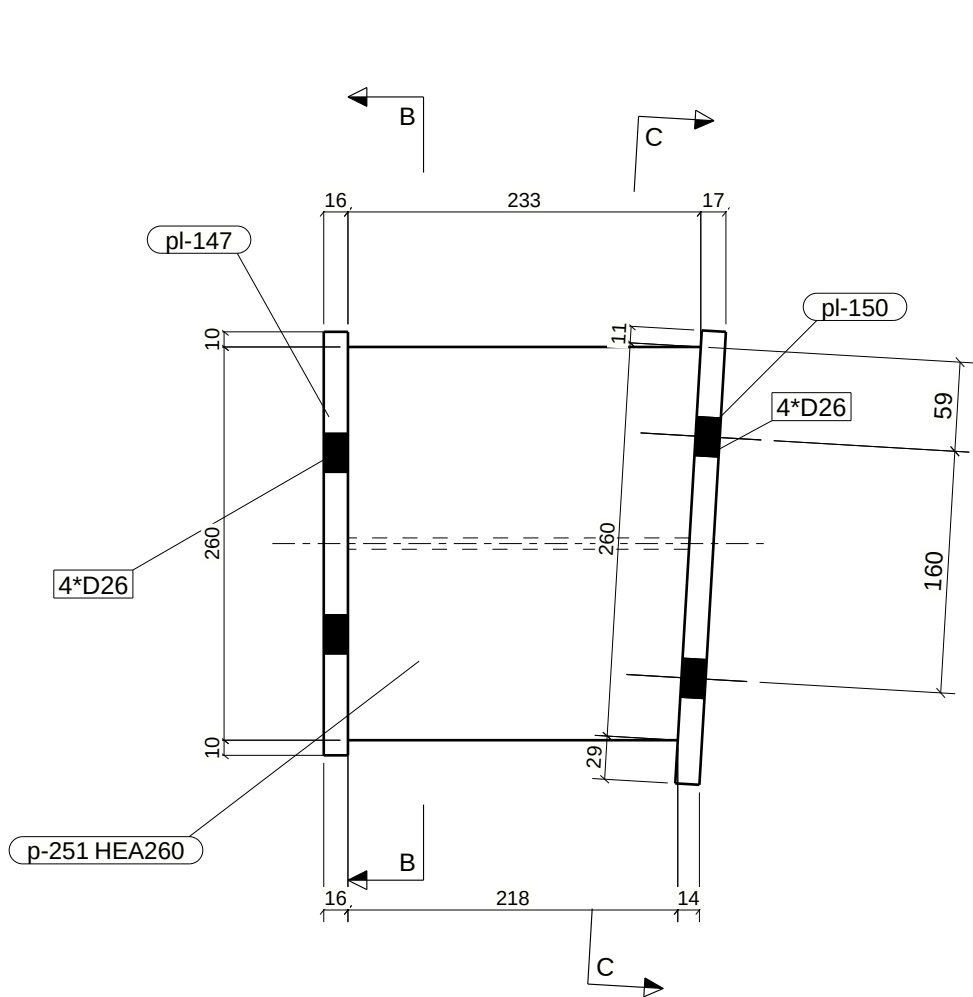
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-180	L75*75*8	164	1	1.5
p-239	HEA220	193	1	9.7
p-250	HEA260	168	1	11.4
pl-93	PL16*320	350	1	13.2
pl-147	PL16*280	280	1	9.8
pl-148	PL16*280	280	1	9.8
pl-182	BL12*200	220	1	4.1
pl-183	BL12*100	216	1	2.0
Viso:				61.7

PHASE	QUANTITY
126	1



ANT-18 Kiekis 1

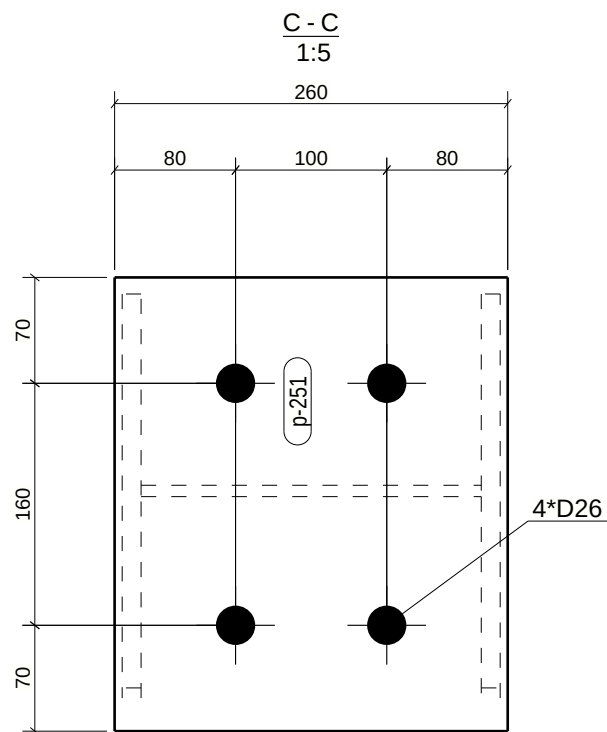
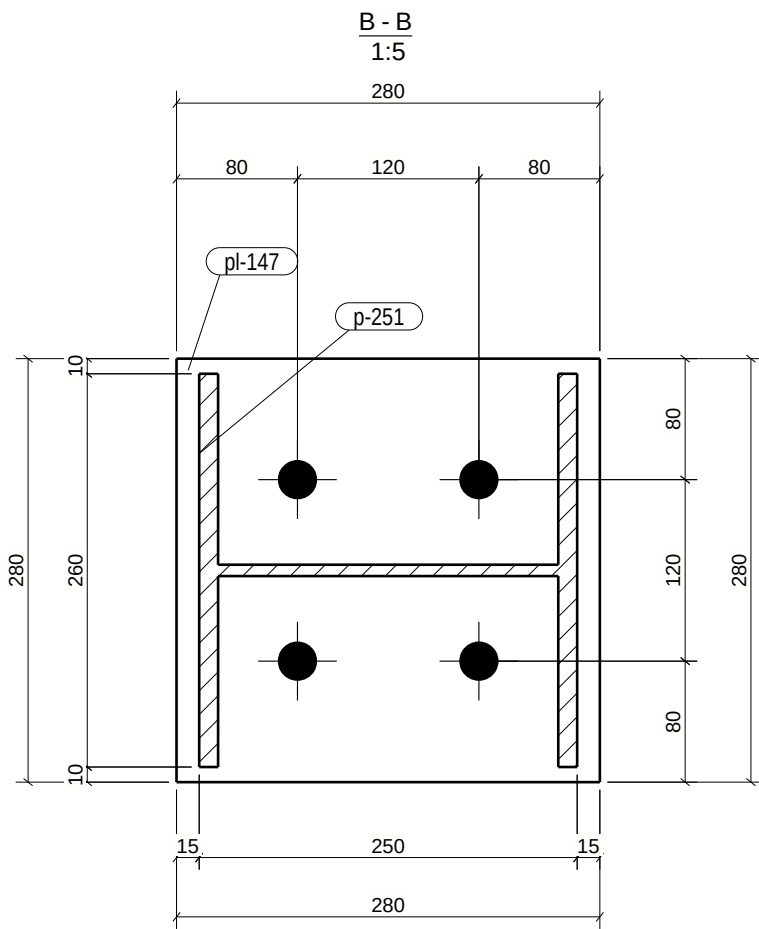
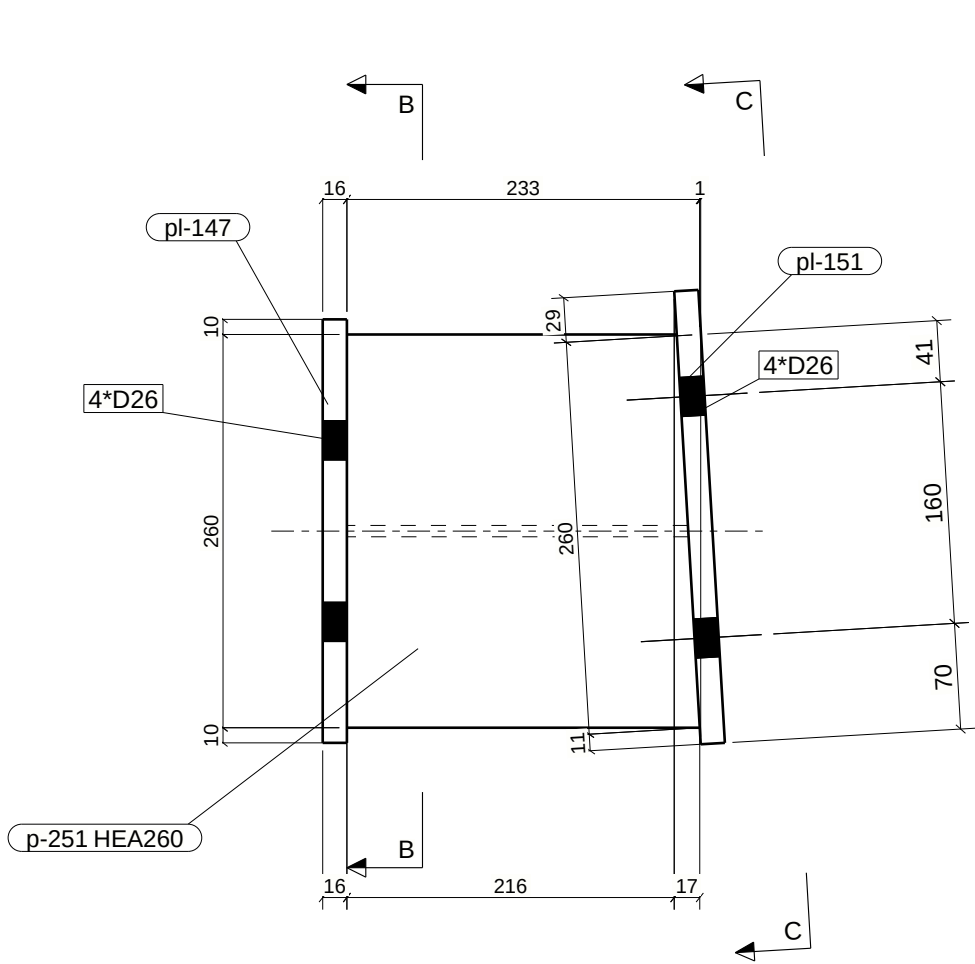
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-181	L75*75*8	184	1	1.6
p-239	HEA220	193	1	9.7
p-250	HEA260	168	1	11.4
pl-93	PL16*320	350	1	13.2
pl-147	PL16*280	280	1	9.8
pl-148	PL16*280	280	1	9.8
pl-182	BL12*200	220	1	4.1
pl-183	BL12*100	216	1	2.0
			Viso:	61.8



ANT-19 Kiekis 5

PHASE	QUANTITY
126	5

Zymuo				
Profilis				
Ilgis				
Kiekis				
Svoris				
p-251	HEA260	233	1	15.9
pl-147	PL16*280	280	1	9.8
pl-150	BL16*260	300	1	9.8
Viso:				35.6



ANT-20 Kiekis 5

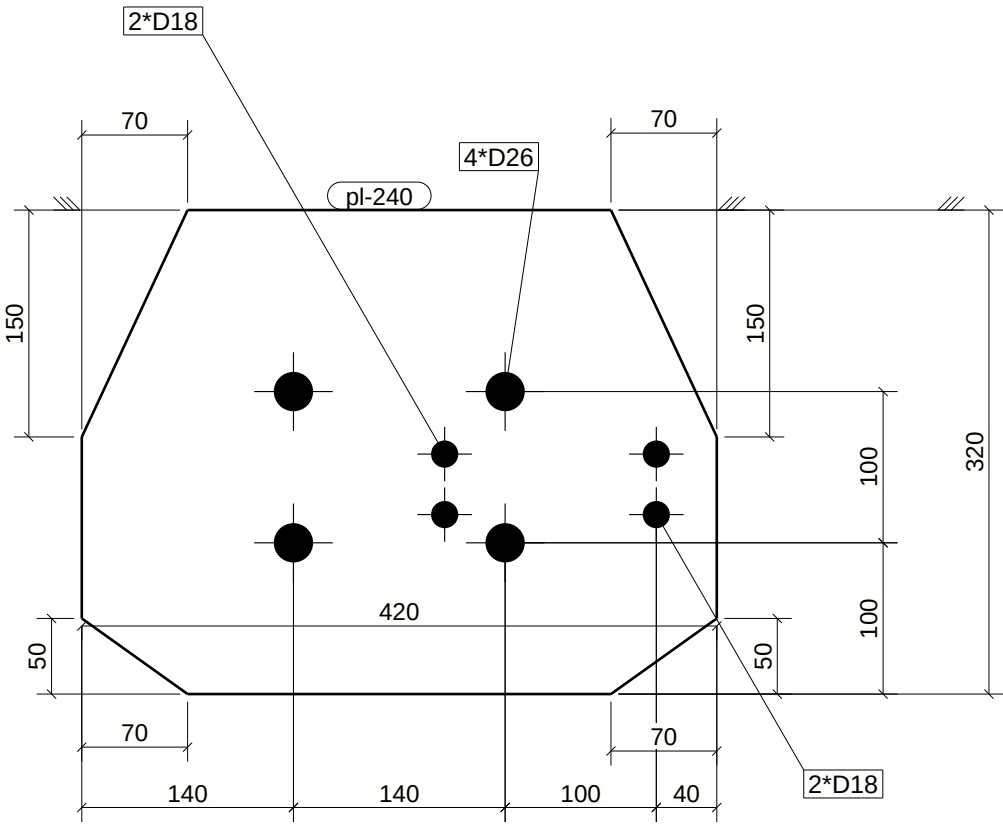
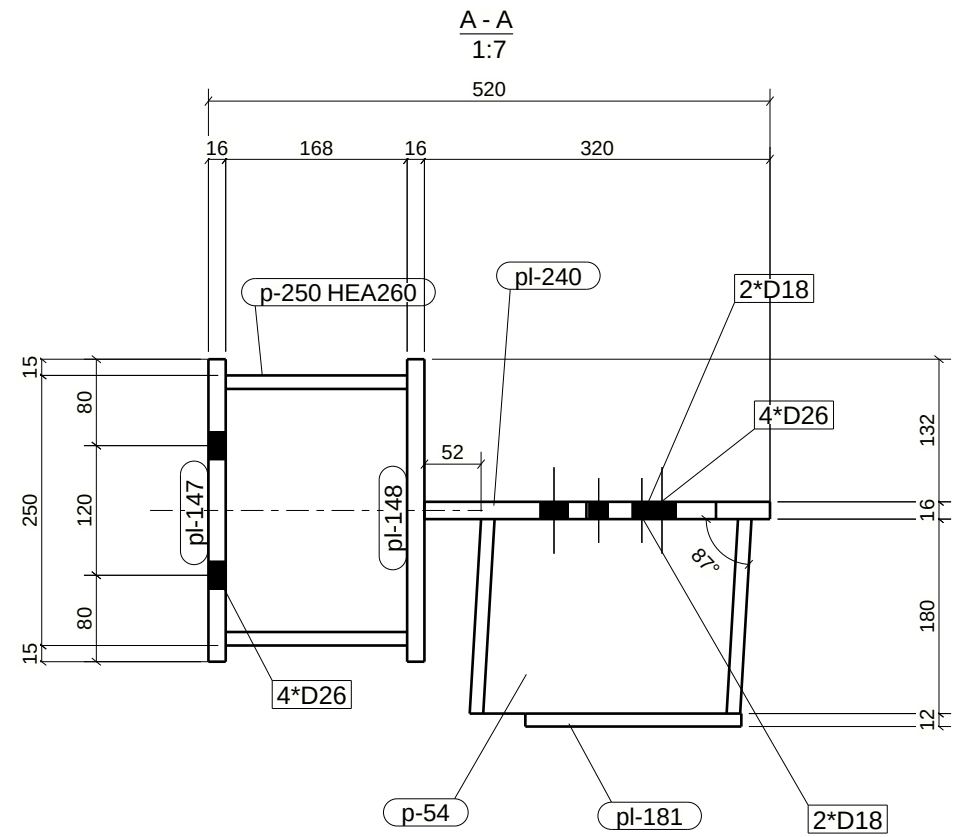
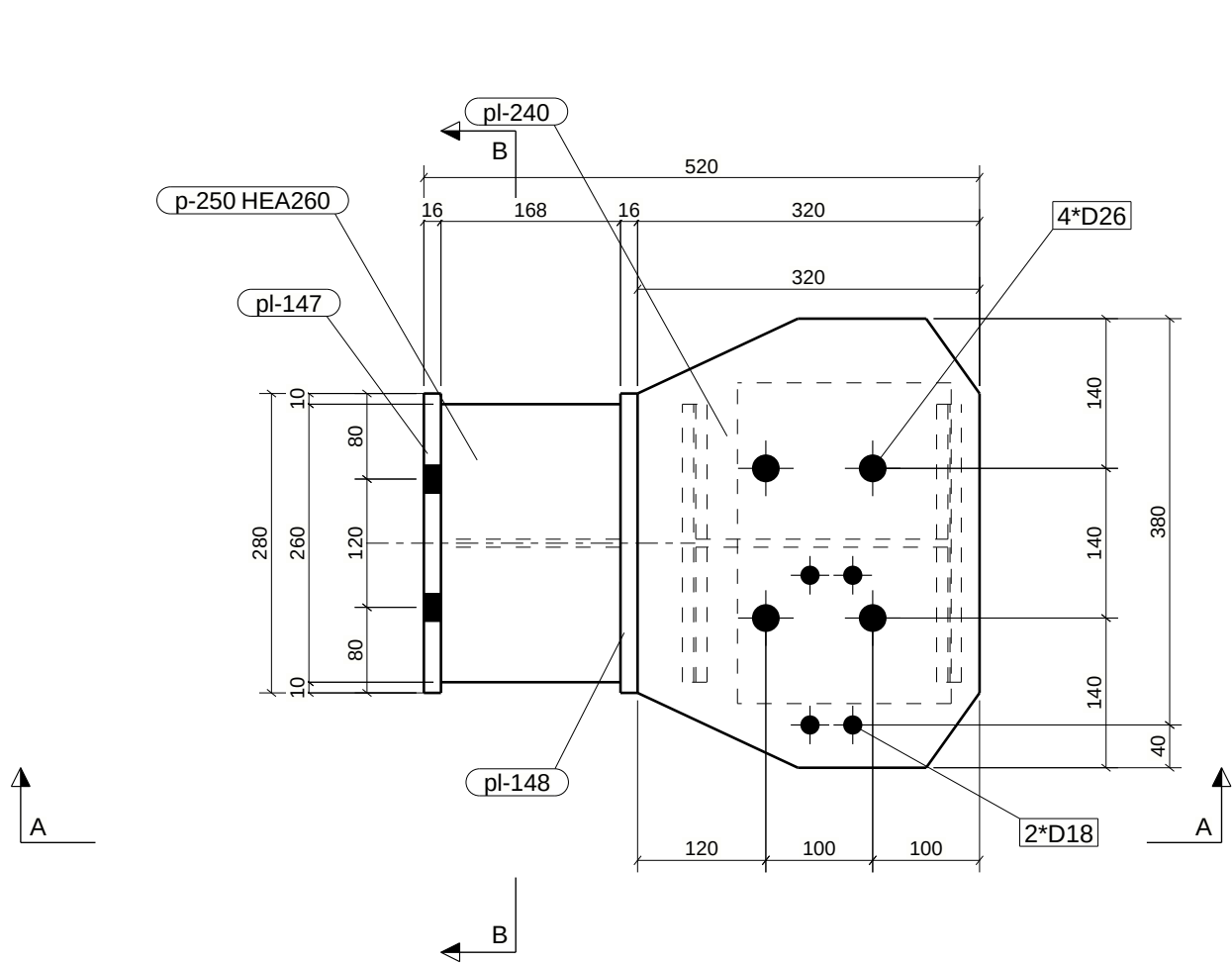
PHASE	QUANTITY
126	5

Zymuo	Profilis	Ilgis	Kiekis	
p-251	HEA260	233	1	
pl-147	PL16*280	280	1	
pl-151	BL16*260	300	1	
			Viso:	35.6

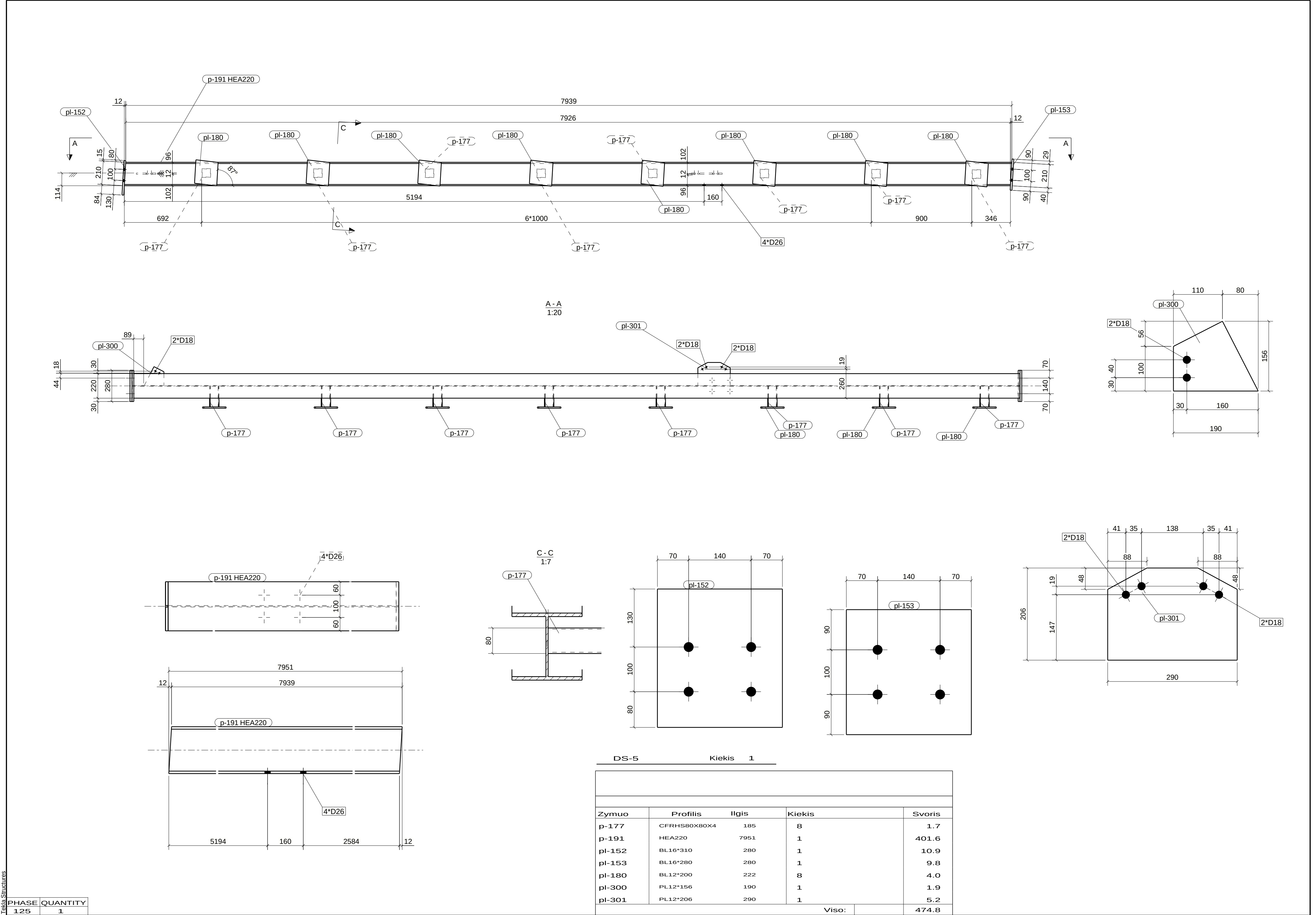
PHASE	QUANTITY
126	1

ANT-22 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-54	HEA260	195	1	13.3
p-250	HEA260	168	1	11.4
pl-147	PL16*280	280	1	9.8
pl-148	PL16*280	280	1	9.8
pl-181	BL12*200	300	1	5.7
pl-240	PL16*320	420	1	15.1
Viso:				65.2

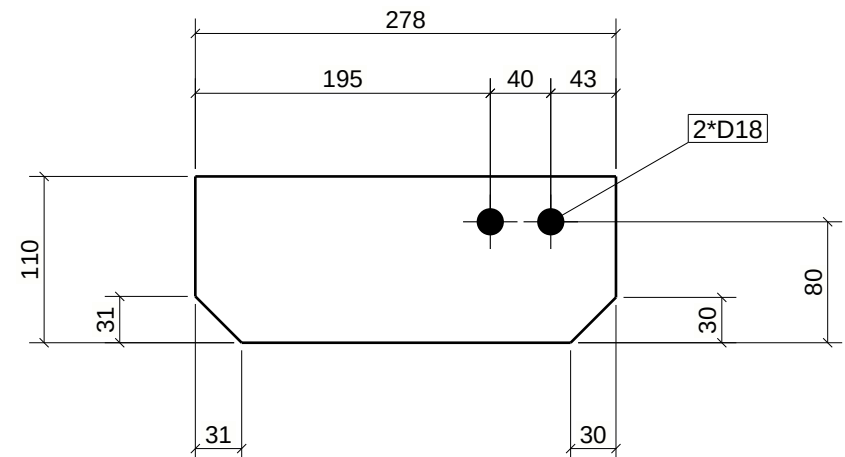
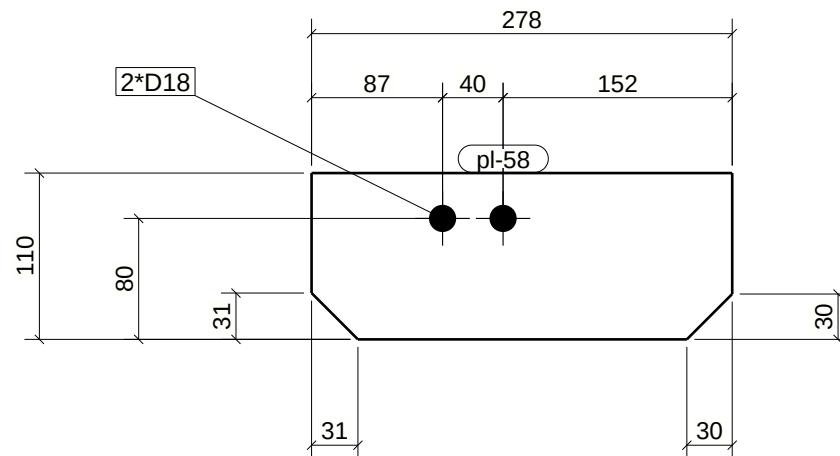
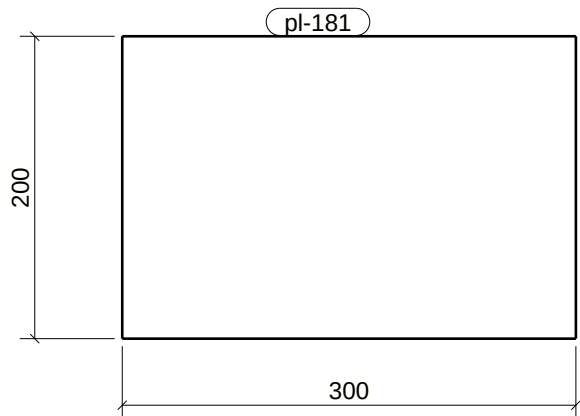
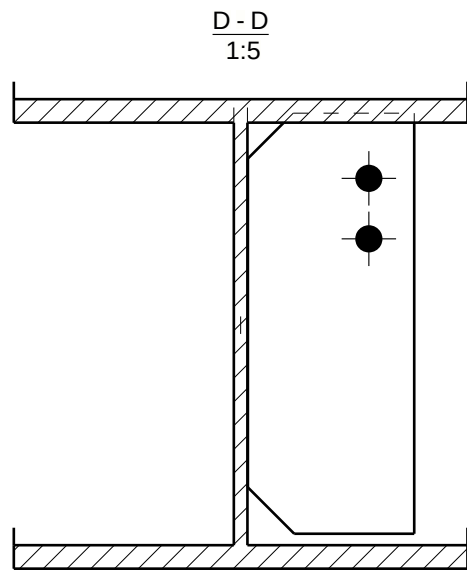
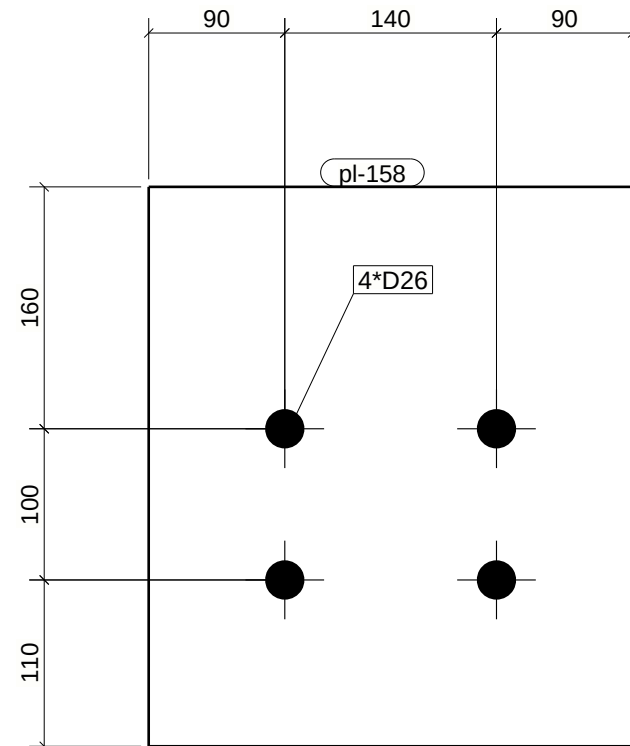
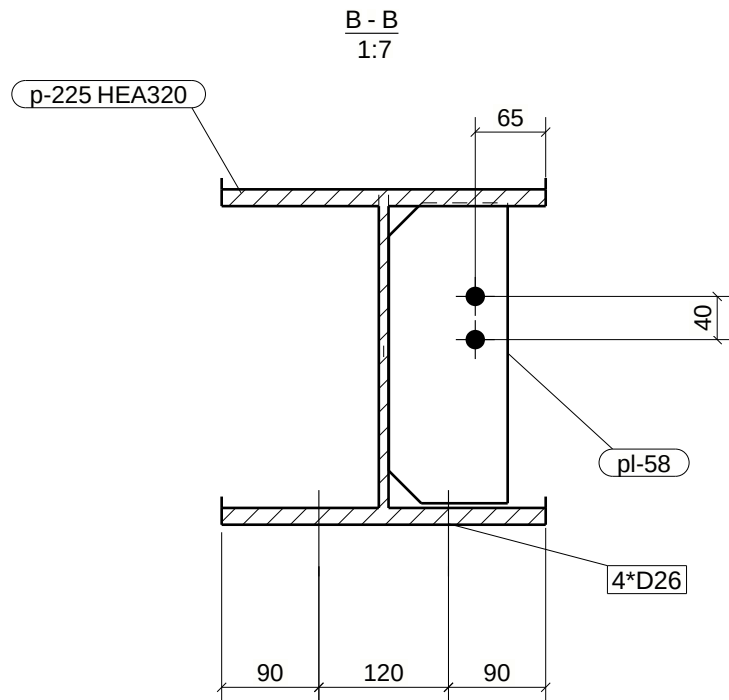
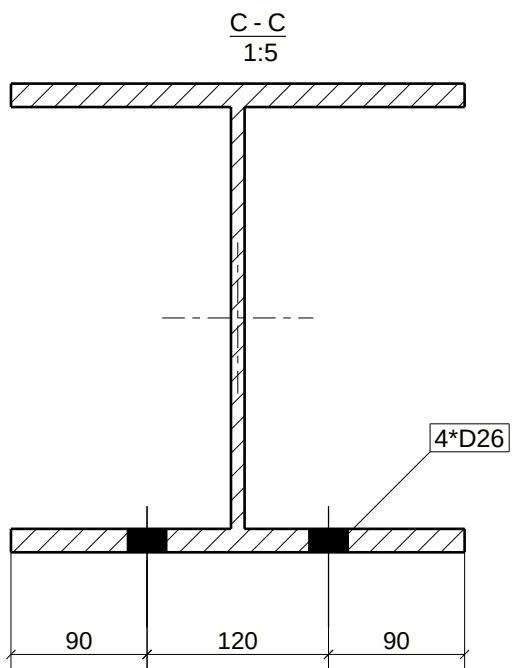
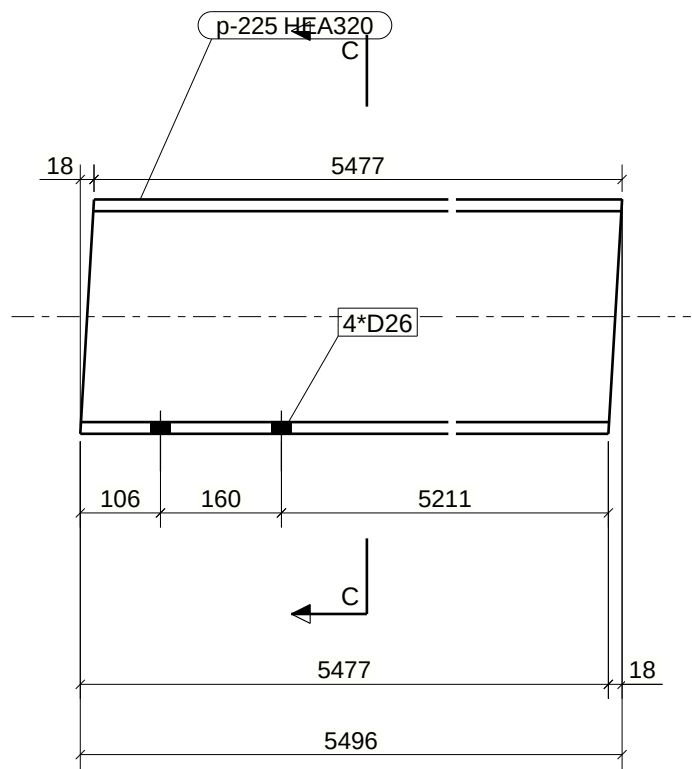
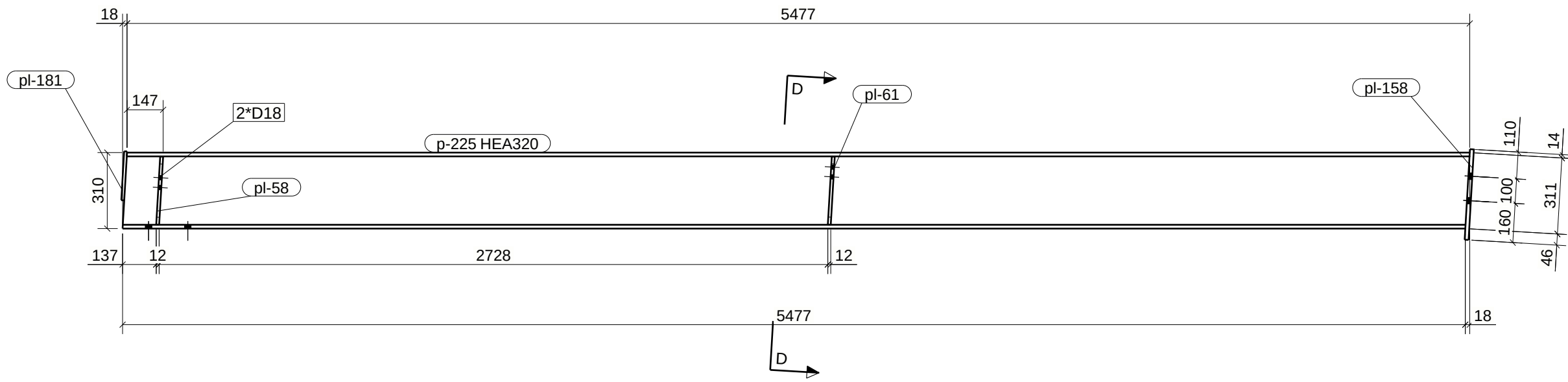


PHASE	QUANTITY
125	1



DS-5 Kiekis 1

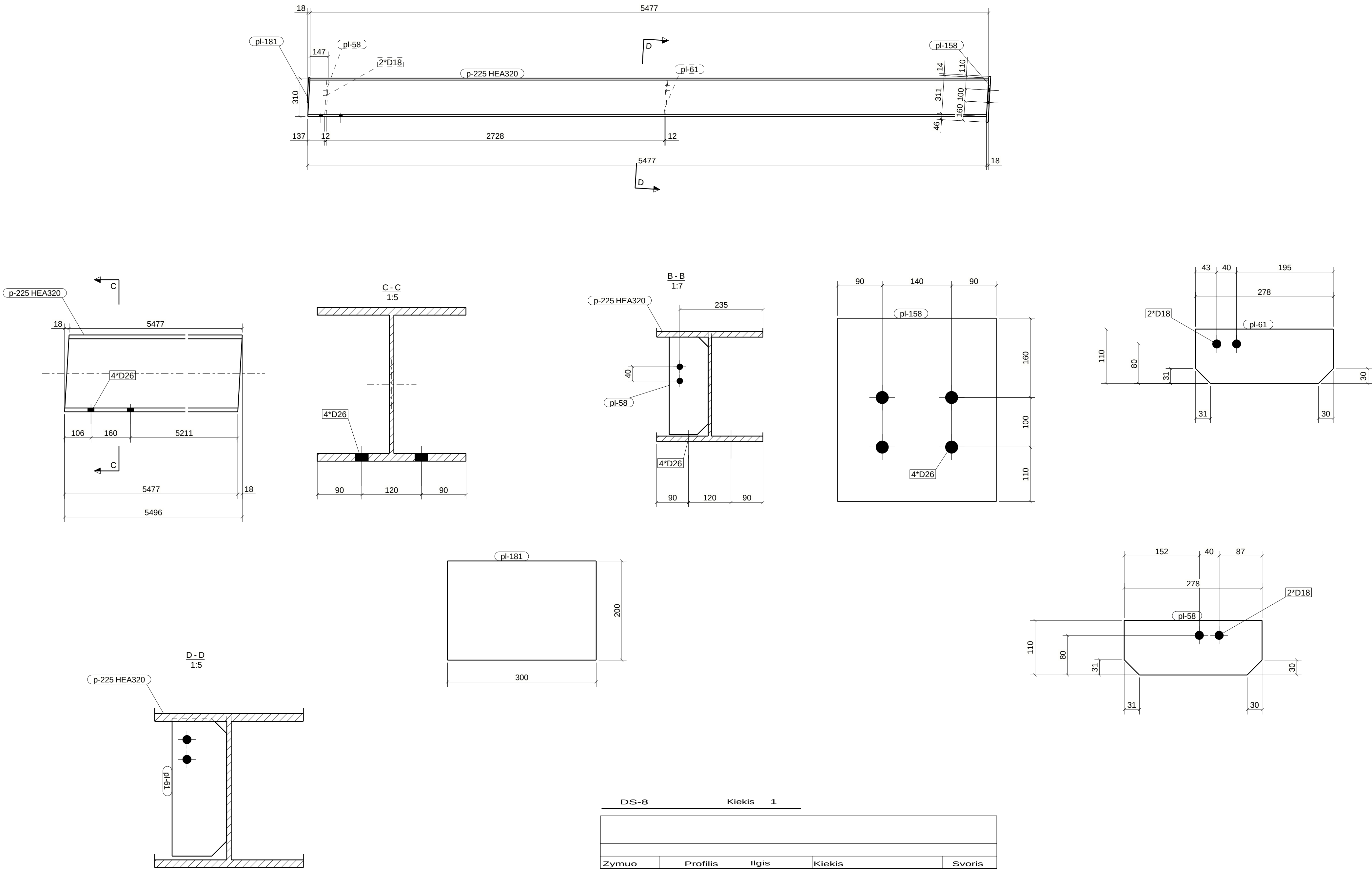
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-177	CFRHS80X80X4	185	8	1.7
p-191	HEA220	7951	1	401.6
pl-152	BL16*310	280	1	10.9
pl-153	BL12*200	280	1	9.8
pl-180	PL12*156	190	1	1.9
pl-301	PL12*206	290	1	5.2
Viso:				474.8



DS-7 Kiekis 1

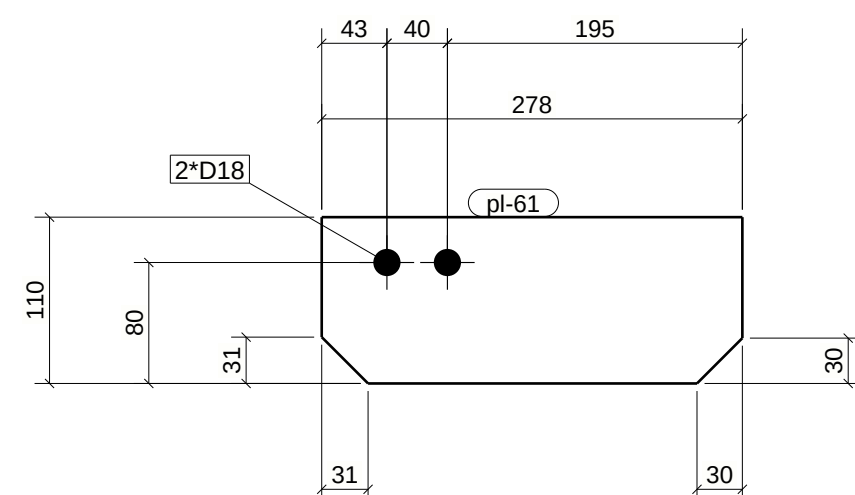
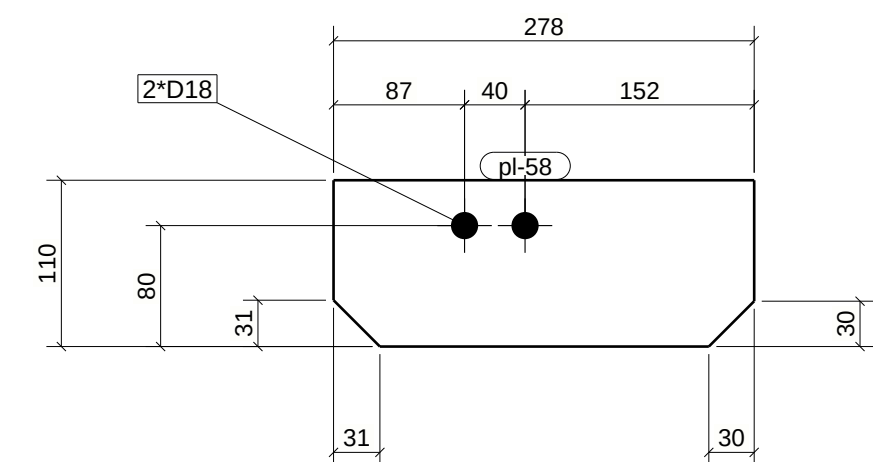
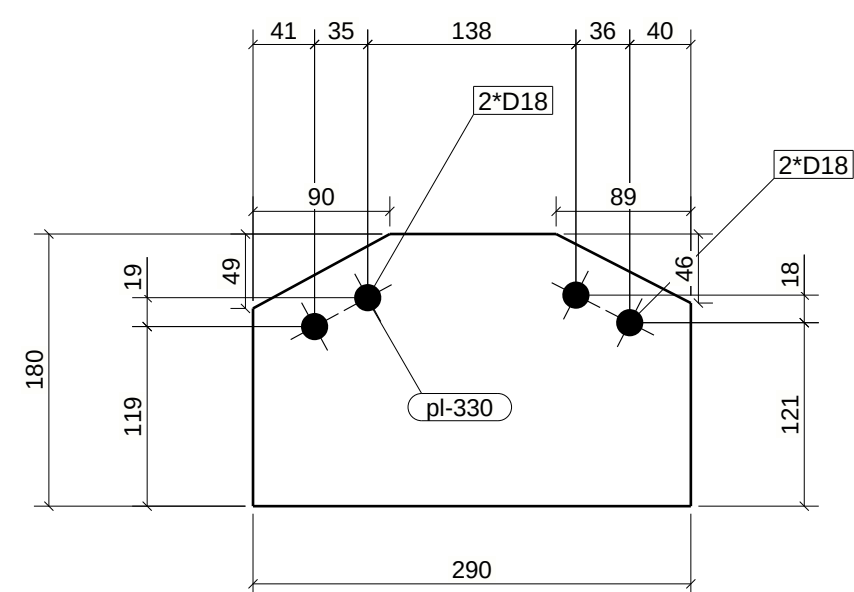
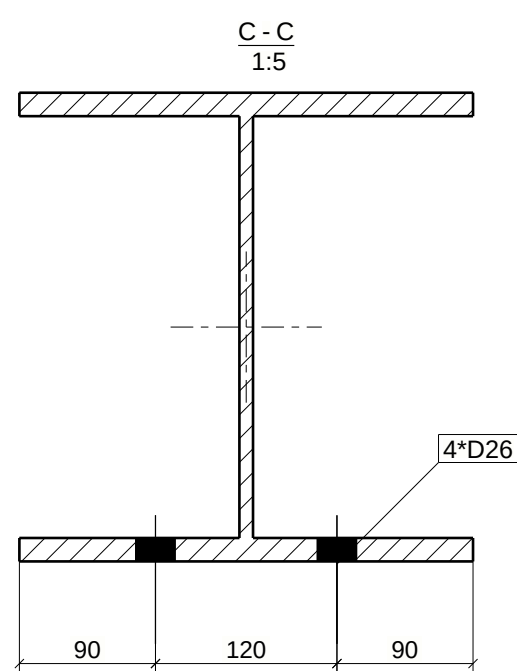
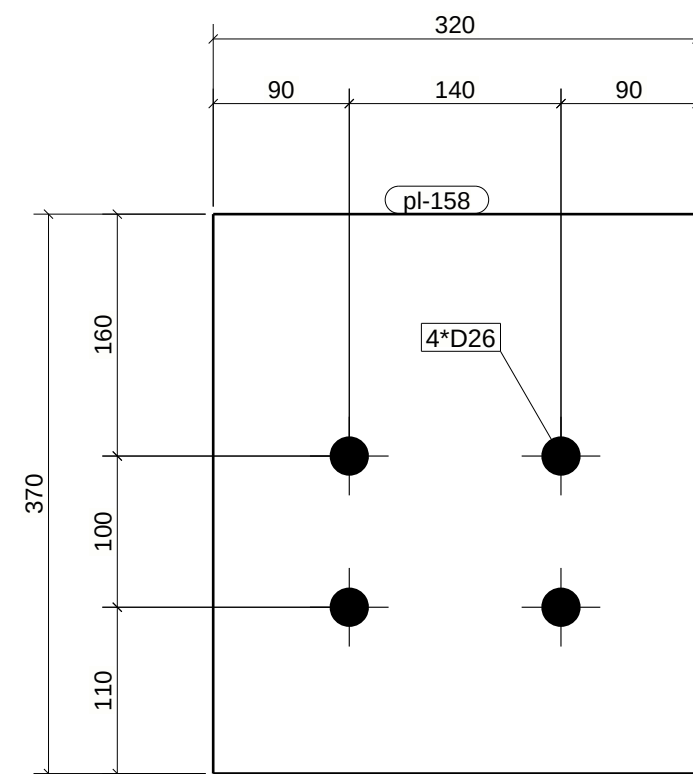
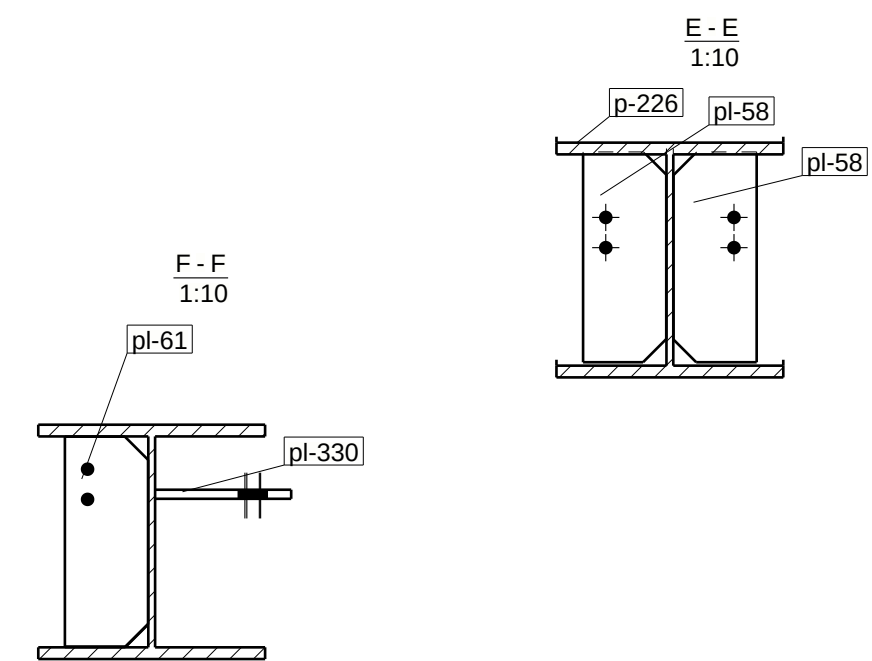
DS-7 Kiekis 1				
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-225	HEA320	5496	1	536.7
pl-58	PL12*110	278	1	2.8
pl-61	PL12*110	278	1	2.8
pl-158	BL16*370	320	1	14.9
pl-181	BL12*200	300	1	5.7
Viso:				562.8

PHASE	QUANTITY
125	1

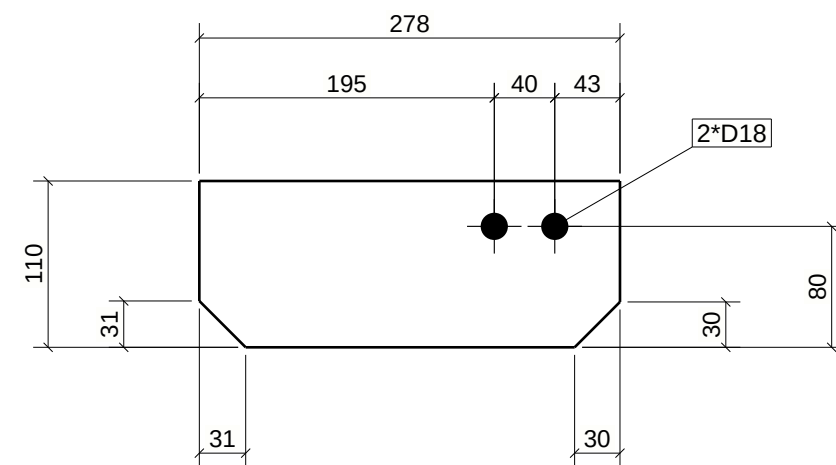
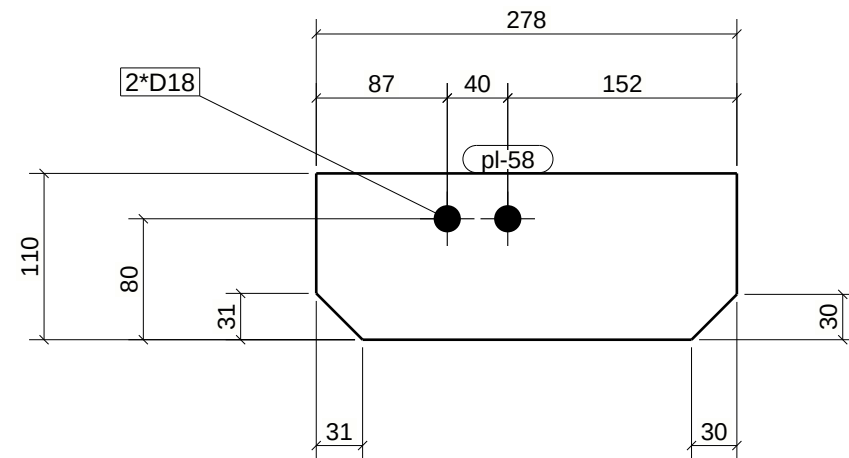
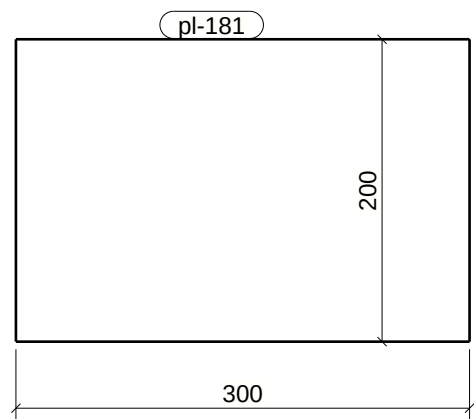
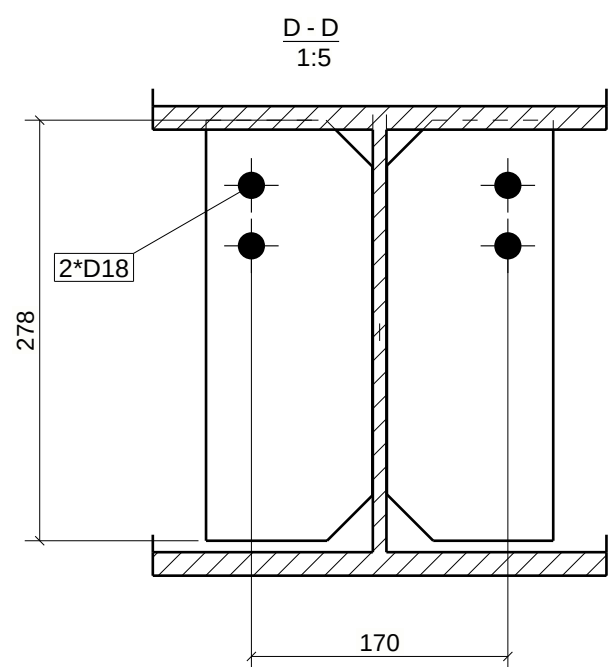
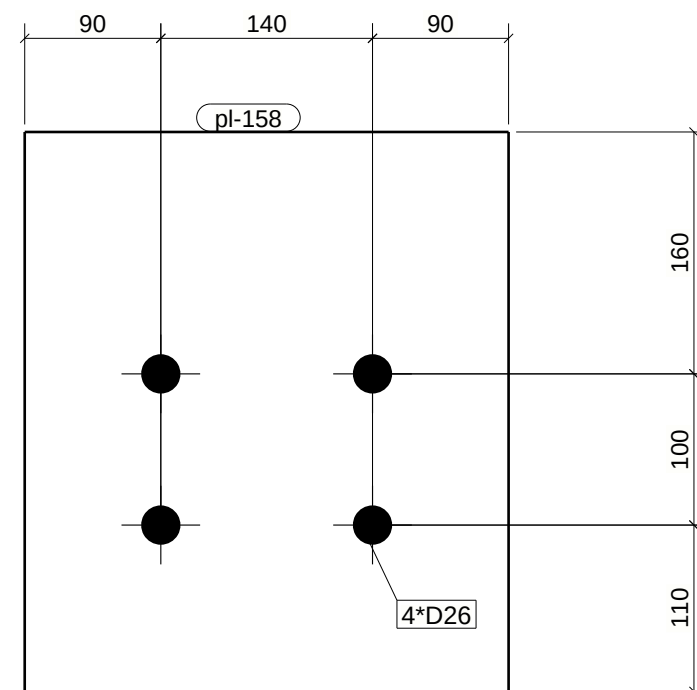
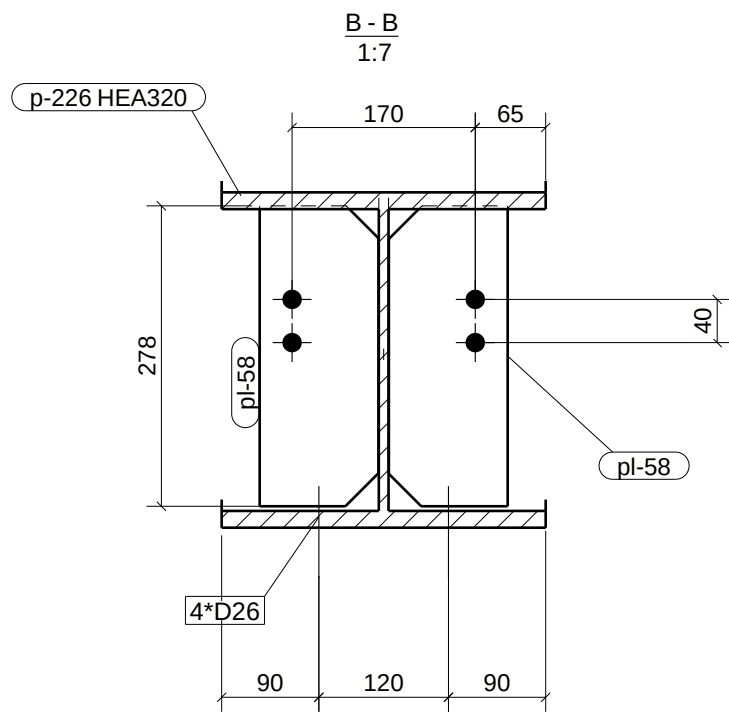
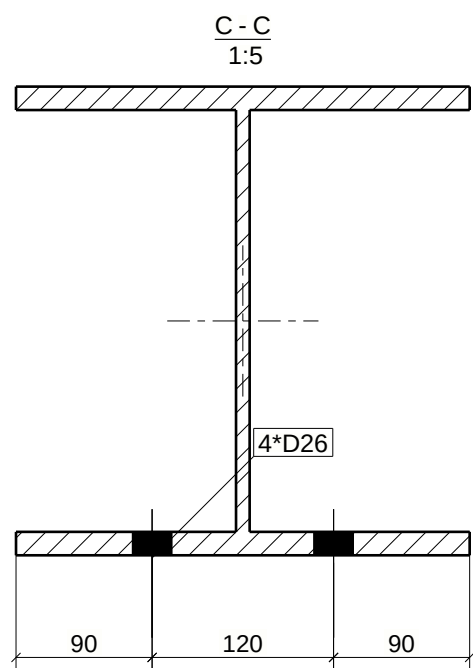
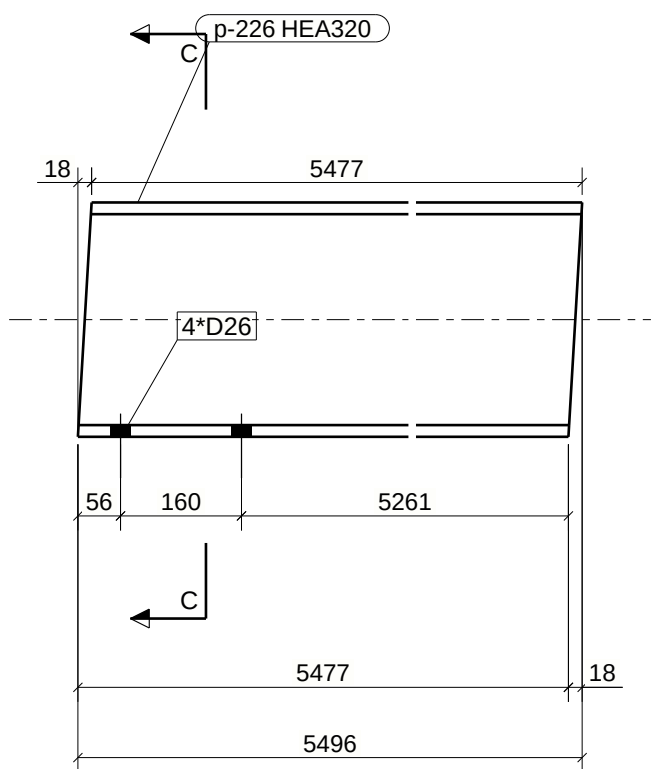
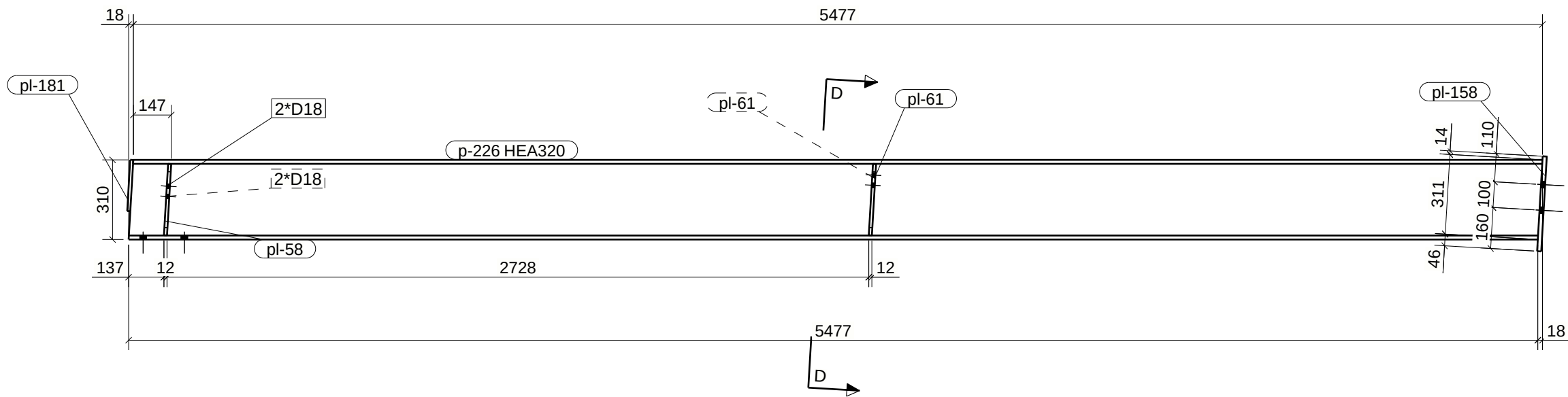


DS-8 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-225	HEA320	5496	1	536.7
pl-58	PL12*110	278	1	2.8
pl-61	PL12*110	278	1	2.8
pl-158	BL16*370	320	1	14.9
pl-181	BL12*200	300	1	5.7
Viso:				562.8



PHASE	QUANTITY
125	1



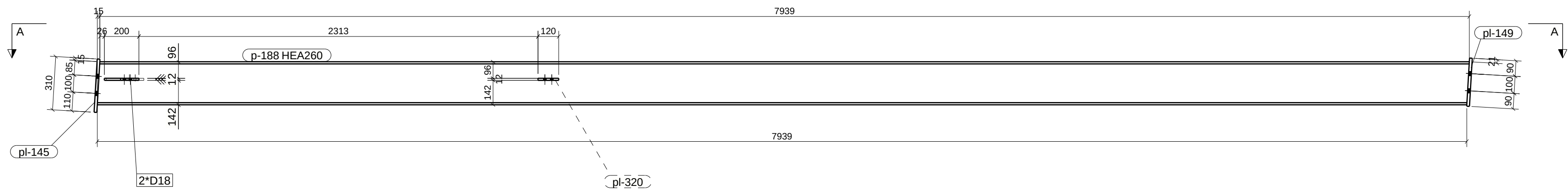
DS-11 Kiekis 2

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-226	HEA320	5496	1	536.7
pl-58	PL12*110	278	2	2.8
pl-61	PL12*110	278	2	2.8
pl-158	BL16*370	320	1	14.9
pl-181	BL12*200	300	1	5.7
Viso:				568.4

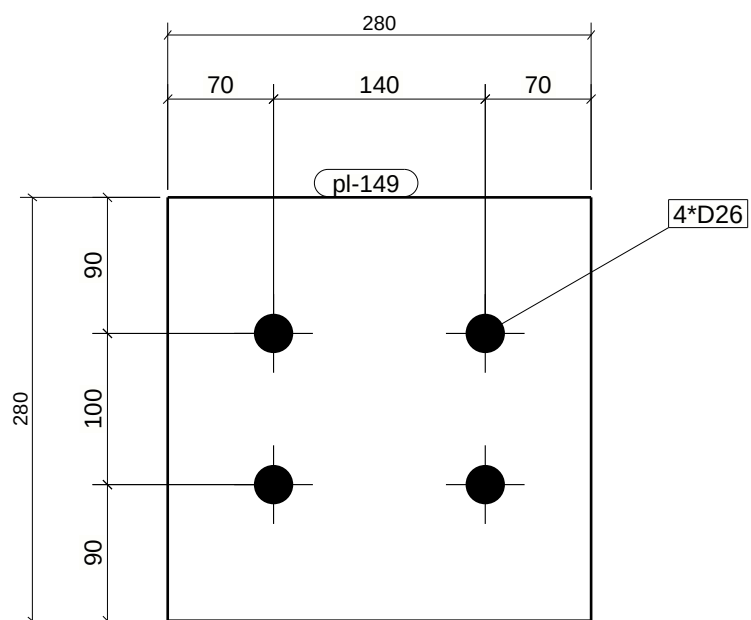
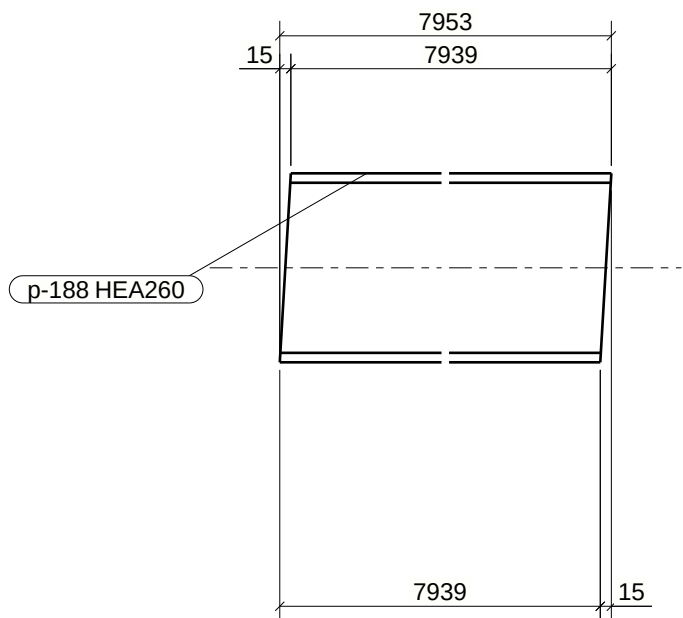
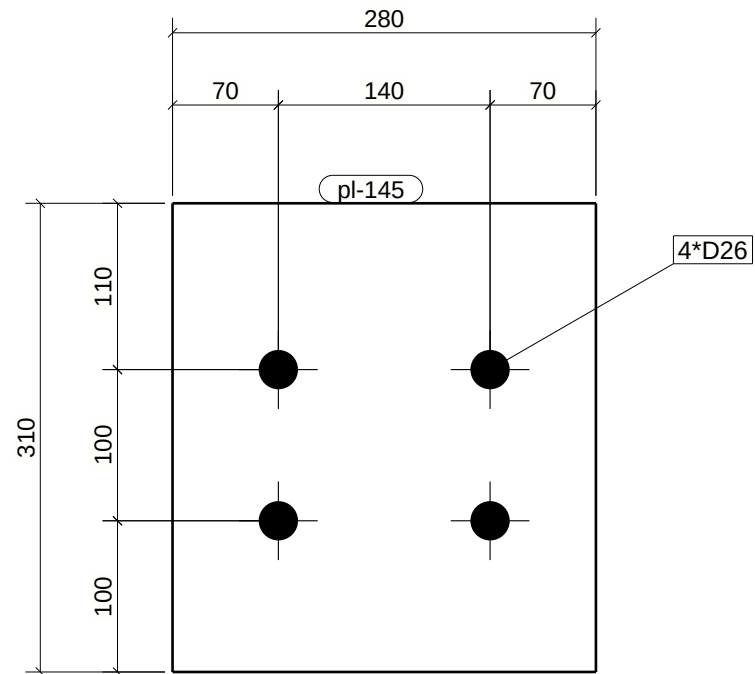
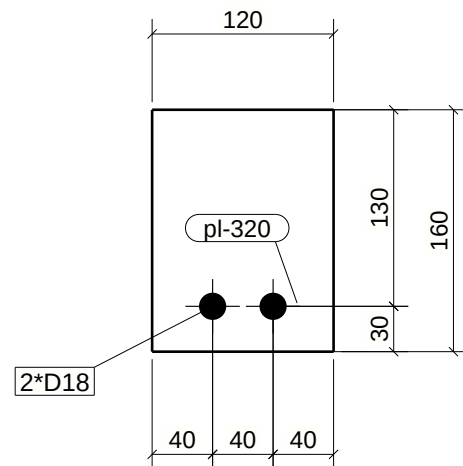
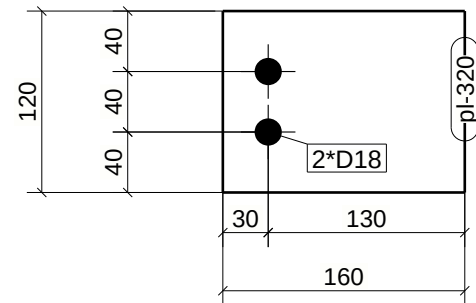
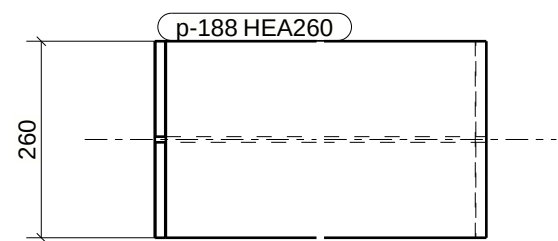
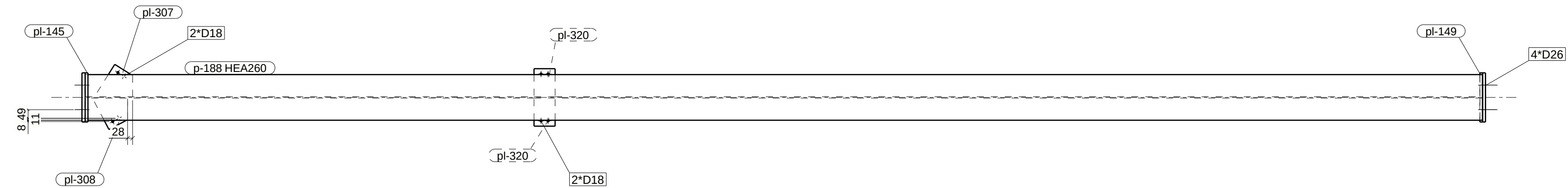
PHASE	QUANTITY
125	2

Tekla Structures

PHASE	QUANTITY
125	1



A - A
1:20

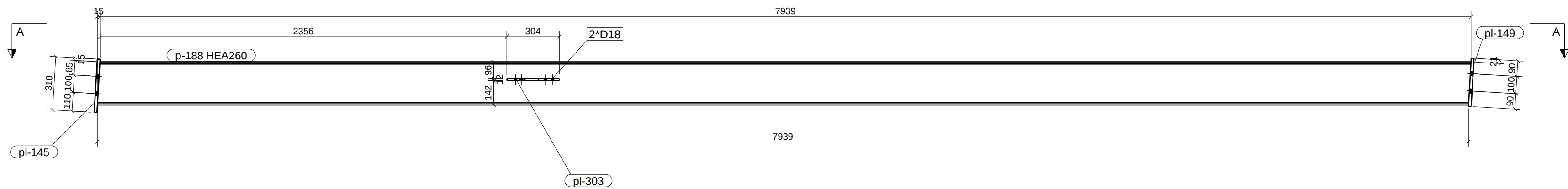


DS-17 Kiekis 1

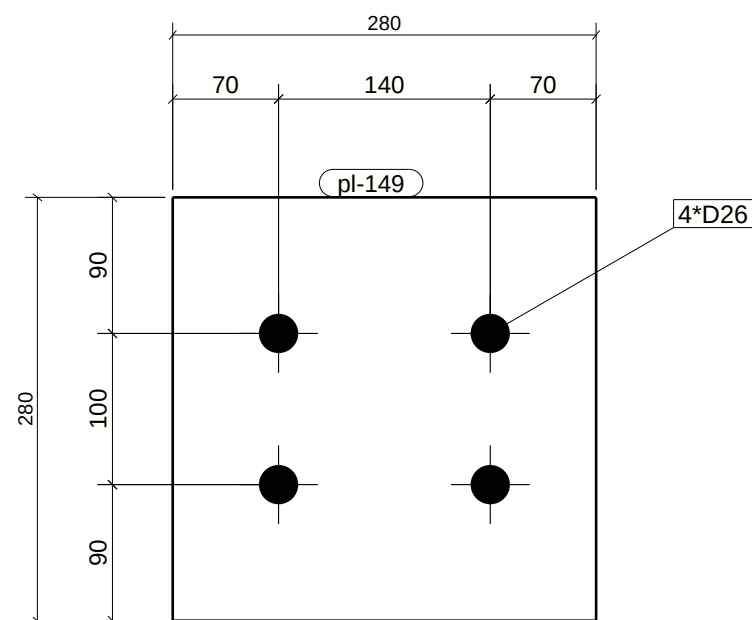
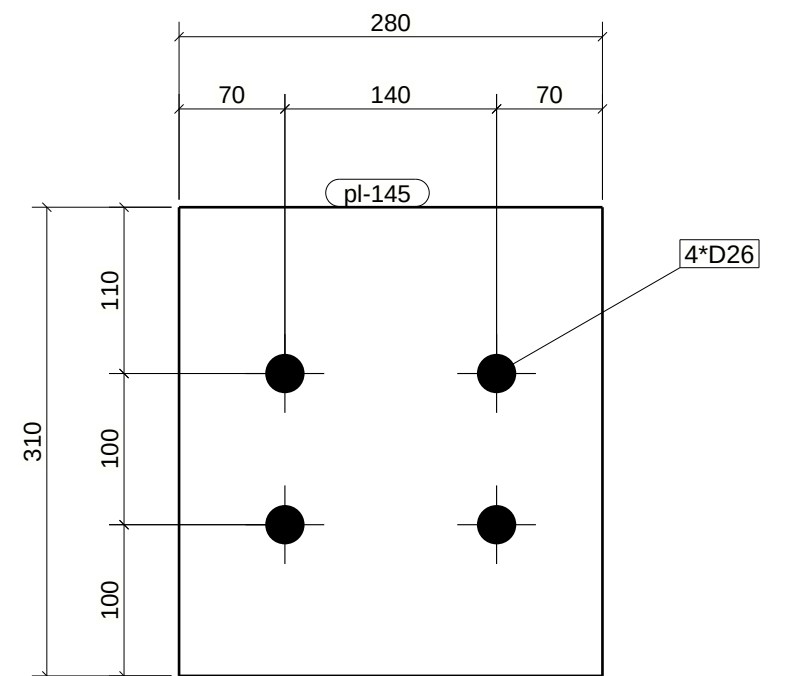
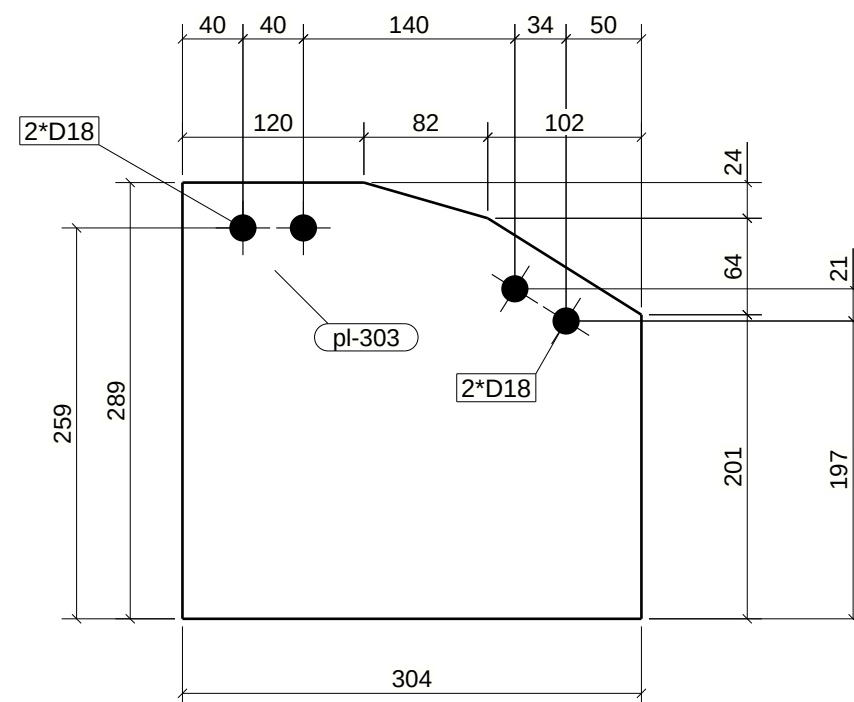
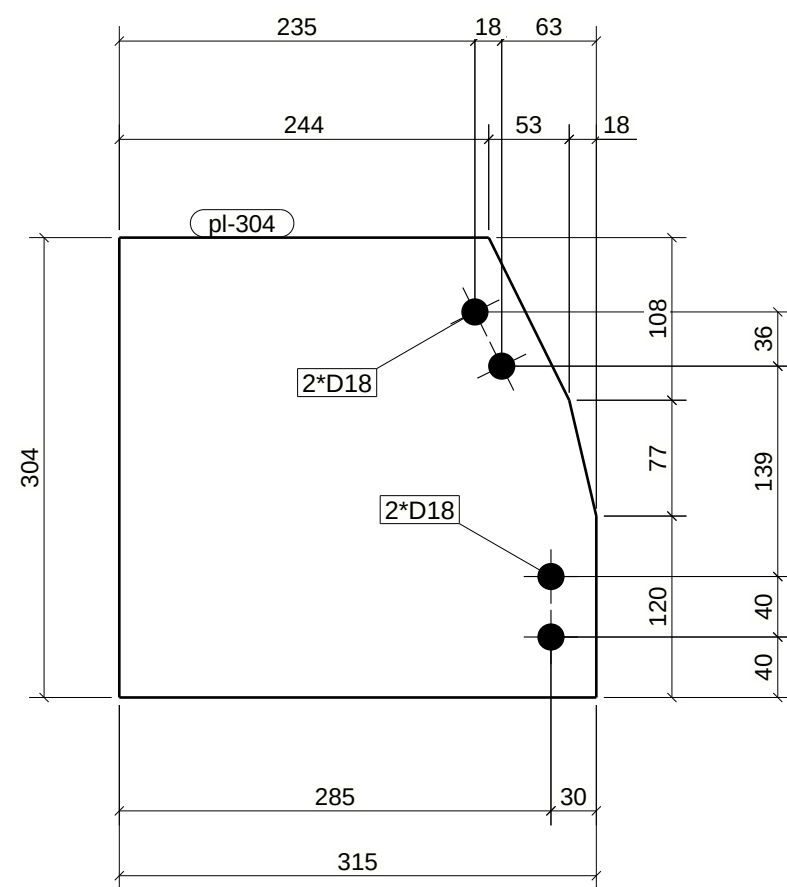
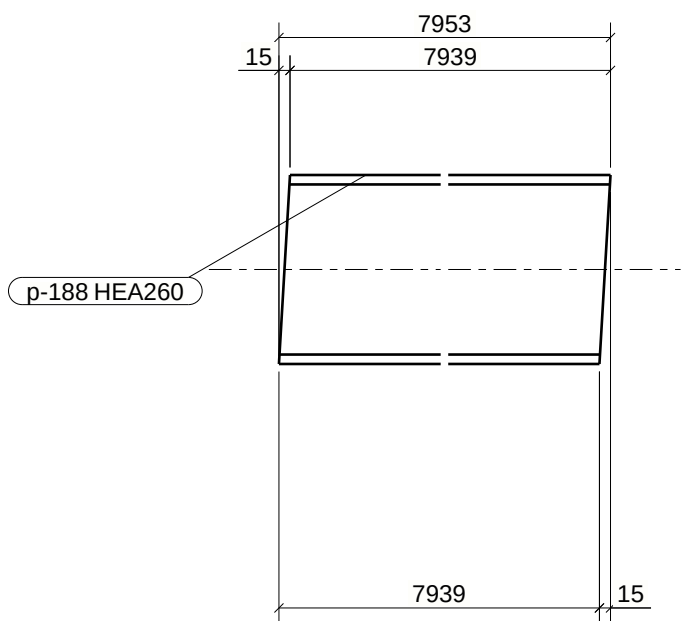
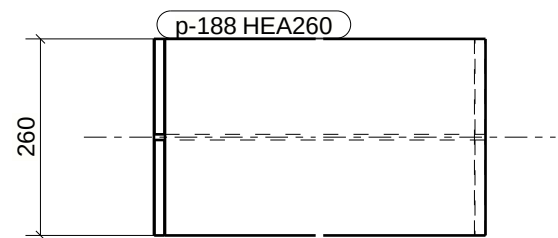
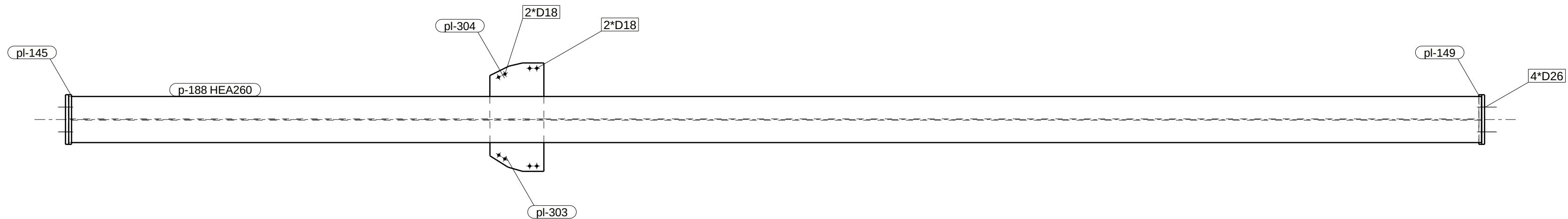
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-188	HEA260	7953	1	542.0
pl-145	BL16*310	280	1	10.9
pl-149	BL16*280	280	1	9.8
pl-307	PL12*184	218	1	2.5
pl-308	PL12*177	202	1	2.3
pl-320	PL12*120	160	2	1.8
Viso:				571.2

Tekla Structures

PHASE	QUANTITY
125	1



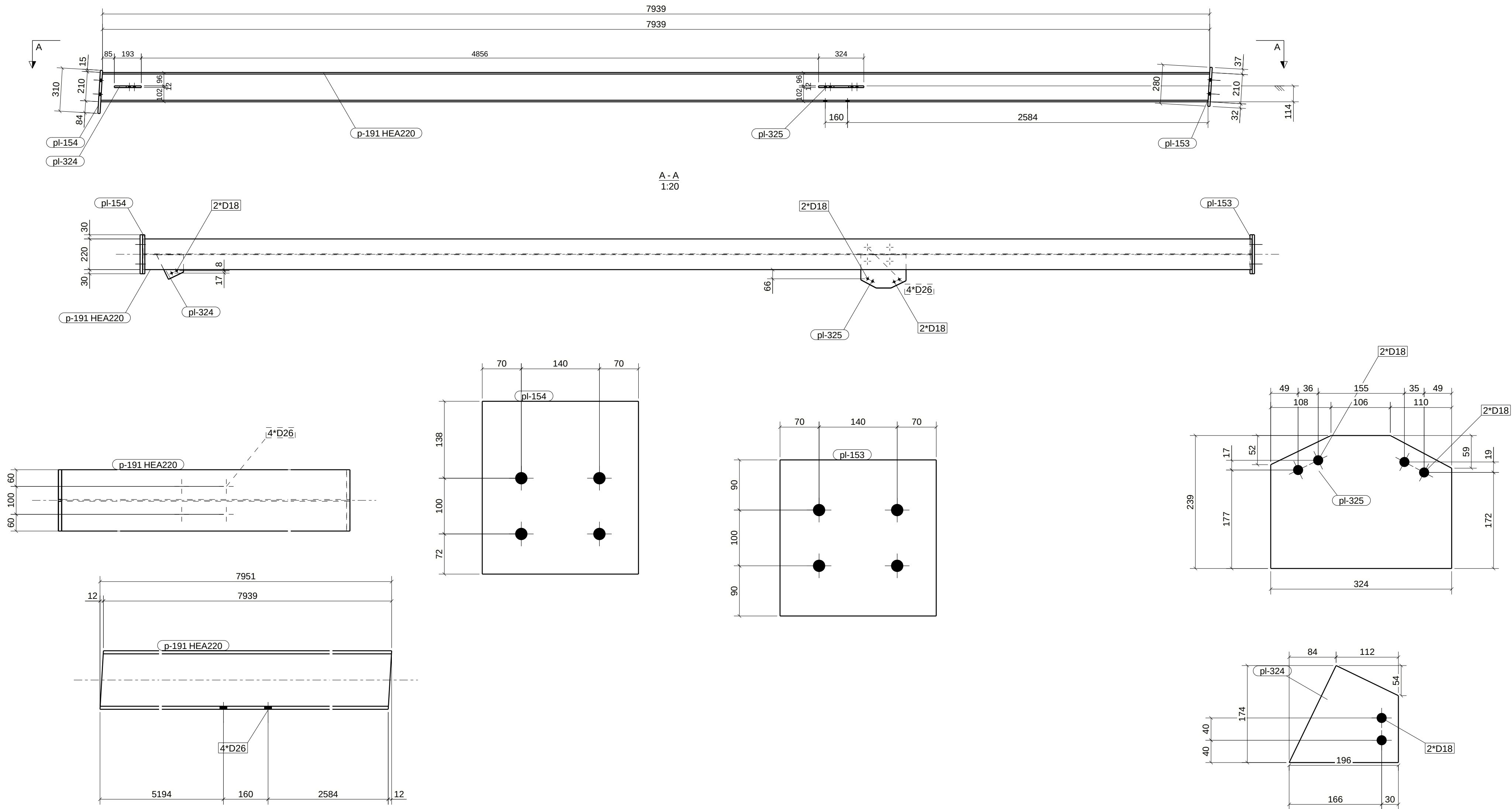
A - A
1:20



DS-19 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-188	HEA260	7953	1	542.0
pl-145	BL16*310	280	1	10.9
pl-149	BL16*280	280	1	9.8
pl-303	PL12*289	304	1	7.6
pl-304	PL12*304	315	1	8.5
Viso:				578.9

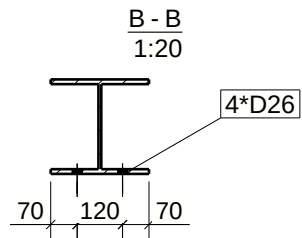
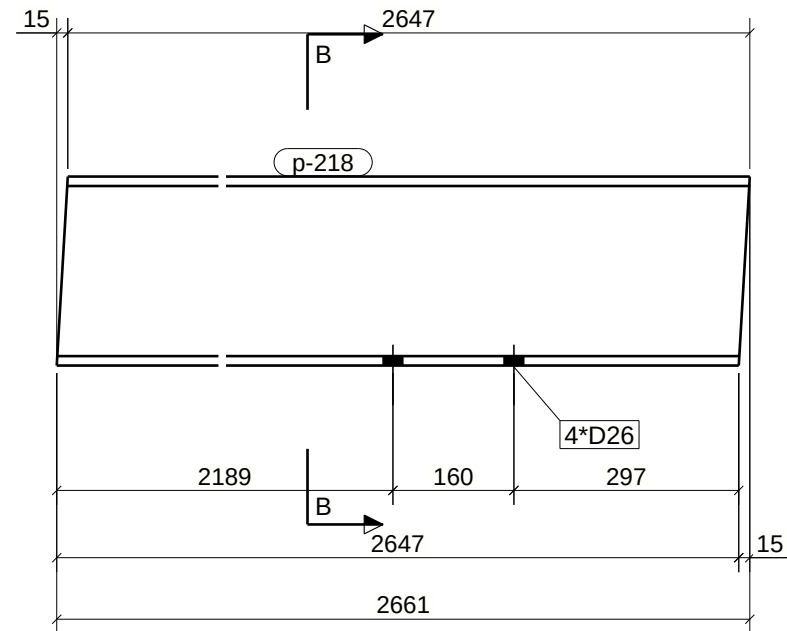
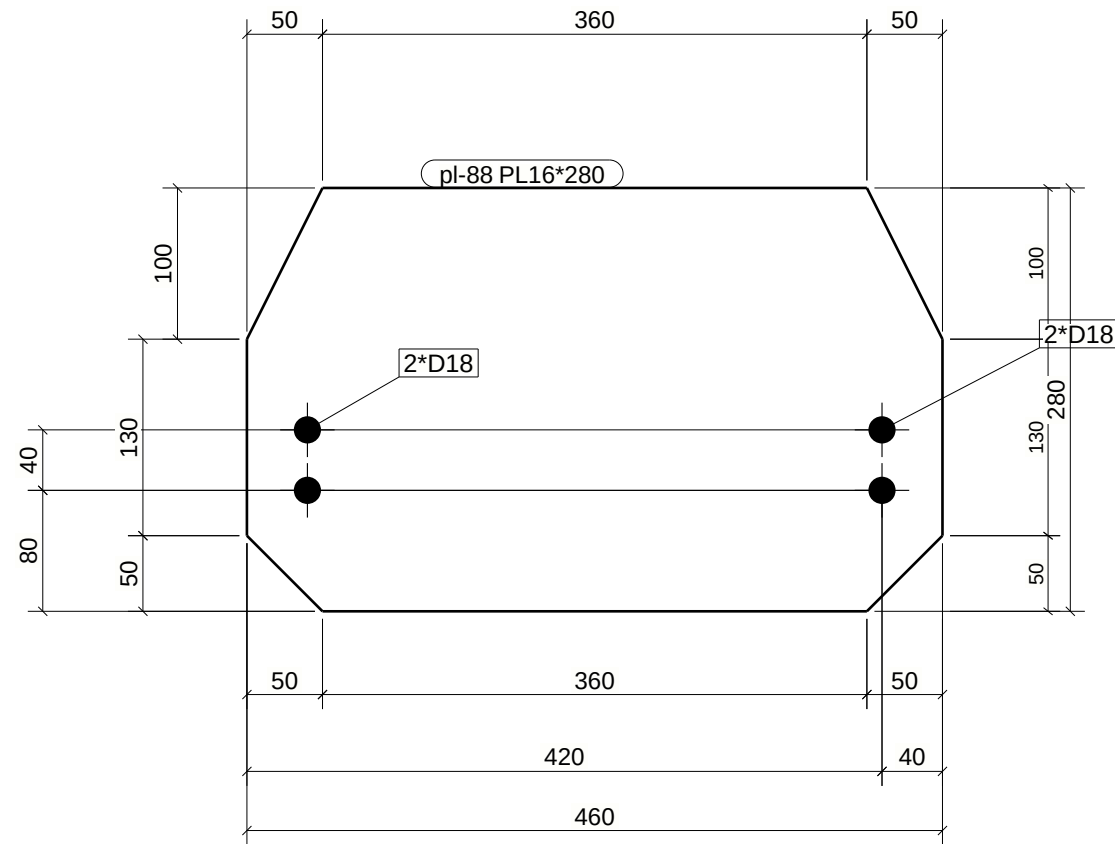
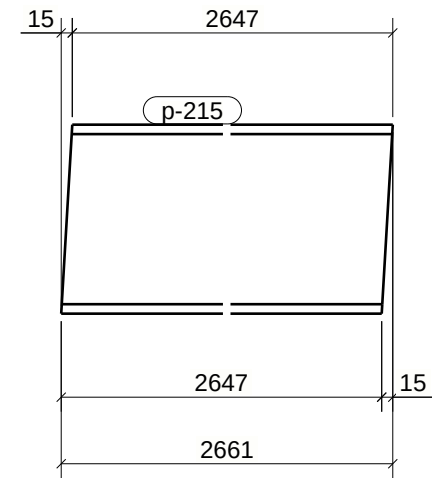
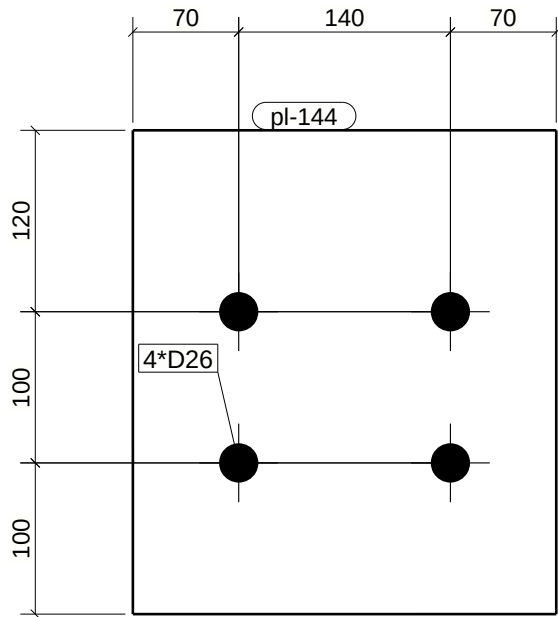
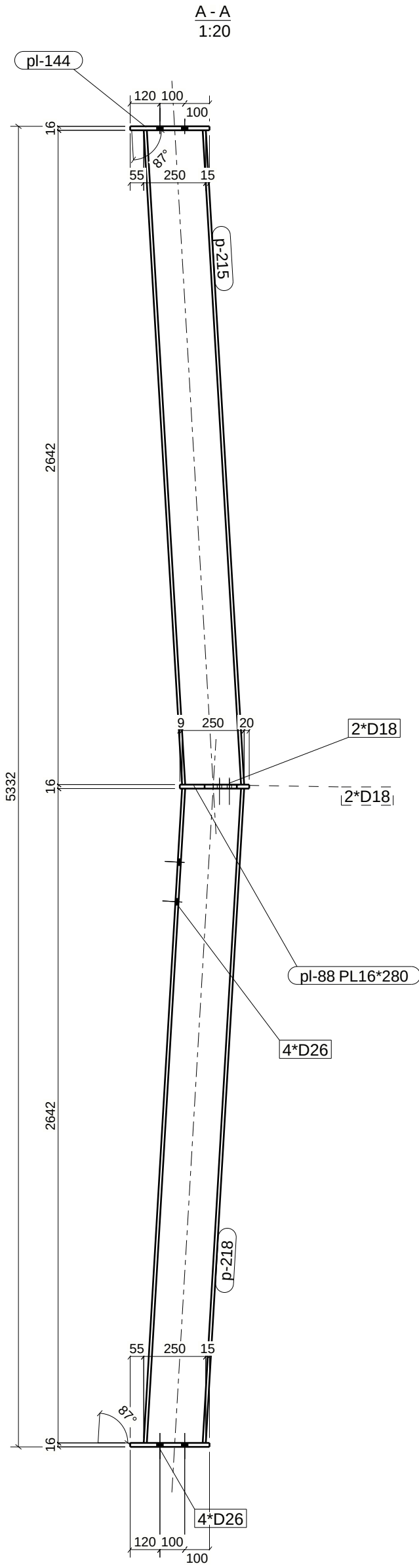
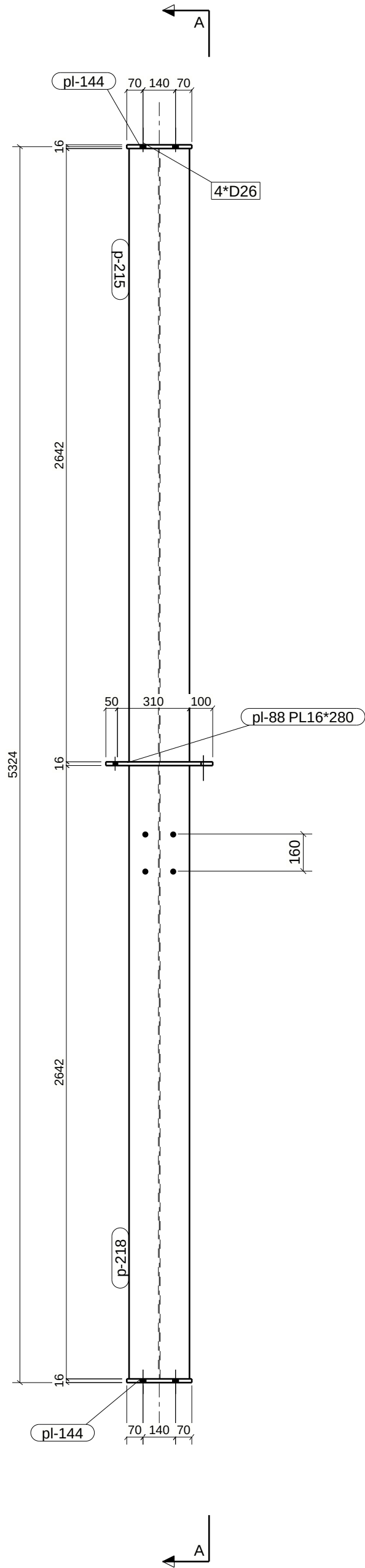
PHASE	QUANTITY
125	1



DS-22 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-191	HEA220	7951	1	401.6
pl-153	BL16*280	280	1	9.8
pl-154	BL16*310	280	1	10.9
pl-324	PL12*174	196	1	2.2
pl-325	PL12*239	324	1	6.7
Viso:				431.3

PHASE	QUANTITY
125	1

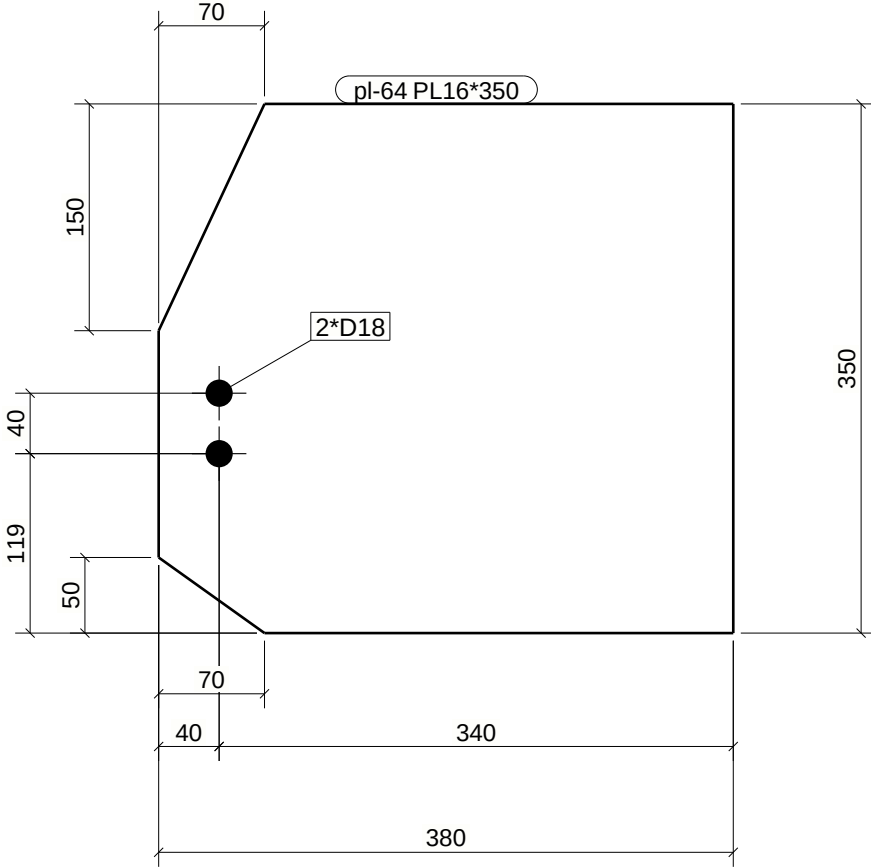
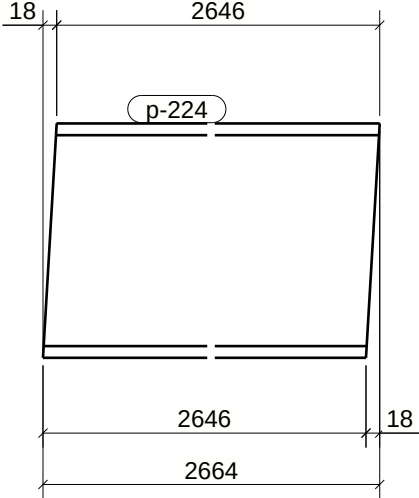
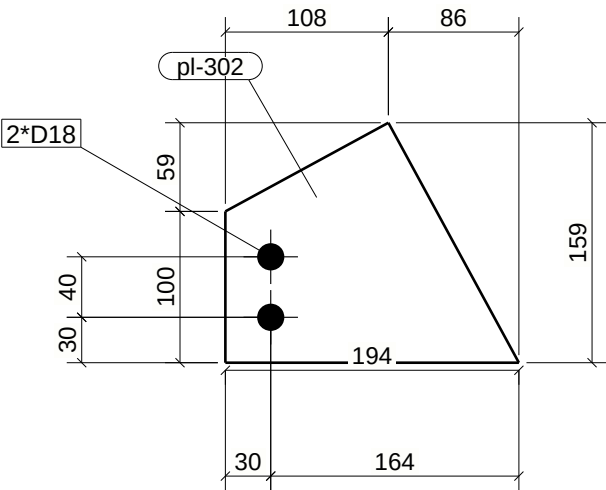
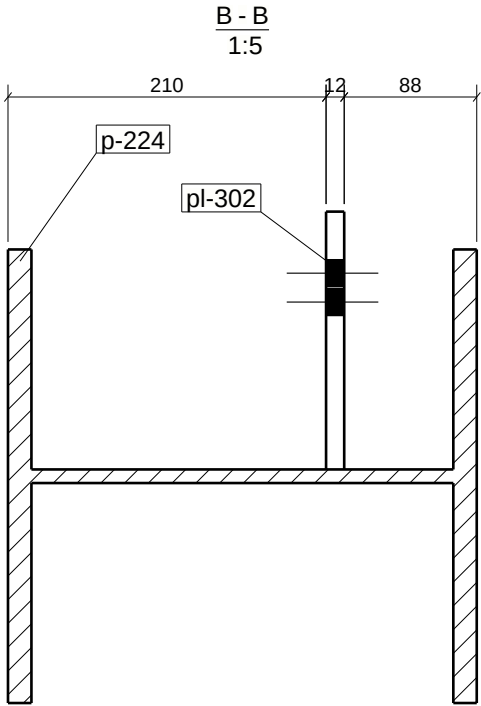
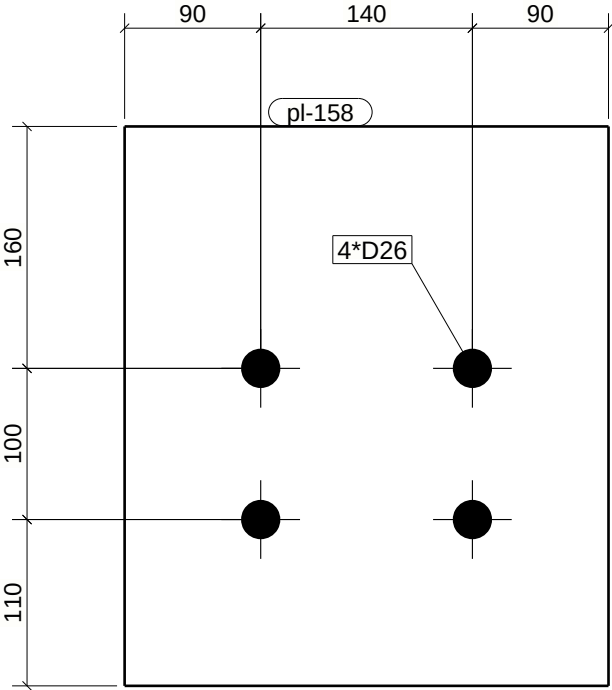
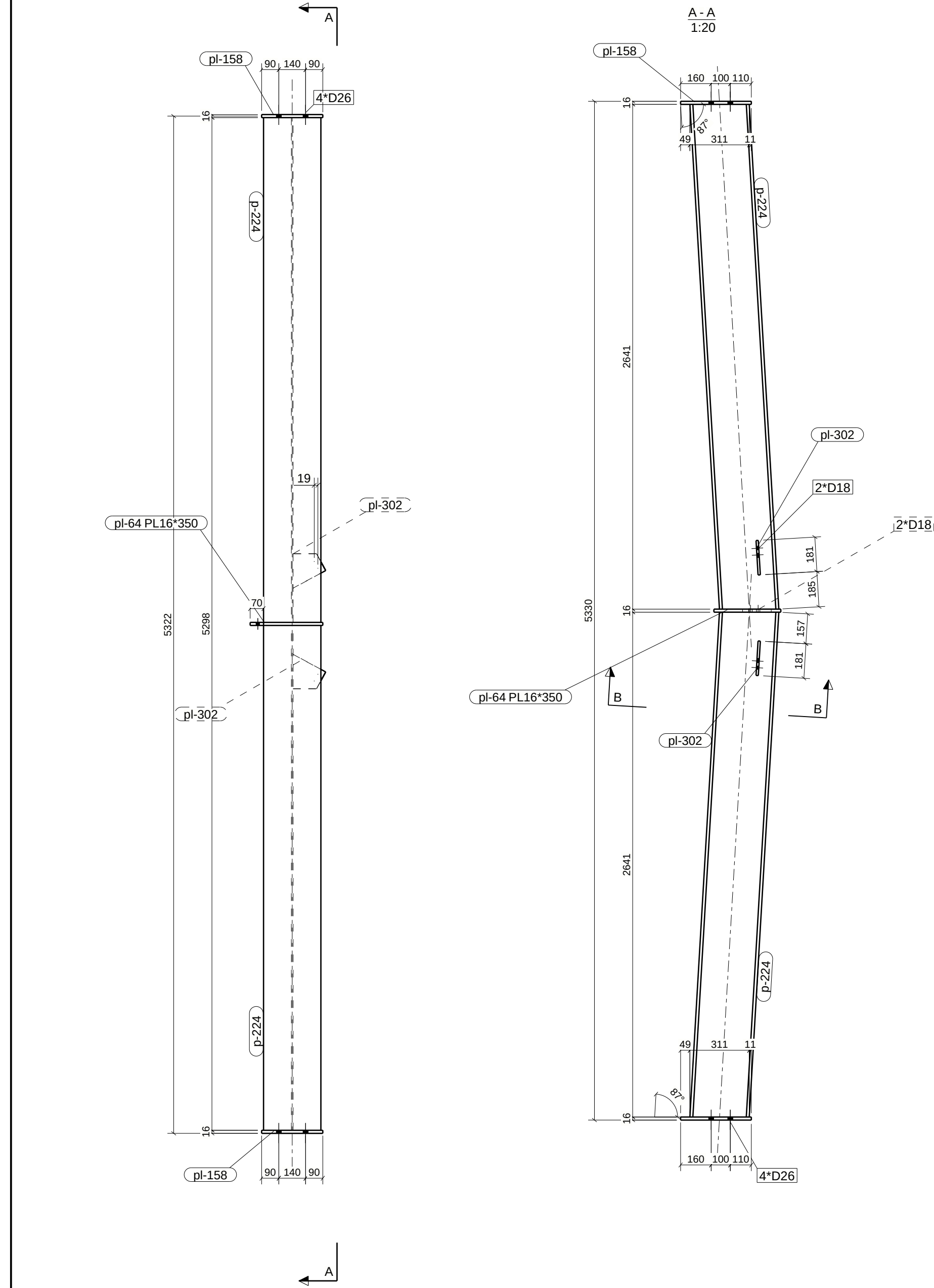


DS-24 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-215	HEA260	2661	1	181.4
p-218	HEA260	2661	1	181.4
pl-88	PL16*280	460	1	15.2
pl-144	BL16*320	280	2	11.3
Viso:				400.5

Tekla Structures

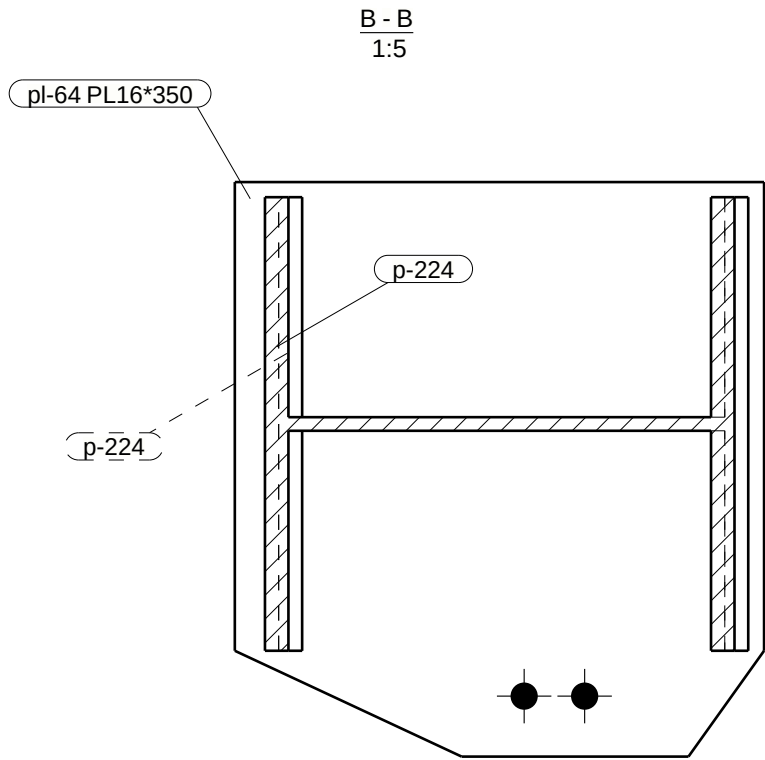
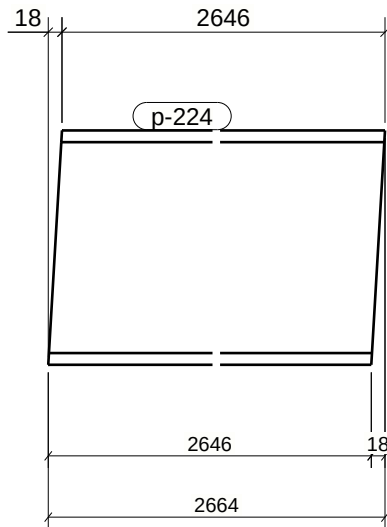
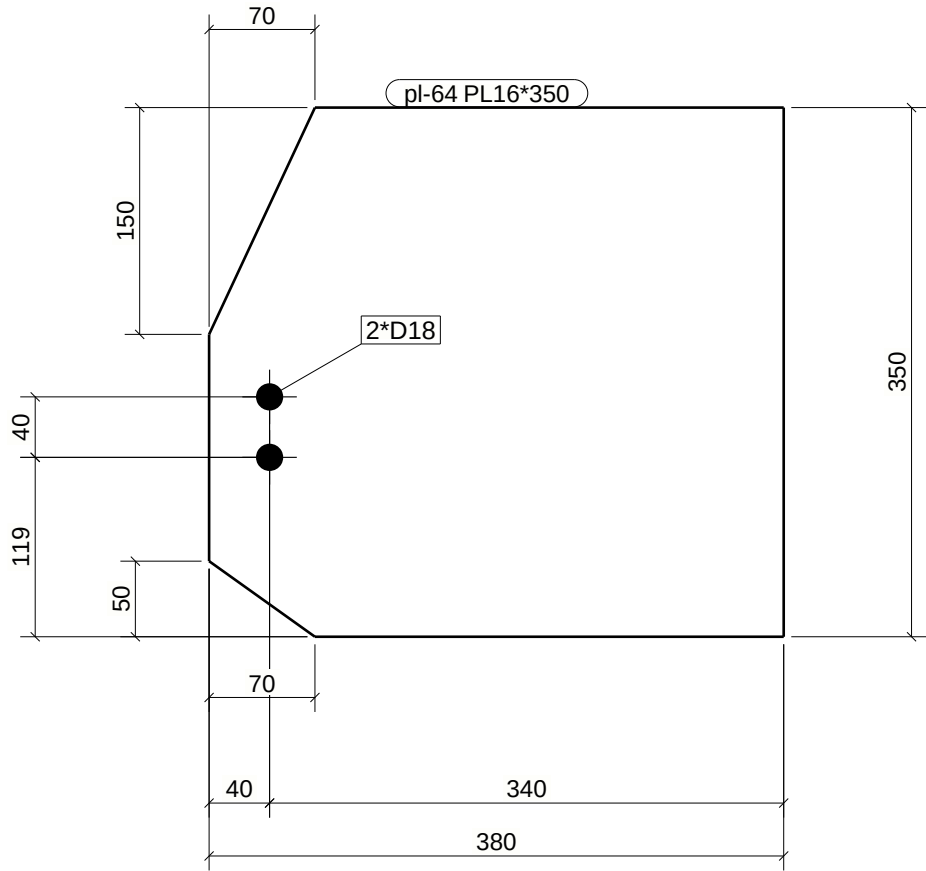
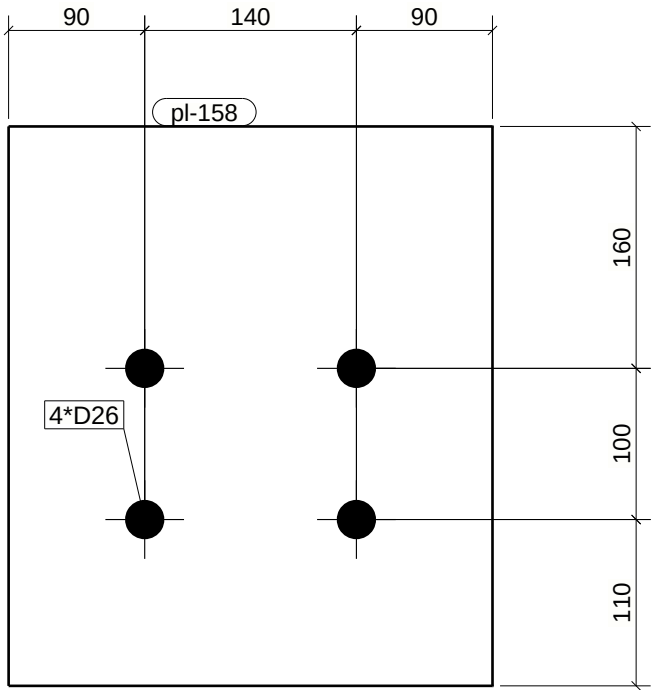
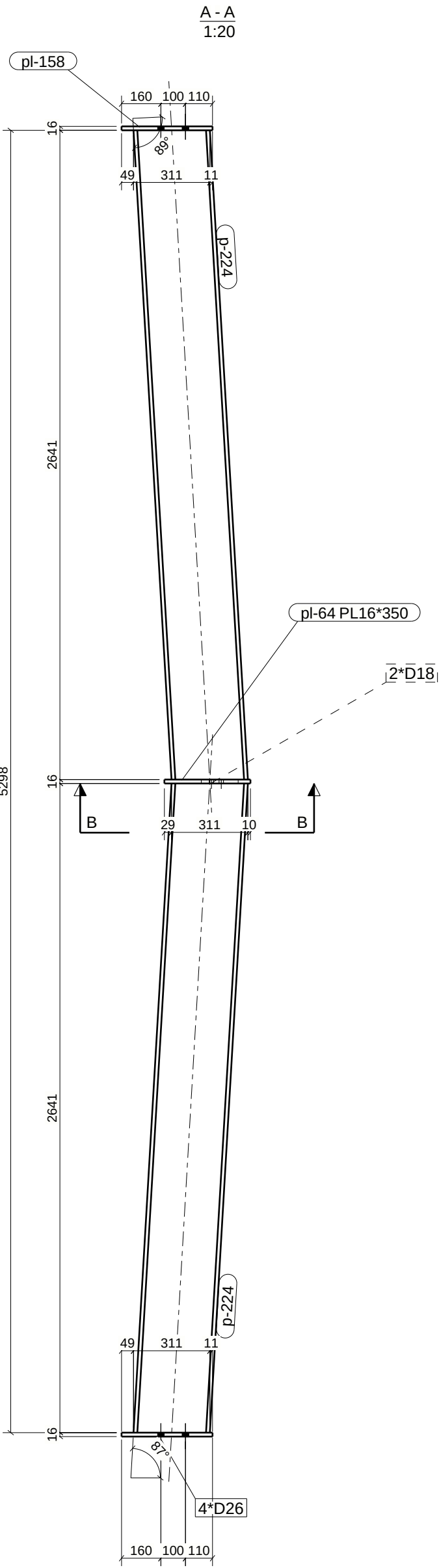
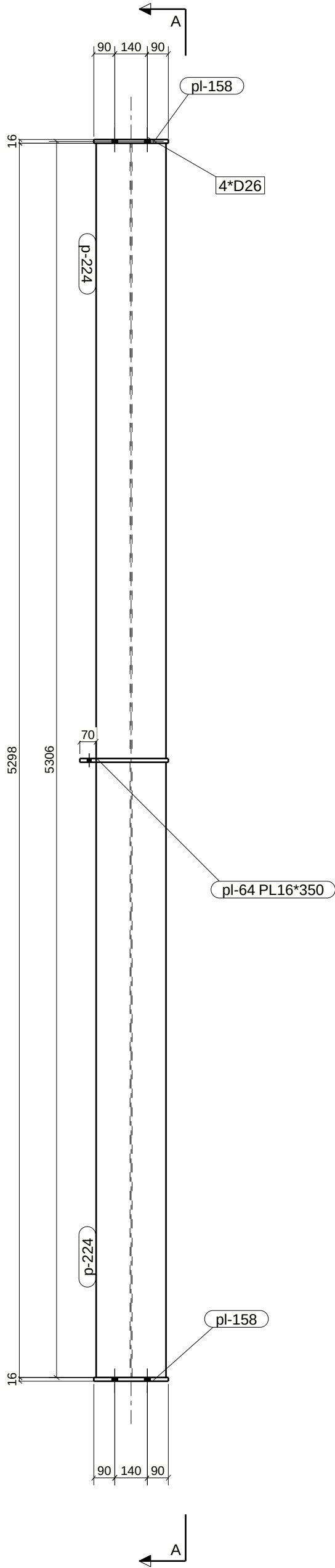
PHASE	QUANTITY
125	1



DS-25 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-224	HEA320	2664	2	260.1
pl-64	PL16*350	380	1	15.8
pl-158	BL16*370	320	2	14.9
pl-302	PL12*159	194	2	2.0
Viso:				569.7

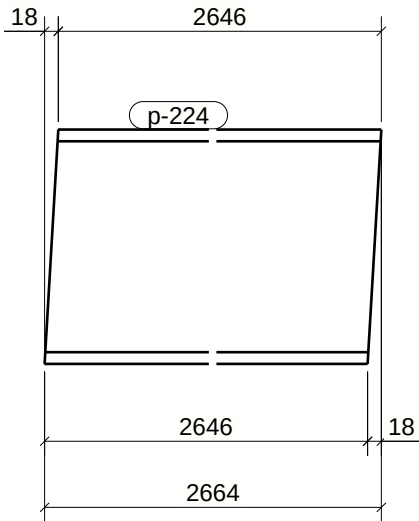
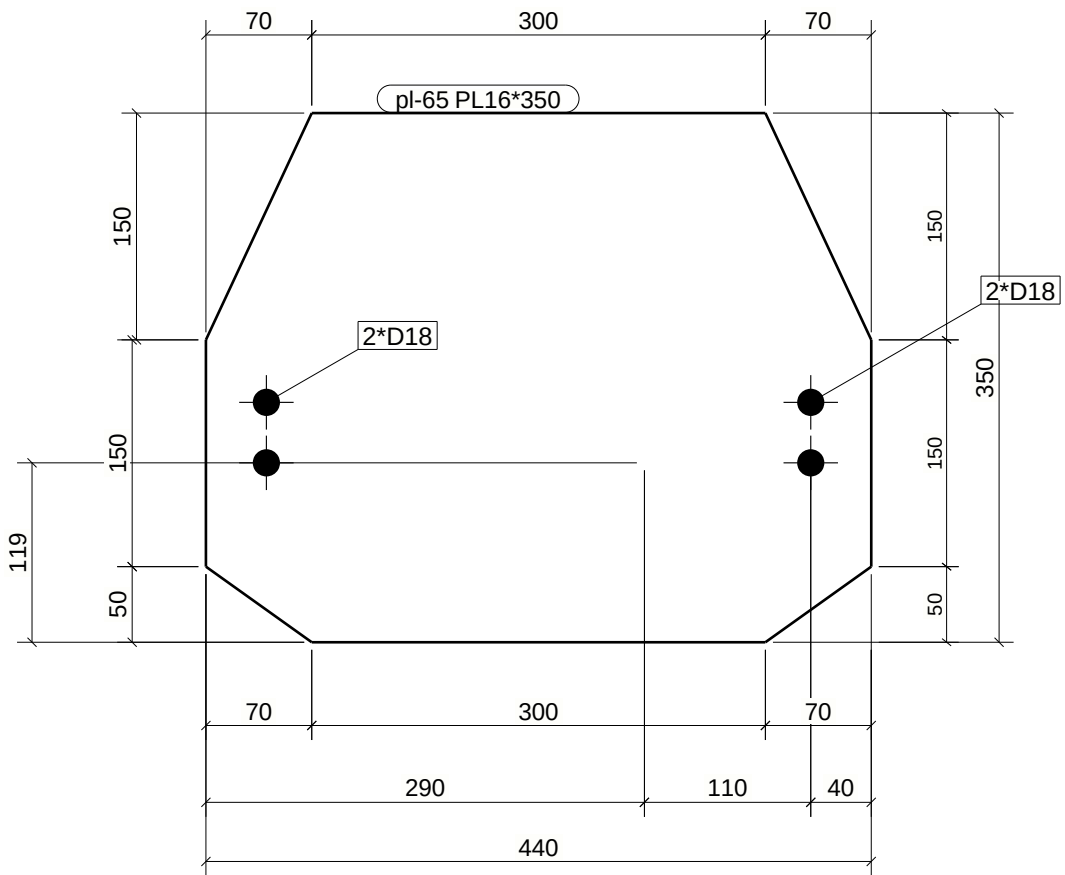
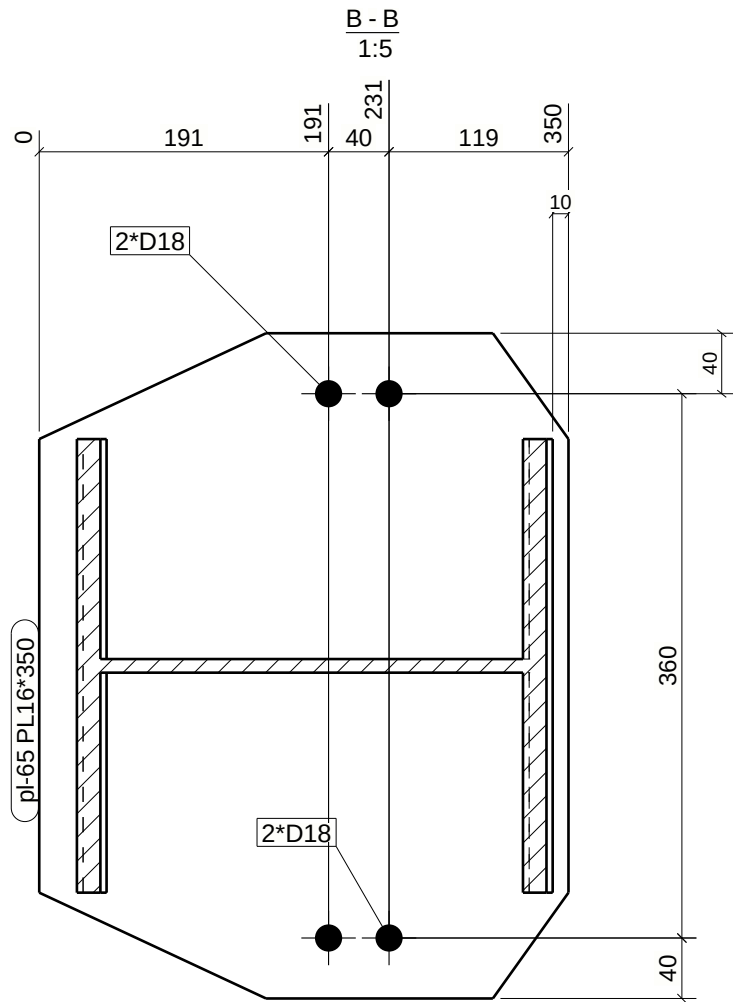
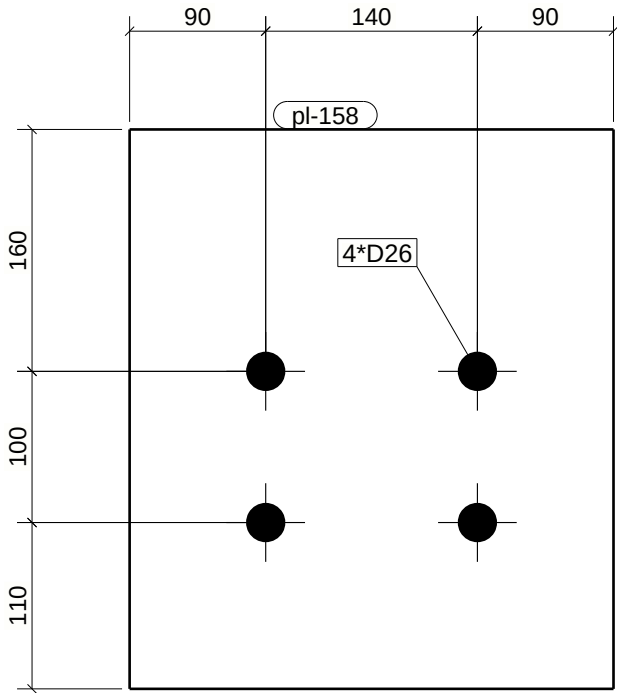
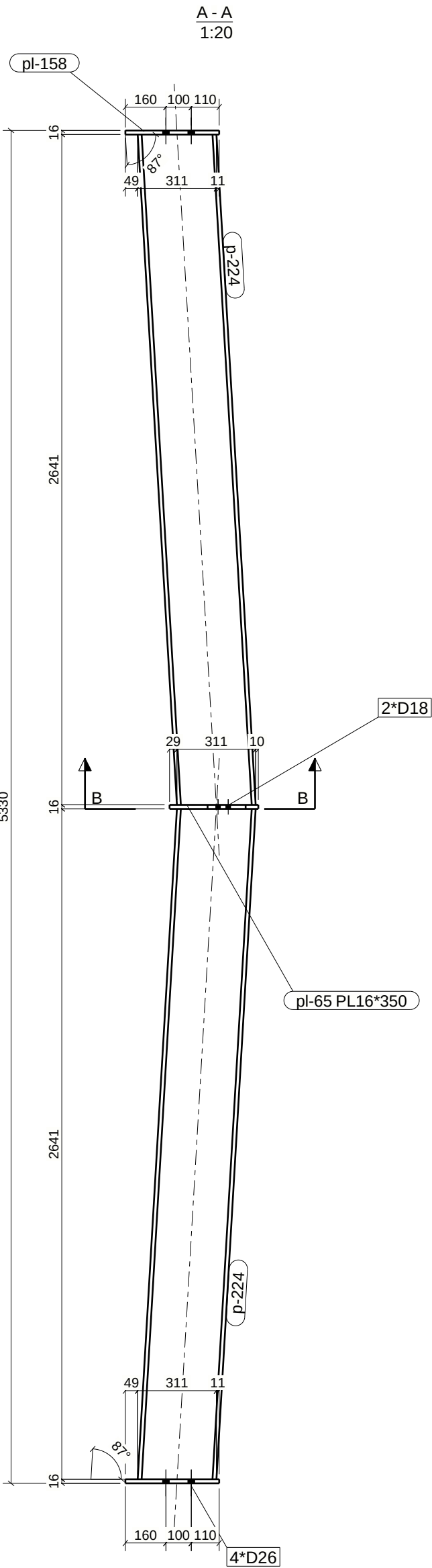
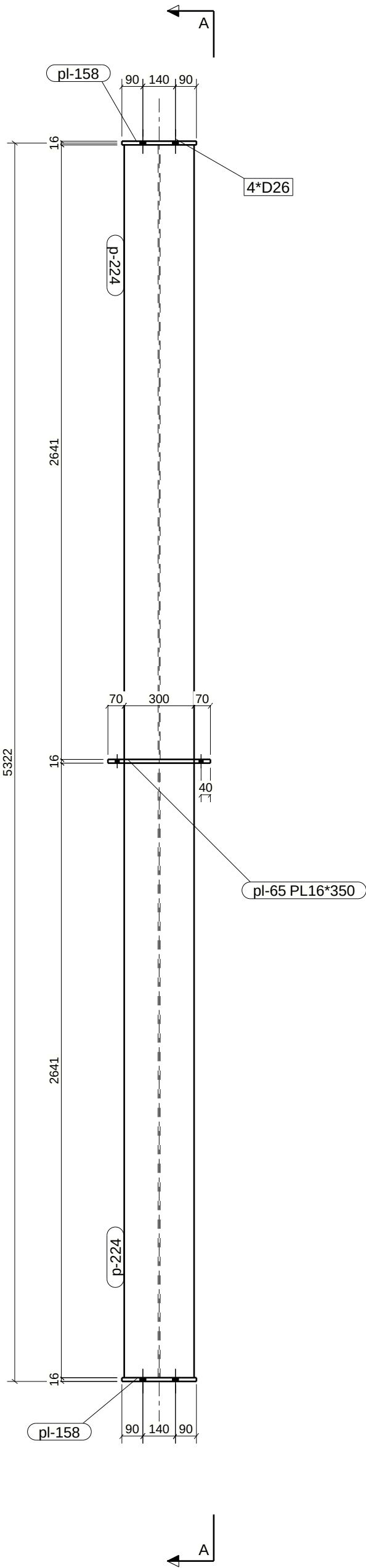
PHASE	QUANTITY
125	1



DS-26 Kiekis 1

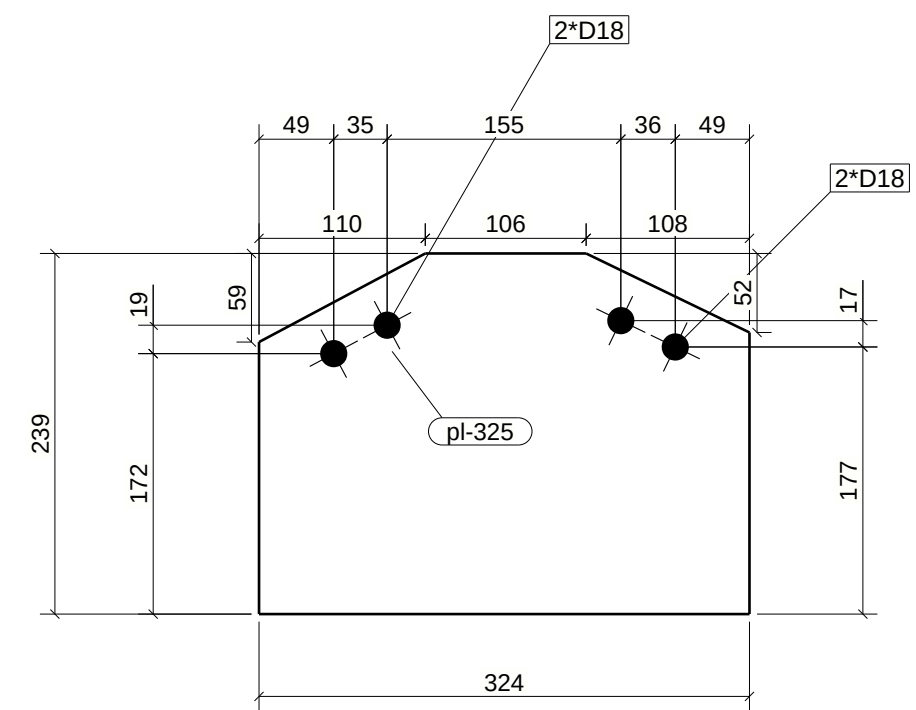
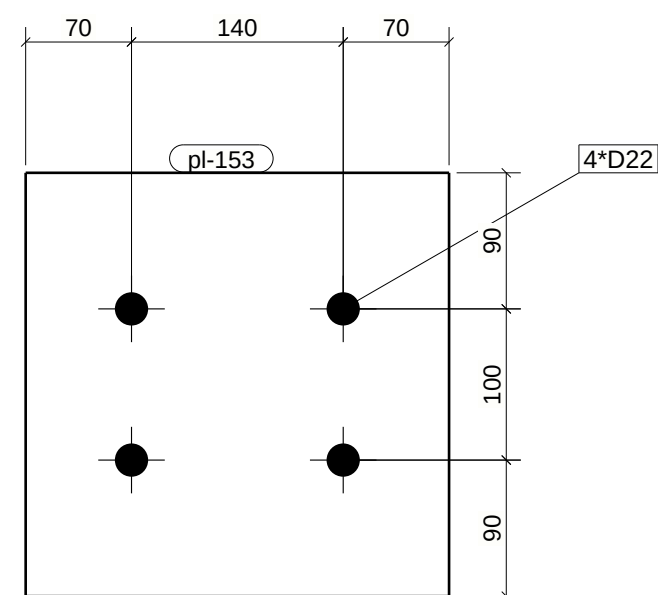
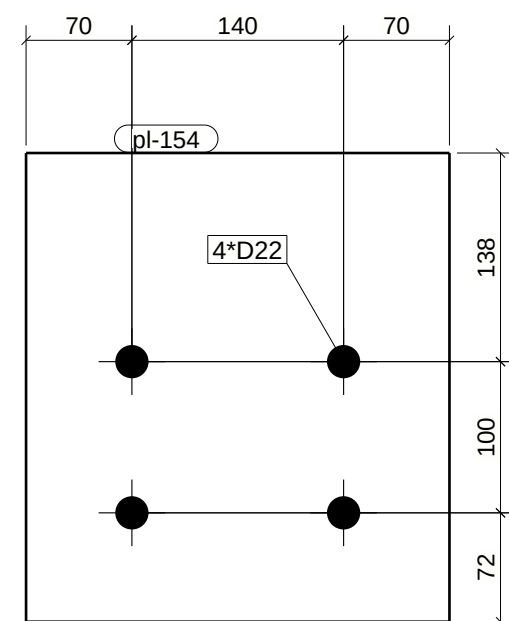
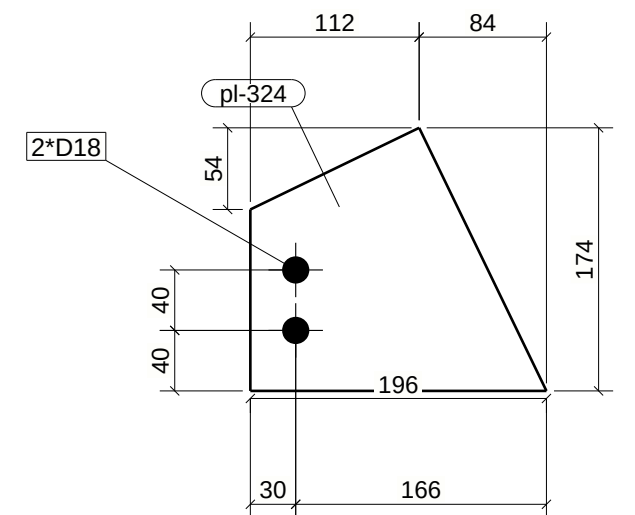
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-224	HEA320	2664	2	260.1
pl-64	PL16*350	380	1	15.8
pl-158	BL16*370	320	2	14.9
Viso:				565.8

PHASE	QUANTITY
125	1



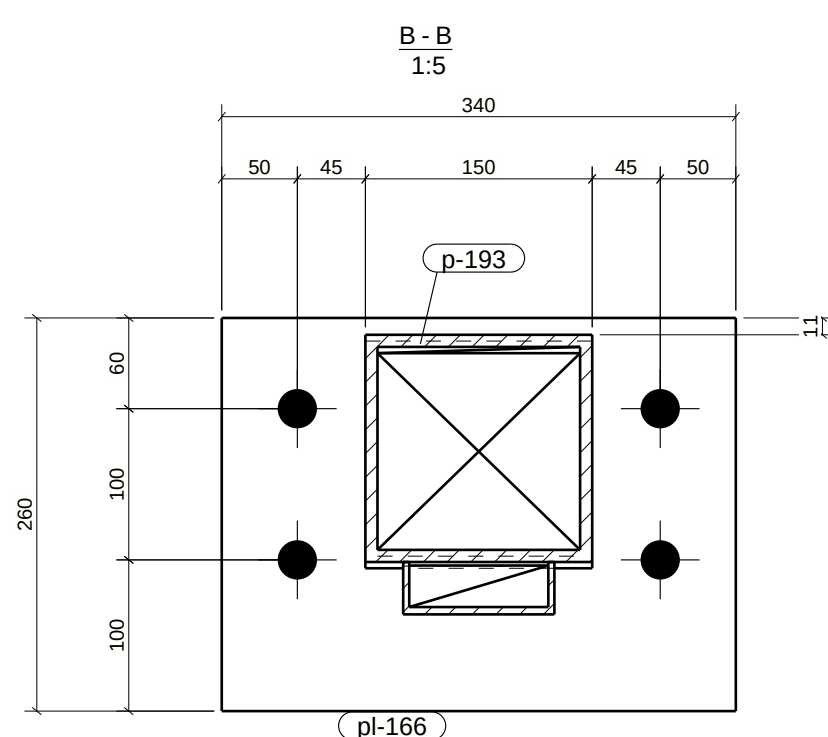
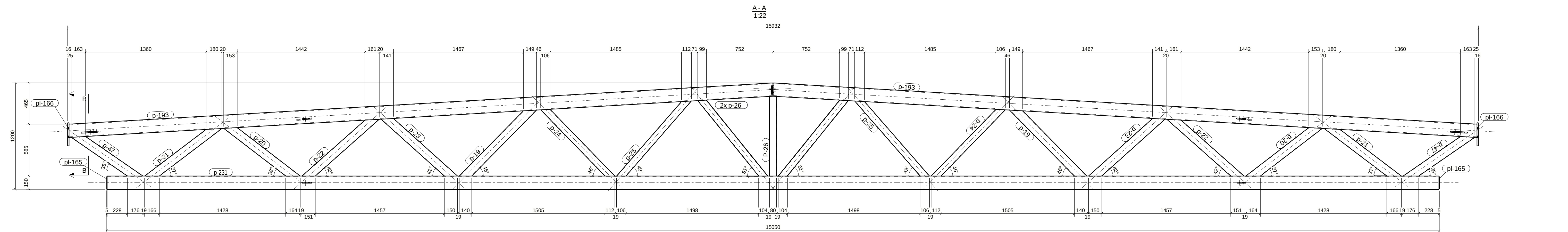
DS-27 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-224	HEA320	2664	2	260.1
pl-65	PL16*350	440	1	17.6
pl-158	BL16*370	320	2	14.9
Viso:				567.6

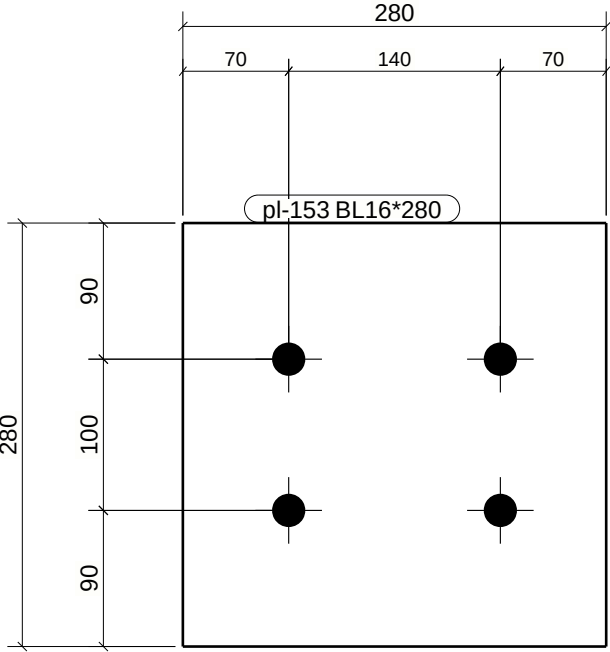


Tekla Structures

PHASE	QUANTITY
125	1



Zymuo	Profilis	Ilgis	Kiekis	Svoris
P-26	CFRHS80*4	900	1	8.5
P-19	CFRHS100*4	1142	2	12.5
p-20	CFRHS100*4	1013	2	10.7
P-21	CFRHS100*4	1020	2	10.6
p-22	CFRHS100*4	1078	2	11.5
p-23	CFRHS100*4	1071	2	11.6
P-24	CFRHS80*4	1119	2	10.0
P-25	CFRHS80*4	1193	2	10.7
p-26	CFRHS80*4	1159	2	10.5
P-47	CFRHS100*4	915	2	9.4
p-193	CFRHS150*8	7972	2	284.1
P-231	CFRHS150*6	15040	1	408.0
pl-13	PL12*100	110	4	1.0
pl-86	PL12*106	110	2	1.1
pl-165	PL5*140	140	2	0.8
pl-166	BL16*260	340	2	11.1
pl-311	PL12*173	195	2	2.2
pl-312	PL12*172	193	2	2.2
pl-315	PL12*120	130	2	1.5
Viso:				1221.7



EDS-1	Kiekis	2

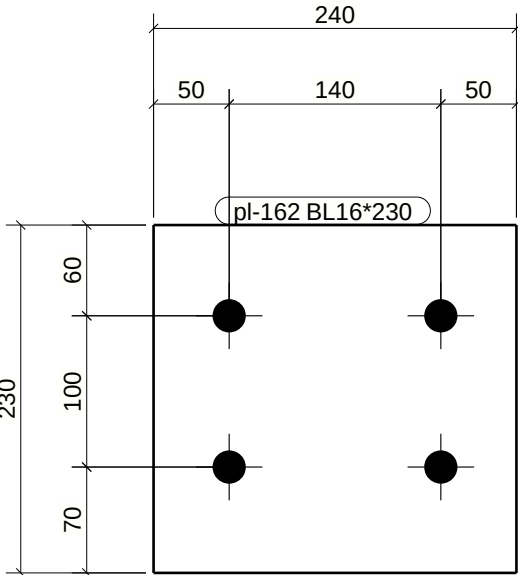
PHASE	QUANTITY
125	2

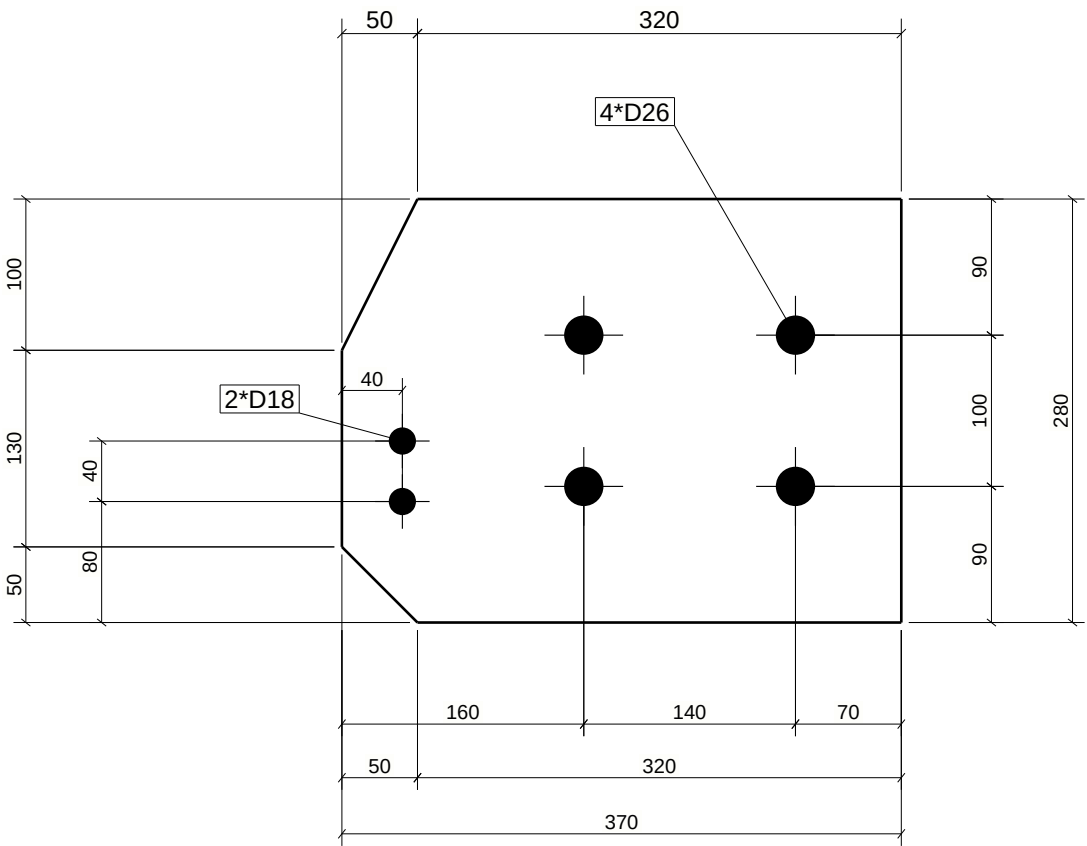
Zymuo	Profilis	Ilgis	Kiekis
pl-153	BL16*280	280	1
Viso:			9.8

PHASE	QUANTITY
125	1

EDS-2 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
pl-162	BL16*230	240	1	6.9
			Viso:	6.9

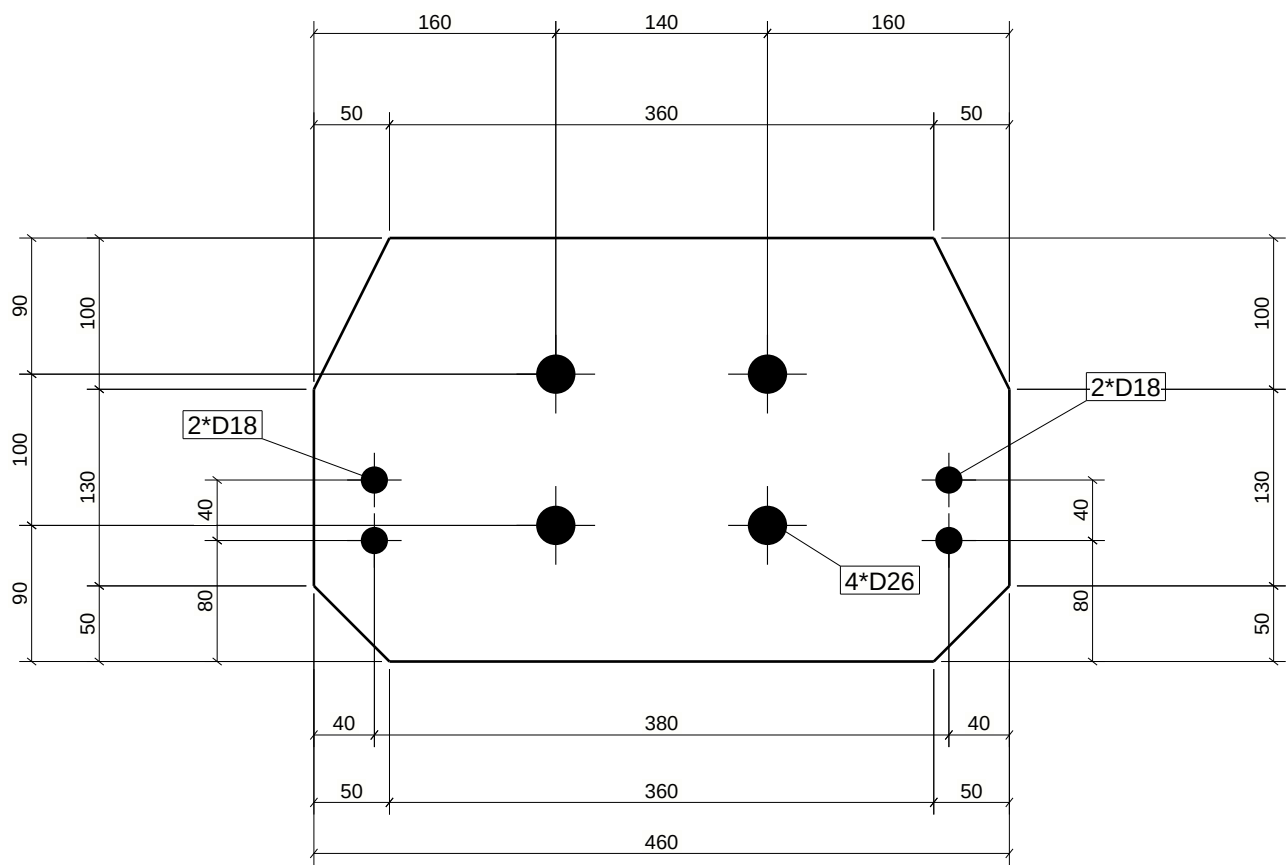




EDS-3 Kiekis 1

PHASE	QUANTITY
125	1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
pl-6	PL16*280	370	1	12.5
			Viso:	12.5

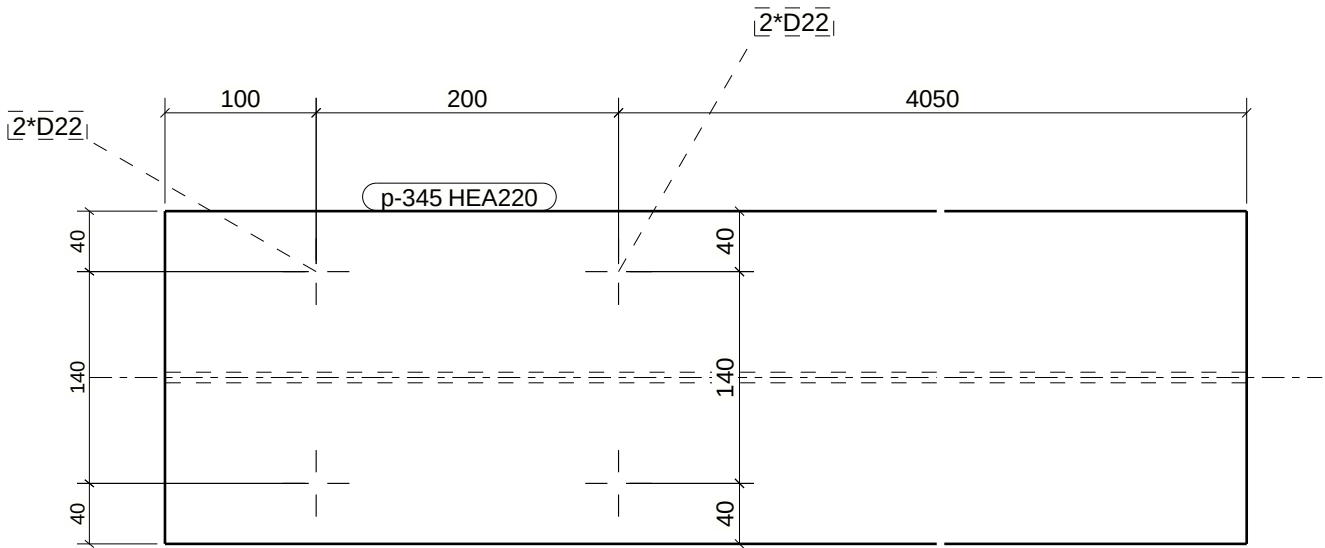
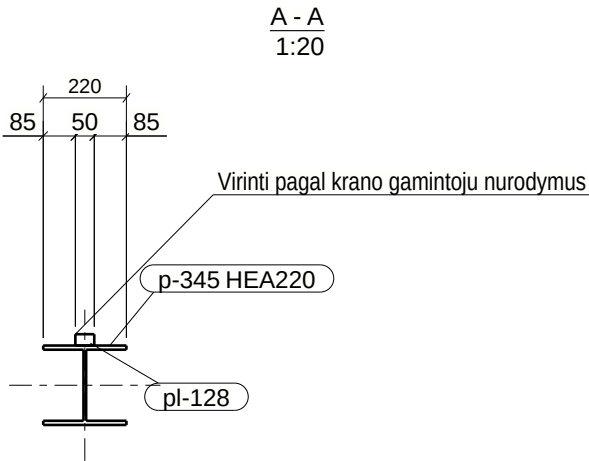
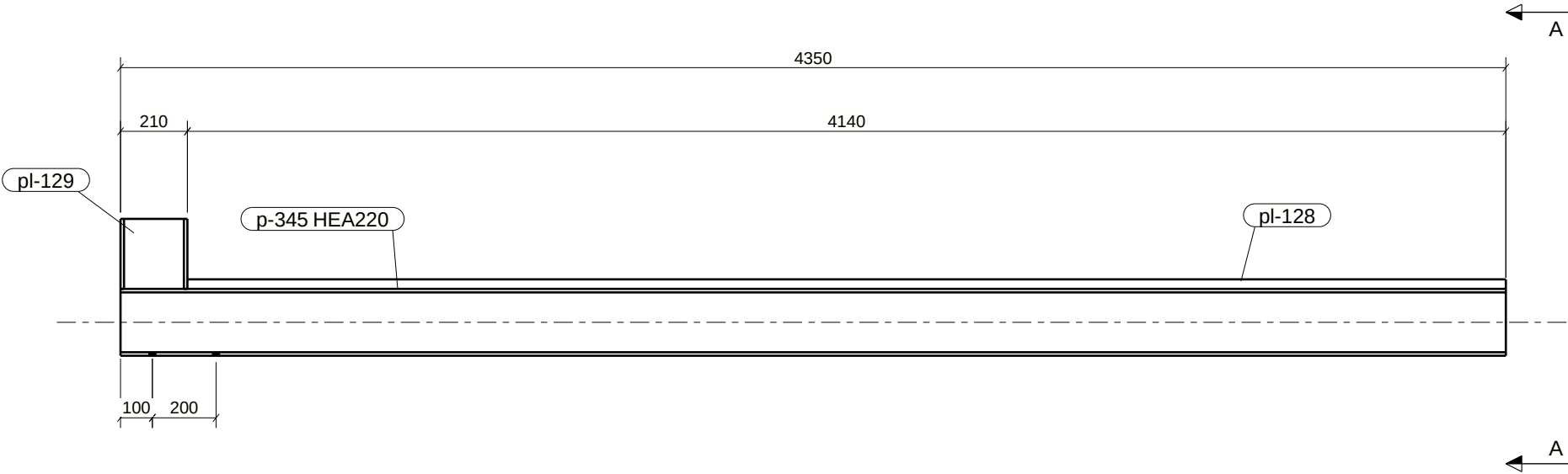


EDS-4

Kiekis 3

PHASE	QUANTITY
125	3

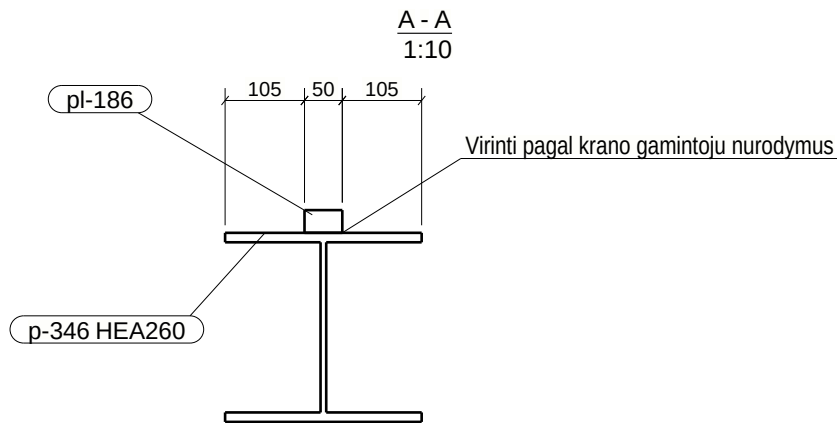
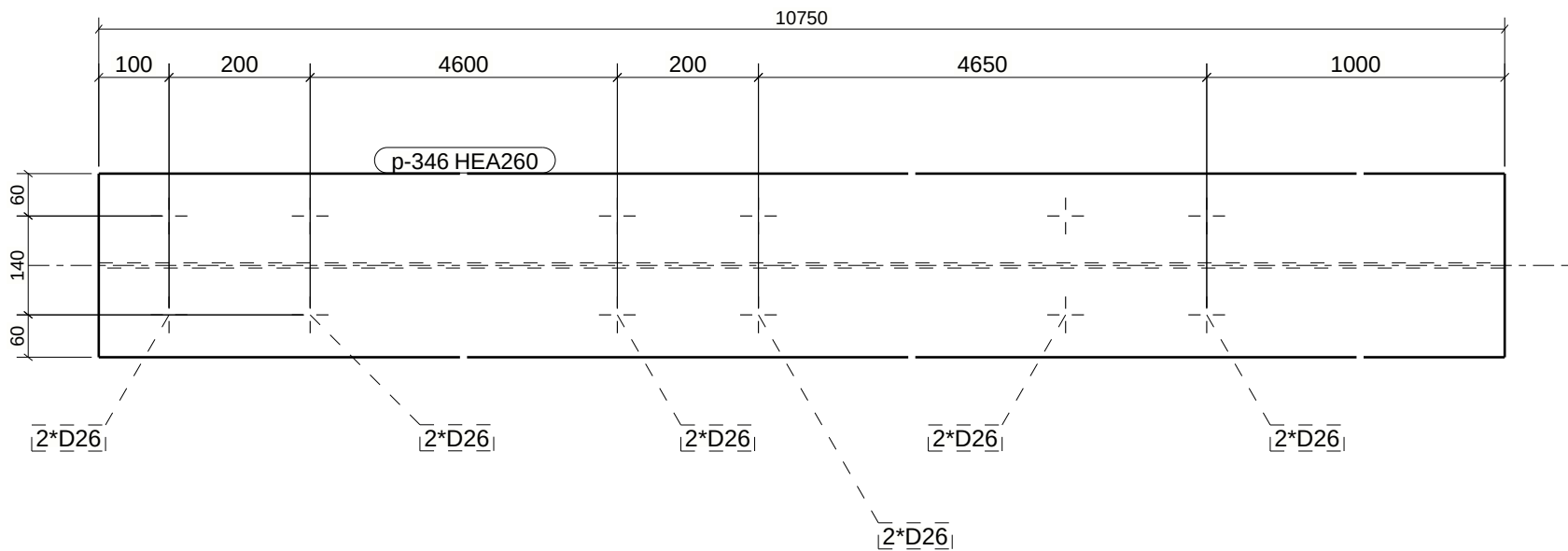
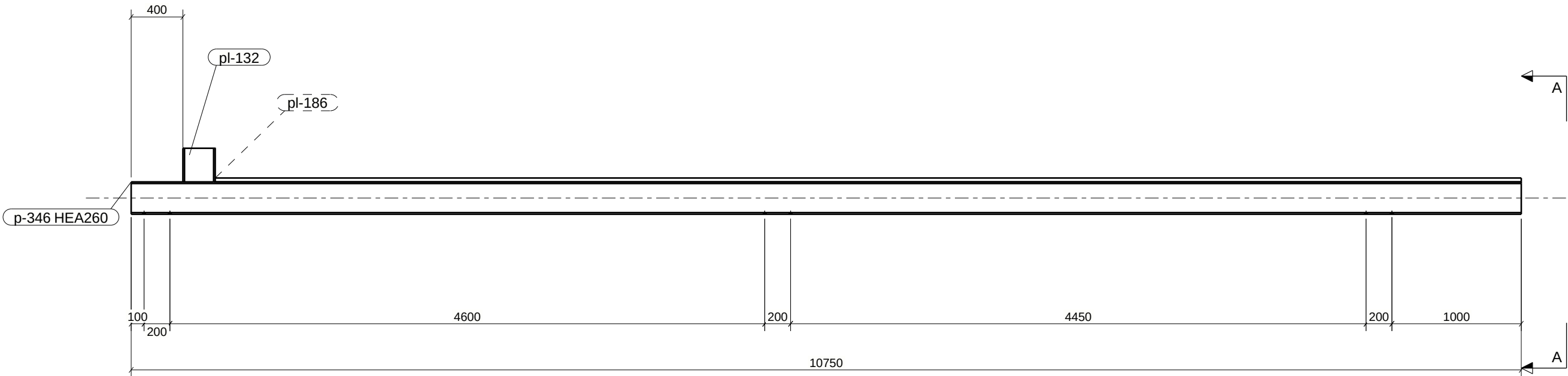
Zymuo	Profilis	Ilgis	Svoris
pl-7	PL16*280	460	15.2
Viso:			15.2



KRAN-1 Kiekis 2

Zymuo	Profilis	Ilgis	Kiekis	
p-345	HEA220	4350	1	
pl-128	BL50*30	4140	1	
pl-129	HEA220	220	1	
			Viso:	279.6

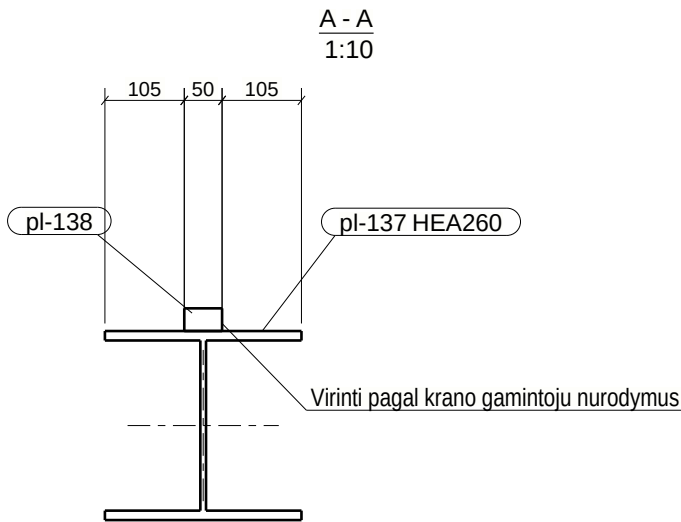
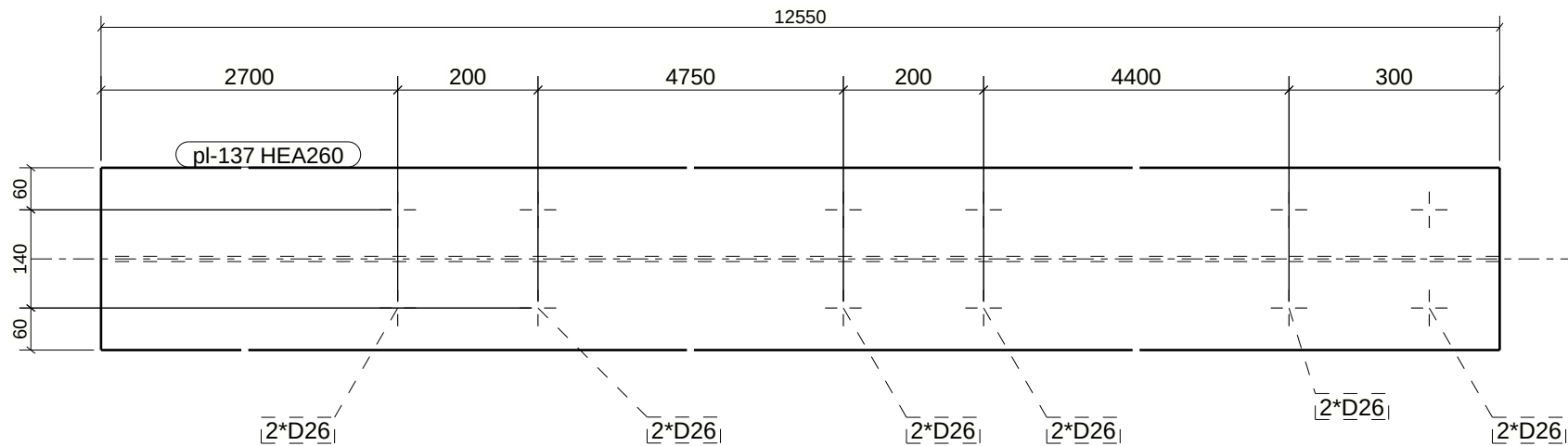
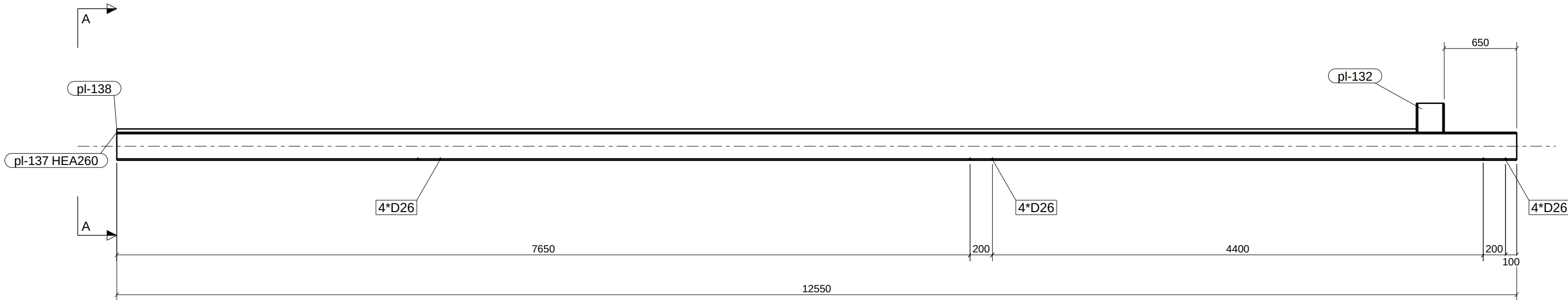
PHASE	QUANTITY
127	2



KRAN-3 Kiekis 2

Zymuo	Profilis	Ilgis	Kiekis	
p-346	HEA260	10750	1	
pl-132	HEA260	260	1	
pl-186	BL30*50	10100	1	
			Viso:	869.3

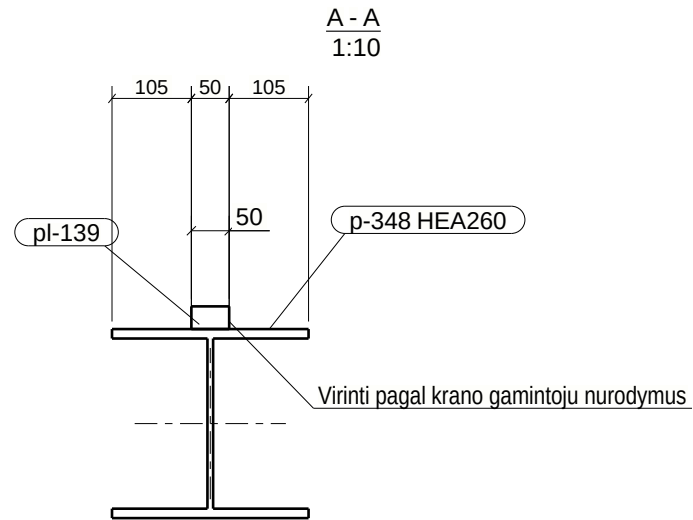
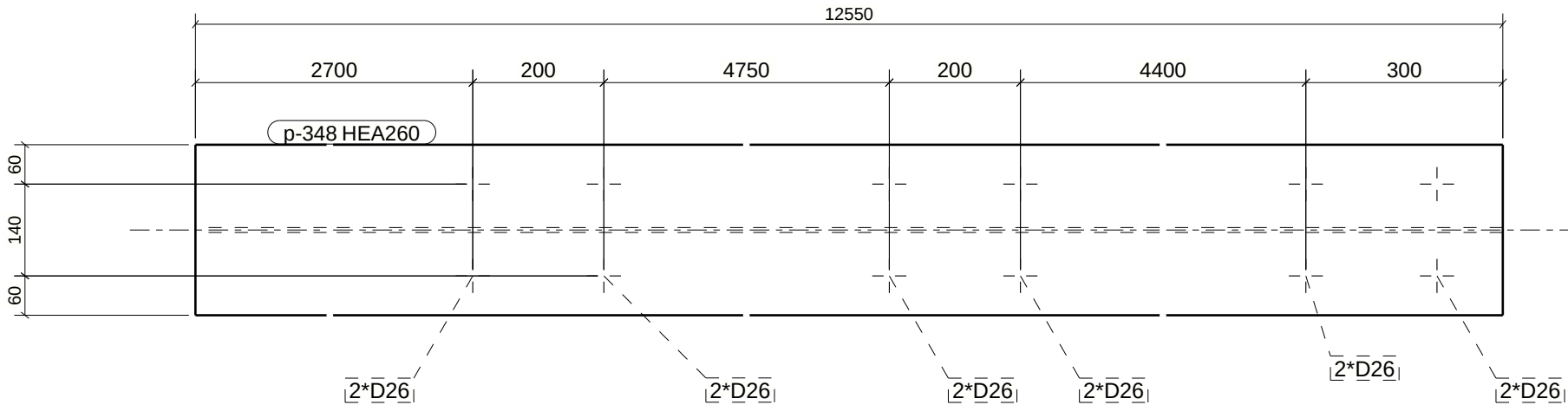
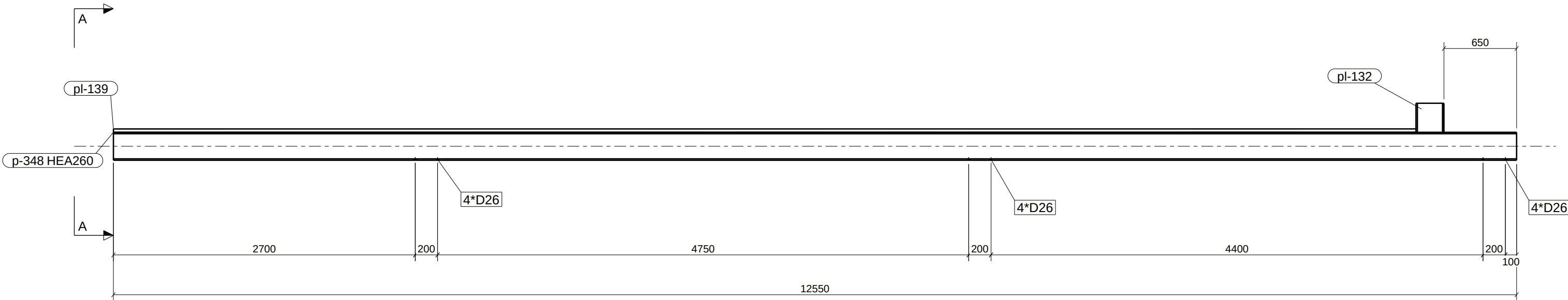
PHASE	QUANTITY
127	2



KRAN-4 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	
pl-132	HEA260	260	1	
pl-137	HEA260	12550	1	
pl-138	BL30*50	11650	1	
Viso:			1010.2	

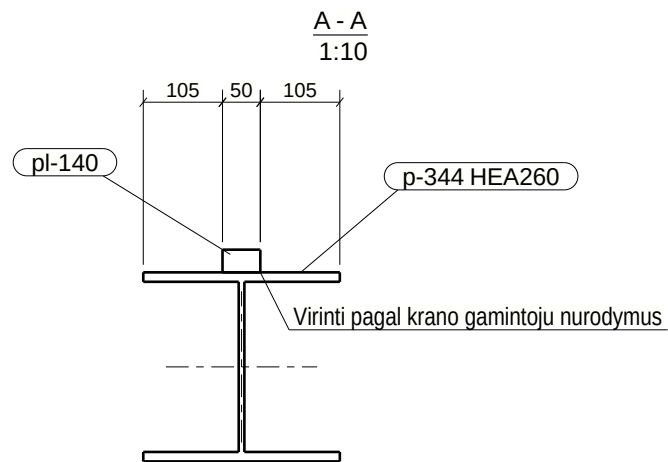
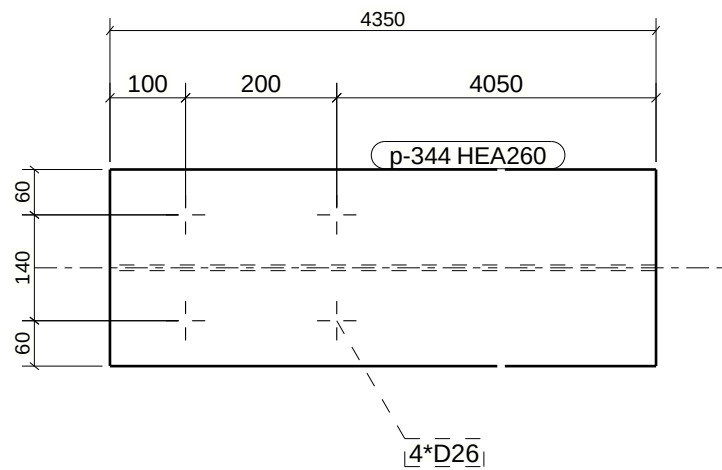
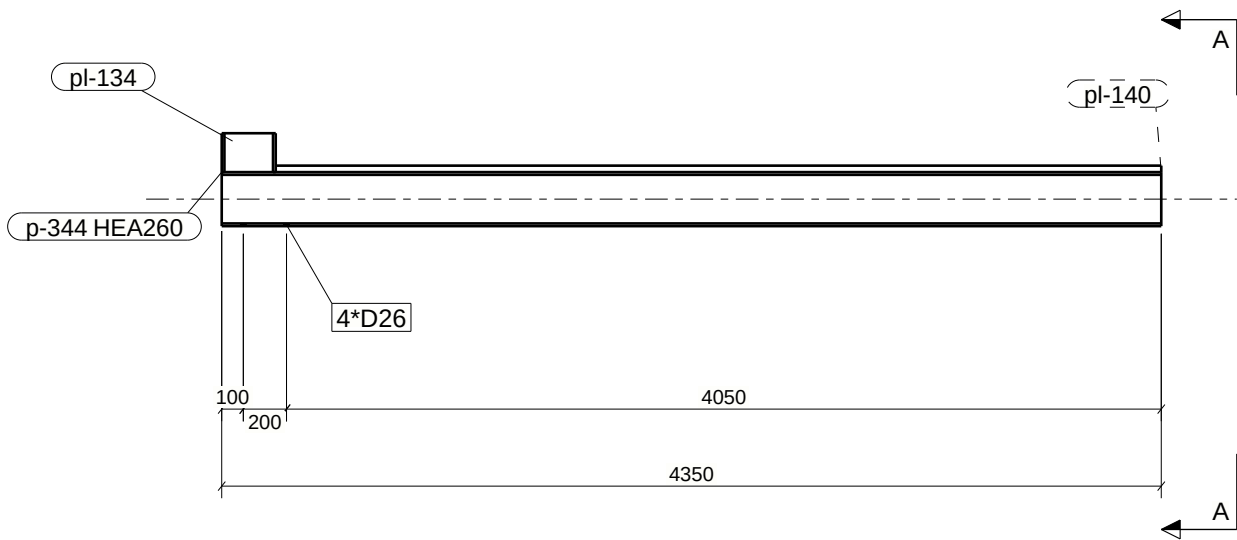
PHASE	QUANTITY
127	1



KRAN-5 Kiekis 1

PHASE		QUANTITY	
127		1	

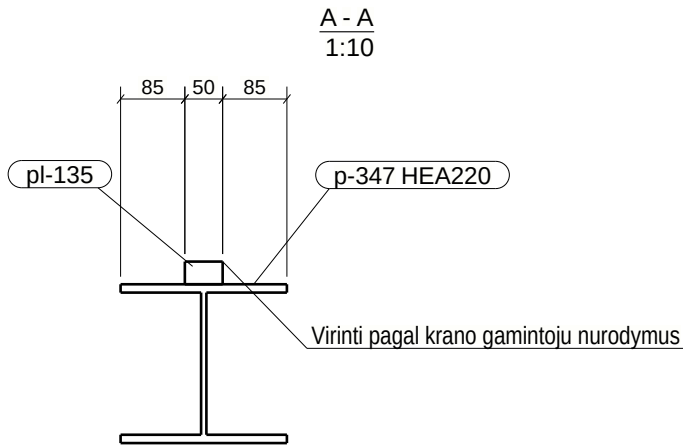
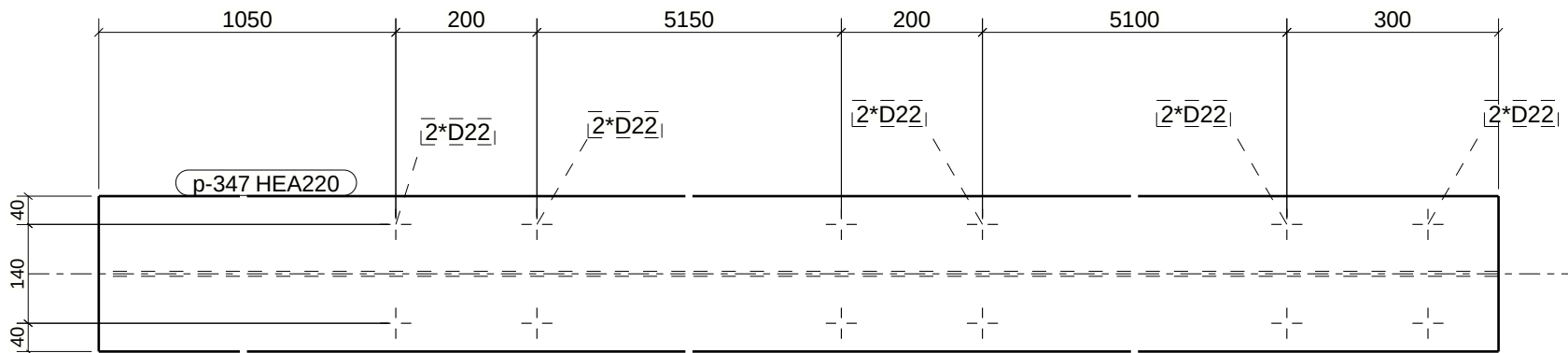
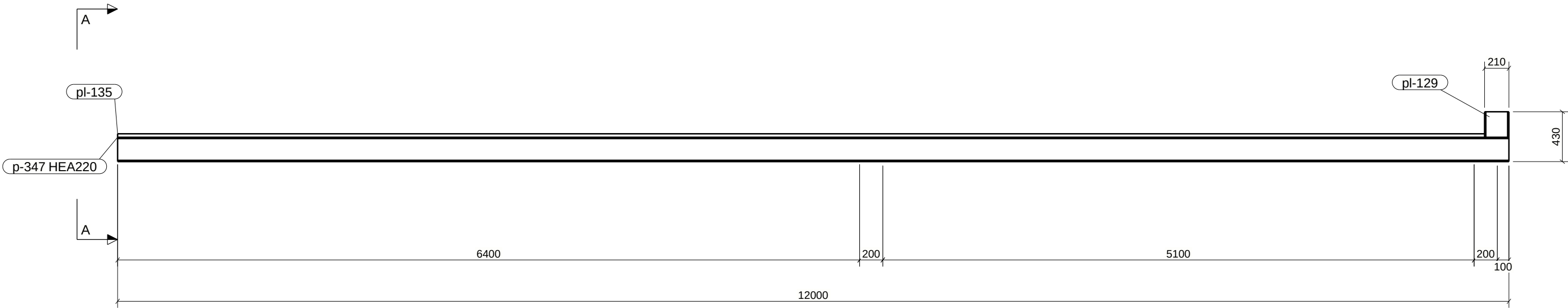
Kiekis				
Zymuo	Profilis	Ilgis	Kiekis	
p-348	HEA260	12550	1	
pl-132	HEA260	260	1	
pl-139	BL30*50	11651	1	
Viso:			1010.2	



KRAN-8 Kiekis 2

PHASE	QUANTITY
127	2

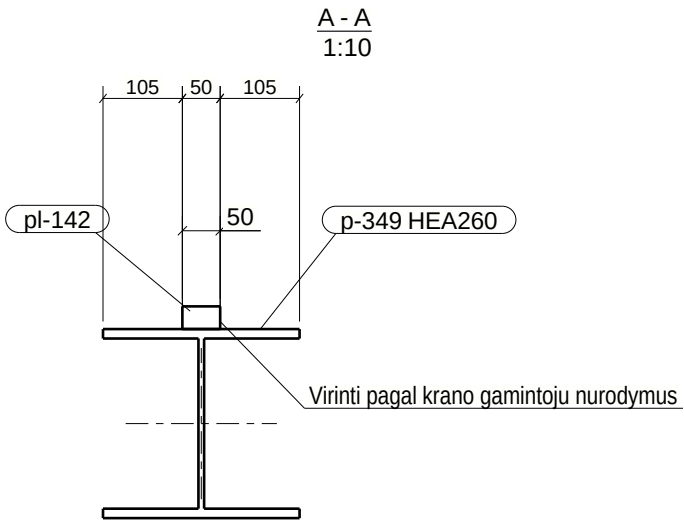
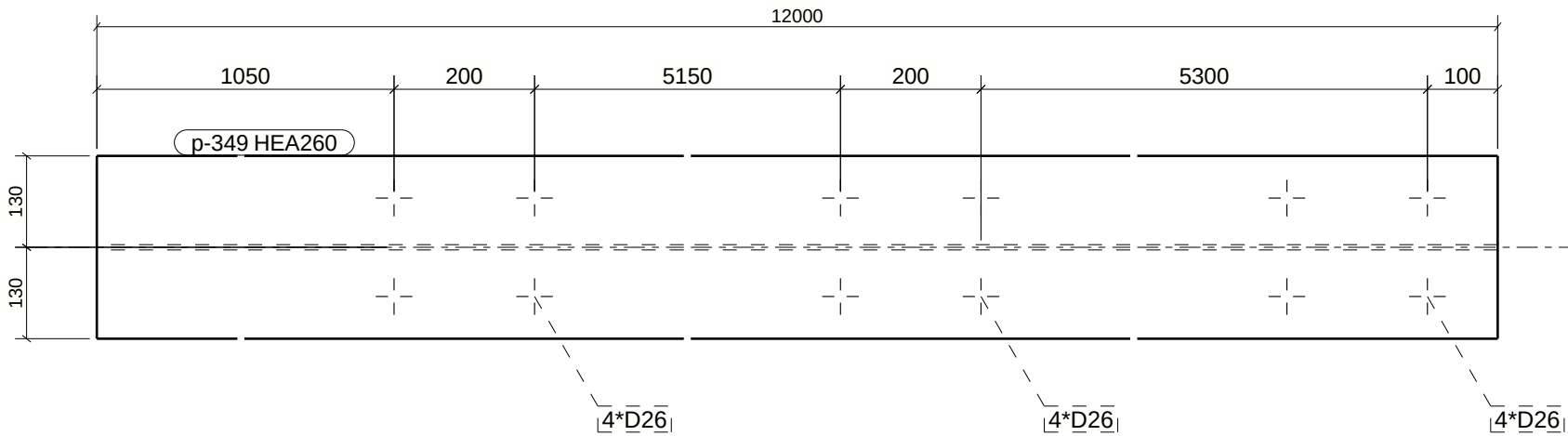
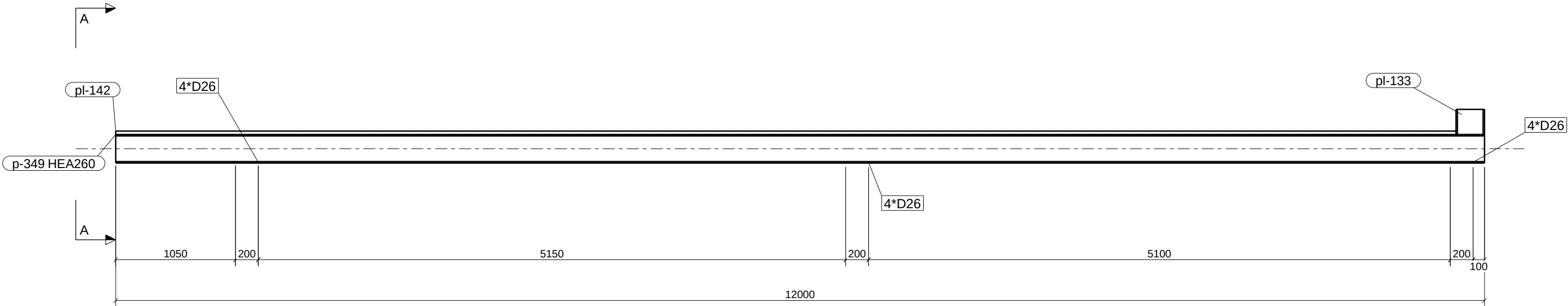
Kiekis				
Zymuo	Profilis	Ilgis	Kiekis	
p-344	HEA260	4350	1	296.5
pl-134	HEA260	180	1	12.3
pl-140	BL50*30	4100	1	48.3
Viso:				357.0



KRAN-9 Kiekis 2

Zymuo	Profilis	Ilgis	Kiekis	
p-347	HEA220	12000	1	
pl-129	HEA220	220	1	
pl-135	BL50*30	11790	1	
			Viso:	
				756.0

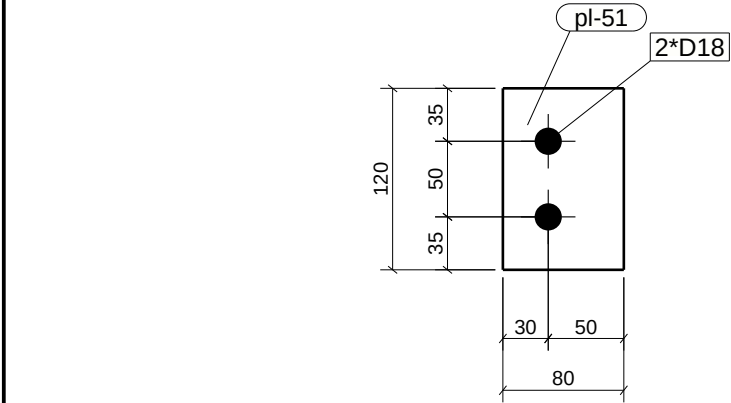
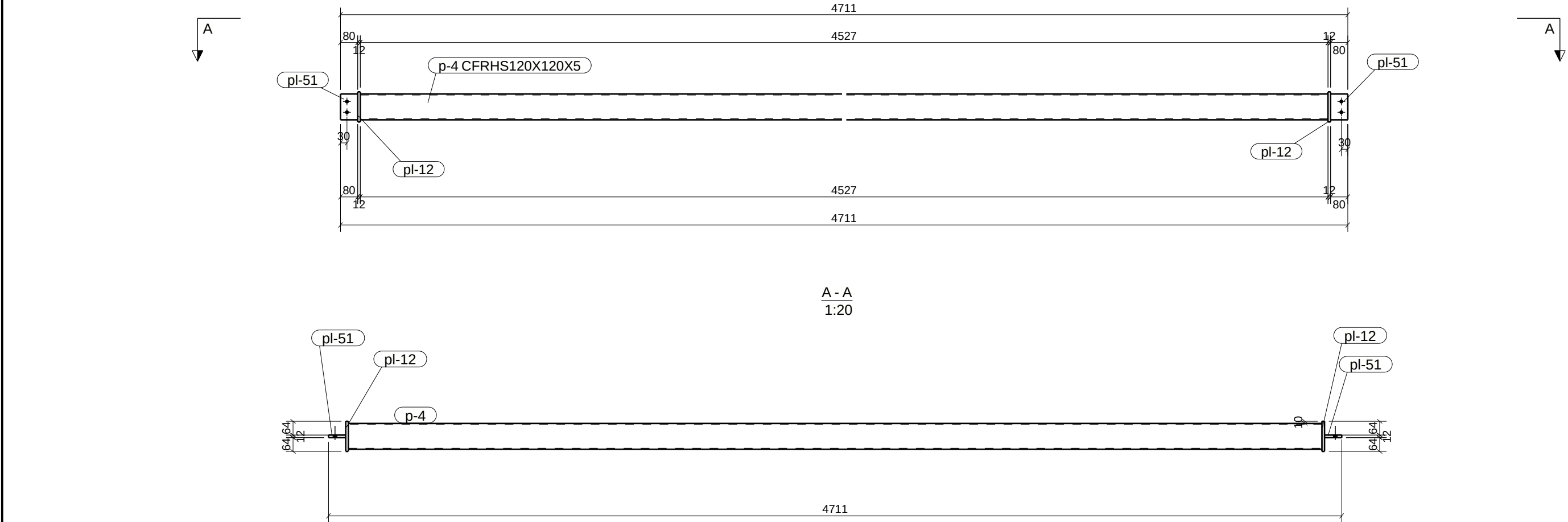
PHASE	QUANTITY
127	2



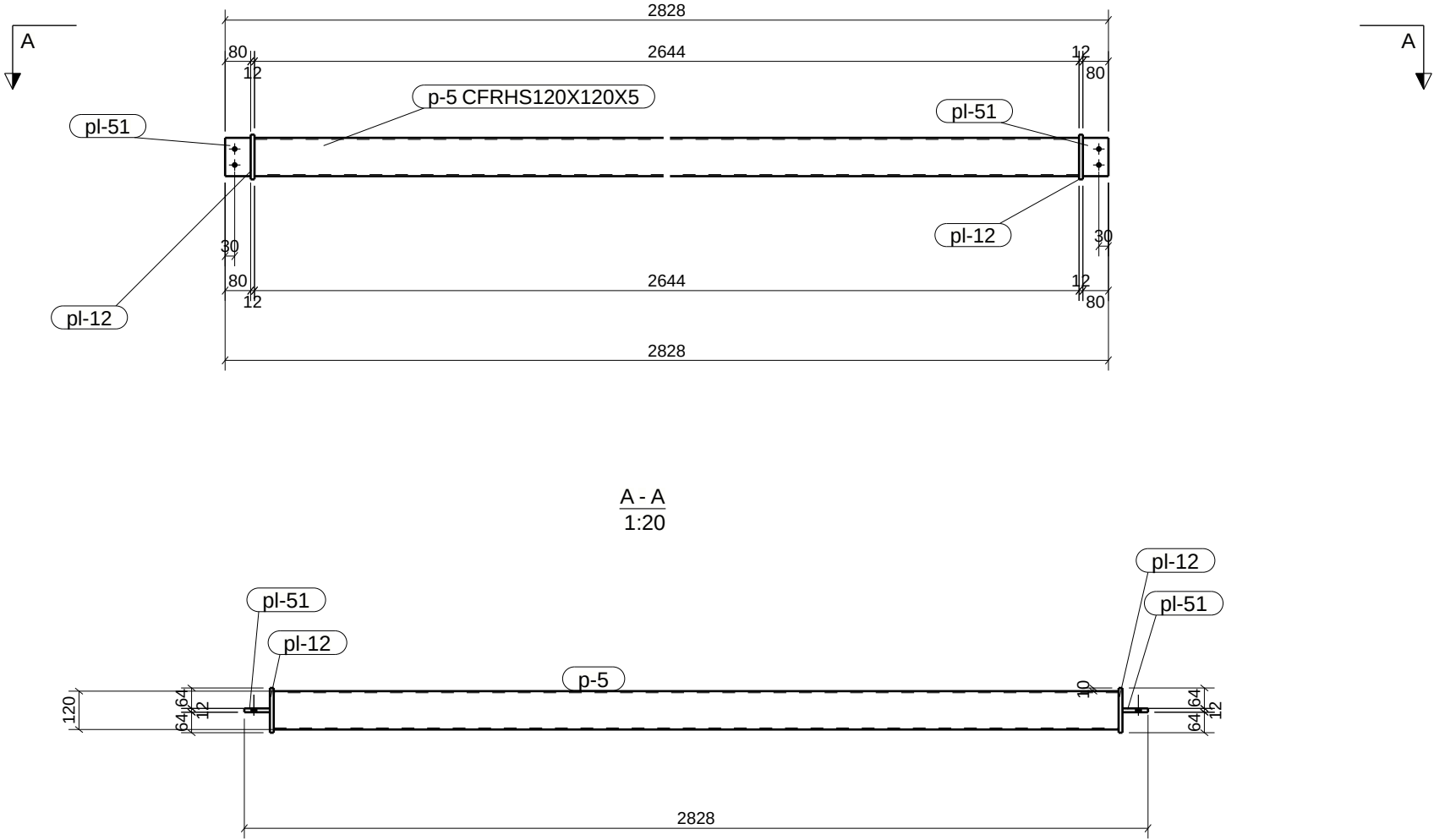
KRAN-10 Kiekis 2

PHASE	QUANTITY
127	2

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-349	HEA260	12000	1	817.8
pl-133	HEA260	220	1	15.0
pl-142	BL50*30	11750	1	138.4
Viso:				971.2



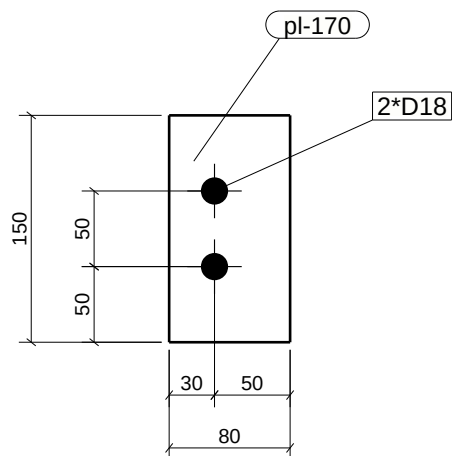
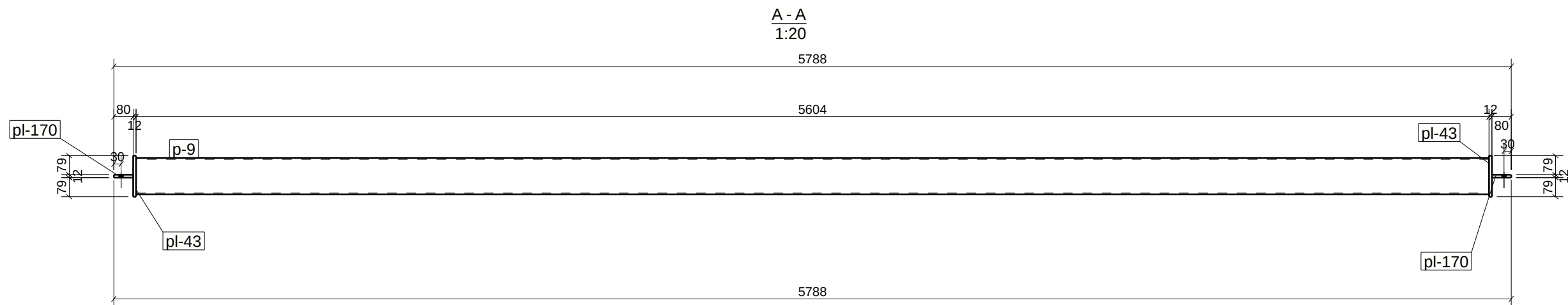
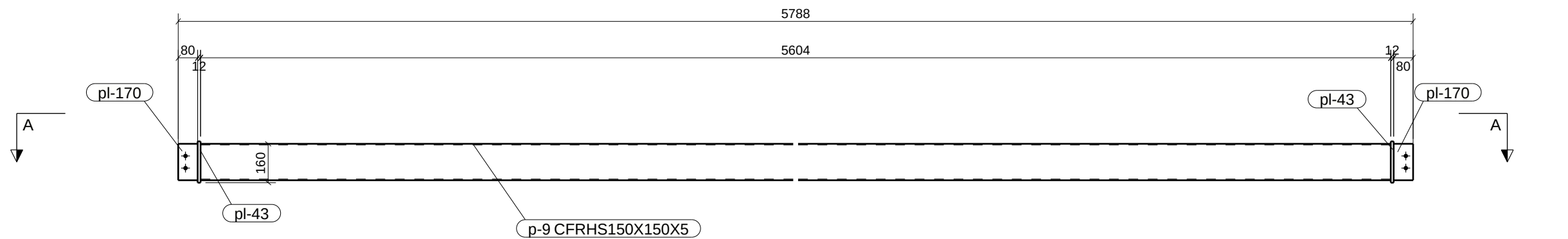
</



KRY-2 Kiekis 4

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-5	CFRHS120X120X5	2644	1	46.4
pl-12	PL12*140	140	2	1.8
pl-51	PL12*120	80	2	0.9
			Viso:	51.9

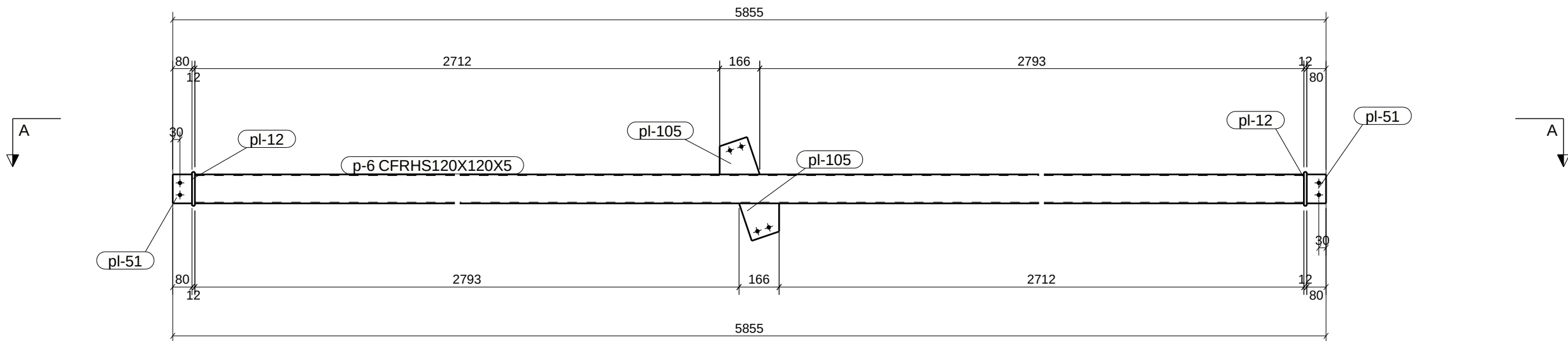
PHASE	QUANTITY
129	4



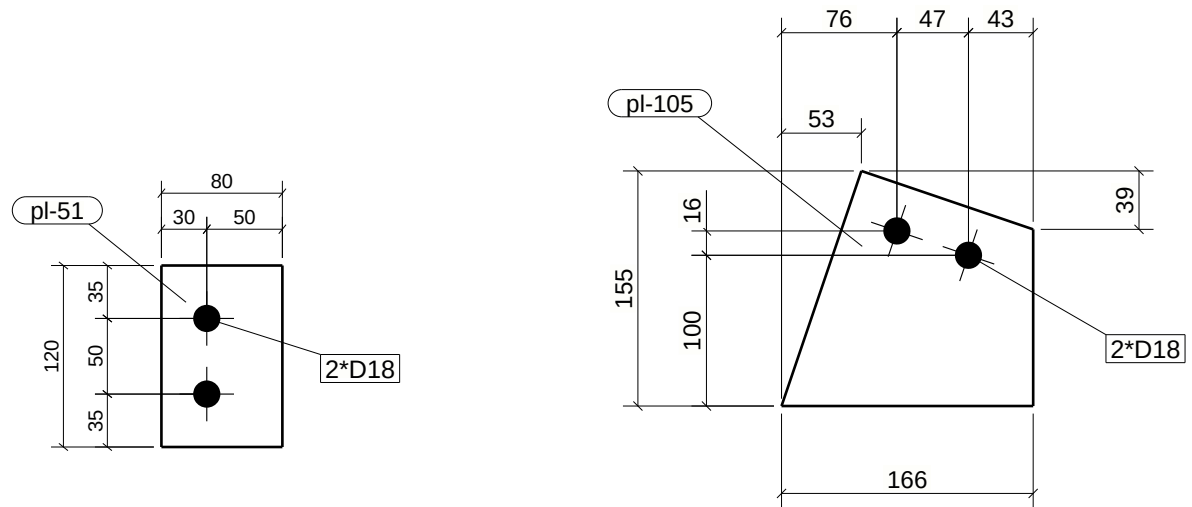
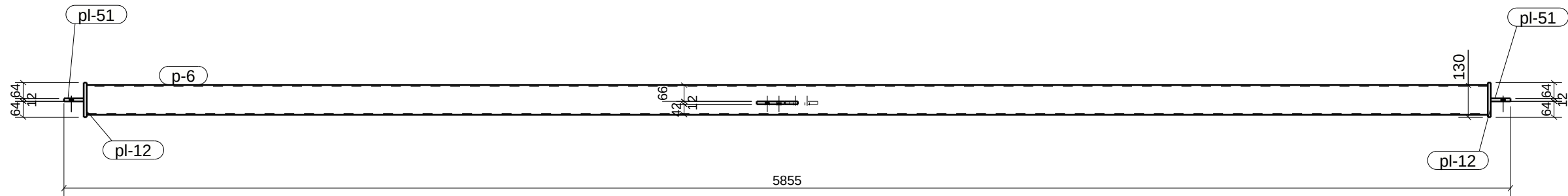
KRY-3 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	
p-9	CFRHS150X150X5	5604	1	
pl-43	PL12*170	170	2	
pl-170	PL12*150	80	2	
			Viso:	132.5

PHASE	QUANTITY
129	1



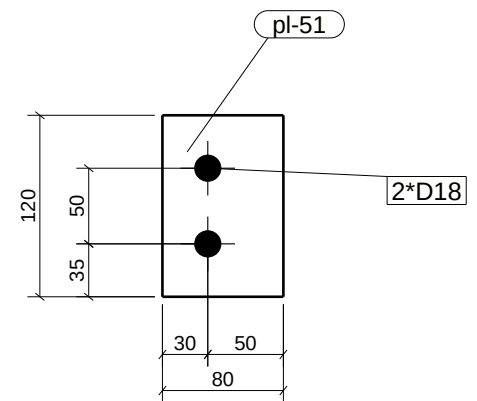
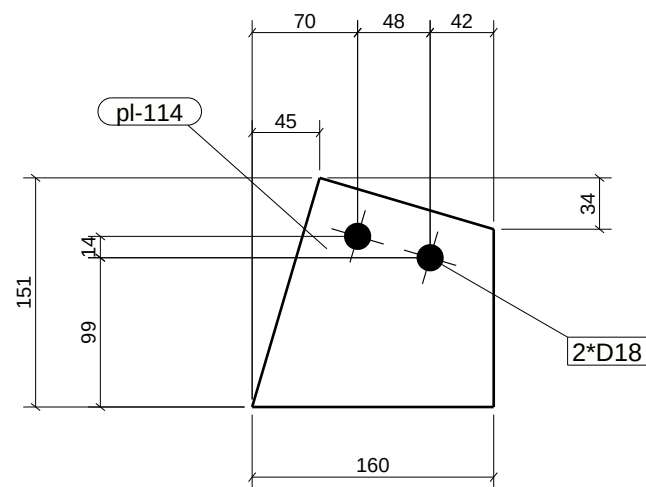
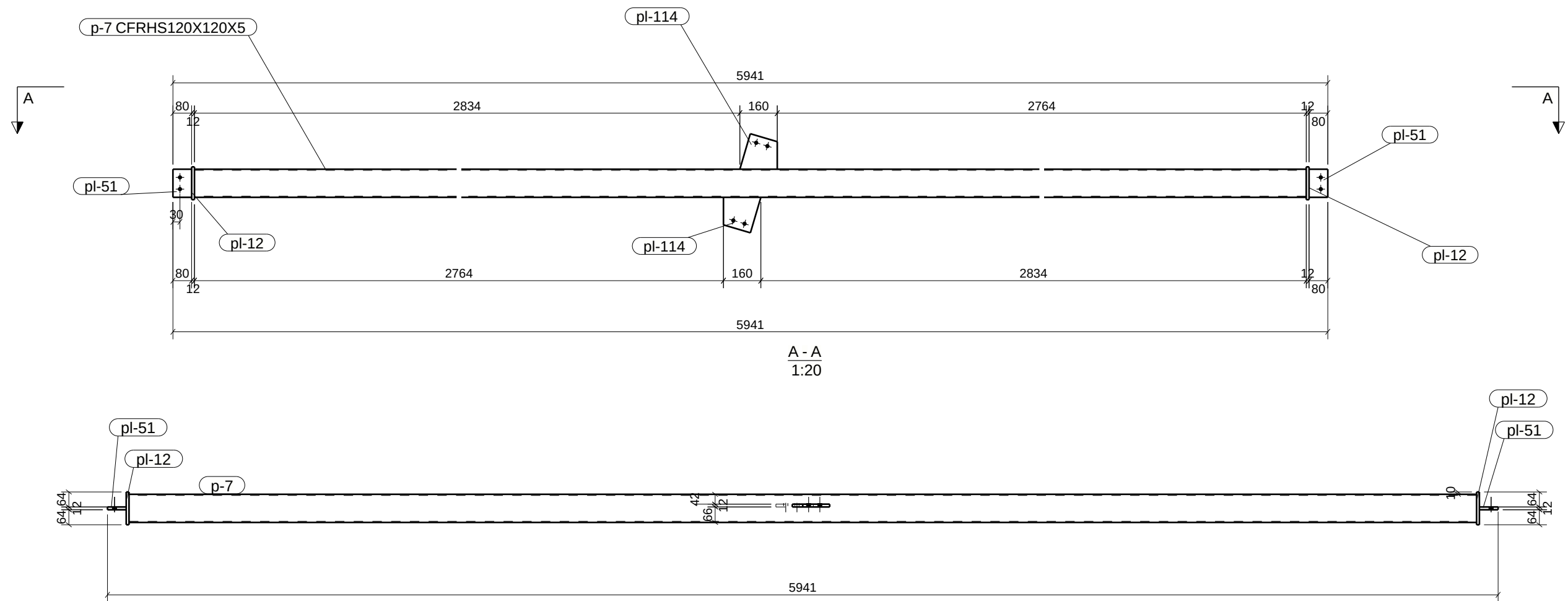
A - A
1:20



KRY-6 Kiekis 1

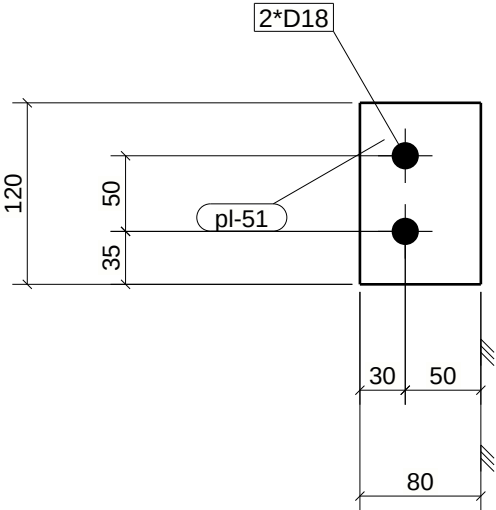
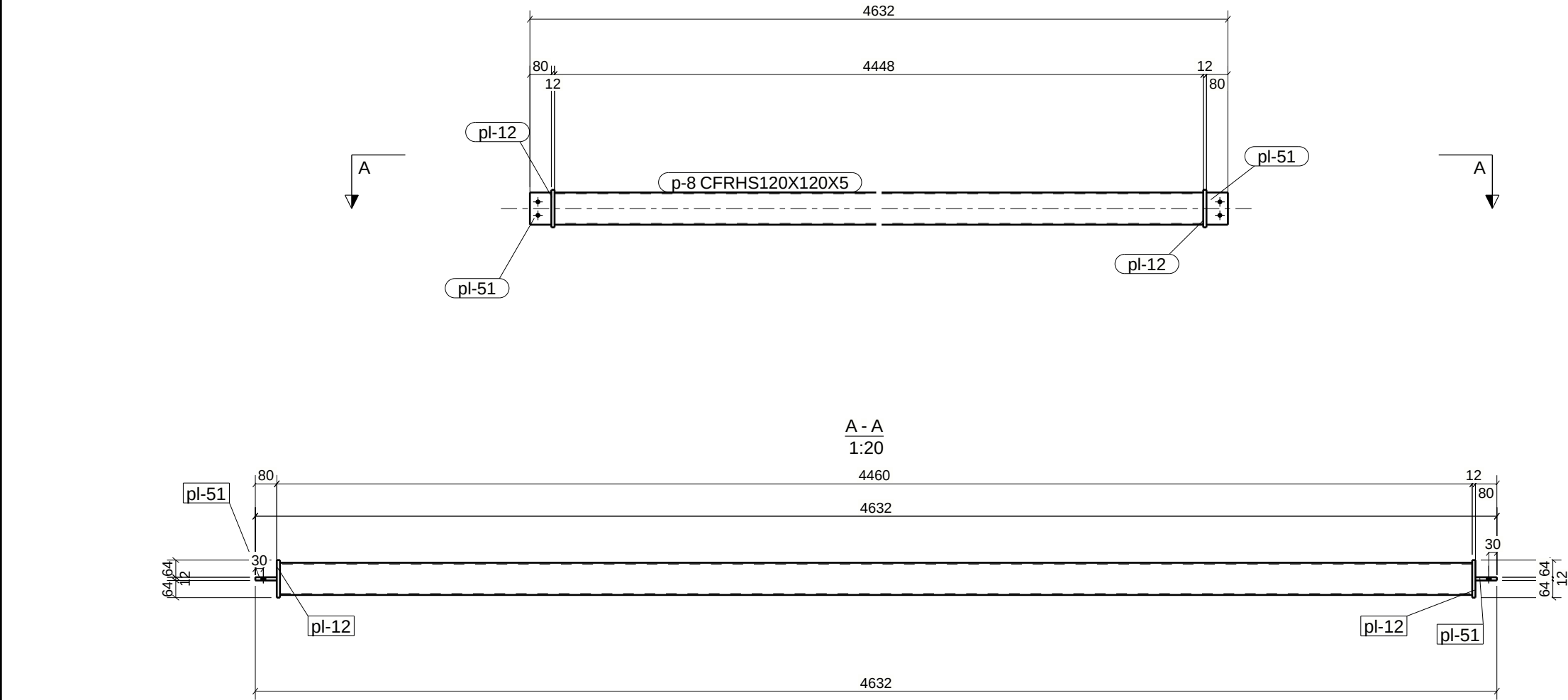
Zymuo	Profilis	Ilgis	Kiekis	
p-6	CFRHS120X120X5	5671	1	
p-12	PL12*140	140	2	
p-51	PL12*120	80	2	
p-105	PL12*155	166	2	
			Viso:	108.7

PHASE	QUANTITY
129	1



KRY-7		Kiekis	1
Zymuo	Profilis	Ilgis	Kiekis
p-7	CFRHS120X120X5	5757	1
pl-12	PL12*140	140	2
pl-51	PL12*120	80	2
pl-114	PL12*151	160	2
Viso:			110.1

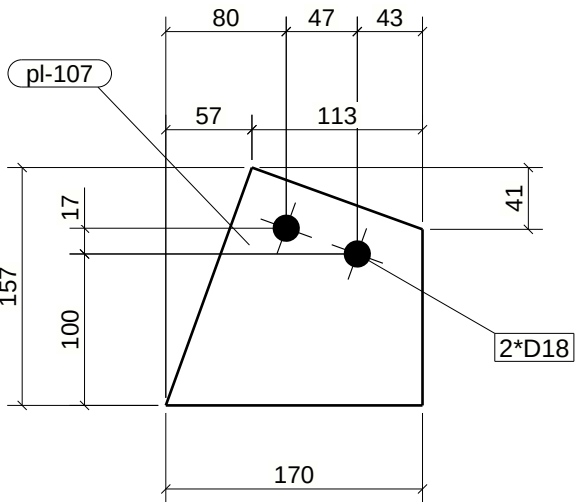
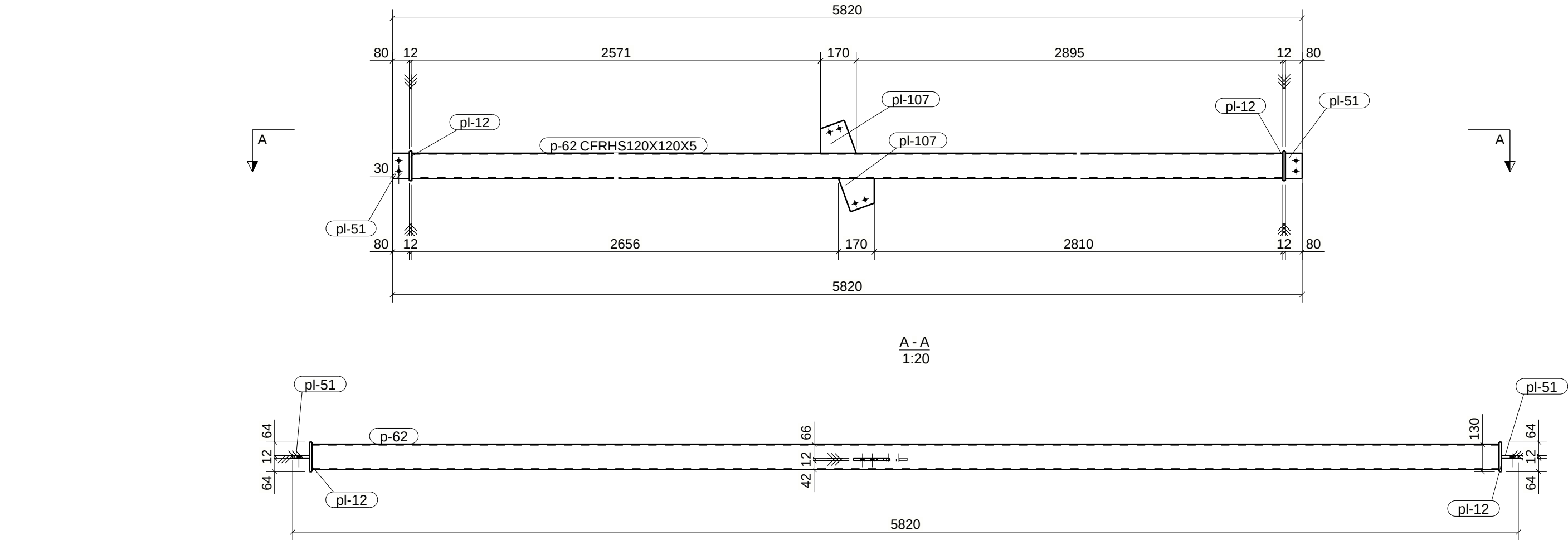
PHASE	QUANTITY
129	1



KRY-8 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-8	CFRHS120X120X5	4448	1	78.1
pl-12	PL12*140	140	2	1.8
pl-51	PL12*120	80	2	0.9
			Viso:	83.6

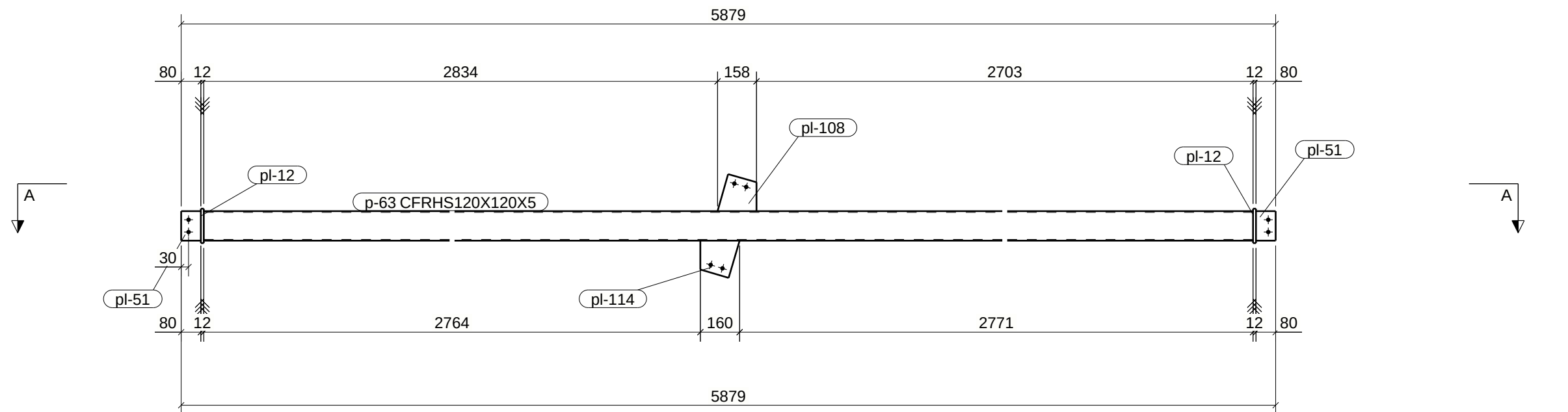
PHASE	QUANTITY
129	1



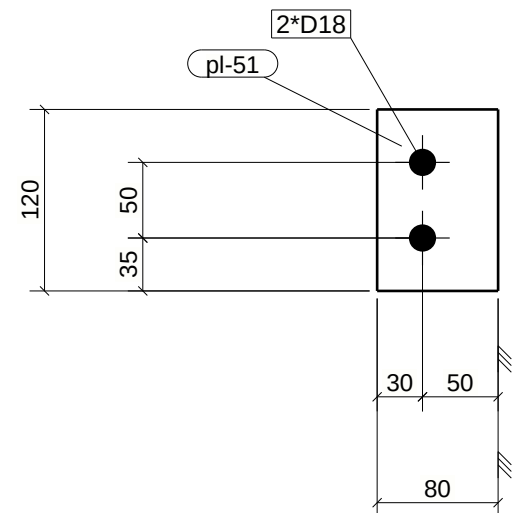
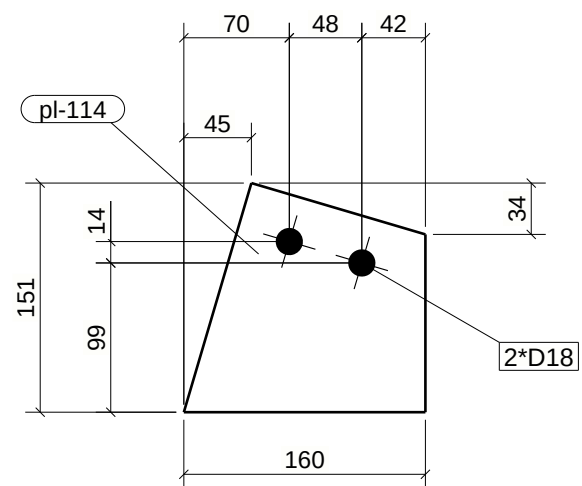
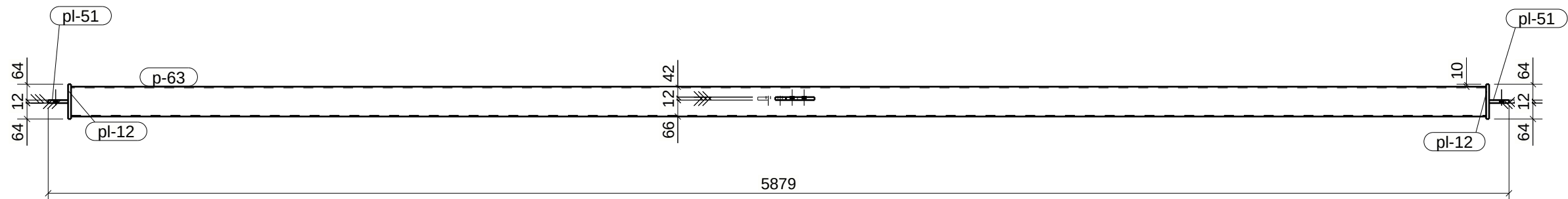
KRY-10 Kiekis 2

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-62	CFRHS120X120X5	5636	1	98.9
pl-12	PL12*140	140	2	1.8
pl-51	PL12*120	80	2	0.9
pl-107	PL12*157	170	2	1.9
			Viso:	108.2

PHASE	QUANTITY
129	2



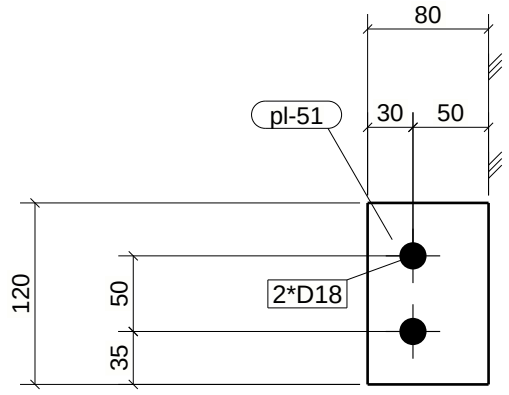
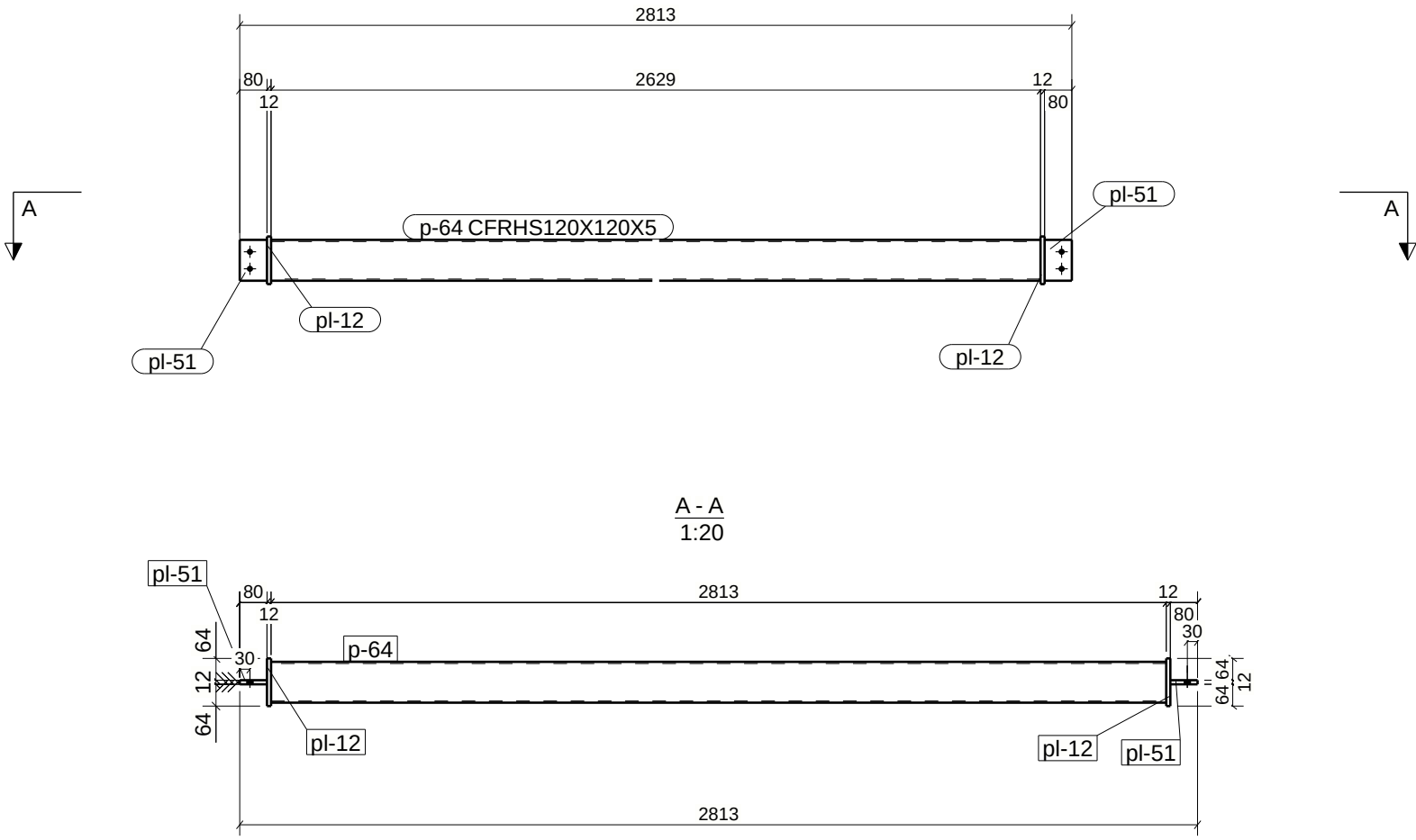
A - A
1:20



KRY-11 Kiekis 2

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-63	CFRHS120X120X5	5695	1	99.9
pI-12	PL12*140	140	2	1.8
pI-51	PL12*120	80	2	0.9
pI-108	PL12*151	158	1	1.8
pI-114	PL12*151	160	1	1.8
			Viso:	109.0

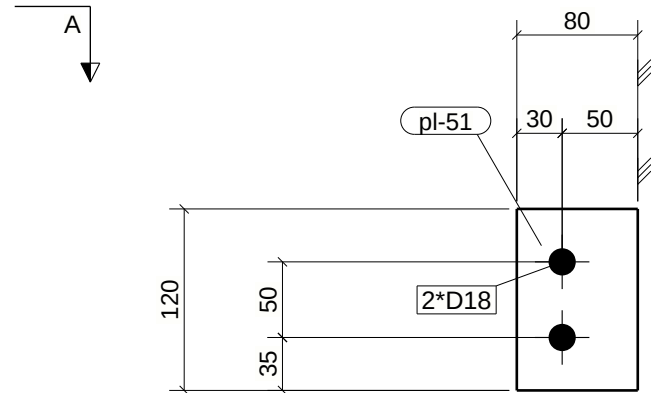
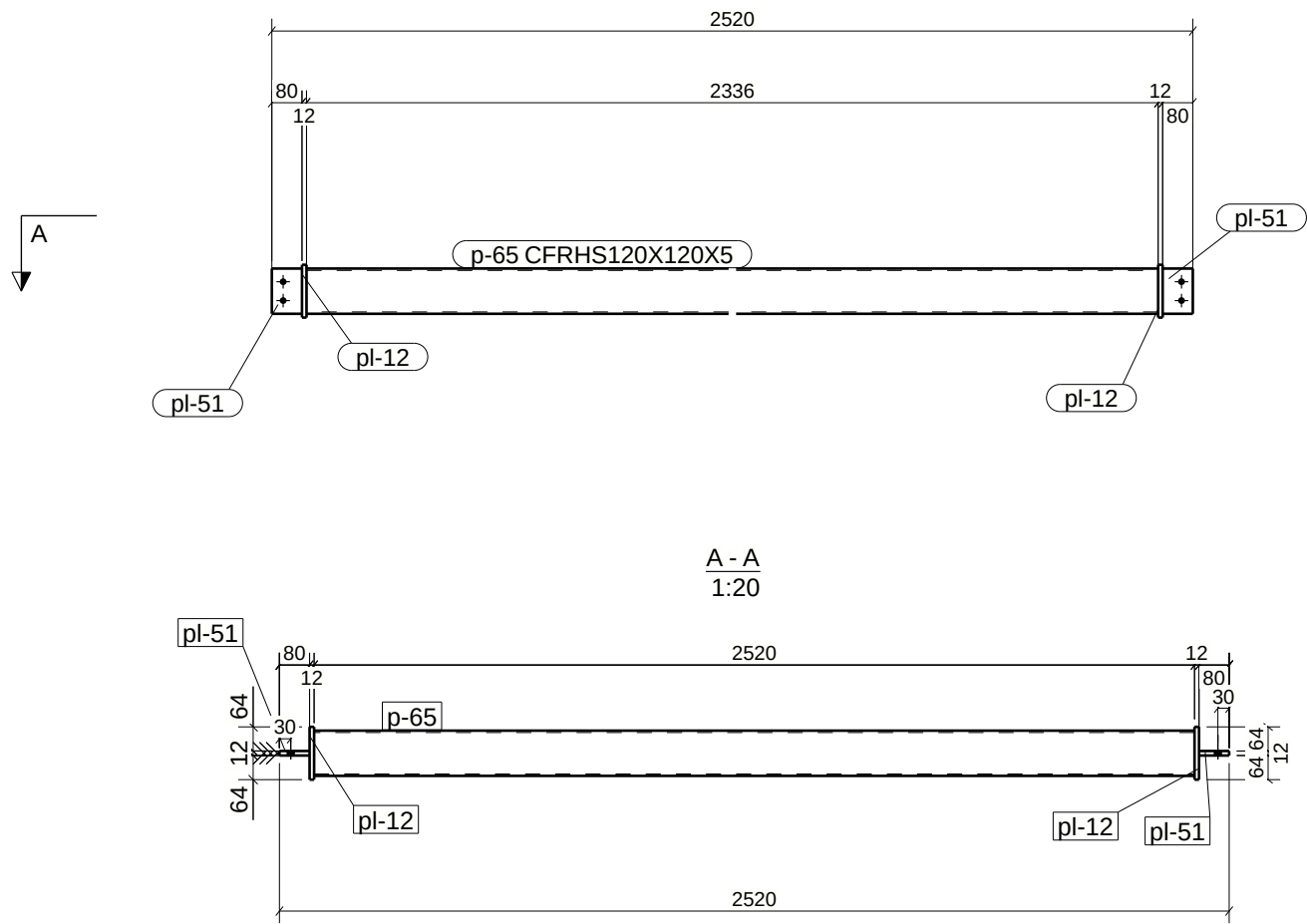
PHASE	QUANTITY
129	2



KRY-12 Kiekis 2

Zymuo	Profilis	Ilgis	Kiekis	
p-64	CFRHS120X120X5	2629	1	
pl-12	PL12*140	140	2	
pl-51	PL12*120	80	2	
			Viso:	
				51.6

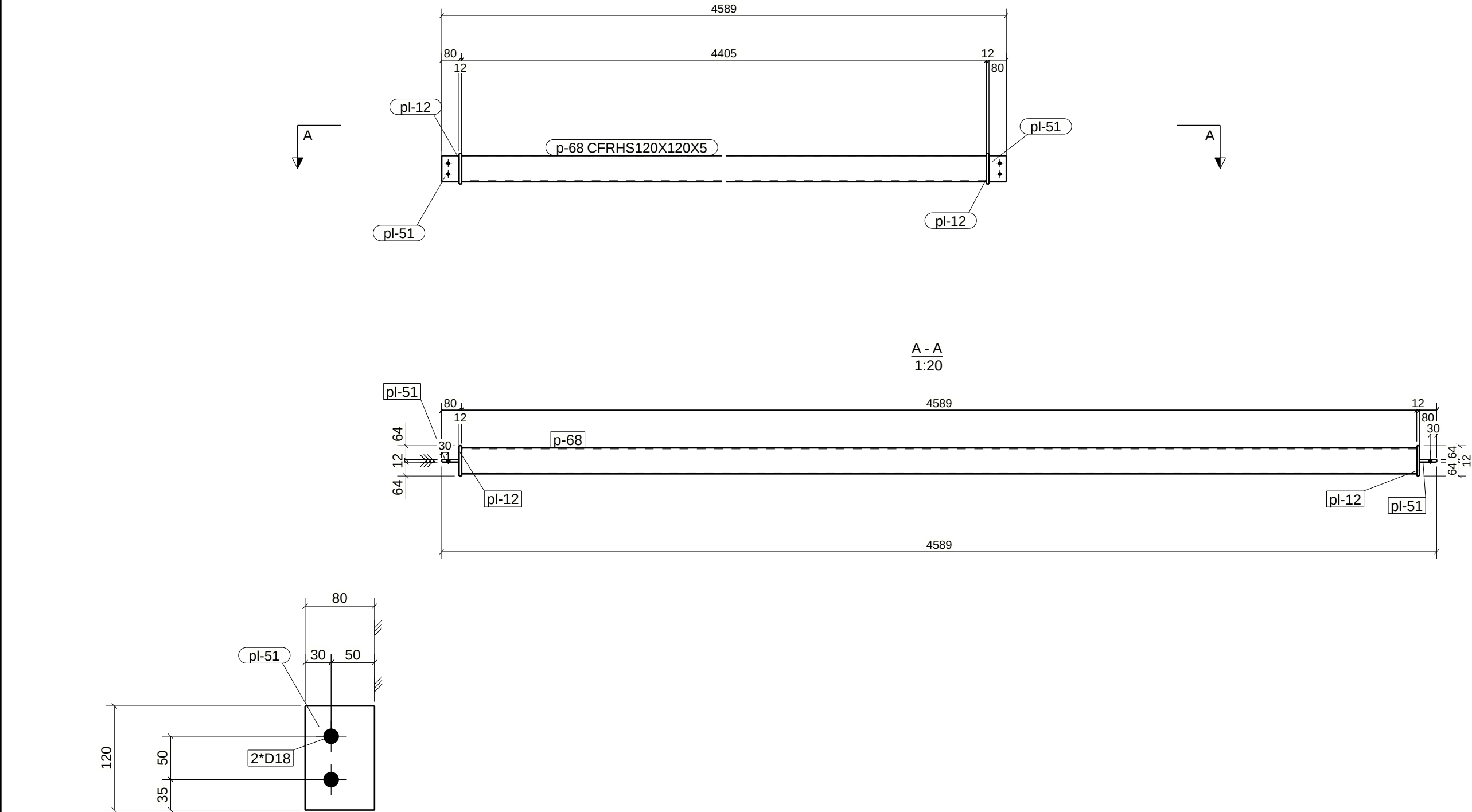
PHASE	QUANTITY
129	2



KRY-13 Kiekis 2

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-65	CFRHS120X120X5	2336	1	41.0
pl-12	PL12*140	140	2	1.8
pl-51	PL12*120	80	2	0.9
			Viso:	46.5

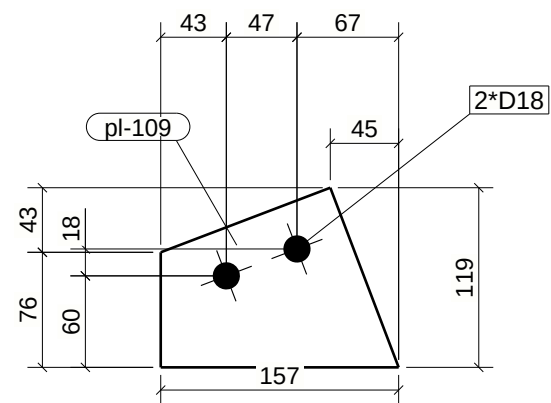
PHASE	QUANTITY
129	2



KRY-15 Kiekis 1

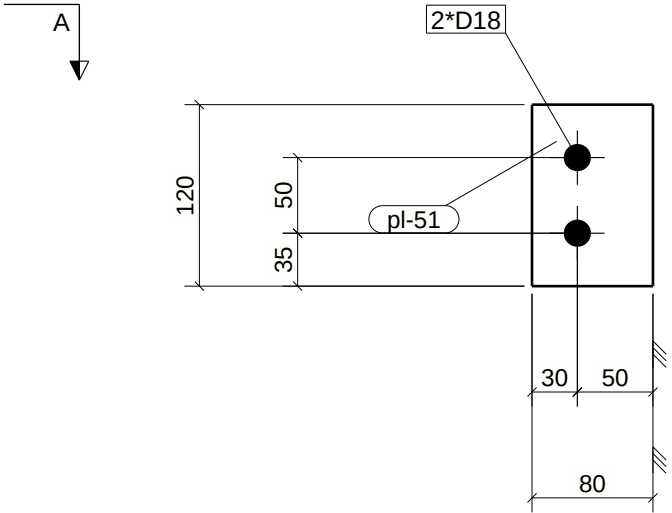
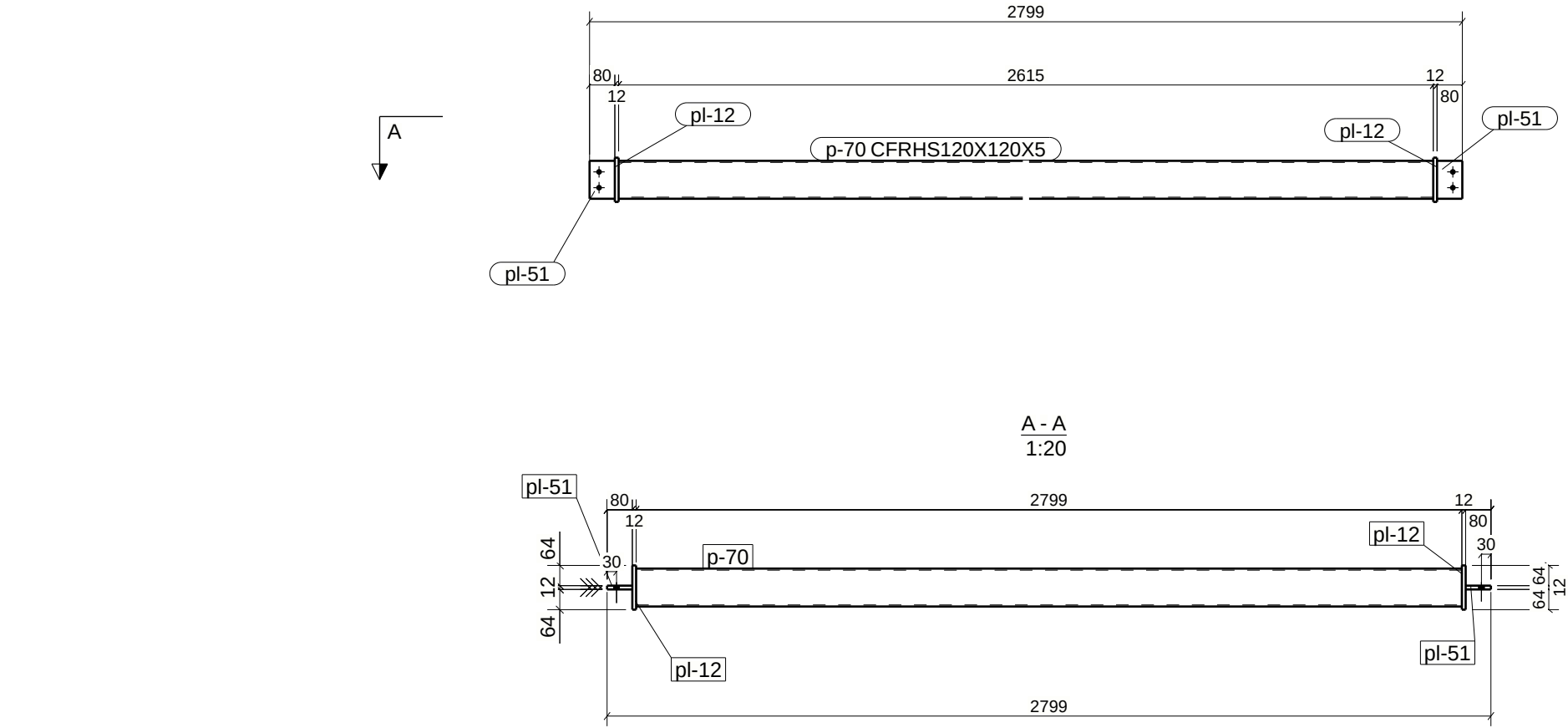
PHASE	QUANTITY
129	1

Zymuo	Profilis	Ilgis	Kiekis	
p-68	CFRHS120X120X5	4405	1	
pl-12	PL12*140	140	2	
pl-51	PL12*120	80	2	
			Viso:	82.8



Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-69	CFRHS120X120X5	5454	1	95.7
pI-12	PL12*140	140	2	1.8
pI-51	PL12*120	80	2	0.9
pI-109	PL12*119	157	2	1.3
			Viso:	103.8

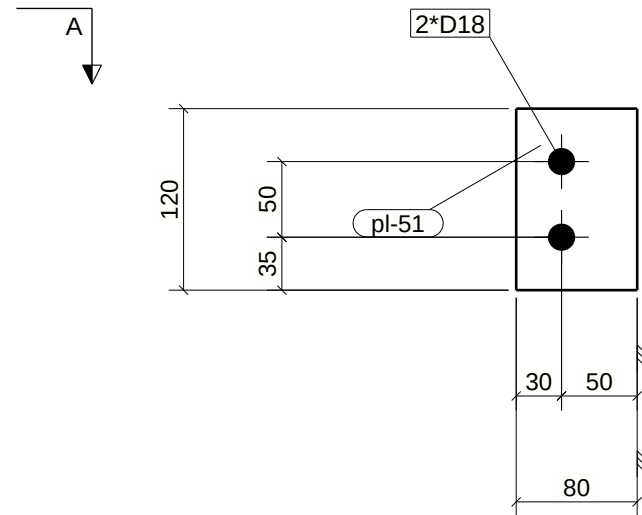
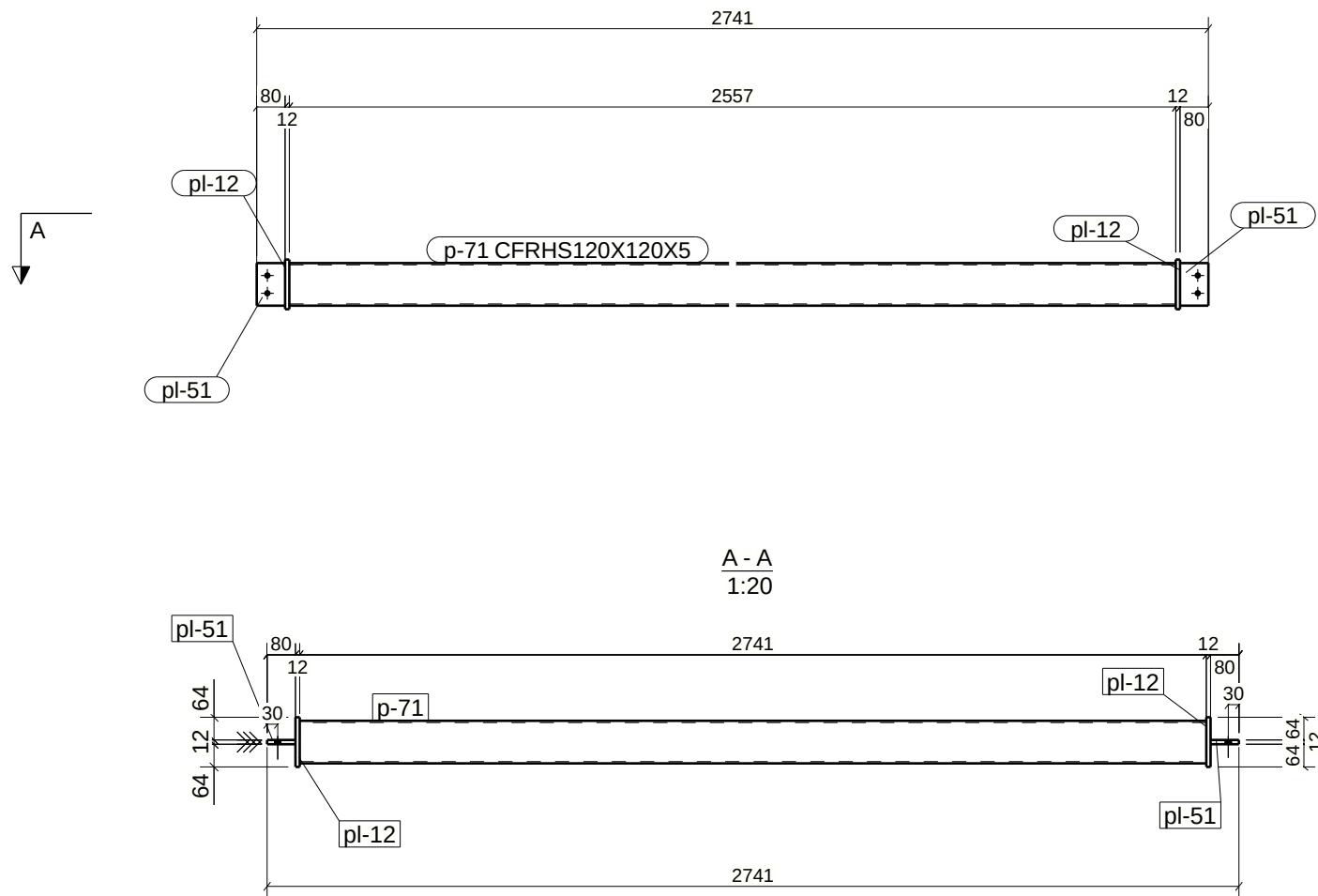
PHASE	QUANTITY
129	1



KRY-17 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	
p-70	CFRHS120X120X5	2615	1	
pl-12	PL12*140	140	2	
pl-51	PL12*120	80	2	
			Viso:	51.4

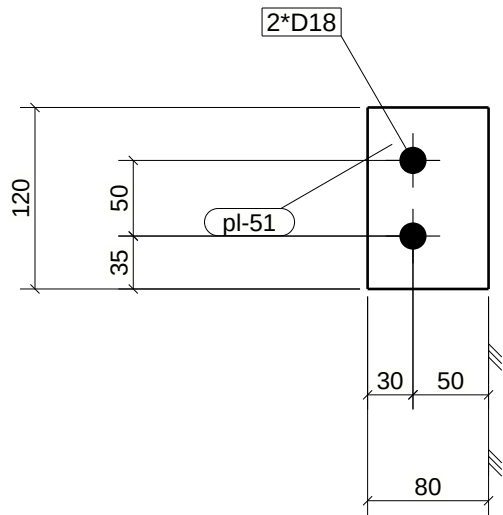
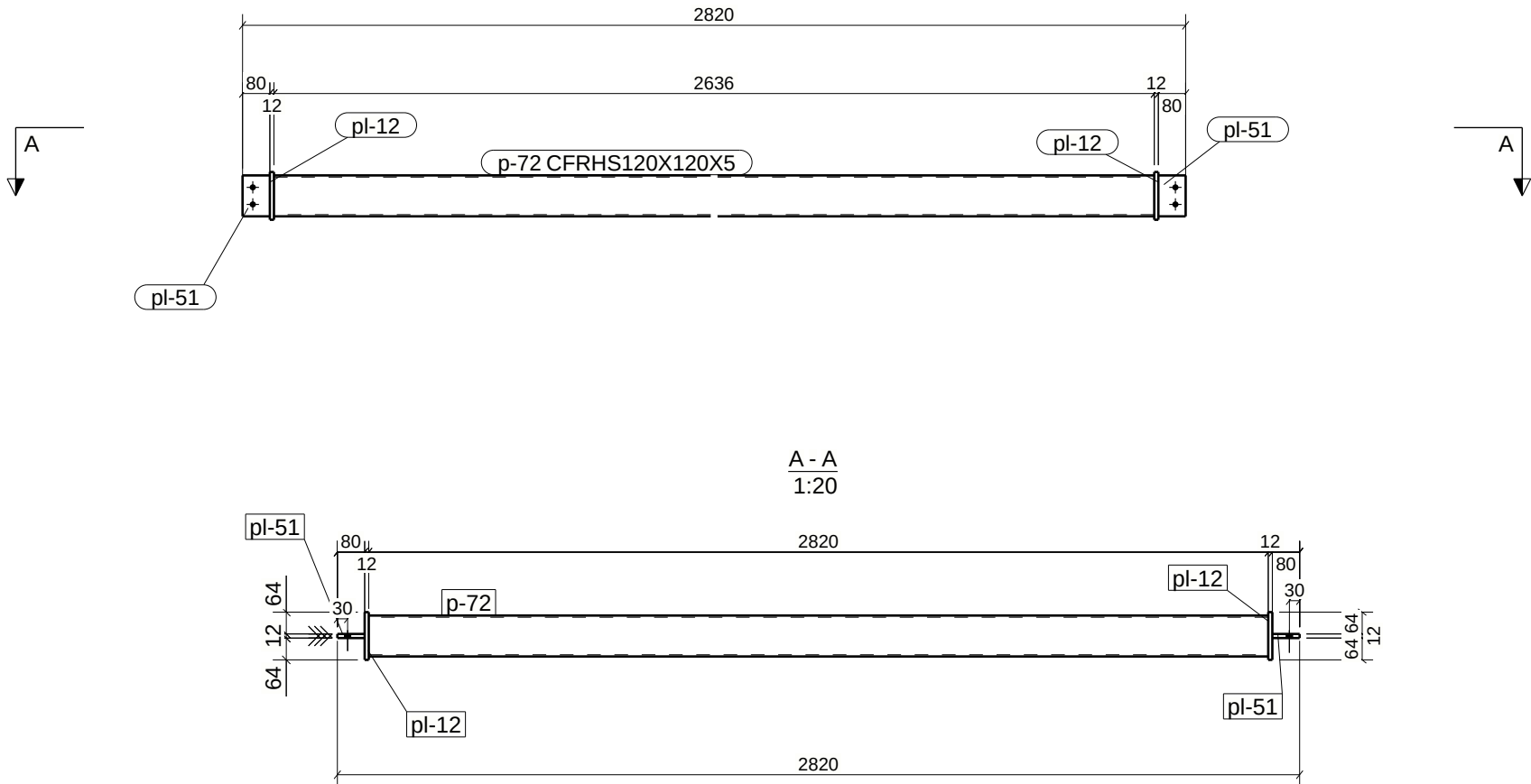
PHASE	QUANTITY
129	1



KRY-18 Kiekis 1

PHASE	QUANTITY
129	1

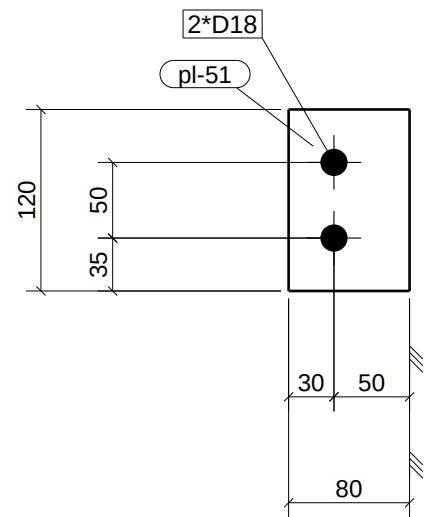
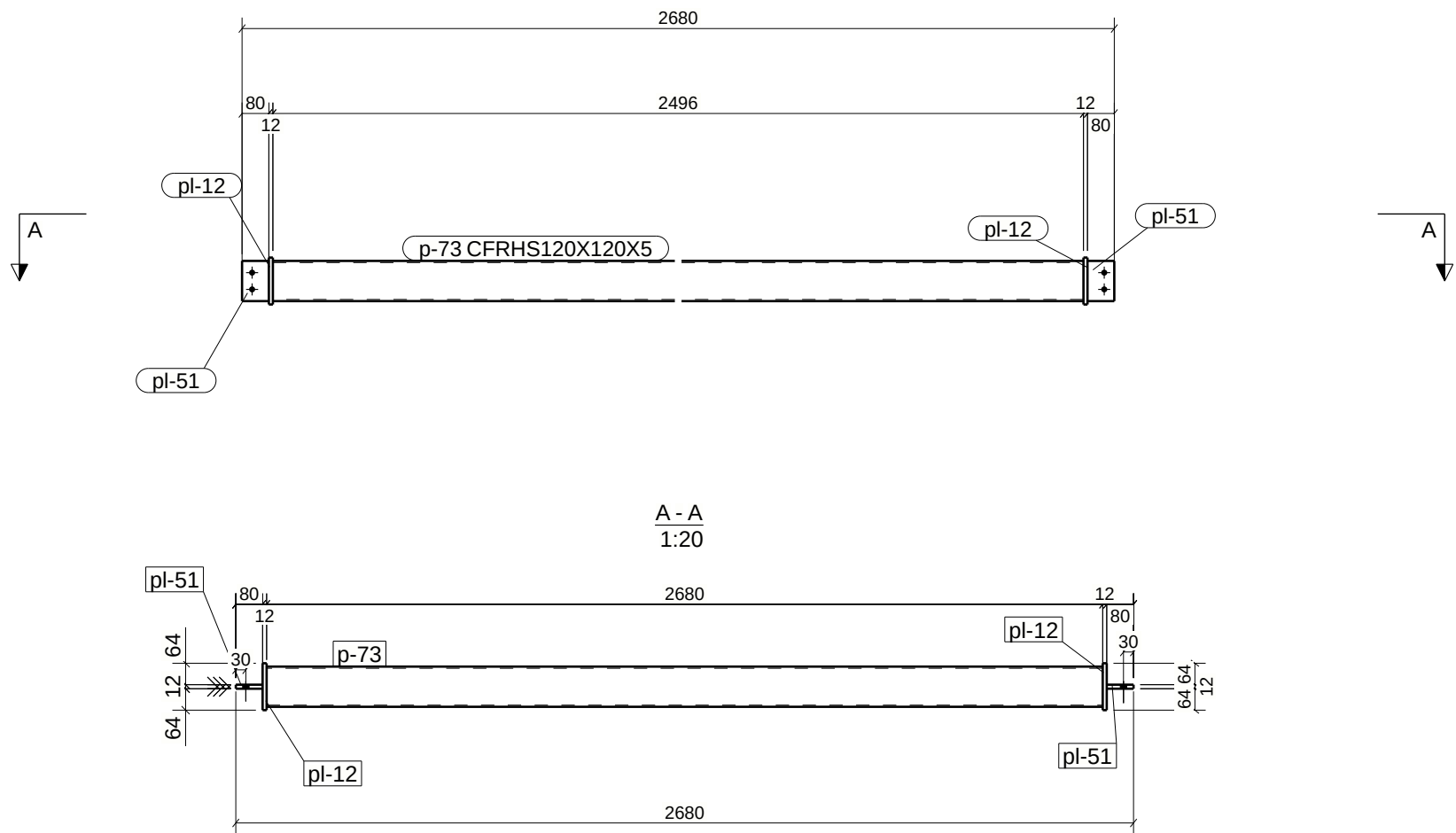
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-71	CFRHS120X120X5	2557	1	44.9
pl-12	PL12*140	140	2	1.8
pl-51	PL12*120	80	2	0.9
Viso:				50.4



KRY-19 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	
p-72	CFRHS120X120X5	2636	1	
pl-12	PL12*140	140	2	
pl-51	PL12*120	80	2	
			Viso:	
				51.8

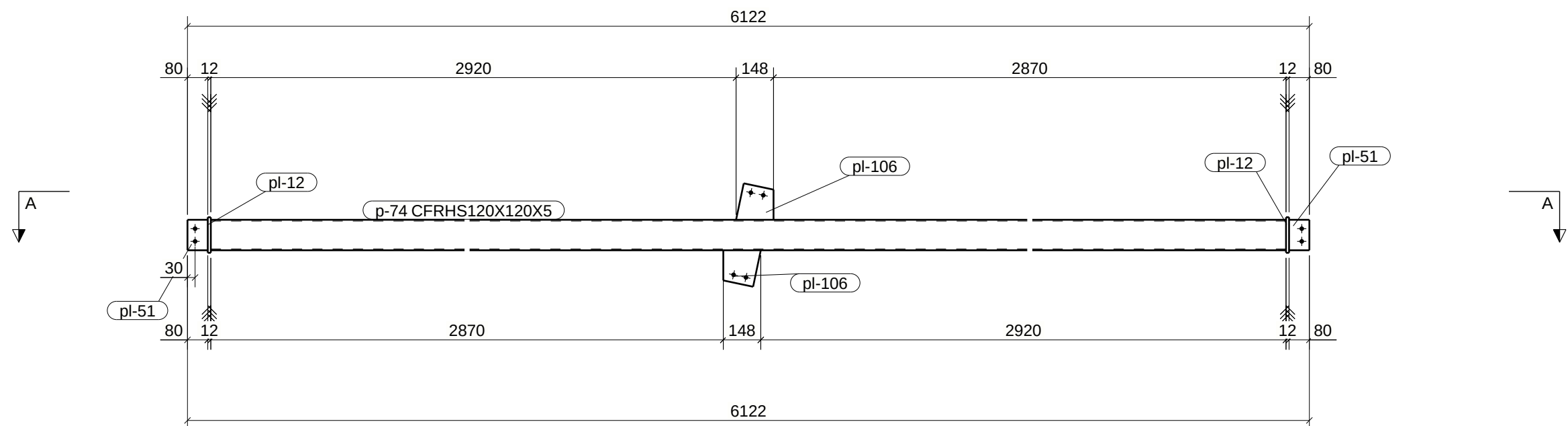
PHASE	QUANTITY
129	1



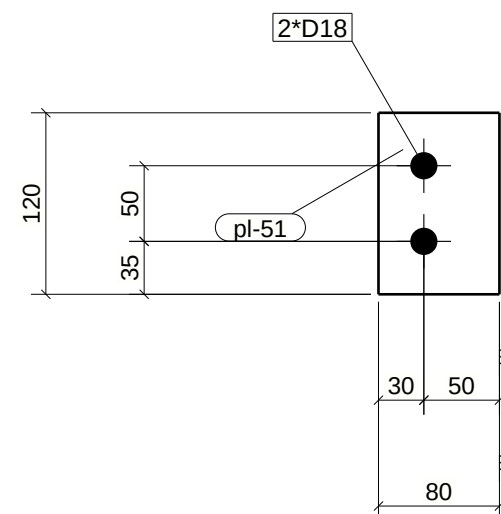
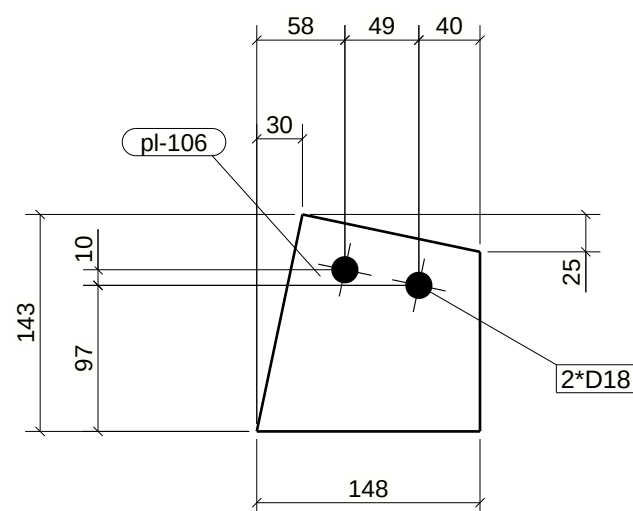
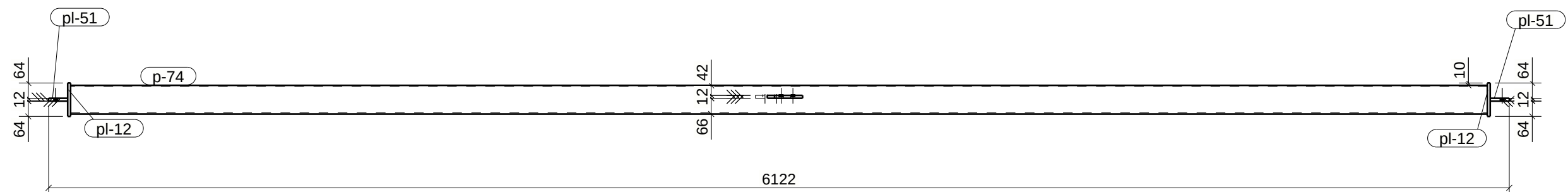
KRY-20 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	
p-73	CFRHS120X120X5	2496	1	
pl-12	PL12*140	140	2	
pl-51	PL12*120	80	2	
			Viso:	
				49.3

PHASE	QUANTITY
129	1



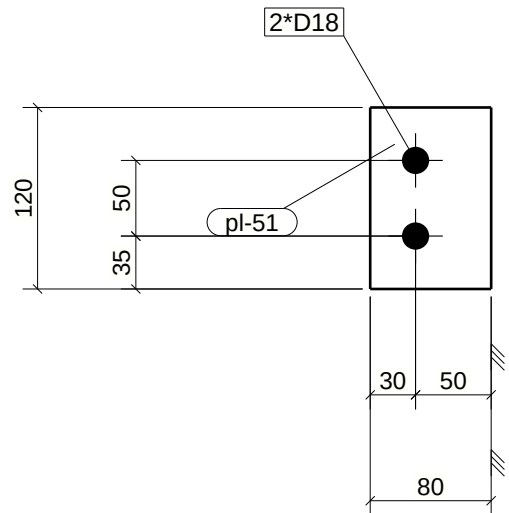
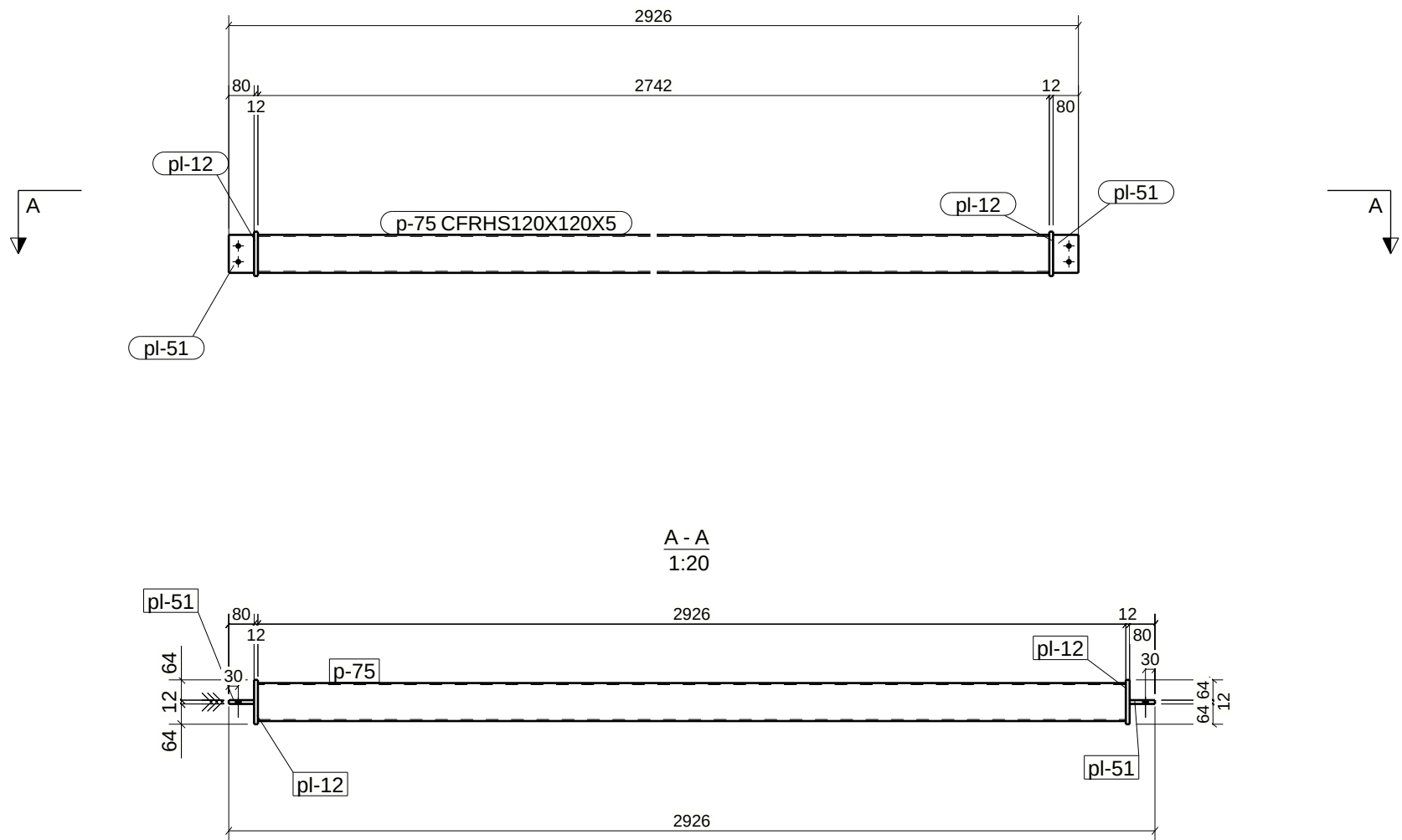
A - A
1:20



KRY-21 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-74	CFRHS120X120X5	5938	1	104.2
pl-12	PL12*140	140	2	1.8
pl-51	PL12*120	80	2	0.9
pl-106	PL12*143	148	2	1.7
			Viso:	113.0

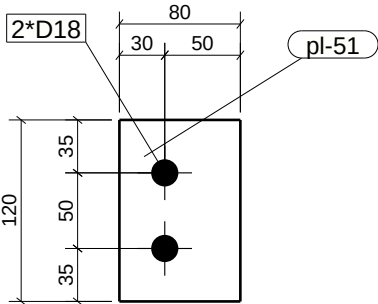
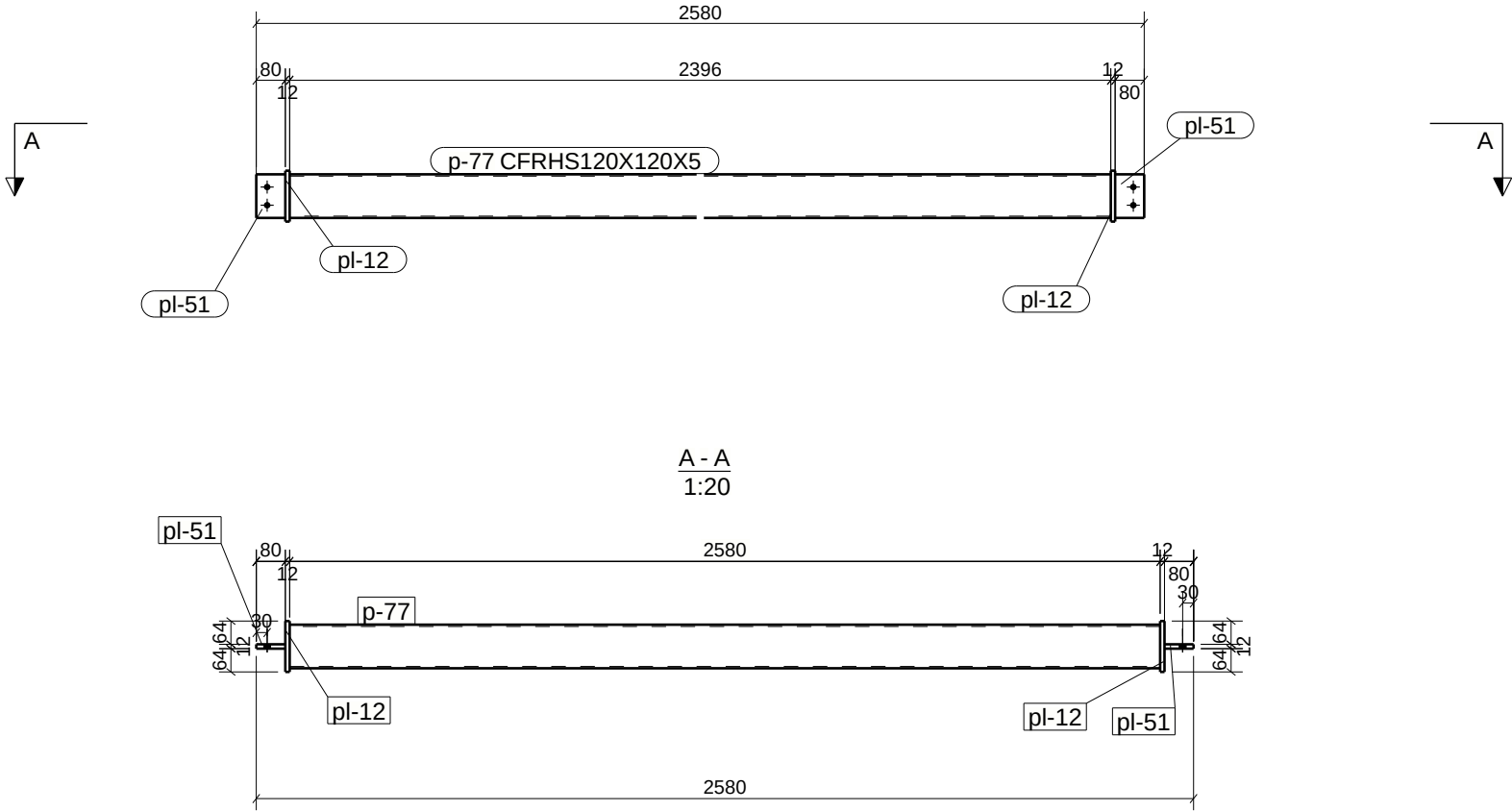
PHASE	QUANTITY
129	1



KRY-22 Kiekis 2

PHASE	QUANTITY
129	2

KRY-22				
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-75	CFRHS120X120X5	2742	1	48.1
pl-12	PL12*140	140	2	1.8
pl-51	PL12*120	80	2	0.9
Viso:				53.6

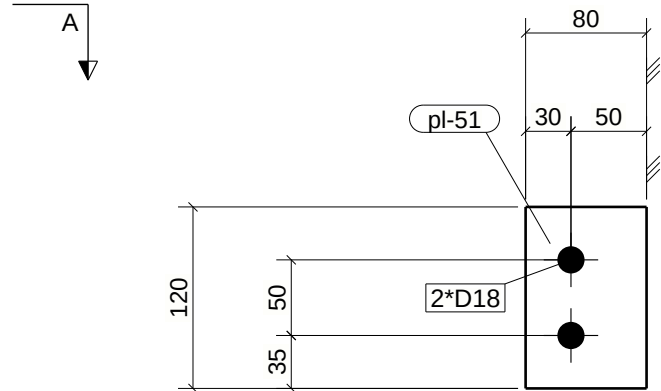
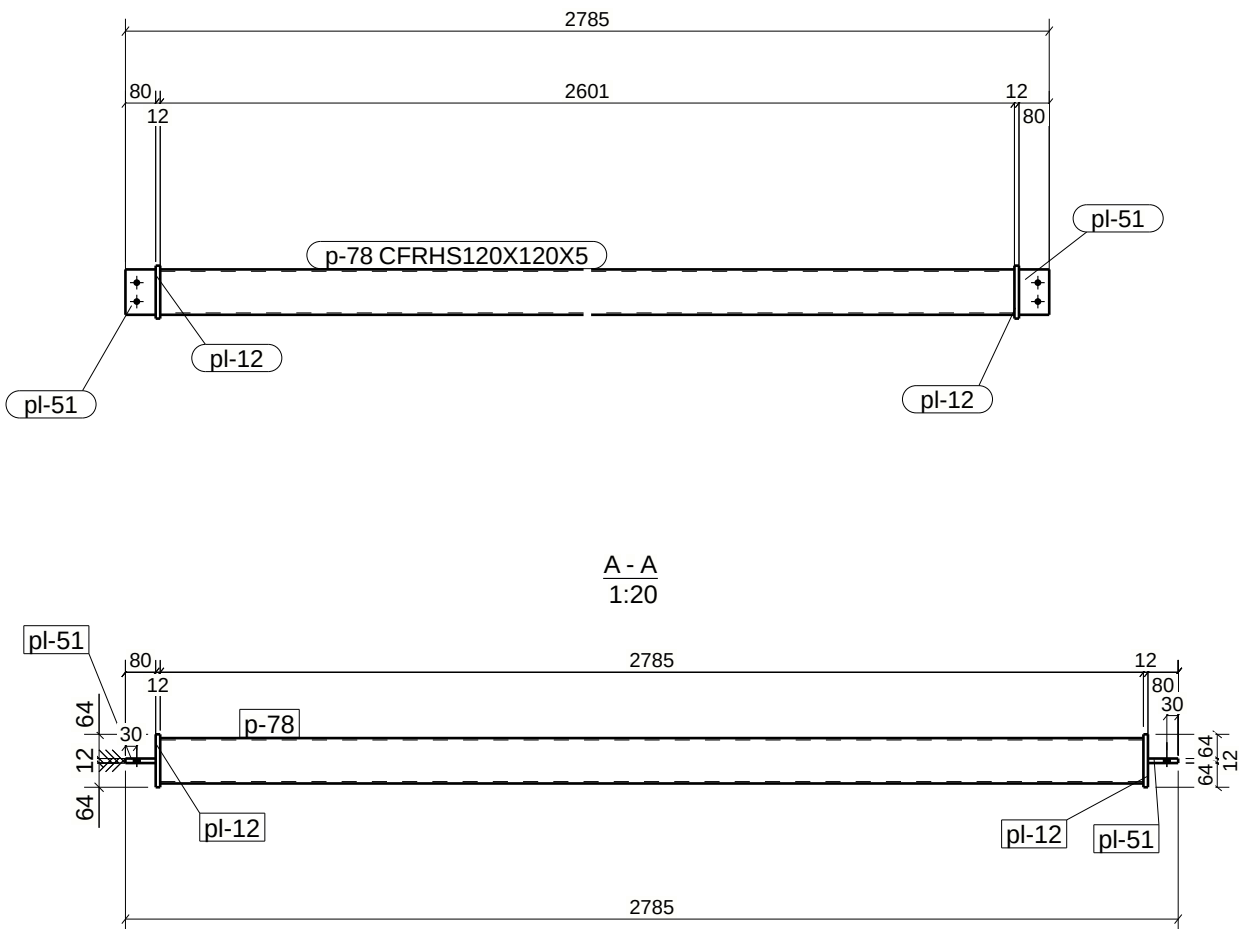


KRY-23 Kiekis 2

PHASE	QUANTITY
129	2

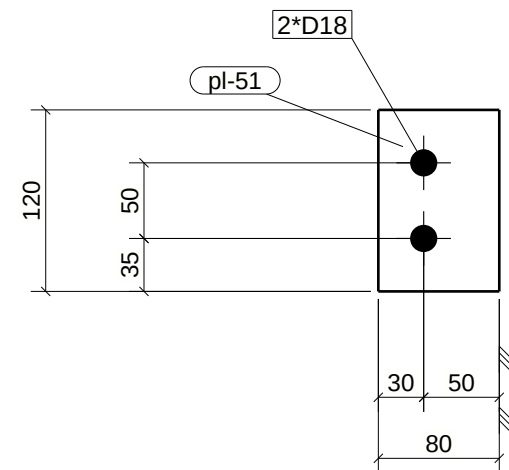
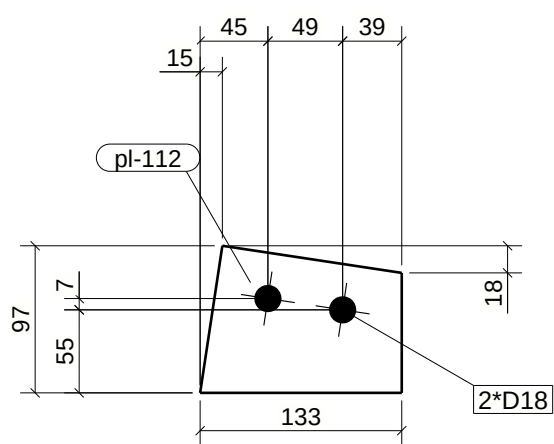
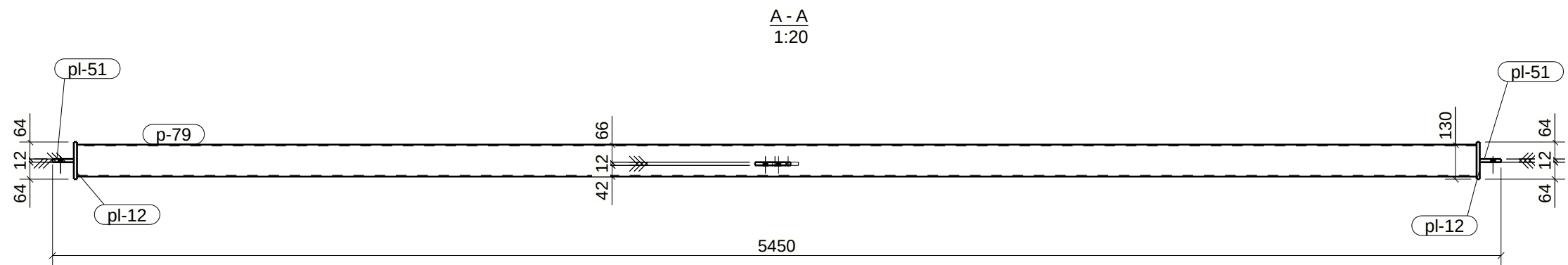
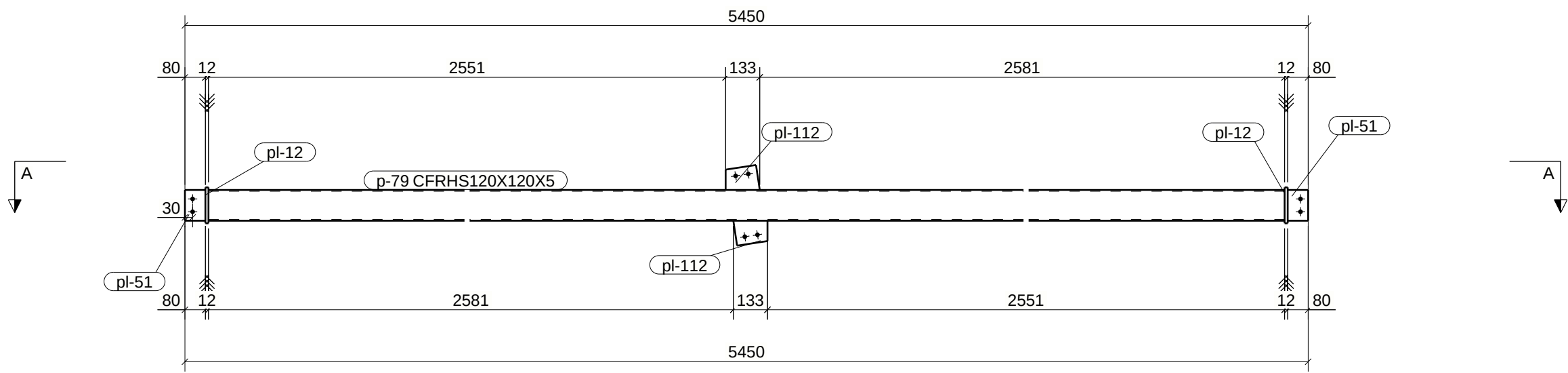
KRY-23				
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-77	CFRHS120X120X5	2396	1	42.0
pl-12	PL12*140	140	2	1.8
pl-51	PL12*120	80	2	0.9
Viso:				47.5

PHASE	QUANTITY
129	2



KRY-24 Kiekis 2

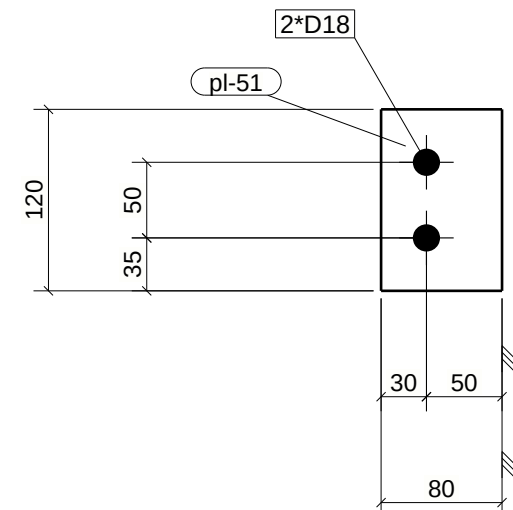
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-78	CFRHS120X120X5	2601	1	45.7
pl-12	PL12*140	140	2	1.8
pl-51	PL12*120	80	2	0.9
			Viso:	51.2



KRY-25 Kiekis 2

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-79	CFRHS120X120X5	5266	1	92.4
pl-12	PL12*140	140	2	1.8
pl-51	PL12*120	80	2	0.9
pl-112	PL12*97	133	2	1.1
Viso:				100.0

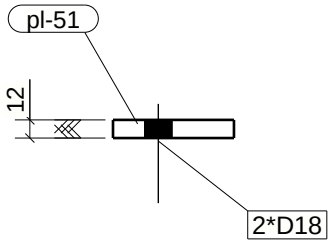
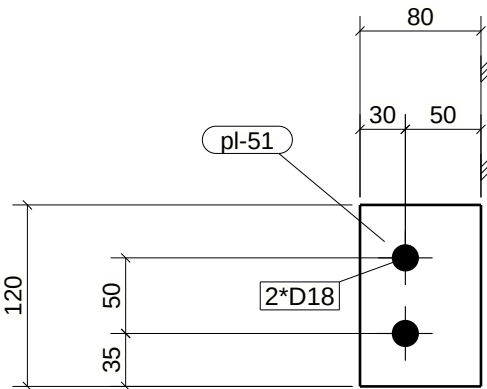
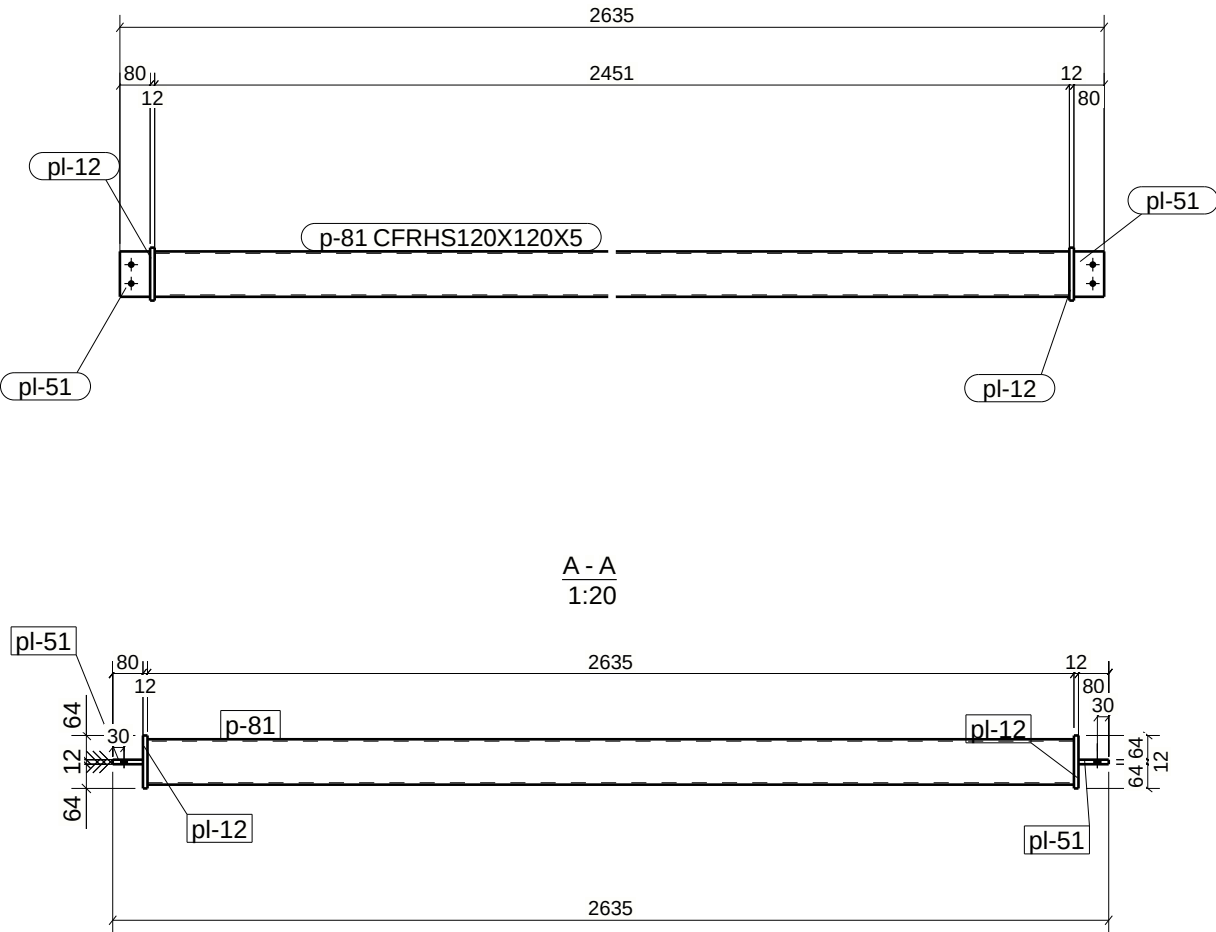
PHASE	QUANTITY
129	2



Tekla Structures

PHASE	QUANTITY
129	1

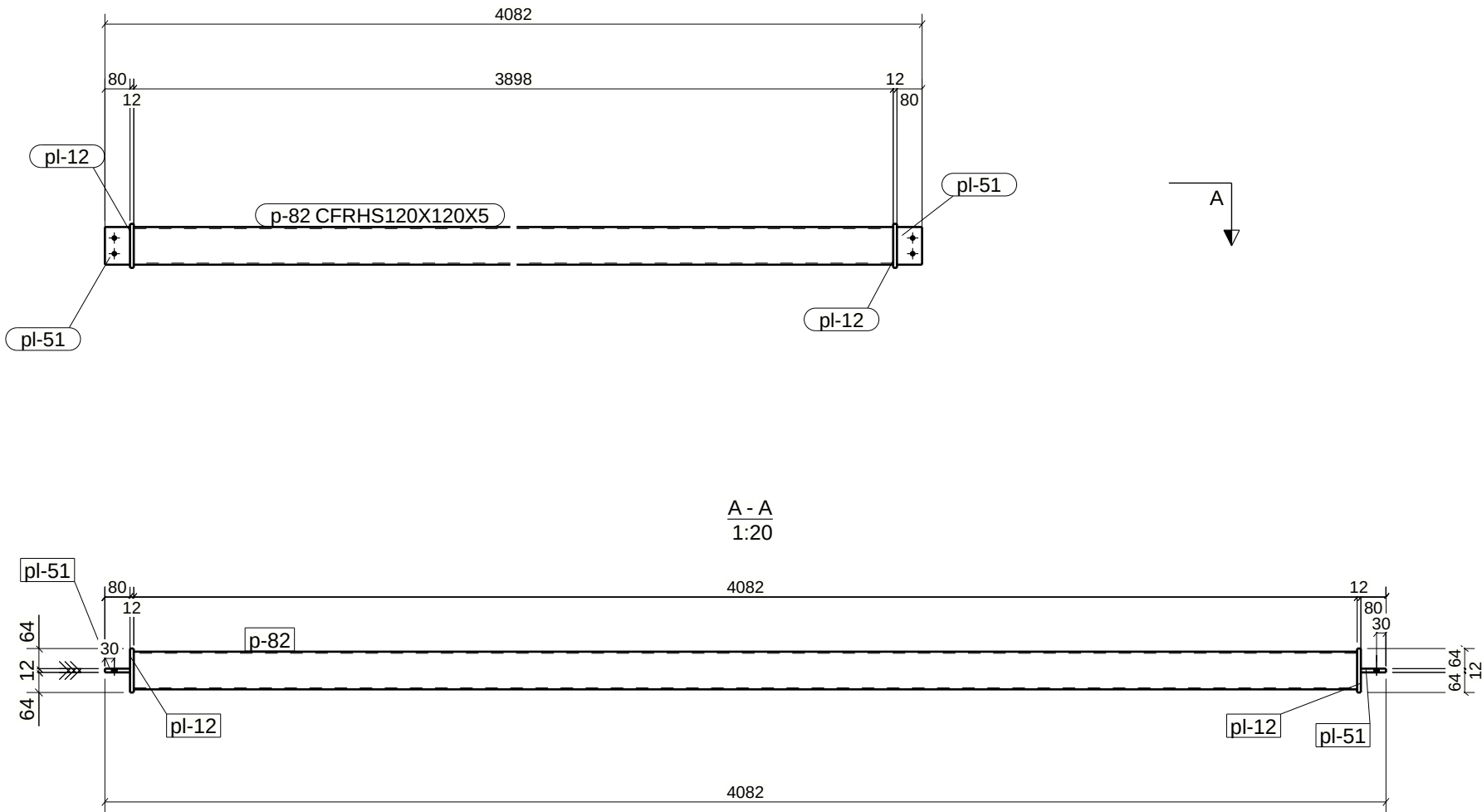
PHASE	QUANTITY
129	4



KRY-27 Kiekis 4

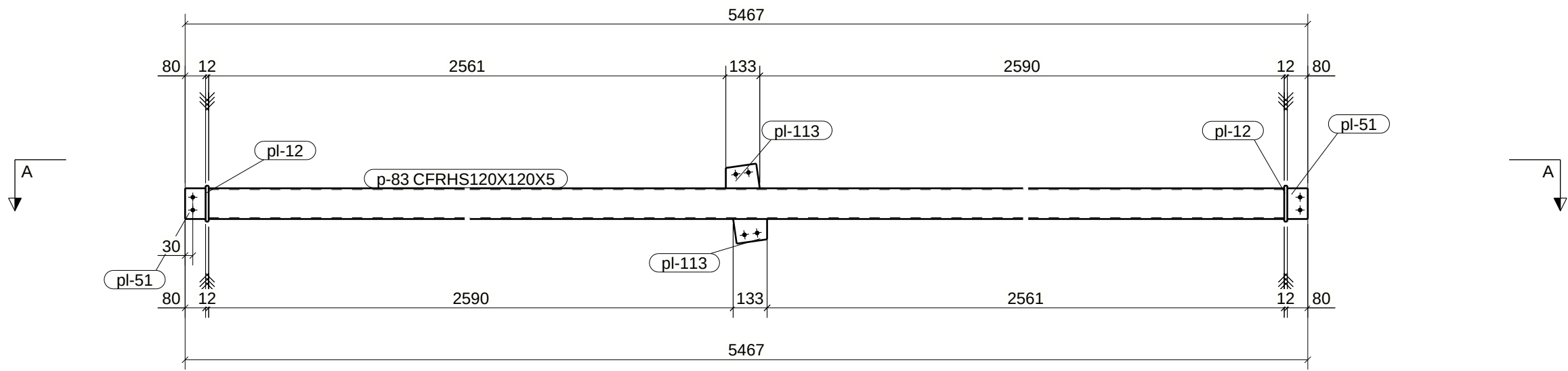
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-81	CFRHS120X120X5	2451	1	43.0
pl-12	PL12*140	140	2	1.8
pl-51	PL12*120	80	2	0.9
			Viso:	48.5

PHASE	QUANTITY
129	1

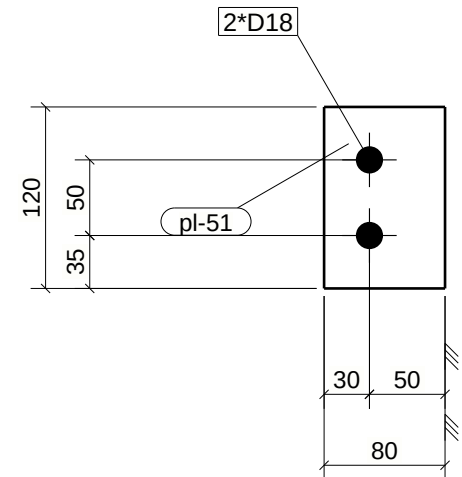
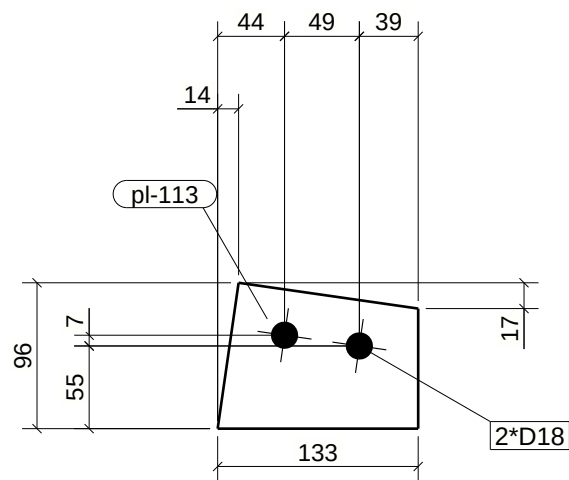
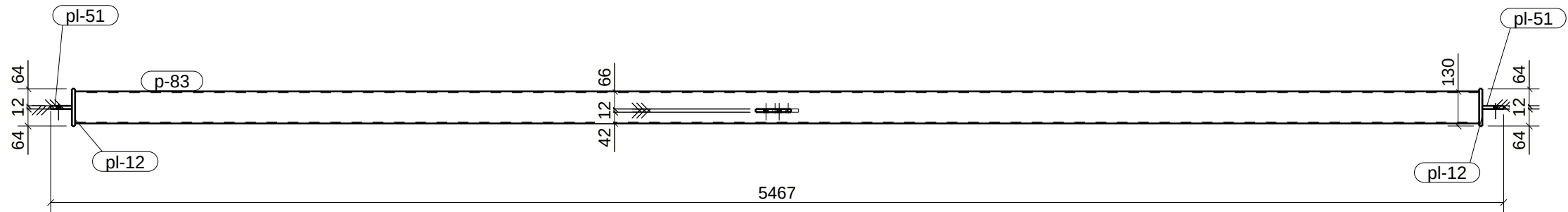


KRY-28 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	
p-82	CFRHS120X120X5	3898	1	
pl-12	PL12*140	140	2	
pl-51	PL12*120	80	2	
Viso:			73.9	



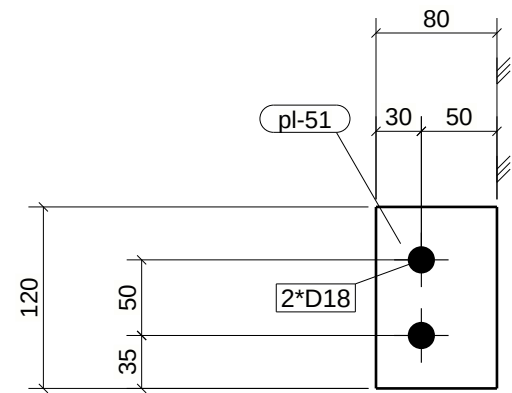
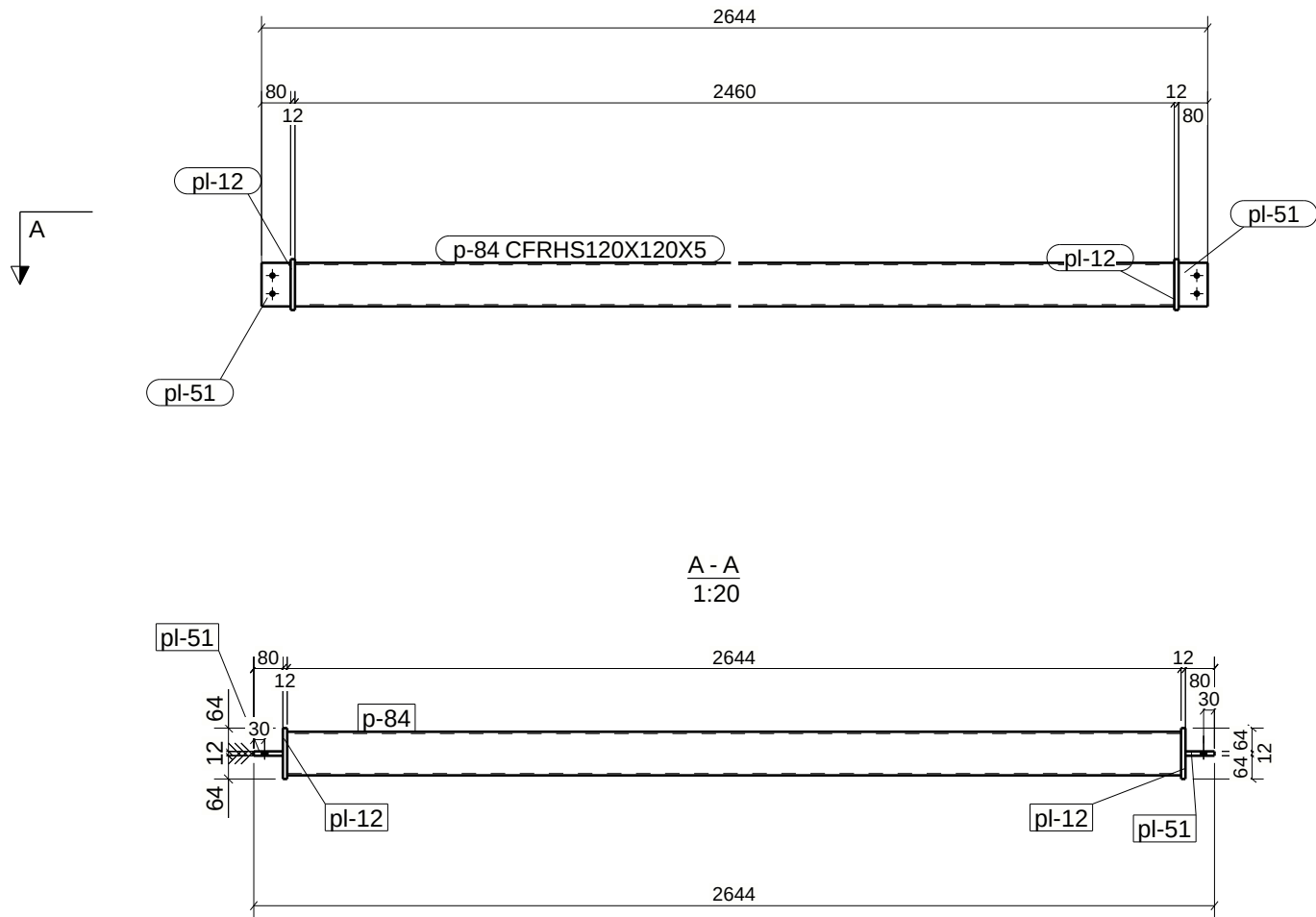
A - A
1:20



KRY-29 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-83	CFRHS120X120X5	5283	1	92.7
pl-12	PL12*140	140	2	1.8
pl-51	PL12*120	80	2	0.9
pl-113	PL12*96	133	2	1.0
			Viso:	100.3

PHASE	QUANTITY
129	1

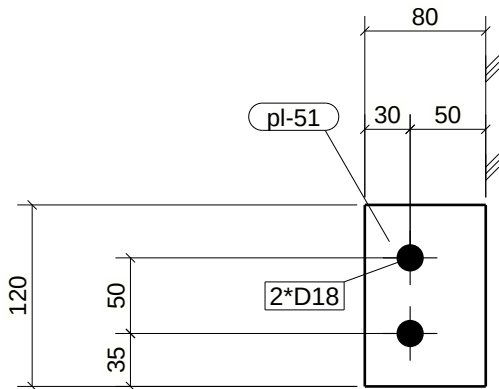
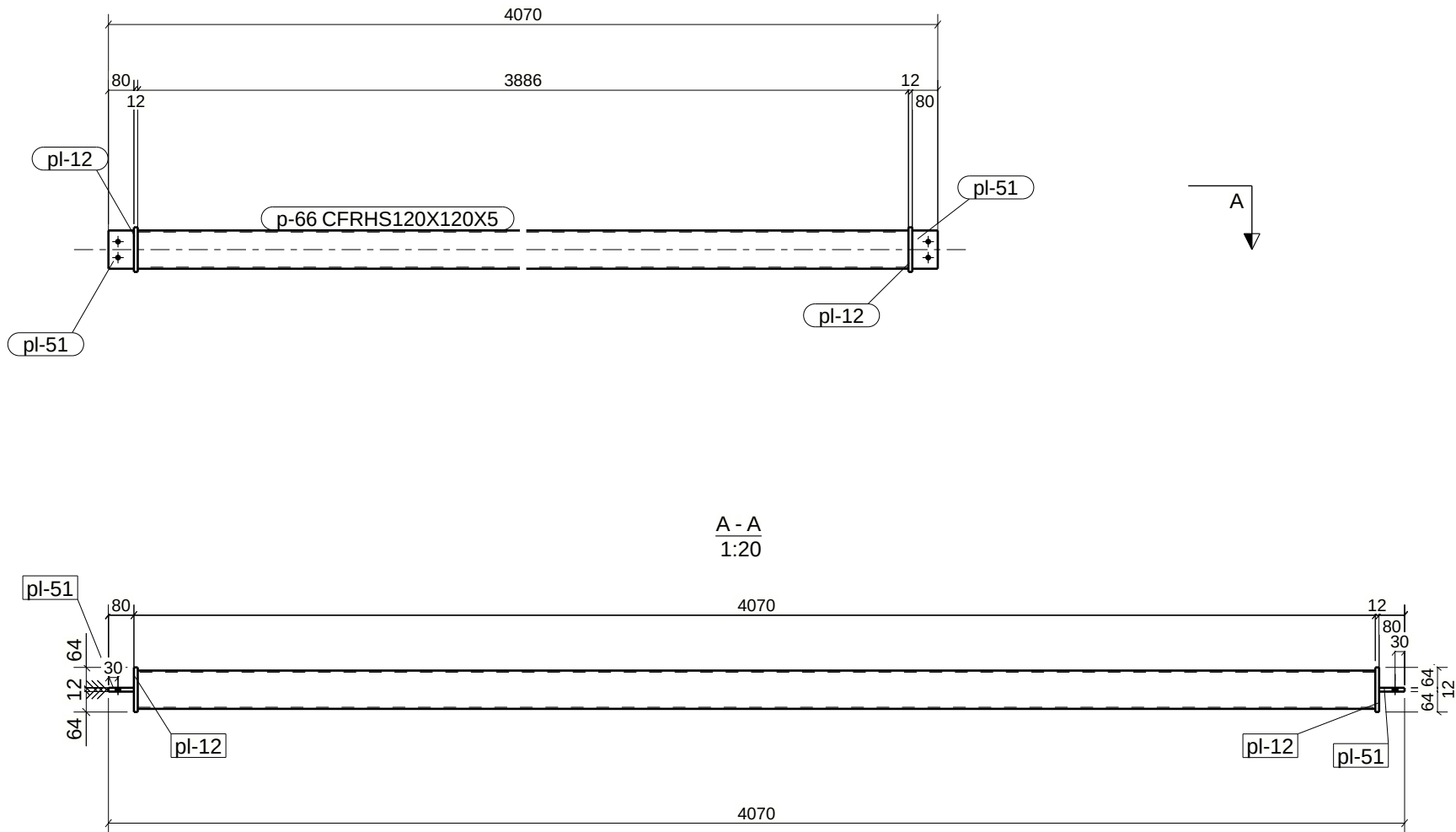


KRY-30	Kiekis	2

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-84	CFRHS120X120X5	2460	1	43.2
pl-12	PL12*140	140	2	1.8
pl-51	PL12*120	80	2	0.9
			Viso:	48.7

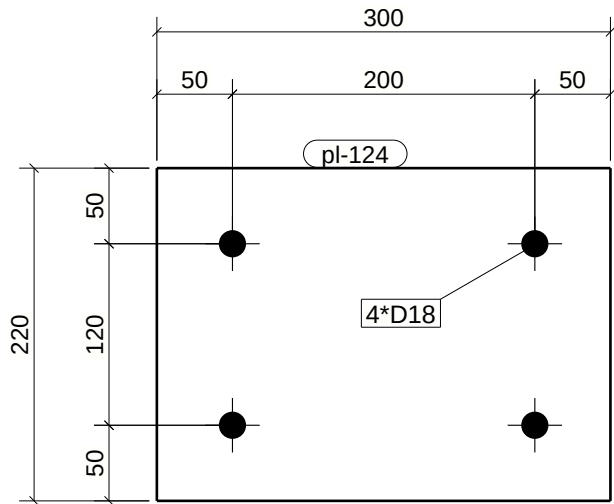
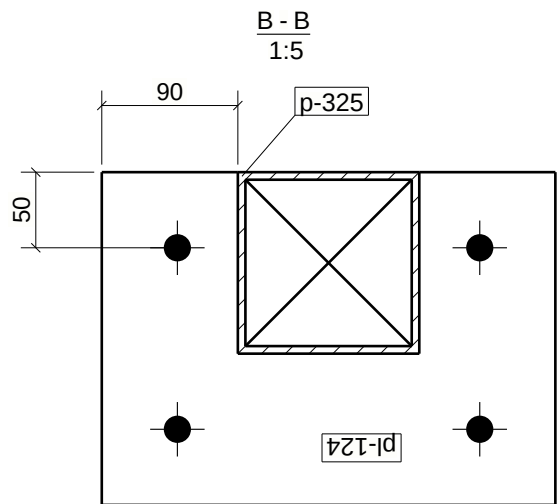
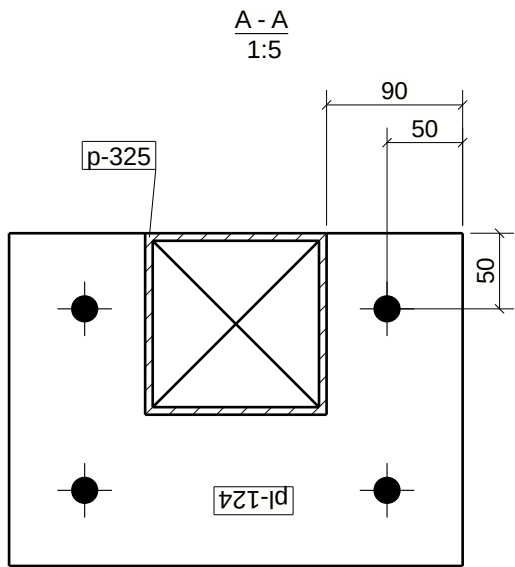
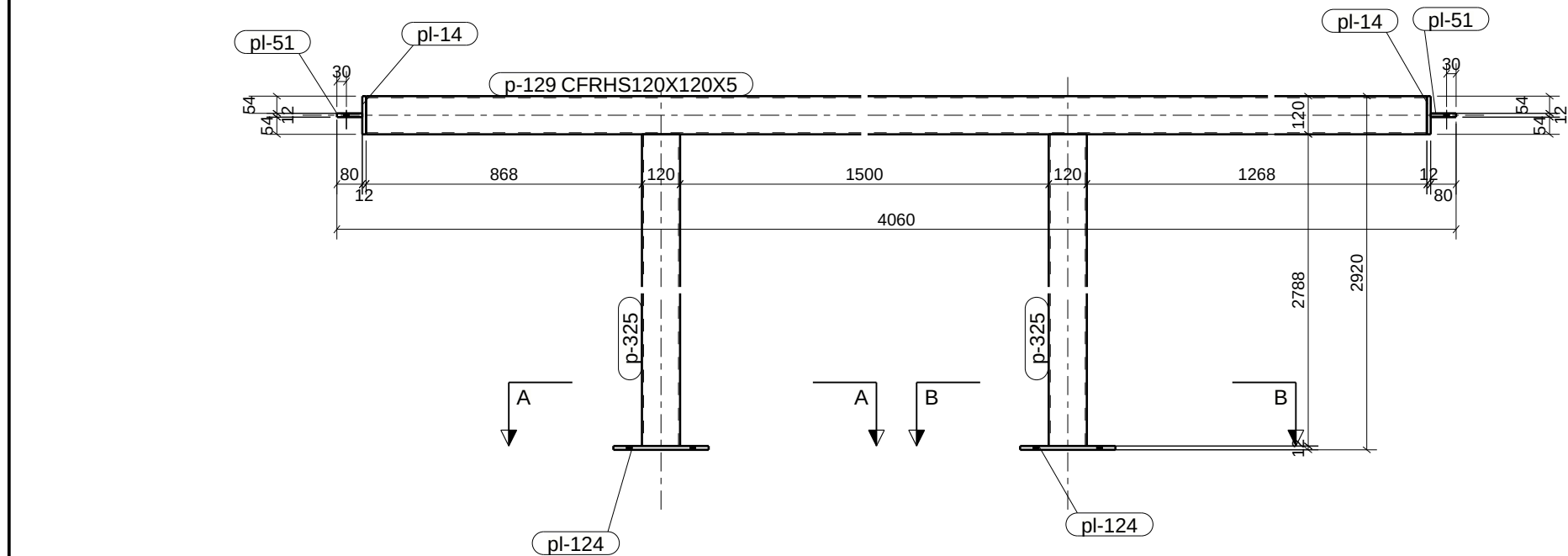
PHASE	QUANTITY
129	2

PHASE	QUANTITY
129	1



KRY-31 Kiekis 1

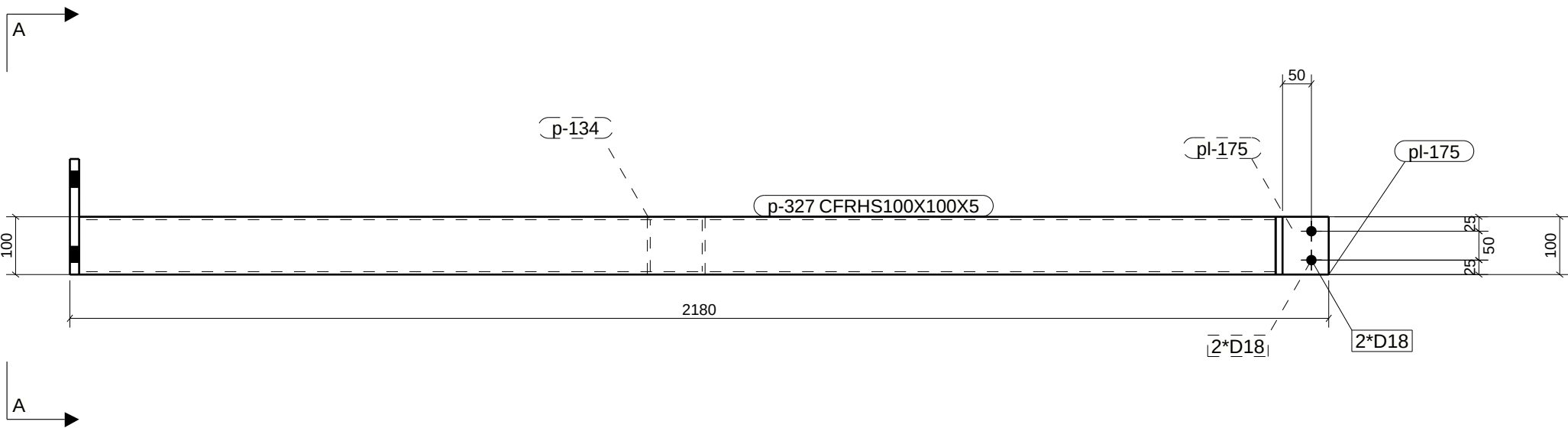
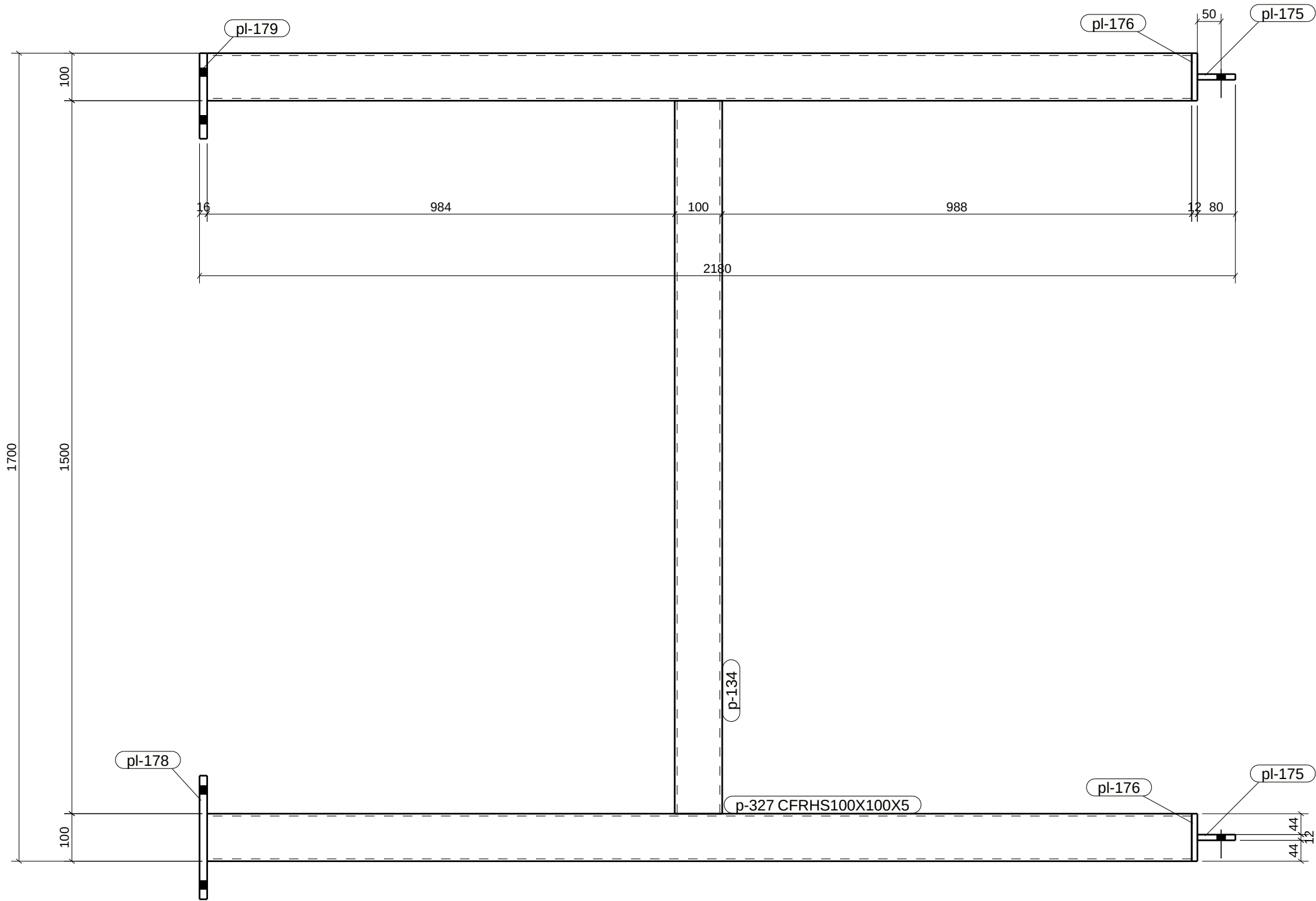
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-66	CFRHS120X120X5	3886	1	68.2
pl-12	PL12*140	140	2	1.8
pl-51	PL12*120	80	2	0.9
			Viso:	73.7



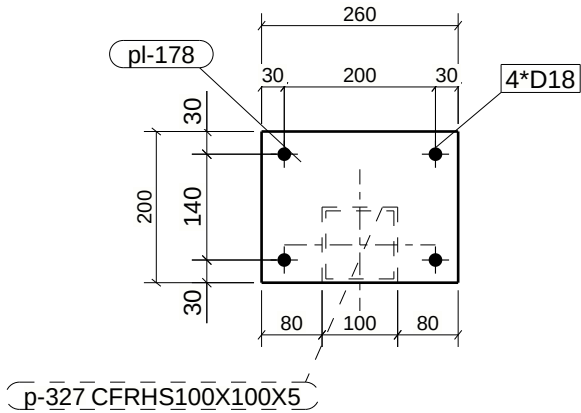
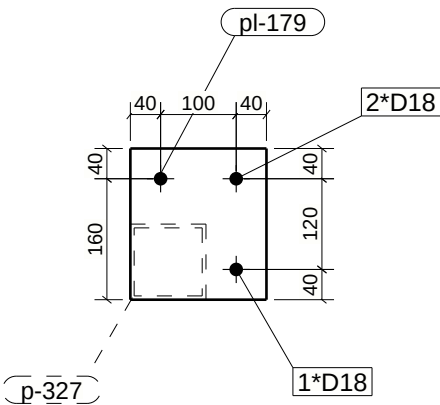
RR-2 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-129	CFRHS120X120X5	3876	1	68.0
p-325	CFRHS120X120X5	2788	2	48.9
pl-14	PL12*120	120	2	1.4
pl-51	PL12*120	80	2	0.9
pl-124	PL12*220	300	2	6.2
			Viso:	182.8

PHASE	QUANTITY
137	1



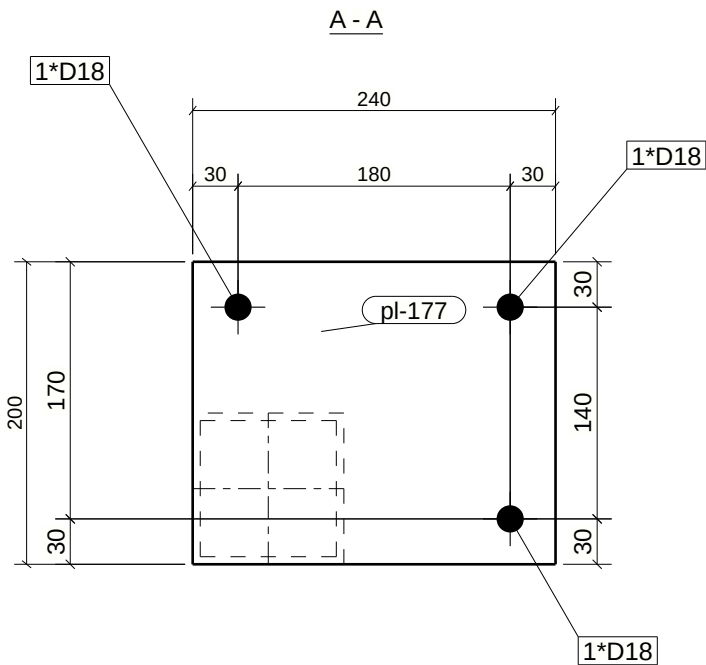
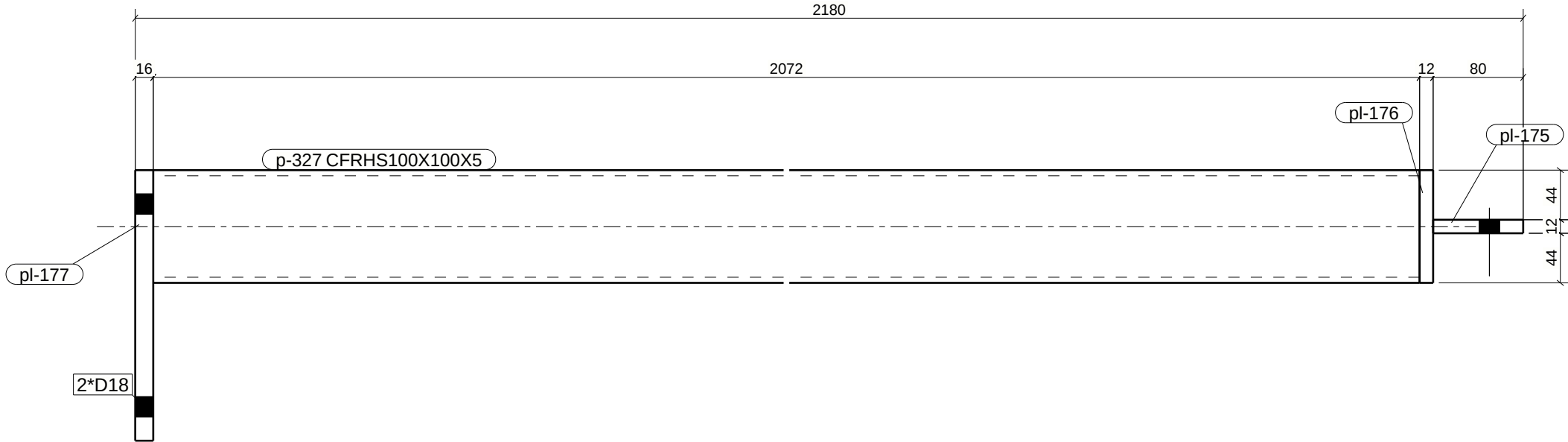
A - A



RR-4 Kiekis 1

RR-4 Kiekis 1				
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-134	CFRHS100X100X5	1500	1	21.6
p-327	CFRHS100X100X5	2072	2	29.9
pl-175	PL12*100	80	2	0.8
pl-176	PL12*100	100	2	0.9
pl-178	PL16*260	200	1	6.5
pl-179	PL16*180	200	1	4.5
			Viso:	95.8

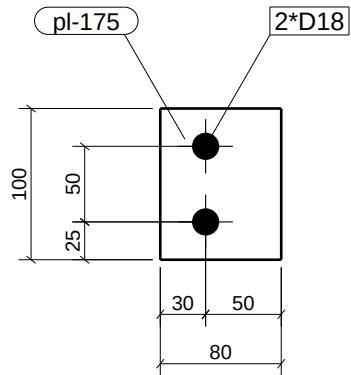
GRID LOCATION	
RR-5	11/A



A



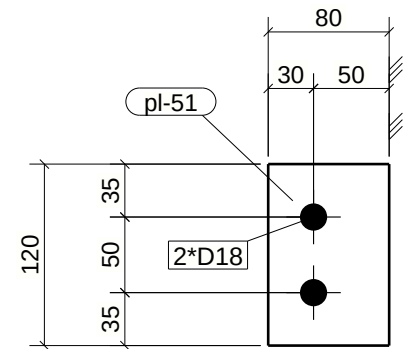
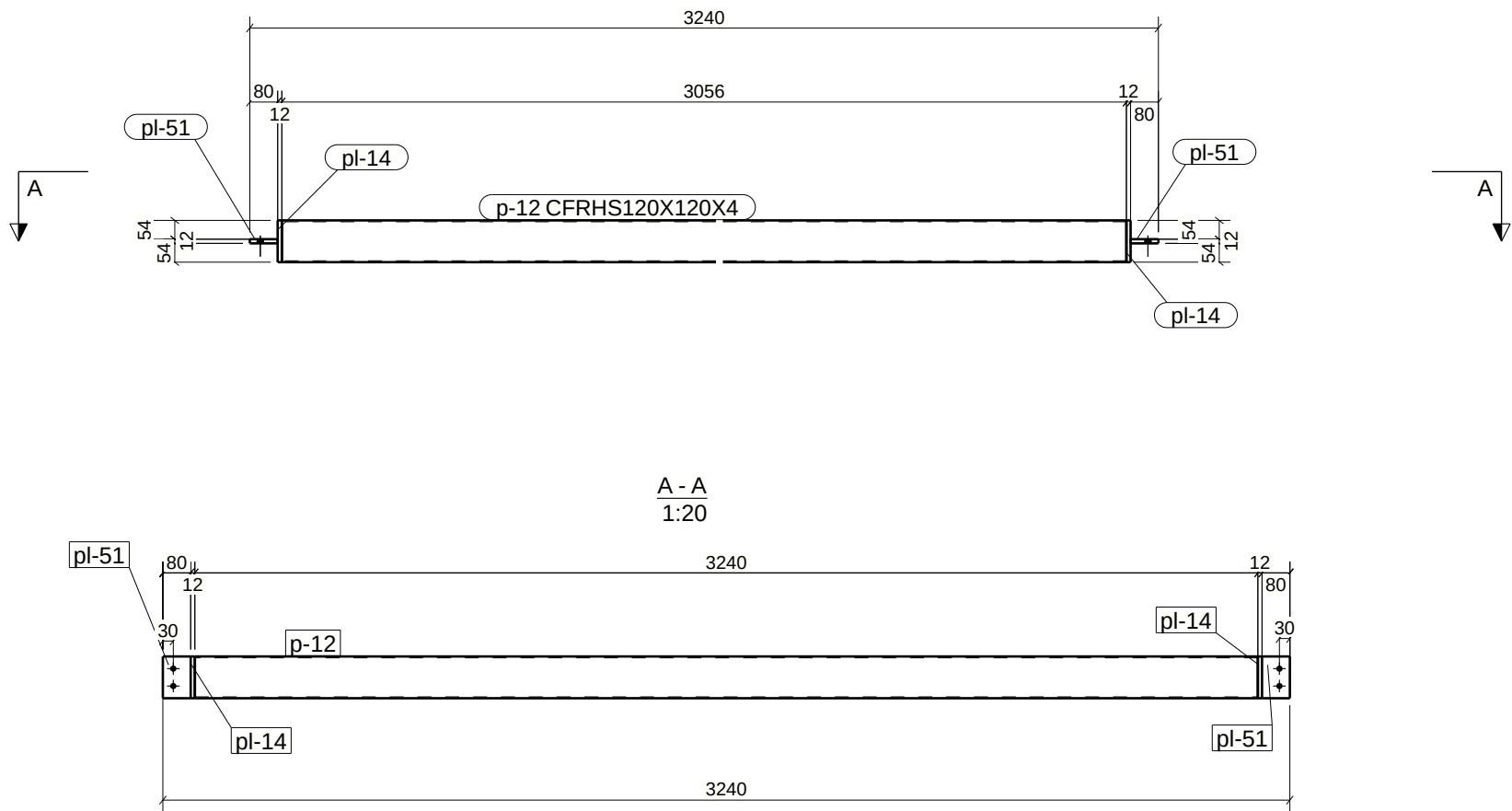
A



RR-5 Kiekis 1

PHASE	QUANTITY
103	1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-327	CFRHS100X100X5	2072	1	29.9
pl-175	PL12*100	80	1	0.8
pl-176	PL12*100	100	1	0.9
pl-177	PL16*240	200	1	6.0
			Viso:	37.6

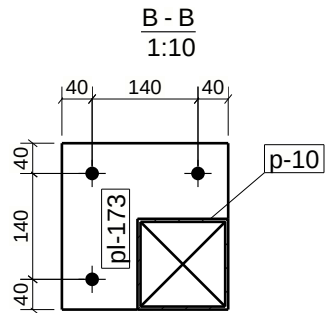
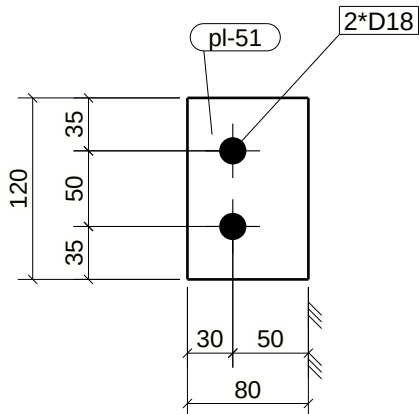
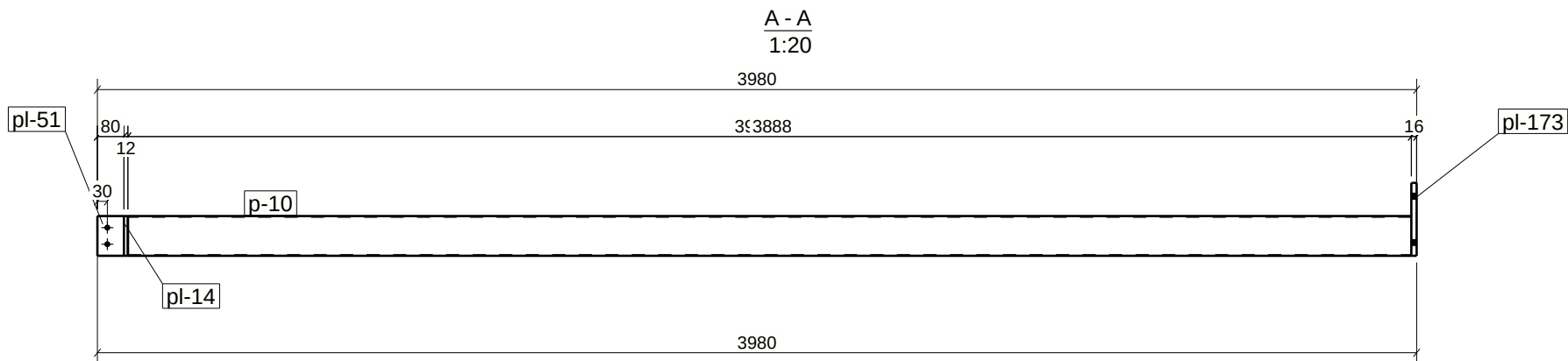
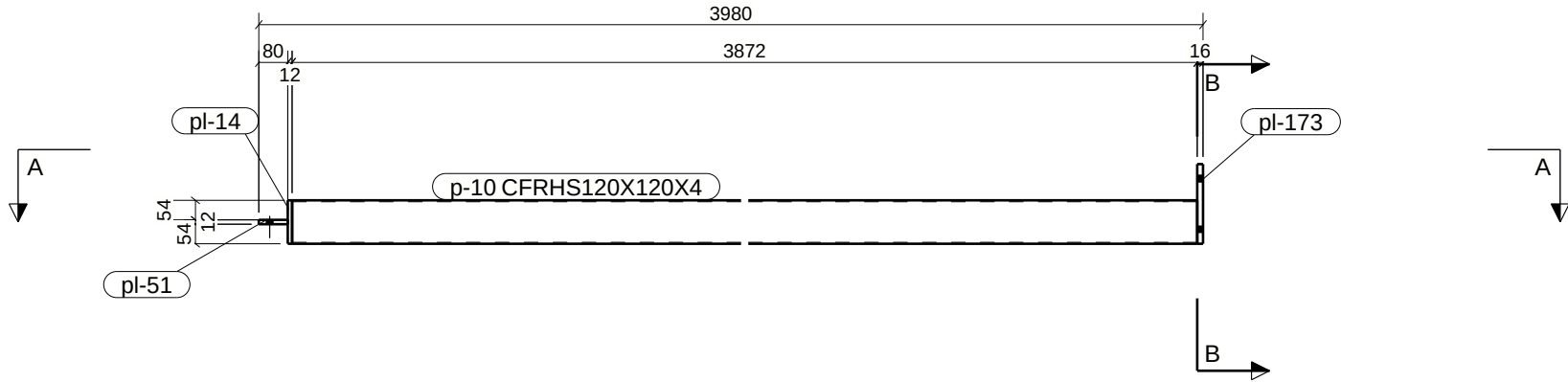
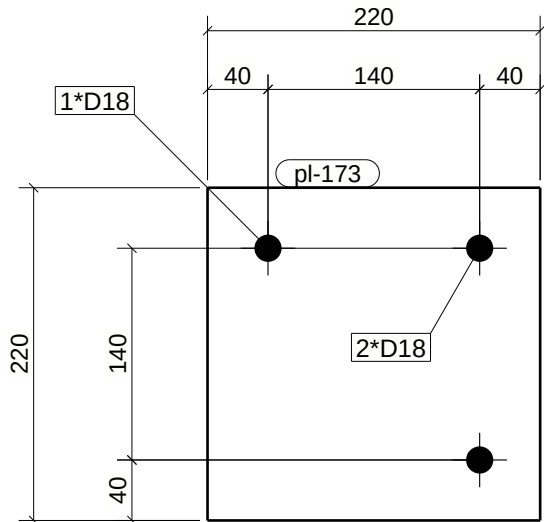


RR-6 Kiekis 12

Zymuo	Profilis	Ilgis	Kiekis	
p-12	CFRHS120X120X4	3056	1	
pl-14	PL12*120	120	2	
pl-51	PL12*120	80	2	
			Viso:	
				48.1

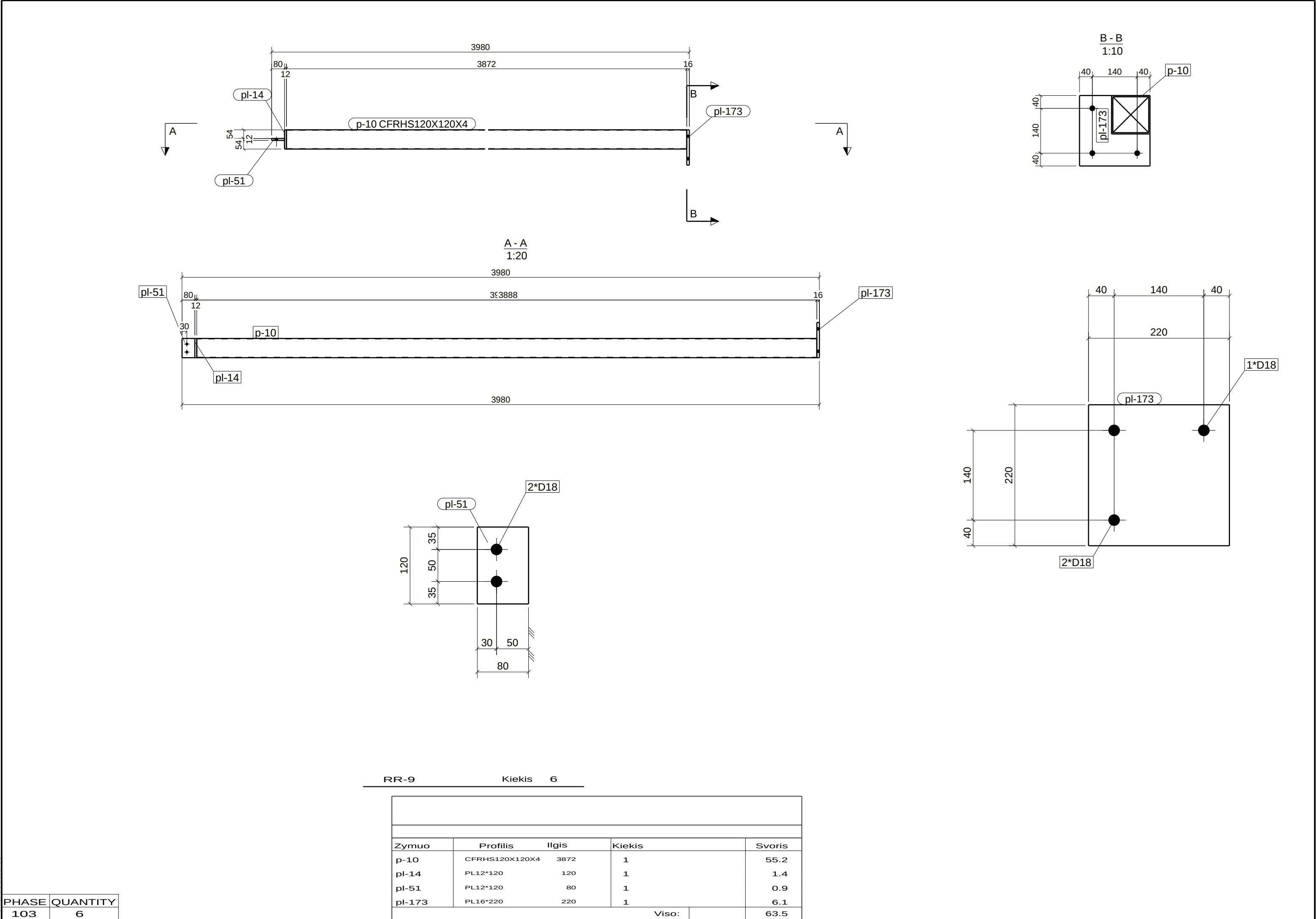
PHASE	QUANTITY
103	12

PHASE	QUANTITY
103	5

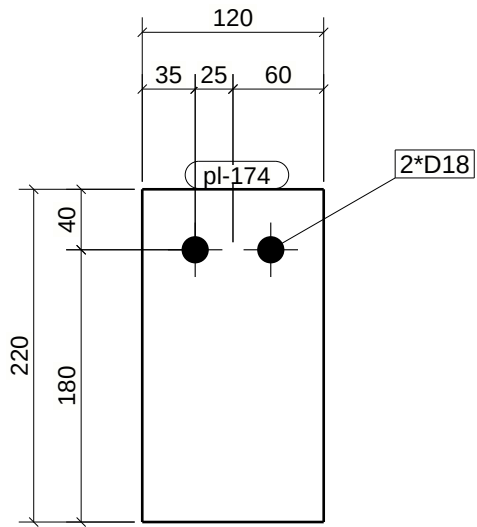
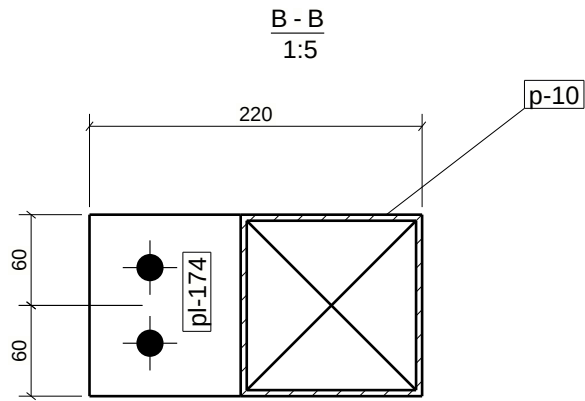
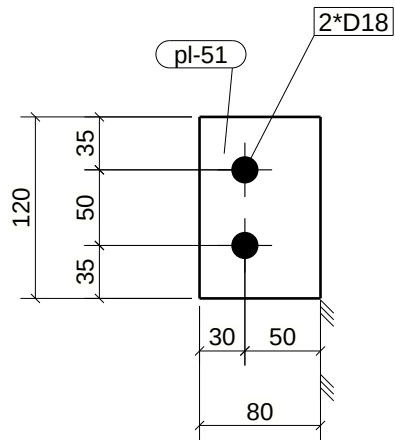
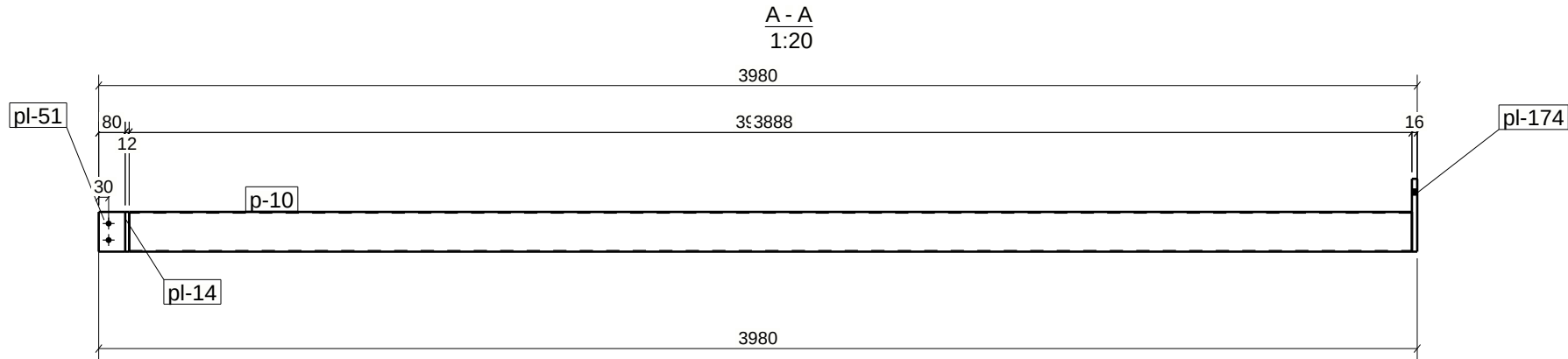
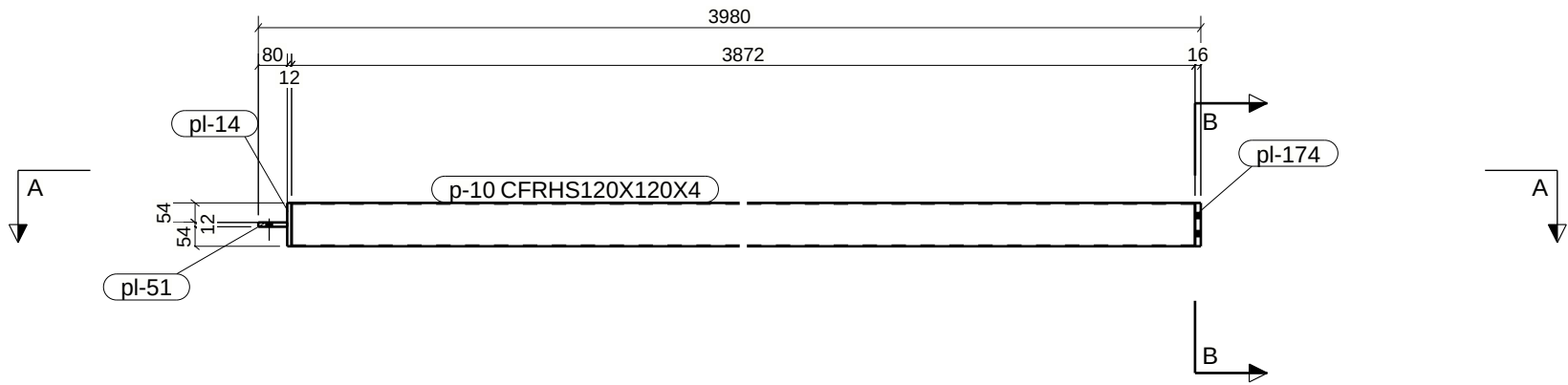


RR-8 Kiekis 5

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-10	CFRHS120X120X4	3872	1	55.2
pl-14	PL12*120	120	1	1.4
pl-51	PL12*120	80	1	0.9
pl-173	PL16*220	220	1	6.1
Viso:				63.5



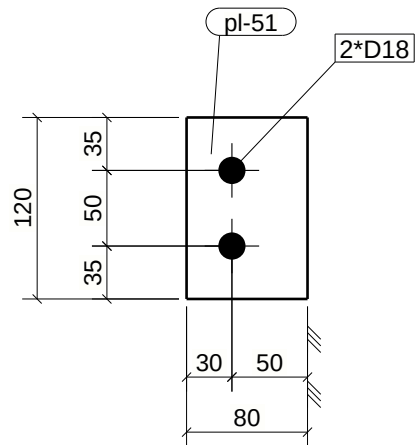
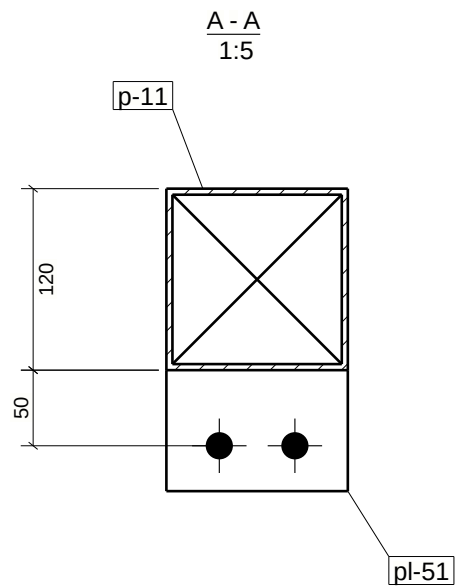
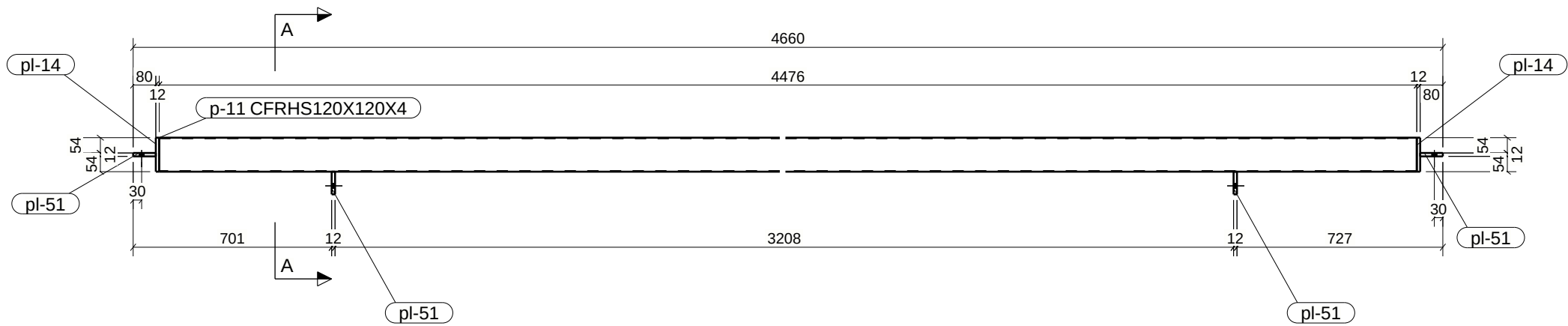
RR-9 Kiekis 6



RR-10 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-10	CFRHS120X120X4	3872	1	55.2
pl-14	PL12*120	120	1	1.4
pl-51	PL12*120	80	1	0.9
pl-174	PL16*220	120	1	3.3
			Viso:	60.7

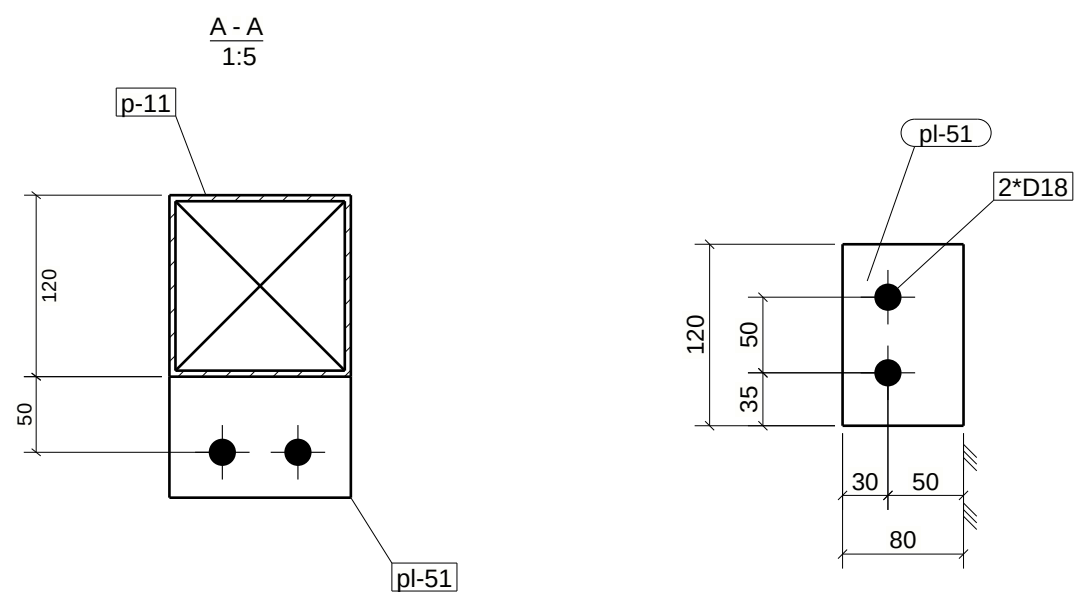
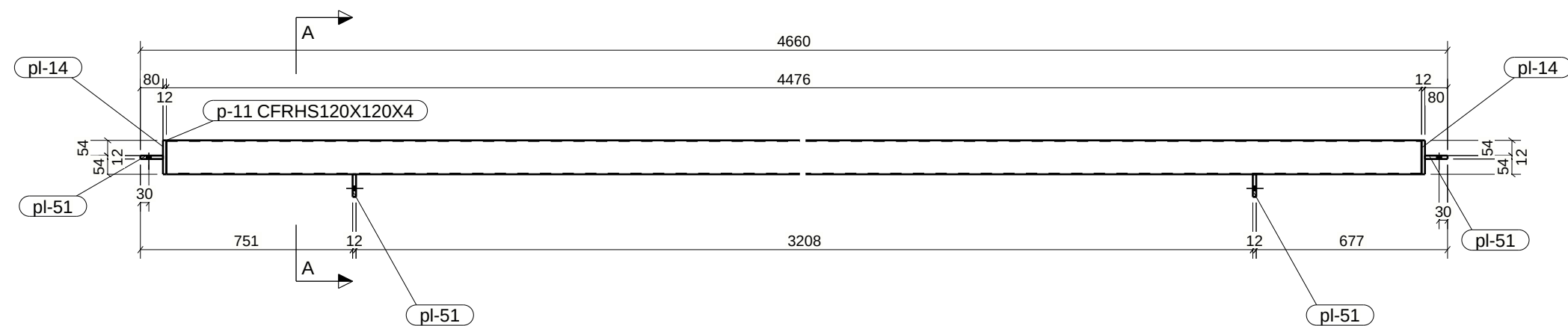
PHASE	QUANTITY
103	1



RR-11 Kiekis 1

PHASE	QUANTITY
103	1

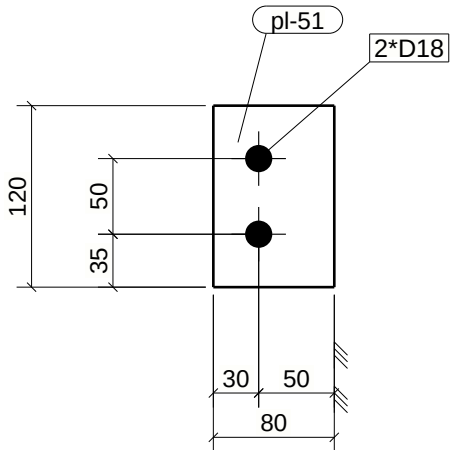
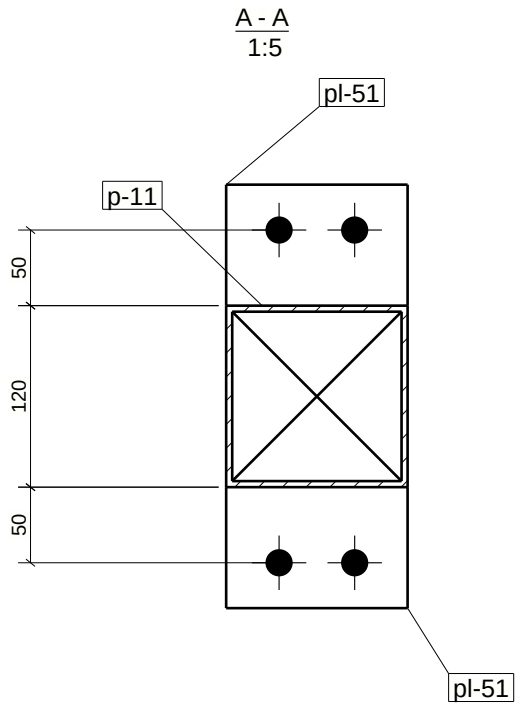
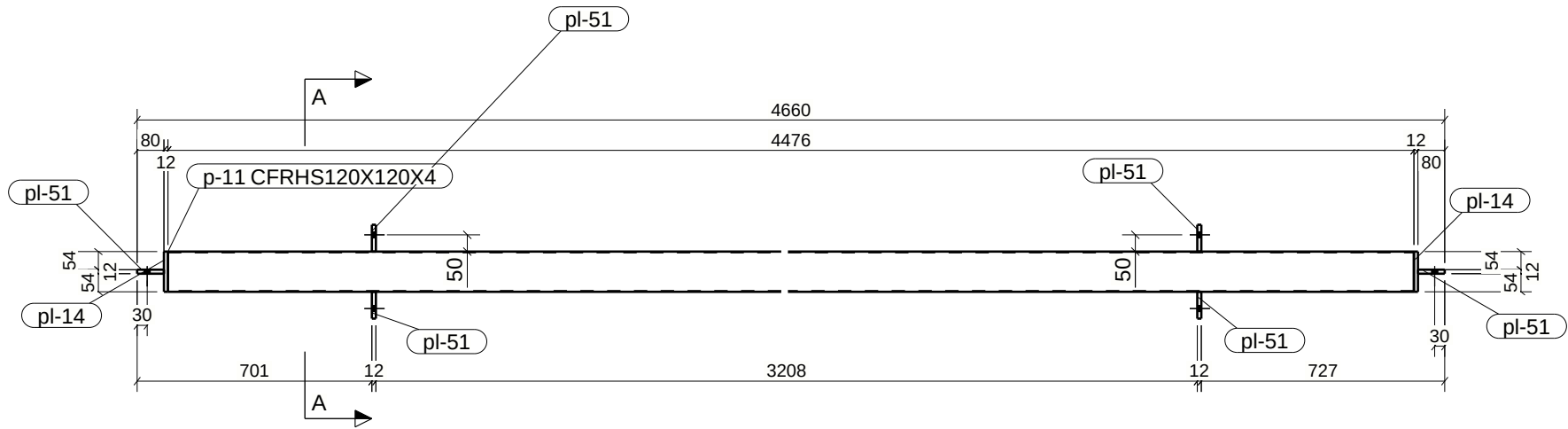
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-11	CFRHS120X120X4	4476	1	63.8
pl-14	PL12*120	120	2	1.4
pl-51	PL12*120	80	4	0.9
			Viso:	70.1



RR-12	Kiekis	1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-11	CFRHS120X120X4	4476	1	63.8
pl-14	PL12*120	120	2	1.4
pl-51	PL12*120	80	4	0.9
			Viso:	70.1

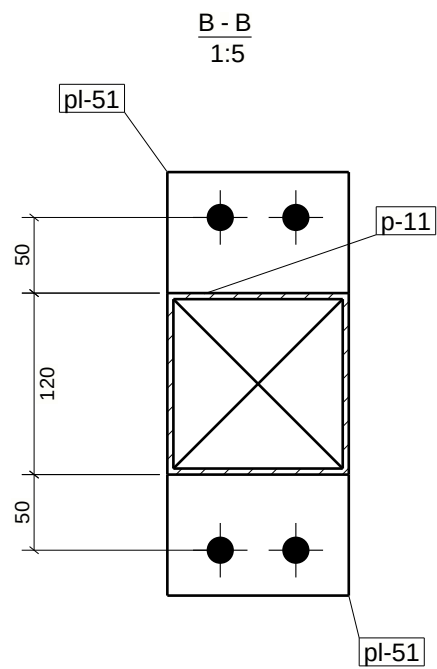
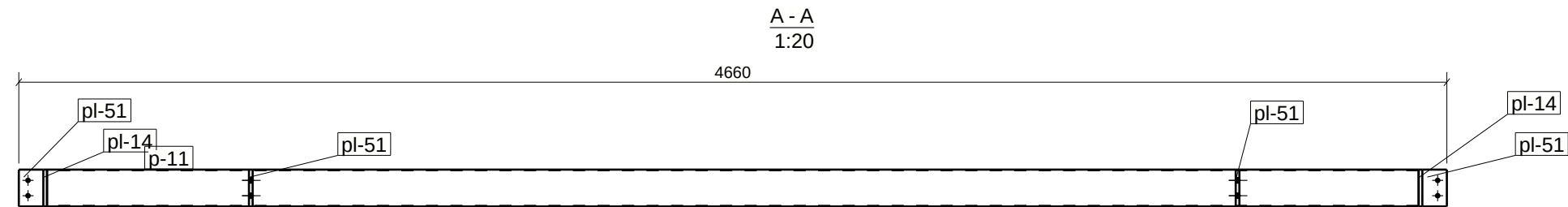
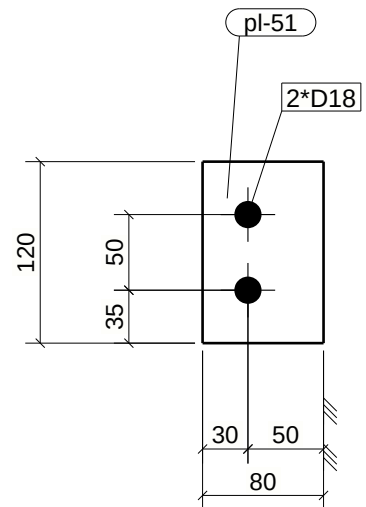
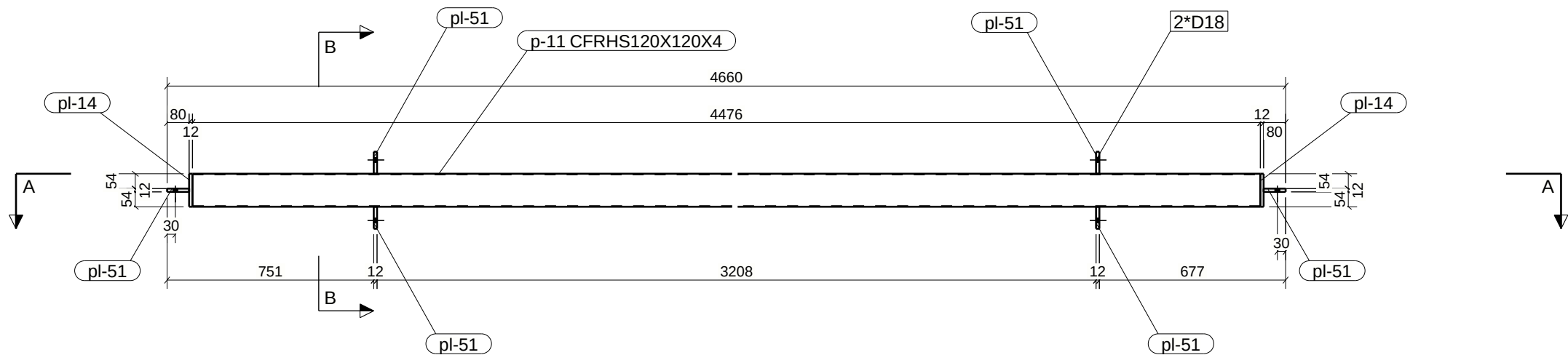
PHASE	QUANTITY
103	1



RR-13 Kiekis 1

PHASE	QUANTITY
103	1

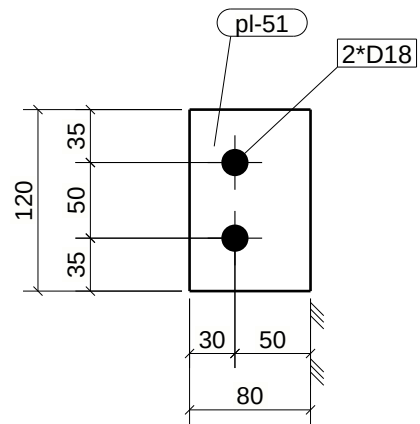
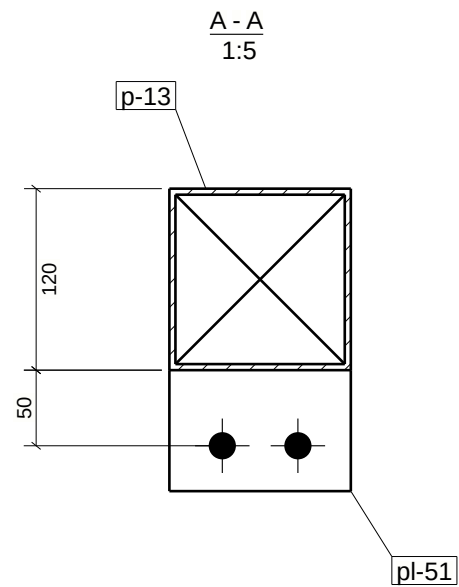
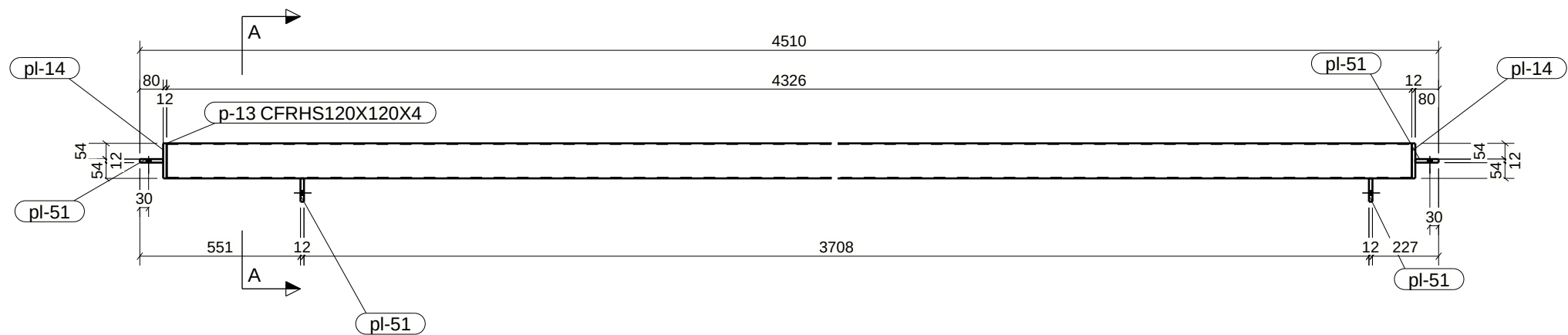
Zymuo				
Profilis				
Ilgis				
Kiekis				
Svoris				
p-11	CFRHS120X120X4	4476	1	63.8
pl-14	PL12*120	120	2	1.4
pl-51	PL12*120	80	6	0.9
Viso:				71.9



RR-14 Kiekis 1

Zymuo				
Profilis				
Ilgis				
Kiekis				
Svoris				
p-11	CFRHS120X120X4	4476	1	63.8
pl-14	PL12*120	120	2	1.4
pl-51	PL12*120	80	6	0.9
Viso:				71.9

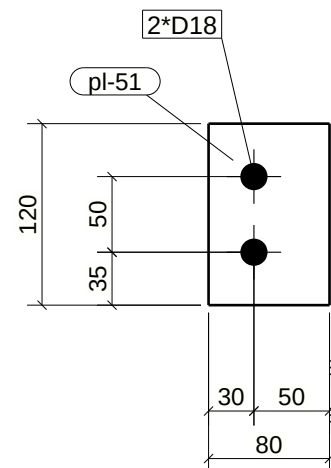
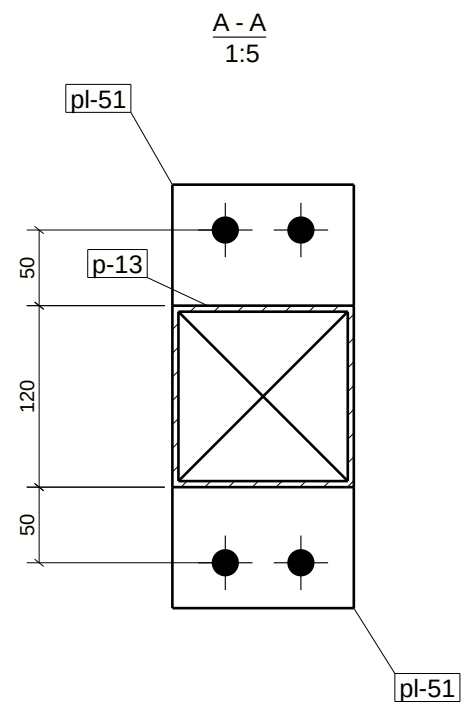
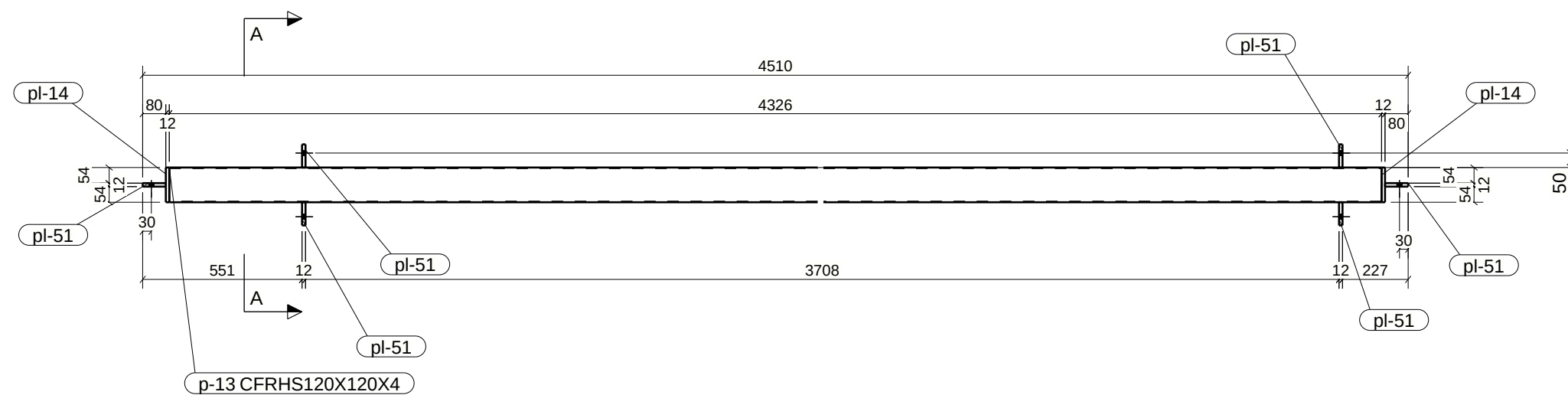
PHASE	QUANTITY
103	1



RR-15 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	
p-13	CFRHS120X120X4	4326	1	
pl-14	PL12*120	120	2	
pl-51	PL12*80	120	4	
			Viso:	
				68.0

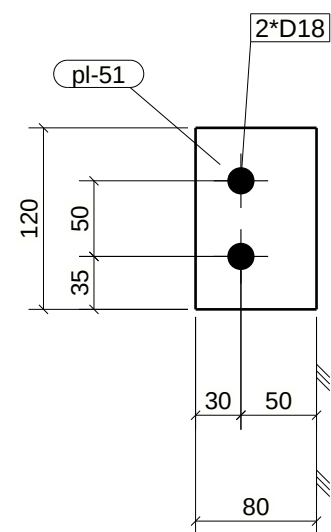
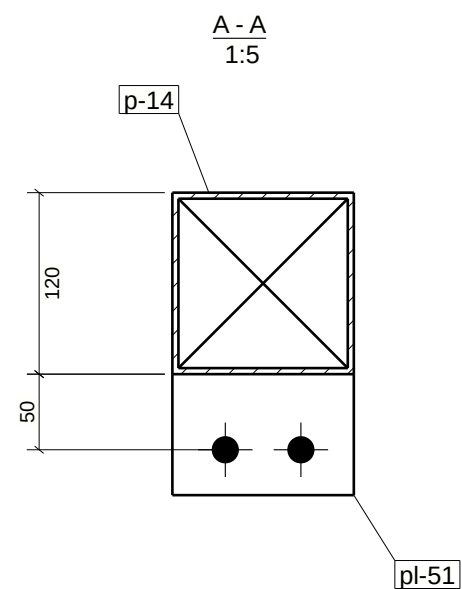
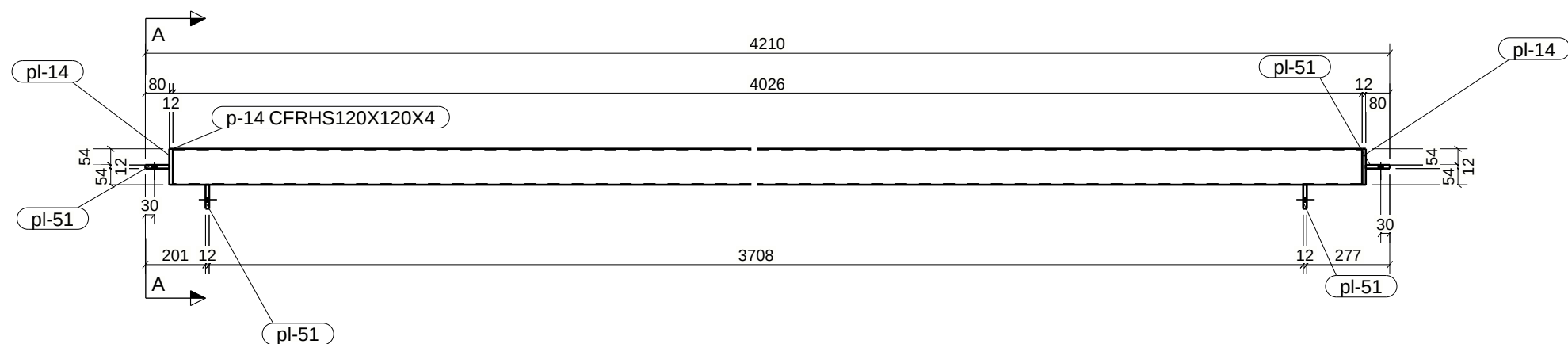
PHASE	QUANTITY
103	1



RR-16	Kiekis	1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-13	CFRHS120X120X4	4326	1	61.6
pI-14	PL12*120	120	2	1.4
pI-51	PL12*120	80	6	0.9
			Viso:	69.8

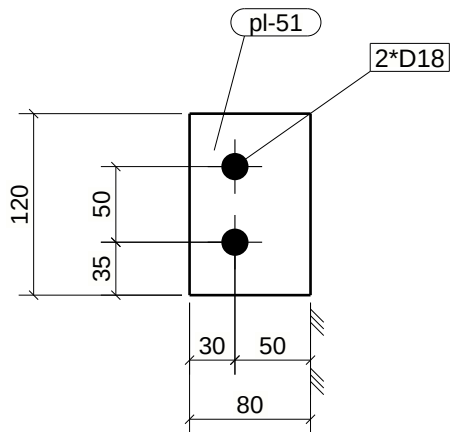
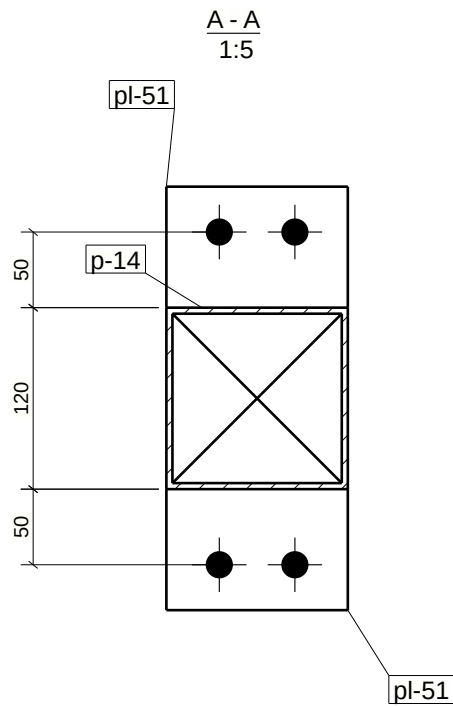
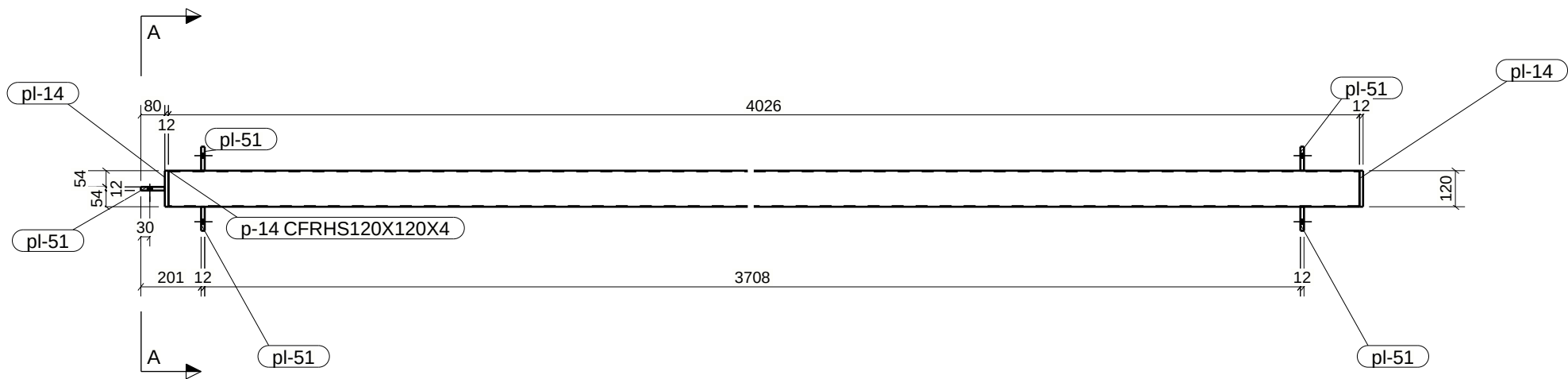
PHASE	QUANTITY
103	1



RR-17	Kiekis	1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-14	CFRHS120X120X4	4026	1	57.4
pl-14	PL12*120	120	2	1.4
pl-51	PL12*120	80	4	0.9
			Viso:	63.7

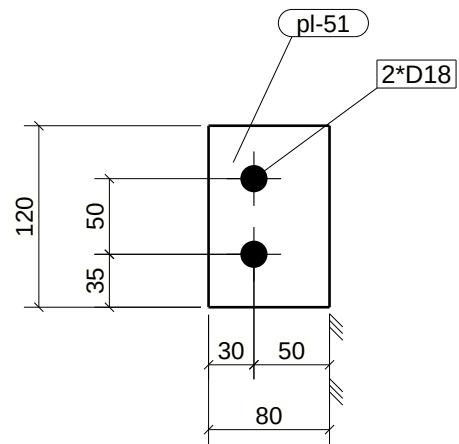
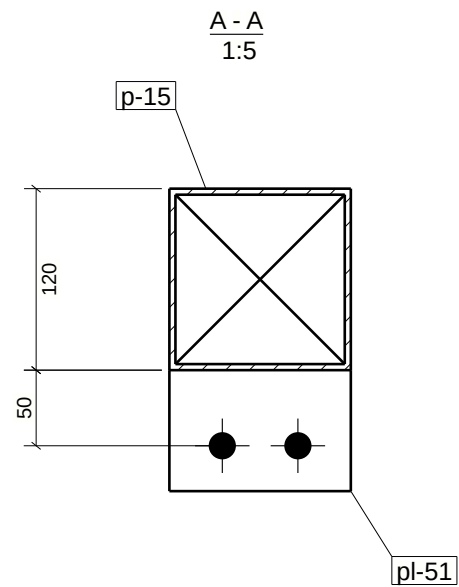
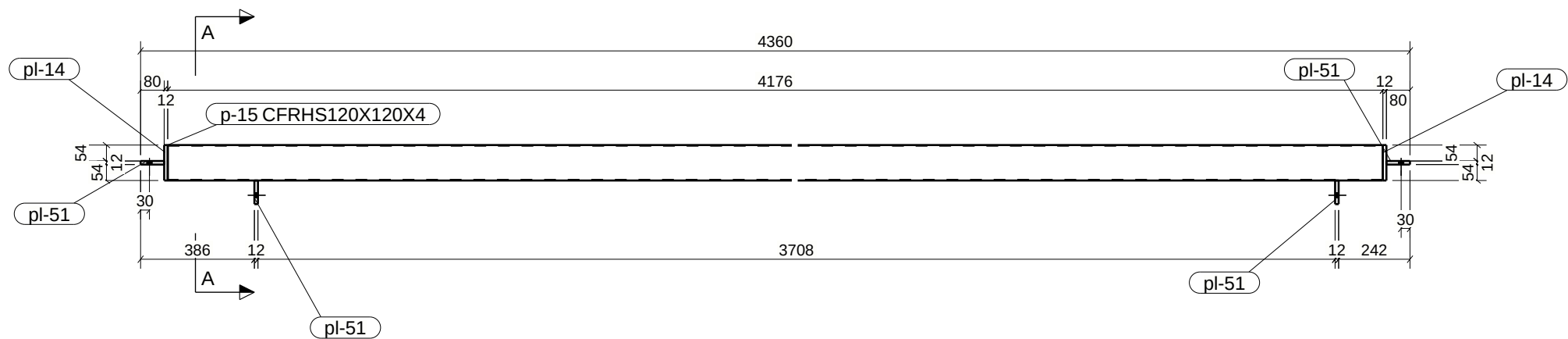
PHASE	QUANTITY
103	1



RR-18 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	
p-14	CFRHS120X120X4	4026	1	
pl-14	PL12*120	120	2	
pl-51	PL12*120	80	5	
			Viso:	64.6

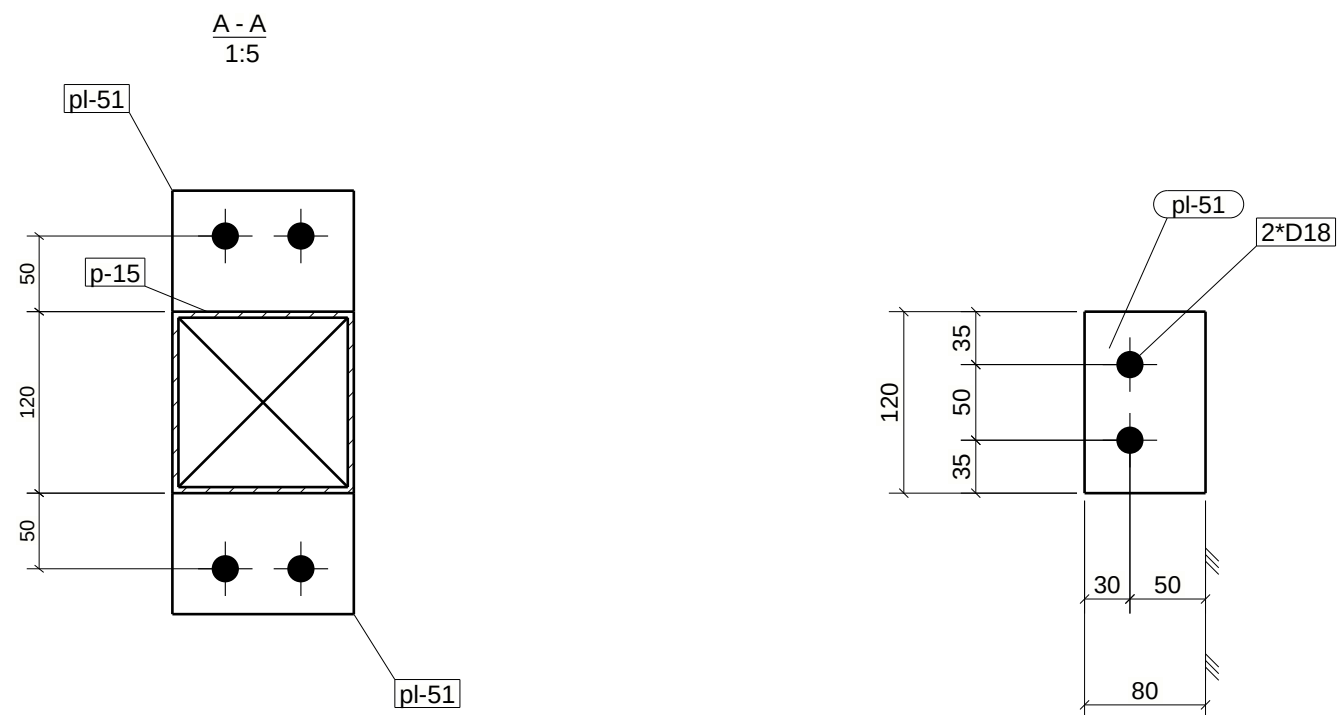
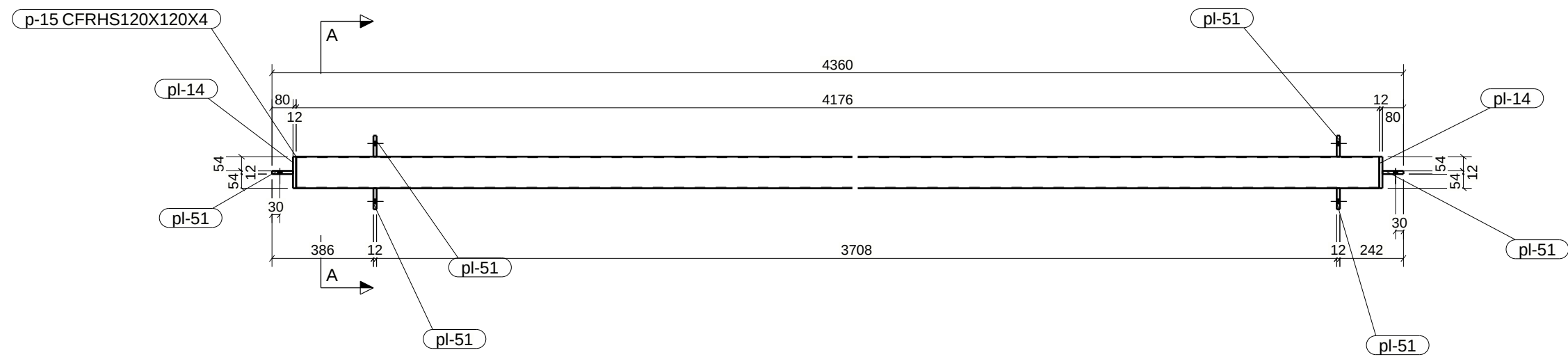
PHASE	QUANTITY
103	1



RR-19 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-15	CFRHS120X120X4	4176	1	59.5
pl-14	PL12*120	120	2	1.4
pl-51	PL12*120	80	4	0.9
			Viso:	65.8

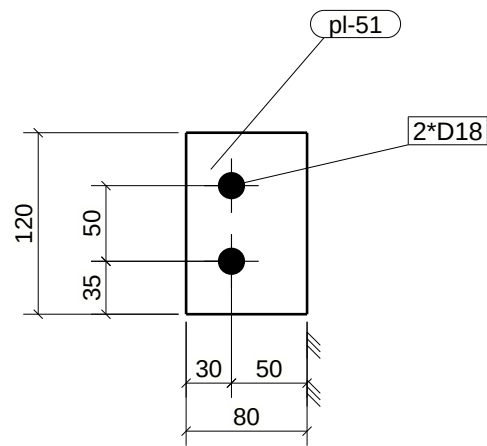
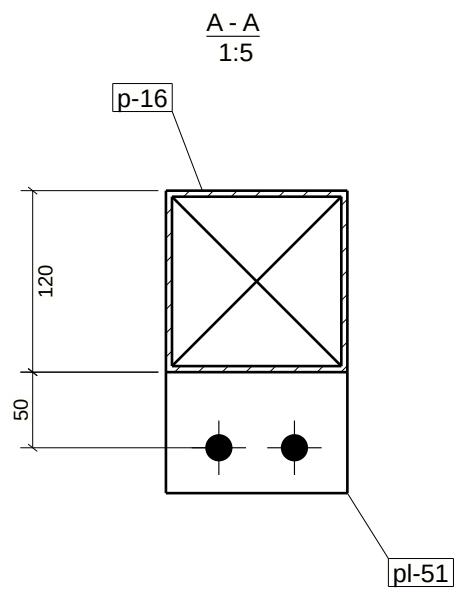
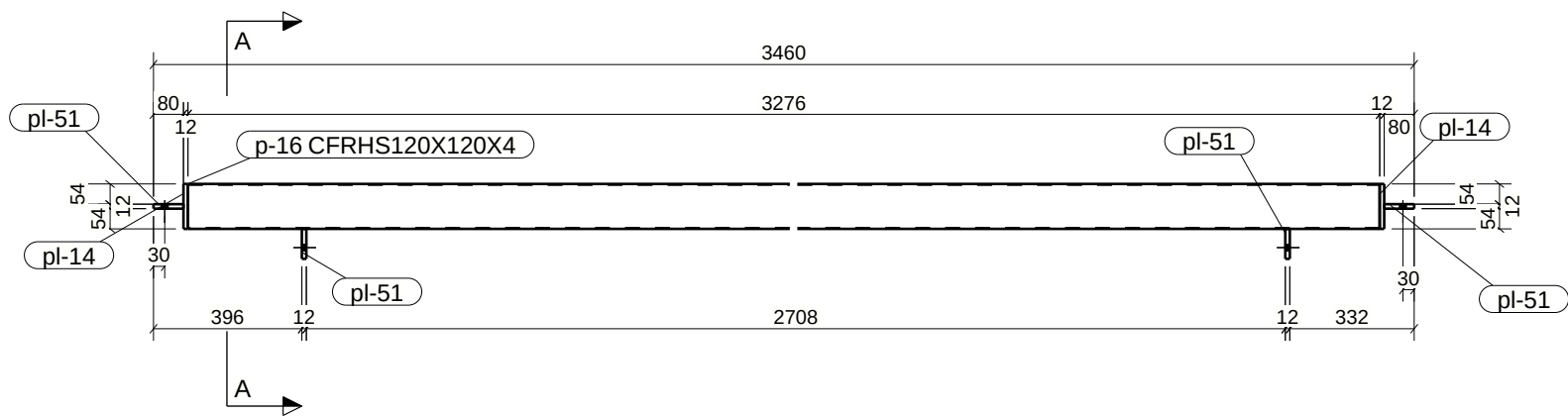
PHASE	QUANTITY
103	1



RR-20	Kiekis	1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-15	CFRHS120X120X4	4176	1	59.5
pl-14	PL12*120	120	2	1.4
pl-51	PL12*120	80	6	0.9
			Viso:	67.6

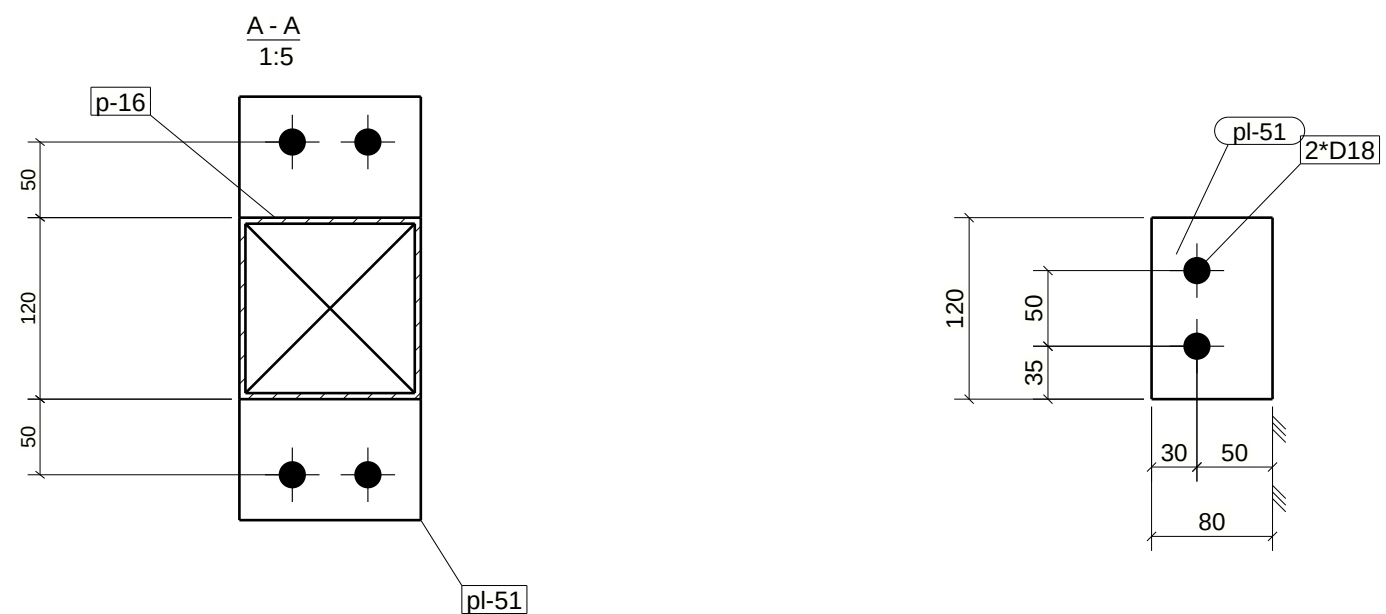
PHASE	QUANTITY
103	1



RR-21 Kiekis 1

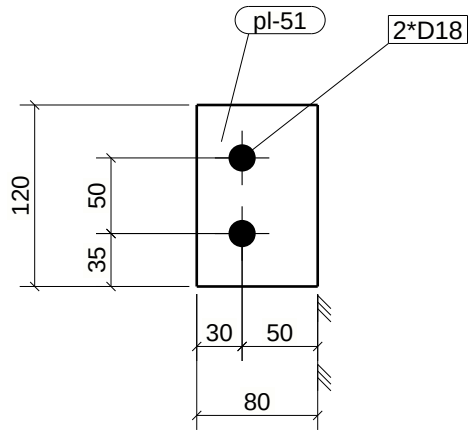
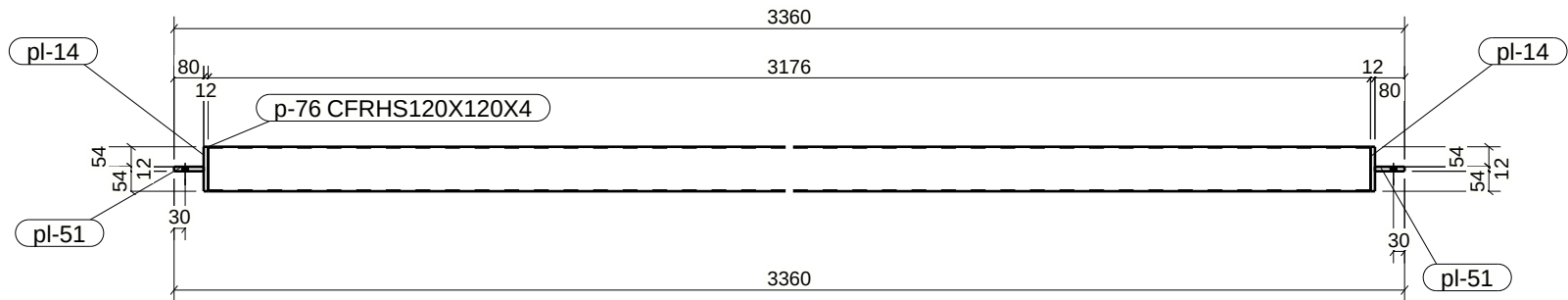
Zymuo	Profilis	Ilgis	Kiekis	
p-16	CFRHS120X120X4	3276	1	
pl-14	PL12*120	120	2	
pl-51	PL12*120	80	4	
Viso:				53.0

PHASE	QUANTITY
103	1



Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-16	CFRHS120X120X4	3276	1	46.7
pI-14	PL12*120	120	2	1.4
pI-51	PL12*120	80	6	0.9
			Viso:	54.8

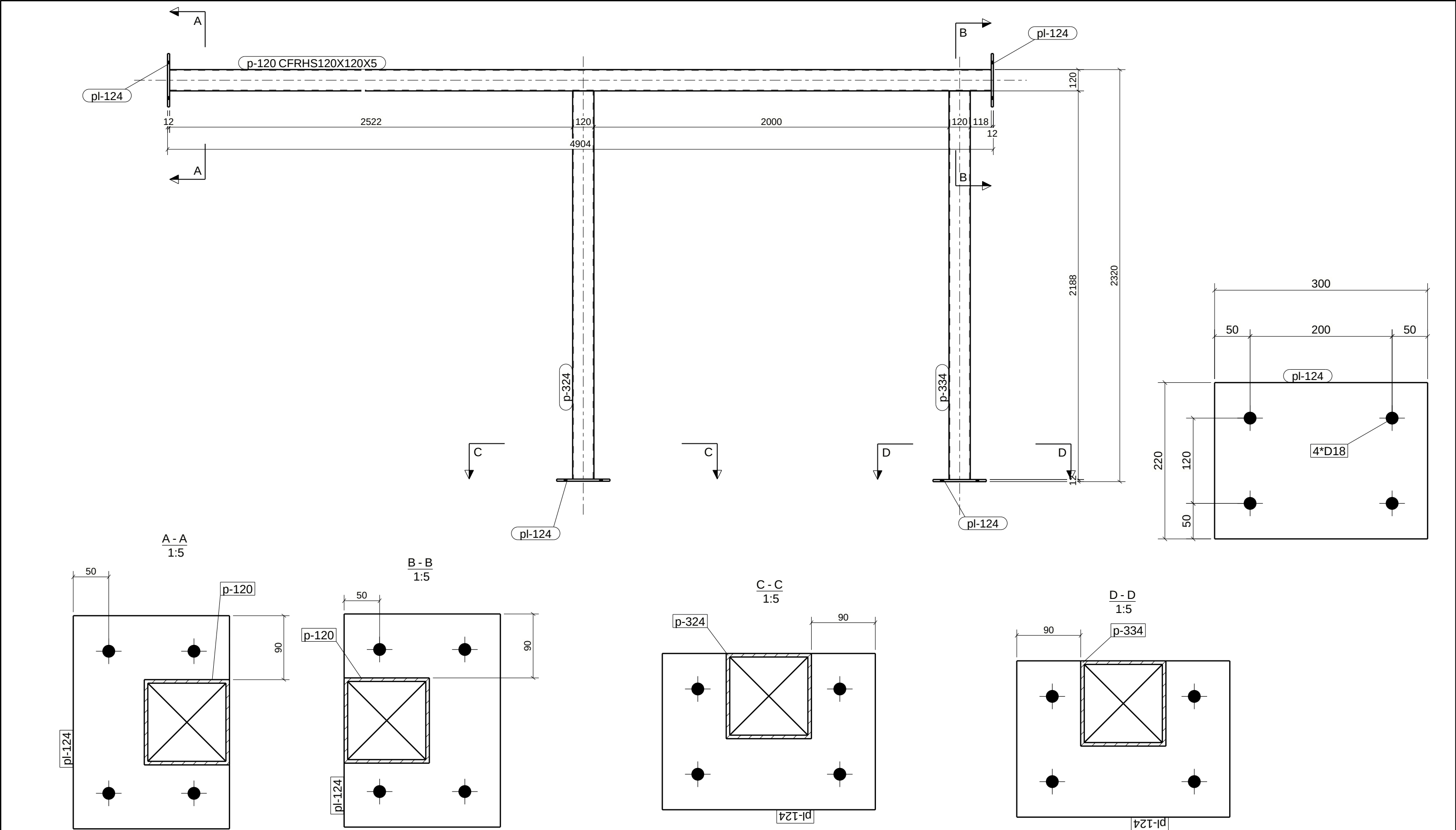
PHASE	QUANTITY
103	1



RR-23 Kiekis 1

PHASE	QUANTITY
103	1

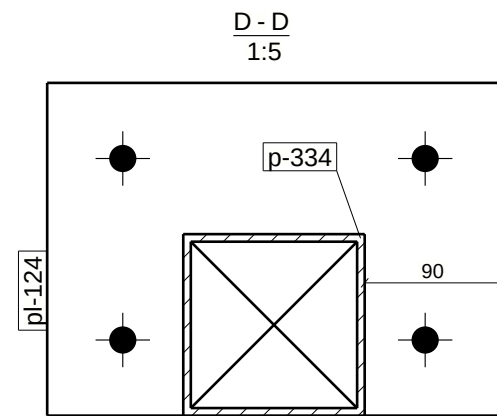
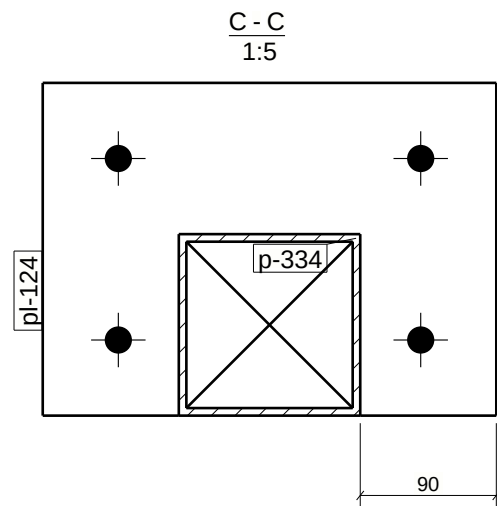
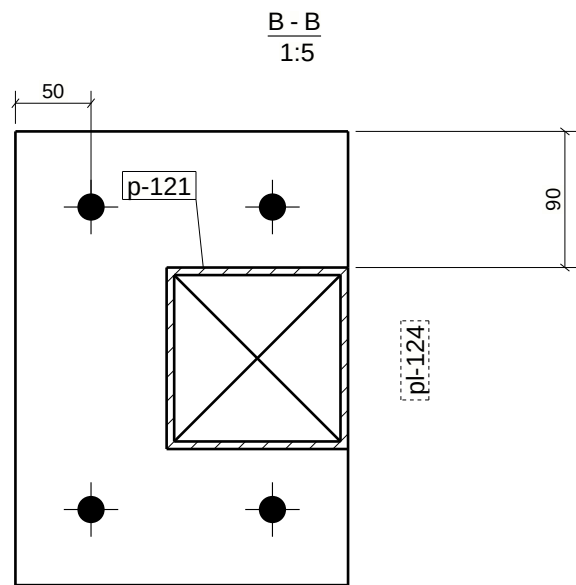
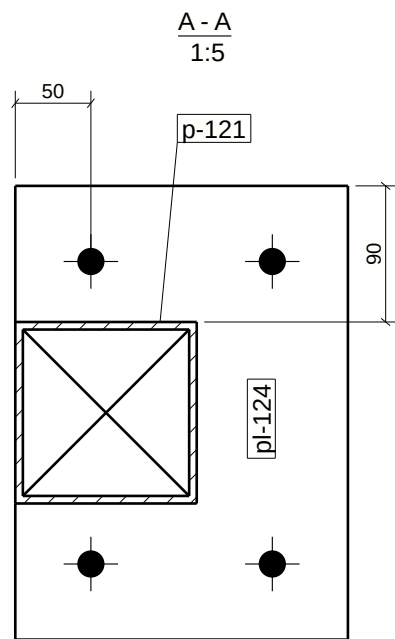
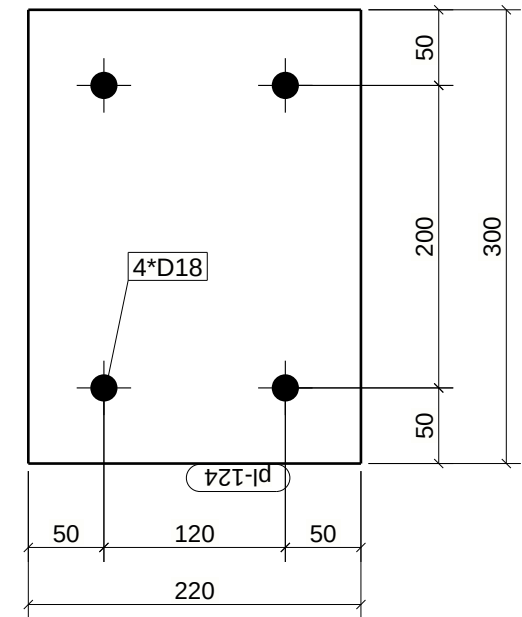
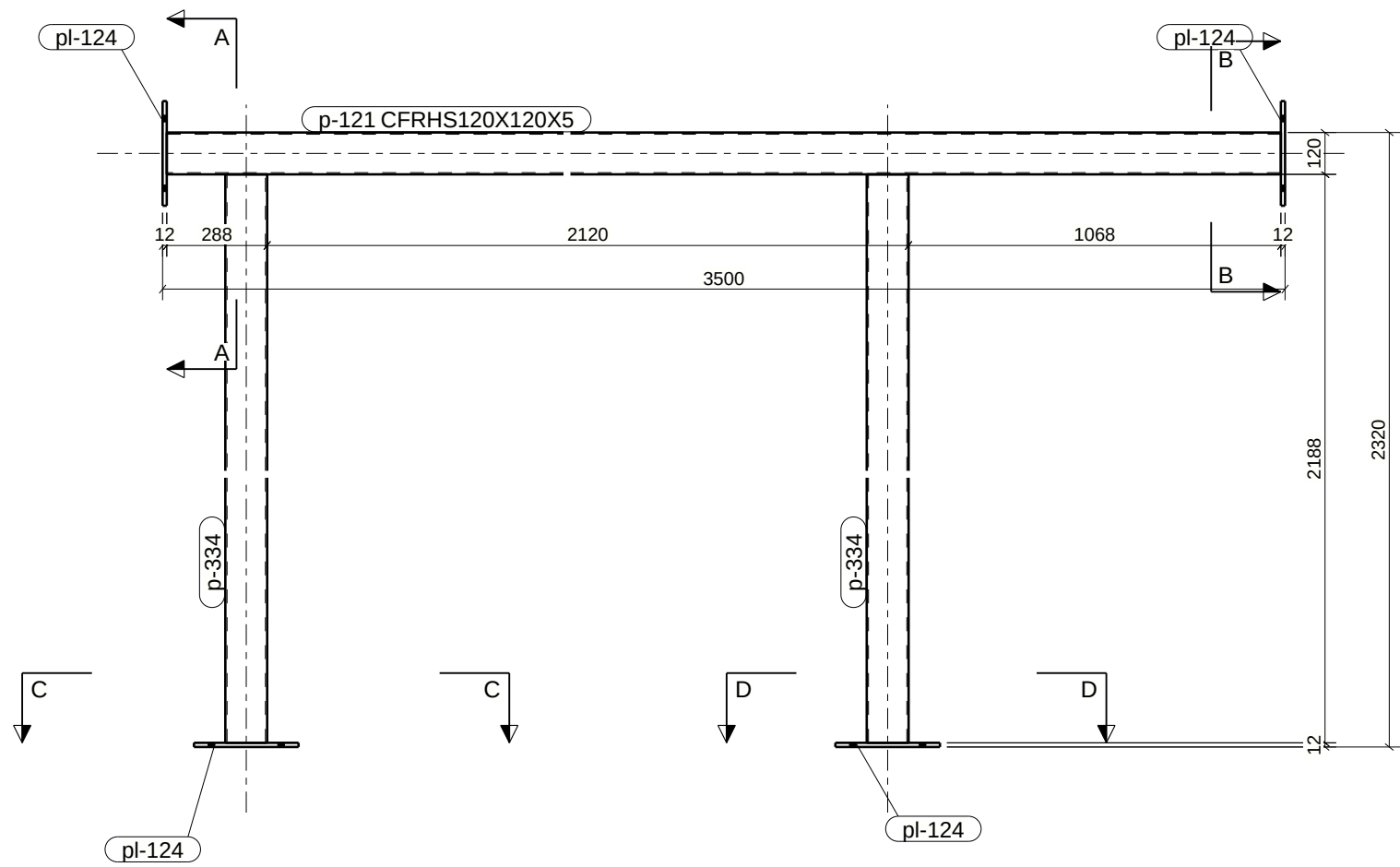
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-76	CFRHS120X120X4	3176	1	45.2
pl-14	PL12*120	120	2	1.4
pl-51	PL12*120	80	2	0.9
			Viso:	49.8



RR-25 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-120	CFRHS120X120X5	4880	1	85.6
p-324	CFRHS120X120X5	2186	1	38.4
p-334	CFRHS120X120X5	2188	1	38.4
pl-124	PL12*220	300	4	6.2
			Viso:	187.3

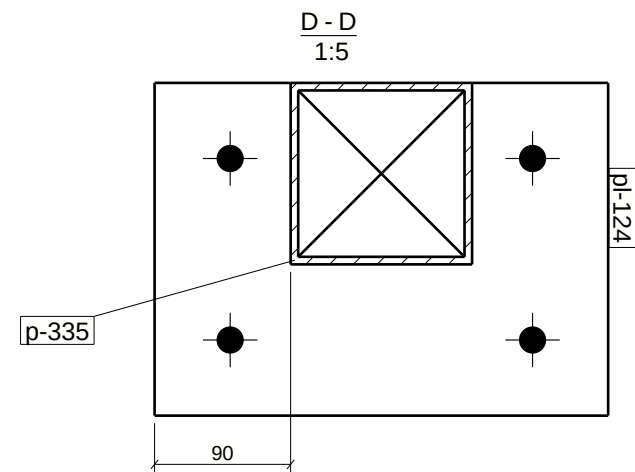
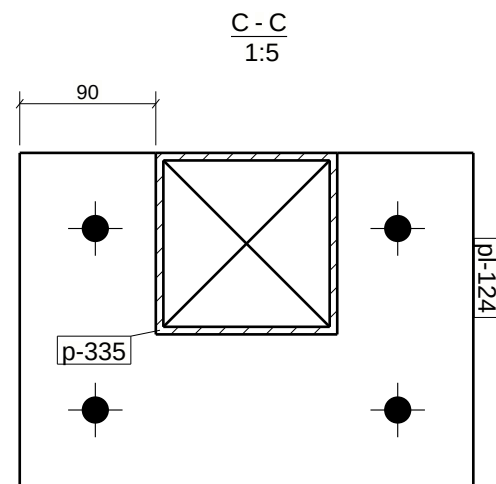
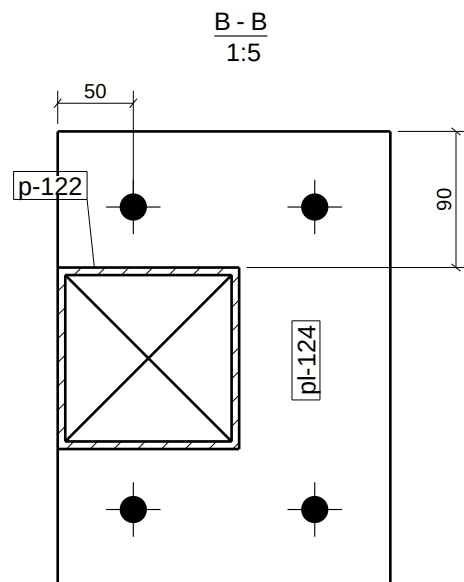
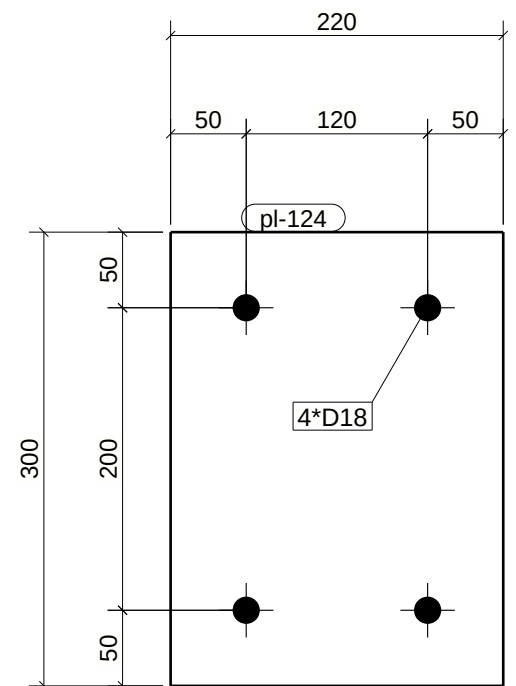
PHASE	QUANTITY
137	1



RR-26 Kiekis 1

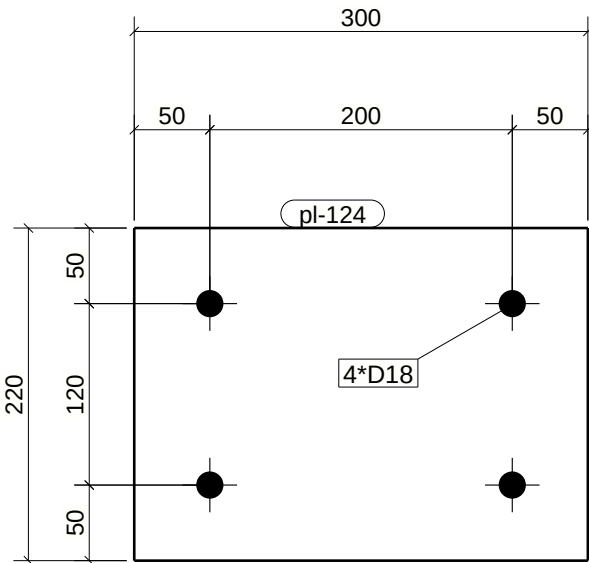
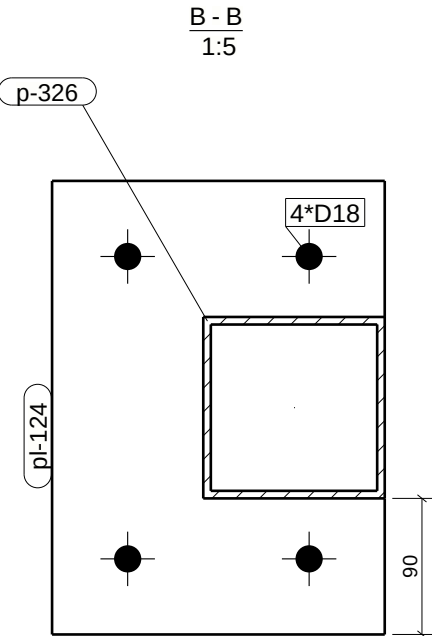
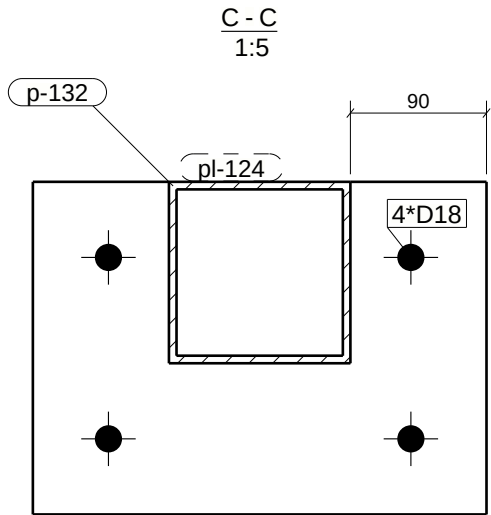
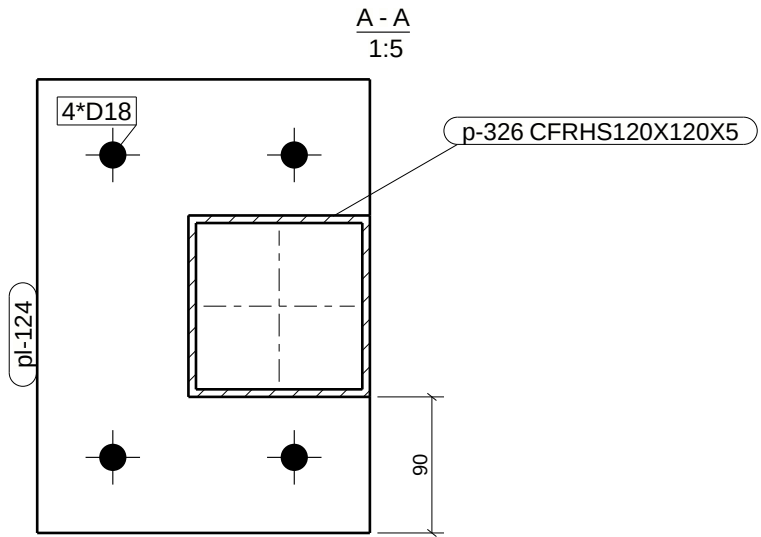
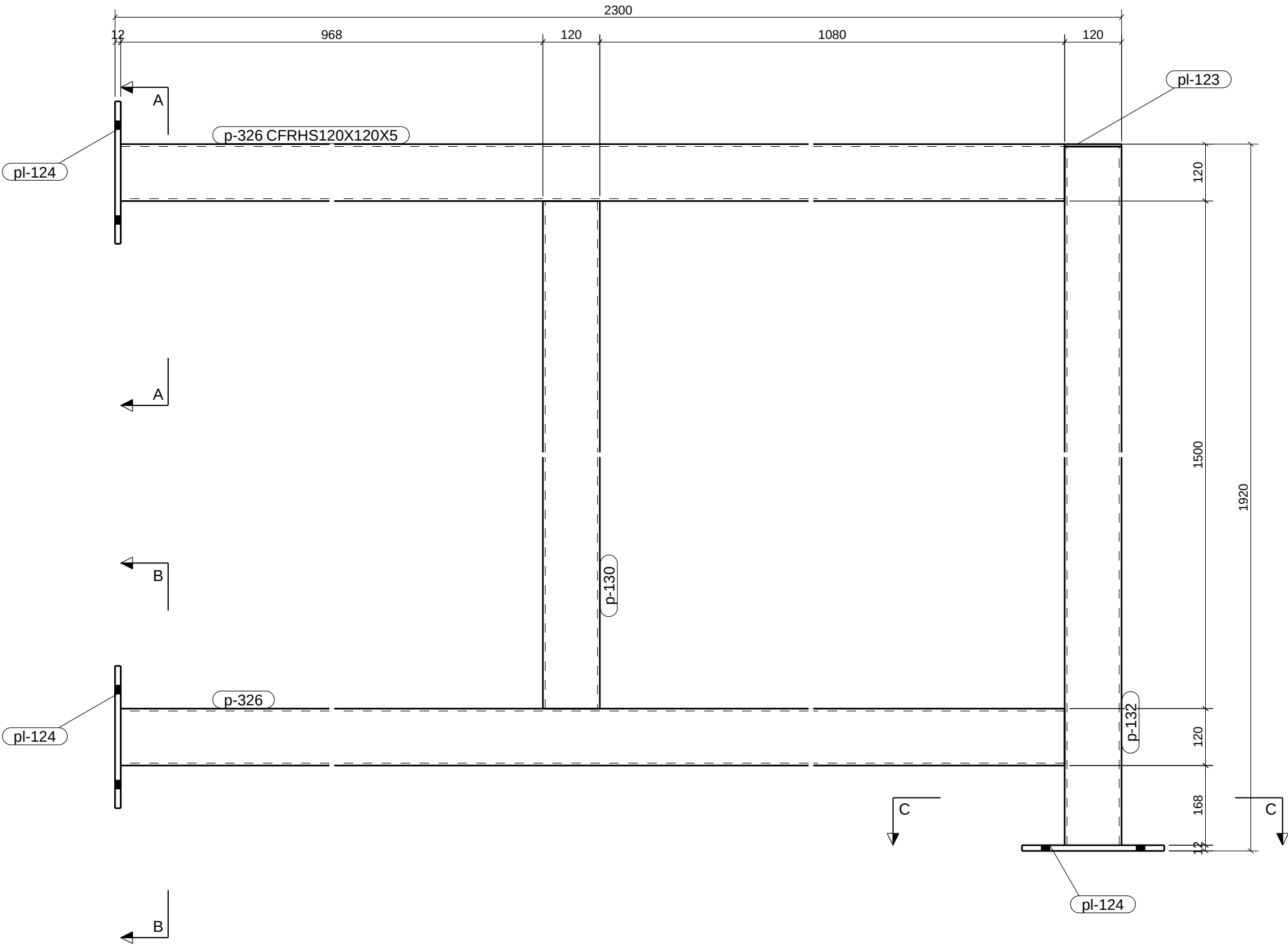
Zymuo	Profilis	Ilgis	Kiekis	
p-121	CFRHS120X120X5	3476	1	
p-334	CFRHS120X120X5	2188	2	
pl-124	PL12*220	300	4	
			Viso:	162.7

PHASE	QUANTITY
137	1



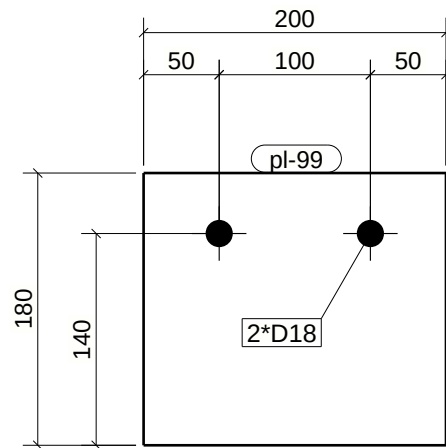
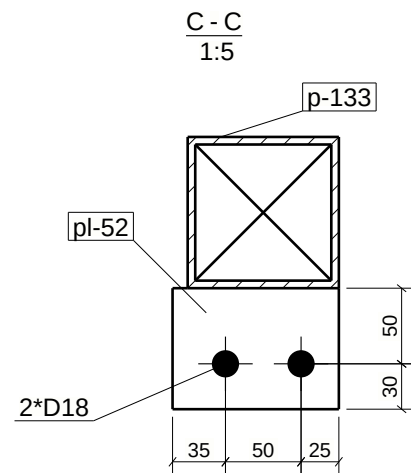
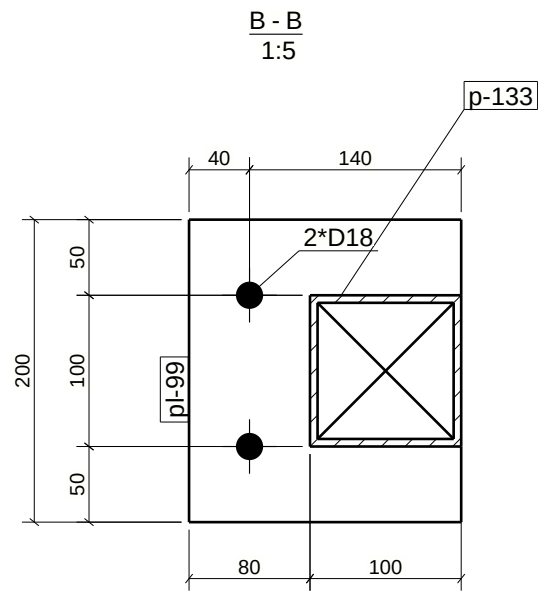
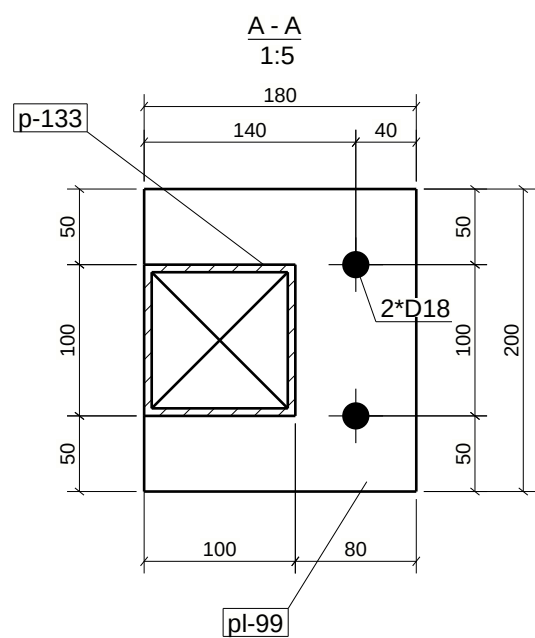
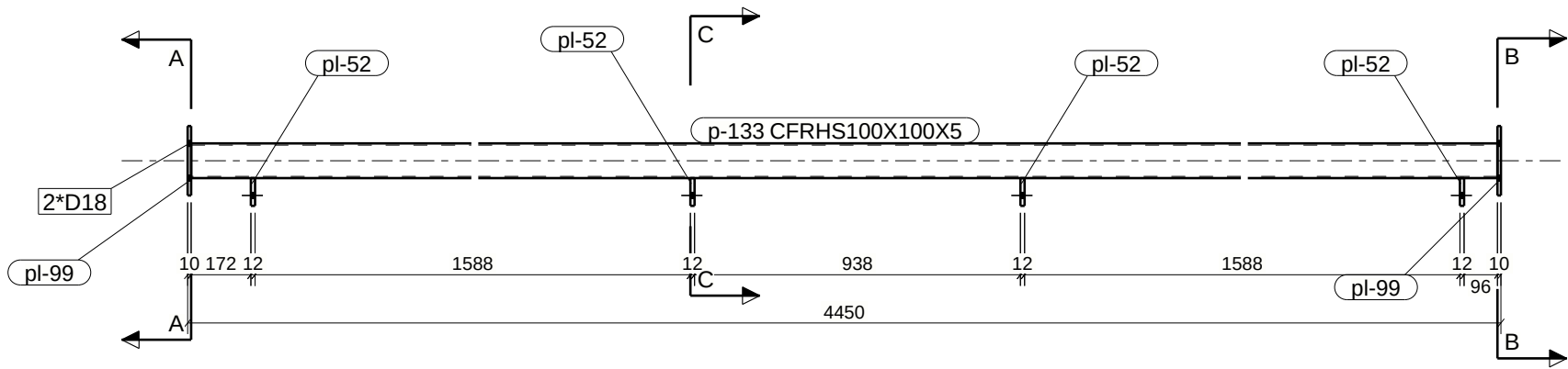
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-122	CFRHS120X120X5	4376	1	76.8
p-335	CFRHS120X120X5	2088	2	36.6
pl-124	PL12*300	220	4	6.2
			Viso:	175.0

PHASE	QUANTITY
137	1



RR-29 Kiekis 1

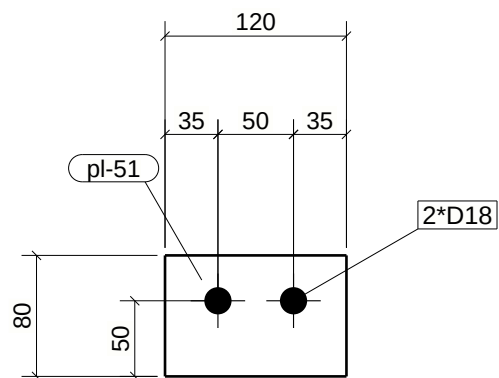
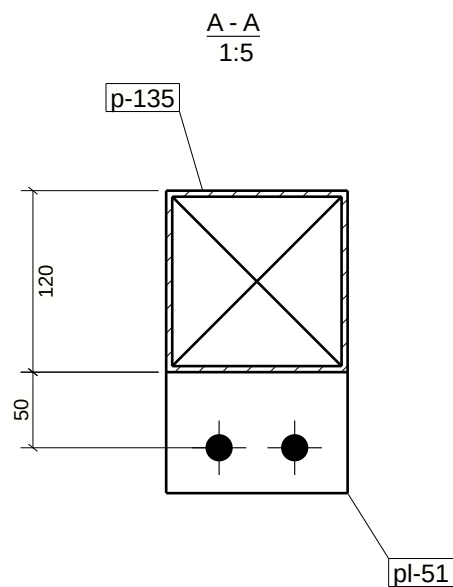
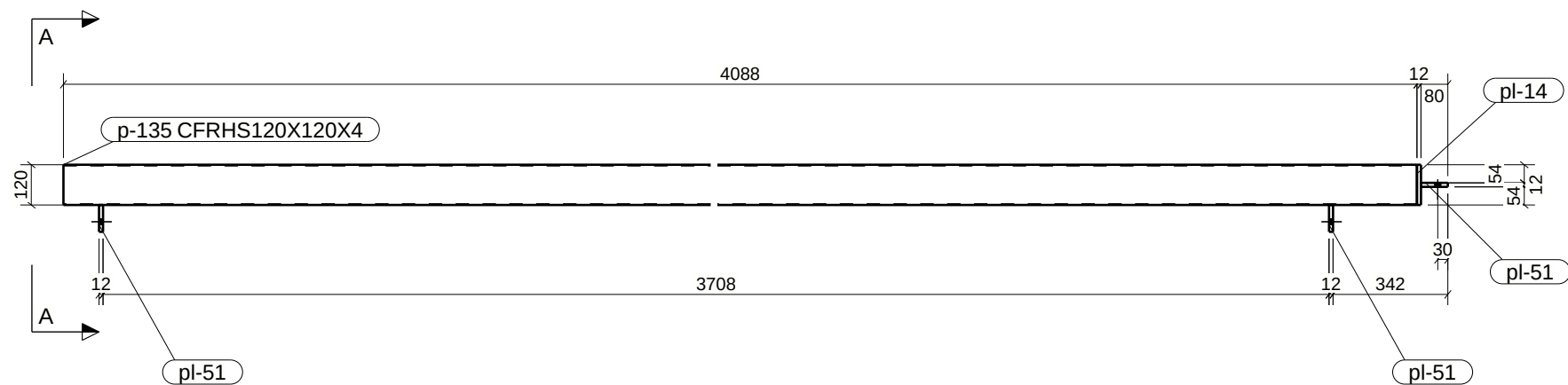
Zymuo				
Profilis				
Ilgis				
Kiekis				
Svoris				
p-130	CFRHS120X120X5	1500	1	26.3
p-132	CFRHS120X120X5	1903	1	33.4
p-326	CFRHS120X120X5	2168	2	38.0
pl-123	PL5*120	120	1	0.6
pl-124	PL12*220	300	3	6.2
Viso:				155.0



RR-30 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-133	CFRHS100X100X5	4430	1	63.8
pl-52	PL12*80	110	4	0.8
pl-99	PL10*180	200	2	2.8
Viso:				72.8

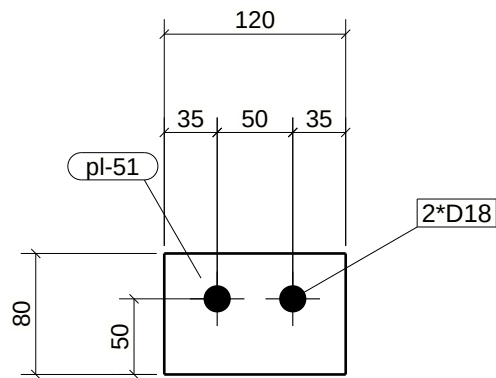
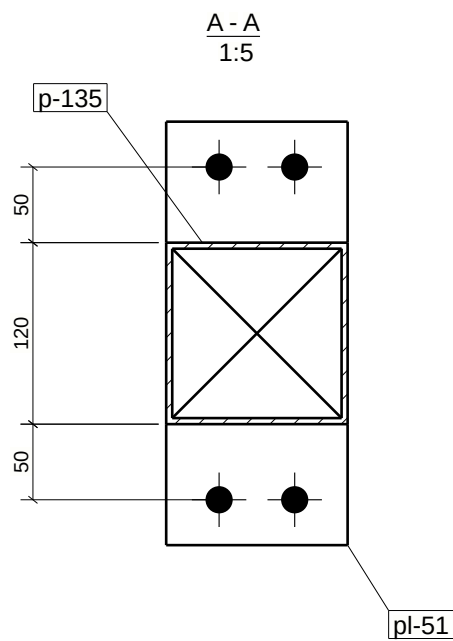
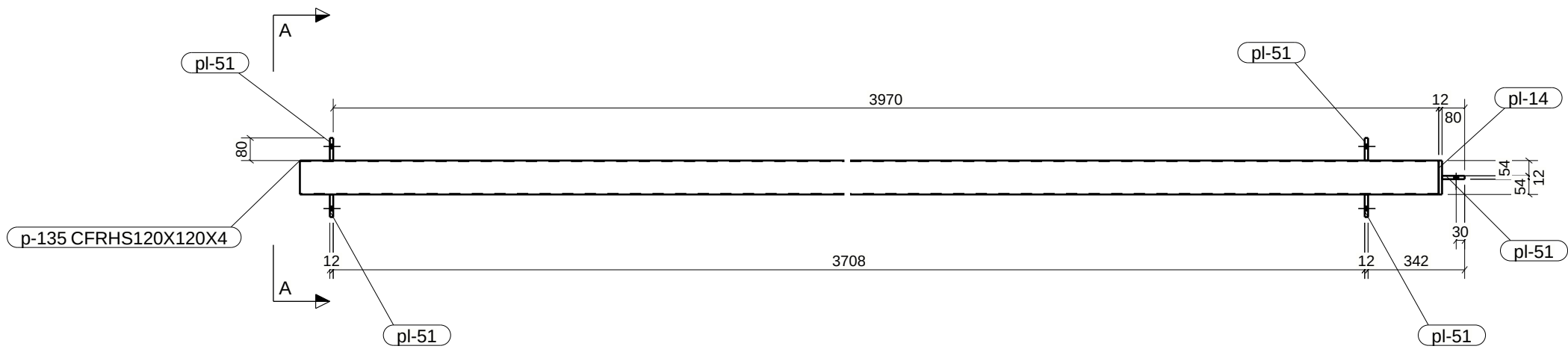
PHASE	QUANTITY
103	1



RR-31 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-135	CFRHS120X120X4	4088	1	58.2
pl-14	PL12*120	120	1	1.4
pl-51	PL12*120	80	3	0.9
			Viso:	62.3

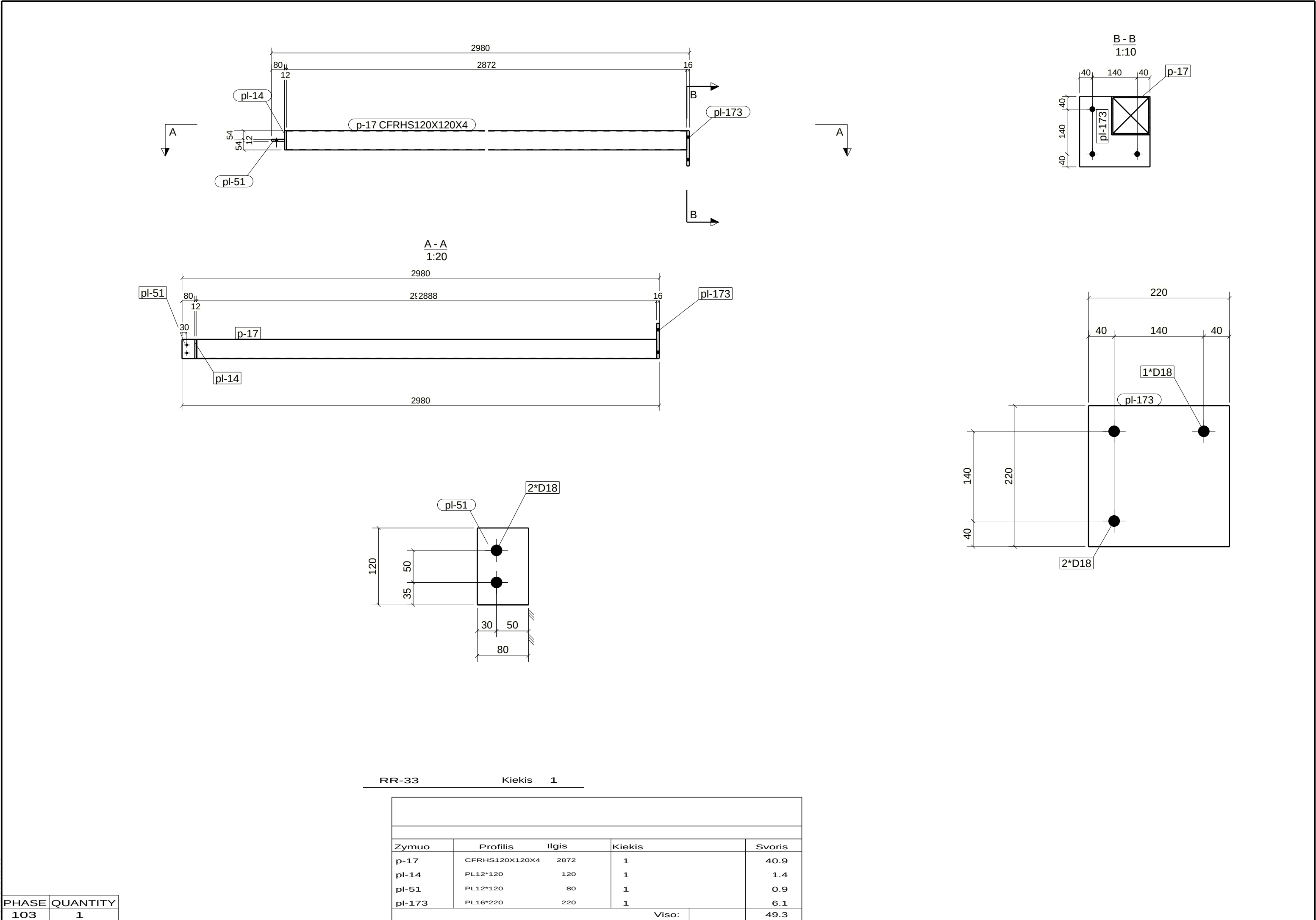
PHASE	QUANTITY
103	1



RR-32 Kiekis 1

PHASE	QUANTITY
103	1

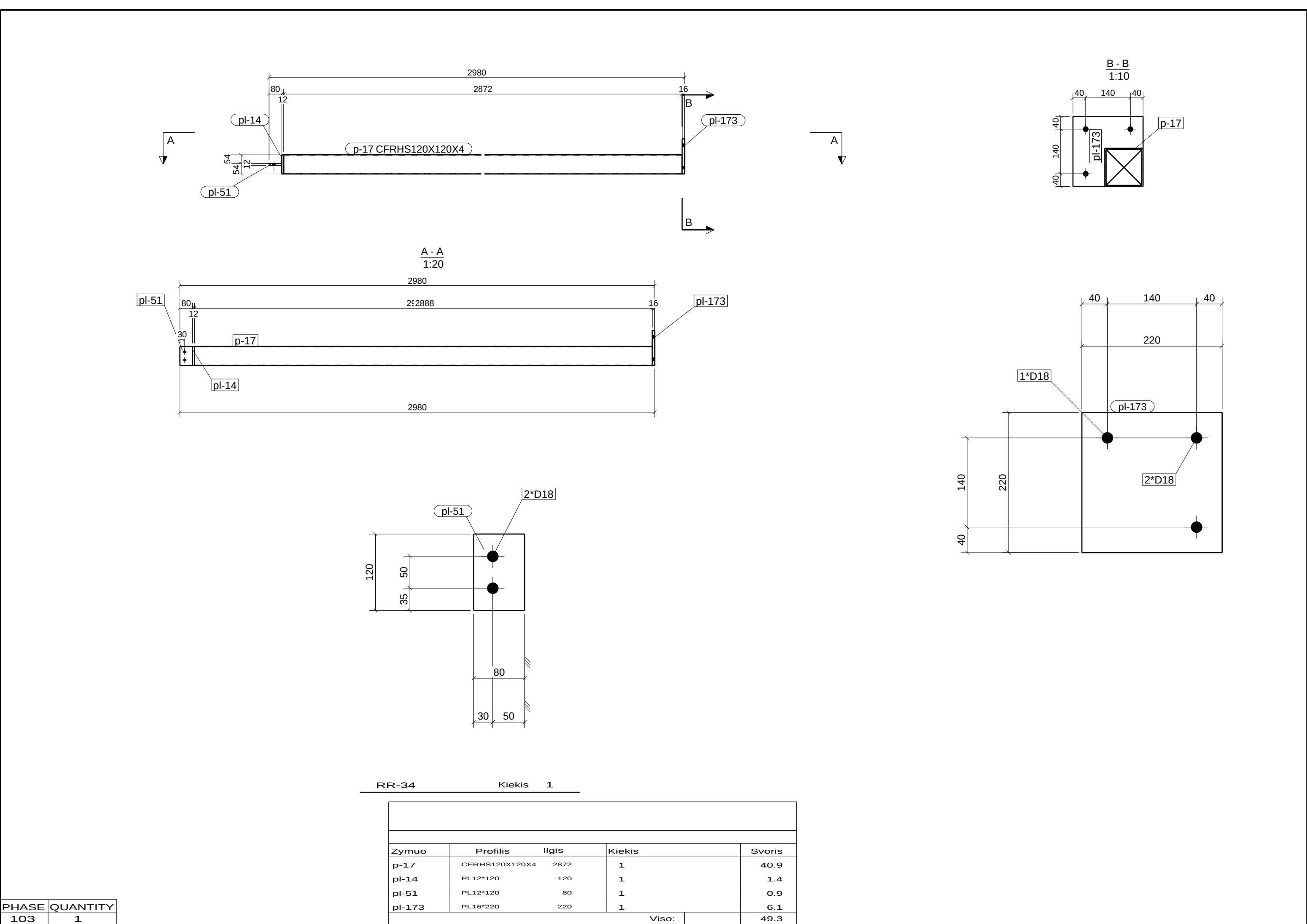
Zymuo	Profilis	Ilgis	Kiekis	
p-135	CFRHS120X120X4	4088	1	
pl-14	PL12*120	120	1	
pl-51	PL12*120	80	5	
			Viso:	64.1



RR-33 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-17	CFRHS120X120X4	2872	1	40.9
pl-14	PL12*120	120	1	1.4
pl-51	PL12*120	80	1	0.9
pl-173	PL16*220	220	1	6.1
			Viso:	49.3

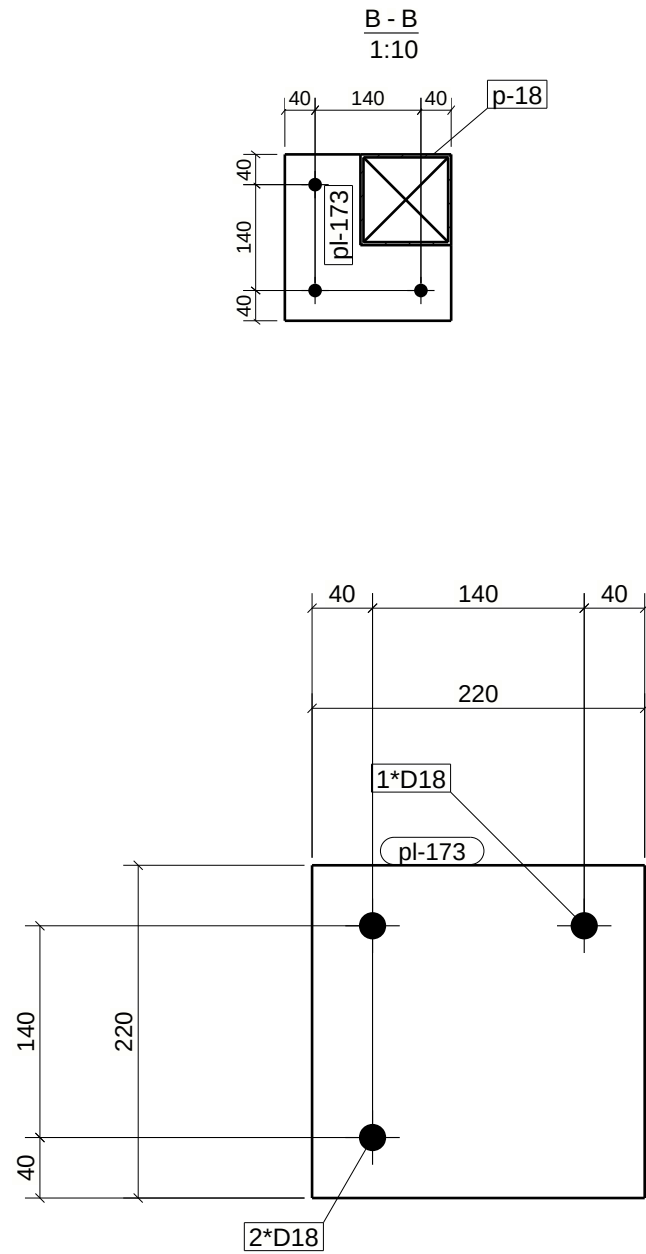
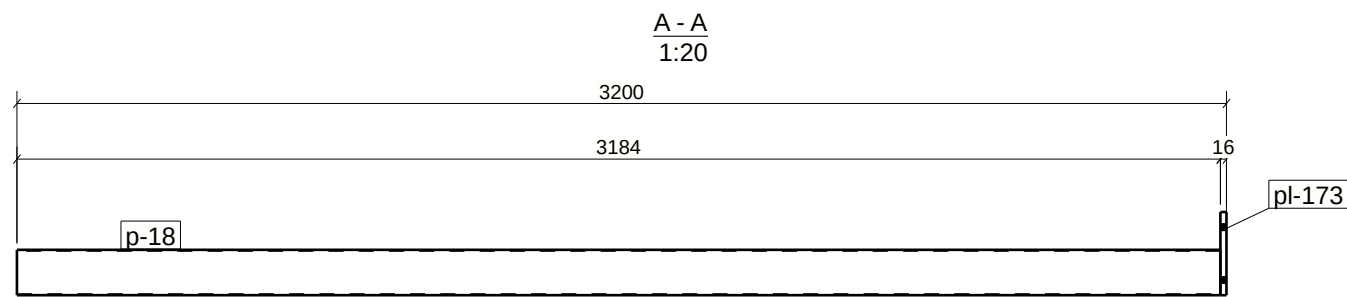
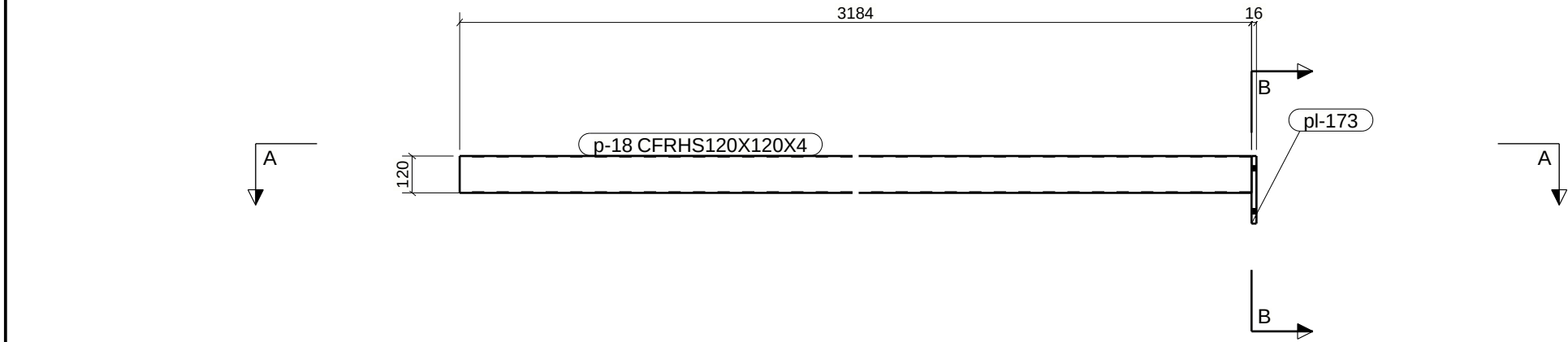
PHASE	QUANTITY
103	1



RR-34 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-17	CFRHS120X120X4	2872	1	40.9
pl-14	PL12*120	120	1	1.4
pl-51	PL12*120	80	1	0.9
pl-173	PL16*220	220	1	6.1
			Viso:	49.3

PHASE	QUANTITY
103	1

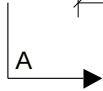
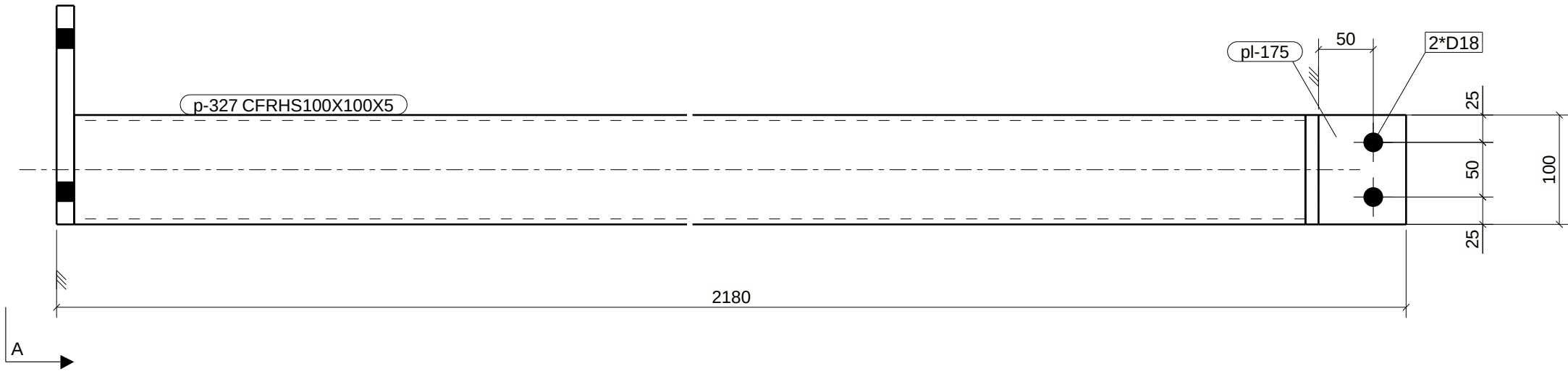
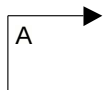
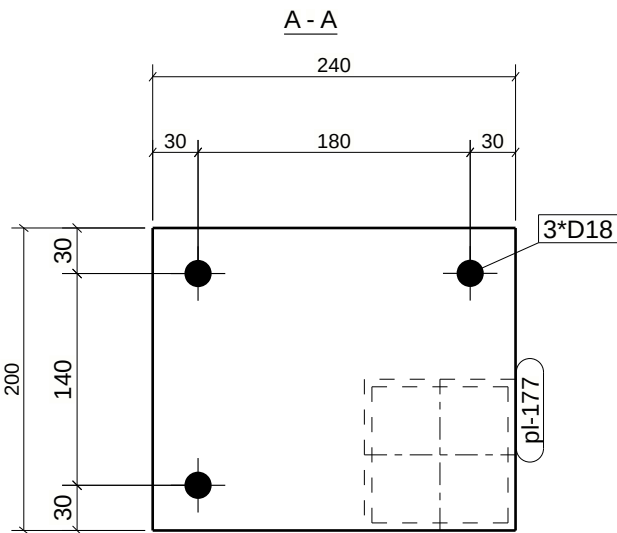
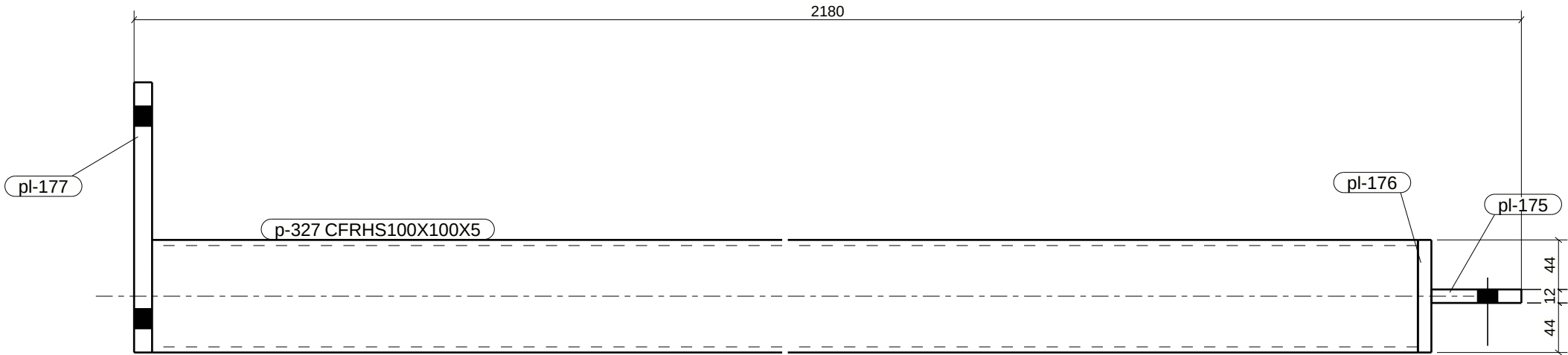


RR-35 Kiekis 1

PHASE	QUANTITY
103	1

Zymuo				
Profilis				
Ilgis				
Kiekis				
Svoris				
p-18	CFRHS120X120X4	3184	1	45.4
pl-173	PL16*220	220	1	6.1
Viso:				51.4

GRID LOCATION	
RR-39	11-12/A

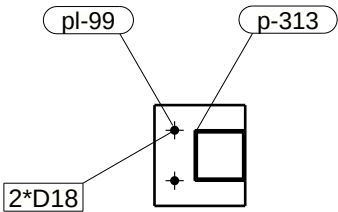
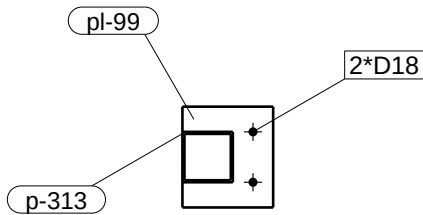
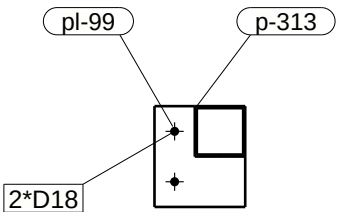
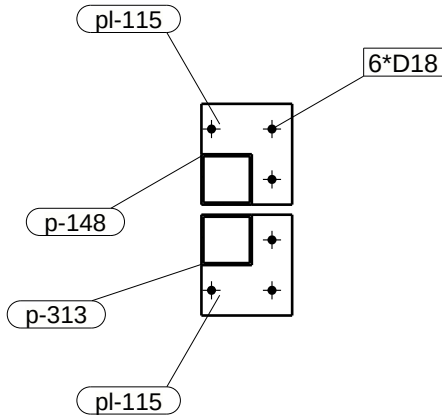
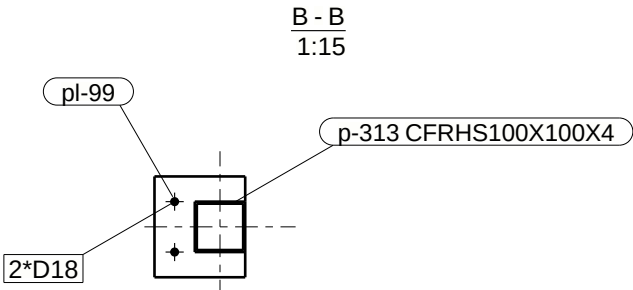
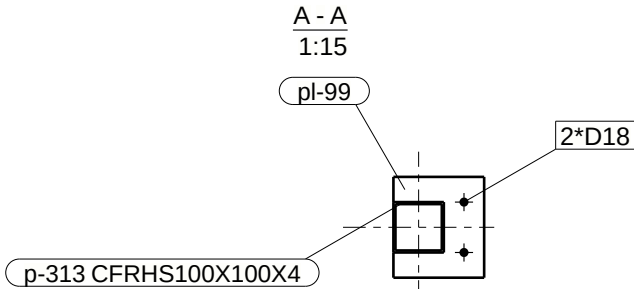
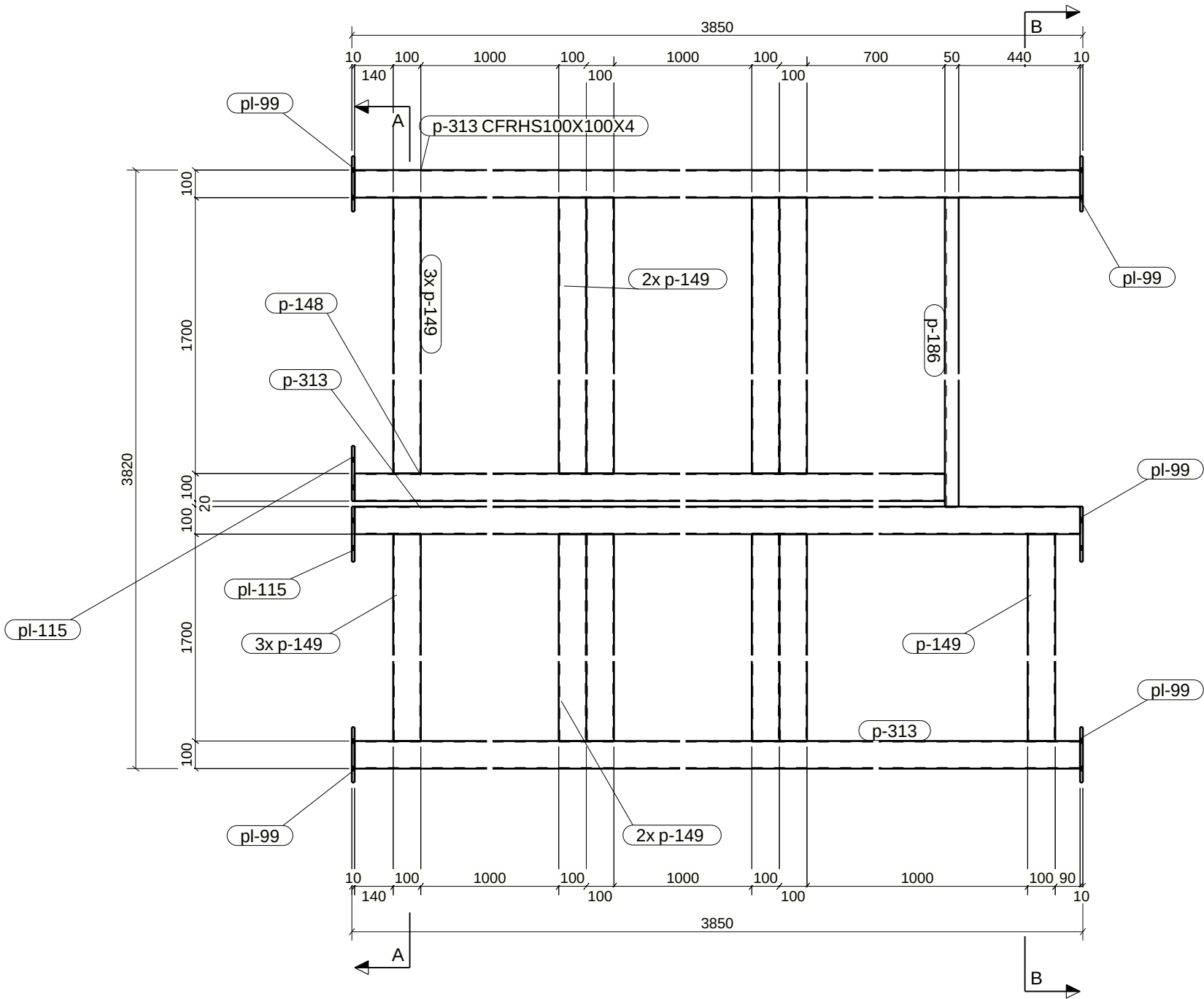


RR-39 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-327	CFRHS100X100X5	2072	1	29.9
pl-175	PL12*100	80	1	0.8
pl-176	PL12*100	100	1	0.9
pl-177	PL16*240	200	1	6.0
			Viso:	37.6

PHASE	QUANTITY
103	1

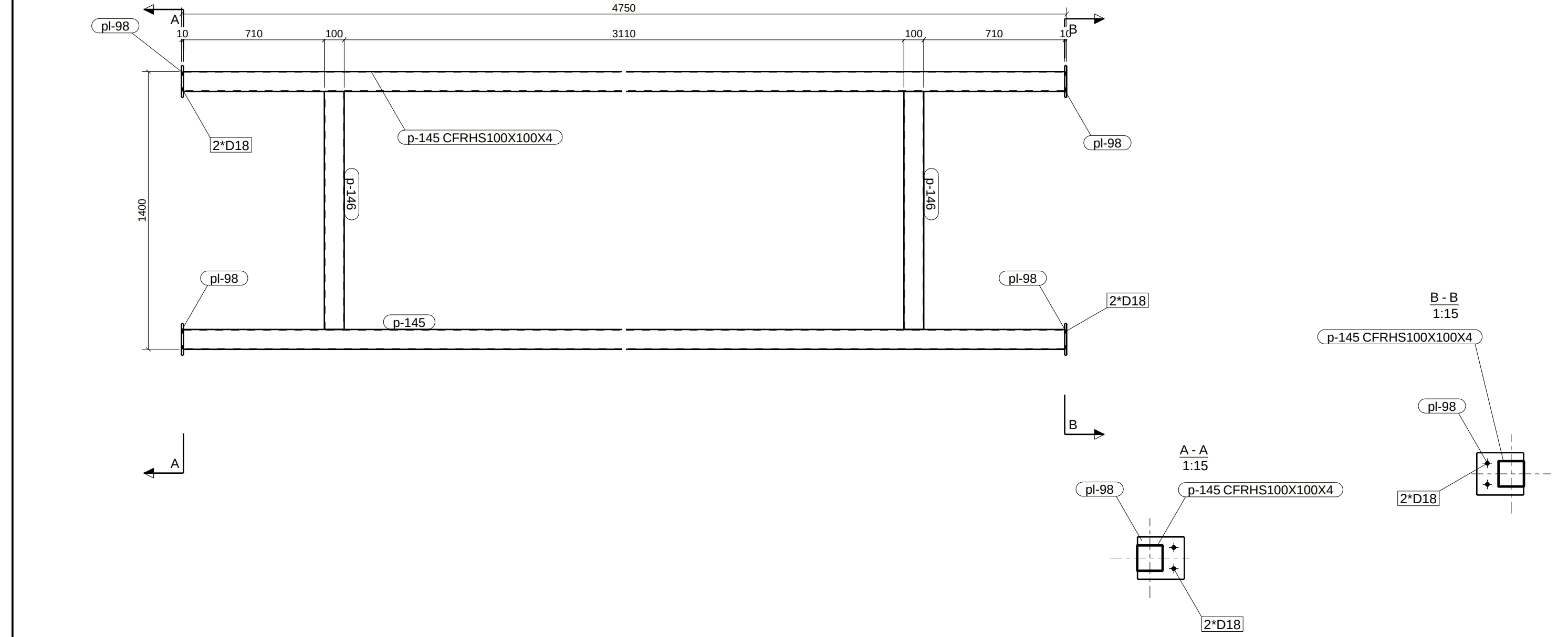
PHASE	QUANTITY
137	1



PASTABOS:
1. Kiaurymiu vietas plokštelese tikslinti po to, kai iš gamyklos bus gauti GB kolonu armavimo brėžiniai.

RR-40 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-148	CFRHS100X100X4	3340	1	39.2
p-149	CFRHS100X100X4	1700	11	19.9
p-186	UPN100	1820	1	19.3
p-313	CFRHS100X100X4	3830	3	44.9
pl-99	PL10*180	200	5	2.8
pl-115	PL10*180	200	2	2.8
Viso:				432.5

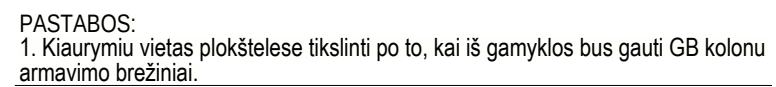


PASTABOS:
1. Kiaurymiu vietas plokštelese tikslinti po to, kai iš gamyklos bus gauti GB kolonu armavimo brėžiniai.

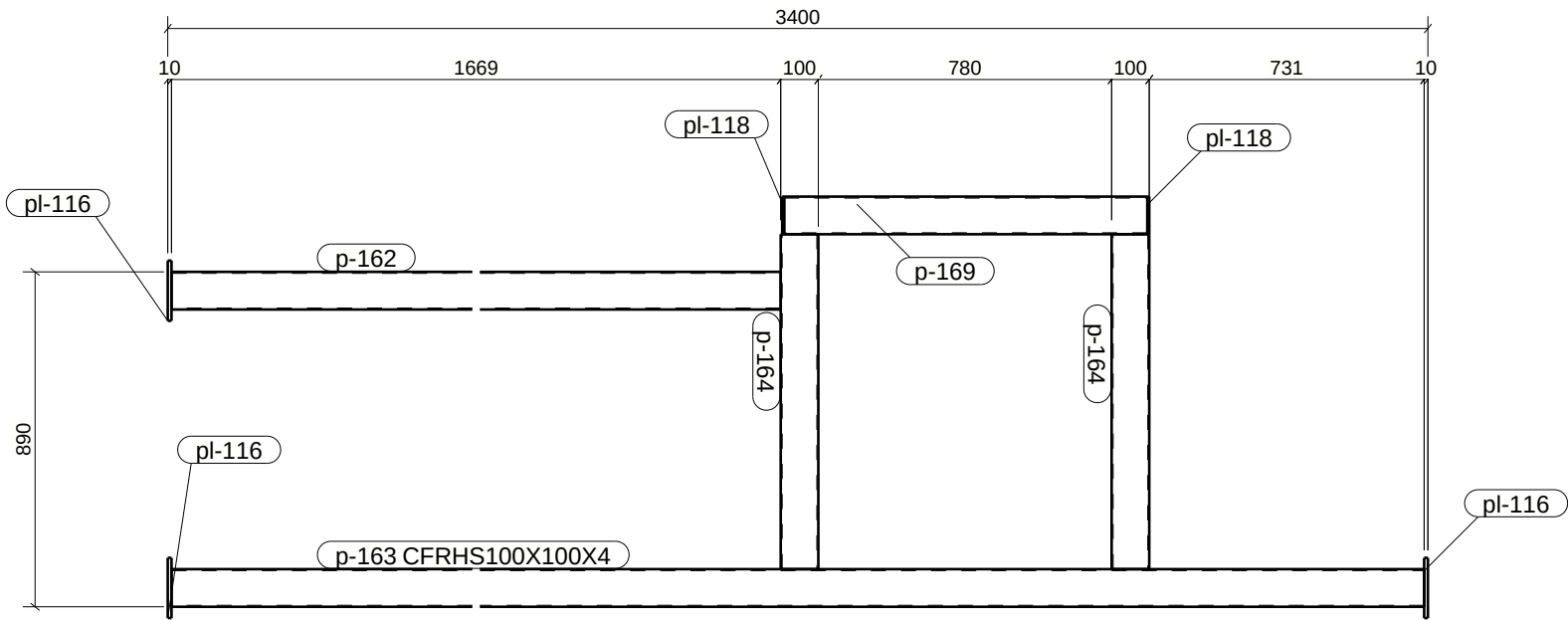
RR-41 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-145	CFRHS100X100X4	4730	2	55.5
p-146	CFRHS100X100X4	1200	2	14.1
pl-98	PL10*177	160	4	2.2
Viso:				148.1

PHASE	QUANTITY
137	1



Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-151	CFRHS100X100X4	700	2	8.2
p-166	CFRHS100X100X4	4380	1	51.4
p-167	CFRHS100X100X4	941	1	11.0
p-168	CFRHS100X100X4	3439	1	40.4
pl-116	PL10*200	160	2	2.5
pl-117	PL10*200	180	1	2.8
pl-118	PL5*100	100	2	0.4
			Viso:	127.9

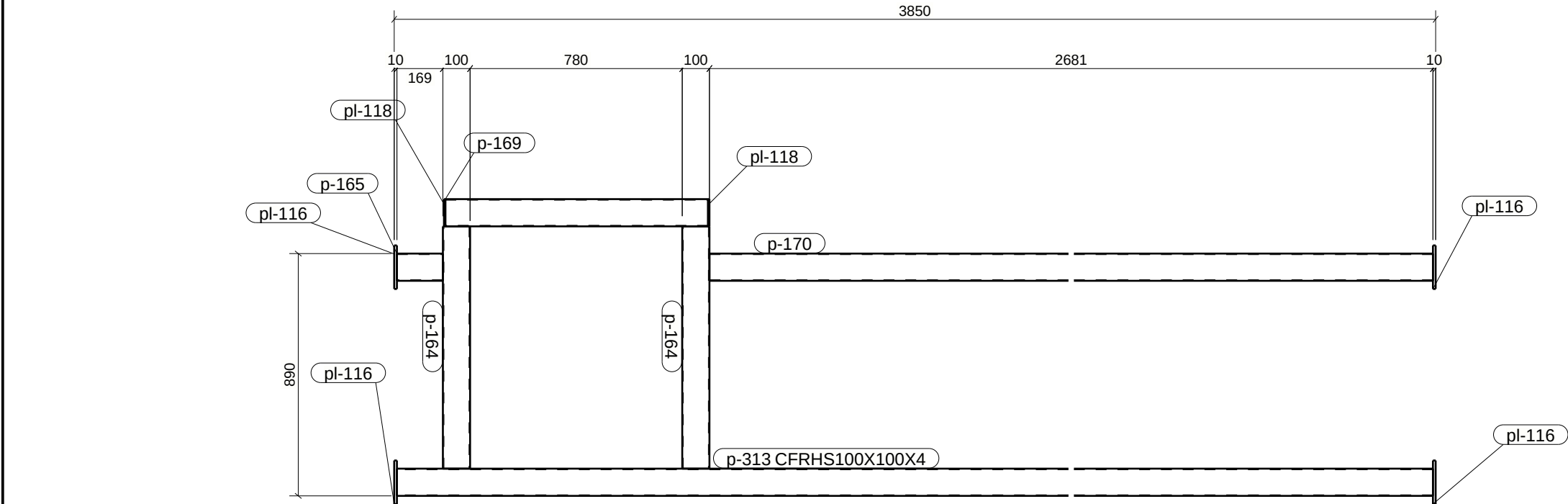


PASTABOS:
1. Kiaurymiu vietas plokštelese tikslinti po to, kai iš gamyklos bus gauti GB kolonu armavimo brėžiniai.

RR-43 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-162	CFRHS100X100X4	1669	1	19.6
p-163	CFRHS100X100X4	3380	1	39.7
p-164	CFRHS100X100X4	890	2	10.4
p-169	CFRHS100X100X4	966	1	11.3
pl-116	PL10*200	160	3	2.5
pl-118	PL5*100	100	2	0.4
			Viso:	99.8

PHASE	QUANTITY
137	1

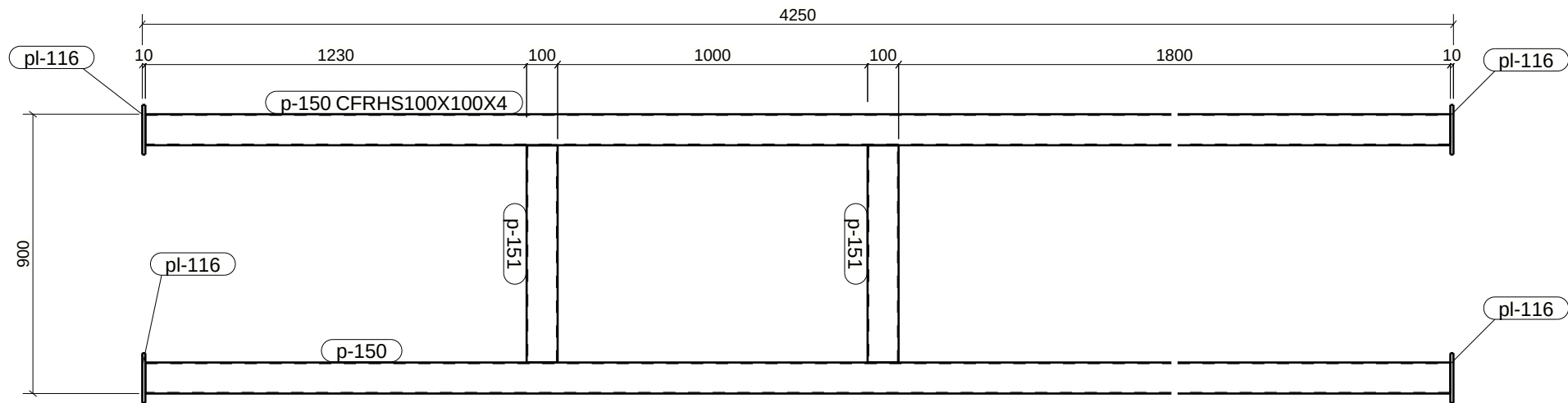


PASTABOS:
1. Kiaurymiu vietas plokštelese tikslinti po to, kai iš gamyklos bus gauti GB kolonu armavimo brėžiniai.

RR-44 Kiekis 1

PHASE	QUANTITY
137	1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-164	CFRHS100X100X4	890	2	10.4
p-165	CFRHS100X100X4	169	1	2.0
p-169	CFRHS100X100X4	966	1	11.3
p-170	CFRHS100X100X4	2681	1	31.5
p-313	CFRHS100X100X4	3830	1	44.9
pl-116	PL10*200	160	4	2.5
pl-118	PL5*100	100	2	0.4
			Viso:	121.4

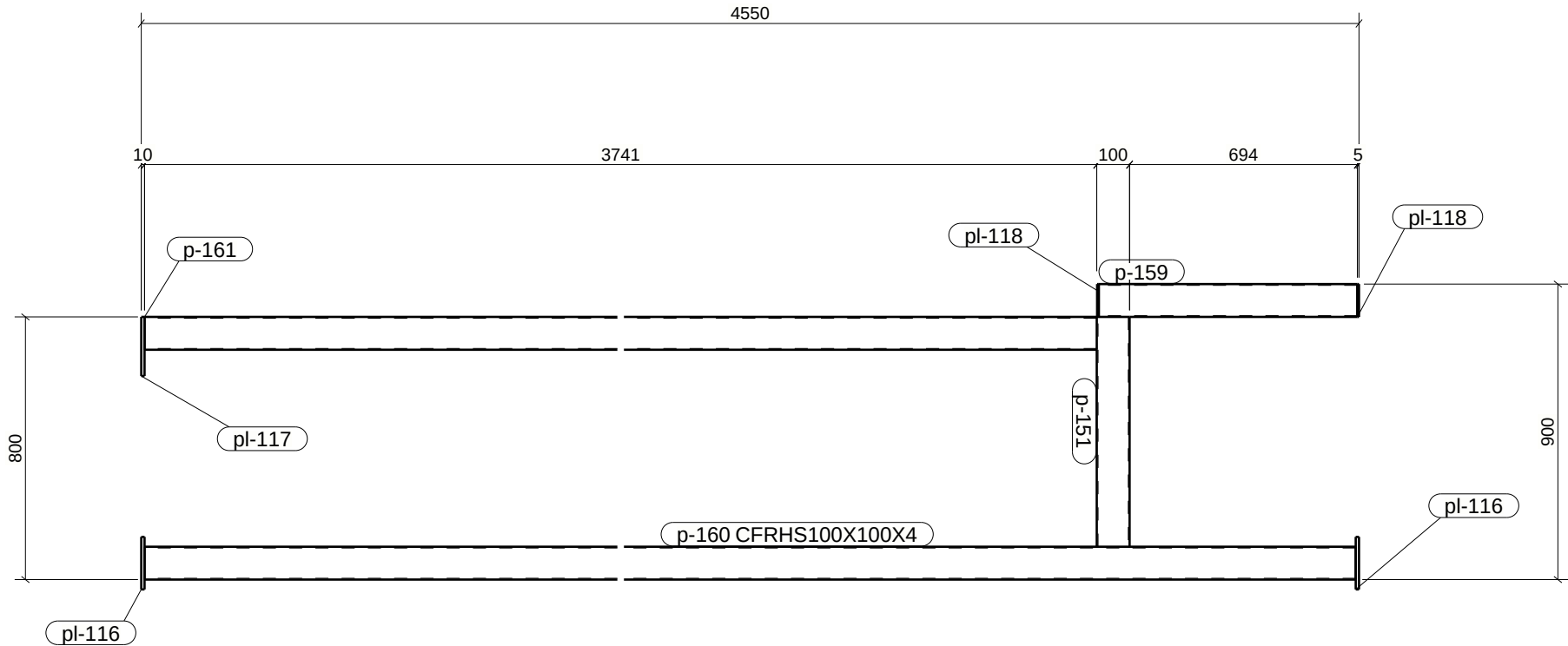


PASTABOS:
1. Kiaurymiu vietas plokštelese tikslinti po to, kai iš gamyklos bus gauti GB kolonu armavimo brėžiniai.

RR-45 Kiekis 1

PHASE	QUANTITY
137	1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-150	CFRHS100X100X4	4230	2	49.6
p-151	CFRHS100X100X4	700	2	8.2
pl-116	PL10*200	160	4	2.5
			Viso:	125.7

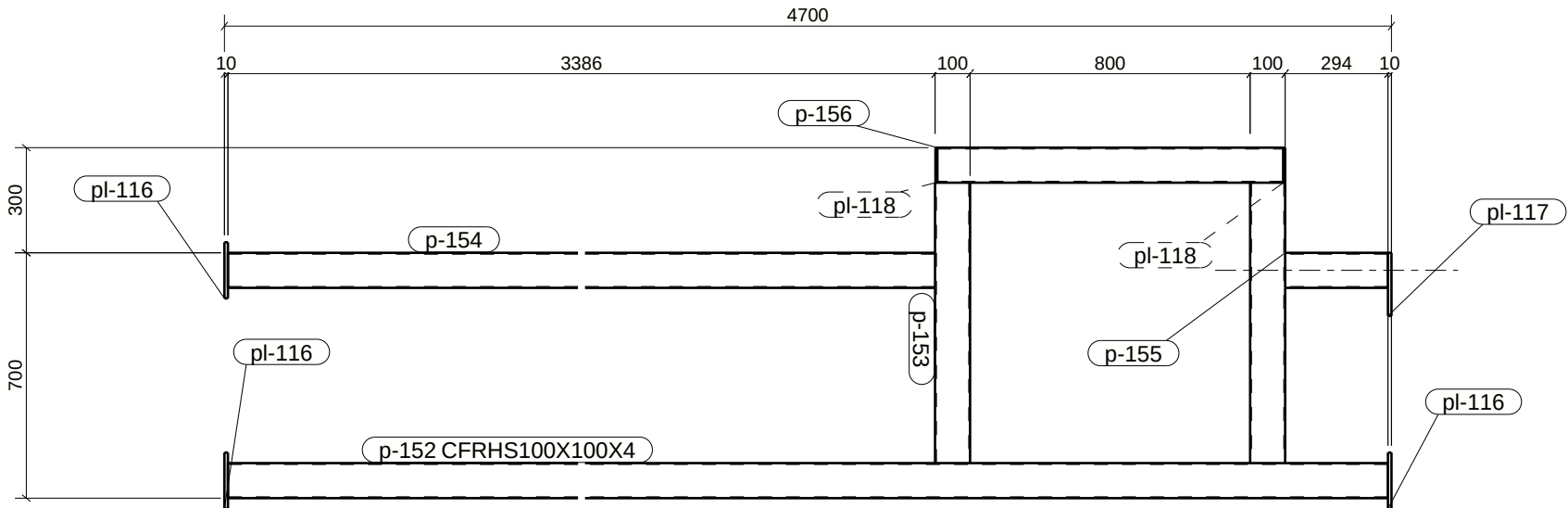


PASTABOS:
1. Kiaurymiu vietas plokštelese tikslinti po to, kai iš gamyklos bus gauti GB kolonu armavimo brėžiniai.

RR-46 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-151	CFRHS100X100X4	700	1	8.2
p-159	CFRHS100X100X4	788	1	9.2
p-160	CFRHS100X100X4	4530	1	53.2
p-161	CFRHS100X100X4	3741	1	43.9
pl-116	PL10*200	160	2	2.5
pl-117	PL10*200	180	1	2.8
pl-118	PL5*100	100	2	0.4
			Viso:	123.1

PHASE	QUANTITY
137	1

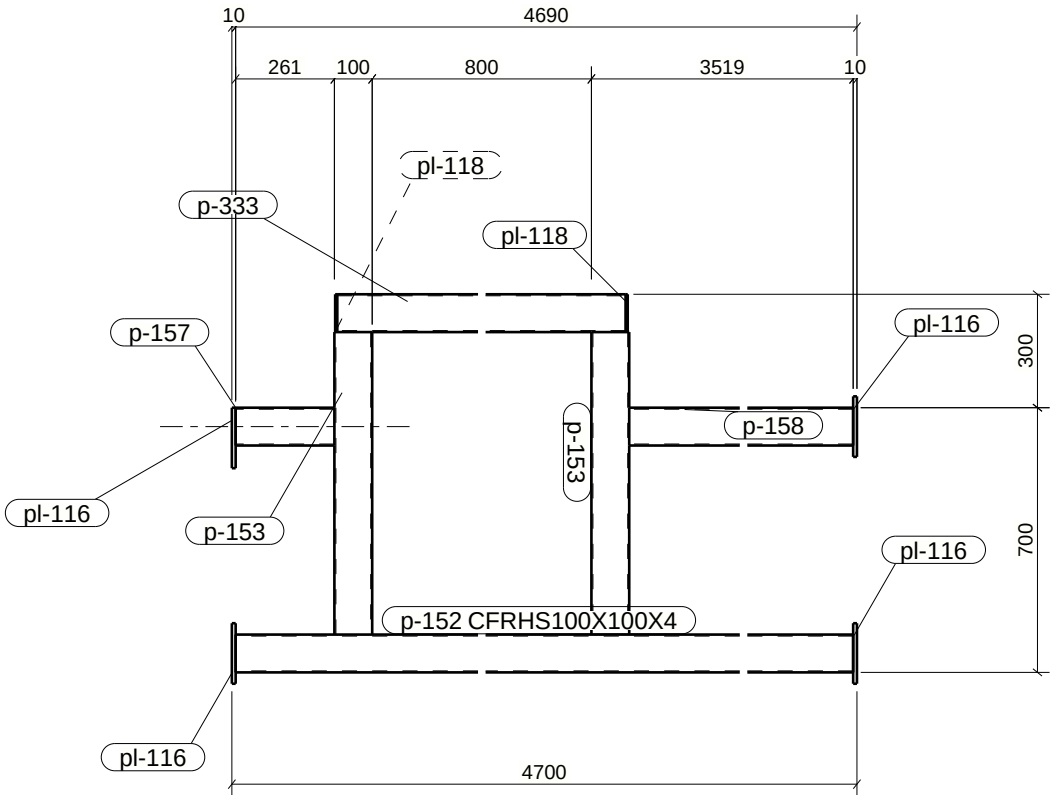


PASTABOS:
1. Kiaurymiu vietas plokštelese tikslinti po to, kai iš gamyklos bus gauti GB kolonu armavimo brėžiniai.

RR-47 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-152	CFRHS100X100X4	4680	1	54.9
p-153	CFRHS100X100X4	800	2	9.4
p-154	CFRHS100X100X4	3386	1	39.7
p-155	CFRHS100X100X4	294	1	3.4
p-156	CFRHS100X100X4	989	1	11.6
pl-116	PL10*200	160	3	2.5
pl-117	PL10*200	180	1	2.8
pl-118	PL5*100	100	2	0.4
			Viso:	139.6

PHASE	QUANTITY
137	1

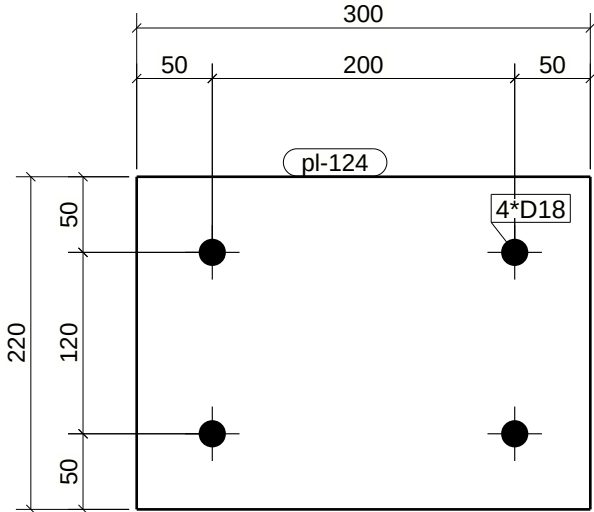
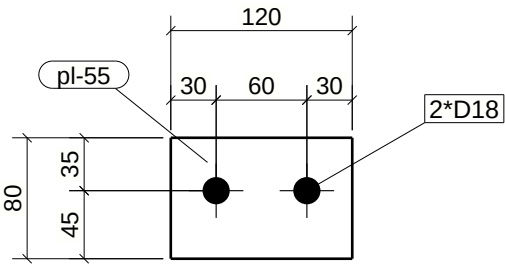
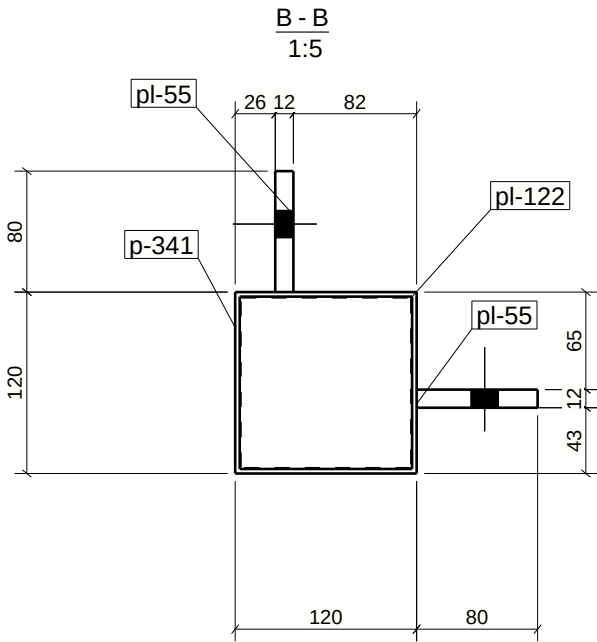
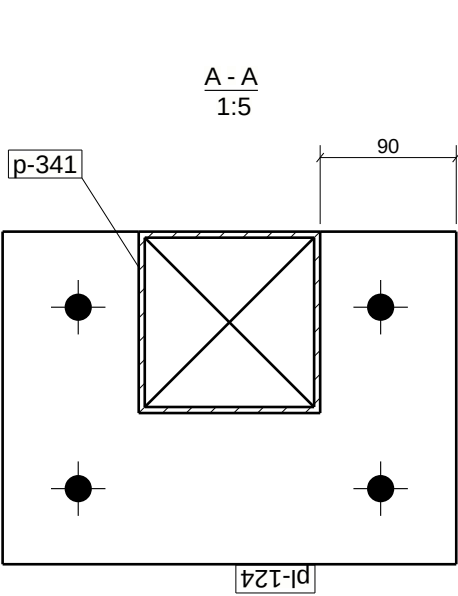
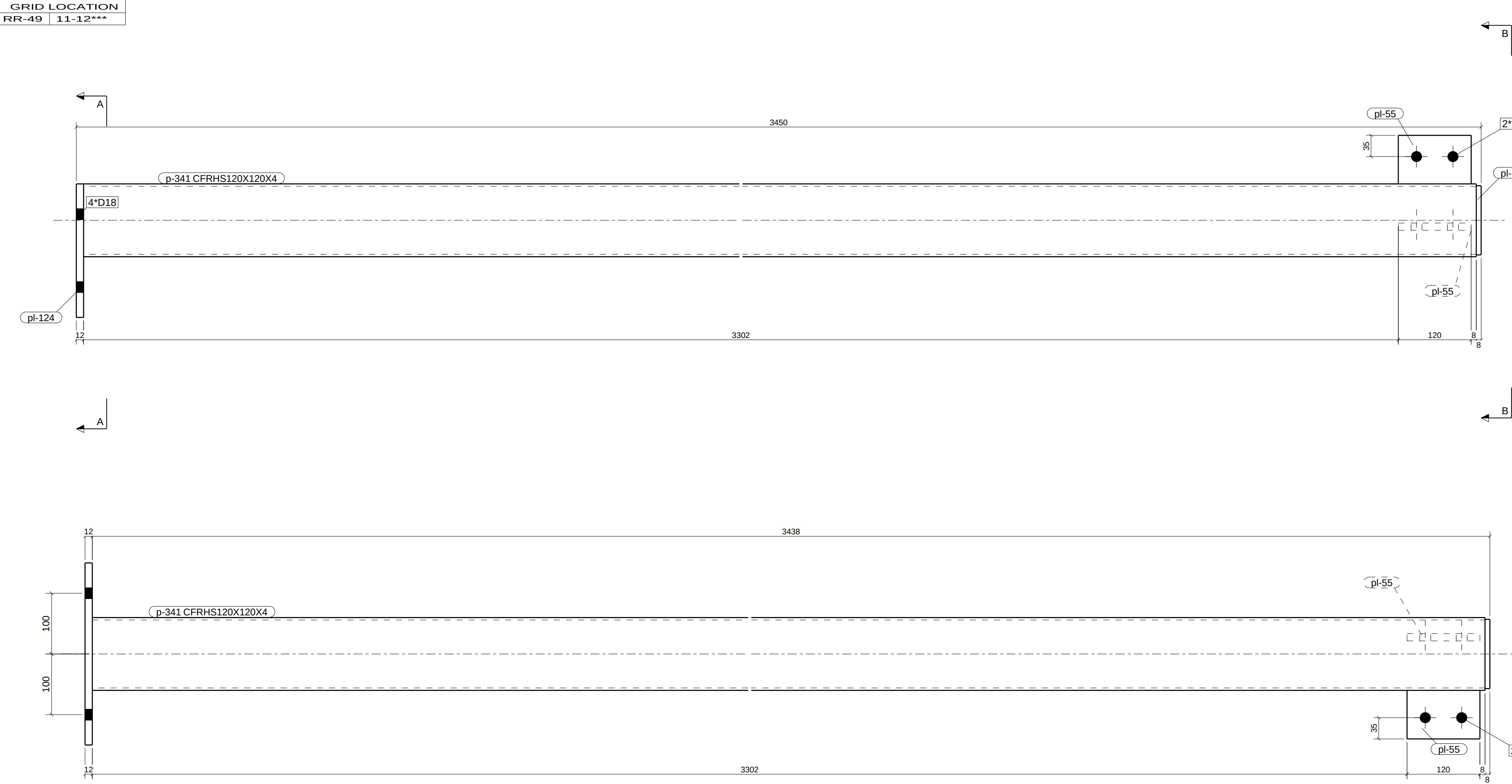


PASTABOS:
1. Kiaurymiu vietas plokštelese tikslinti po to, kai iš gamyklos bus gauti GB kolonų armavimo brėžiniai.

RR-48 Kiekis 1

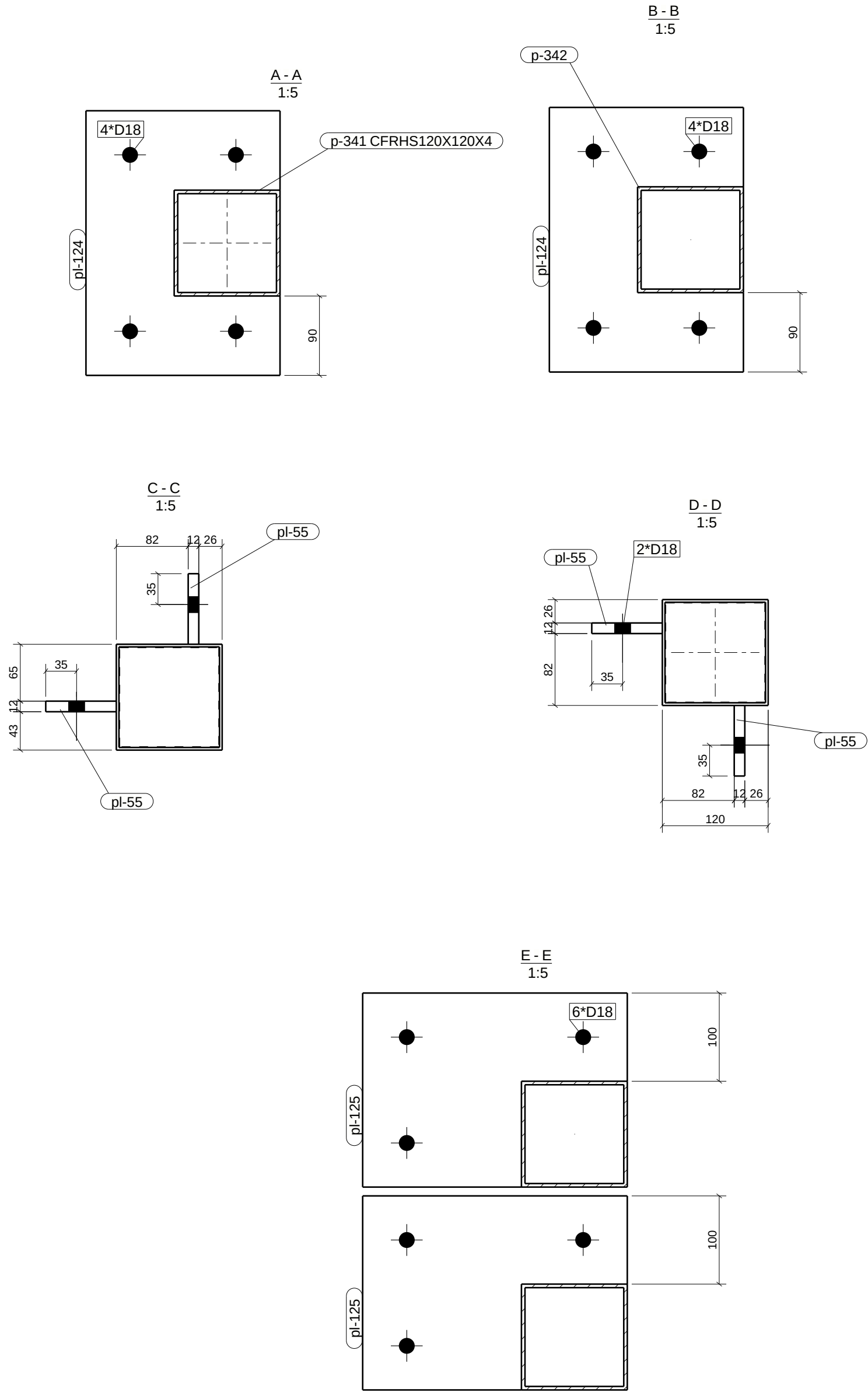
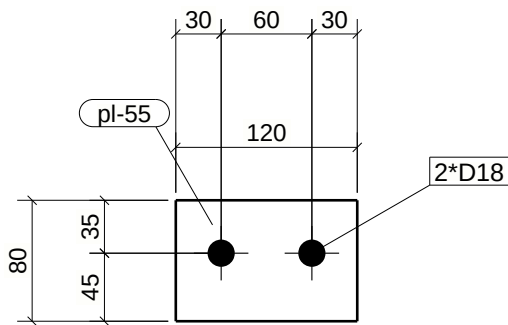
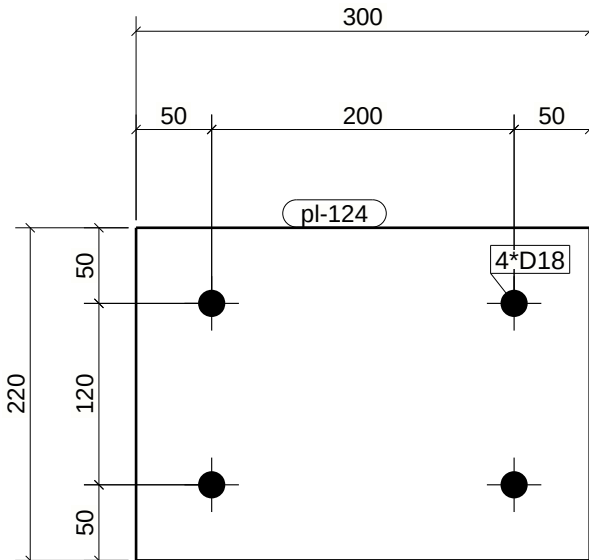
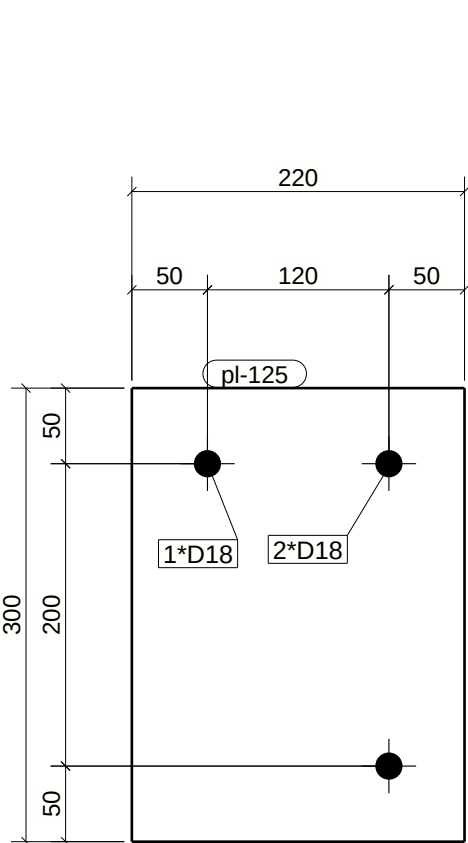
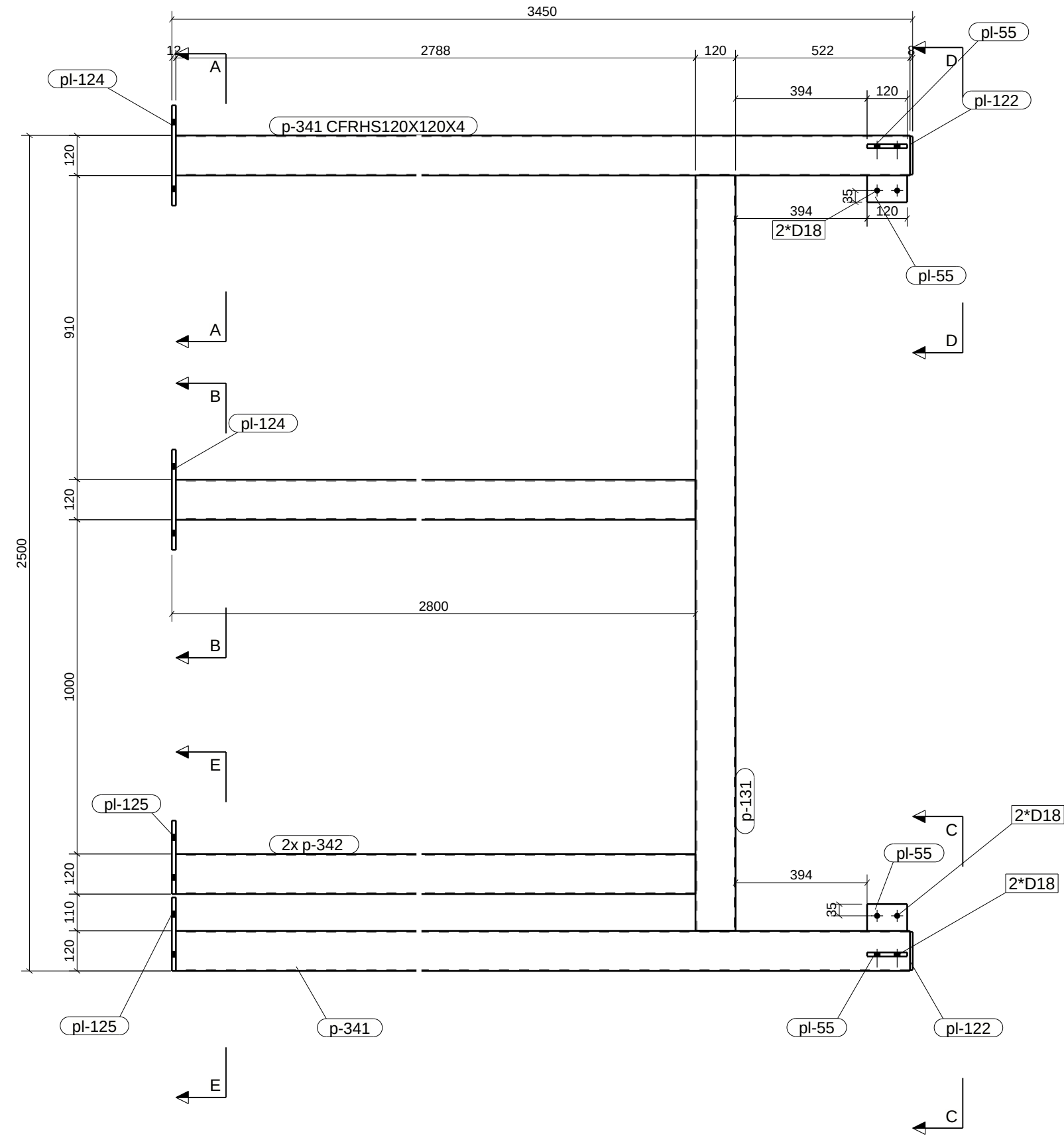
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-152	CFRHS100X100X4	4680	1	54.9
p-153	CFRHS100X100X4	800	2	9.4
p-157	CFRHS100X100X4	261	1	3.1
p-158	CFRHS100X100X4	3419	1	40.1
p-333	CFRHS100X100X4	984	1	11.5
pl-116	PL10*200	160	4	2.5
pl-118	PL5*100	100	2	0.4
			Viso:	139.3

PHASE	QUANTITY
137	1



RR-49 Kiekis 1

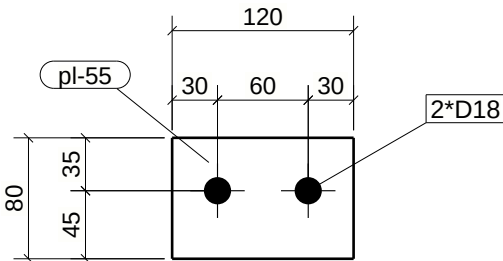
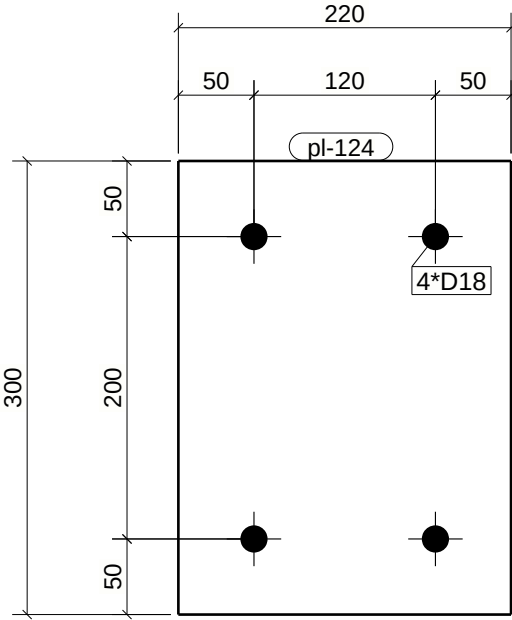
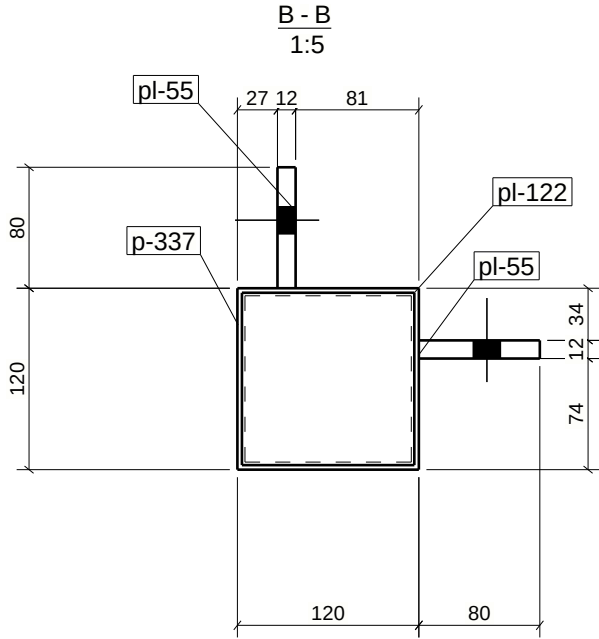
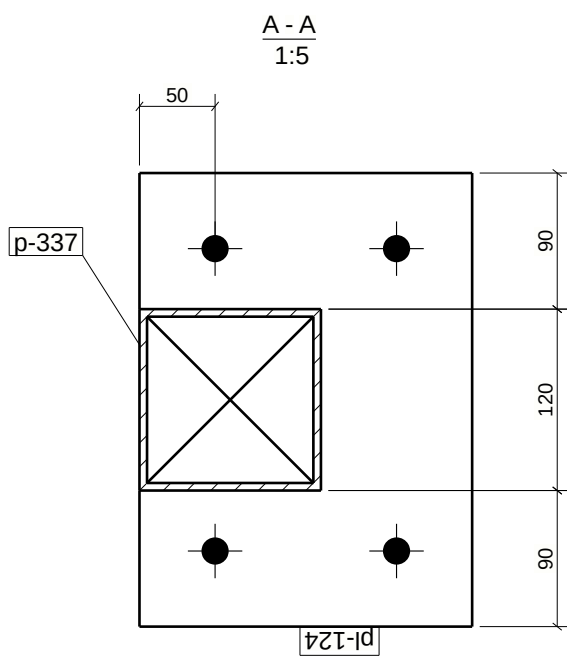
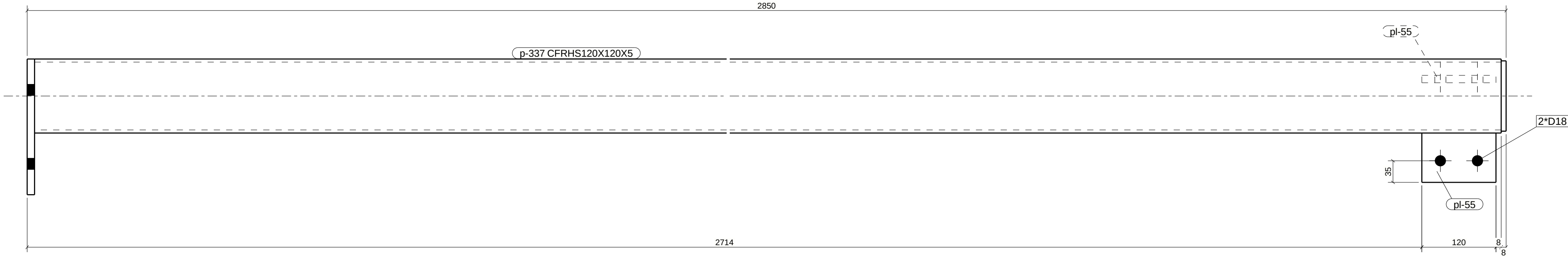
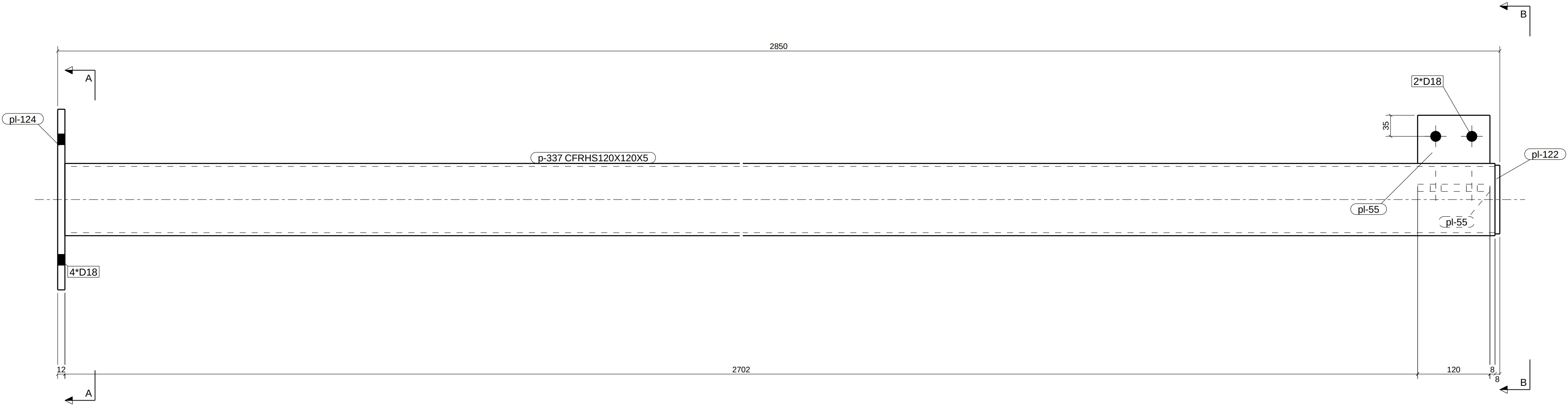
RR-49 Kiekis 1				
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-341	CFRHS120X120X4	3430	1	48.9
pl-55	PL12*80	120	2	0.9
pl-122	PL8*114	114	1	0.8
pl-124	PL12*220	300	1	6.2
			Viso:	57.7



RR-50 Kiekis 1

RR-50 Kiekis 1				
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-131	CFRHS120X120X4	2260	1	32.2
p-341	CFRHS120X120X4	3430	2	48.9
p-342	CFRHS120X120X4	2788	2	39.7
pl-55	PL12*80	120	4	0.9
pl-122	PL8*114	114	2	0.8
pl-124	PL12*220	300	2	6.2
pl-125	PL12*300	220	2	6.2
			Viso:	239.5

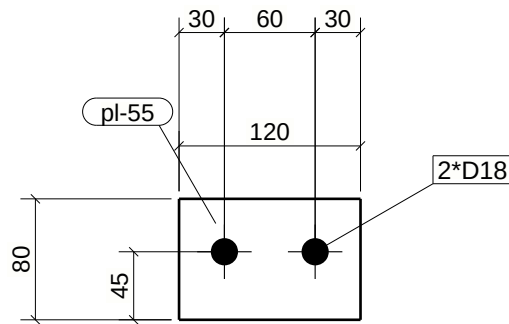
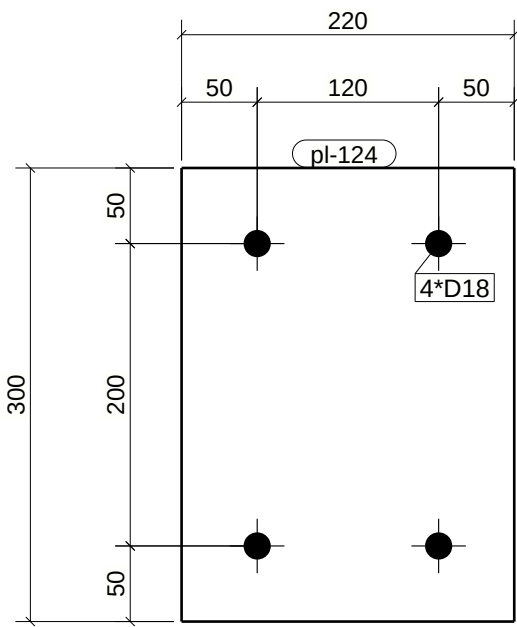
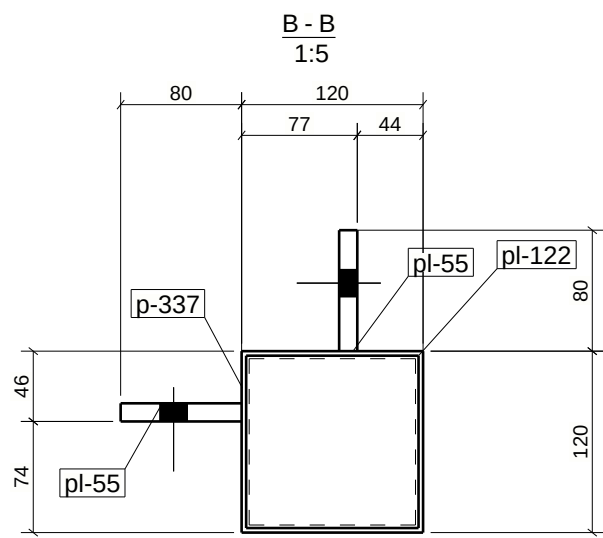
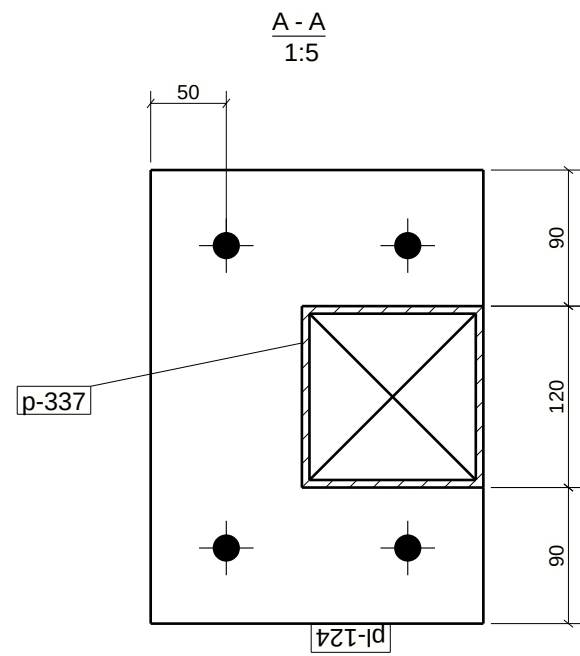
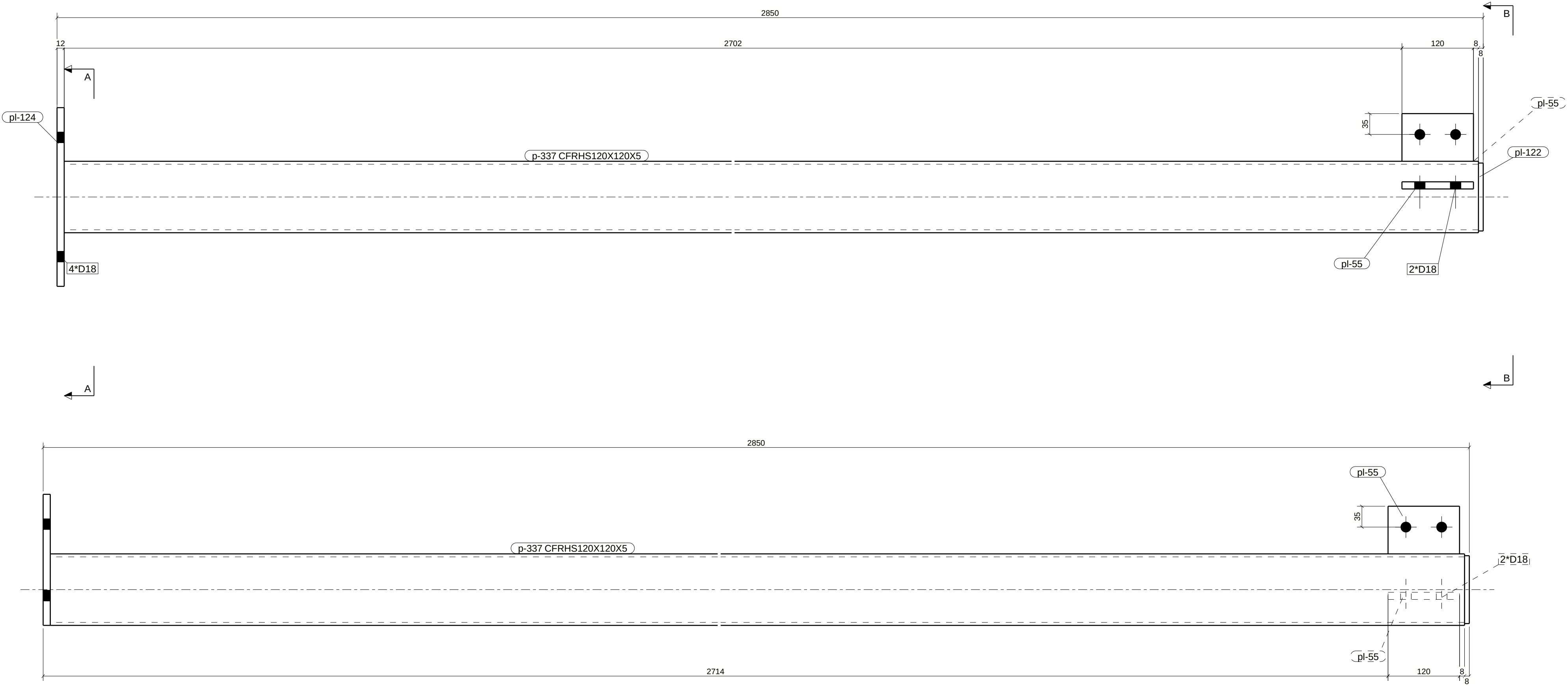
GRID LOCATION	
RR-51	4/C



RR-51 Kiekis 1

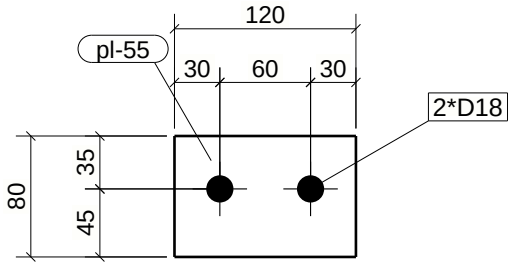
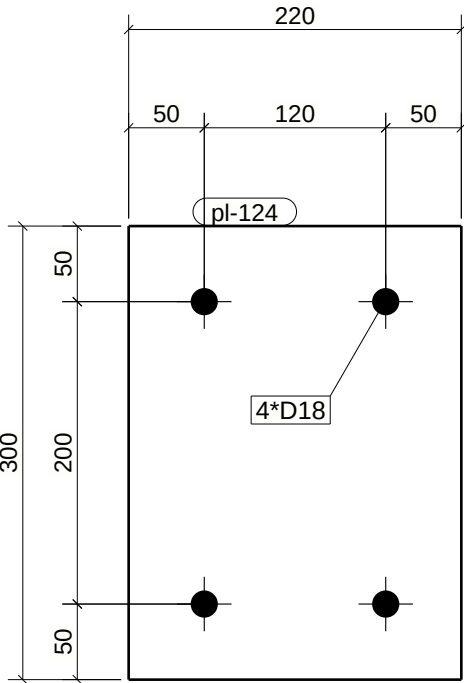
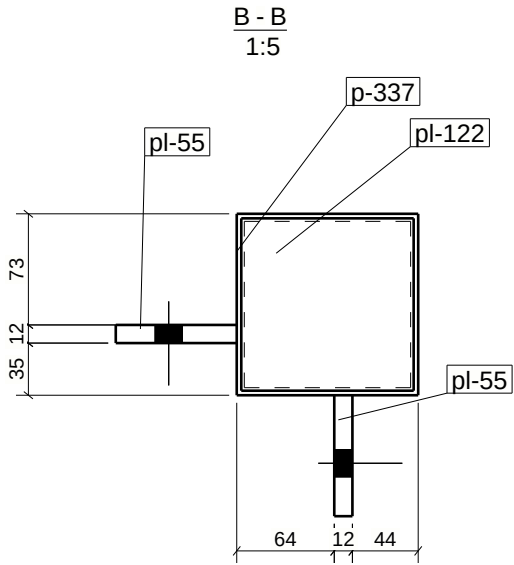
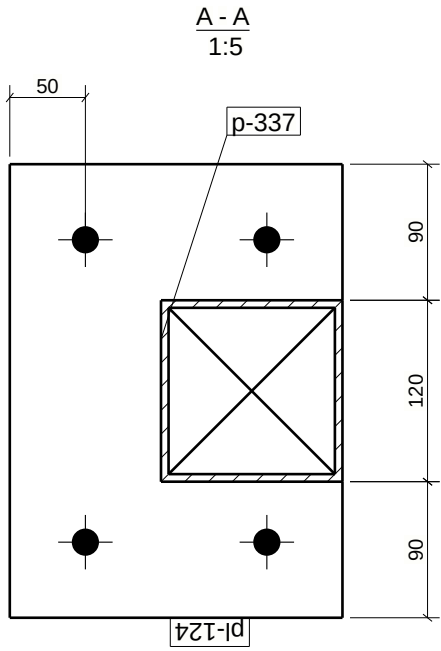
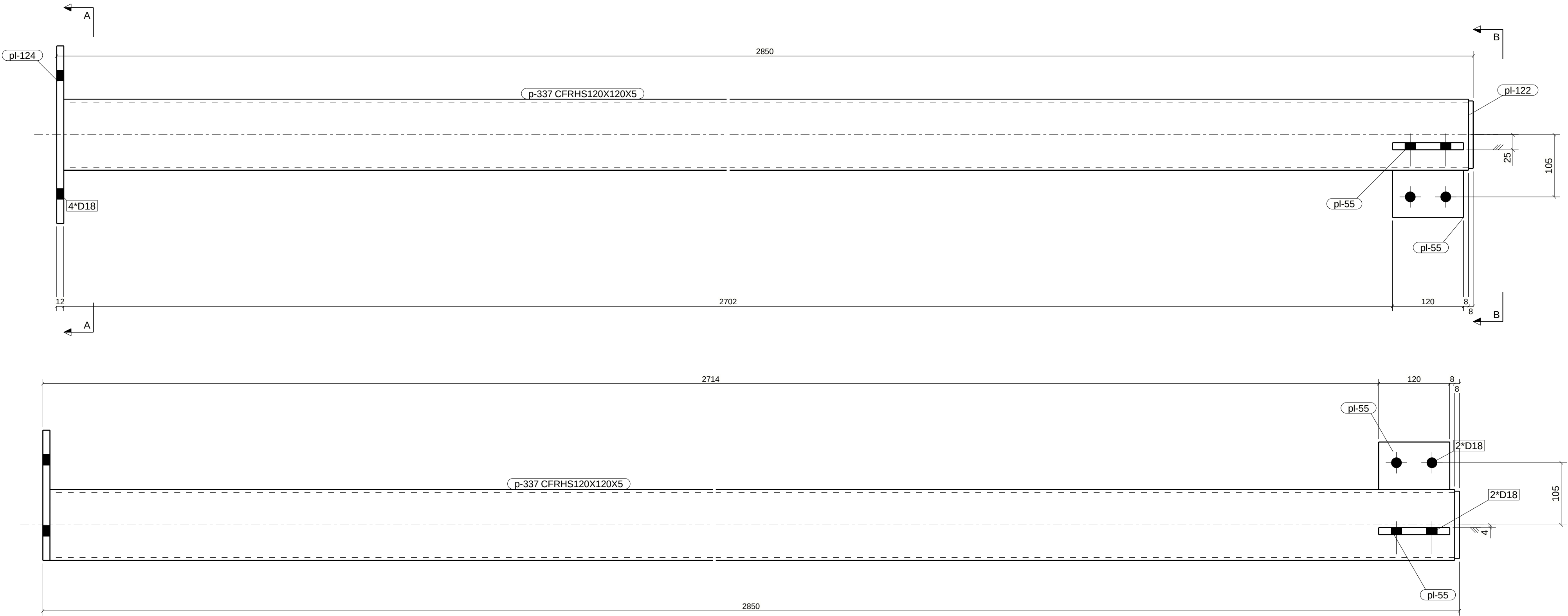
RR-51 Kiekis 1				
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-337	CFRHS120X120X5	2830	1	49.7
pl-55	PL12*80	120	2	0.9
pl-122	PL8*114	114	1	0.8
pl-124	PL12*300	220	1	6.2
			Viso:	58.5

PHASE	QUANTITY
137	1



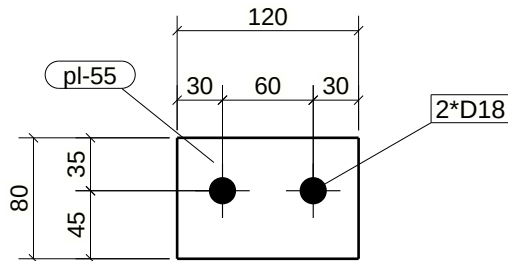
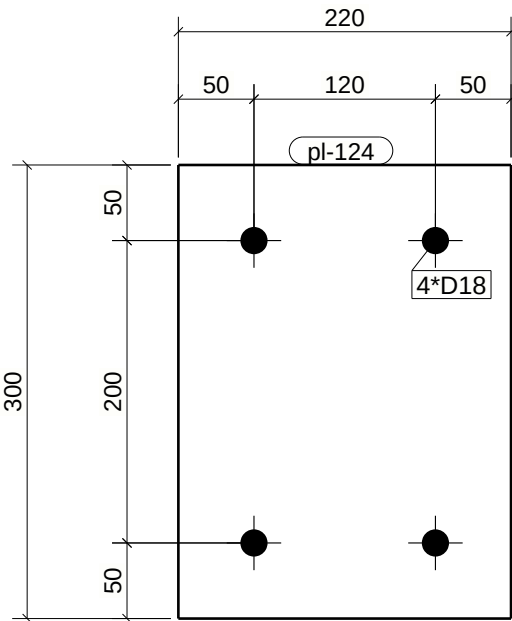
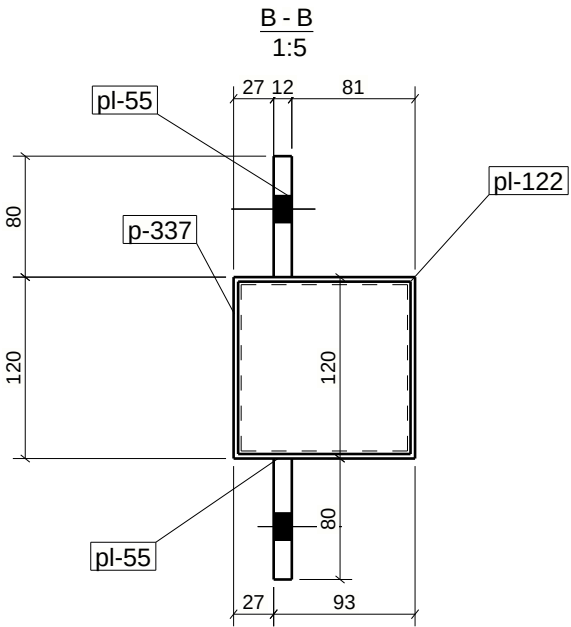
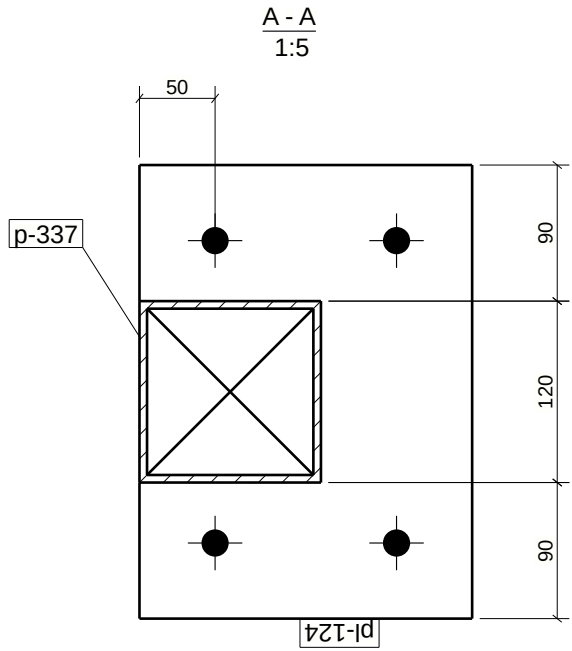
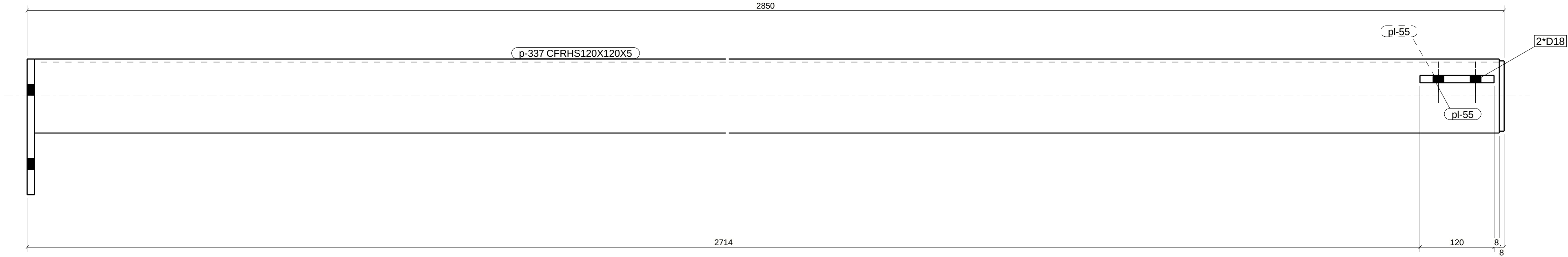
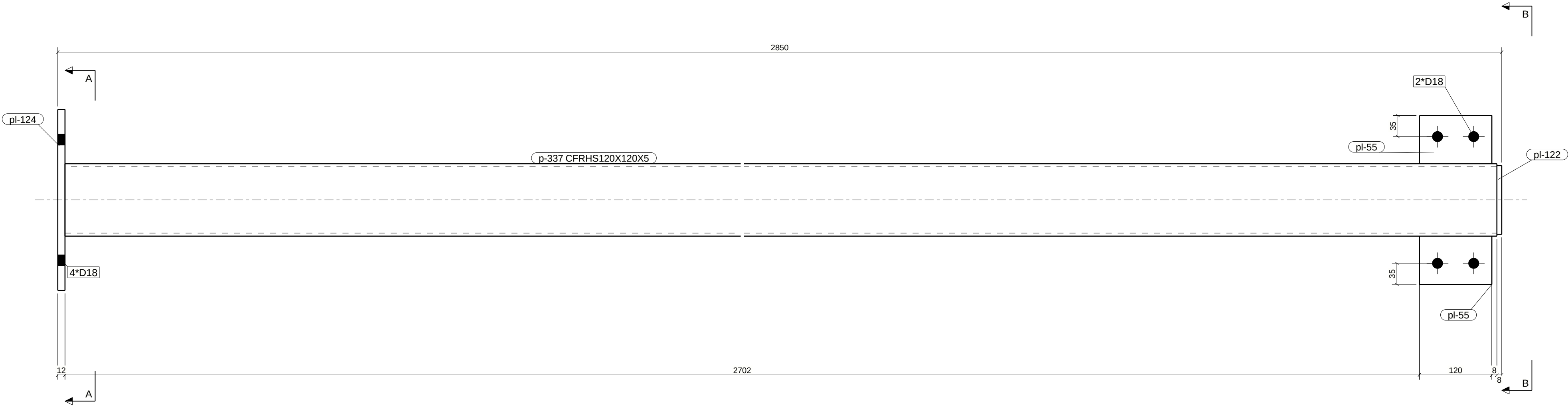
RR-52 Kiekis 1

RR-52 Kiekis 1				
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-337	CFRHS120X120X5	2830	1	49.7
pl-55	PL12*80	120	2	0.9
pl-122	PL8*114	114	1	0.8
pl-124	PL12*300	220	1	6.2
			Viso:	58.5



RR-53 Kiekis 1

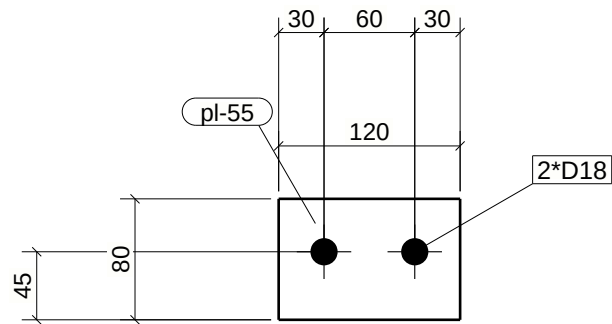
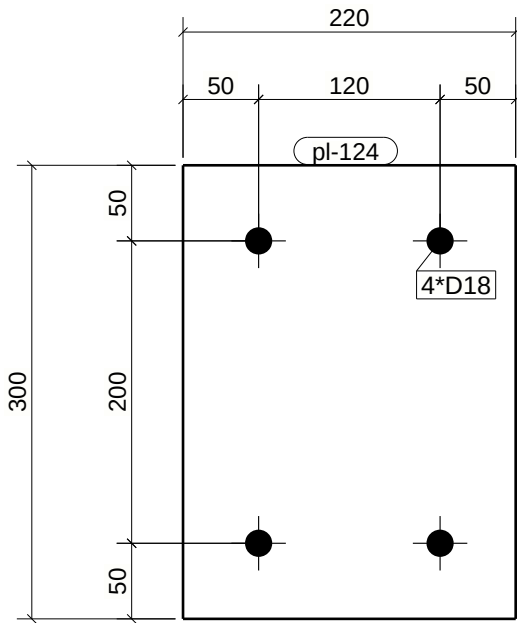
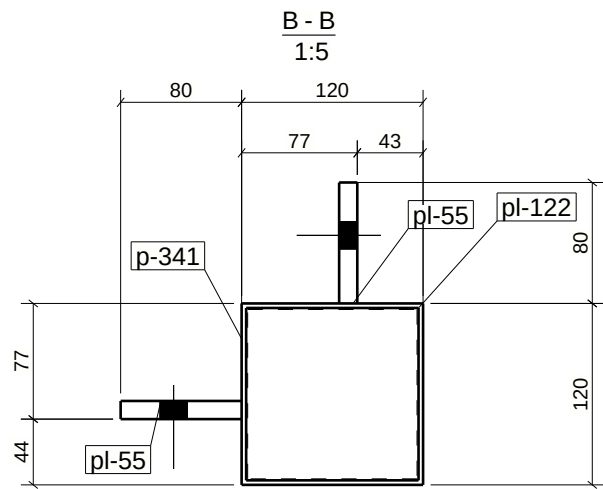
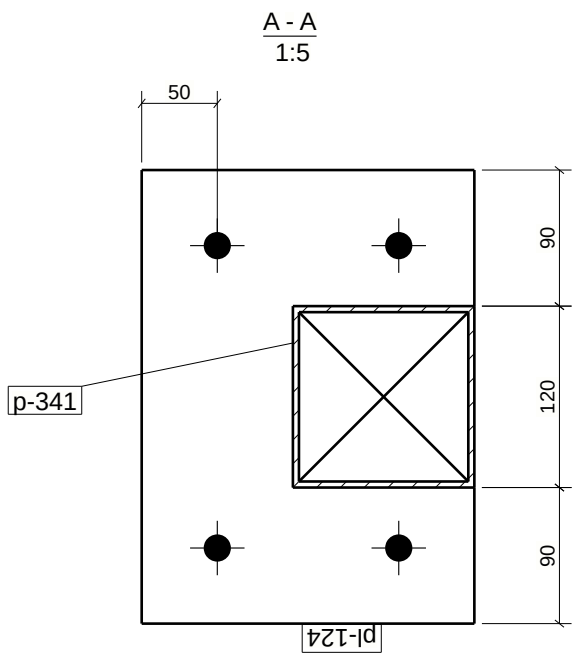
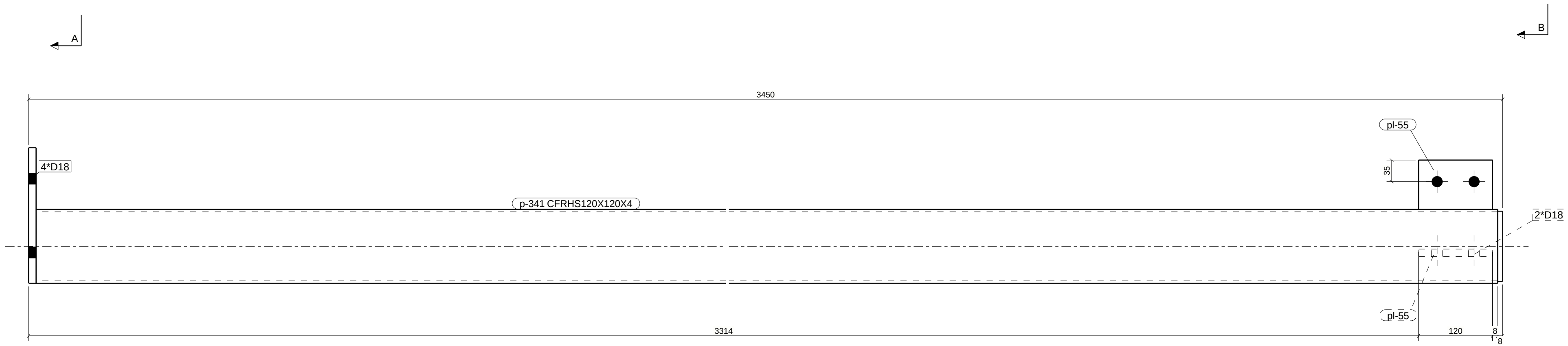
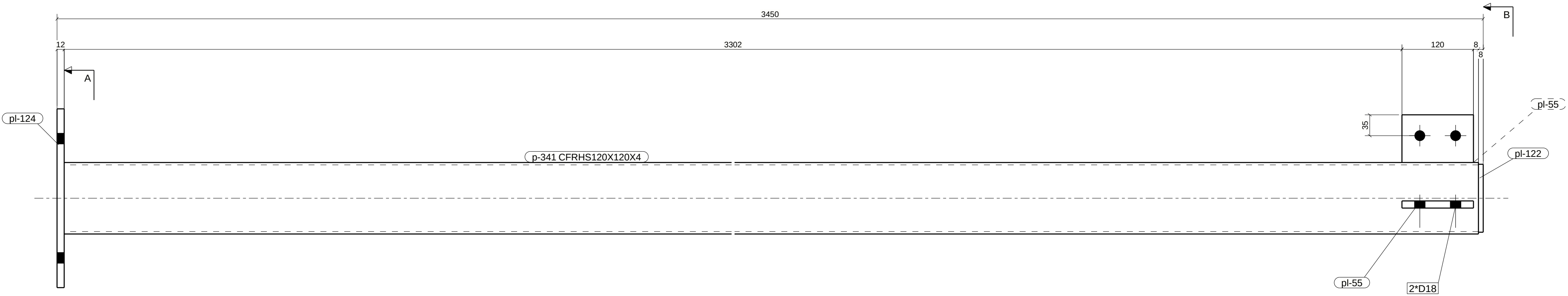
RR-53 Kiekis 1				
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-337	CFRHS120X120X5	2830	1	49.7
pl-55	PL12*80	120	2	0.9
pl-122	PL8*114	114	1	0.8
pl-124	PL12*300	220	1	6.2
			Viso:	58.5



RR-54Kiekis 1

RR-54				
Kiekis 1				
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-337	CFRHS120X120X5	2830	1	49.7
pl-55	PL12*80	120	2	0.9
pl-122	PL8*114	114	1	0.8
pl-124	PL12*300	220	1	6.2
Viso:				58.5

GRID LOCATION	
RR-55	11-12***

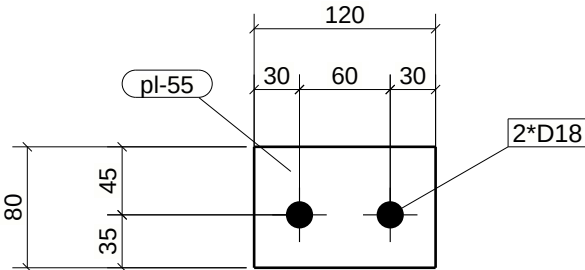
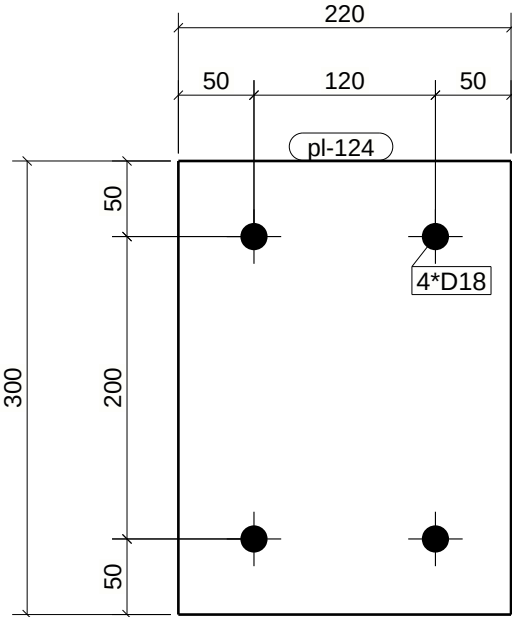
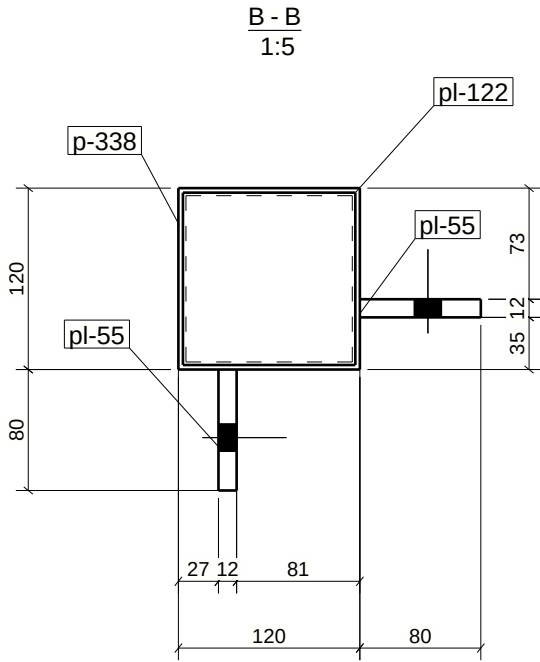
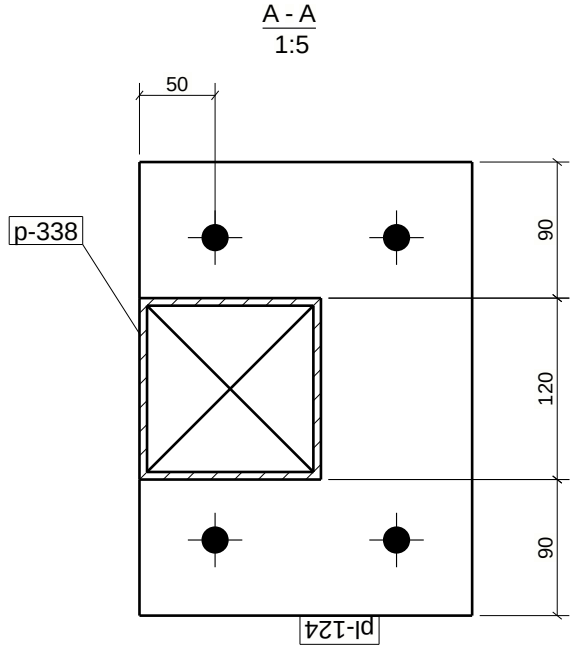
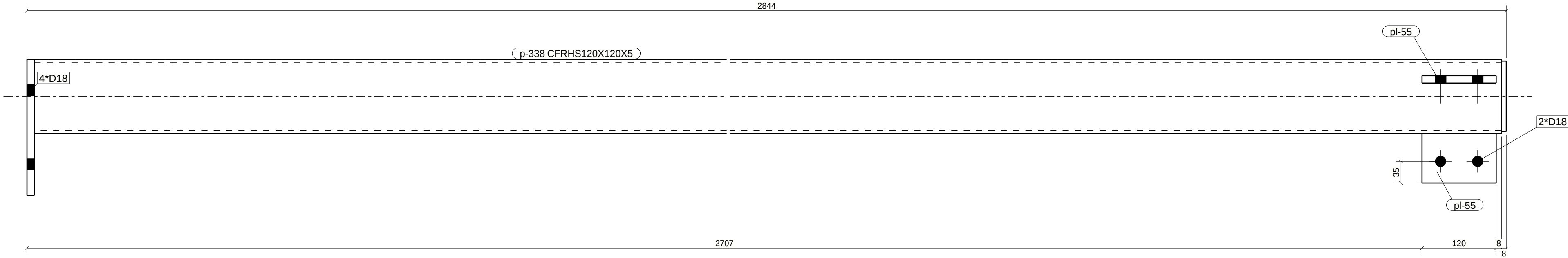
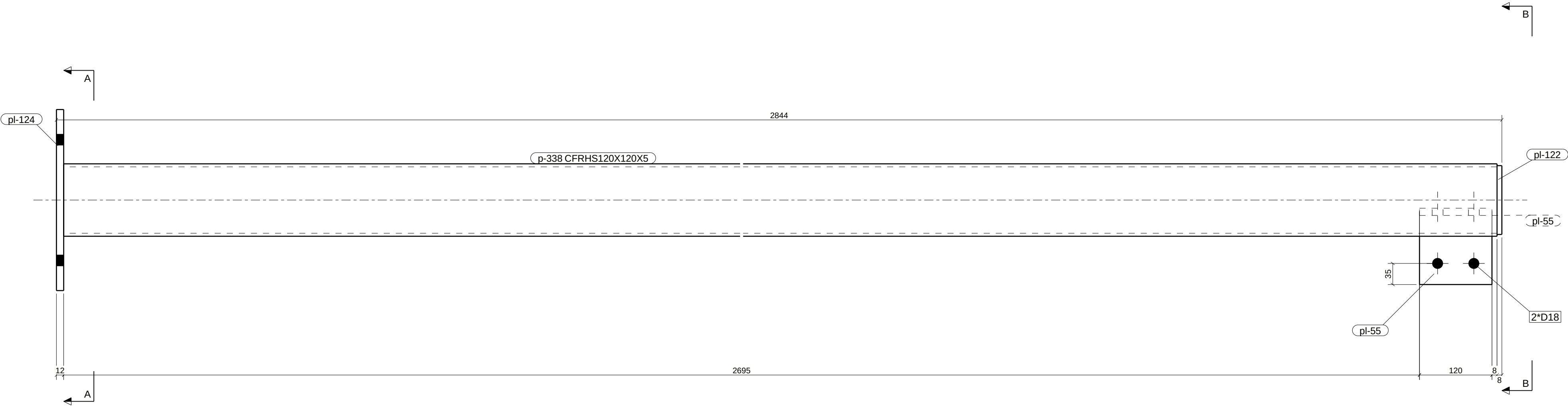


RR-55 Kiekis 1

RR-55 Kiekis 1				
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-341	CFRHS120X120X4	3430	1	48.9
pl-55	PL12*80	120	2	0.9
pl-122	PL8*114	114	1	0.8
pl-124	PL12*300	220	1	6.2
			Viso:	57.7

PHASE	QUANTITY
137	1

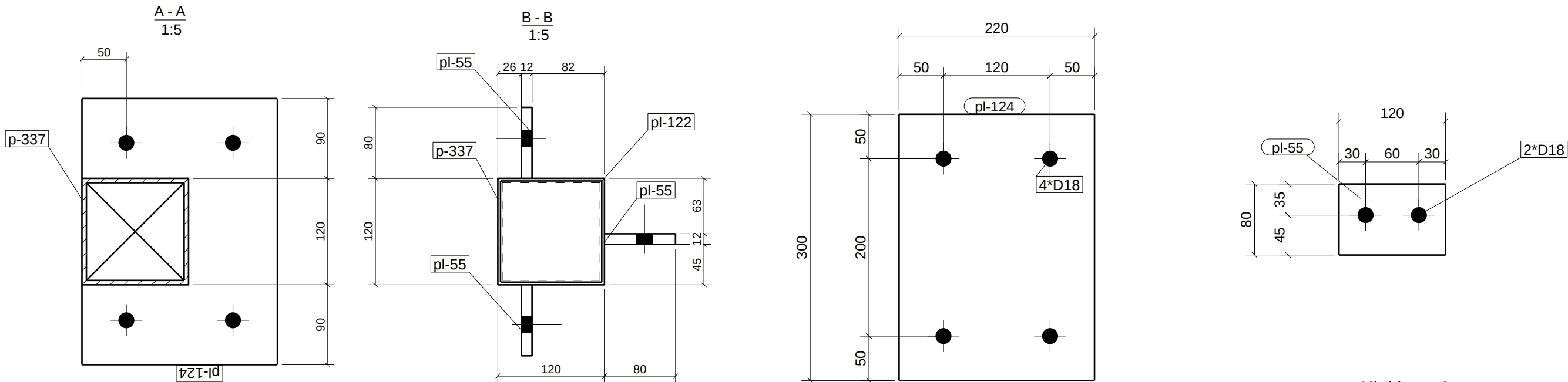
GRID LOCATION	
RR-56	6/C



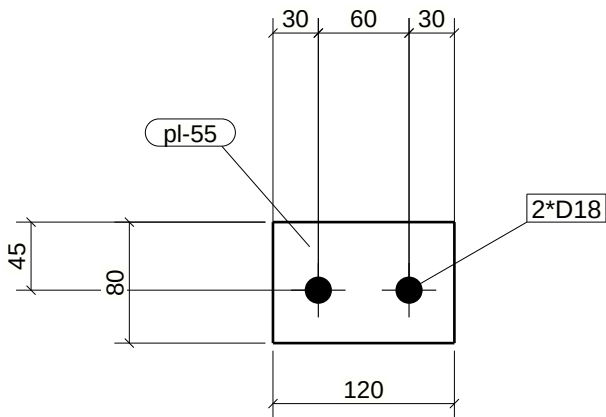
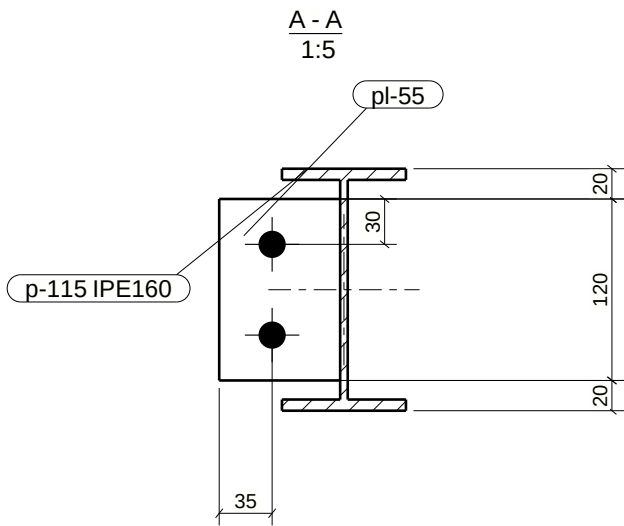
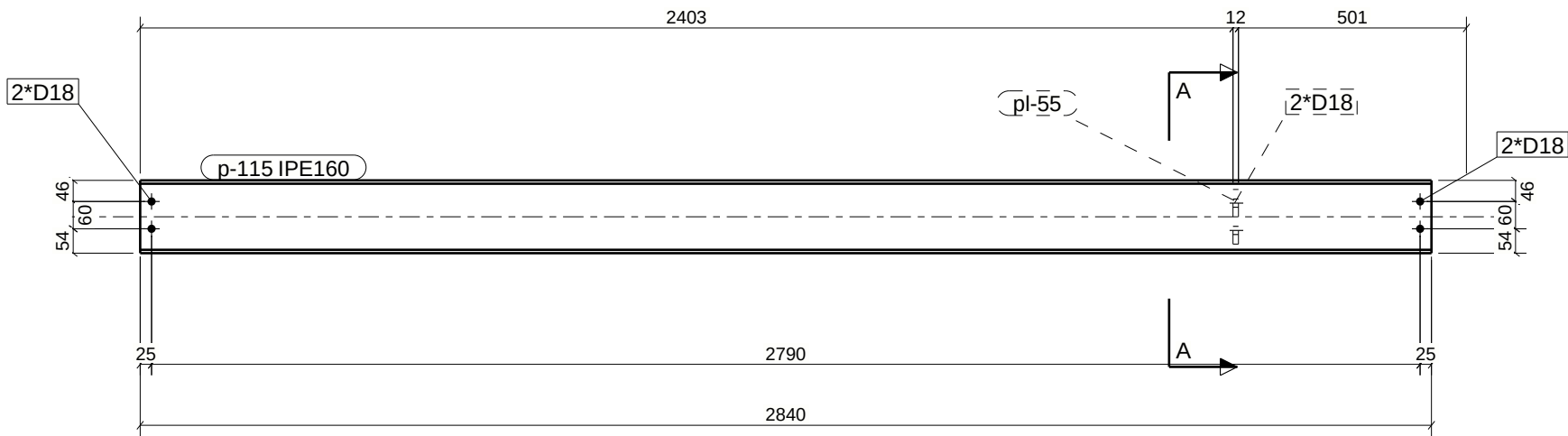
RR-56 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-338	CFRHS120X120X5	2824	1	49.6
pl-55	PL12*80	120	2	0.9
pl-122	PL8*114	114	1	0.8
pl-124	PL12*300	220	1	6.2
			Viso:	58.4

PHASE	QUANTITY
137	1



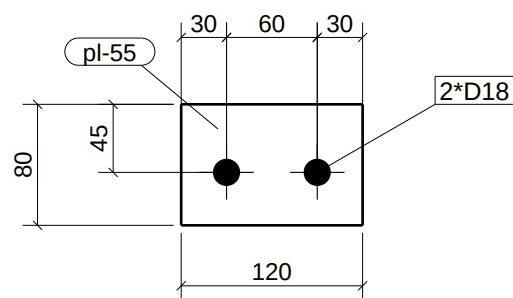
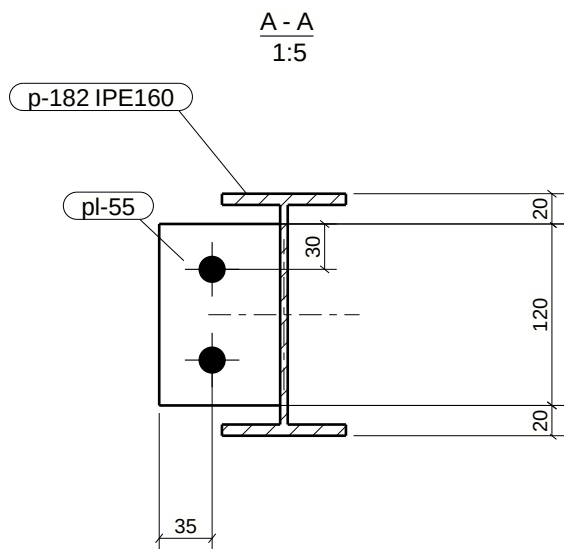
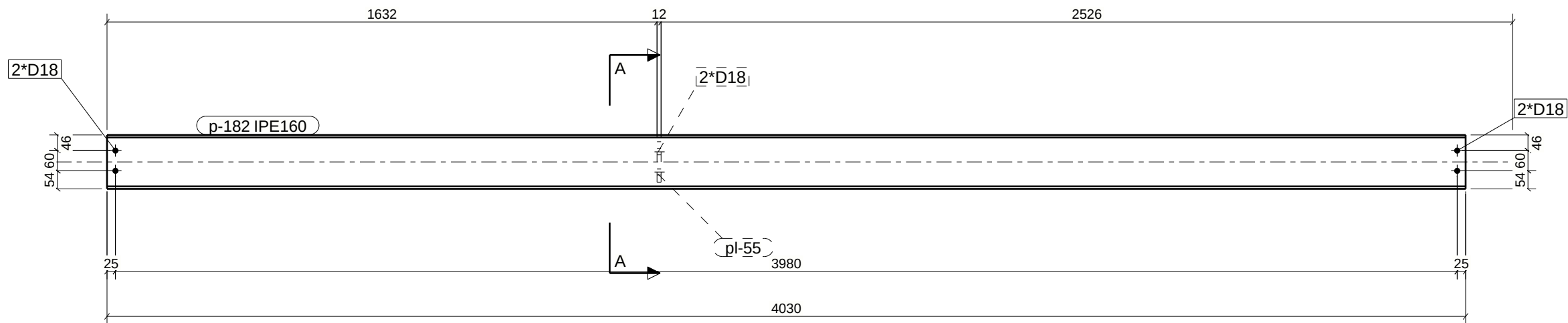
RR-57		Kiekis		1
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-337	CFRHS120X120X5	2830	1	49.7
pl-55	PL12*80	120	3	0.9
pl-122	PL8*114	114	1	0.8
pl-124	PL12*300	220	1	6.2
			Viso:	59.4



RR-58 Kiekis 1

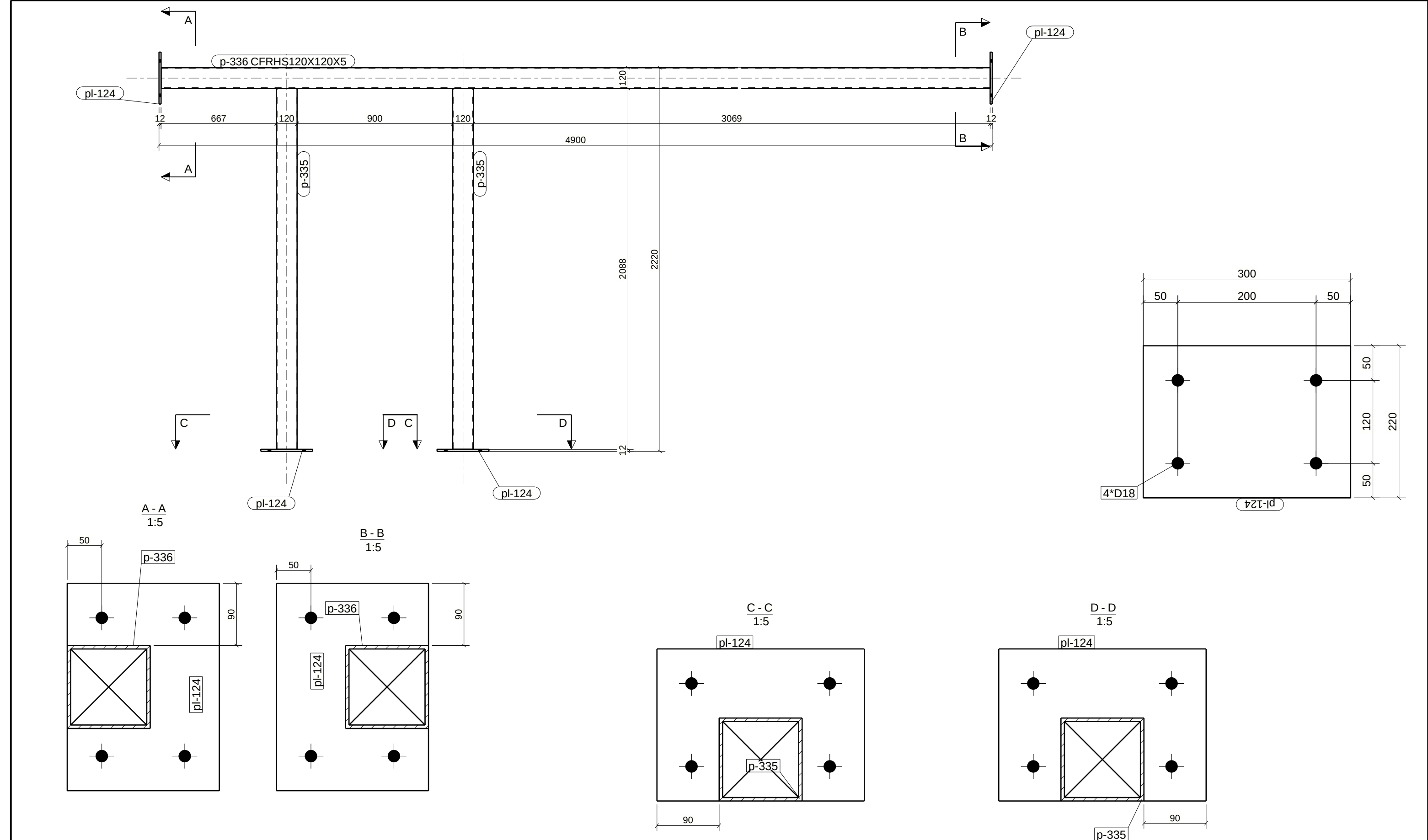
PHASE	QUANTITY
137	1

Zymuo				
Profilis				
Ilgis				
Kiekis				
Svoris				
p-115	IPE160	2840	1	44.8
pl-55	PL12*80	120	1	0.9
Viso:				45.7



RR-59 Kiekis 1

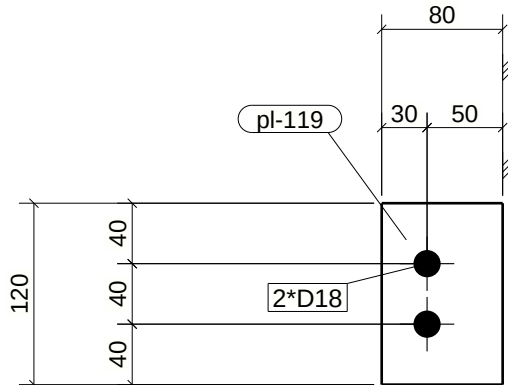
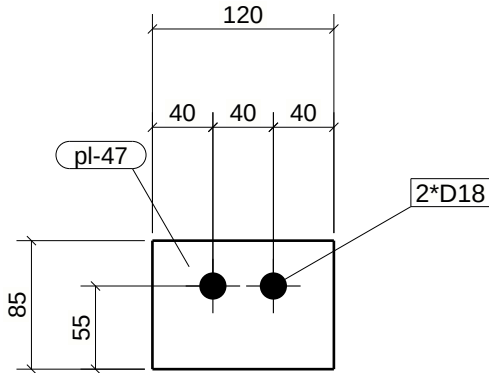
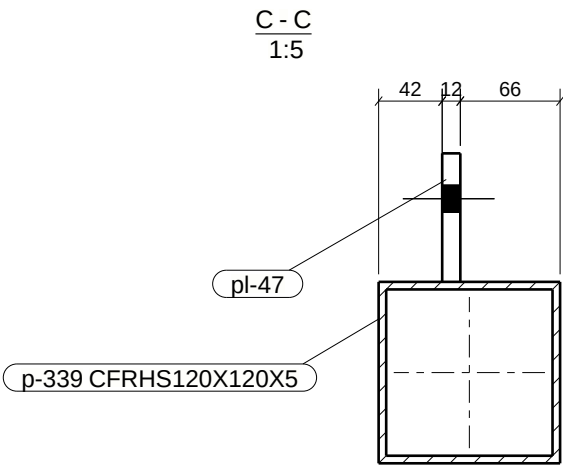
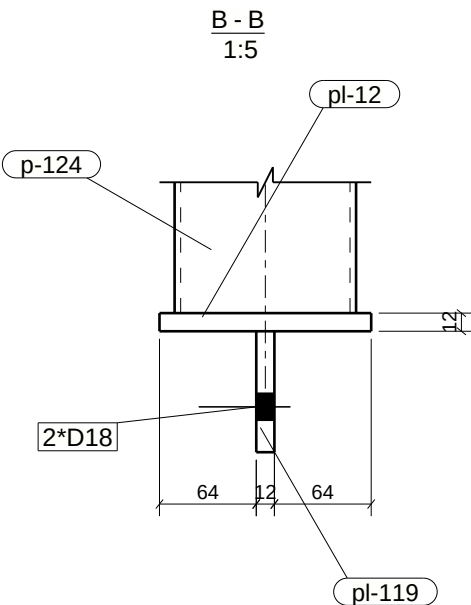
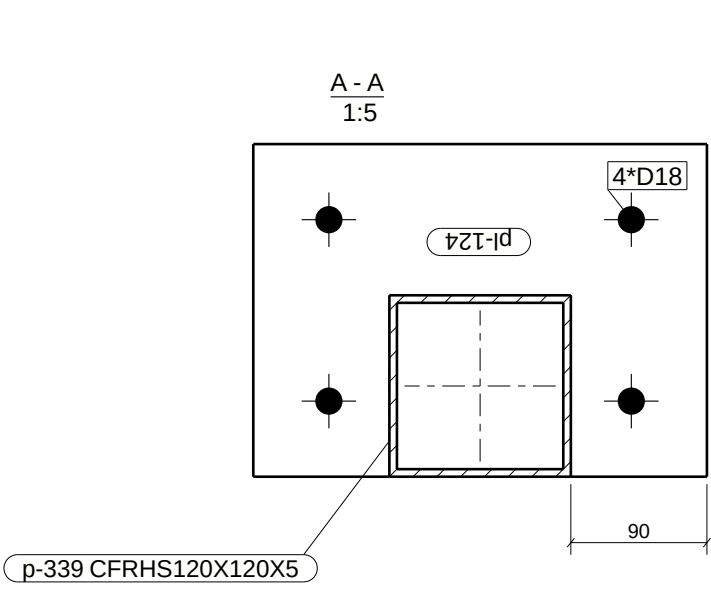
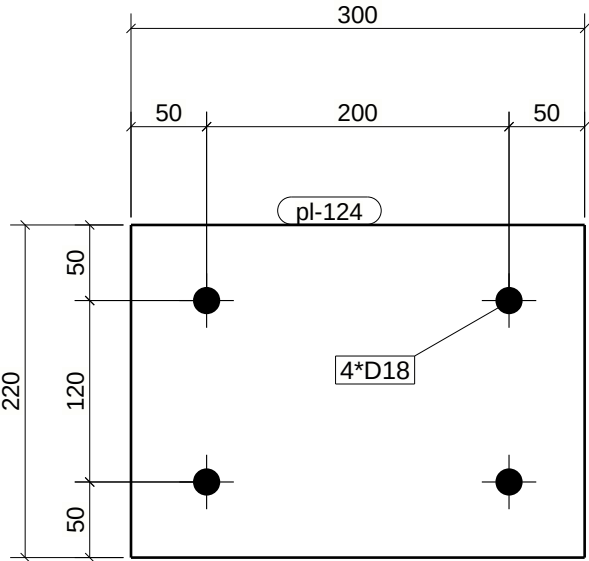
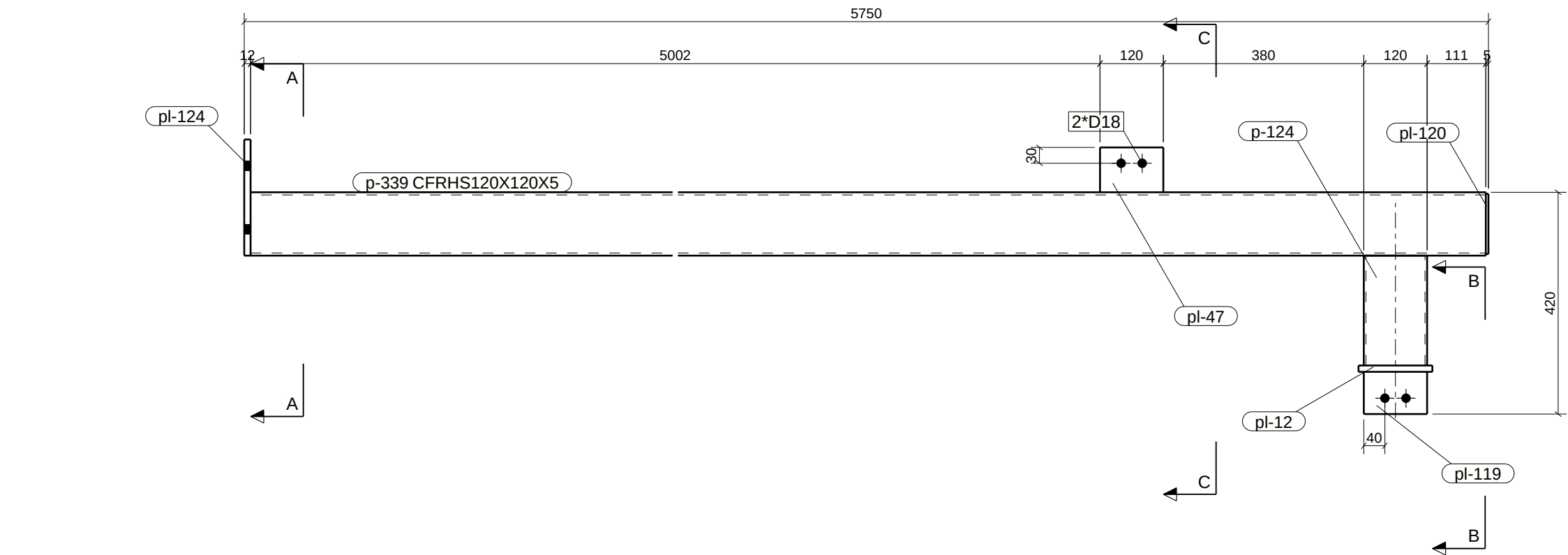
		Zymuo	Profilis	Ilgis	Kiekis	Svoris	
		p-182	IPE160	4030	1	63.6	
		pl-55	PL12*80	120	1	0.9	
PHASE	QUANTITY				Viso:		64.5
137	1						



RR-60 Kiekis 1

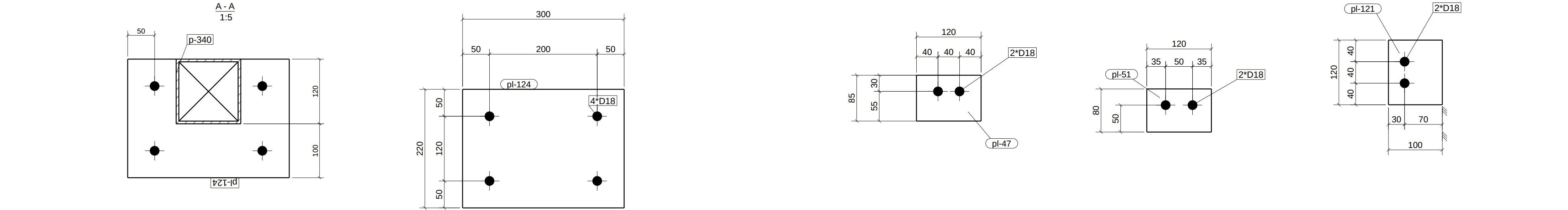
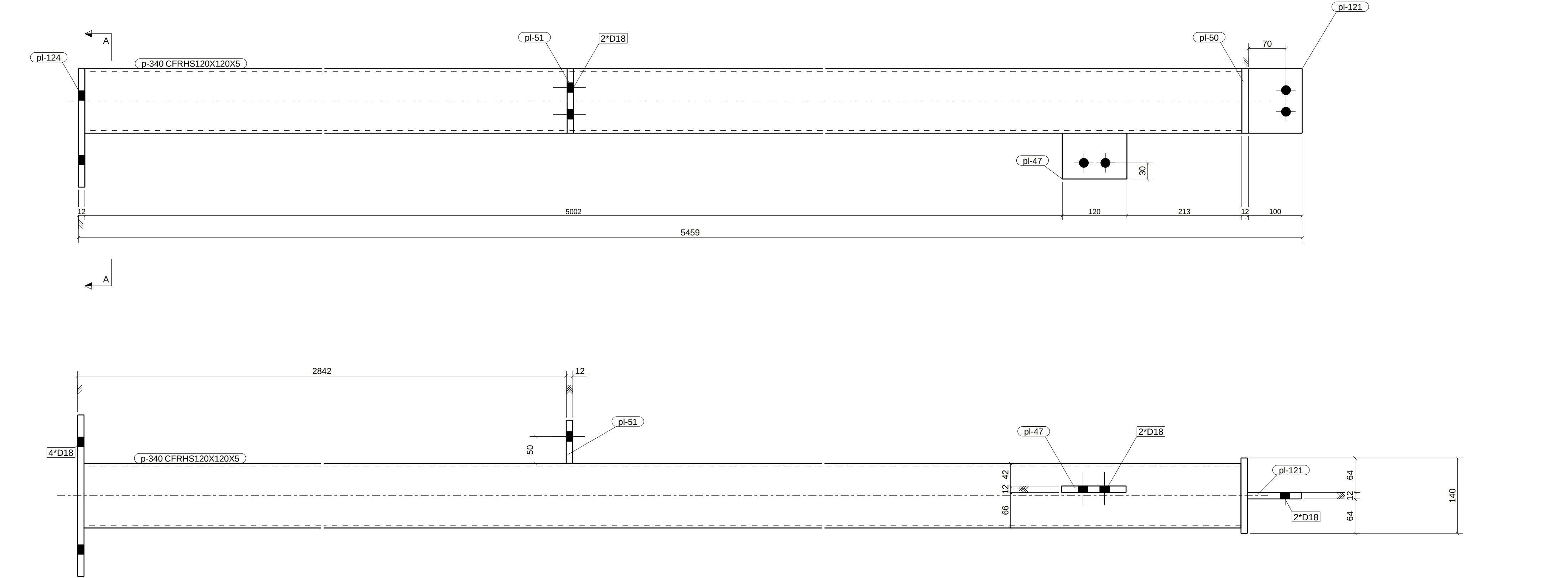
Zymuo	Profilis	Ilgis	Kiekis	
p-335	CFRHS120X120X5	2088	2	
p-336	CFRHS120X120X5	4876	1	
pl-124	PL12*220	300	4	
			Viso:	183.7

PHASE	QUANTITY
137	1



RR-61 Kiekis 1

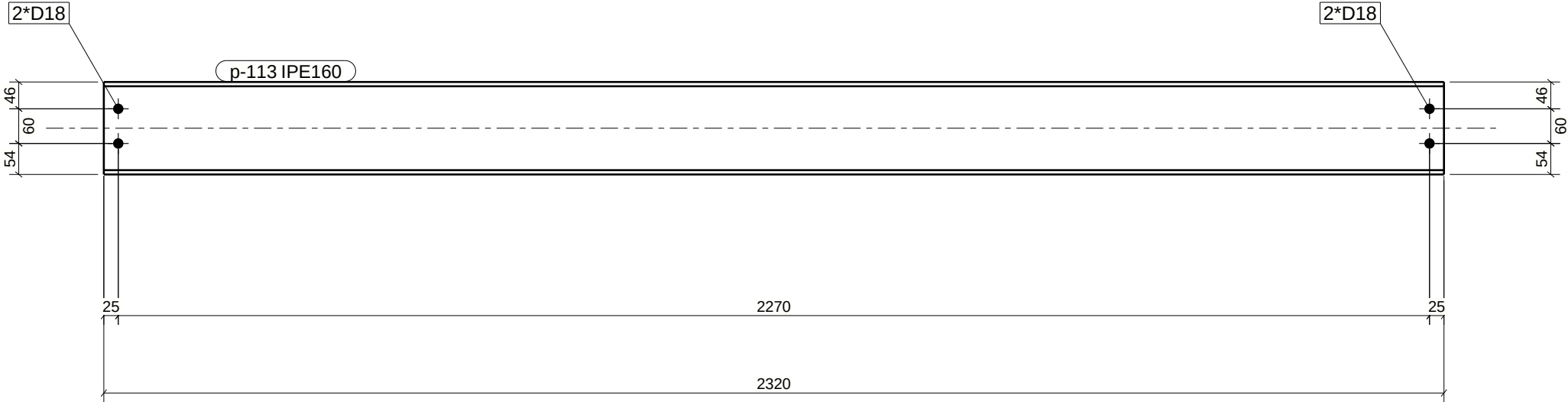
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-124	CFRHS120X120X4	208	1	3.0
p-339	CFRHS120X120X5	5733	1	100.6
pl-12	PL12*140	140	1	1.8
pl-47	PL12*85	120	1	1.0
pl-119	PL12*120	80	1	0.9
pl-120	PL5*114	114	1	0.5
pl-124	PL12*220	300	1	6.2
			Viso:	114.0



PHASE QUANTITY	
137	1

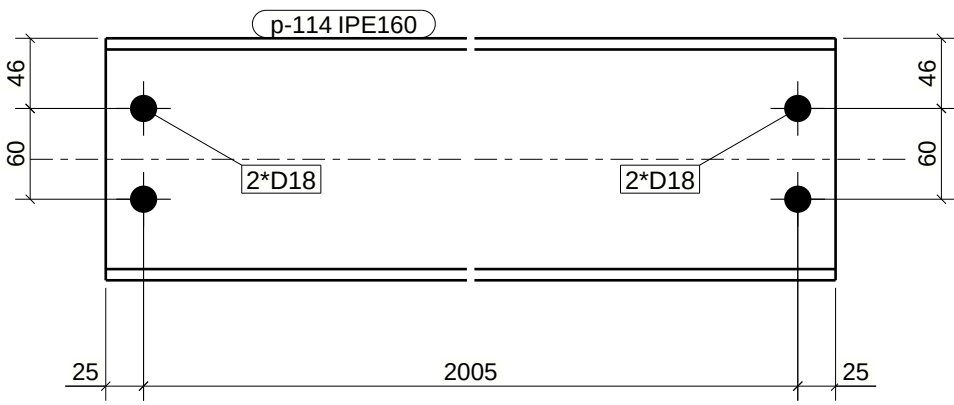
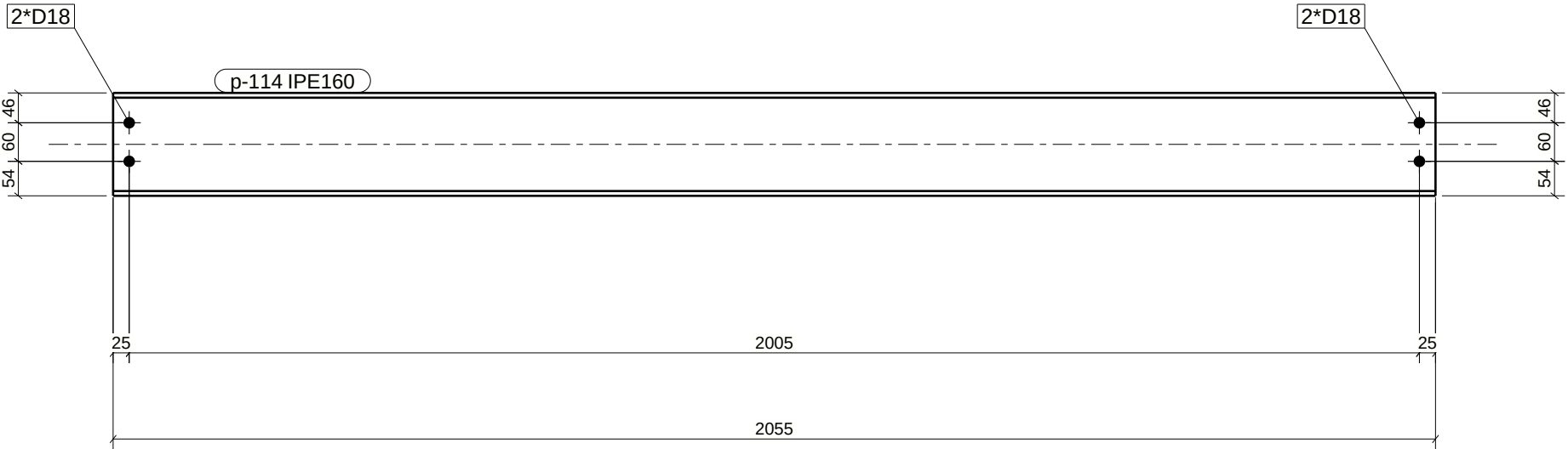
RR-62 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-340	CFRHS120X120X5	5335	1	93.6
pl-47	PL12*85	120	1	1.0
pl-50	PL12*120	140	1	1.6
pl-51	PL12*80	120	1	0.9
pl-121	PL12*120	100	1	1.1
pl-124	PL12*220	300	1	6.2
			Viso:	104.4

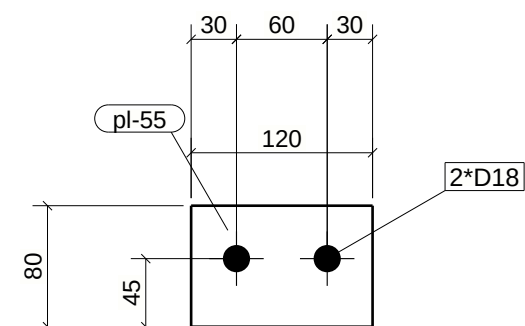
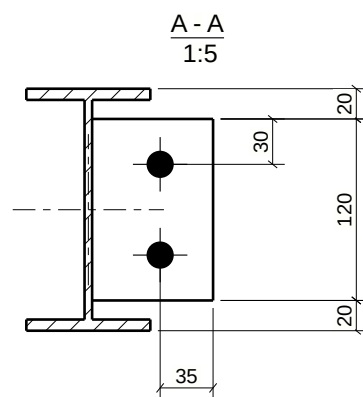
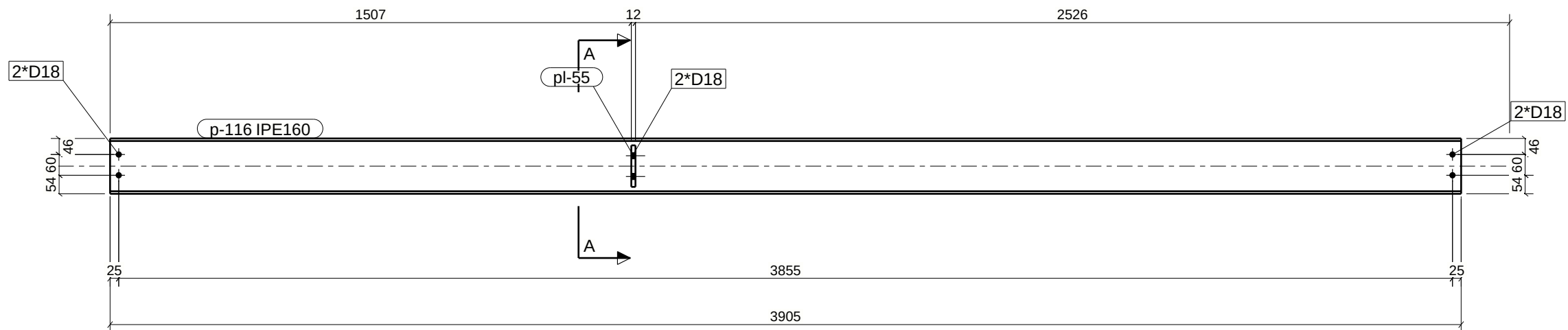


RR-65 Kiekis 2

		Zymuo		Svoris	
		p-113		36.6	
				</	



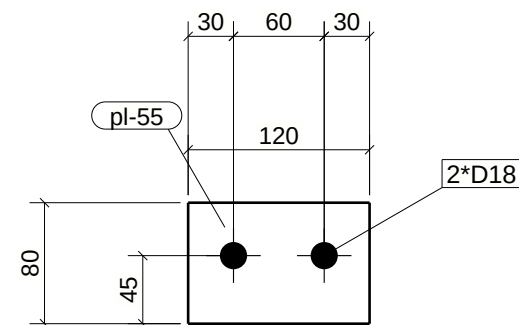
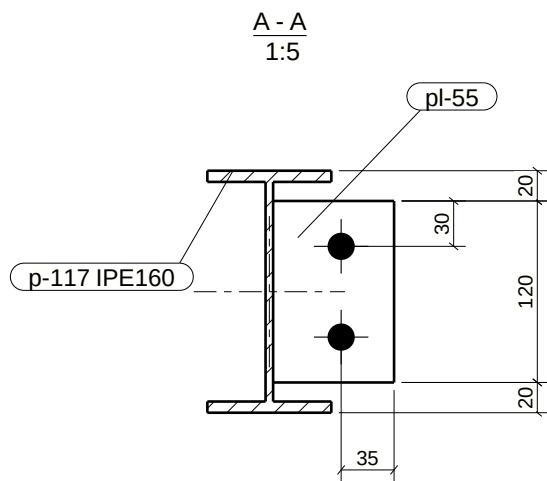
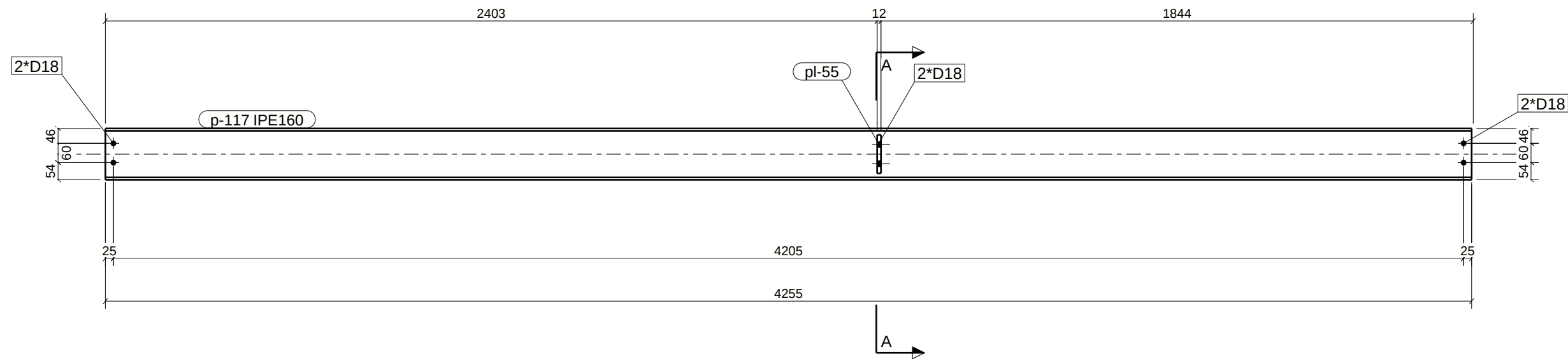
RR-66	Kiekis	1



RR-67	Kiekis	1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-116	IPE160	3905	1	61.6
pI-55	PL12*80	120	1	0.9
			Viso:	62.5

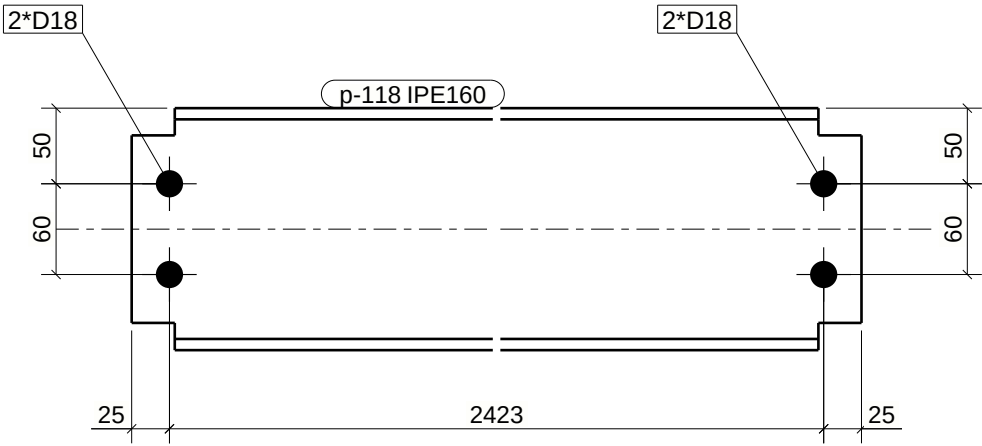
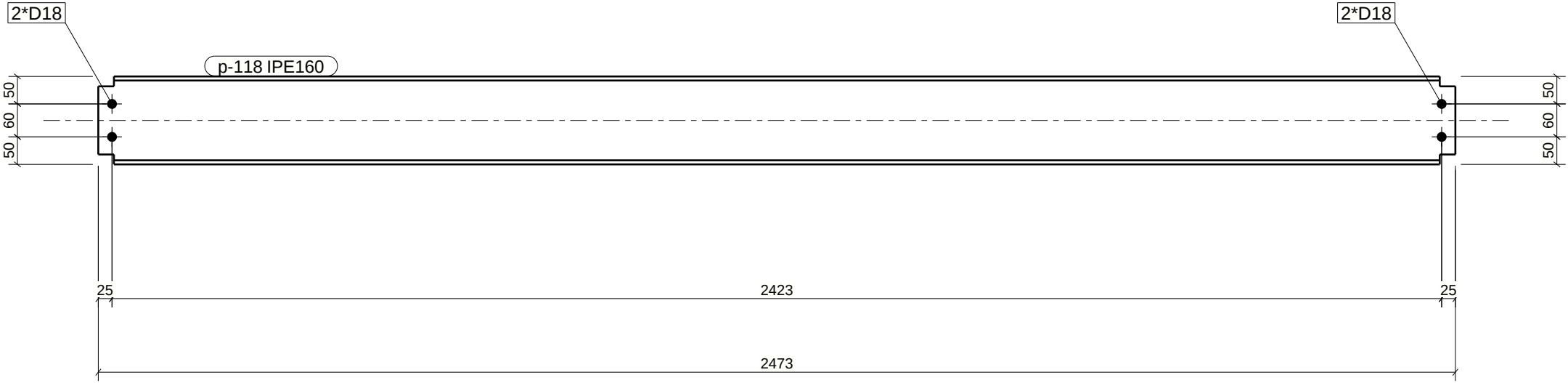
PHASE	QUANTITY
137	1



RR-68 Kiekis 1

PHASE	QUANTITY
137	1

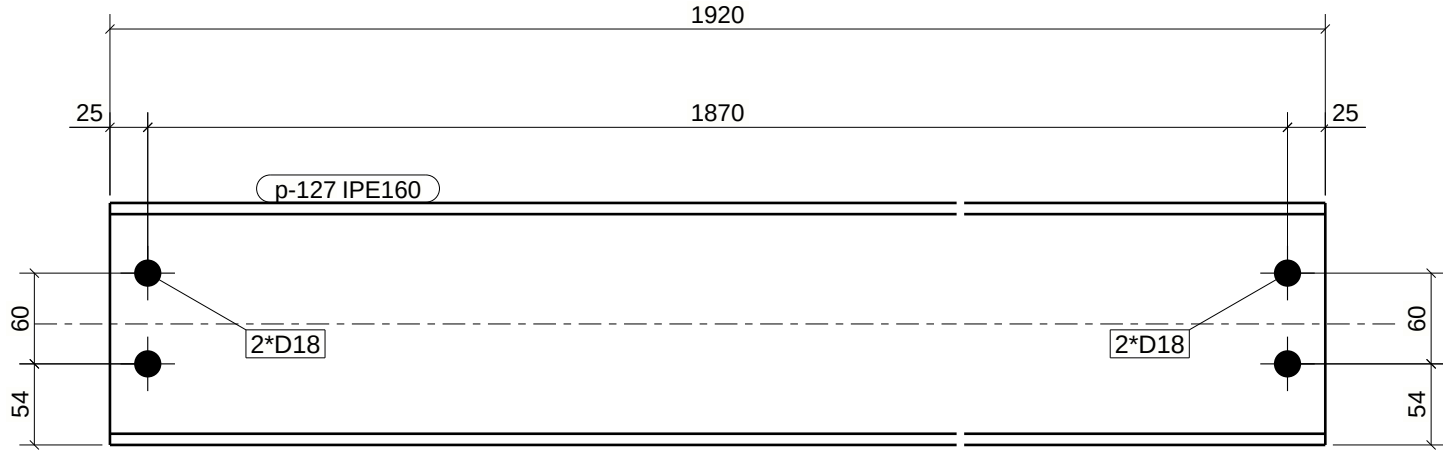
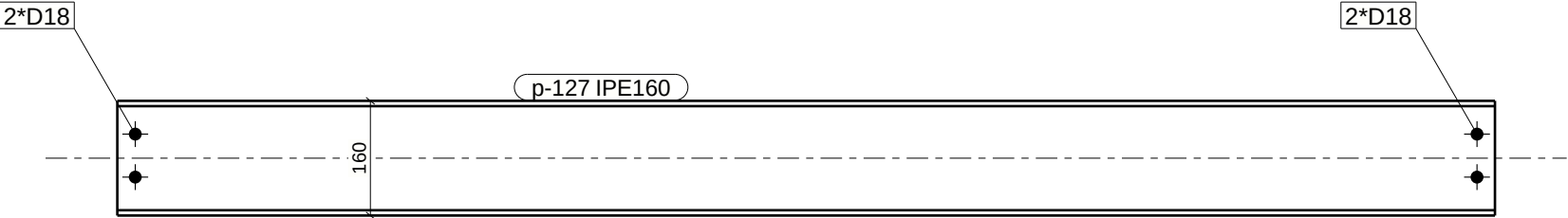
Zymuo	Profilis	Ilgis	Kiekis	
p-117	IPE160	4255	1	
pl-55	PL12*80	120	1	
			Viso:	68.0



RR-69 Kiekis 2

PHASE	QUANTITY
137	2

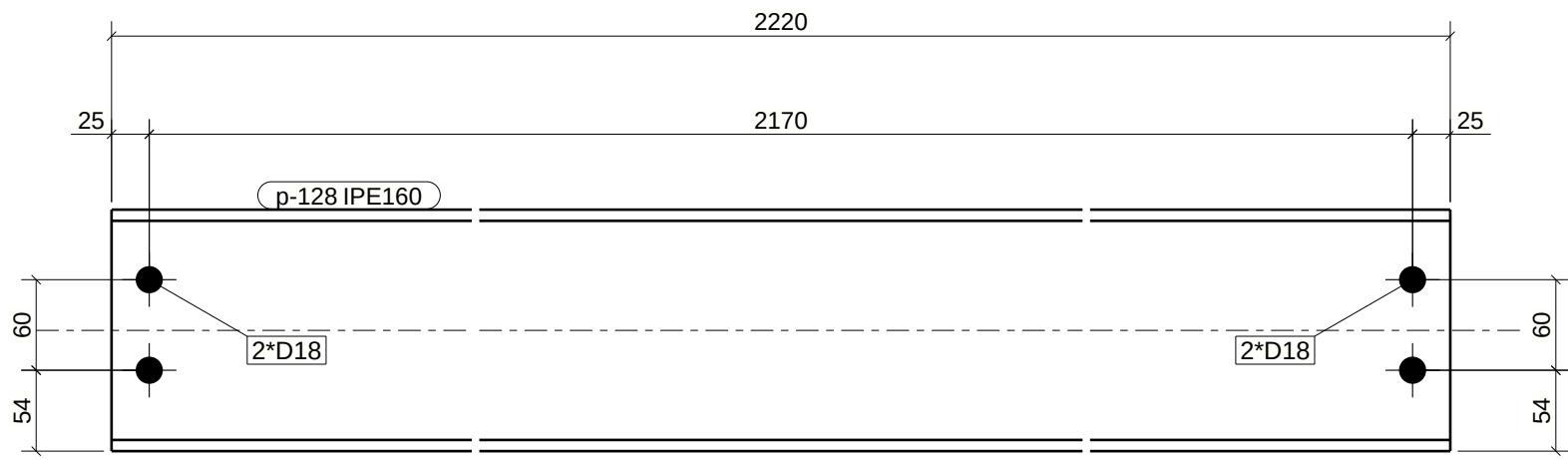
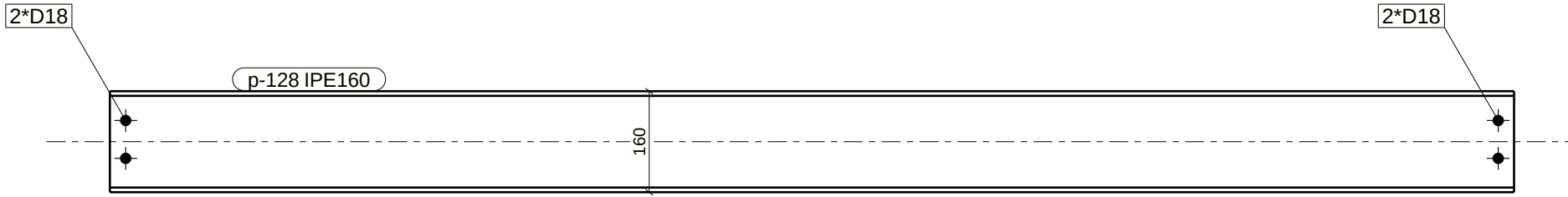
Zymuo				
Profilis				
Ilgis				
Kiekis				
Svoris				
p-118	IPE160	2473	1	39.0
Viso:				39.0



RR-70 Kiekis 2

PHASE	QUANTITY
137	2

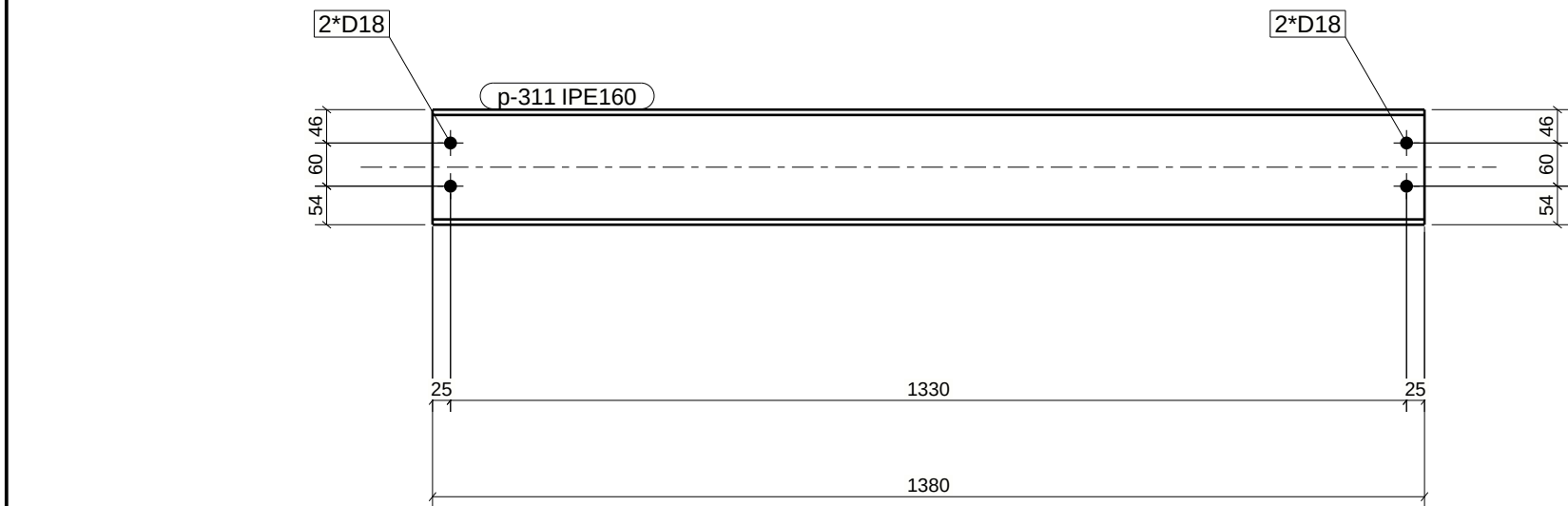
Zymuo				
Profilis				
Ilgis				
Kiekis				
Svoris				
p-127	IPE160	1920	1	30.3
Viso:				30.3



RR-71 Kiekis 2

PHASE	QUANTITY
137	2

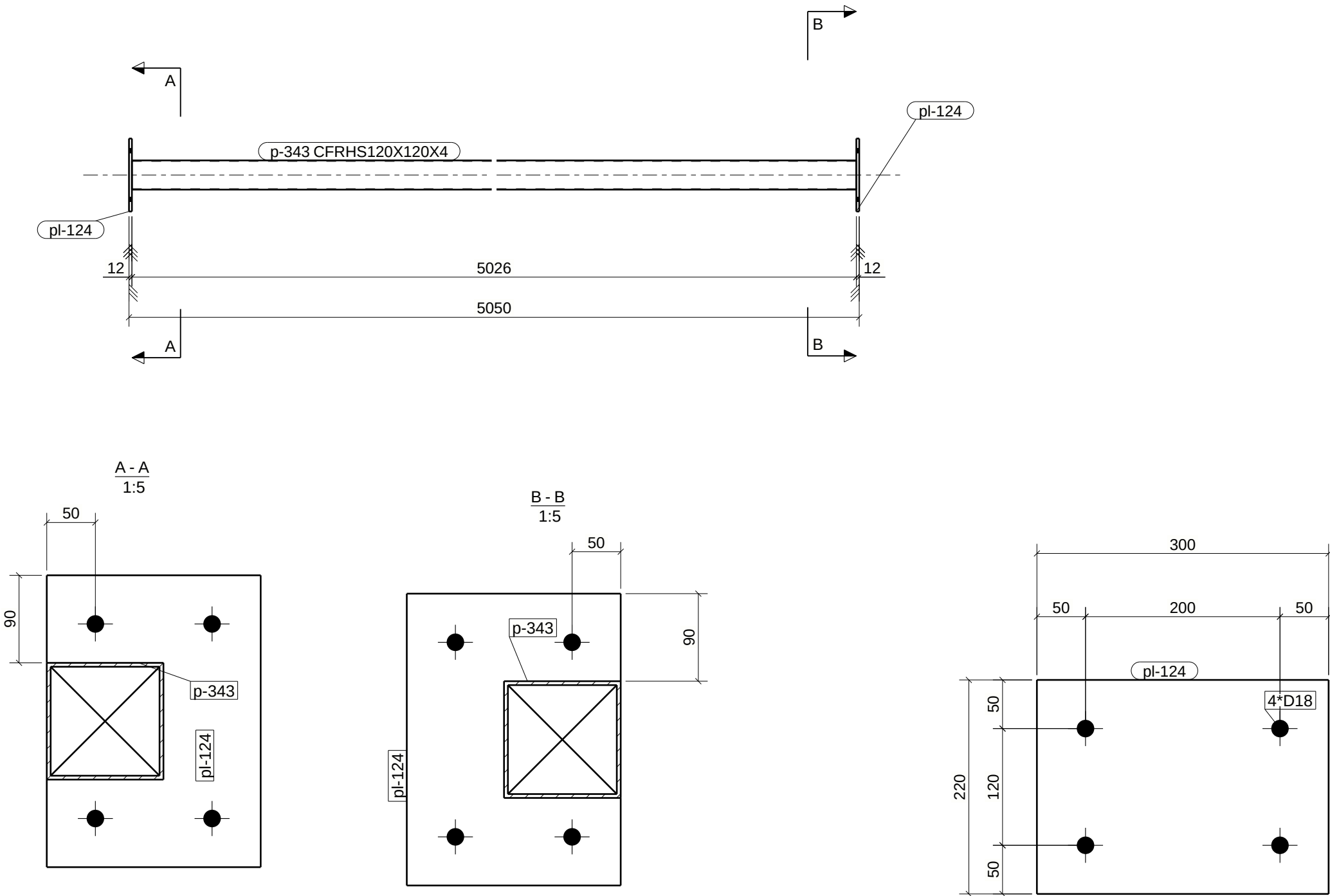
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-128	IPE160	2220	1	35.0
			Viso:	35.0



RR-72 Kiekis 1

PHASE	QUANTITY
137	1

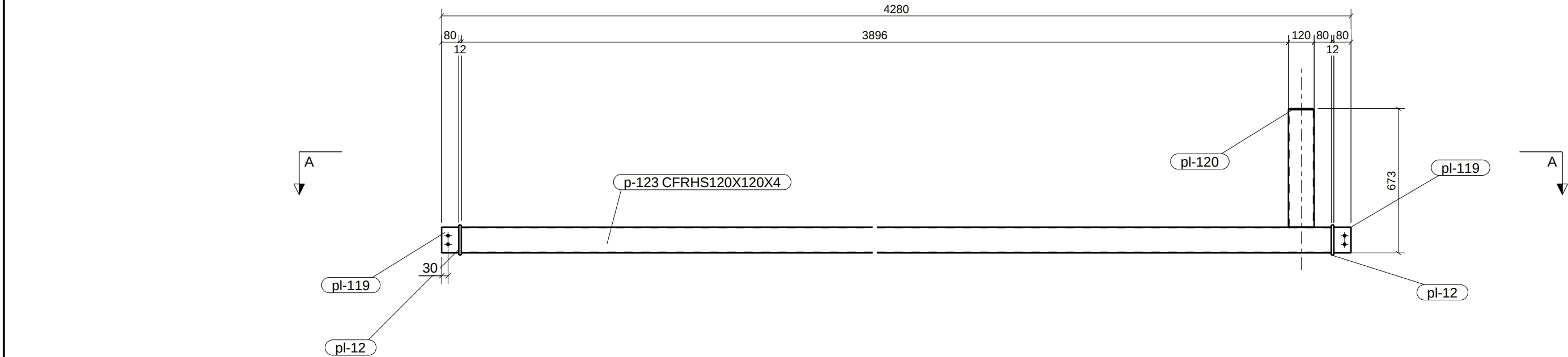
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-311	IPE160	1380	1	21.8
			Viso:	21.8



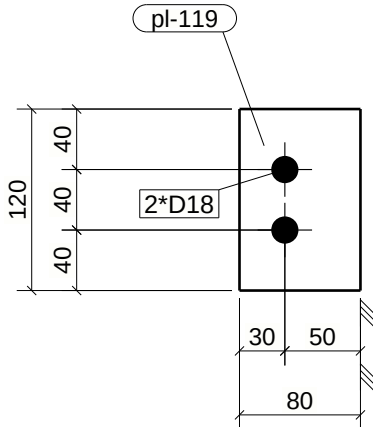
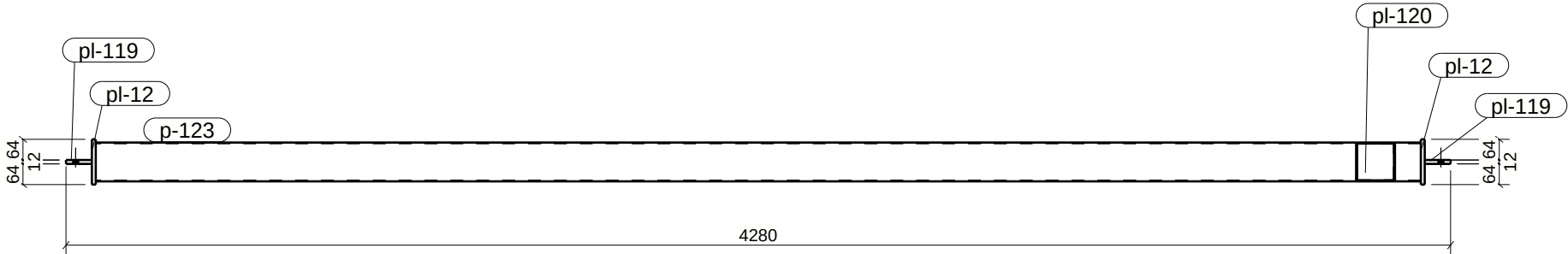
RR-73 Kiekis 4

Zymuo	Profilis	Ilgis	Kiekis	
p-343	CFRHS120X120X4	5026	1	
pl-124	PL12*220	300	2	
			Viso:	
				84.0

PHASE	QUANTITY
137	4



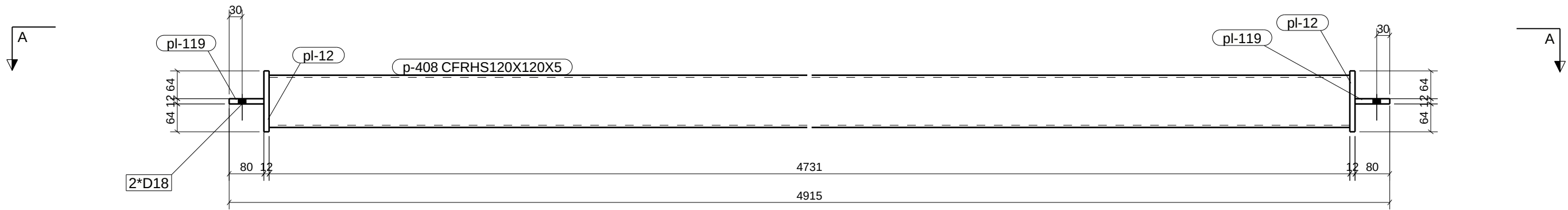
A - A
1:20



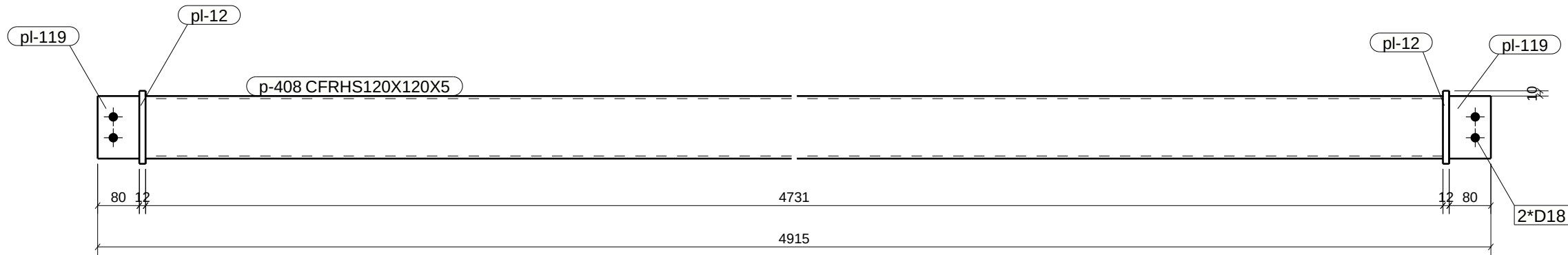
PHASE	QUANTITY
137	1

S-105 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
P-17	CFRHS120X120X5	548	1	9.6
p-123	CFRHS120X120X4	4096	1	58.4
pl-12	PL12*140	140	2	1.8
pl-119	PL12*120	80	2	0.9
pl-120	PL5*114	114	1	0.5
Viso:				74.0



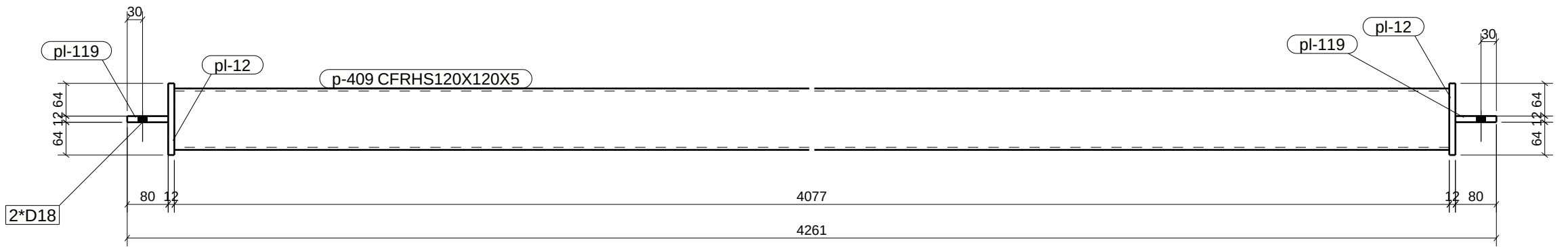
A - A
1:10



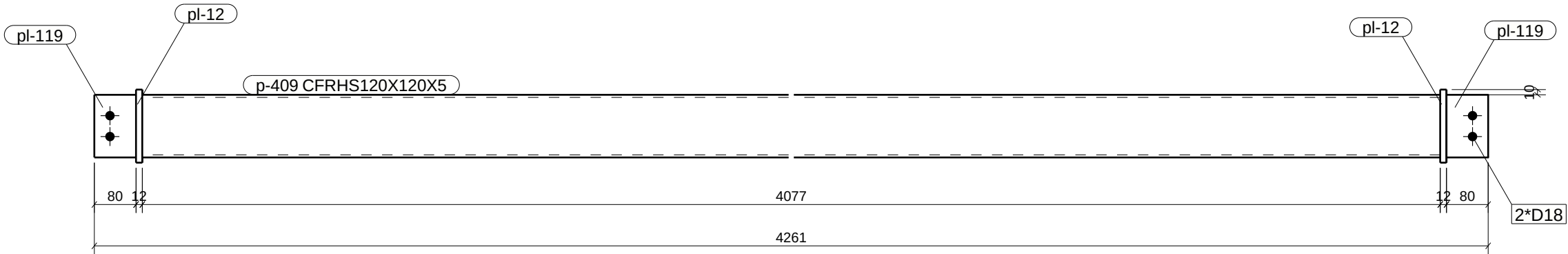
STR-4 Kiekis 2

Zymuo	Profilis	Ilgis	Kiekis	
p-408	CFRHS120X120X5	4731	1	
pl-12	PL12*140	140	2	
pl-119	PL12*120	80	2	
Viso:				88.5

PHASE	QUANTITY
128	2



A - A
1:10

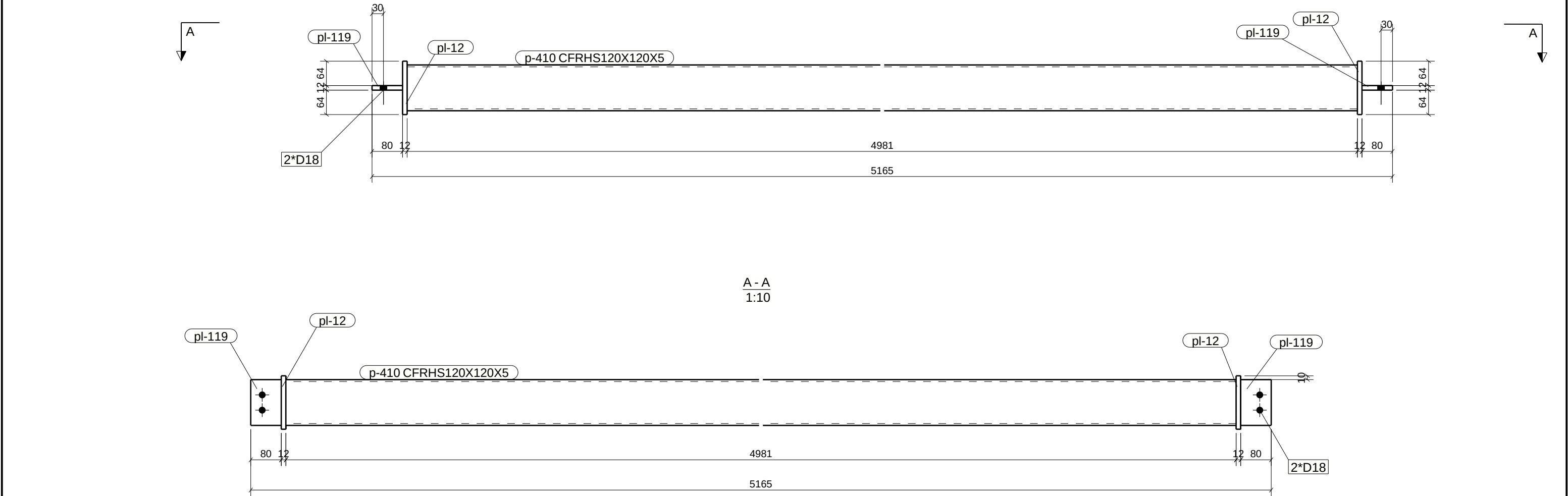


STR-5

Kiekis 2

PHASE		QUANTITY	
128		2	

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-409	CFRHS120X120X5	4077	1	71.6
pl-12	PL12*140	140	2	1.8
pl-119	PL12*120	80	2	0.9
Viso:				77.1



STR-6 Kiekis 2

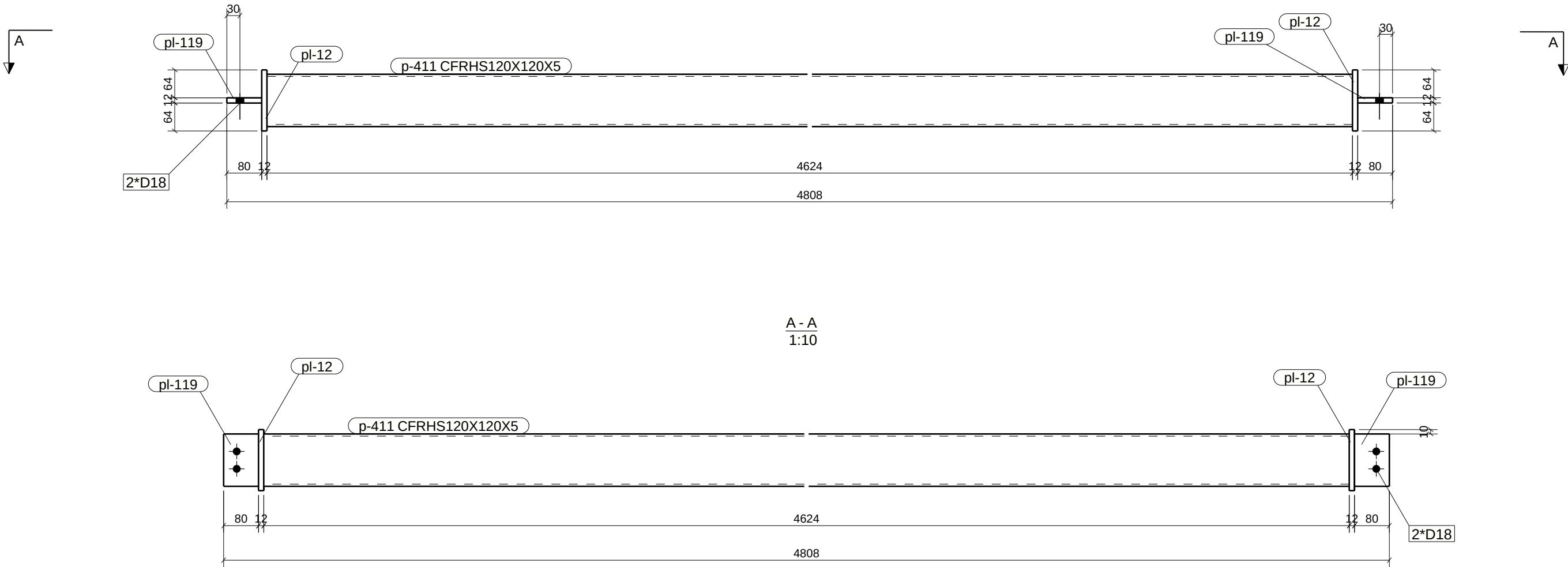
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-410	CFRHS120X120X5	4981	1	87.4
pl-12	PL12*140	140	2	1.8
pl-119	PL12*120	80	2	0.9
			Viso:	92.9

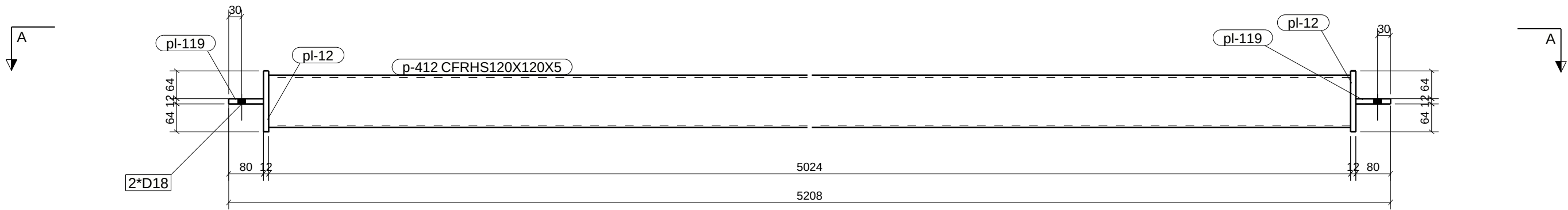
PHASE	QUANTITY
128	2

PHASE	QUANTITY
128	2

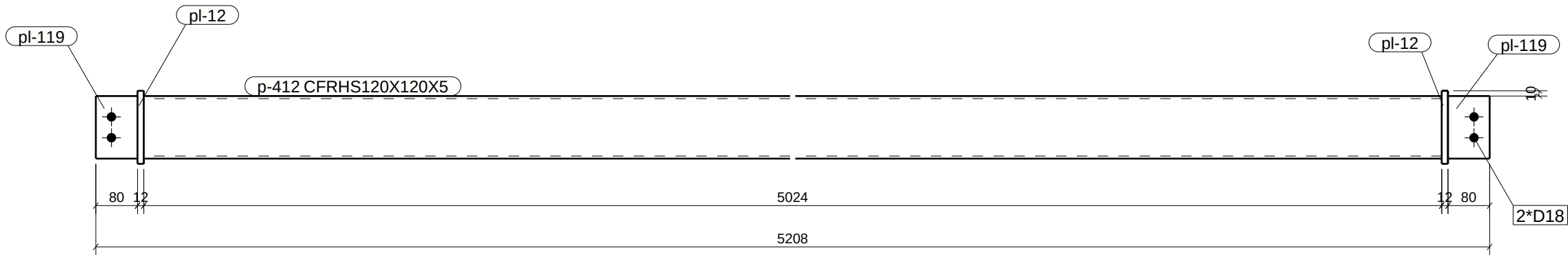
STR-7Kiekis2

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-411	CFRHS120X120X5	4624	1	81.1
pl-12	PL12*140	140	2	1.8
pl-119	PL12*120	80	2	0.9
			Viso:	86.6





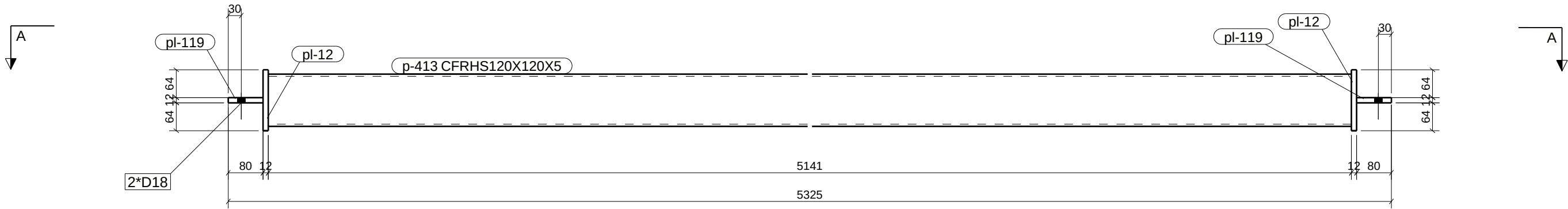
A - A
1:10



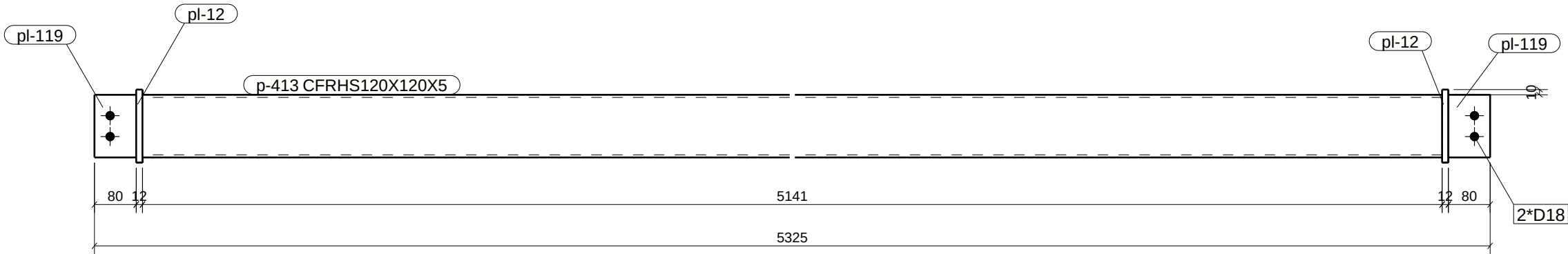
STR-8 Kiekis 2

Zymuo	Profilis	Ilgis	Kiekis	
p-412	CFRHS120X120X5	5024	1	
pl-12	PL12*140	140	2	
pl-119	PL12*120	80	2	
			Viso:	
				93.7

PHASE	QUANTITY
128	2



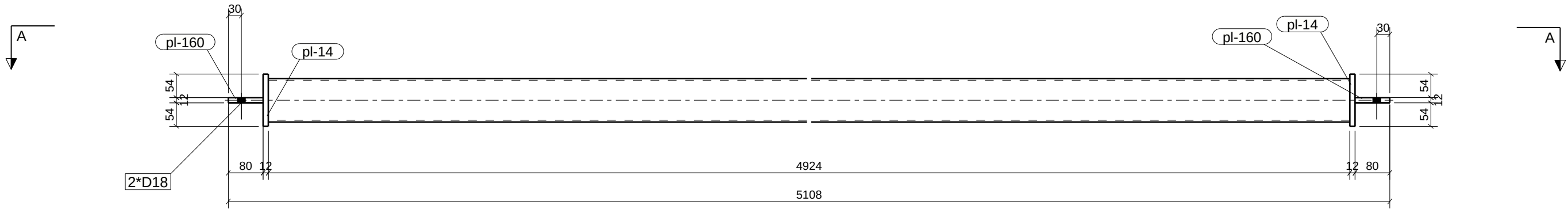
A - A
1:10



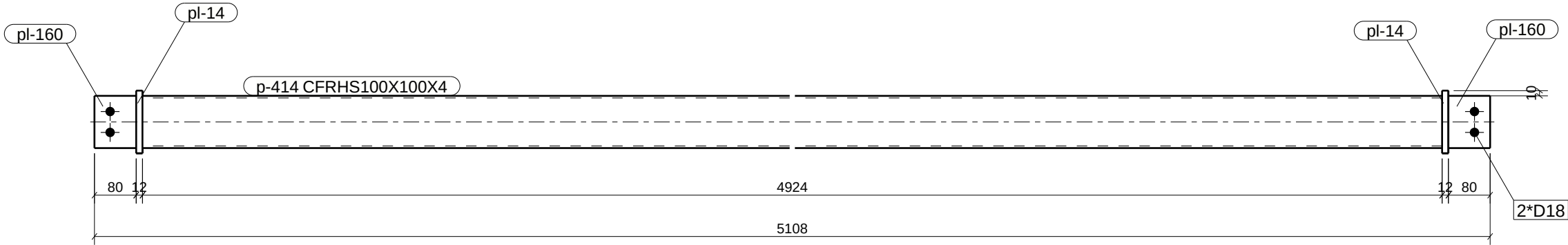
STR-9 Kiekis 2

Zymuo	Profilis	Ilgis	Kiekis	
p-413	CFRHS120X120X5	5141	1	
pl-12	PL12*140	140	2	
pl-119	PL12*120	80	2	
			Viso:	
				95.7

PHASE	QUANTITY
128	2



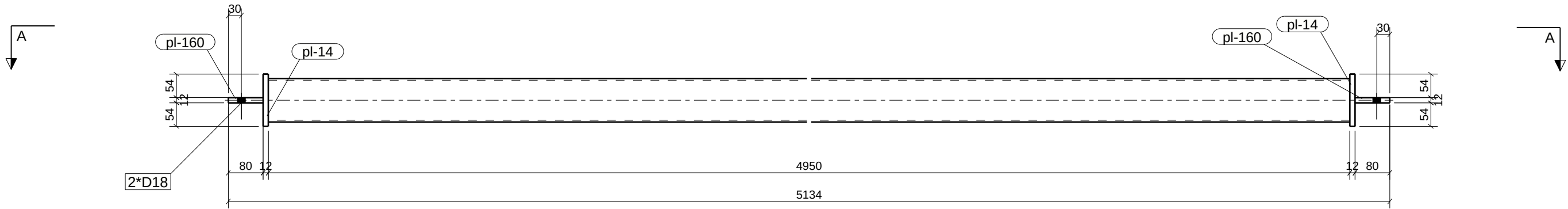
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1:10



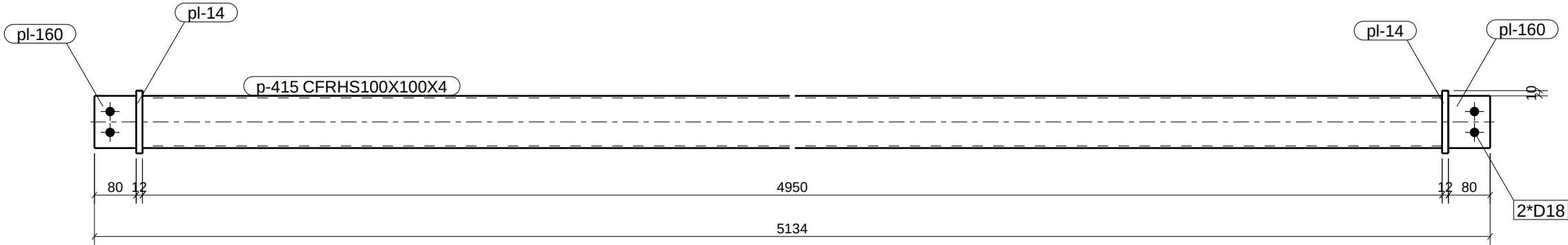
STR-10 Kiekis 4

Zymuo	Profilis	Ilgis	Kiekis	
p-414	CFRHS100X100X4	4924	1	
pl-14	PL12*120	120	2	
pl-160	PL12*100.1	80	2	
			Viso:	62.0

PHASE	QUANTITY
128	4



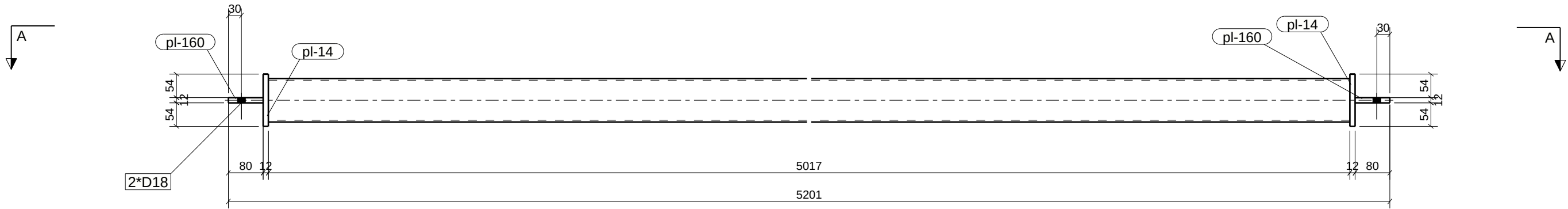
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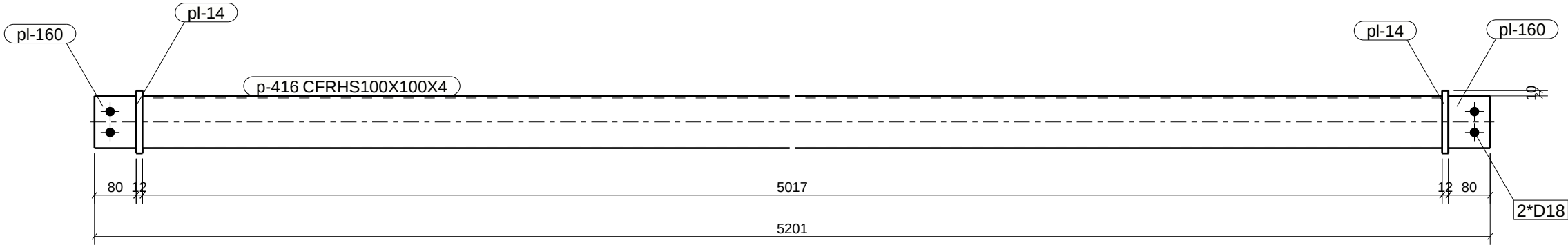
STR-11 Kiekis 4

Zymuo	Profilis	Ilgis	Kiekis	
p-415	CFRHS100X100X4	4950	1	
pl-14	PL12*120	120	2	
pl-160	PL12*100.1	80	2	
			Viso:	
				62.3

PHASE	QUANTITY
128	4



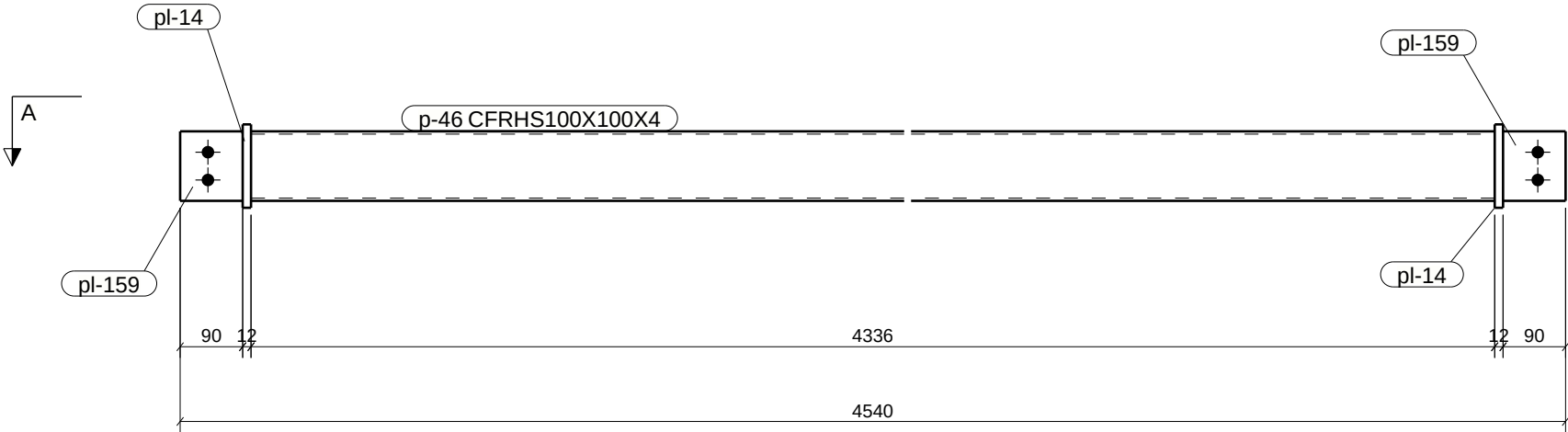
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1:10



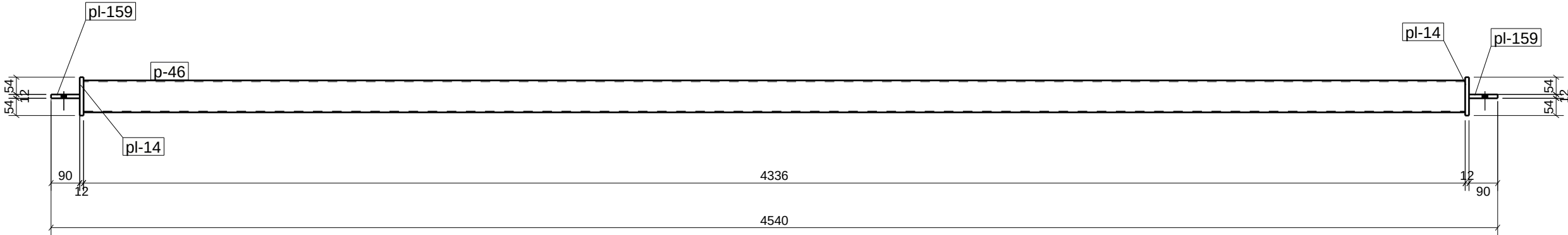
STR-12 Kiekis 2

Zymuo	Profilis	Ilgis	Kiekis	
p-416	CFRHS100X100X4	5017	1	
pl-14	PL12*120	120	2	
pl-160	PL12*100.1	80	2	
			Viso:	
				63.1

PHASE	QUANTITY
128	2



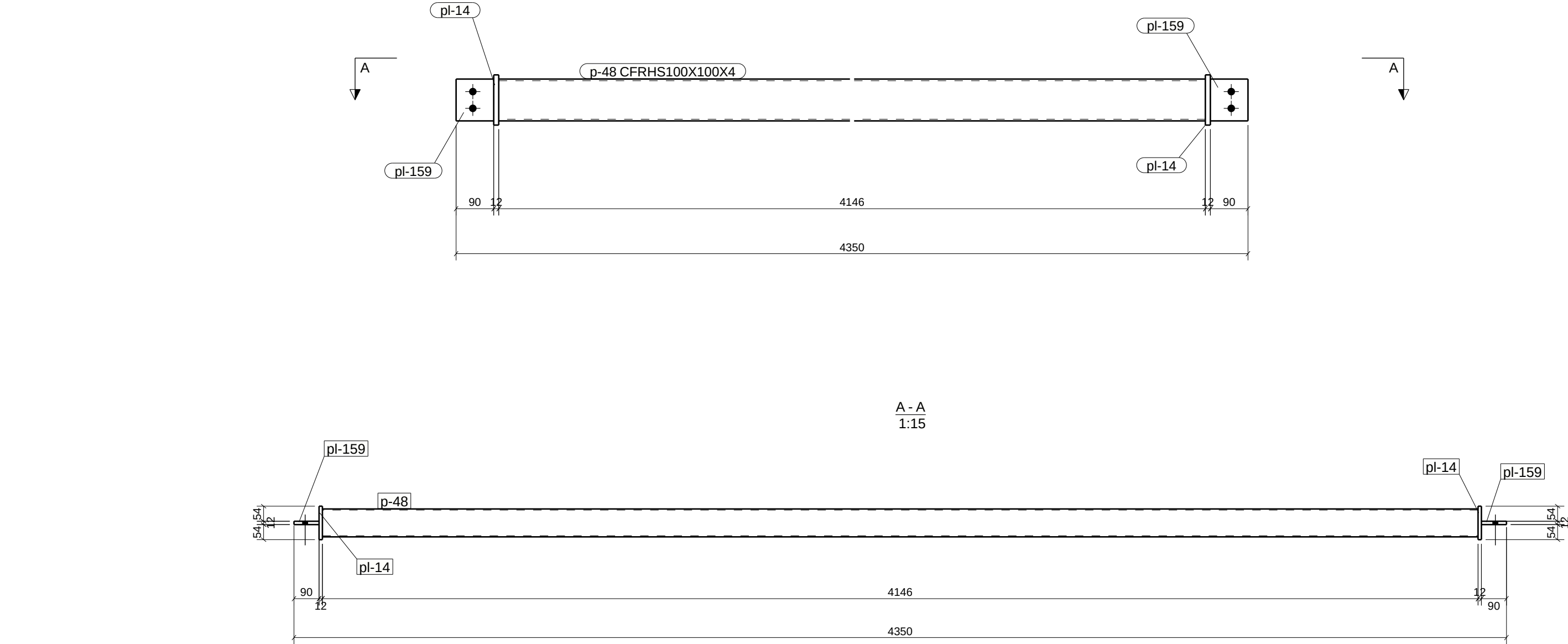
A - A
1:15



STR-19 Kiekis 3

Zymuo	Profilis	Ilgis	Kiekis	
p-46	CFRHS100X100X4	4336	1	
pl-14	PL12*120	120	2	
pl-159	BL12*100	90	2	
			Viso:	
				55.3

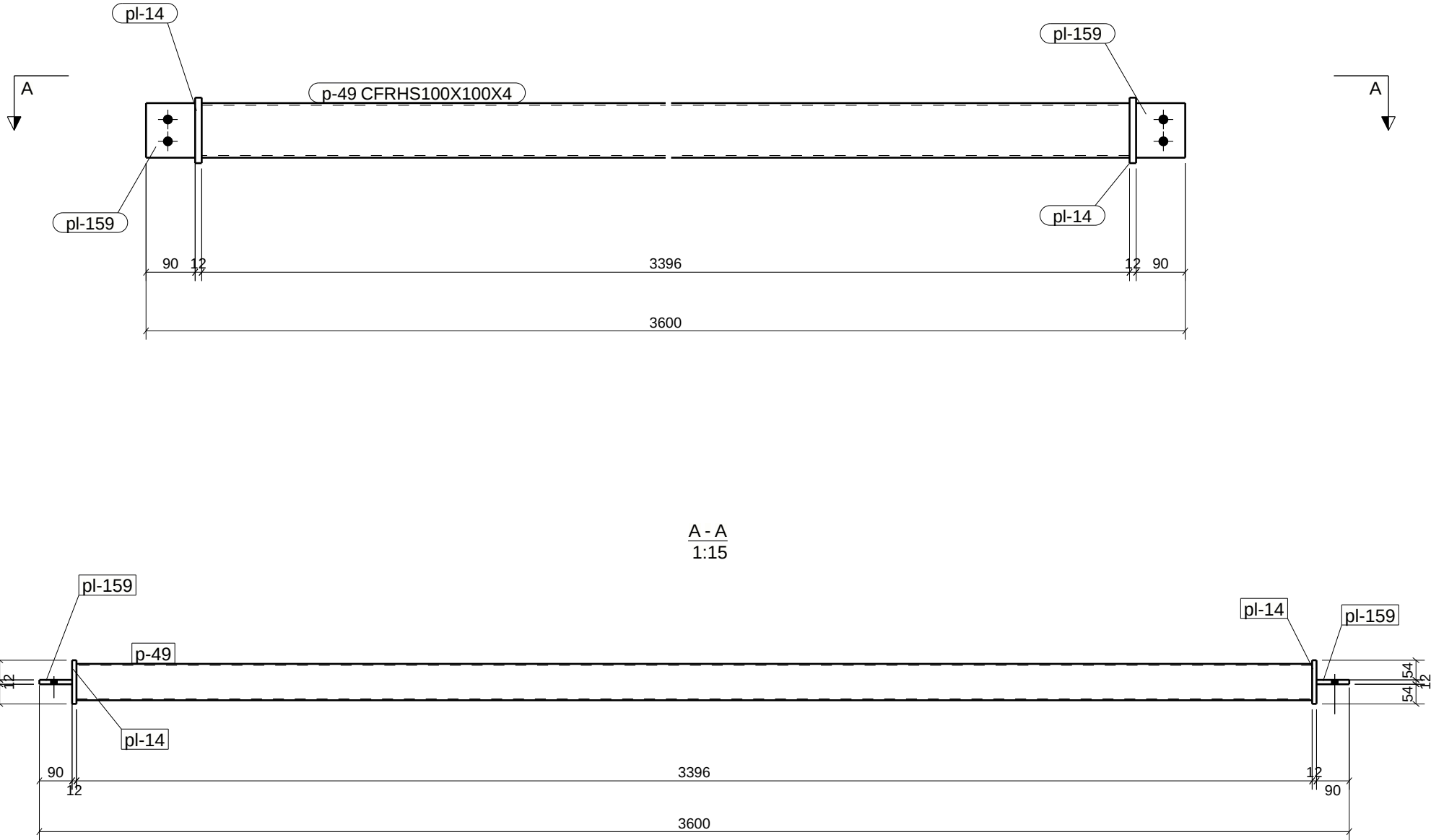
PHASE	QUANTITY
128	3



STR-20 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	
p-48	CFRHS100X100X4	4146	1	
pl-14	PL12*120	120	2	
pl-159	BL12*100	90	2	
			Viso:	
				53.1

PHASE	QUANTITY
128	1



STR-21 Kiekis 1

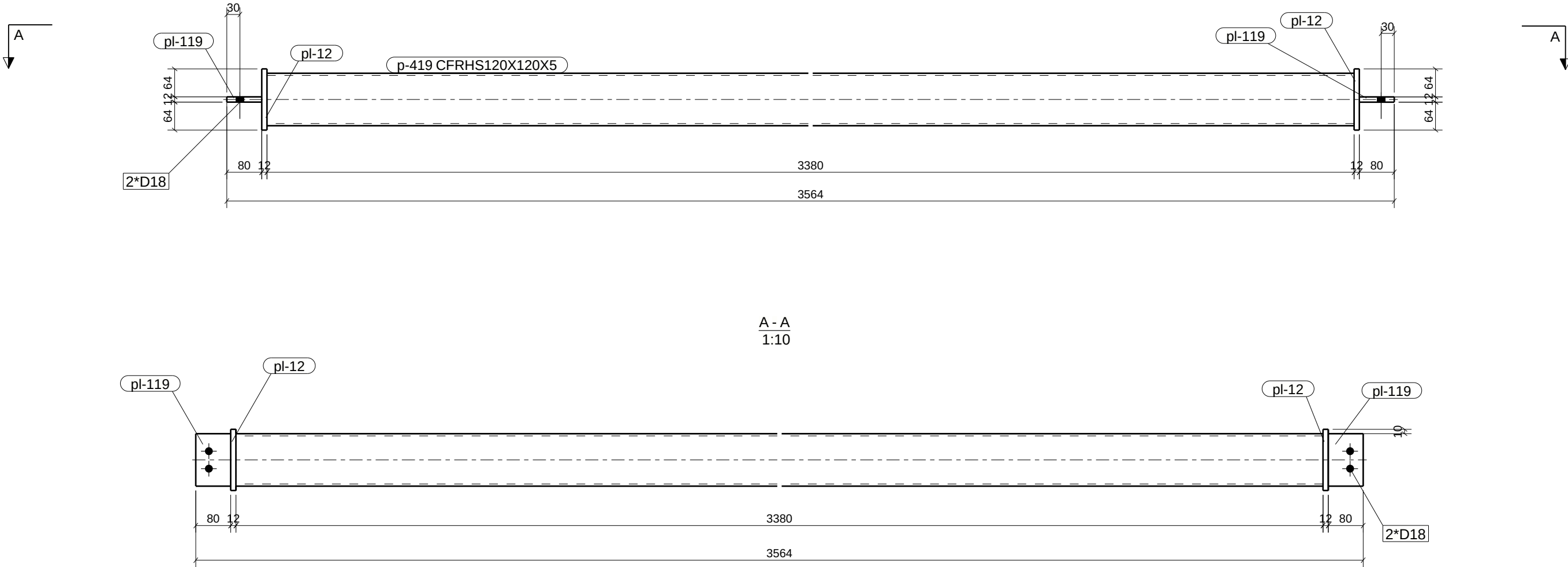
Zymuo	Profilis	Ilgis	Kiekis	
p-49	CFRHS100X100X4	3396	1	
pl-14	PL12*120	120	2	
pl-159	BL12*100	90	2	
			Viso:	
				44.3

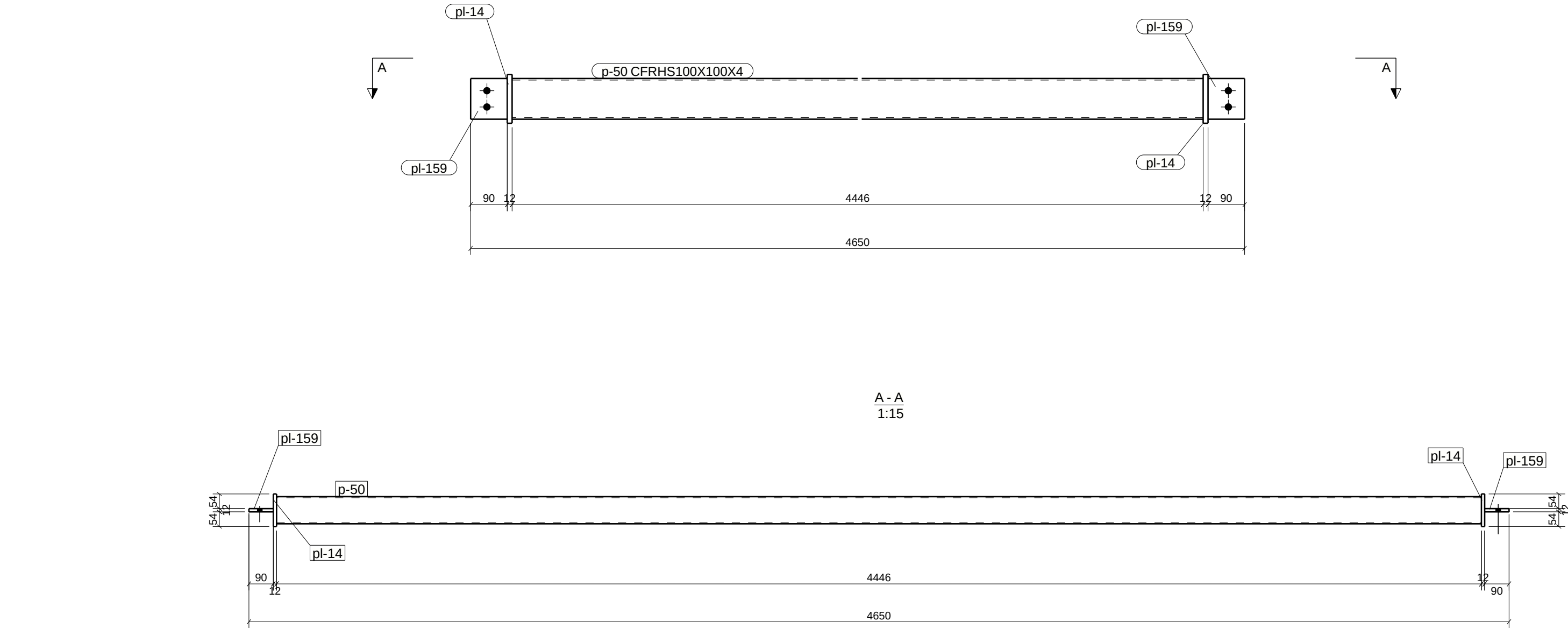
PHASE	QUANTITY
128	1

PHASE	QUANTITY
128	2

STR-22Kiekis2

Zymuo	Profilis	Ilgis	Kiekis	
p-419	CFRHS120X120X5	3380	1	
pl-12	PL12*140	140	2	
pl-119	PL12*120	80	2	
Viso:				64.8

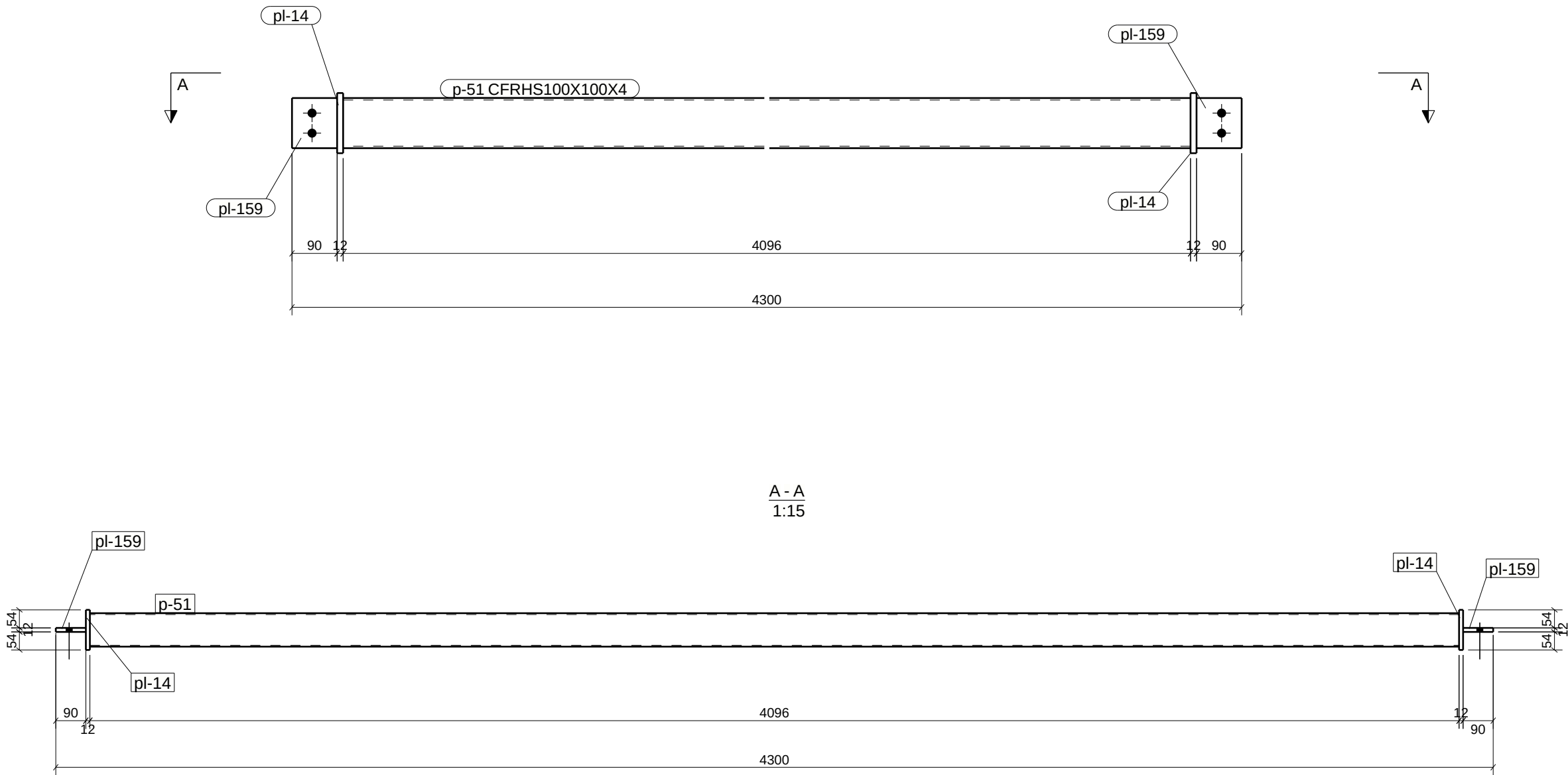




STR-24 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	
p-50	CFRHS100X100X4	4446	1	
pl-14	PL12*120	120	2	
pl-159	BL12*100	90	2	
			Viso:	
				56.6

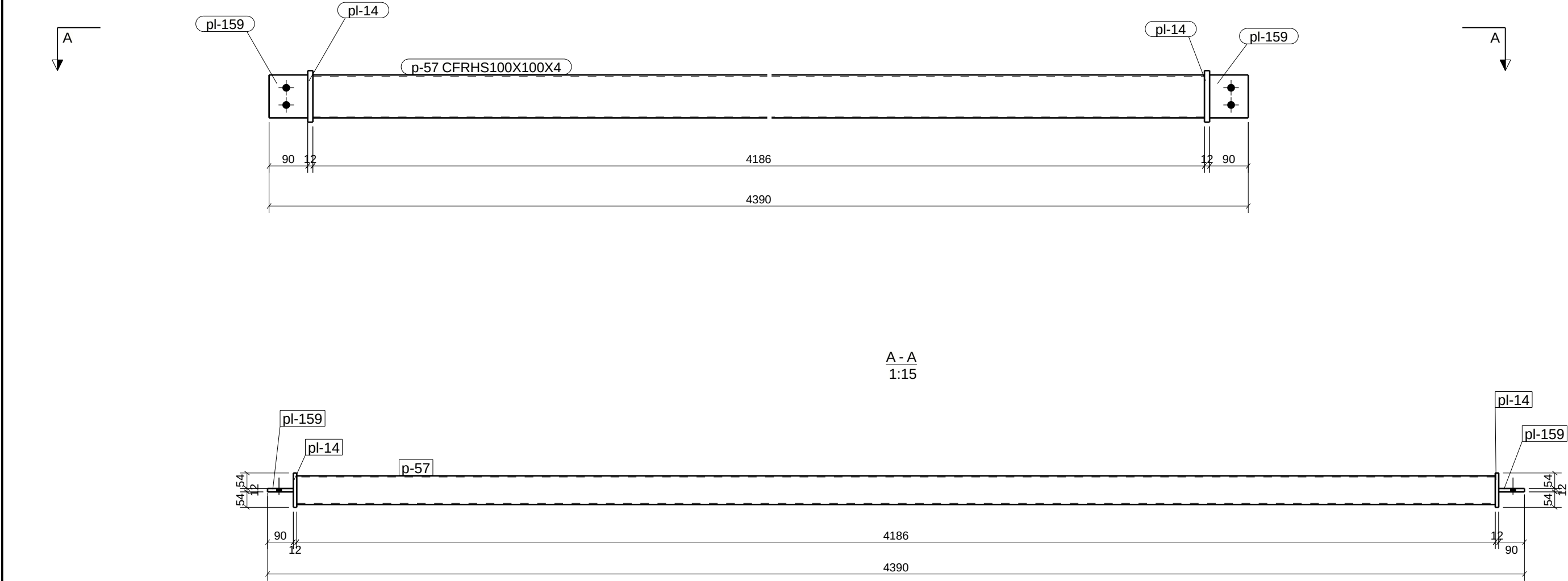
PHASE	QUANTITY
128	1



STR-25 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	
p-51	CFRHS100X100X4	4096	1	
pl-14	PL12*120	120	2	
pl-159	BL12*100	90	2	
			Viso:	
				52.5

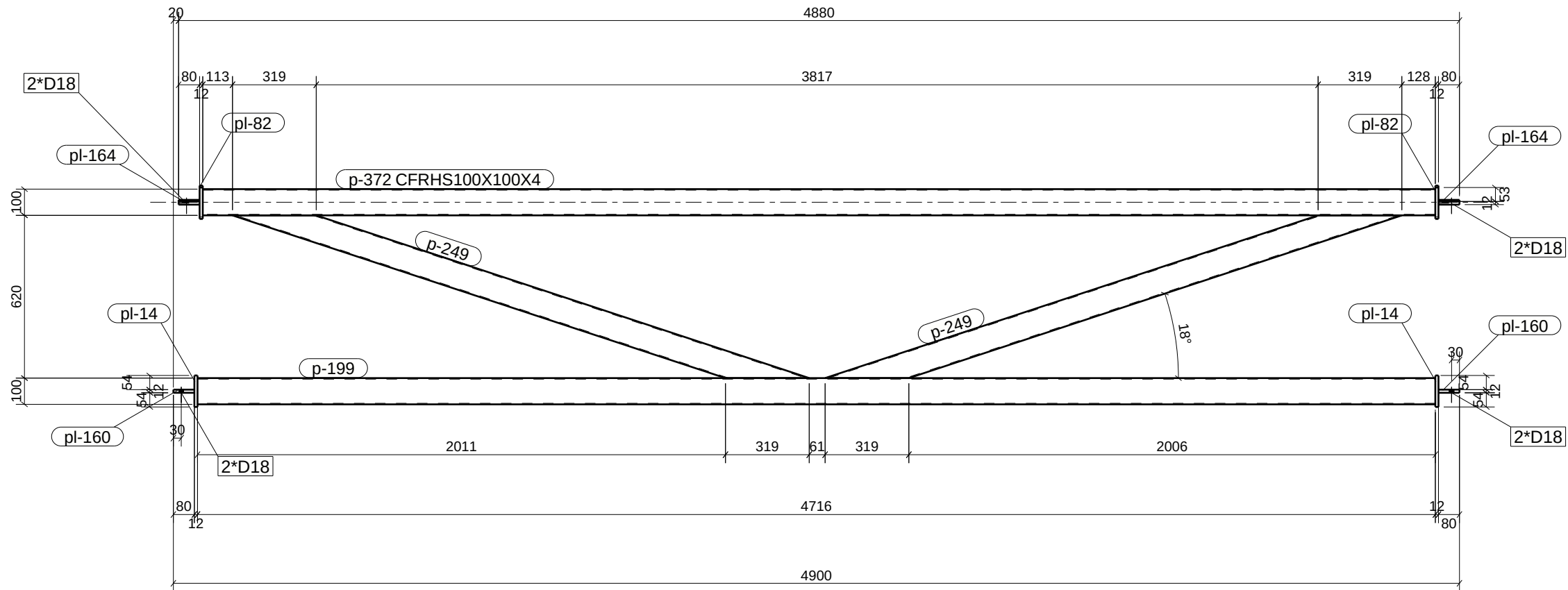
PHASE	QUANTITY
128	1



STR-26 Kiekis 2

PHASE	QUANTITY
128	2

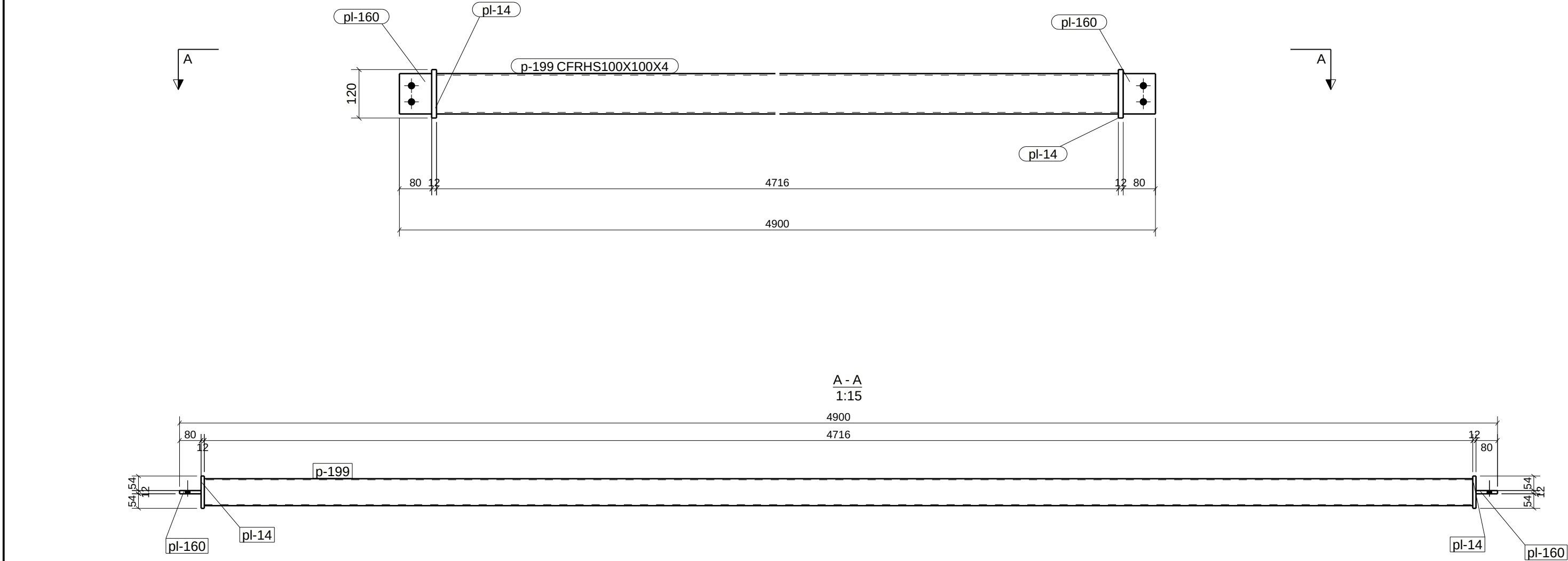
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-57	CFRHS100X100X4	4186	1	49.1
pl-14	PL12*120	120	2	1.4
pl-159	BL12*100	90	2	0.8
			Viso:	53.5



STR-28 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-199	CFRHS100X100X4	4716	1	55.3
p-249	CFRHS100X100X4	2281	2	26.8
p-372	CFRHS100X100X4	4696	1	55.1
pl-14	PL12*120	120	2	1.4
pl-82	PL12*120	126	2	1.4
pl-160	PL12*100	80	2	0.8
pl-164	PL12*105.7	80	2	0.8
			Viso:	172.6

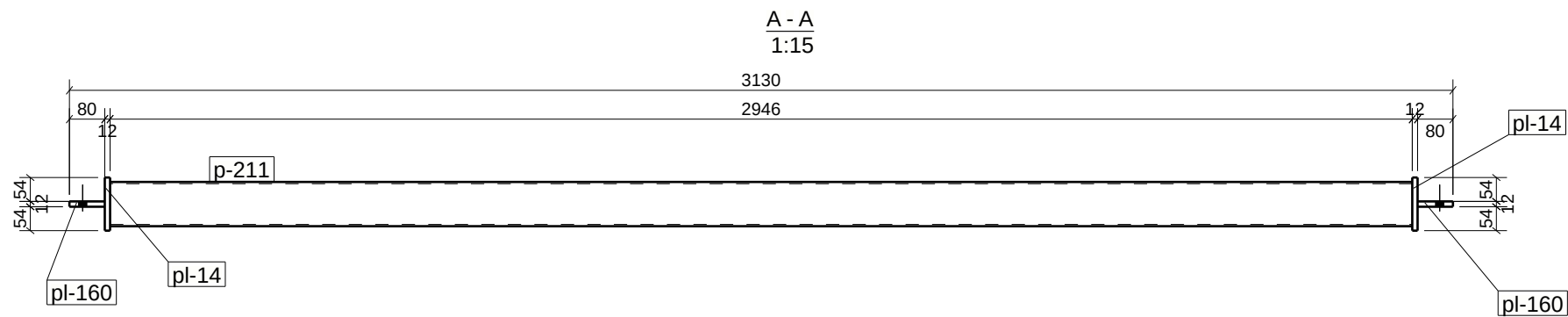
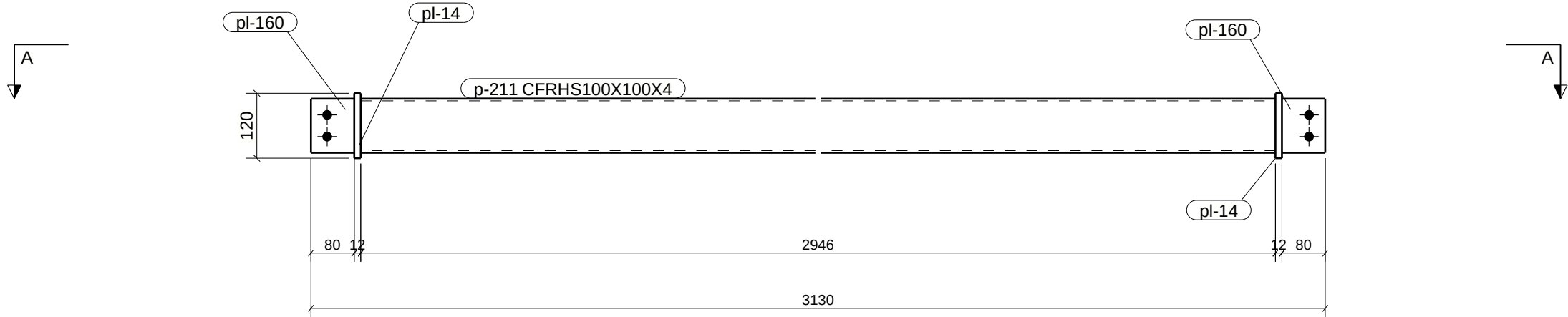
PHASE	QUANTITY
128	1



STR-29 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	
p-199	CFRHS100X100X4	4716	1	
pl-14	PL12*120	120	2	
pl-160	PL12*100	80	2	
			Viso:	59.6

PHASE	QUANTITY
128	1



STR-30 Kiekis 4

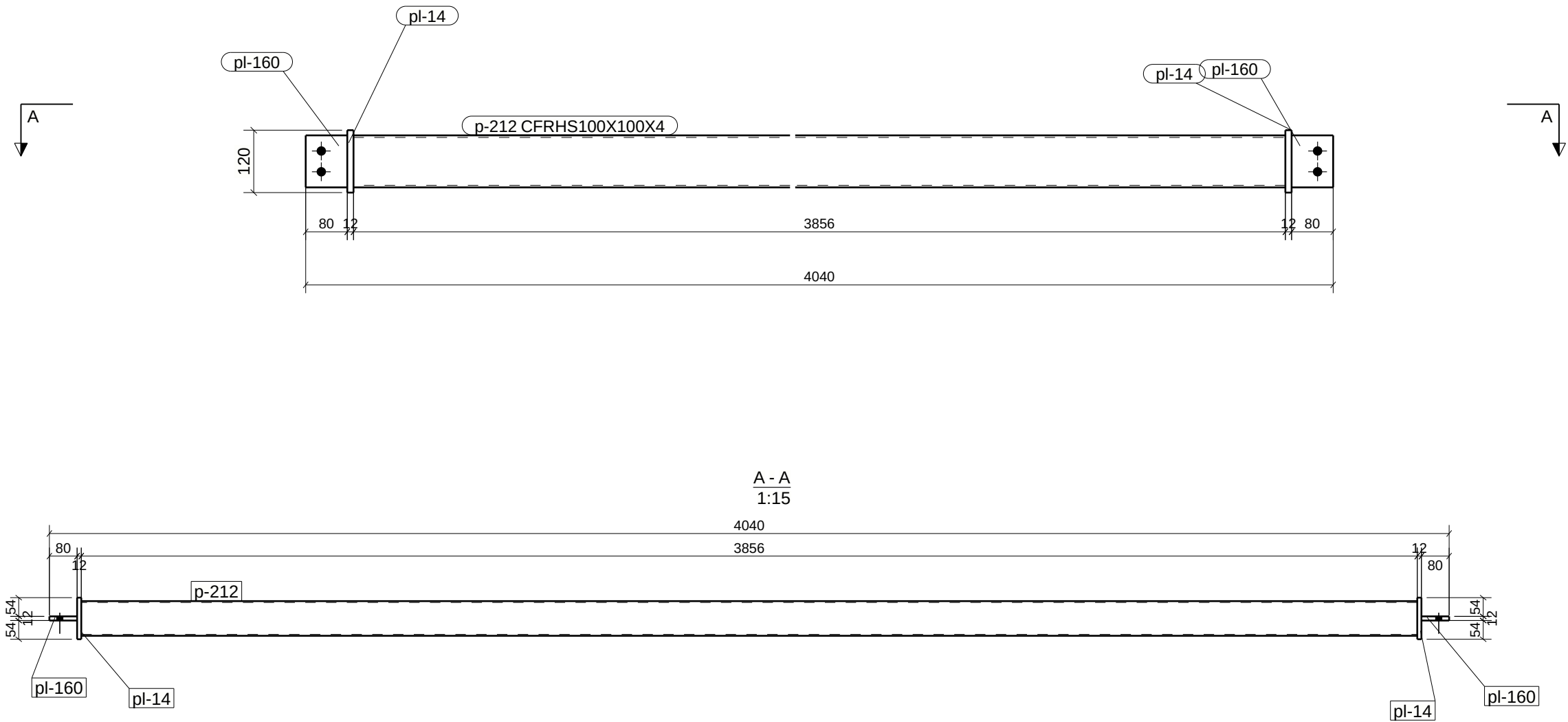
Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-211	CFRHS100X100X4	2946	1	34.6
pl-14	PL12*120	120	2	1.4
pl-160	PL12*100	80	2	0.8
			Viso:	38.8

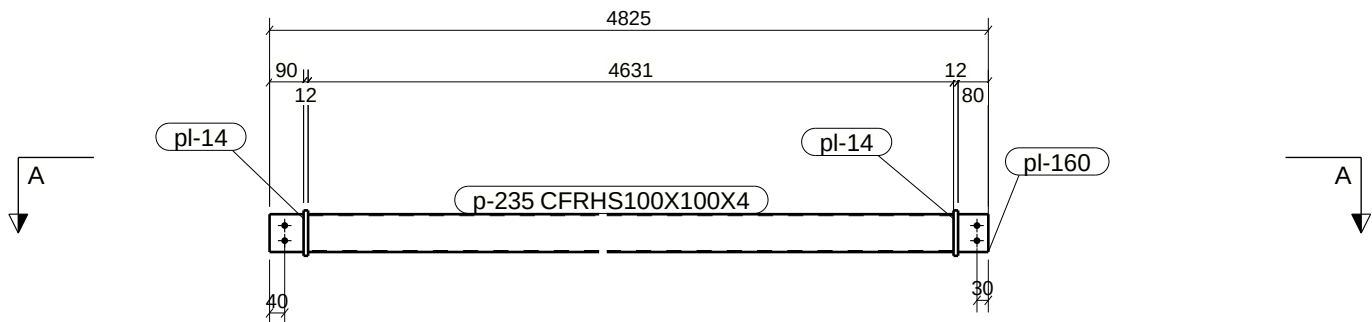
PHASE	QUANTITY
128	4

PHASE	QUANTITY
128	4

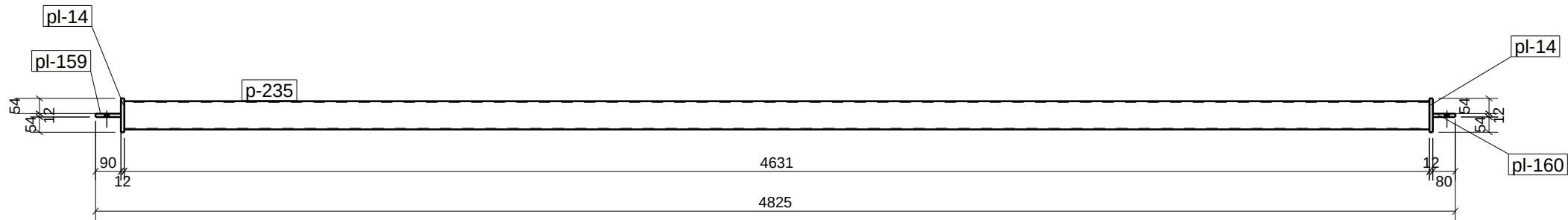
STR-31Kiekis4

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-212	CFRHS100X100X4	3856	1	45.3
pl-14	PL12*120	120	2	1.4
pl-160	PL12*100	80	2	0.8
			Viso:	49.5





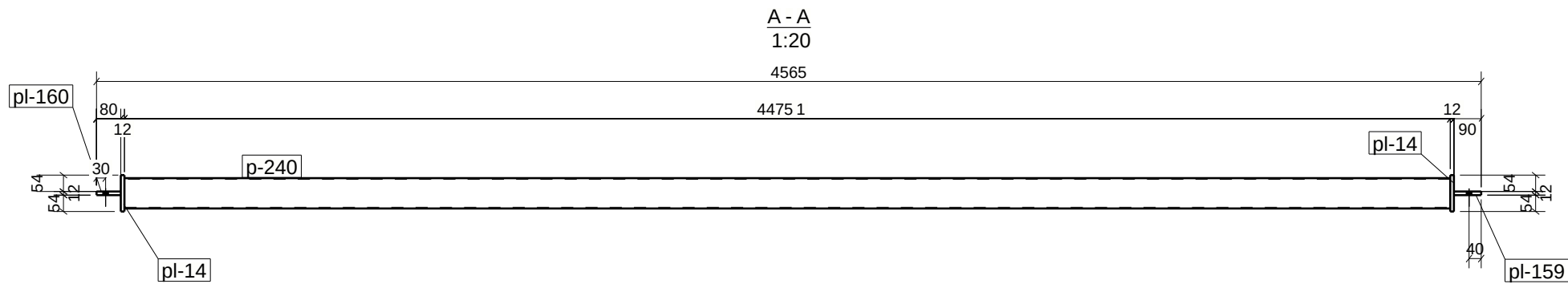
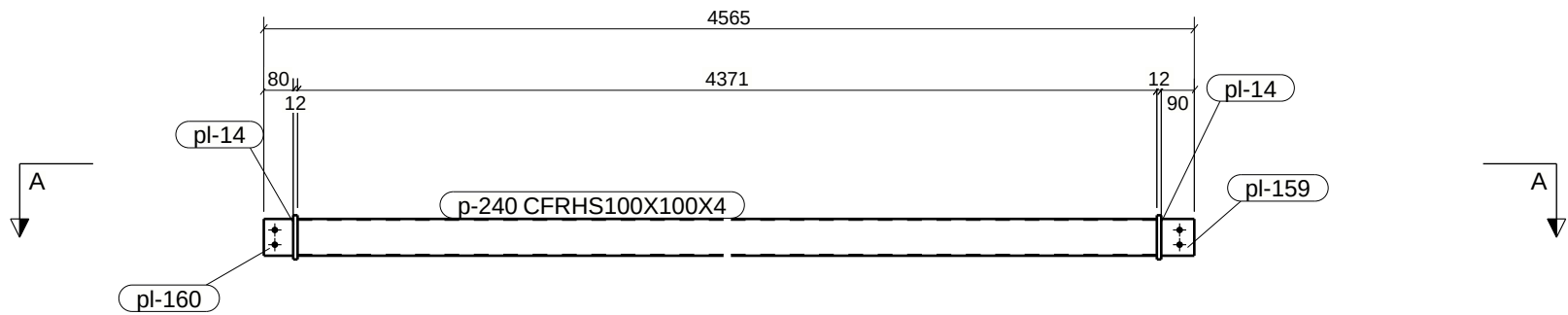
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1:20



STR-38 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-235	CFRHS100X100X4	4631	1	54.3
pl-14	PL12*120	120	2	1.4
pl-159	BL12*100	90	1	0.8
pl-160	PL12*100	80	1	0.8
			Viso:	58.7

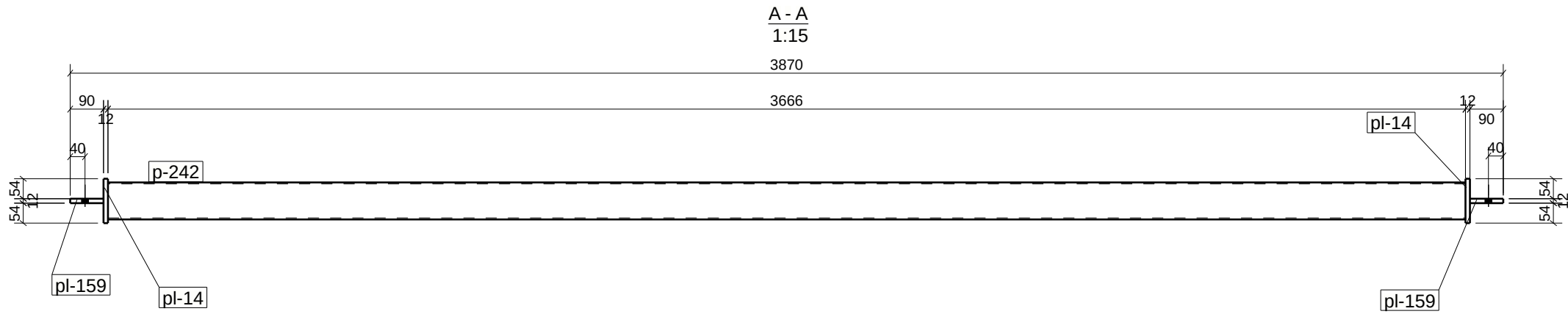
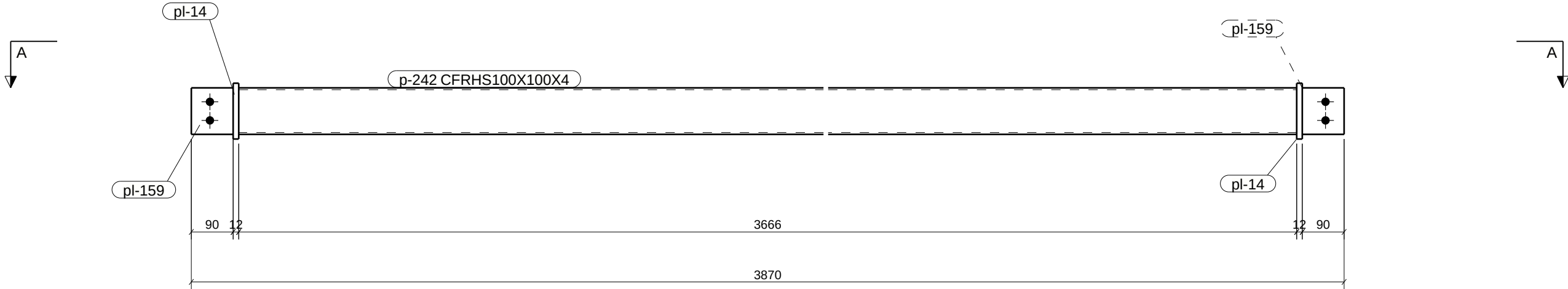
PHASE	QUANTITY
128	1



STR-39 Kiekis 2

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-240	CFRHS100X100X4	4371	1	51.3
pl-14	PL12*120	120	2	1.4
pl-159	BL12*100	90	1	0.8
pl-160	PL12*100	80	1	0.8
			Viso:	55.6

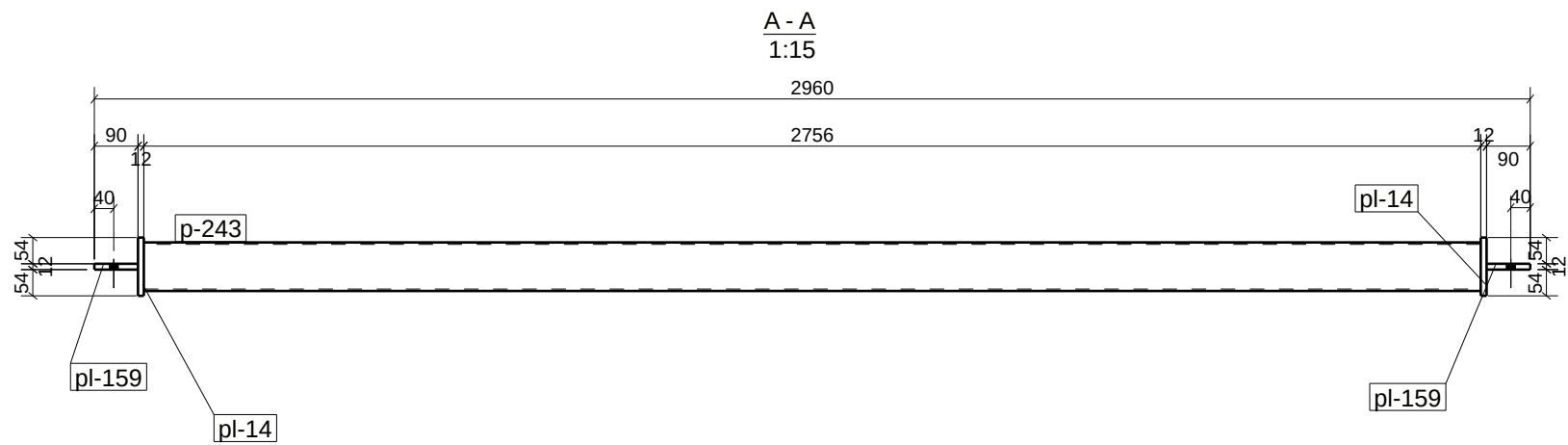
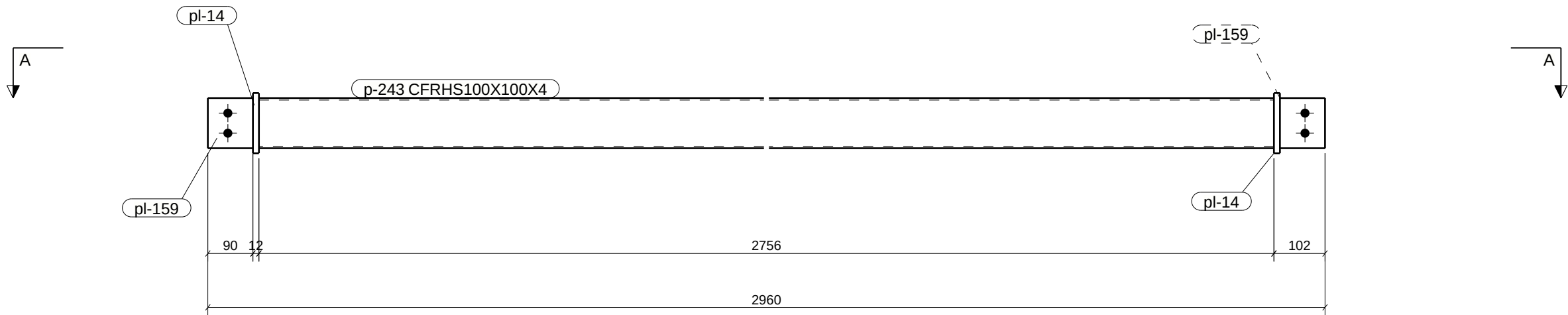
PHASE	QUANTITY
128	2



STR-40 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-242	CFRHS100X100X4	3666	1	43.0
pl-14	PL12*120	120	2	1.4
pl-159	BL12*100	90	2	0.8
			Viso:	47.4

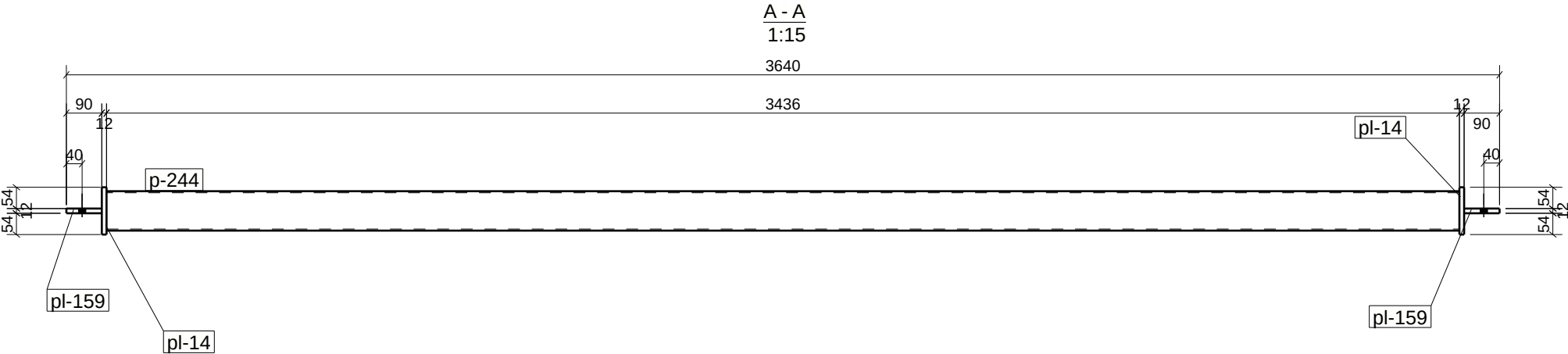
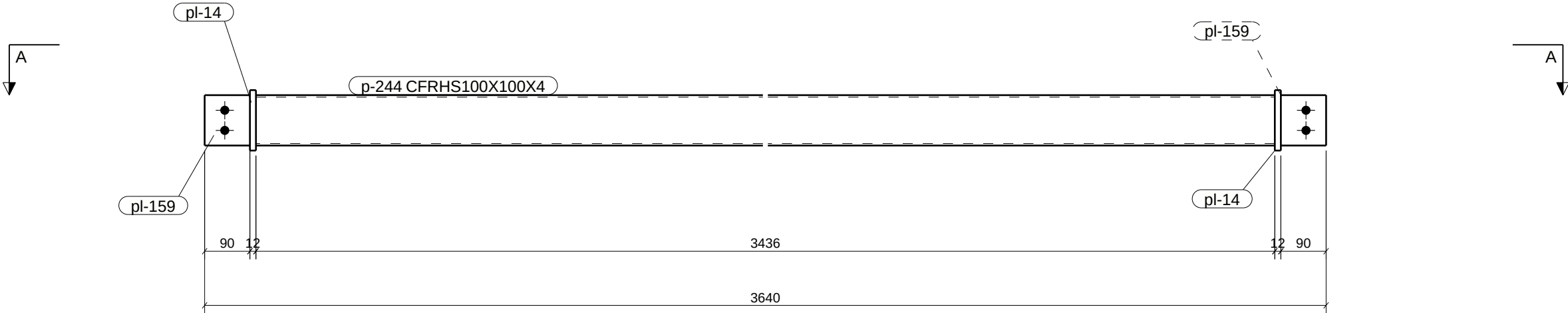
PHASE	QUANTITY
128	1



STR-41 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-243	CFRHS100X100X4	2756	1	32.3
pl-14	PL12*120	120	2	1.4
pl-159	BL12*100	90	2	0.8
			Viso:	36.7

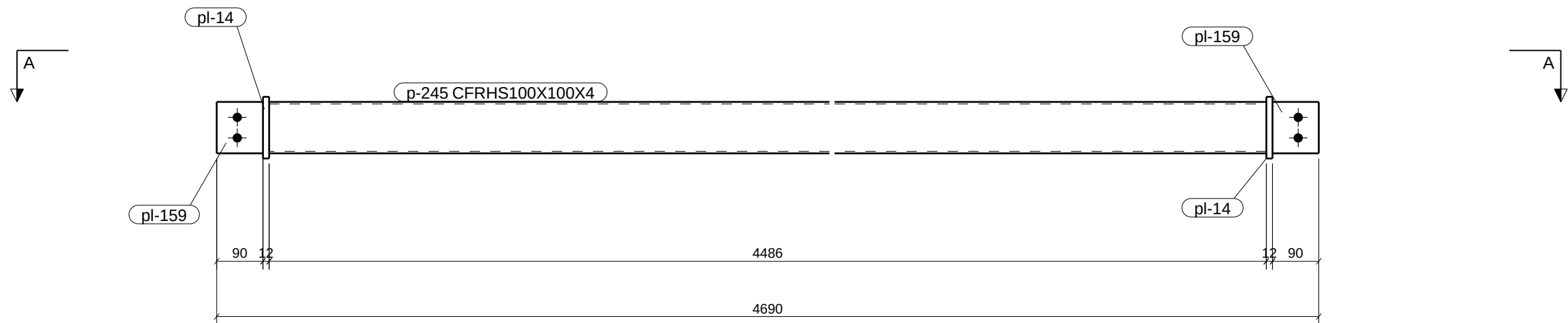
PHASE	QUANTITY
128	1



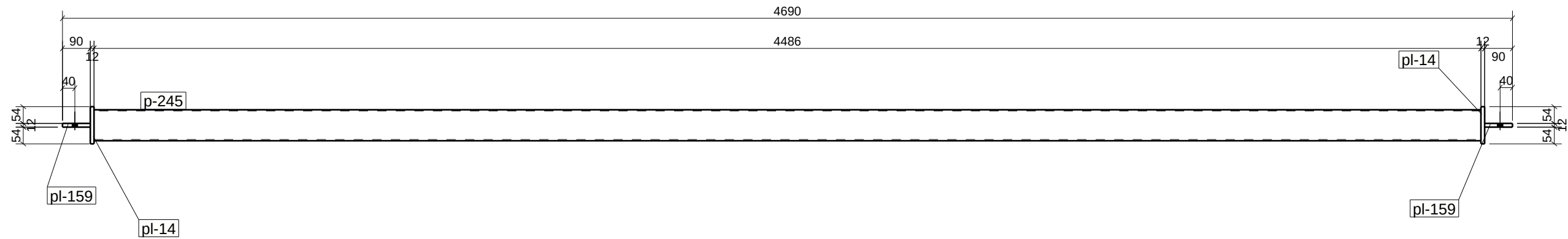
STR-42 Kiekis 2

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-244	CFRHS100X100X4	3436	1	40.3
pl-14	PL12*120	120	2	1.4
pl-159	BL12*100	90	2	0.8
			Viso:	44.7

PHASE	QUANTITY
128	2



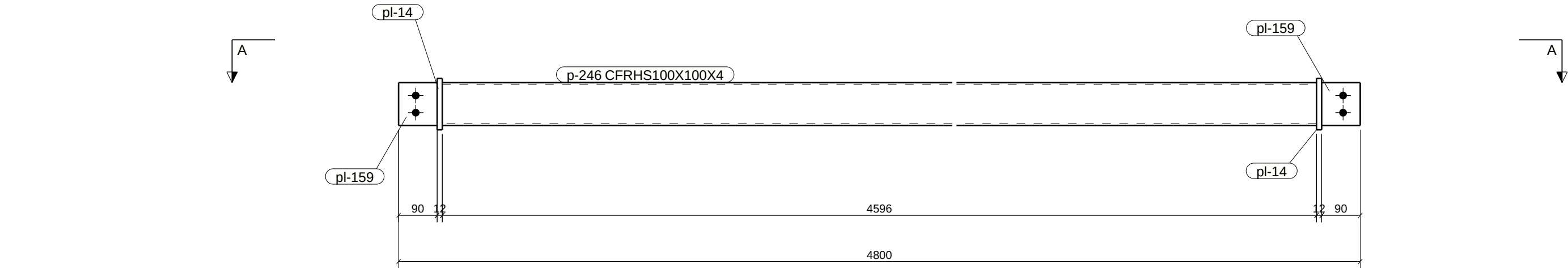
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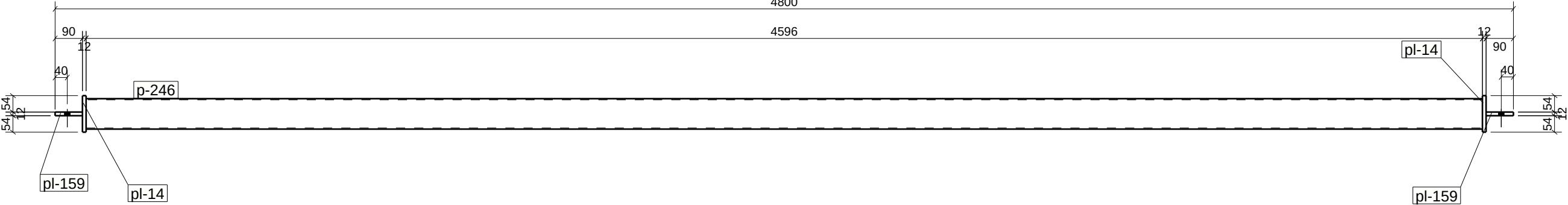
STR-43	Kiekis	2

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-245	CFRHS100X100X4	4486	1	52.6
pI-14	PL12*120	120	2	1.4
pI-159	BL12*100	90	2	0.8
			Viso:	57.0

PHASE	QUANTITY
128	2

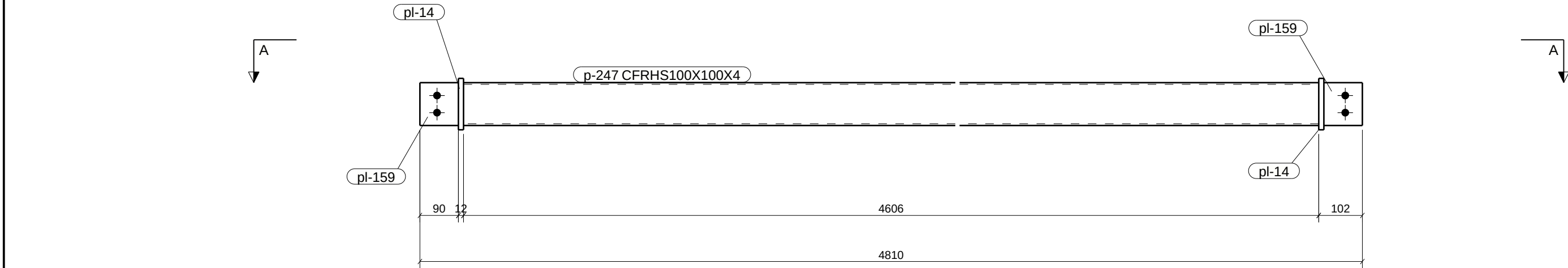


A - A
1:15
4800

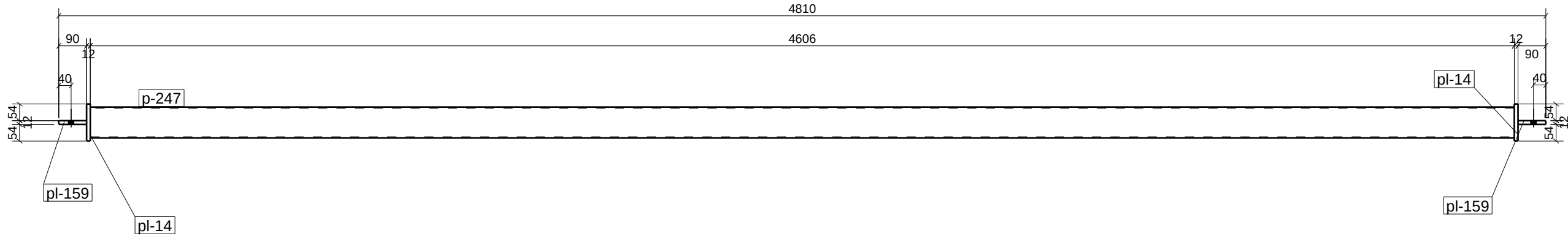


STR-44 Kiekis 4

<table><tr><th>PHASE</th><th>QUANTITY</th></tr><tr><td>128</td><td>4</td></tr></table>		PHASE	QUANTITY	128	4				
		PHASE	QUANTITY						
		128	4						
		Zymuo	Profilis	Ilgis	Kiekis	Svoris			
		p-246	CFRHS100X100X4	4596	1	53.9			
		pI-14	PL12*120	120	2	1.4			
pI-159	BL12*100	90	2	0.8					
			Viso:		58.3				



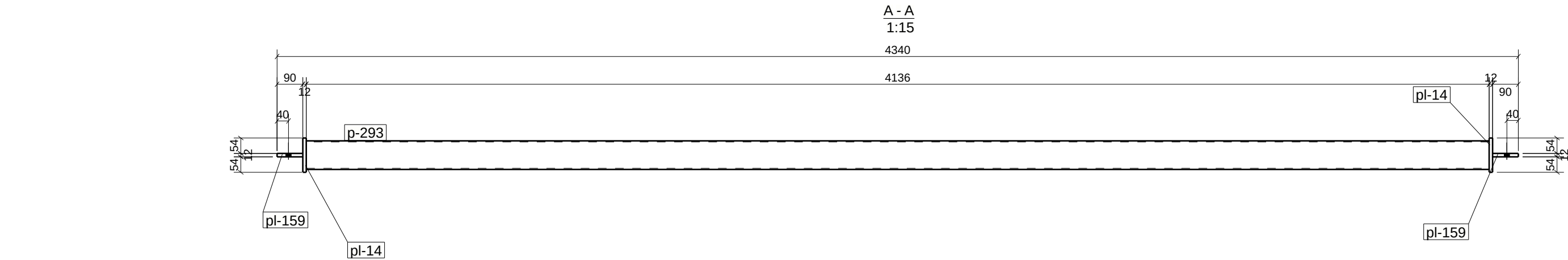
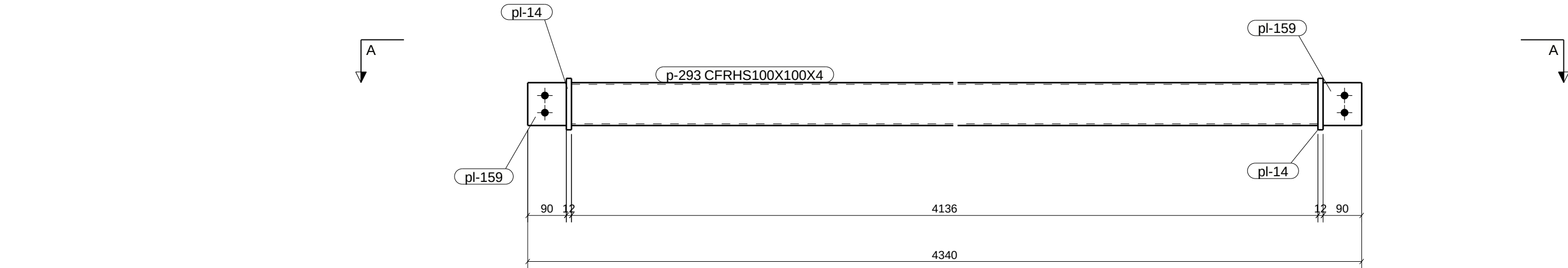
A - A
1:15



STR-45 Kiekis 2

PHASE	QUANTITY
128	2

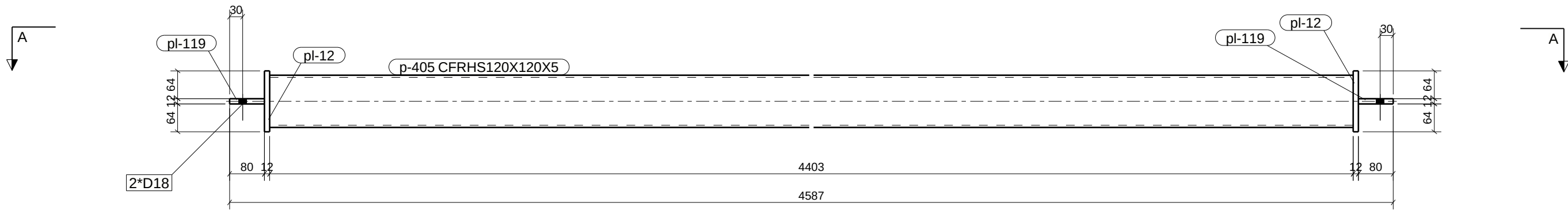
Zymuo	Profilis	Ilgis	Kiekis	
p-247	CFRHS100X100X4	4606	1	
pl-14	PL12*120	120	2	
pl-159	BL12*100	90	2	
			Viso:	58.5



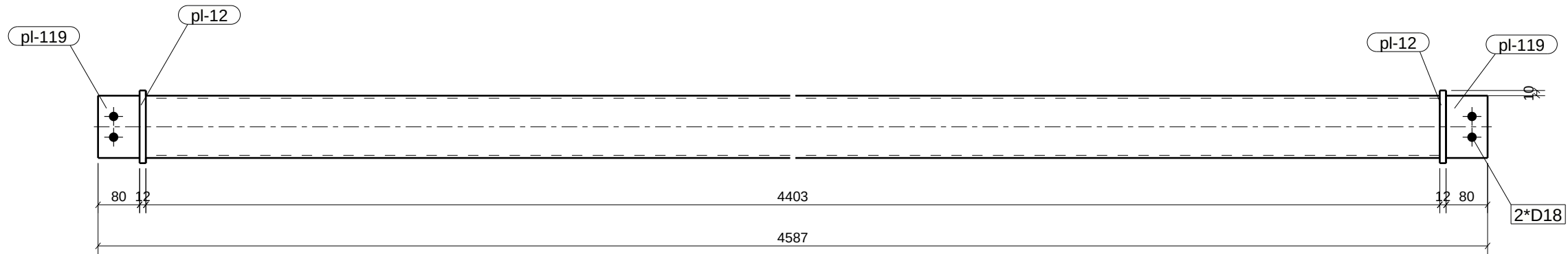
STR-46 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	
p-293	CFRHS100X100X4	4136	1	
pl-14	PL12*120	120	2	
pl-159	BL12*100	90	2	
			Viso:	
				52.9

PHASE	QUANTITY
128	1



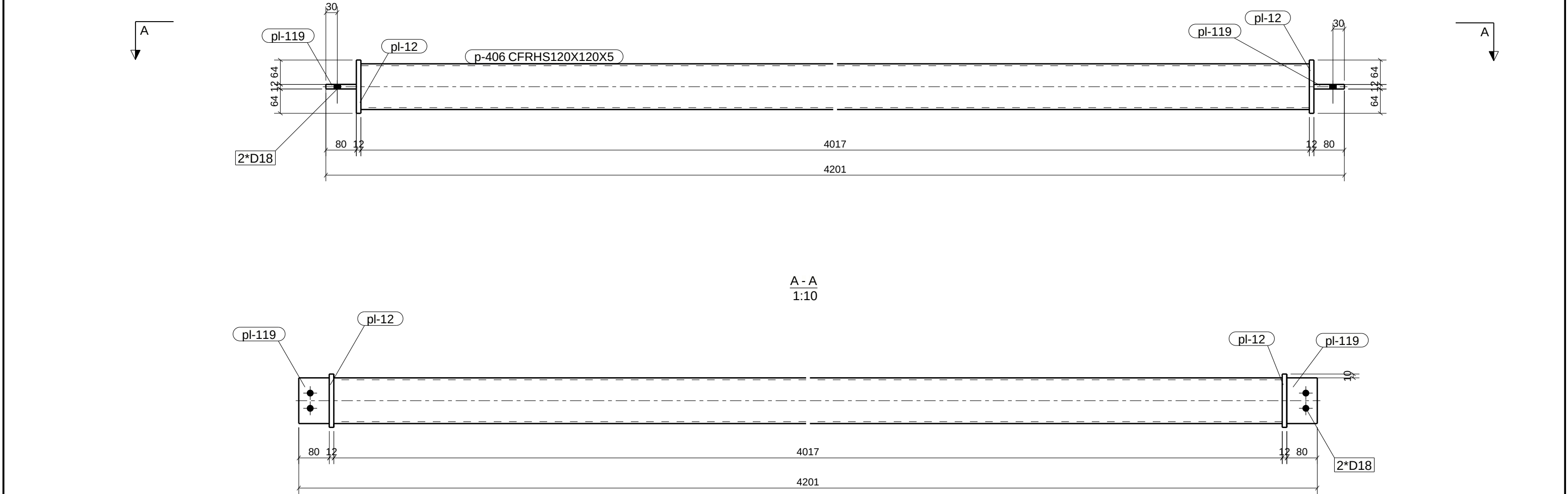
A - A
1:10



STR-47 Kiekis 2

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-405	CFRHS120X120X5	4403	1	77.3
pl-12	PL12*140	140	2	1.8
pl-119	PL12*120	80	2	0.9
			Viso:	82.8

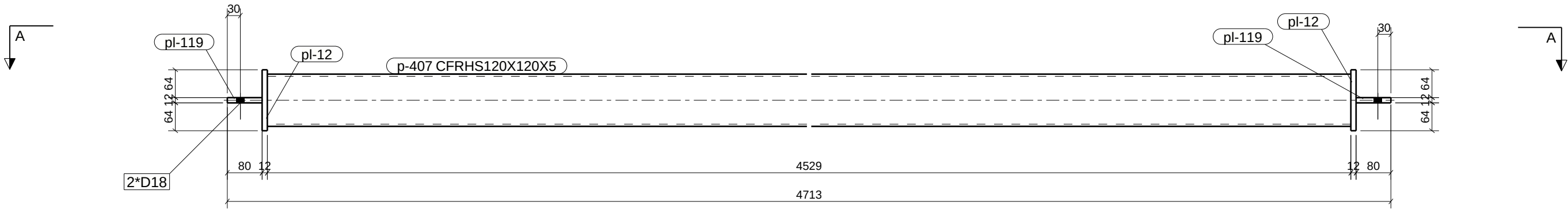
PHASE	QUANTITY
128	2



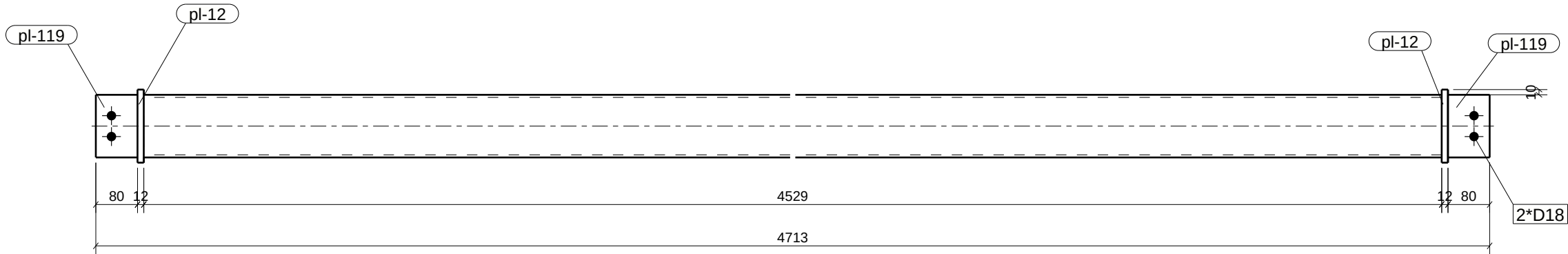
STR-49 Kiekis 2

Zymuo	Profilis	Ilgis	Kiekis	
p-406	CFRHS120X120X5	4017	1	
pl-12	PL12*140	140	2	
pl-119	PL12*120	80	2	
Viso:			76.0	

PHASE	QUANTITY
128	2



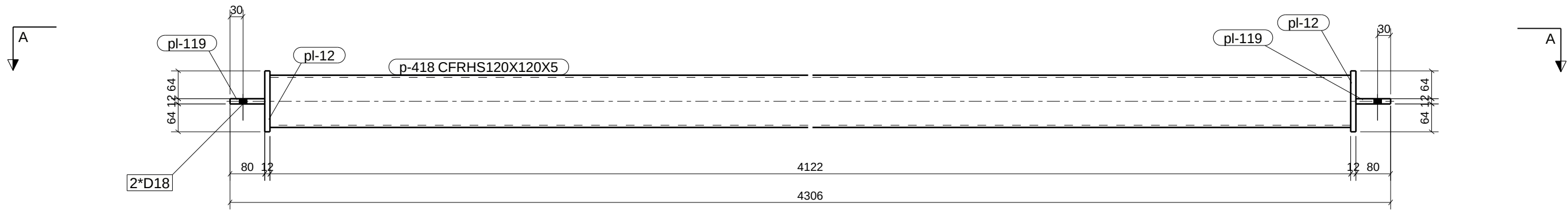
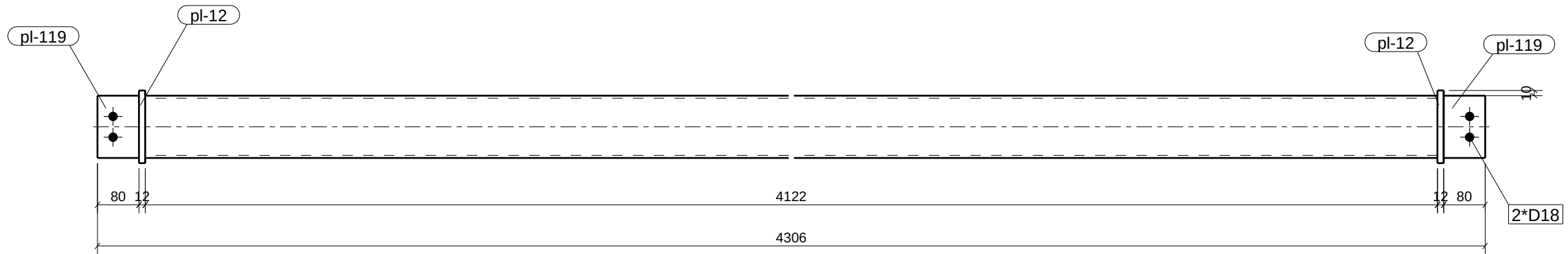
A - A
1:10



STR-51 Kiekis 2

Zymuo	Profilis	Ilgis	Kiekis	
p-407	CFRHS120X120X5	4529	1	
pl-12	PL12*140	140	2	
pl-119	PL12*120	80	2	
			Viso:	85.0

PHASE	QUANTITY
128	2

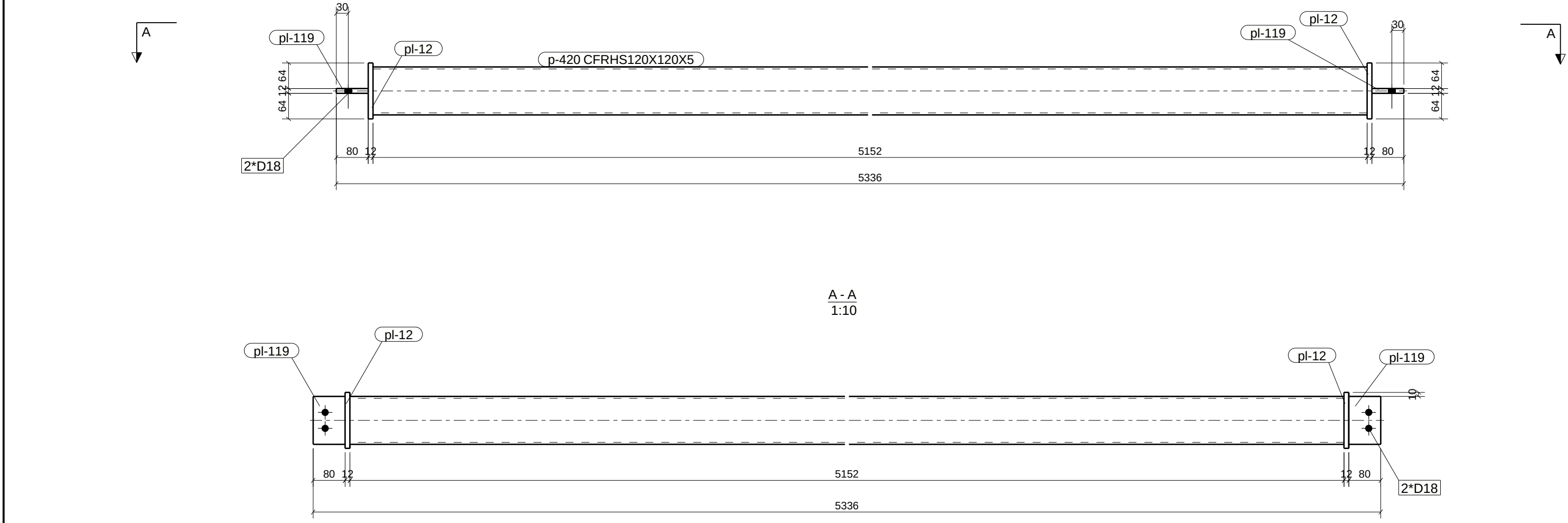

$$\frac{A - A}{1:10}$$


STR-53

Kiekis	2

Zymuo	Profilis	Ilgis	Kiekis	Svoris
p-418	CFRHS120X120X5	4122	1	72.3
pl-12	PL12*140	140	2	1.8
pl-119	PL12*120	80	2	0.9
			Viso:	77.8

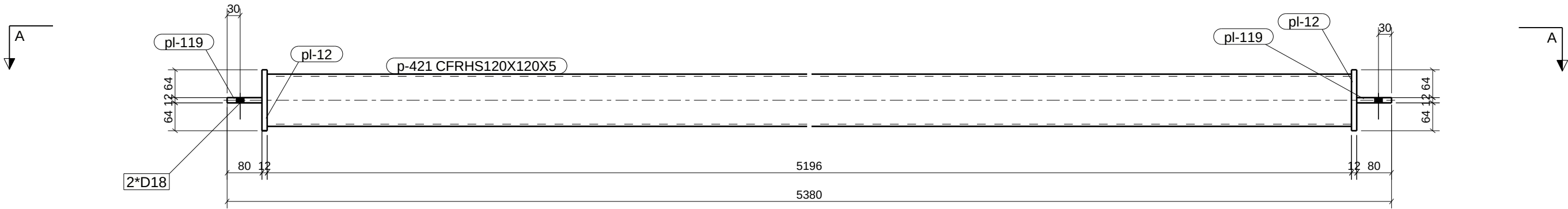
PHASE	QUANTITY
128	2



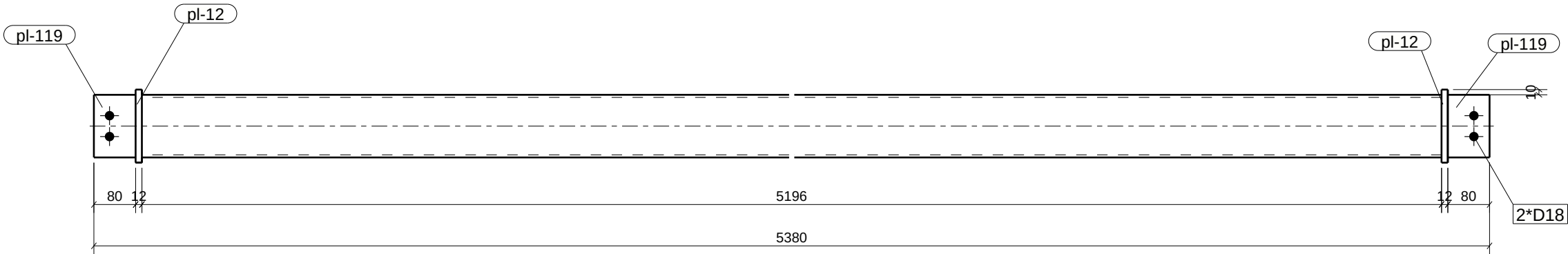
STR-70 Kiekis 2

PHASE	QUANTITY
128	2

Zymuo	Profilis	Ilgis	Kiekis	
p-420	CFRHS120X120X5	5152	1	
pl-12	PL12*140	140	2	
pl-119	PL12*120	80	2	
			Viso:	95.9



A - A
1:10



STR-71 Kiekis 2

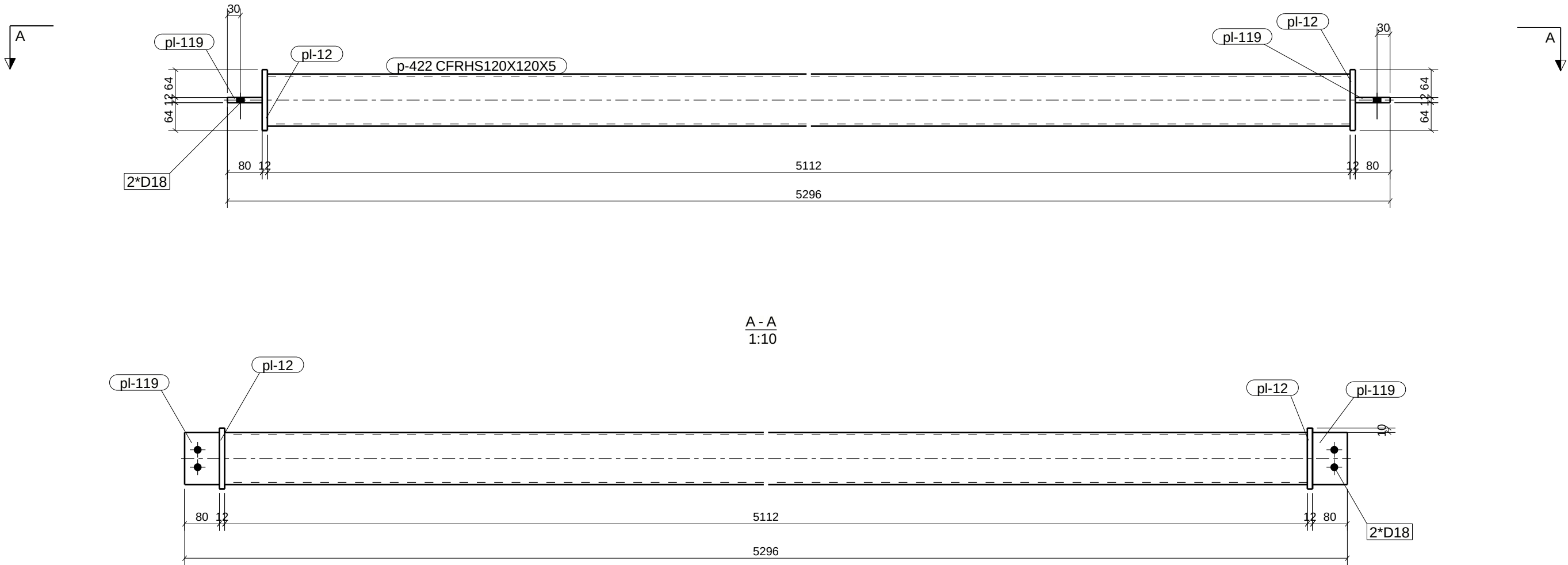
Zymuo	Profilis	Ilgis	Kiekis	
p-421	CFRHS120X120X5	5196	1	
pl-12	PL12*140	140	2	
pl-119	PL12*120	80	2	
			Viso:	
				96.7

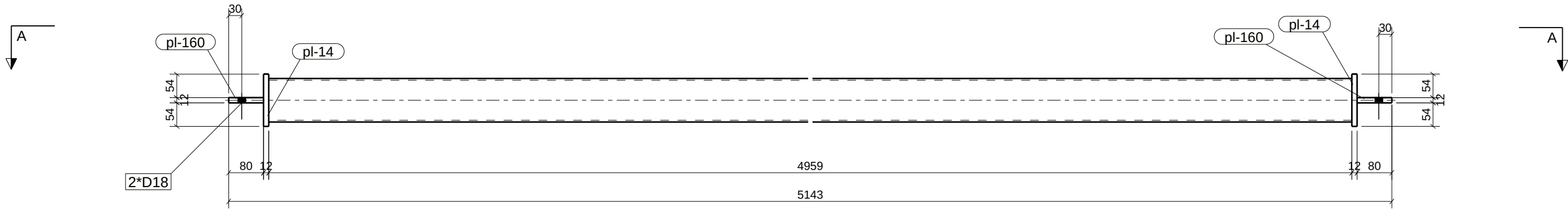
PHASE	QUANTITY
128	2

PHASE	QUANTITY
128	2

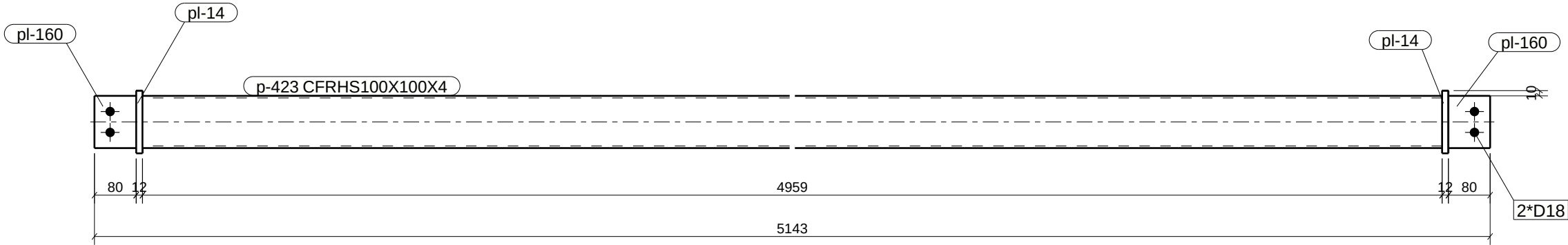
STR-72 Kiekis 2

Zymuo	Profilis	Ilgis	Kiekis	
p-422	CFRHS120X120X5	5112	1	
pl-12	PL12*140	140	2	
pl-119	PL12*120	80	2	
			Viso:	95.2





A - A
1:10



STR-73 Kiekis 2

Zymuo	Profilis	Ilgis	Kiekis	
p-423	CFRHS100X100X4	4959	1	
pl-14	PL12*120	120	2	
pl-160	PL12*100.1	80	2	
			Viso:	
				62.4

PHASE	QUANTITY
128	2

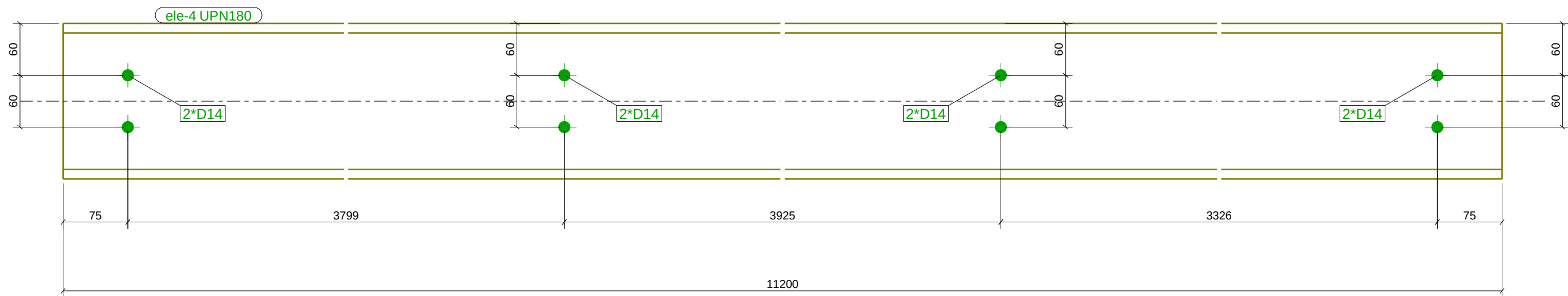


Tekla Structures

PHASE	QUANTITY
128	1

6 priedas

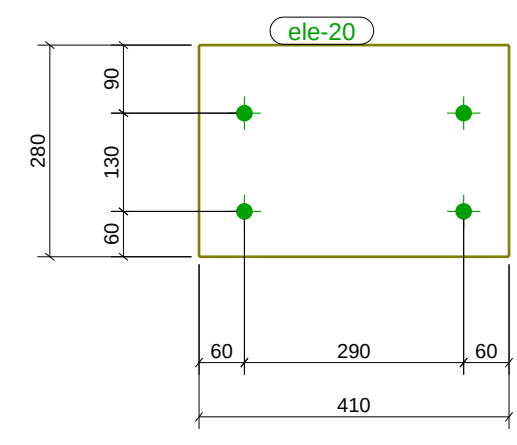
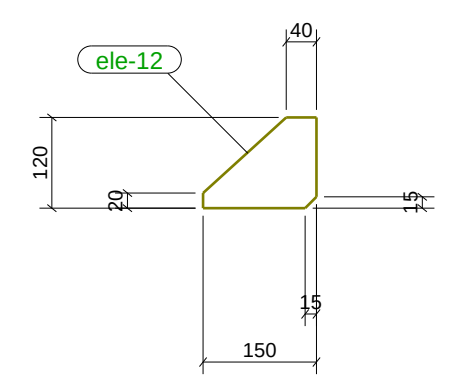
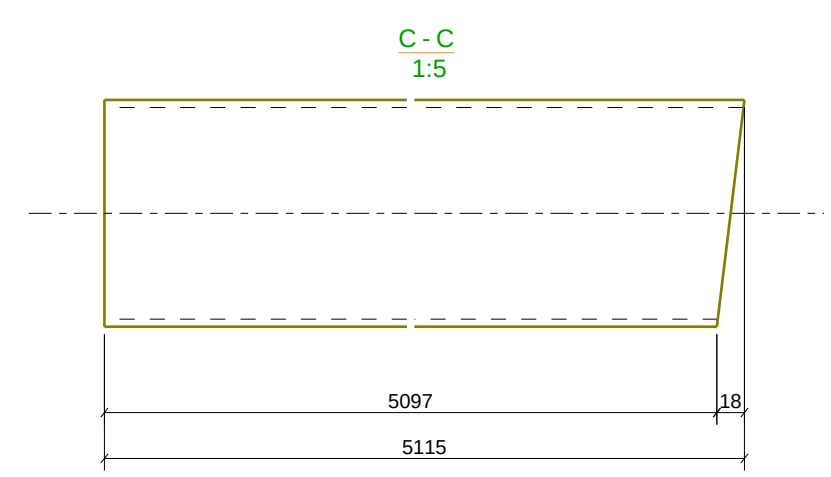
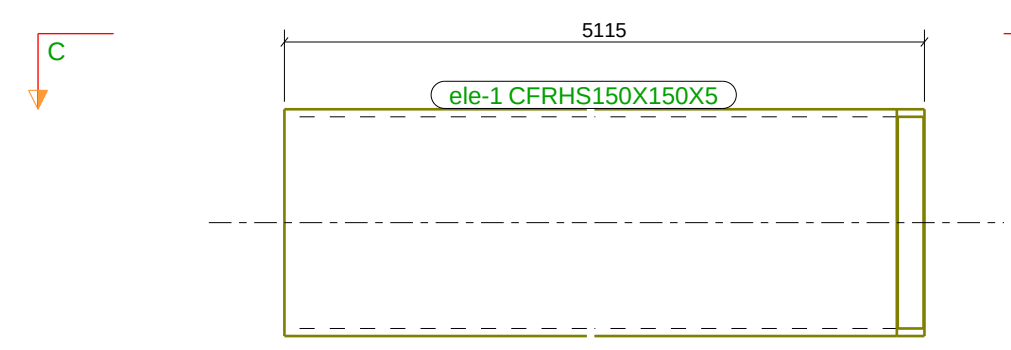
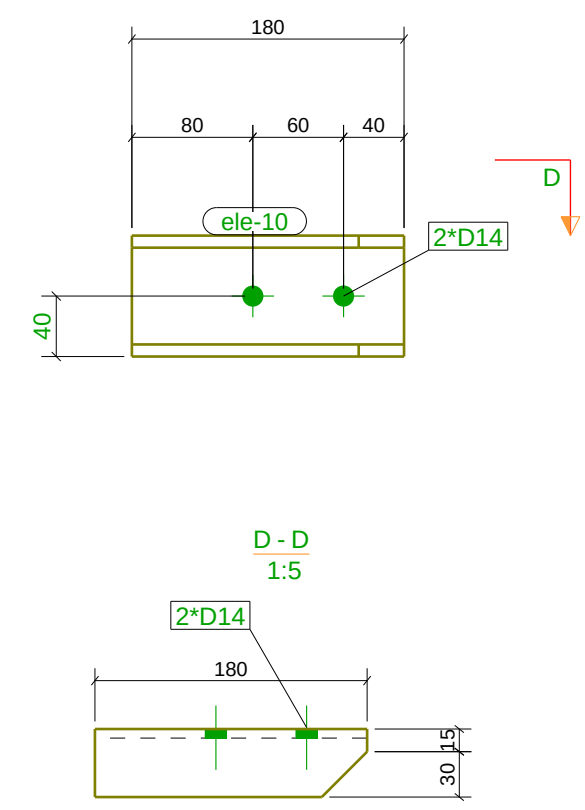
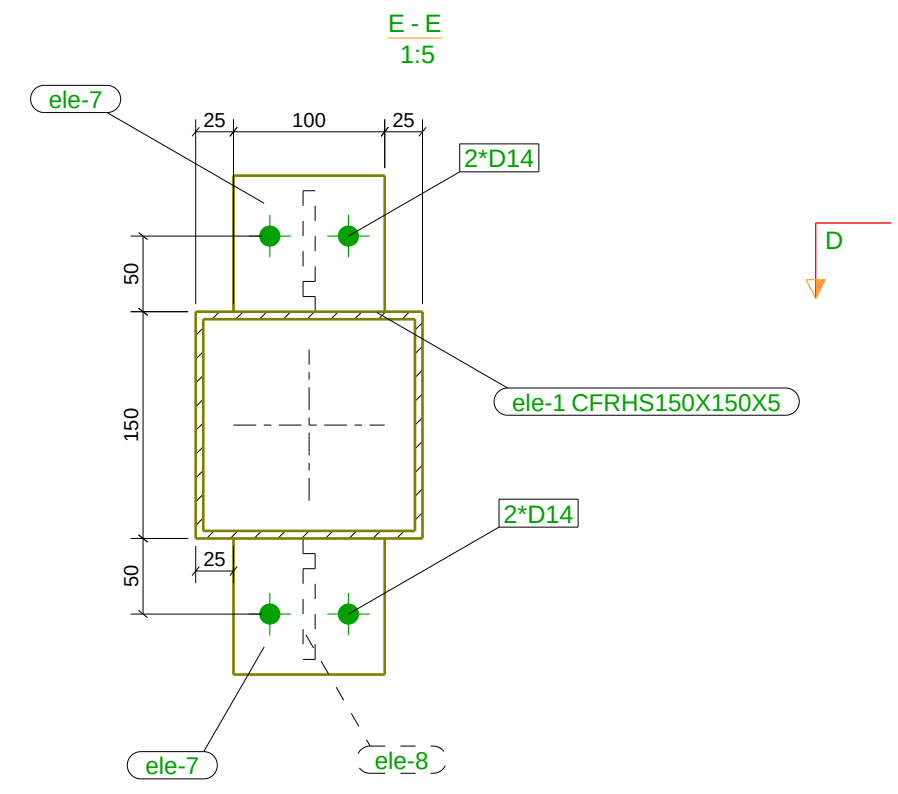
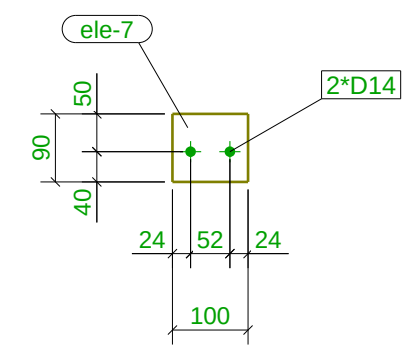
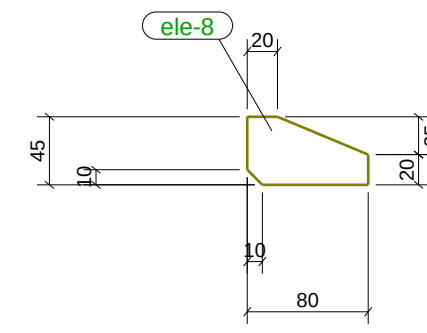
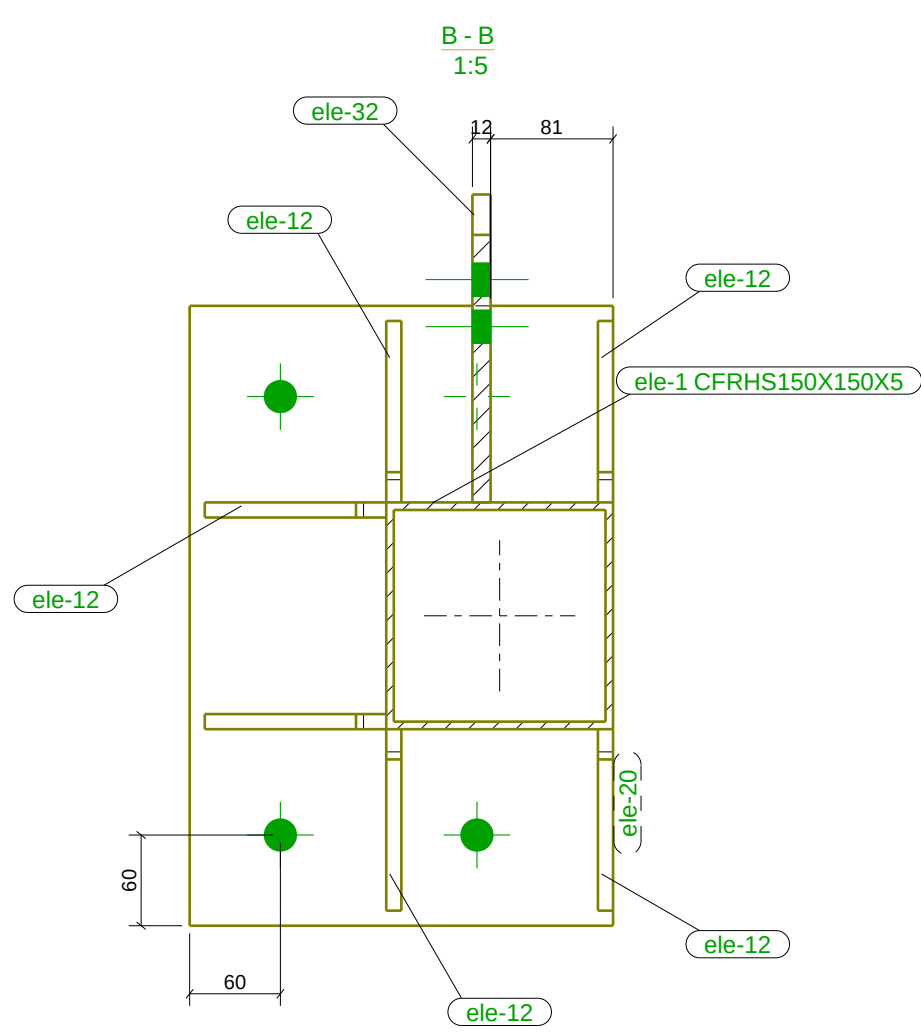
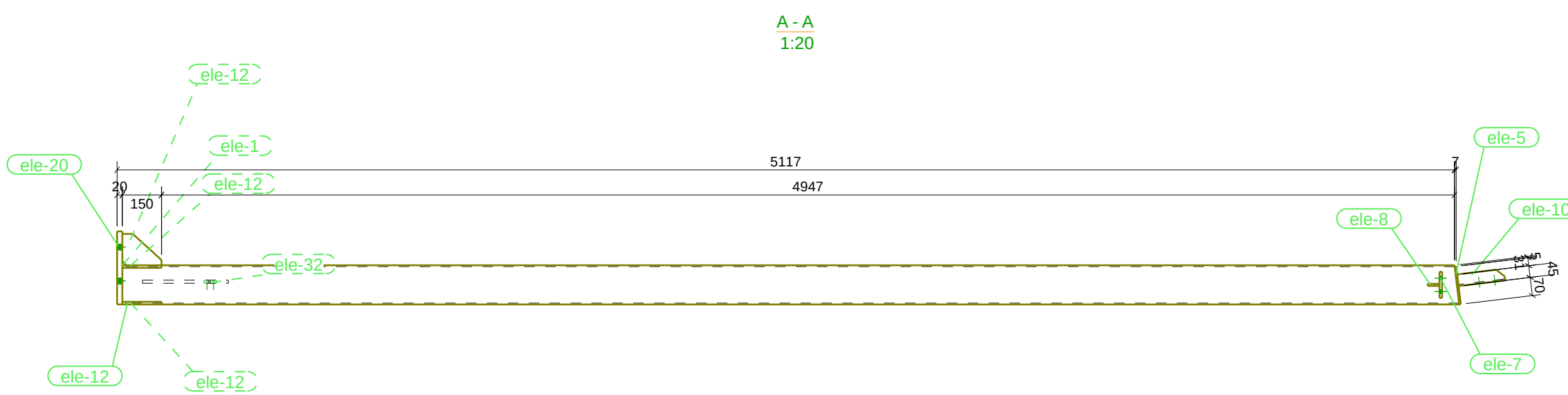
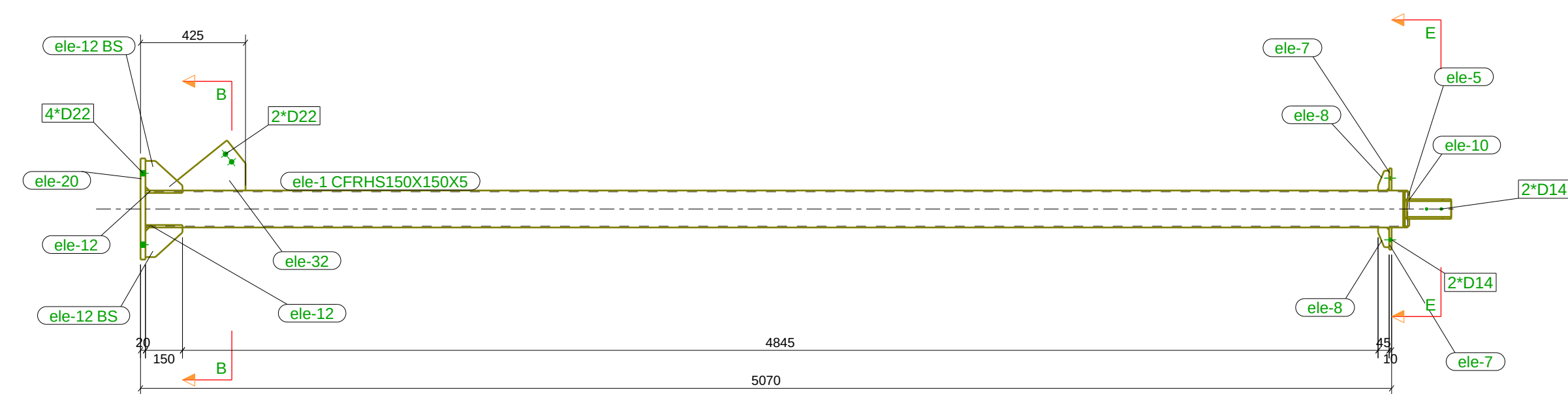
03 pastato metalo gaminių geometriniai brėžiniai



I-3 Kiekis 3

PHASE	QUANTITY
511	3

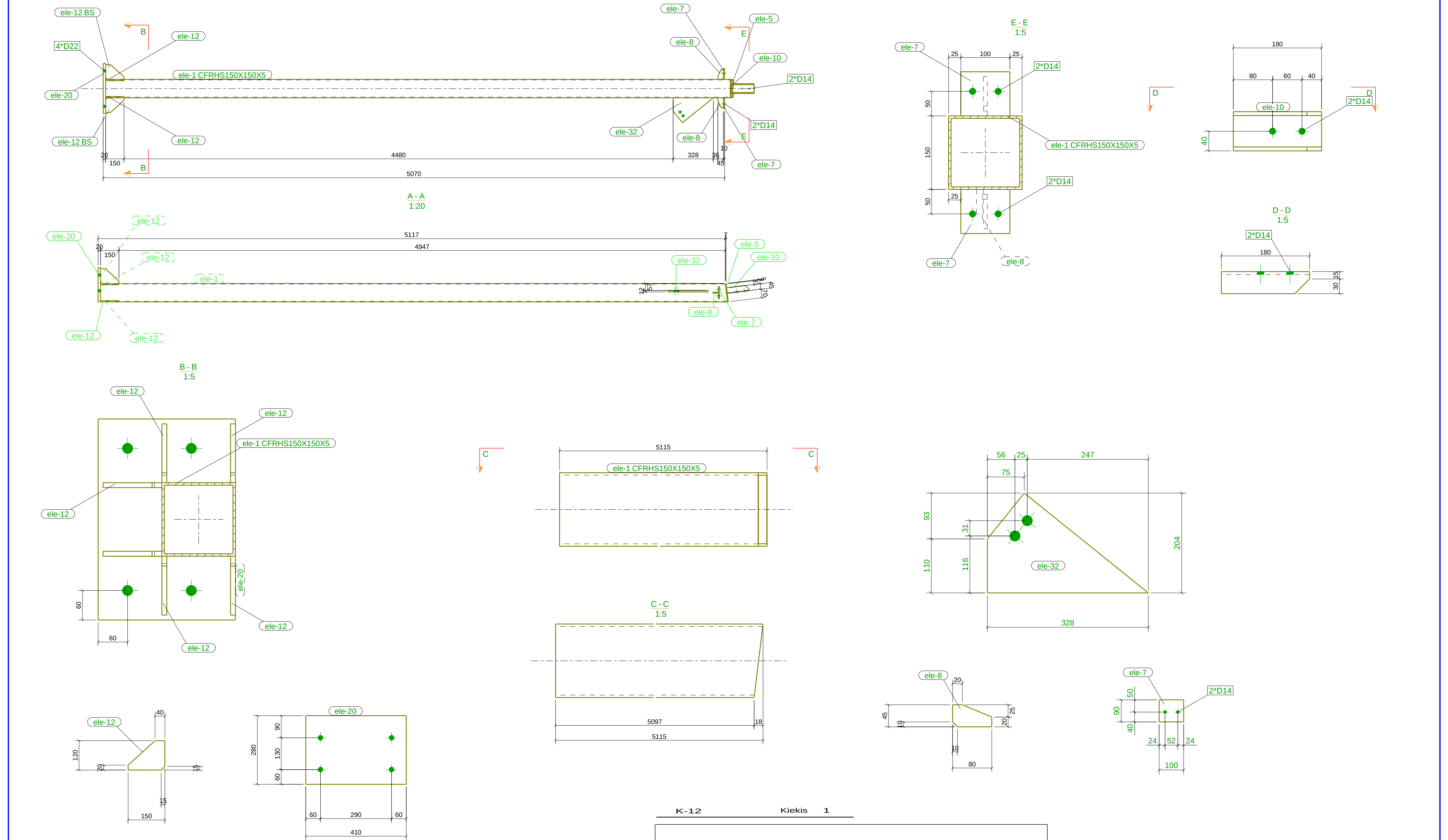
Zymuo	Profilis	Ilgis	Kiekis	Svoris
ele-4	UPN180	11200	1	246.2
Viso:				246.2



K-11 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
ele-1	CFRHS150X150X5	5115	1	113.9
ele-5	PL6*140	146	1	1.0
ele-7	PL10*90	100	2	0.7
ele-8	PL8*45	80	2	0.2
ele-10	UPN80	180	1	1.6
ele-12	PL10*120	150	6	1.0
ele-20	PL20*280	410	1	18.0
ele-32	PL12*204	328	1	3.5
Viso:				145.5

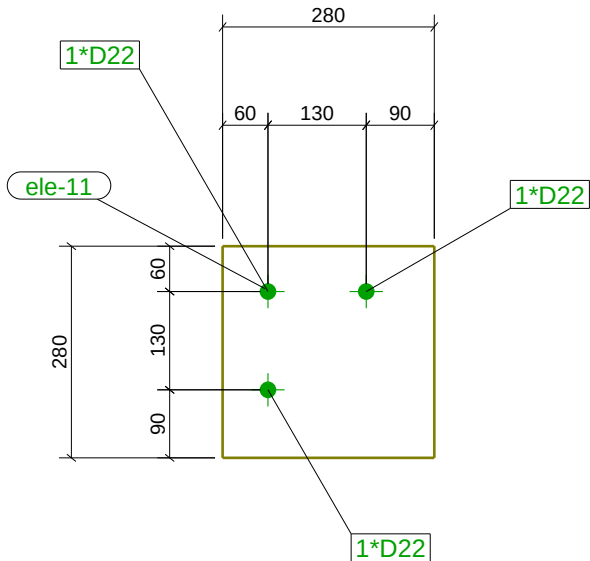
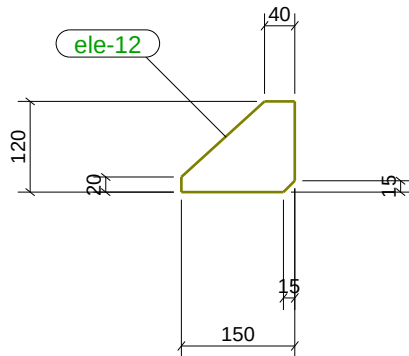
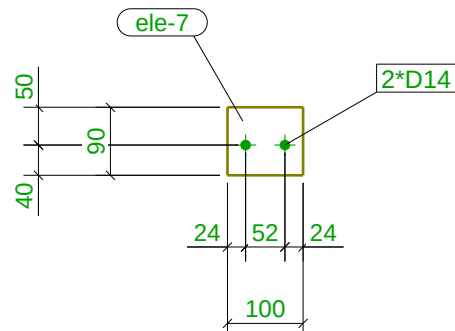
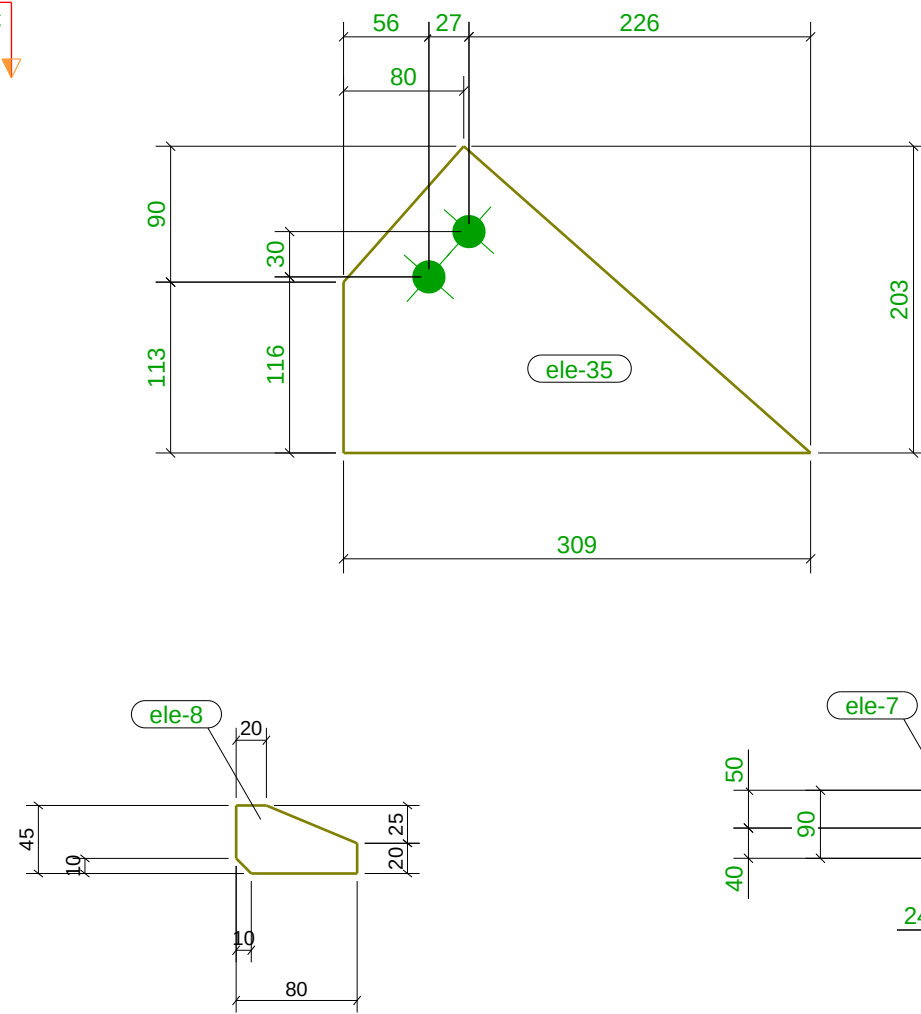
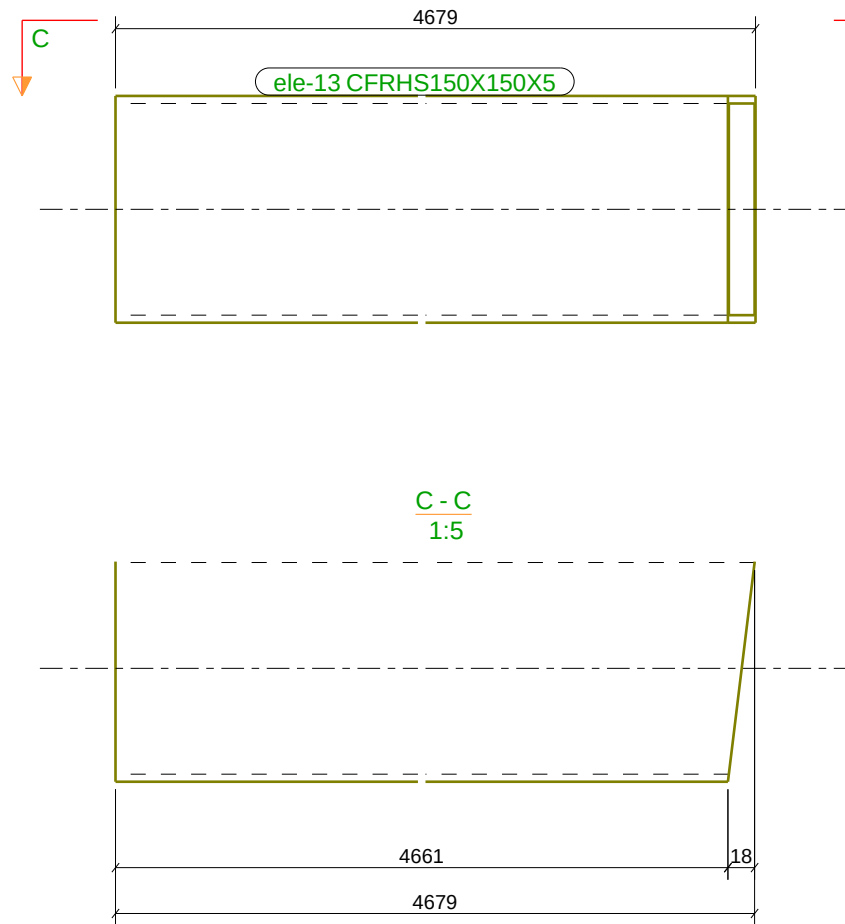
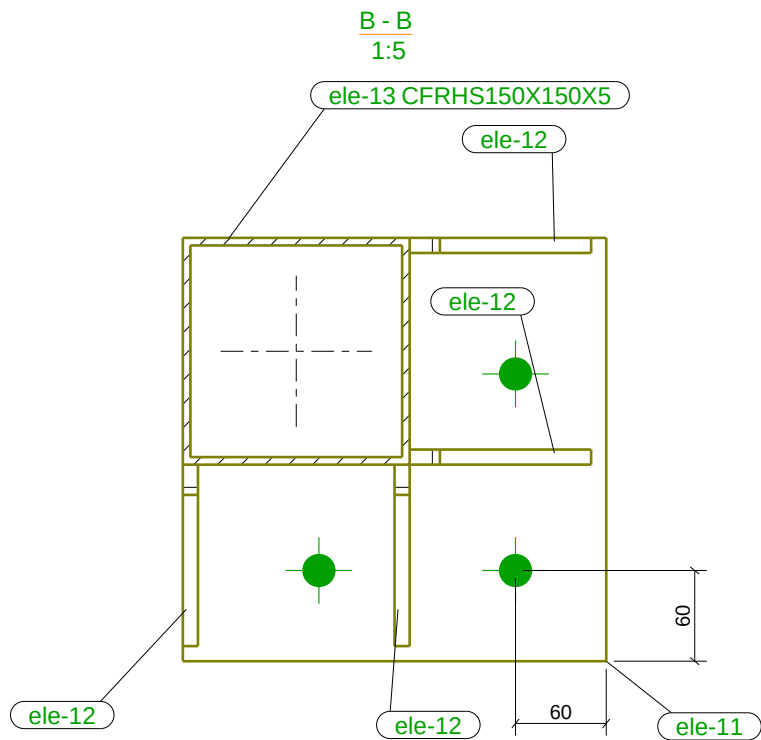
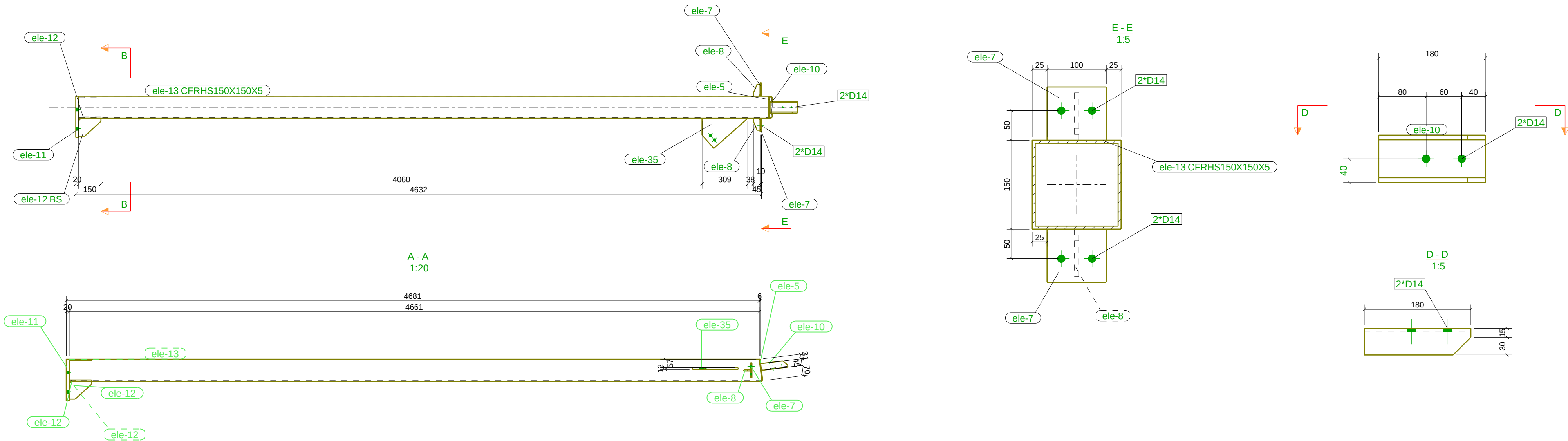
PHASE	QUANTITY
511	1



K-12 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
ele-1	CFRHS150X150X5	5115	1	113.9
ele-5	PL6*140	146	1	1.0
ele-7	PL10*90	100	2	0.7
ele-8	PL8*45	80	2	0.2
ele-10	UPN80	180	1	1.6
ele-12	PL10*120	150	6	1.0
ele-20	PL20*280	410	1	18.0
ele-32	PL12*204	328	1	3.5
Viso:				145.5

PHASE	QUANTITY
511	1



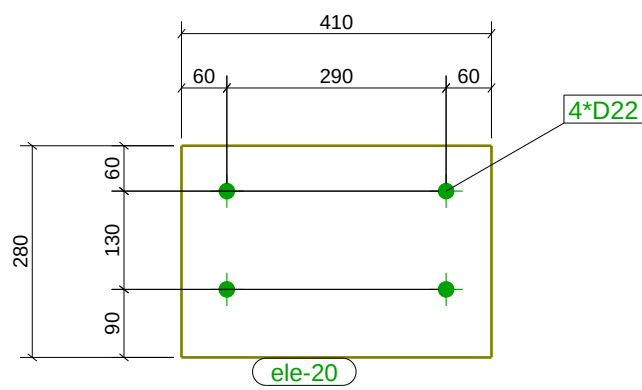
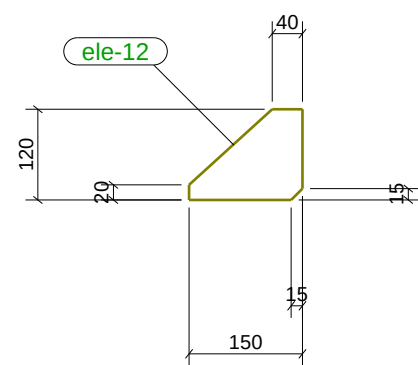
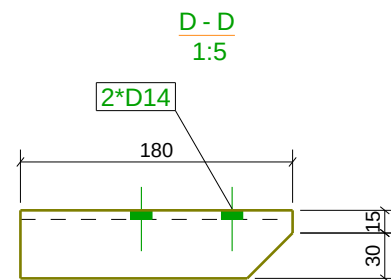
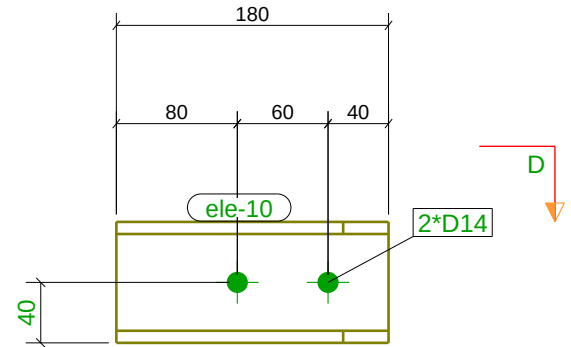
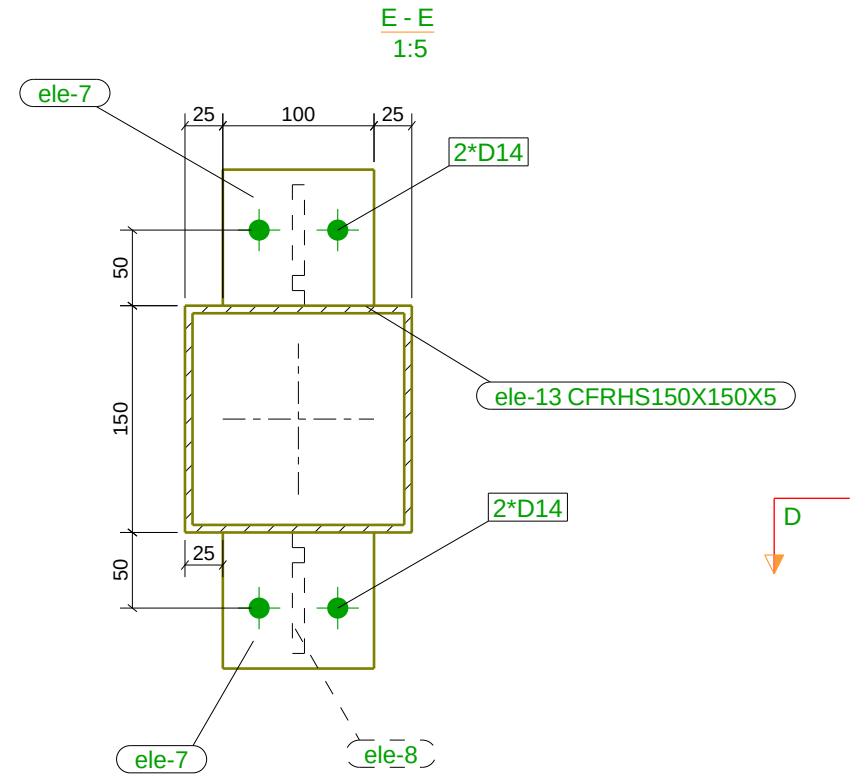
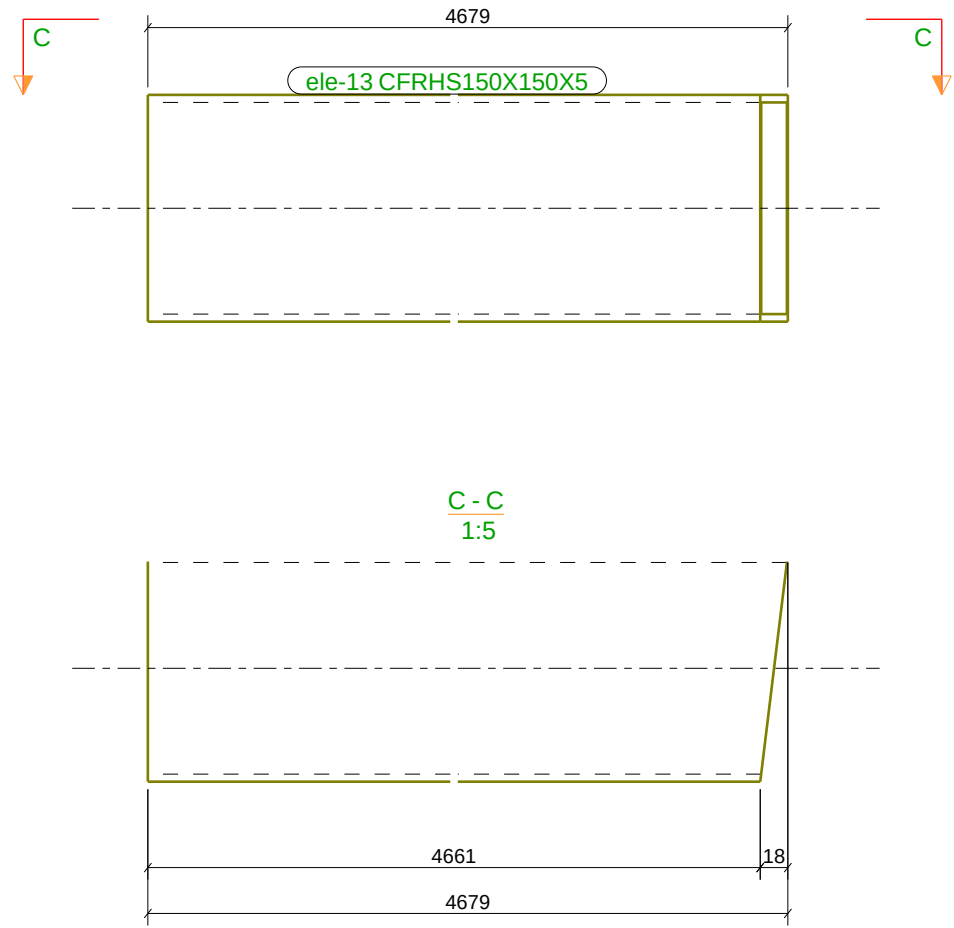
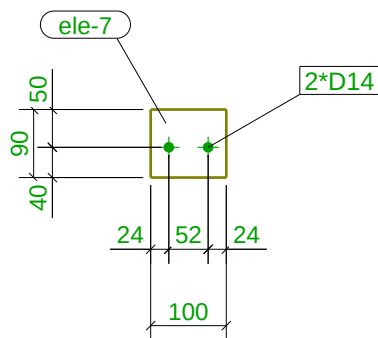
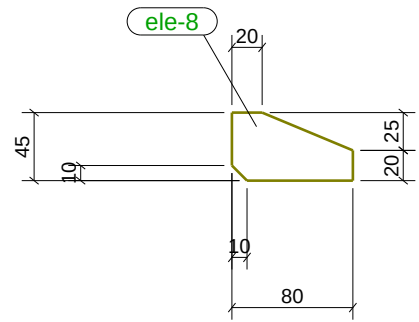
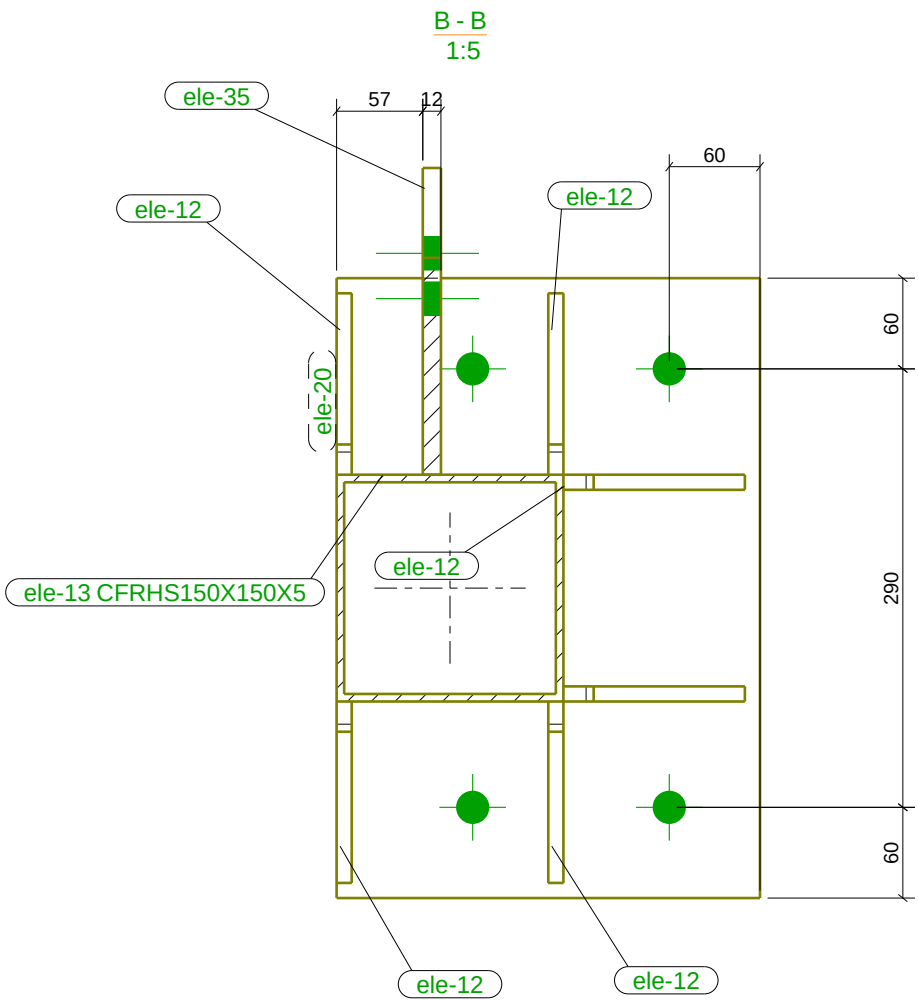
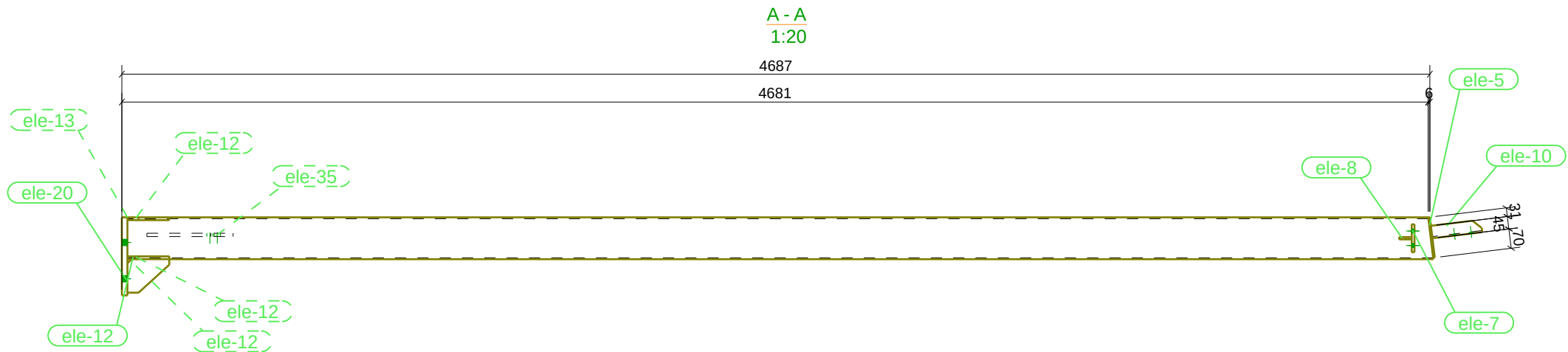
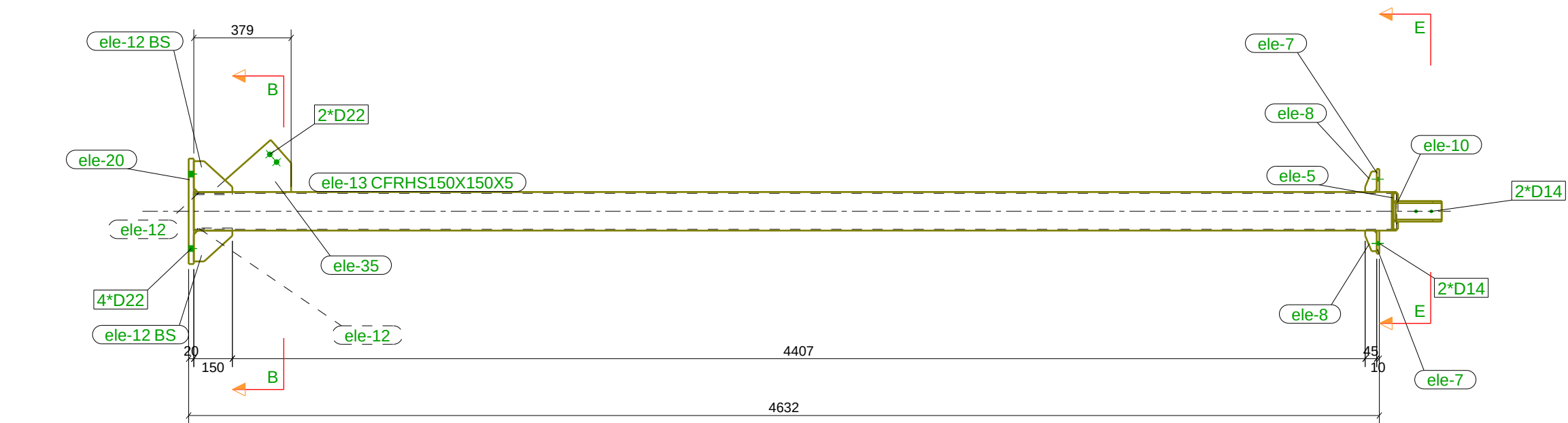
K-13 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
ele-5	PL6*140	146	1	1.0
ele-7	PL10*90	100	2	0.7
ele-8	PL8*45	80	2	0.2
ele-10	UPN80	180	1	1.6
ele-11	PL20*280	280	1	12.3
ele-12	PL10*120	150	4	1.0
ele-13	CFRHS150X150X5	4679	1	104.2
ele-35	PL12*203	309	1	3.4
Viso:				128.0

PHASE	QUANTITY
511	1

K-14 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
ele-5	PL6*140	146	1	1.0
ele-7	PL10*90	100	2	0.7
ele-8	PL8*45	80	2	0.2
ele-10	UPN80	180	1	1.6
ele-12	PL10*120	150	6	1.0
ele-13	CFRHS150X150X5	4679	1	104.2
ele-20	PL20*280	410	1	18.0
ele-35	PL12*203	309	1	3.4
Viso:				135.7

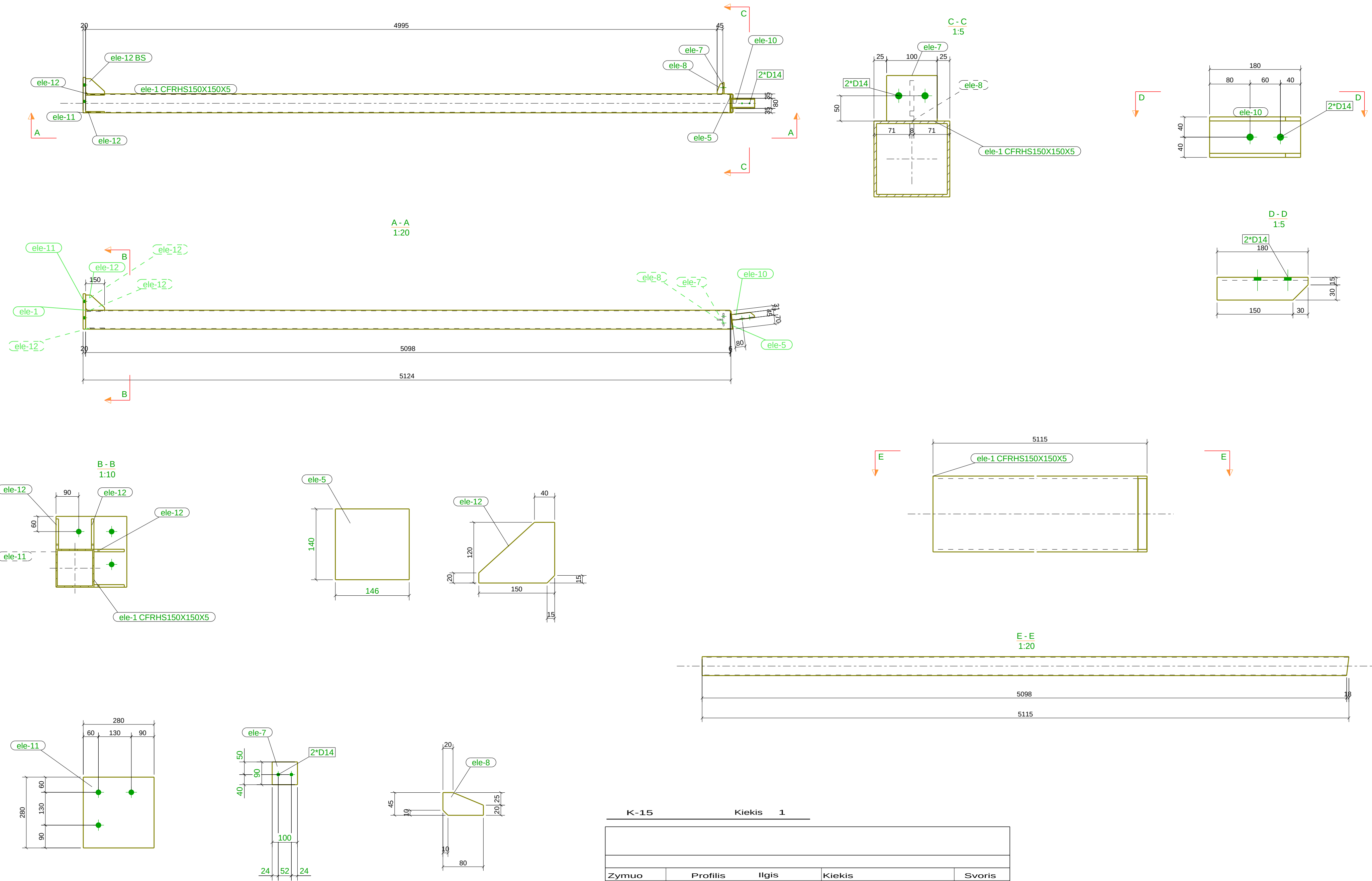


Tekla Structures

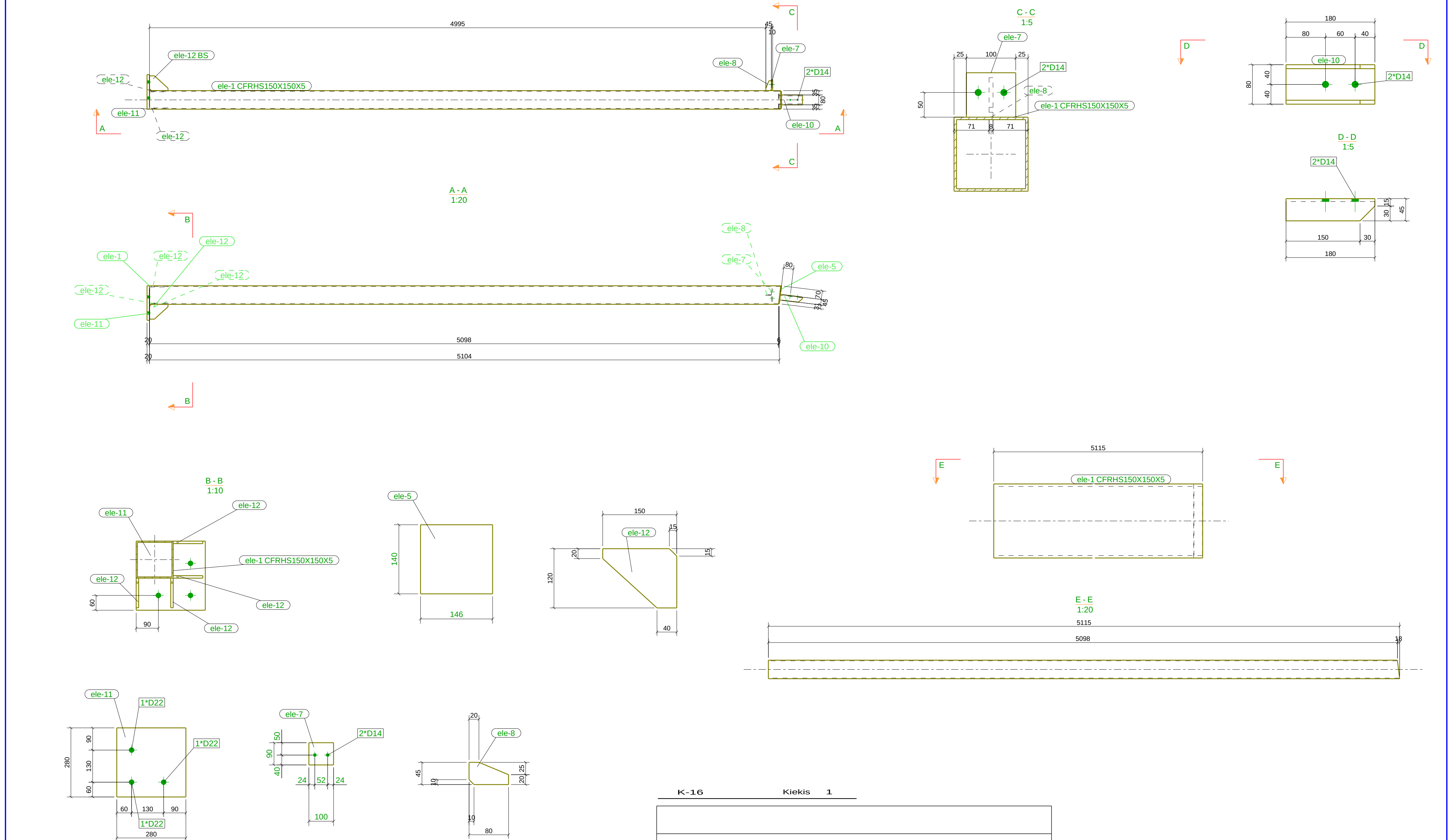
PHASE	QUANTITY
511	1

K-15 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
ele-1	CFRHS150X150X5	5115	1	113.9
ele-5	PL6*140	146	1	1.0
ele-7	PL10*90	100	1	0.7
ele-8	PL8*45	80	1	0.2
ele-10	UPN80	180	1	1.6
ele-11	PL20*280	280	1	12.3
ele-12	PL10*120	150	4	1.0
Viso:				133.5



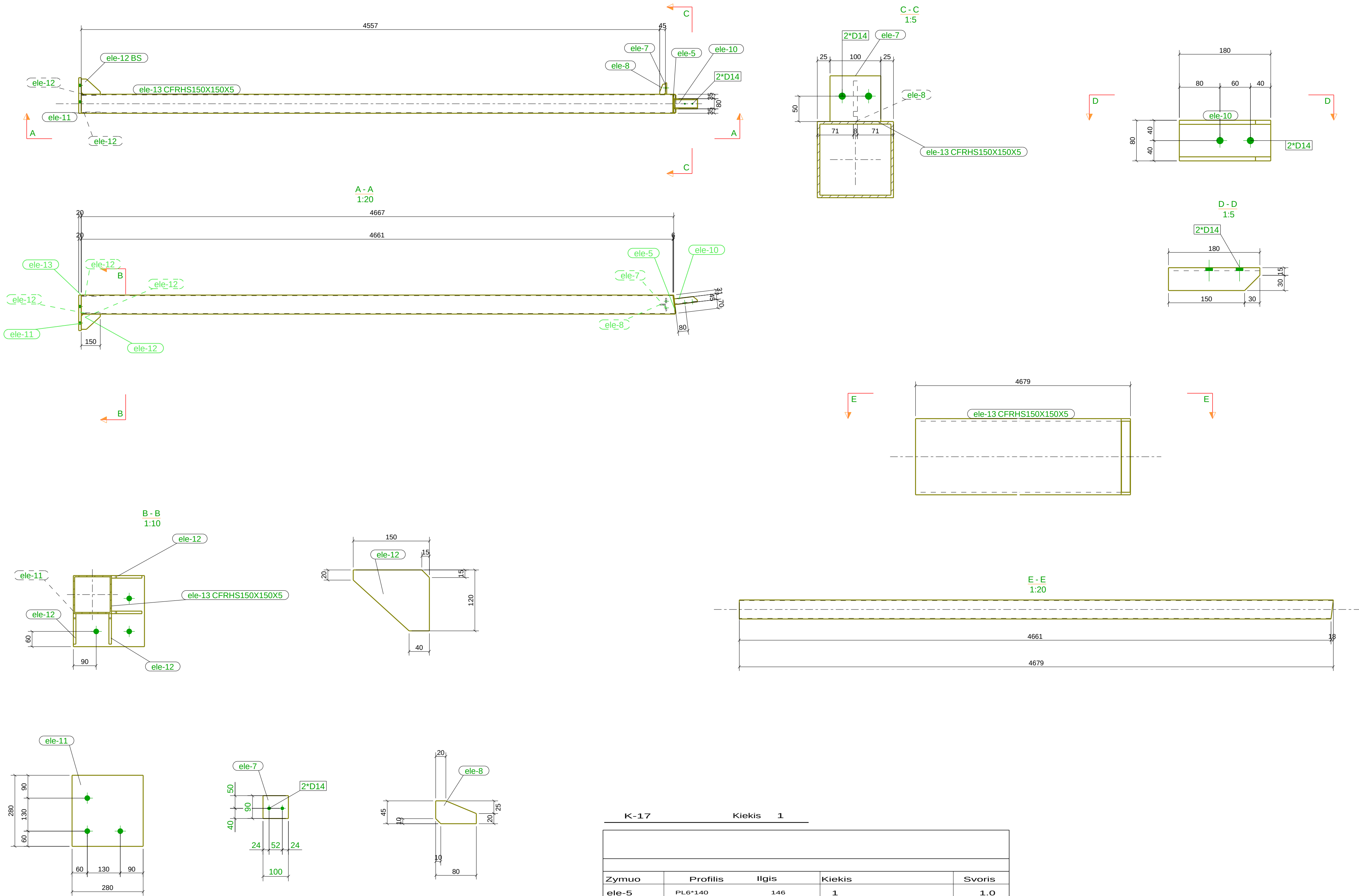
PHASE	QUANTITY
511	1



K-16 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
ele-1	CFRHS150X150X5	5115	1	113.9
ele-5	PL6*140	146	1	1.0
ele-7	PL10*90	100	1	0.7
ele-8	PL8*45	80	1	0.2
ele-10	UPN80	180	1	1.6
ele-11	PL20*280	280	1	12.3
ele-12	PL10*120	150	4	1.0
Viso:				133.5

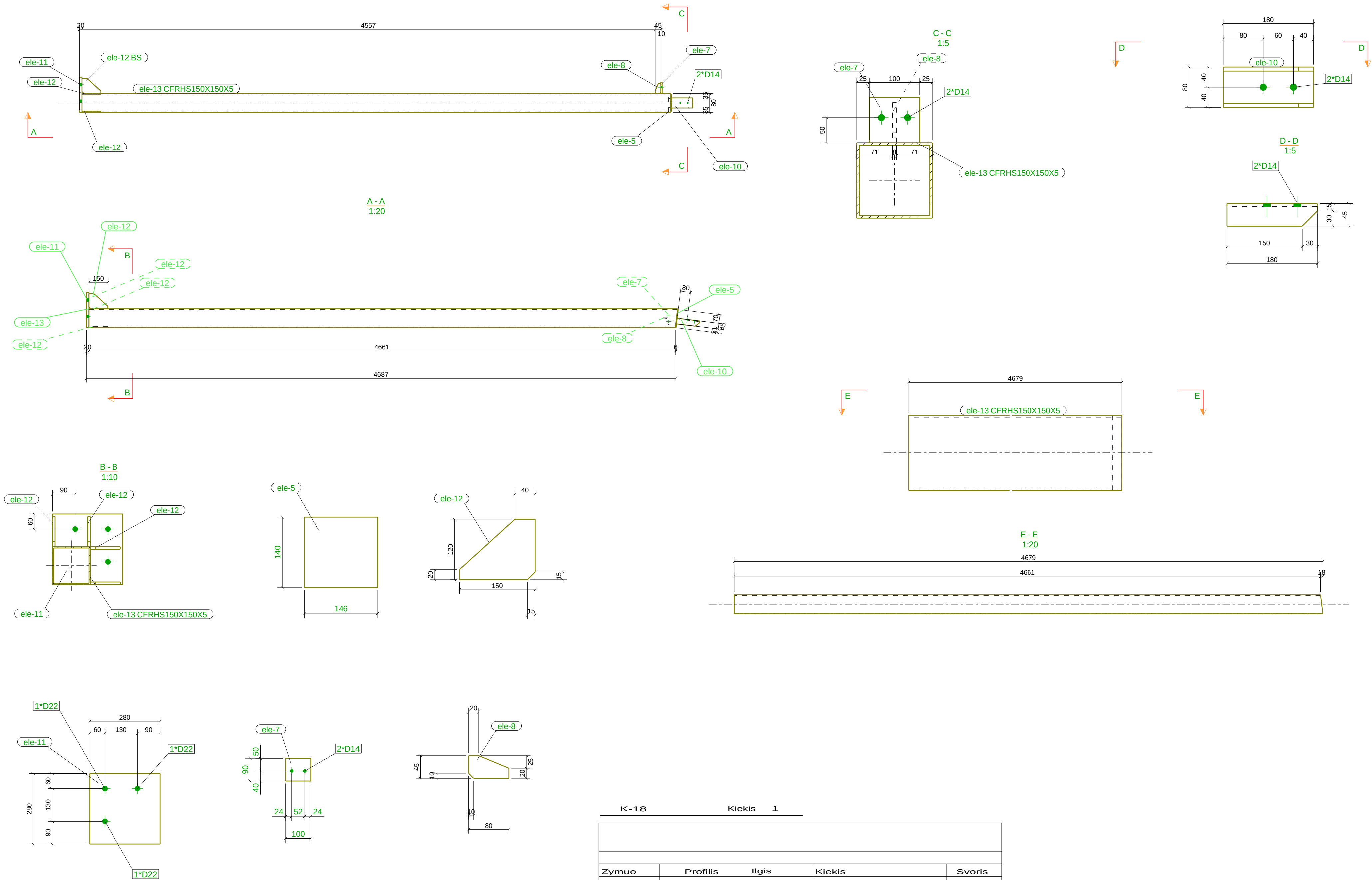
PHASE	QUANTITY
511	1



K-17 Kiekis 1

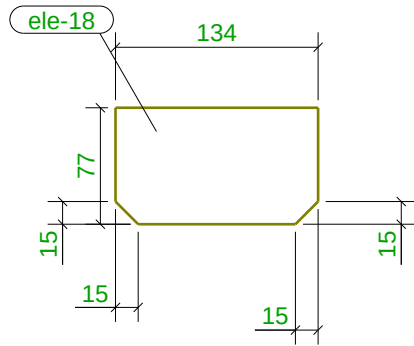
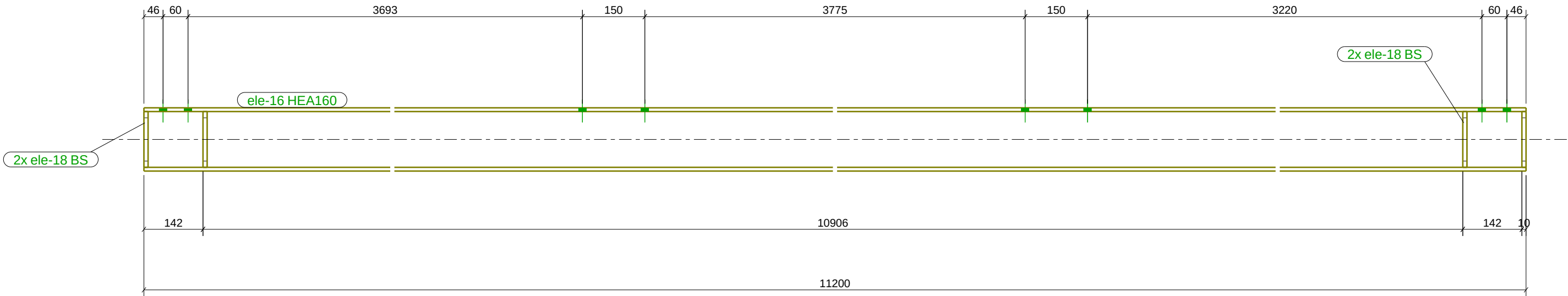
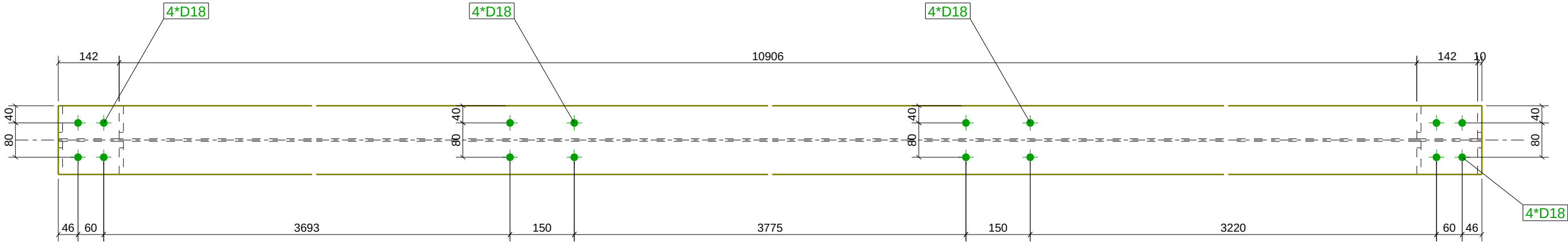
Zymuo	Profilis	Ilgis	Kiekis	Svoris
ele-5	PL6*140	146	1	1.0
ele-7	PL10*90	100	1	0.7
ele-8	PL8*45	80	1	0.2
ele-10	UPN80	180	1	1.6
ele-11	PL20*280	280	1	12.3
ele-12	PL10*120	150	4	1.0
ele-13	CFRHS150X150X5	4679	1	104.2
Viso:				123.8

PHASE	QUANTITY
511	1



K-18 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
ele-5	PL6*140	146	1	1.0
ele-7	PL10*90	100	1	0.7
ele-8	PL8*45	80	1	0.2
ele-10	UPN80	180	1	1.6
ele-11	PL20*280	280	1	12.3
ele-12	PL10*120	150	4	1.0
ele-13	CFRHS150X150X5	4679	1	104.2
Viso:				123.8

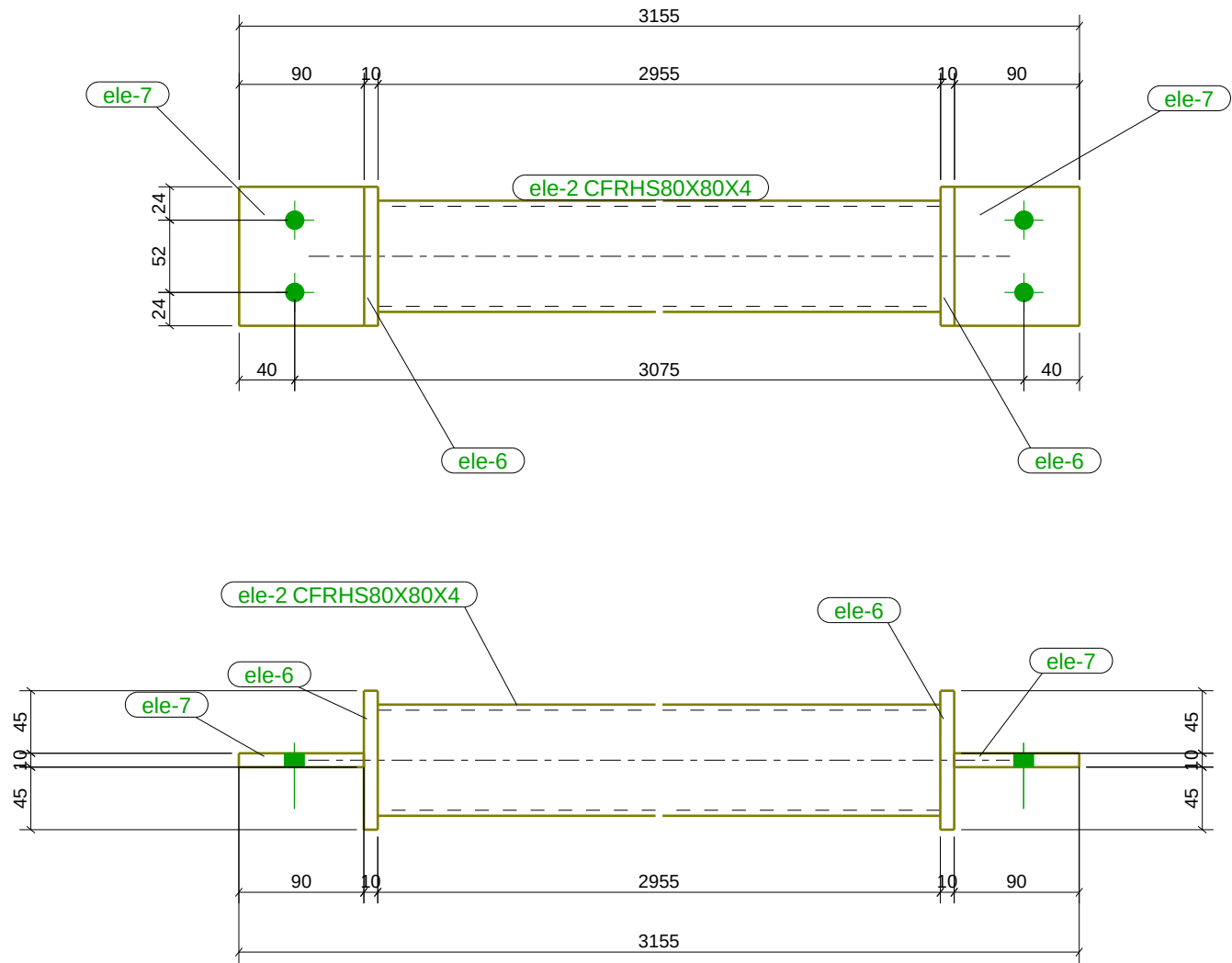


KS-1 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	
ele-16	HEA160	11200	1	
ele-18	PL10*77	134	8	
			Viso:	
				347.2

PHASE	QUANTITY
511	1

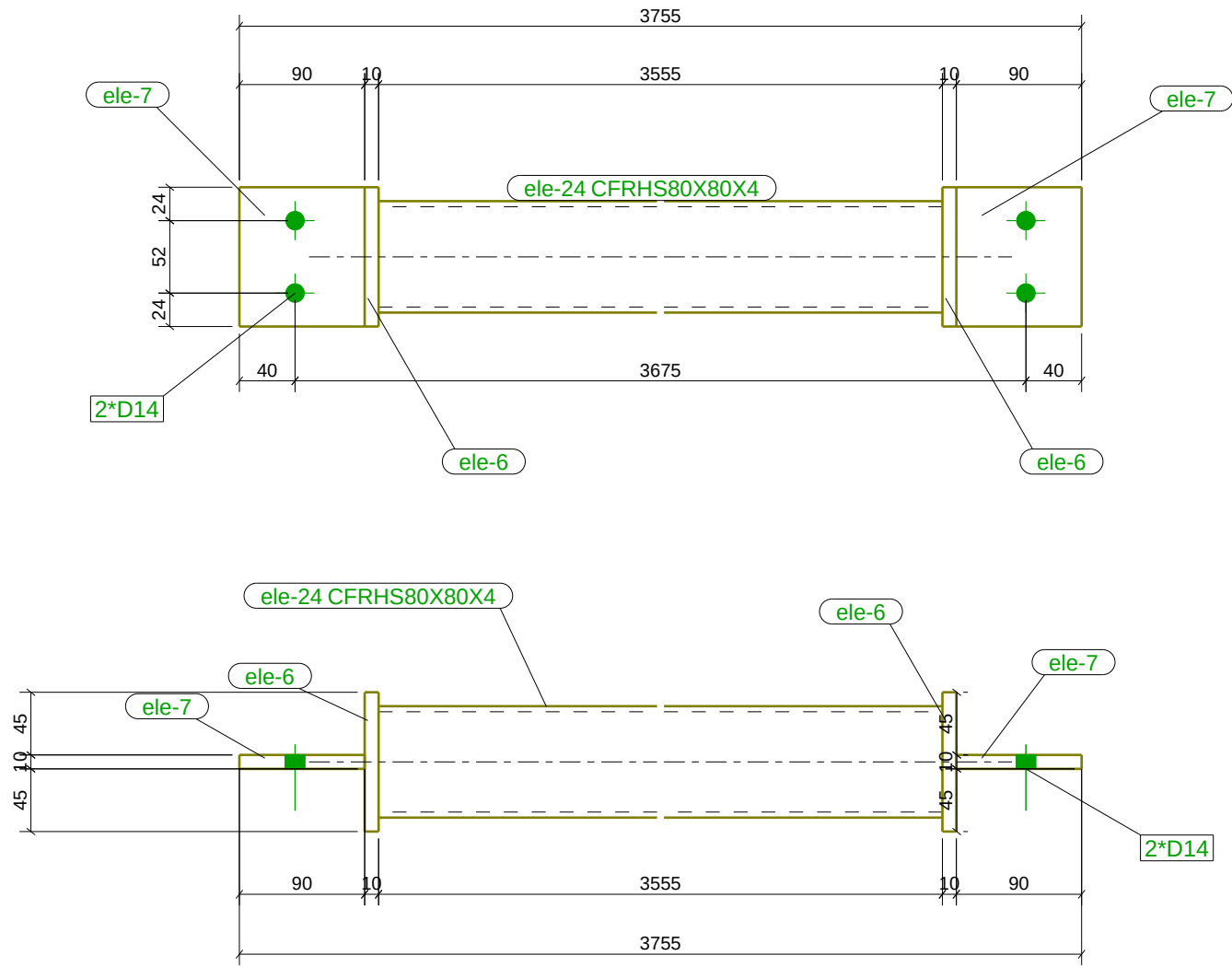
PHASE	QUANTITY
511	2



R-1 Kiekis 2

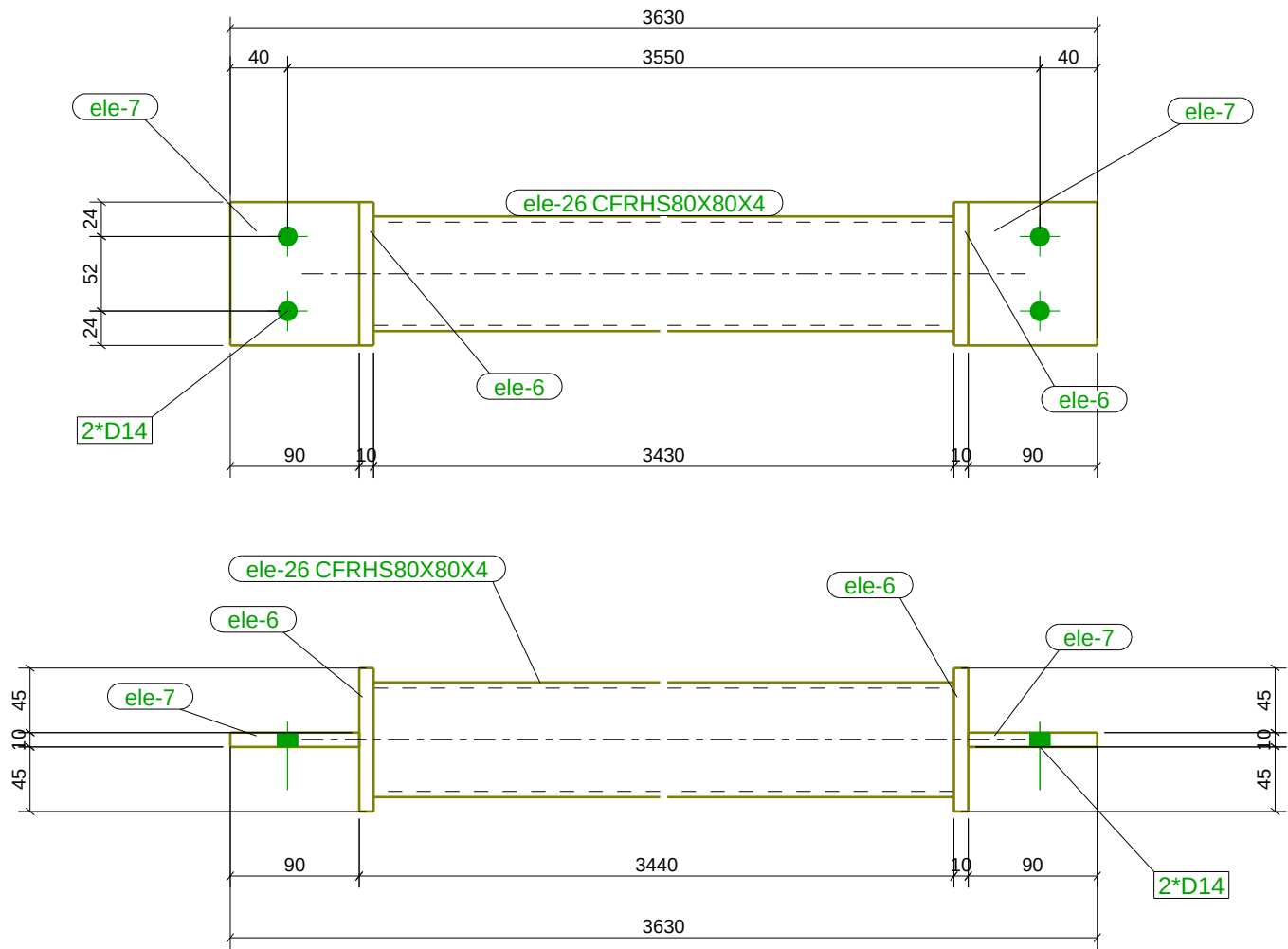
Zymuo	Profilis	Ilgis	Kiekis	Svoris
ele-2	CFRHS80X80X4	2955	1	27.3
ele-6	PL10*100	100	2	0.8
ele-7	PL10*90	100	2	0.7
			Viso:	30.2

PHASE	QUANTITY
511	2



R-2 Kiekis 2

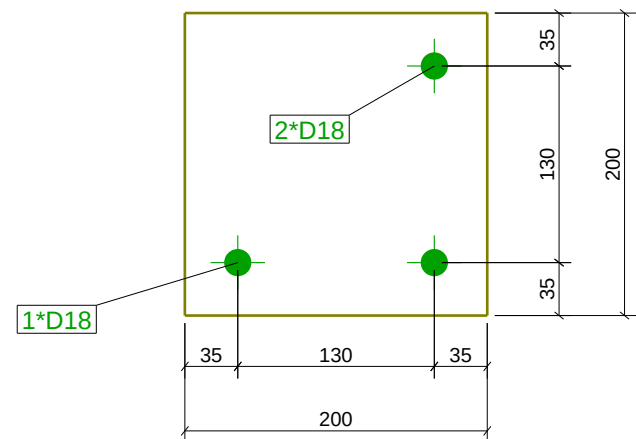
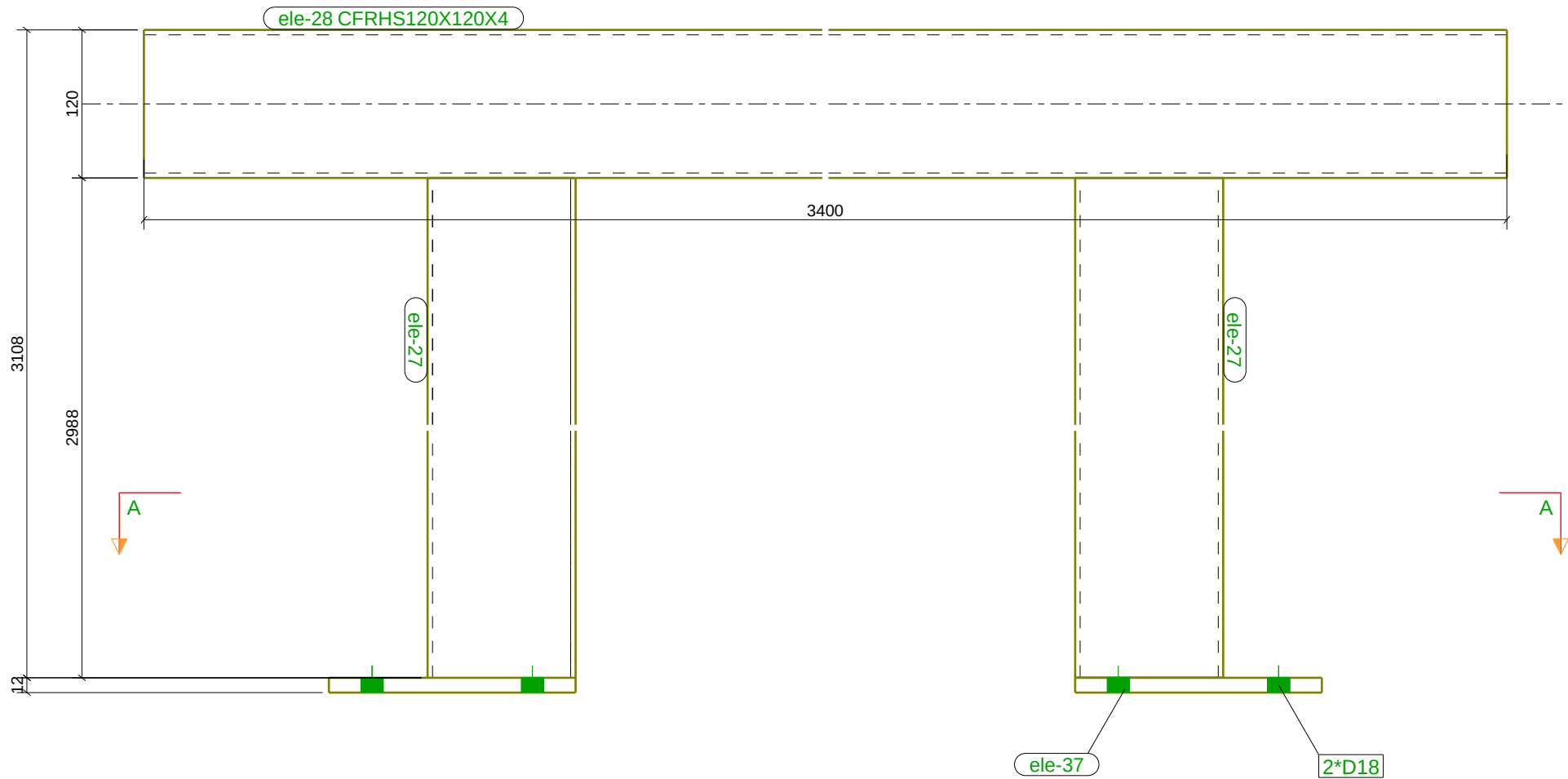
Zymuo	Profilis	Ilgis	Kiekis	
ele-6	PL10*100	100	2	
ele-7	PL10*90	100	2	
ele-24	CFRHS80X80X4	3555	1	
			Viso:	35.8



R-3 Kiekis 2

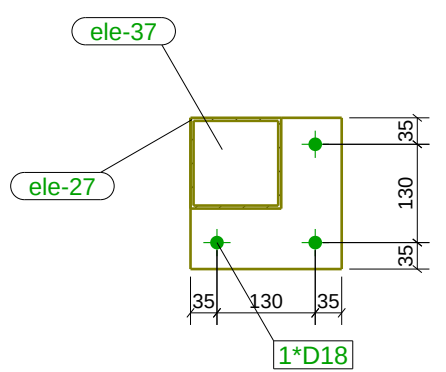
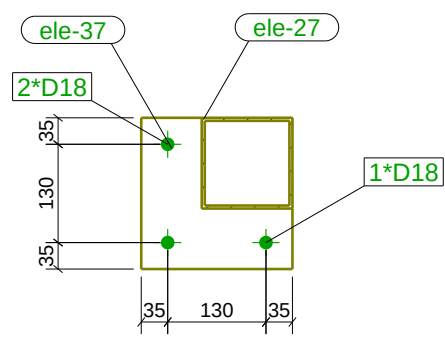
PHASE	QUANTITY
511	2

Zymuo	Profilis	Ilgis	Kiekis	
ele-6	PL10*100	100	2	
ele-7	PL10*90	100	2	
ele-26	CFRHS80X80X4	3430	1	
			Viso:	
				34.6



ele-37 2*D18

A - A
1:10



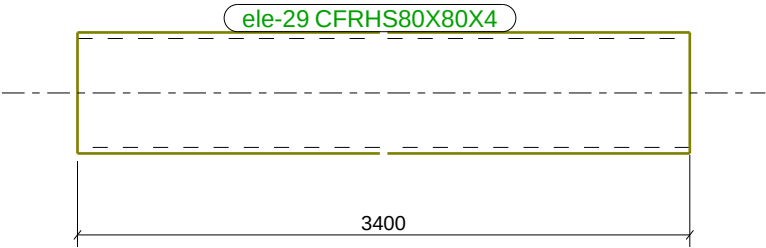
PHASE	QUANTITY
511	1

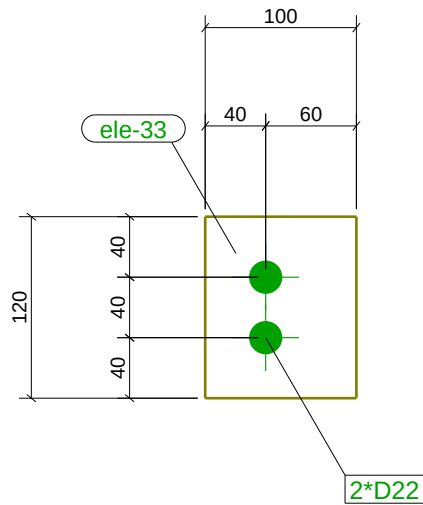
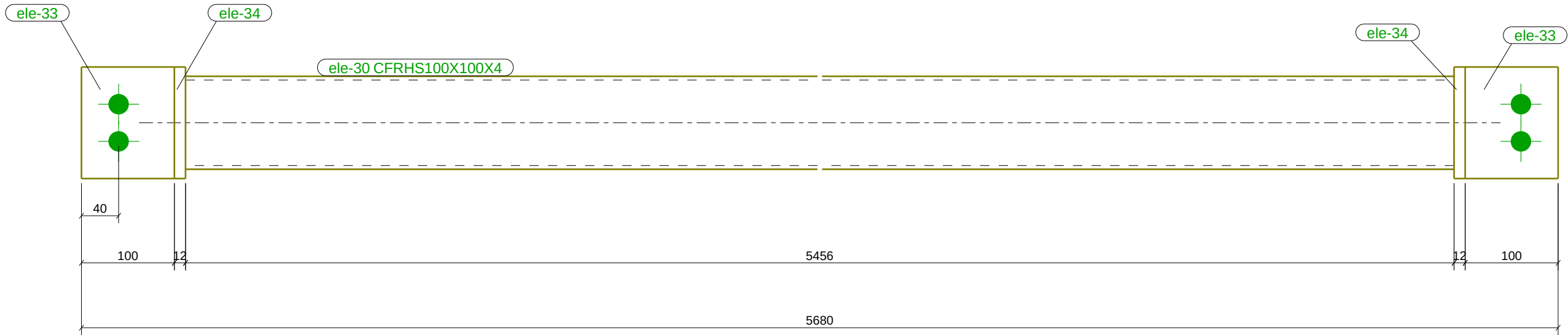
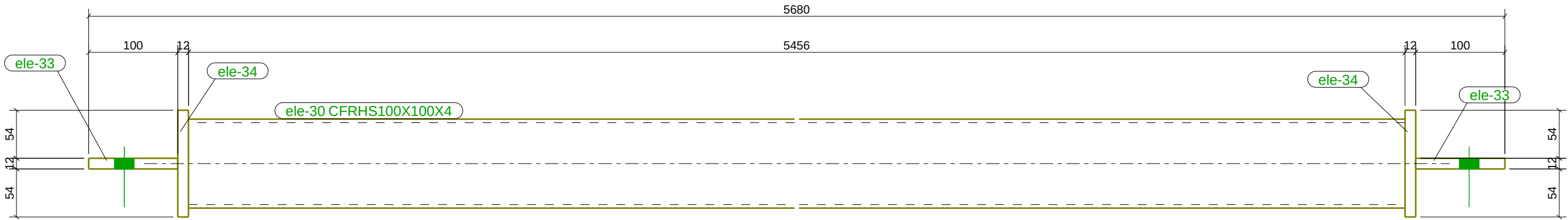
Re-2 Kiekis 1				
Zymuo	Profilis	Ilgis	Kiekis	Svoris
ele-27	CFRHS120X120X4	2988	2	42.6
ele-28	CFRHS120X120X4	3400	1	48.4
ele-37	PL12*200	200	2	3.8
			Viso:	141.1

PHASE	QUANTITY
504	1
511	1

Re-4 Kiekis 2

Zymuo	Profilis	Ilgis	Kiekis	Svoris
ele-29	CFRHS80X80X4	3400	1	31.4
			Viso:	31.4

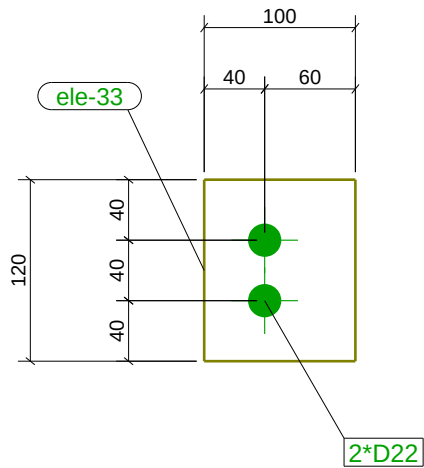
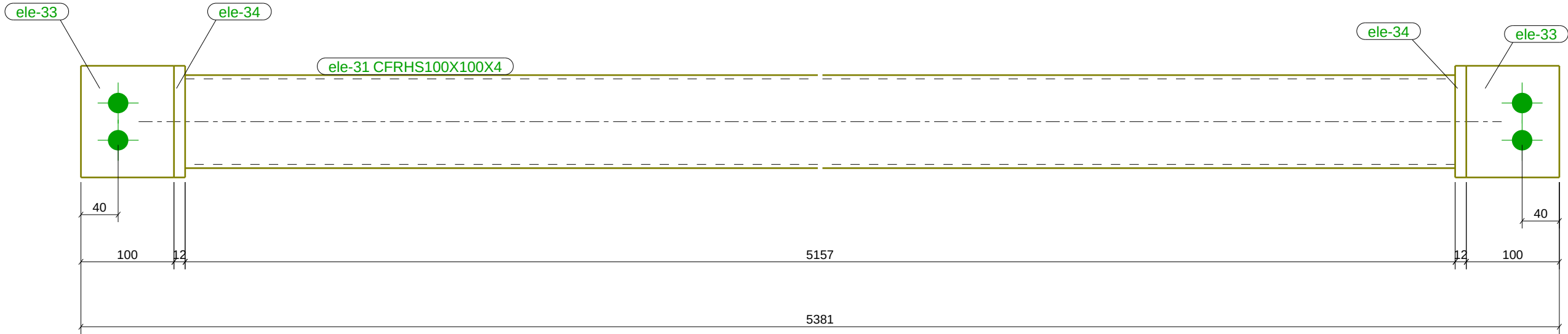
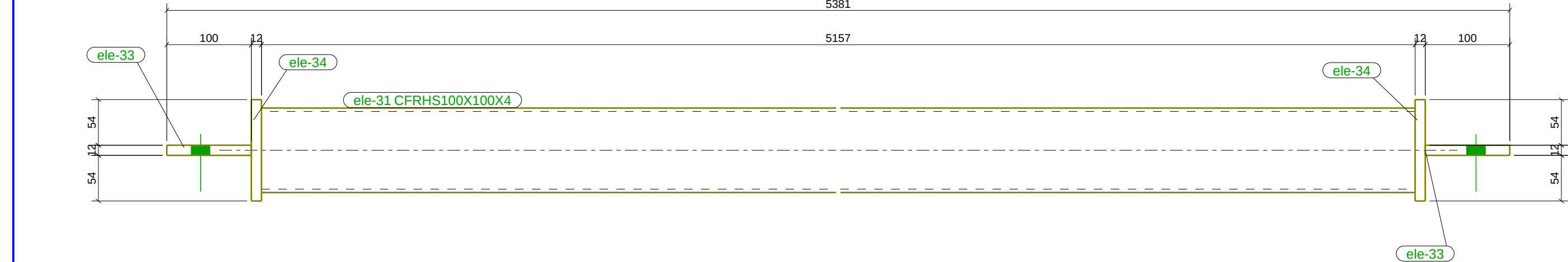




RY-1 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	
ele-30	CFRHS100X100X4	5456	1	
ele-33	PL12*120	100	2	
ele-34	PL12*120	120	2	
			Viso:	
				69.0

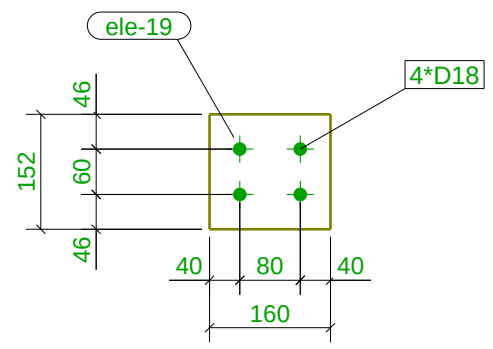
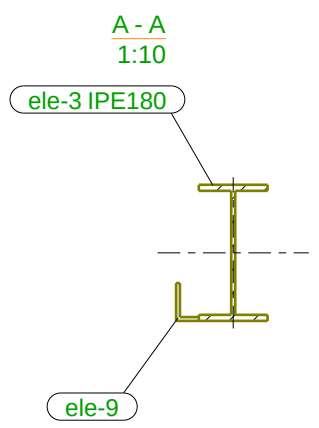
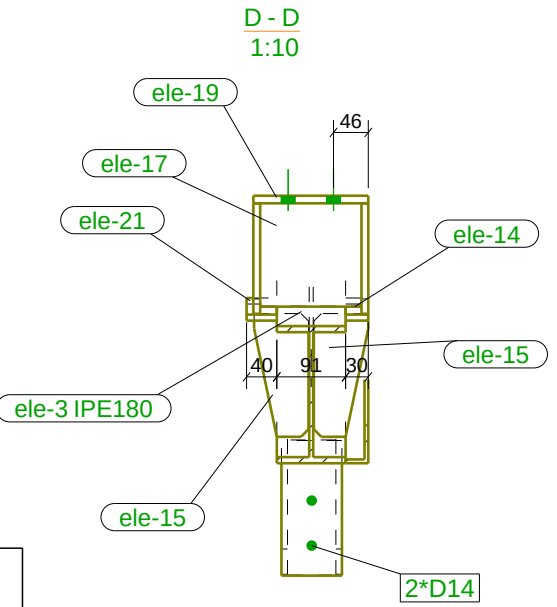
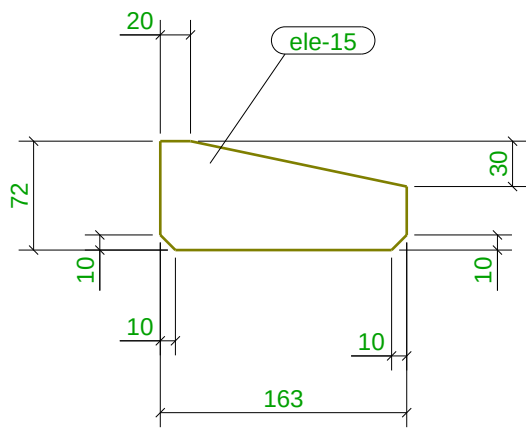
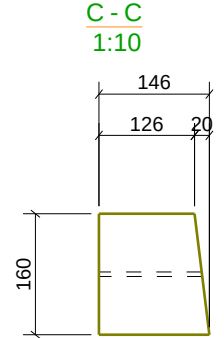
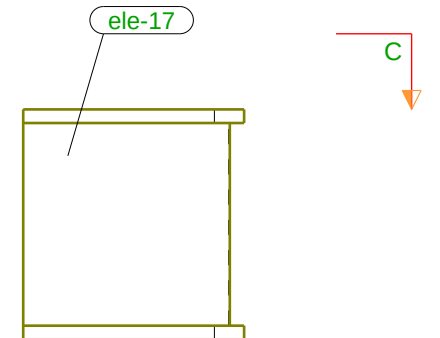
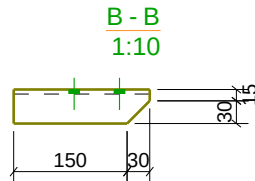
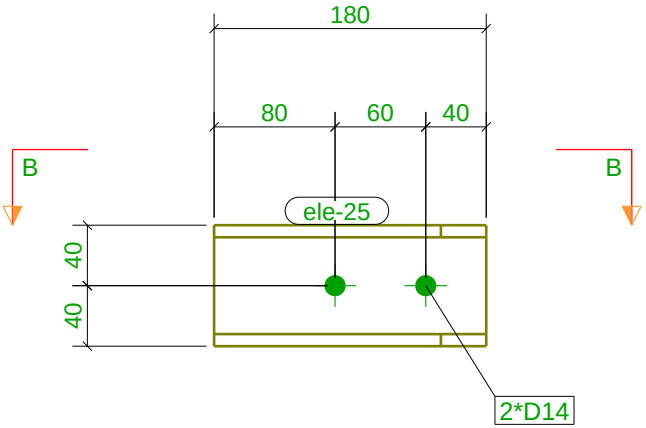
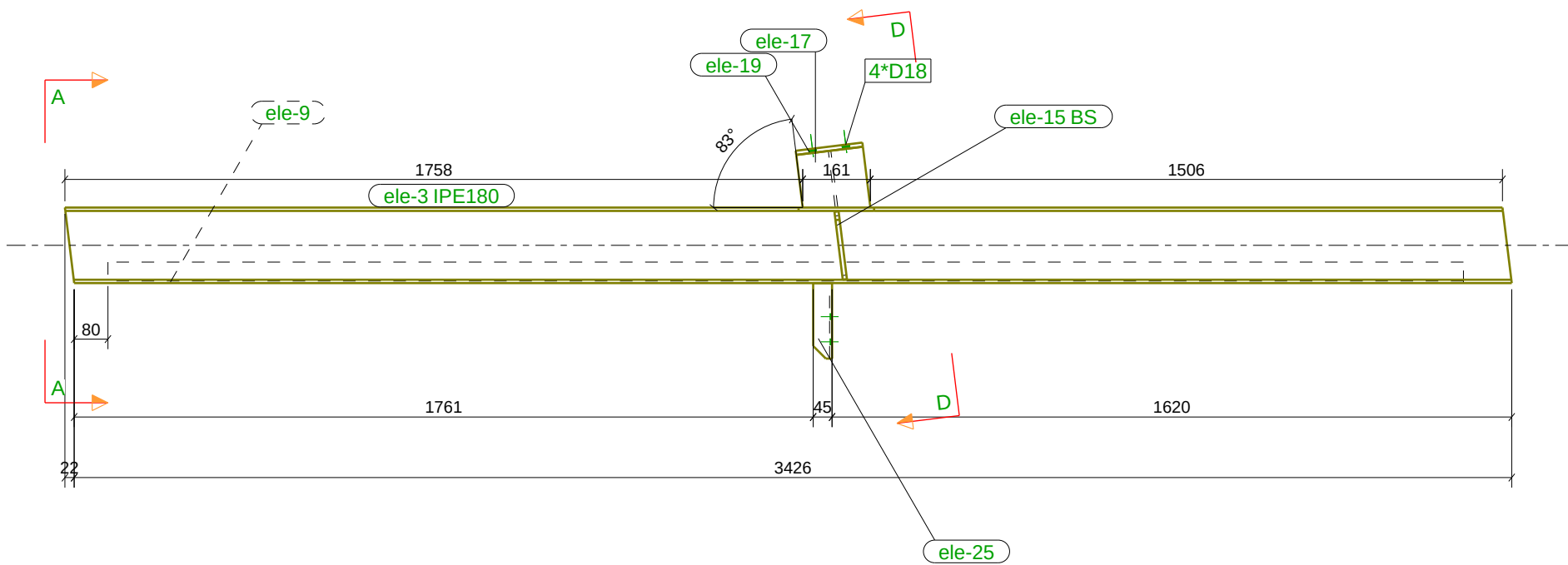
PHASE	QUANTITY
511	1



RY-2 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	
ele-31	CFRHS100X100X4	5157	1	
ele-33	PL12*120	100	2	
ele-34	PL12*120	120	2	
			Viso:	
				65.5

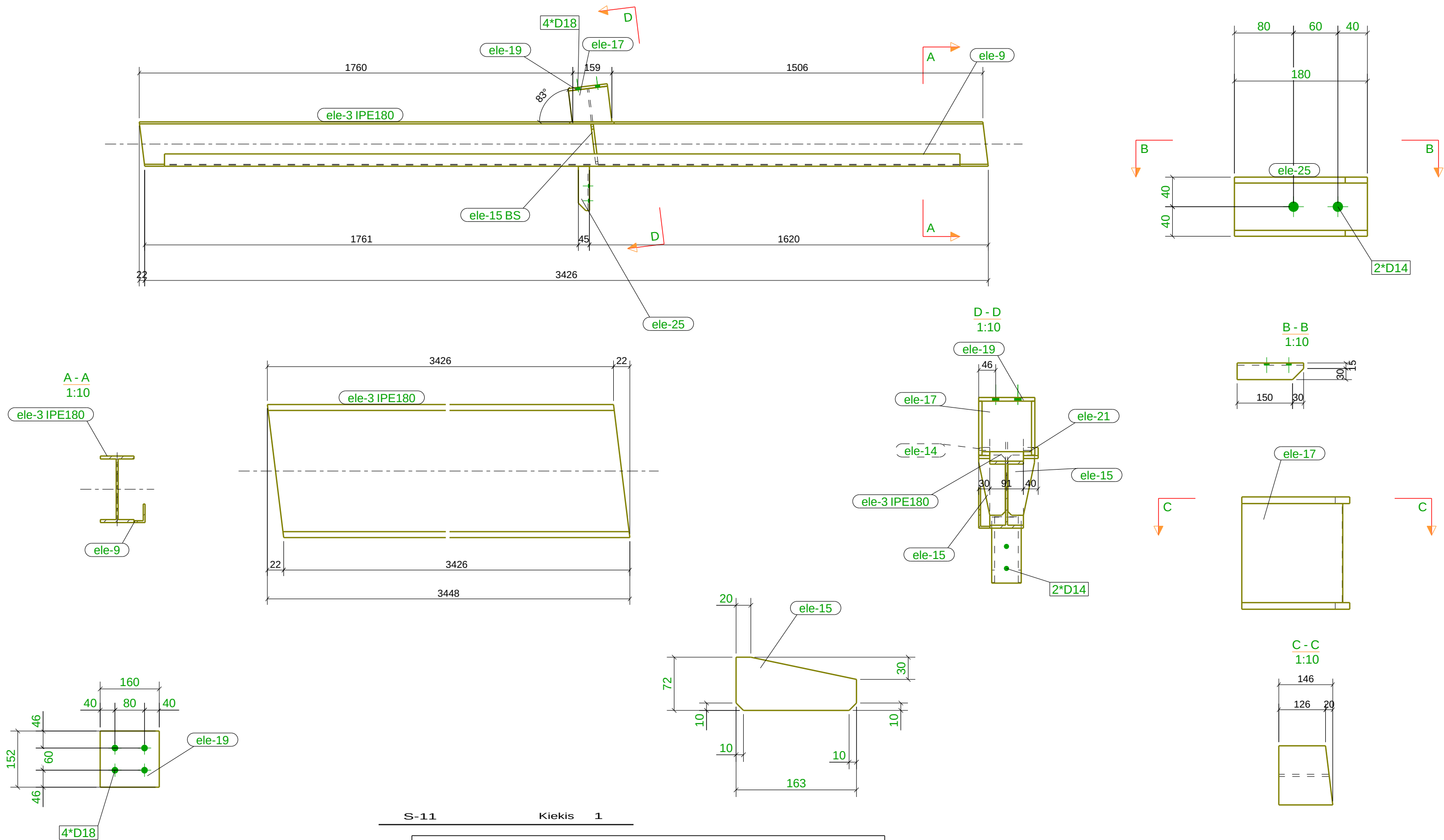
PHASE	QUANTITY
511	1



S-10 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
ele-3	IPE180	3448	1	64.7
ele-9	L50*30*5	3230	1	9.6
ele-14	PL8*30	180	1	0.3
ele-15	PL10*72	163	2	0.7
ele-17	HEA160	146	1	4.4
ele-19	PL10*152	160	1	1.9
ele-21	PL8*40	180	1	0.5
ele-25	UPN80	180	1	1.6
Viso:				84.5

PHASE	QUANTITY
30	1



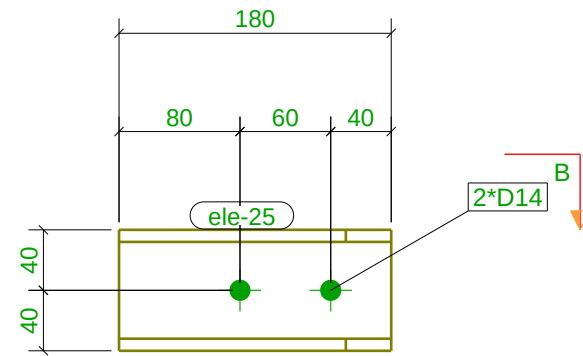
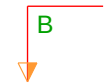
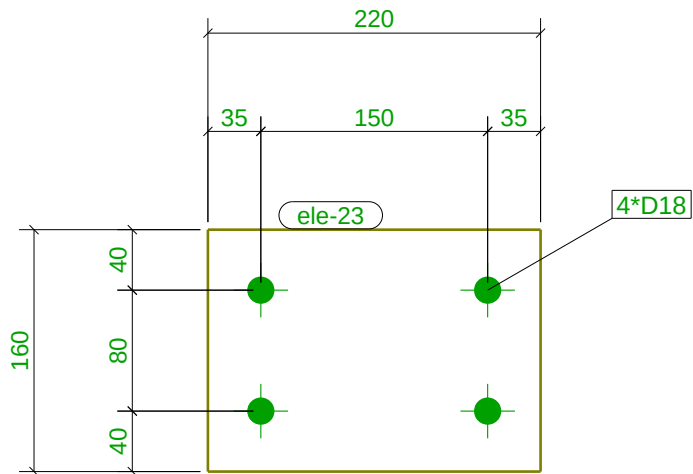
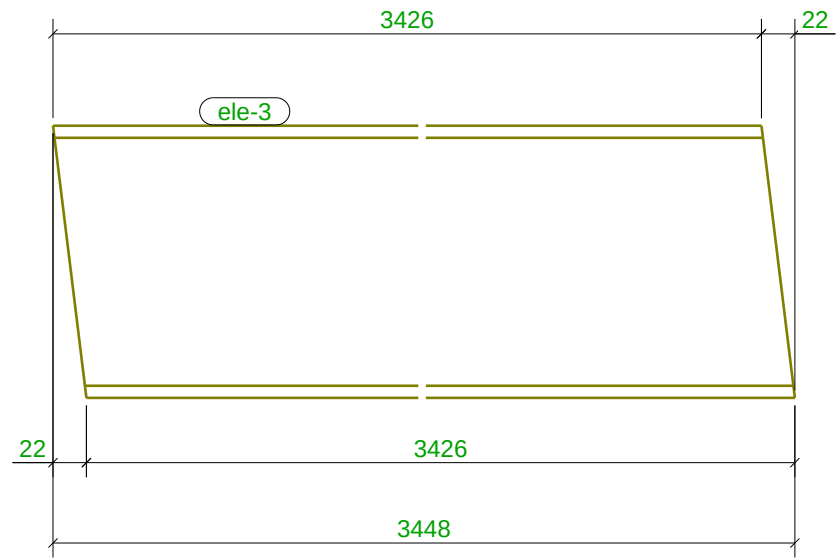
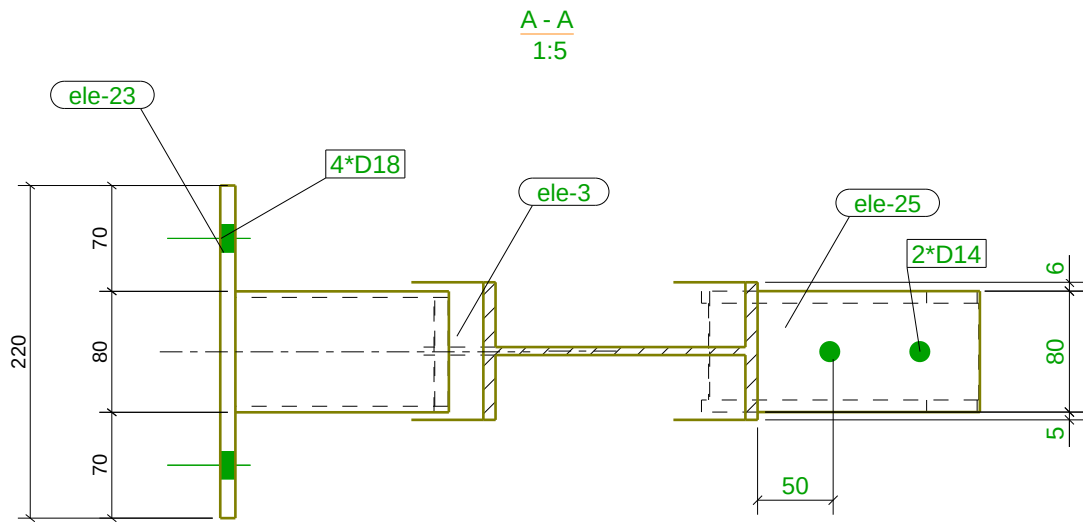
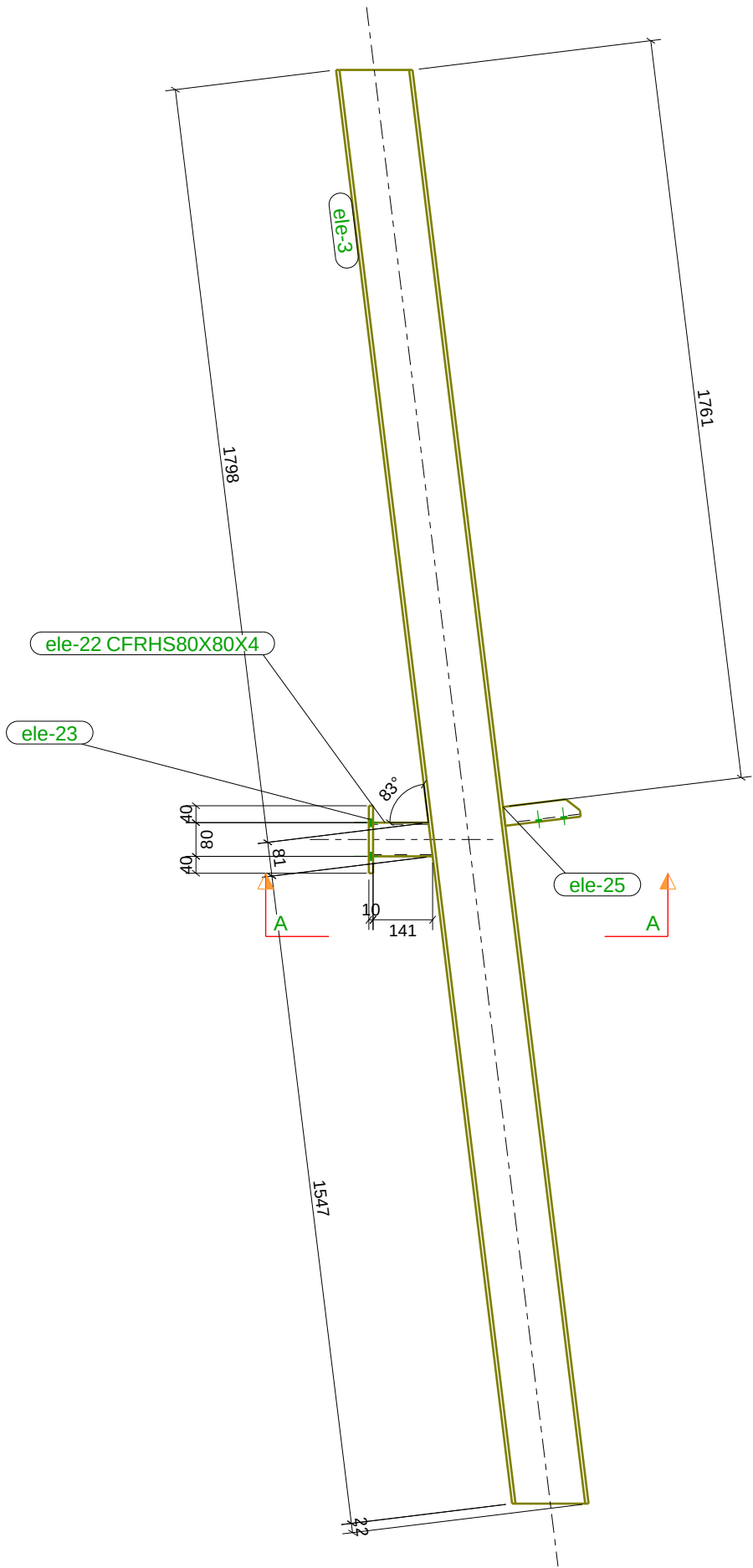
S-11 Kiekis 1

Zymuo	Profilis	Ilgis	Kiekis	Svoris
ele-3	IPE180	3448	1	64.7
ele-9	L50*30*5	3230	1	9.6
ele-14	PL8*30	180	1	0.3
ele-15	PL10*72	163	2	0.7
ele-17	HEA160	146	1	4.4
ele-19	PL10*152	160	1	1.9
ele-21	PL8*40	180	1	0.5
ele-25	UPN80	180	1	1.6
			Viso:	84.5

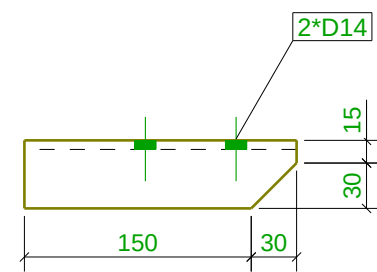
PHASE	QUANTITY
30	1

Tekla Structures

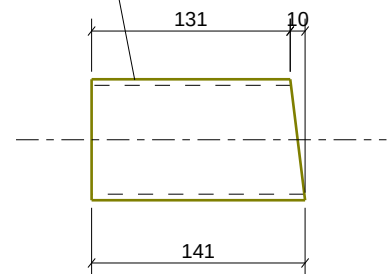
PHASE	QUANTITY
511	2



B - B
1:5



ele-22 CFRHS80X80X4



S-12 Kiekis 2

Zymuo	Profilis	Ilgis	Kiekis	Svoris
ele-3	IPE180	3448	1	64.7
ele-22	CFRHS80X80X4	141	1	1.3
ele-23	PL10*160	220	1	2.8
ele-25	UPN80	180	1	1.6
Viso:				70.3

7 priedas

Projekto vadovo užduotis konstrukcijų daliai rengti

PROJEKTO VADOVO UŽDUOTIS KONSTRUKCIJŲ DALIAI RENGTI

Suprojektuoti objekto „**Kitų pagalbinių paskirties pastatų (pagalbinių pastatų grupės) ir kitos paskirties statinių (kitų inžinerinių statinių grupės) Vilniaus r. sav., Nemenčinės sen., Gaukštonių k., Gaukštonių g. 3, statybos ir griovimo projektas**“ konstrukcijų dalį, remiantis statybos techninio reglamento STR 1.04.04:2017 „STATINIO PROJEKTAVIMAS, PROJEKTO EKSPERTIZĖ“ pagrindu, siekiant nustatyti pagrindinius techninius bei ekonominius sprendimus, nustatyti reikalavimus statybai vykdyti. Perengto techninio projekto sprendiniai turi atitikti privalomiesiems dokumentams ir esminiams statinio reikalavimams pagal STR 1.04.04:2017 „STATINIO PROJEKTAVIMAS, PROJEKTO EKSPERTIZĖ“. Atlikti konstrukcijų skaičiavimai turi atitikti projekto rengimo dokumentų reikalavimus, normatyvinių statybos techninių dokumentų reikalavimus, konstrukcinių elementų laikomoji galia ir deformacijos privalo neviršyti ribinių reikšmių.

Projekto vadovas

8 priedas

Projekto dalių vadovų tarpusavio sprendinių suderinimo lapas

STATINIO PROJEKTO DALIŲ TARPUSAVIO SUDERINIMO AKTAS

Statytojas: UAB „Vilniaus vandenys“

Statinio projektuotojas:

Statinio projektas: Kitų pagalbinių paskirties pastatų (pagalbinių pastatų grupės) ir kitos paskirties statinių (kitų inžinerinių statinių grupės) Vilniaus r. sav., Nemenčinės sen., Gaukštonių k., Gaukštonių g. 3, statybos ir griovimo projektas

Statinio projekto žymuo: 2024-017-XX-TDP

Data: 2025-09-08

Mes žemiau pasirašę (žr. 1 lentelė) projekto dalių vadovai patvirtiname, kad susipažinome su kitomis techninio projekto dalimis ir sprendinius tarpusavyje suderinome.

1 lentelė. Projekto dalių vadovų sprendinių suderinimo patvirtinimo lentelė

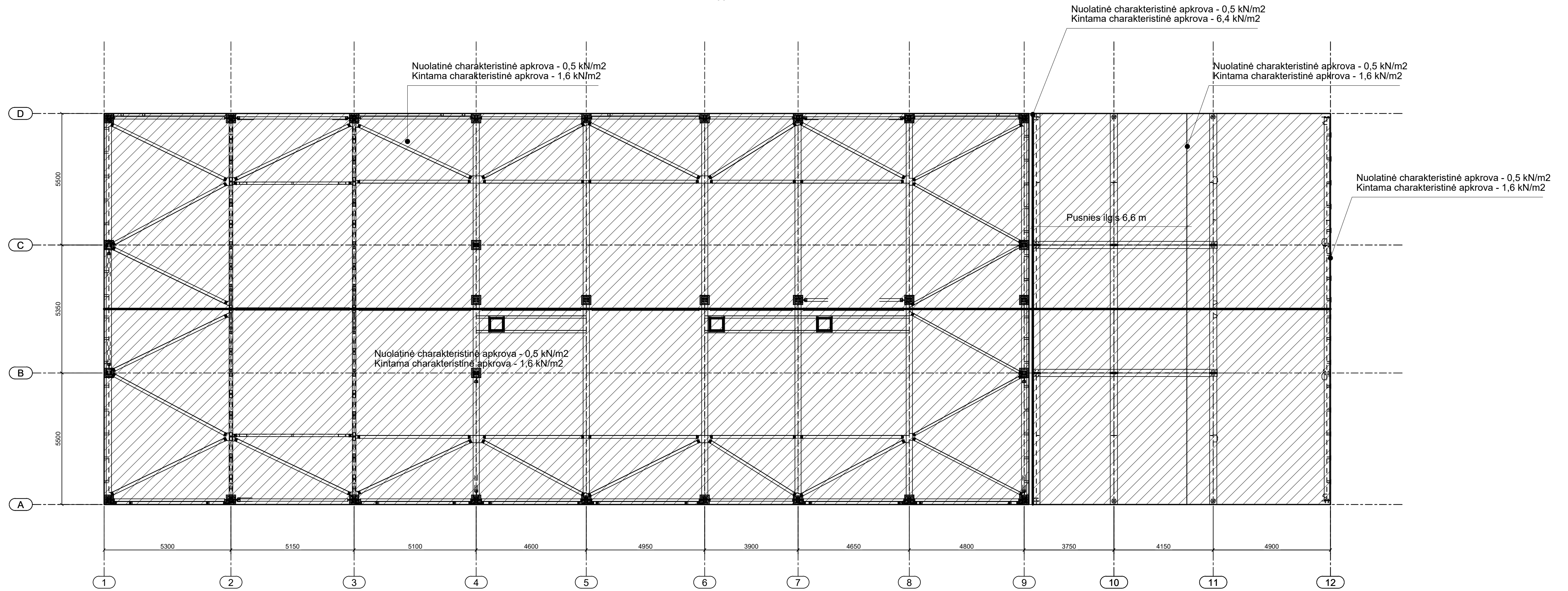
Eil. Nr.	Projekto dalis, žymuo	Atsakingo asmens Vardas Pavardė	Atestato Nr.	Parašas	Pastabos
1.	Bendroji dalis BD-01				
2.	Sklypo plano dalis SP-01				
3.	Architektūrinė dalis SA-01				
4.	Konstrukcinė dalis SK-01				
5.	Technologinė dalis T-01				
6.	Vandentiekio ir nuotekų šalinimo dalis VN-01				
7.	Šildymo, vėdinimo ir oro kondicionavimo dalis ŠVOK-01				

8.	Elektrotechninė dalis E-01				
9.	Elektroninių ryšių (telekomunikacijų) dalis ER-01				
10.	Apsauginės signalizacijos dalis AS-01, AS-02				
11.	Gaisro aptikimo ir signalizavimo dalis GSS-01				
12.	Procesų valdymo ir automatizacijos dalis PVA-01, PVA-02				
13.	Gaisrinės saugos dalis GS-01				
14.	Pasirengimo statybai ir statybos darbų organizavimo dalis SO-01				
15.	Skaičiuojamosios kainos nustatymo dalis KS-01				

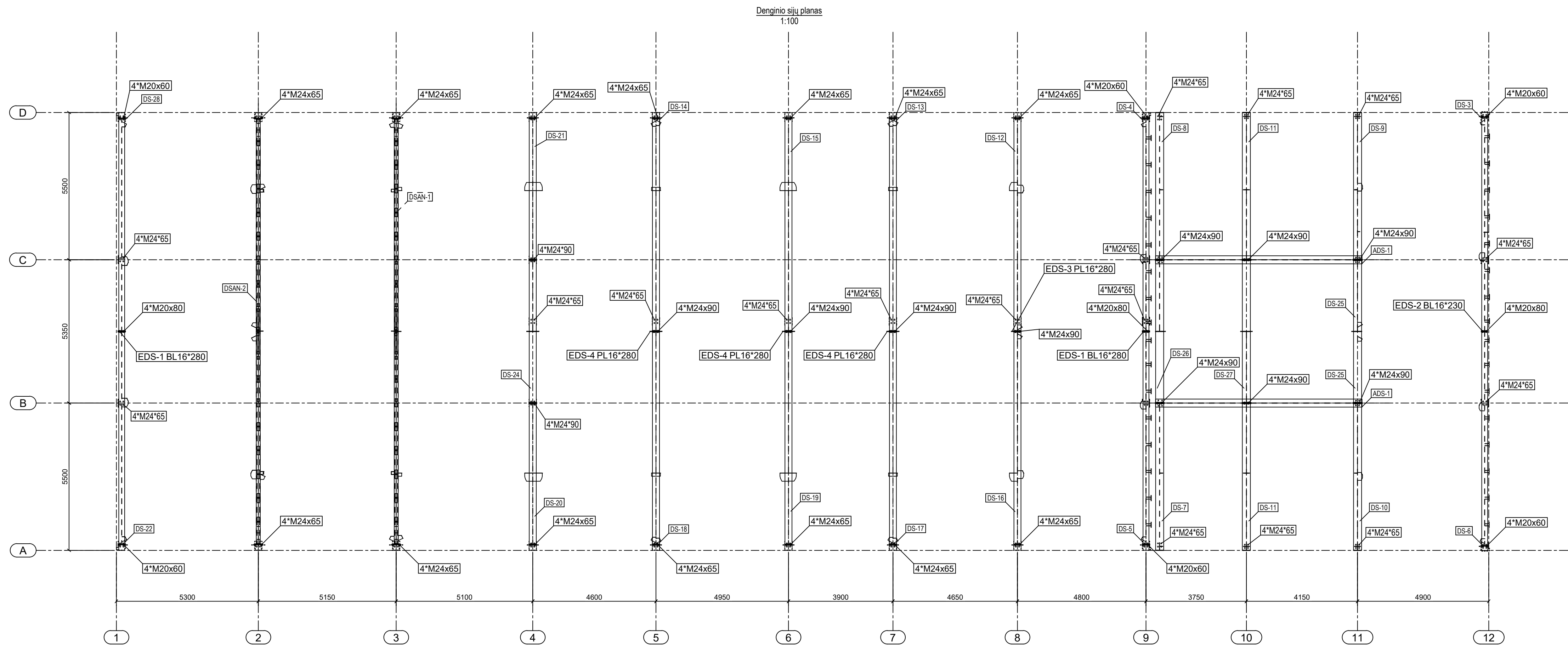
9 priedas

Užduotis profiliuoto pakloto gamintojui (01) pastatas

Užduotis profiliuotam paklotui
1:100



Atsargos koeficientai: kintamiems poveikiams - 1,3. Nuolatiniams - 1,35.
Prof. pakloto savasis svoris apkrovose nevertintas.



ADS-1	HEA450	S355J2	15440	2	2246.3
DS-3	HEA220	S355J2	8038	1	473.2
DS-4	HEA220	S355J2	7989	1	474.8
DS-5	HEA220	S355J2	7989	1	474.8
DS-6	HEA220	S355J2	8038	1	470.6
DS-7	HEA320	S355J2	5518	1	562.8
DS-8	HEA320	S355J2	5518	1	562.8
DS-9	HEA320	S355J2	5518	1	572.2
DS-10	HEA320	S355J2	5518	1	570.1
DS-11	HEA320	S355J2	11036	2	1136.7
DS-12	HEA260	S355J2	7989	1	578.6
DS-13	HEA260	S355J2	7989	1	571.2
DS-14	HEA260	S355J2	7989	1	571.0
DS-15	HEA260	S355J2	7989	1	578.9
DS-16	HEA260	S355J2	7989	1	578.6
DS-17	HEA260	S355J2	7989	1	571.2
DS-18	HEA260	S355J2	7989	1	571.0
DS-19	HEA260	S355J2	7989	1	578.9
DS-20	HEA260	S355J2	5309	1	399.1
DS-21	HEA260	S355J2	5309	1	399.1
DS-22	HEA220	S355J2	7990	1	431.3
DS-24	PL16*280	S355J2	460	1	400.5
DS-25	PL16*350	S355J2	395	1	569.7
DS-26	PL16*350	S355J2	380	1	565.8
DS-27	PL16*350	S355J2	440	1	567.6
DS-28	HEA220	S355J2	7990	1	431.3
DSAN-1	CFRHS150*6	S355J2	15932	1	1221.7
DSAN-2	CFRHS150*6	S355J2	15932	1	1229.3
EDS-1	BL16*280	S355J2	560	2	19.7
EDS-2	BL16*230	S355J2	240	1	6.9
EDS-3	PL16*280	S355J2	370	1	12.5
EDS-4	PL16*280	S355J2	1380	3	45.7
Zymuo	Pagrindinis profilis	Plienas	Ilgis, mm	Kiekis	Svoris, kg
Kiekių ziniaras				Viso:	18443.9

PASTABOS METALINIŲ KONSTRUKCIJŲ ĮRENGIMUI:

- Suvirinimo statinio aukštis - 1,2tmin, kur tmin - ploniausio iš jungiamų elementų storis - jei brėžiniuose nenurodyta kitaip.
- Konstrukcijos turi atitikti C3-M korozijos klasę. Spalviniai sprendiniai derinami su Projekto Architektu.
- Konstrukcijos tarpusavyje jungiamos 8.8 kok. kl. varžtais (pagal standartą LST EN ISO 4017), naudojant 10 kok. kl. varžles pagal standartą LST EN 4032, 200 HV kietumo klasės poveržles pagal standartą LST EN ISO 7090.
- Varžto skersmuo ir ilgis nurodytas brėžiniuose.

Laida "A"

A		2025-11	Korekcijos pagal bendrosios statinio projekto ekspertizės pastabas	
0		2025-07	Statybai	
LAIDA		ISLEIDIMO DATA	LAIDOS STATYBAIS KEITIMO PREŽARTIS (JEI TAIKOMA)	
PATV. DOK. NR.			STATINIO PROJEKTO PAVADINIMAS	
			Kitų pagalbinų paskirties pastatų (pagalbinų pastatų grupės) ir kitos paskirties statinių (kitų inžinerinių statinių grupės) Vilniaus r. sav., Nemėninės sen., Gaukštonių k., Gaukštonių g. 3, statybos ir griovimo projektas	
			STATINIO NUMERIS IR PAVADINIMAS	
			01 Technologinis pastatas	
		DOKUMENTO PAVADINIMAS		LAIDA
		Denginio sijos		0
		STATYTOJAS IR (ARBA) UŽSAKOVAS		DOKUMENTO ŽYMOJIS
		UAB „Vilniaus vandenys“		LAPAS LAPŲ
		2024-017-01-TDP-SK-01.B-06		1 A

10 priedas

01 pastato inkarinių varžtų skaičiavimas



Phone:

Project Number:

Title:

New Project

Location:

DESIGN CALCULATION OF COLUMN-FOUNDATION CONNECTION

Customer:

2025-11-25

Designer:

Company:
Address:
Phone:
E-Mail:
Name:

Project:

Title: New Project
Location:
Contact Person:
Comments:
Design Norm: EN Eurocodes (without NA)
Unit system: SI

This design applies exclusively to proprietary PEIKKO products and can't be used to validate properties of third party products, might they appear to be identical.

Summary

Name	Stage	#	Load Case	Page No.	Max Utilization	Status
Column 1	Final	1	Nd=-100,0, Mxd=0,0, Myd=30,0, Vxd=0,0, Vyd=30,0	4	97%	OK
	Erection	2	wind 'y' + self w.	6	20%	OK
	Erection	3	wind 'y' + self w.	7	20%	OK
	Erection	4	wind 'x' + self w.	8	20%	OK
	Erection	5	wind 'x' + self w.	9	20%	OK

Column 1

Note:

Number of Columns: 1

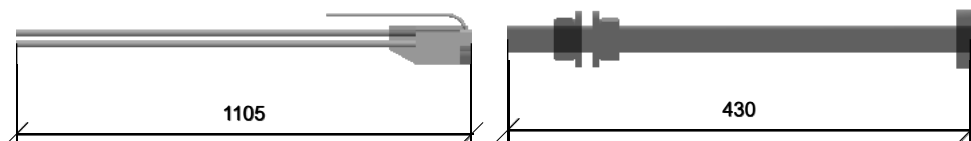
Peikko Products

Column Shoes: 4 x HPKM24

Bolts: 4 x HPM24L

Totals

Product	Amount
HPKM24	4
HPM24L	4



Minimum required torque value of nuts : $T_{min} = 200 \text{ Nm}$

Maximum allowed torque value of nuts : $T_{max} = 380 \text{ Nm}$

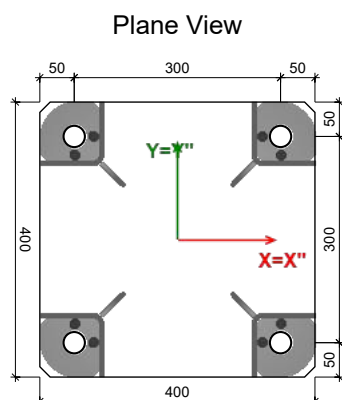
Bolt installation template: PPL24-4 300x300

Materials and Geometry

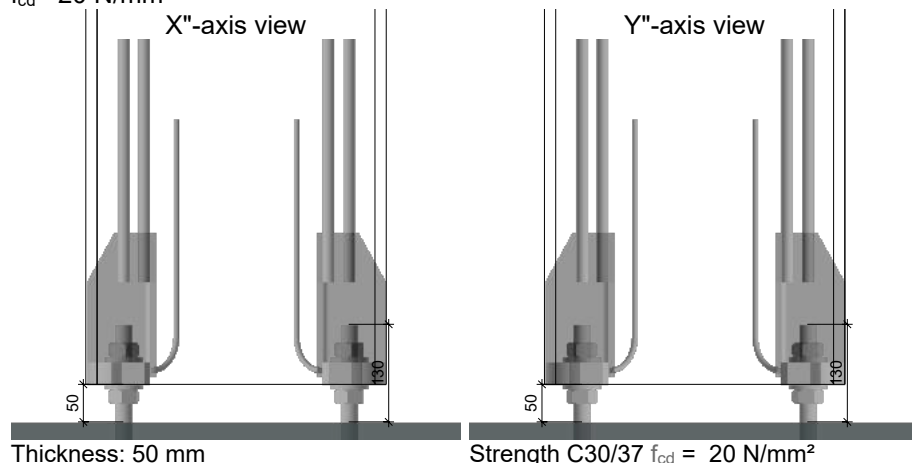
Column: 400x400

Concrete: C30/37

$f_{cd} = 20 \text{ N/mm}^2$



Grouting:



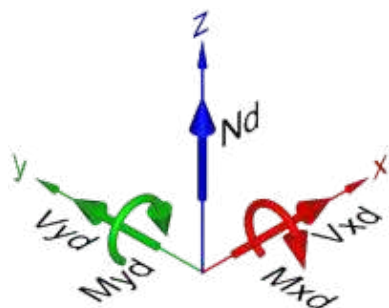
X; Y = local coordinate system of profile

X''; Y'' = local coordinate system of anchors

Load Cases

NOTE: Loads are defined in the local coordinate system of the profile.

(Design loads)



Final Stage

#	Name	N_d [kN]	M_{xd} [kNm]	M_{yd} [kNm]	V_{xd} [kN]	V_{yd} [kN]
1		-100,0	0,0	30,0	0,0	30,0

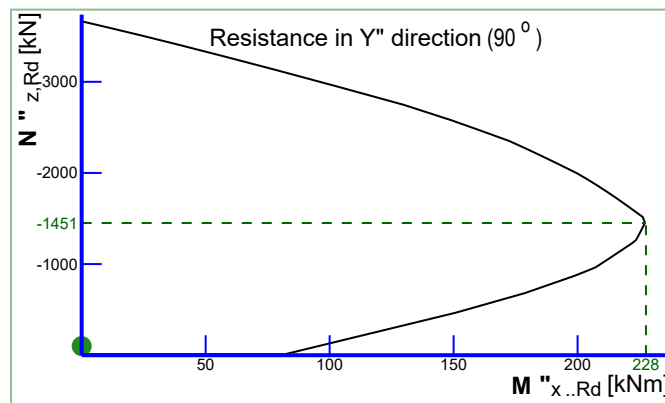
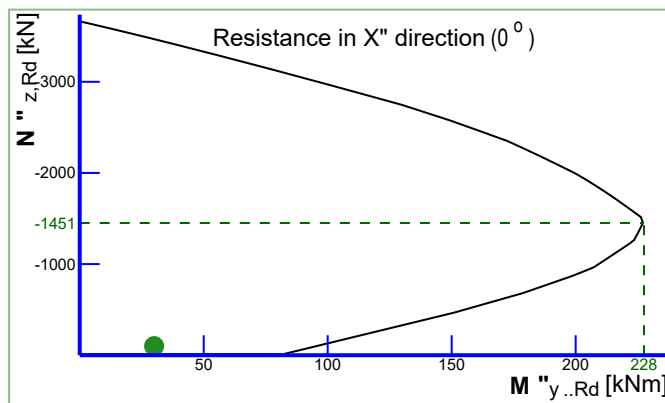
Erection stage

#	Name	N_d [kN]	M_{xd} [kNm]	M_{yd} [kNm]	V_{xd} [kN]	V_{yd} [kN]
2	wind 'y' + self w.	-27,0	4,7	0,0	0,0	-1,9
3	wind 'y' + self w.	-27,0	-4,7	0,0	0,0	1,9
4	wind 'x' + self w.	-27,0	0,0	4,7	1,9	0,0
5	wind 'x' + self w.	-27,0	0,0	-4,7	-1,9	0,0

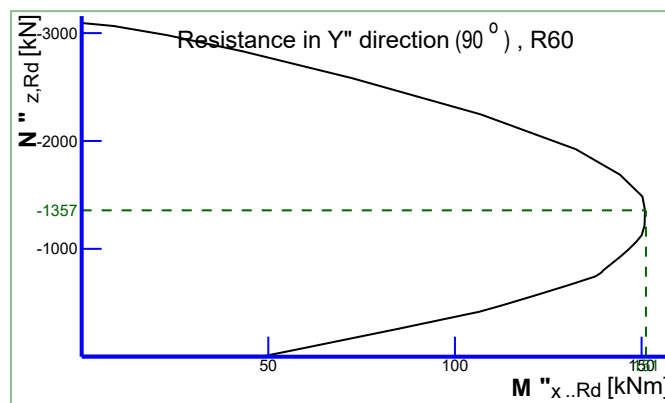
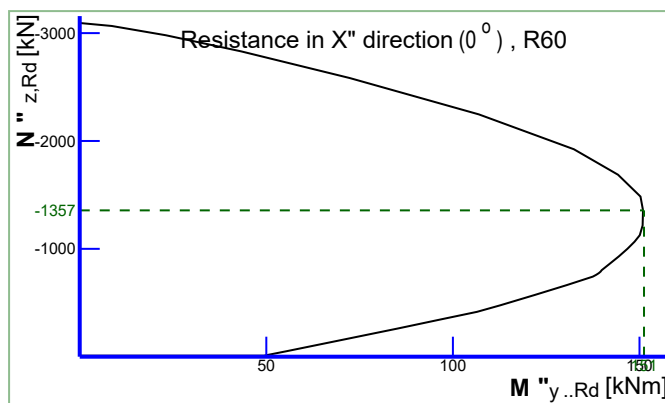
Fire Situation Loads

No load case for this stage defined

Resistance Diagrams



Fire Situation Resistances Diagrams



Supplementary Column Shoe Reinforcement

Concrete Cover 30 mm
Reinforcement B500B
 $f_{yd} = 434,8 \text{ N/mm}^2$

Reinforcement according to Technical Manual of Column Shoes

Base Structure

Concrete	C30/37
Uncracked	No
Aggregate size	16 mm
Footing dimension X-axis direction (b)	700 mm
Footing dimension Y-axis direction (h)	700 mm
Height of Footing	700 mm
Eccentricity of bolted column (e_x)	0 mm
Eccentricity of bolted column (e_y)	0 mm

Anchor Bolts Failure Verifications

Final Stage Bolts

Load Case #1 : $N_d = -100,0$, $M_{xd} = 0,0$, $M_{yd} = 30,0$, $V_{xd} = 0,0$, $V_{yd} = 30,0$

Steel Failure: Sufficient capacity

Concrete failure: Sufficient capacity

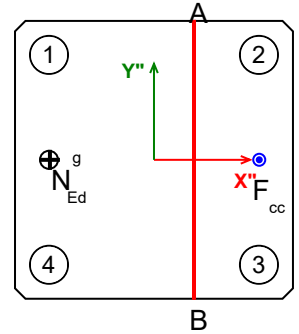
Steel failure verification

Design value of normal compressive force in the column	$N_{c,Ed}$	-100	kN
Friction coefficient (between base plate and grout layer)	C_{fd}	0,2	
Joint friction resistance	$F_{f,Rd}$	20	kN
Resultant shear force	V_{sd}	30	kN
Resultant shear force taking account friction contribution	$V_{sd,f}$	10	kN

Neutral axis in (X"/Y") = A(58,1 / 200,0); B(58,2 / -200,0)

Resultant tension force in (X"/Y") = $N_{Ed}^g(-150,0/0,0)$

Resultant compression force (concrete) in (X"/Y") = $F_{cc}(150,4/0,1)$



Bolt Pos.	Acting axial force [kN]	Design tension resistance [kN]	Axial capacity usage [%]	Acting shear force [kN]	Design shear resistance [kN]	Shear capacity usage [%]	Interaction [%]
1	25,0	127,1	19,7	5,00	45,0	11,1	25,1
2	-11,0	127,1	8,7	5,00	45,0	11,1	n/r
3	-11,0	127,1	8,7	0,0	45,0	0,0	n/r
4	25,0	127,1	19,7	0,0	45,0	0,0	n/r

Concrete failure verifications

Proof	Load [kN]	Capacity [kN]	Utilization [%]	Status
Pull-Out Failure	25,0	282,7	8,8	Ok
Cone failure				Ok
Covered with reinforcement:				
1) Foundation (Plain Concrete)	50,0	87,6	57,1	
2) Assigned Hanger Reinforcement	25,0	98,3	25,4	
3) Requirement of Strut and Tie Model	15,4	68,3	22,6	
Splitting Failure				Ok
Concrete decisive:				
1) Foundation (Plain Concrete)	50,0	116,0	43,1	
2)Assigned Splitting Reinforcement X	0,0	136,6	n/r	
3)Assigned Splitting Reinforcement Y	0,0	136,6	n/r	
Blow-Out Failure	0,0	0,0	n/r	Ok
Pry-out failure	10,0	175,1	5,7	Ok
Edge failure				Ok
Concrete decisive:				
1) -X (Left) Edge (Plain Concrete)	10,0	86,7	11,5	
2) +X (Right) Edge (Plain Concrete)	10,0	86,7	11,5	
3) +Y (Top) Edge (Plain Concrete)	10,0	39,4	25,4	
4) -Y (Bottom) Edge (Plain Concrete)	0,0	86,7	0,0	
5)Assigned Edge Reinforcement (-X)	3,3	0,0	n/r	
6)Assigned Edge Reinforcement (+X)	3,3	0,0	n/r	
7)Assigned Edge Reinforcement (+Y)	6,7	0,0	n/r	
8)Assigned Edge Reinforcement (-Y)	0,0	0,0	n/r	
Combined Resistance	$\beta_N^{2/3} + \beta_V^{2/3} \leq 1$		97,1	Ok

Explanation:

n/r - Verification of failure mode not required

n/a - Not applicable failure mode

(-) - Failure mode has no resistance to actions

Erection Stage Bolts

Load Case #1 : wind 'y' + self w. : $N_d=-27,0$, $M_{xd}=4,7$, $M_{yd}=0,0$, $V_{xd}=0,0$, $V_{yd}=-1,9$

Steel Failure: Sufficient capacity

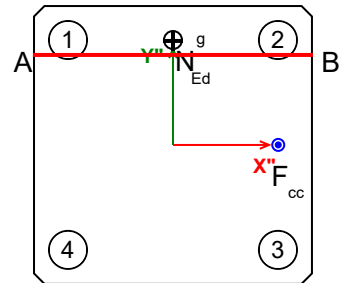
Concrete failure: Sufficient capacity

Steel failure verification

Design value of normal compressive force in the column	$N_{c,Ed}$	0	kN
Friction coefficient (between base plate and grout layer)	C_{fd}	0	
Joint friction resistance	$F_{f,Rd}$	0	kN
Resultant shear force	V_{sd}	1,89	kN
Resultant shear force taking account friction contribution	$V_{sd,f}$	1,89	kN

Neutral axis in (X"/Y") = A(-200,0 / 128,6); B(200,0 / 128,6)

Resultant tension force in (X"/Y") = $N^g_{Ed}(0,0/150,0)$



Bolt Pos.	Acting axial force [kN]	Design tension resistance [kN]	Axial capacity usage [%]	Acting shear force [kN]	Design shear resistance [kN]	Shear capacity usage [%]	Interaction [%]
1	1,12	127,1	0,9	0,0	17,2	0,0	0,9
2	1,12	127,1	0,9	0,0	17,2	0,0	0,9
3	-14,6	127,1	11,5	0,945	17,2	5,5	17,0
4	-14,6	127,1	11,5	0,945	17,2	5,5	17,0

Concrete failure verifications

Proof	Load [kN]	Capacity [kN]	Utilization [%]	Status
Pull-Out Failure	1,1	282,7	0,4	Ok
Cone failure				Ok
Covered with reinforcement:				
1) Foundation (Plain Concrete)	2,2	87,6	2,6	
2) Assigned Hanger Reinforcement	1,1	98,3	1,1	
3) Requirement of Strut and Tie Model	15,4	68,3	22,6	
Splitting Failure				Ok
Concrete decisive:				
1) Foundation (Plain Concrete)	2,2	116,0	1,9	
2)Assigned Splitting Reinforcement X	0,0	136,6	n/r	
3)Assigned Splitting Reinforcement Y	0,0	136,6	n/r	
Blow-Out Failure	0,0	0,0	n/r	Ok
Pry-out failure	1,9	175,1	1,1	Ok
Edge failure				Ok
Concrete decisive:				
1) -X (Left) Edge (Plain Concrete)	1,9	86,7	2,2	
2) +X (Right) Edge (Plain Concrete)	1,9	86,7	2,2	
3) +Y (Top) Edge (Plain Concrete)	0,0	86,7	0,0	
4) -Y (Bottom) Edge (Plain Concrete)	1,9	39,4	4,8	
5)Assigned Edge Reinforcement (-X)	0,6	0,0	n/r	
6)Assigned Edge Reinforcement (+X)	0,6	0,0	n/r	
7)Assigned Edge Reinforcement (+Y)	0,0	0,0	n/r	
8)Assigned Edge Reinforcement (-Y)	1,3	0,0	n/r	
Combined Resistance	$\beta_N^{2/3} + \beta_V^{2/3} \leq 1$		20,4	Ok

Explanation:

n/r - Verification of failure mode not required

n/a - Not applicable failure mode

(-) - Failure mode has no resistance to actions

Load Case #2 : wind 'y' + self w. : Nd=-27,0, Mxd=-4,7, Myd=0,0, Vxd=0,0, Vyd=1,9

Steel Failure: Sufficient capacity

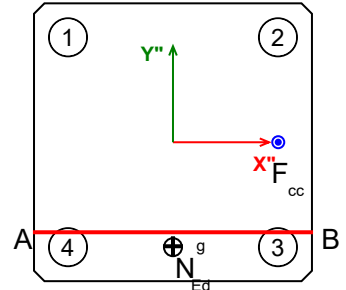
Concrete failure: Sufficient capacity

Steel failure verification

Design value of normal compressive force in the column	$N_{c,Ed}$	0	kN
Friction coefficient (between base plate and grout layer)	C_{fd}	0	
Joint friction resistance	$F_{f,Rd}$	0	kN
Resultant shear force	V_{sd}	1,89	kN
Resultant shear force taking account friction contribution	$V_{sd,f}$	1,89	kN

Neutral axis in (X"/Y") = A(-200,0 / -128,6); B(200,0 / -128,6)

Resultant tension force in (X"/Y") = $N^g_{Ed}(0,0/-150,0)$



Bolt Pos.	Acting axial force [kN]	Design tension resistance [kN]	Axial capacity usage [%]	Acting shear force [kN]	Design shear resistance [kN]	Shear capacity usage [%]	Interaction [%]
1	-14,6	127,1	11,5	0,945	17,2	5,5	17,0
2	-14,6	127,1	11,5	0,945	17,2	5,5	17,0
3	1,12	127,1	0,9	0,0	17,2	0,0	0,9
4	1,12	127,1	0,9	0,0	17,2	0,0	0,9

Concrete failure verifications

Proof	Load [kN]	Capacity [kN]	Utilization [%]	Status
Pull-Out Failure	1,1	282,7	0,4	Ok
Cone failure				Ok
Covered with reinforcement:				
1) Foundation (Plain Concrete)	2,2	87,6	2,6	
2) Assigned Hanger Reinforcement	1,1	98,3	1,1	
3) Requirement of Strut and Tie Model	15,4	68,3	22,6	
Splitting Failure				Ok
Concrete decisive:				
1) Foundation (Plain Concrete)	2,2	116,0	1,9	
2)Assigned Splitting Reinforcement X	0,0	136,6	n/r	
3)Assigned Splitting Reinforcement Y	0,0	136,6	n/r	
Blow-Out Failure	0,0	0,0	n/r	Ok
Pry-out failure	1,9	175,1	1,1	Ok
Edge failure				Ok
Concrete decisive:				
1) -X (Left) Edge (Plain Concrete)	1,9	86,7	2,2	
2) +X (Right) Edge (Plain Concrete)	1,9	86,7	2,2	
3) +Y (Top) Edge (Plain Concrete)	1,9	39,4	4,8	
4) -Y (Bottom) Edge (Plain Concrete)	0,0	86,7	0,0	
5)Assigned Edge Reinforcement (-X)	0,6	0,0	n/r	
6)Assigned Edge Reinforcement (+X)	0,6	0,0	n/r	
7)Assigned Edge Reinforcement (+Y)	1,3	0,0	n/r	
8)Assigned Edge Reinforcement (-Y)	0,0	0,0	n/r	
Combined Resistance	$\beta_N^{2/3} + \beta_V^{2/3} \leq 1$		20,4	Ok

Explanation:

n/r - Verification of failure mode not required

n/a - Not applicable failure mode

(-) - Failure mode has no resistance to actions

Load Case #3 : wind 'x' + self w. : Nd=-27,0, Mxd=0,0, Myd=4,7, Vxd=1,9, Vyd=0,0

Steel Failure: Sufficient capacity

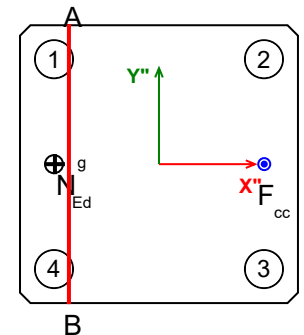
Concrete failure: Sufficient capacity

Steel failure verification

Design value of normal compressive force in the column	$N_{c,Ed}$	0	kN
Friction coefficient (between base plate and grout layer)	C_{fd}	0	
Joint friction resistance	$F_{f,Rd}$	0	kN
Resultant shear force	V_{sd}	1,89	kN
Resultant shear force taking account friction contribution	$V_{sd,f}$	1,89	kN

Neutral axis in (X"/Y") = A(-128,6 / 200,0); B(-128,6 / -200,0)

Resultant tension force in (X"/Y") = N^g_{Ed} (-150,0/0,0)



Bolt Pos.	Acting axial force [kN]	Design tension resistance [kN]	Axial capacity usage [%]	Acting shear force [kN]	Design shear resistance [kN]	Shear capacity usage [%]	Interaction [%]
1	1,12	127,1	0,9	0,0	17,2	0,0	0,9
2	-14,6	127,1	11,5	0,945	17,2	5,5	17,0
3	-14,6	127,1	11,5	0,945	17,2	5,5	17,0
4	1,12	127,1	0,9	0,0	17,2	0,0	0,9

Concrete failure verifications

Proof	Load [kN]	Capacity [kN]	Utilization [%]	Status
Pull-Out Failure	1,1	282,7	0,4	Ok
Cone failure				Ok
Covered with reinforcement:				
1) Foundation (Plain Concrete)	2,2	87,6	2,6	
2) Assigned Hanger Reinforcement	1,1	98,3	1,1	
3) Requirement of Strut and Tie Model	15,4	68,3	22,6	
Splitting Failure				Ok
Concrete decisive:				
1) Foundation (Plain Concrete)	2,2	116,0	1,9	
2)Assigned Splitting Reinforcement X	0,0	136,6	n/r	
3)Assigned Splitting Reinforcement Y	0,0	136,6	n/r	
Blow-Out Failure	0,0	0,0	n/r	Ok
Pry-out failure	1,9	175,1	1,1	Ok
Edge failure				Ok
Concrete decisive:				
1) -X (Left) Edge (Plain Concrete)	0,0	86,7	0,0	
2) +X (Right) Edge (Plain Concrete)	1,9	39,4	4,8	
3) +Y (Top) Edge (Plain Concrete)	1,9	86,7	2,2	
4) -Y (Bottom) Edge (Plain Concrete)	1,9	86,7	2,2	
5)Assigned Edge Reinforcement (-X)	0,0	0,0	n/r	
6)Assigned Edge Reinforcement (+X)	1,2	0,0	n/r	
7)Assigned Edge Reinforcement (+Y)	0,6	0,0	n/r	
8)Assigned Edge Reinforcement (-Y)	0,6	0,0	n/r	
Combined Resistance	$\beta_N^{2/3} + \beta_V^{2/3} \leq 1$		20,4	Ok

Explanation:

n/r - Verification of failure mode not required

n/a - Not applicable failure mode

(-) - Failure mode has no resistance to actions

Load Case #4 : wind 'x' + self w. : Nd=-27,0, Mxd=0,0, Myd=-4,7, Vxd=-1,9, Vyd=0,0

Steel Failure: Sufficient capacity

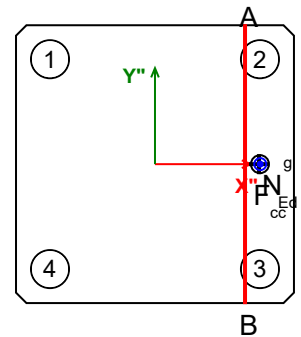
Concrete failure: Sufficient capacity

Steel failure verification

Design value of normal compressive force in the column	$N_{c,Ed}$	0	kN
Friction coefficient (between base plate and grout layer)	C_{fd}	0	
Joint friction resistance	$F_{f,Rd}$	0	kN
Resultant shear force	V_{sd}	1,89	kN
Resultant shear force taking account friction contribution	$V_{sd,f}$	1,89	kN

Neutral axis in (X"/Y") = A(128,6 / 200,0); B(128,6 / -200,0)

Resultant tension force in (X"/Y") = $N^g_{Ed}(150,0/0,0)$



Bolt Pos.	Acting axial force [kN]	Design tension resistance [kN]	Axial capacity usage [%]	Acting shear force [kN]	Design shear resistance [kN]	Shear capacity usage [%]	Interaction [%]
1	-14,6	127,1	11,5	0,945	17,2	5,5	17,0
2	1,12	127,1	0,9	0,0	17,2	0,0	0,9
3	1,12	127,1	0,9	0,0	17,2	0,0	0,9
4	-14,6	127,1	11,5	0,945	17,2	5,5	17,0

Concrete failure verifications

Proof	Load [kN]	Capacity [kN]	Utilization [%]	Status
Pull-Out Failure	1,1	282,7	0,4	Ok
Cone failure				Ok
Covered with reinforcement:				
1) Foundation (Plain Concrete)	2,2	87,6	2,6	
2) Assigned Hanger Reinforcement	1,1	98,3	1,1	
3) Requirement of Strut and Tie Model	15,4	68,3	22,6	
Splitting Failure				Ok
Concrete decisive:				
1) Foundation (Plain Concrete)	2,2	116,0	1,9	
2)Assigned Splitting Reinforcement X	0,0	136,6	n/r	
3)Assigned Splitting Reinforcement Y	0,0	136,6	n/r	
Blow-Out Failure	0,0	0,0	n/r	Ok
Pry-out failure	1,9	175,1	1,1	Ok
Edge failure				Ok
Concrete decisive:				
1) -X (Left) Edge (Plain Concrete)	1,9	39,4	4,8	
2) +X (Right) Edge (Plain Concrete)	0,0	86,7	0,0	
3) +Y (Top) Edge (Plain Concrete)	1,9	86,7	2,2	
4) -Y (Bottom) Edge (Plain Concrete)	1,9	86,7	2,2	
5)Assigned Edge Reinforcement (-X)	1,2	0,0	n/r	
6)Assigned Edge Reinforcement (+X)	0,0	0,0	n/r	
7)Assigned Edge Reinforcement (+Y)	0,6	0,0	n/r	
8)Assigned Edge Reinforcement (-Y)	0,6	0,0	n/r	
Combined Resistance	$\beta_N^{2/3} + \beta_V^{2/3} \leq 1$		20,4	Ok

Explanation:

n/r - Verification of failure mode not required

n/a - Not applicable failure mode

(-) - Failure mode has no resistance to actions

Supplementary Bolt Reinforcement

Concrete side cover	25 mm
Concrete top cover	25 mm
Concrete bottom cover	50 mm
Rebar Material	B500B
$f_{yd} = 434,8$	

Hanger reinforcement for tension force

Calculated stirrups per bolt 4 Ø6

The stirrups are located with a radial distance to the leg not further than R 75 mm

Splitting reinforcement parallel to X ($A_{sp,x}$) 471 mm²

Splitting reinforcement parallel to Y ($A_{sp,y}$) 471 mm²

Detailing of required reinforcement must be executed according to product technical manual. See also CEN/TS 1992-4-2, Figure 2