Modular/GE Universal Formwork

Technical information

PASCHAL

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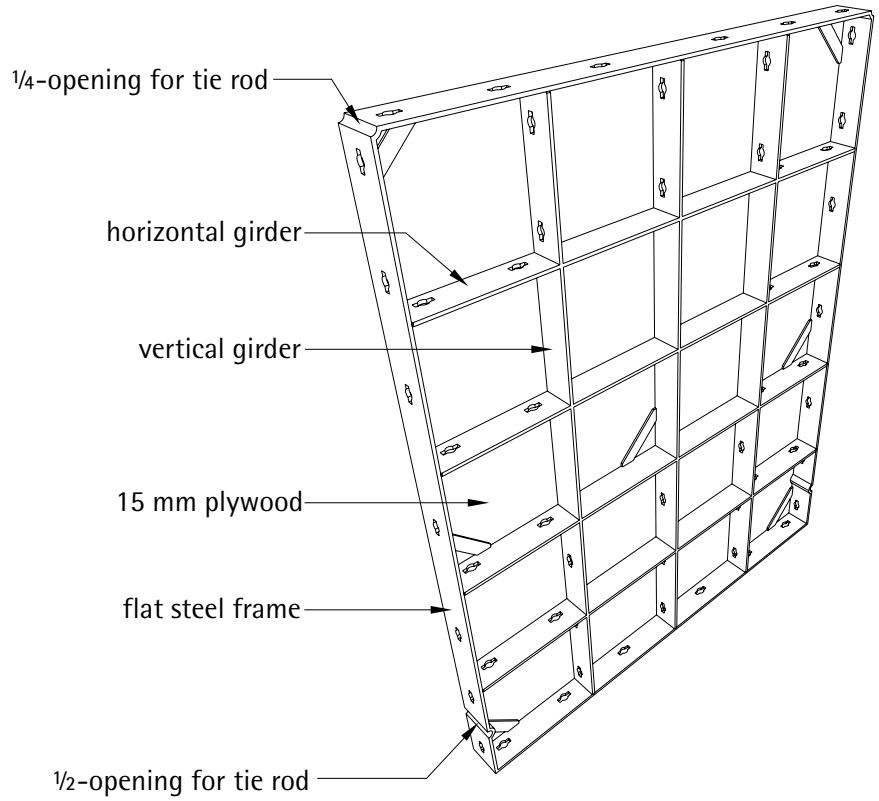
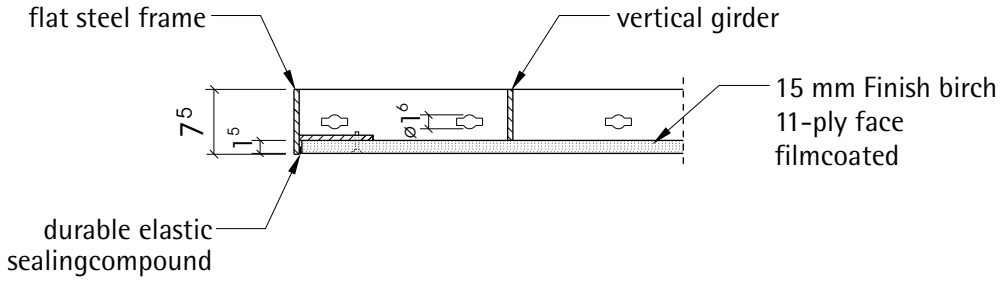
Contents

Subject to technical modifications!

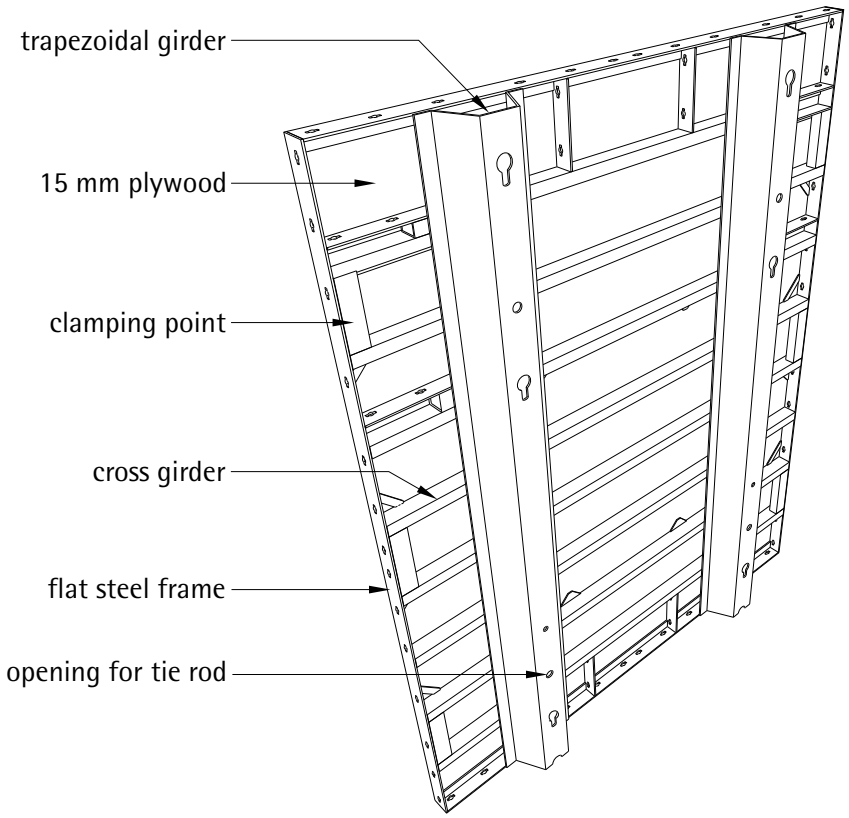


ill.1

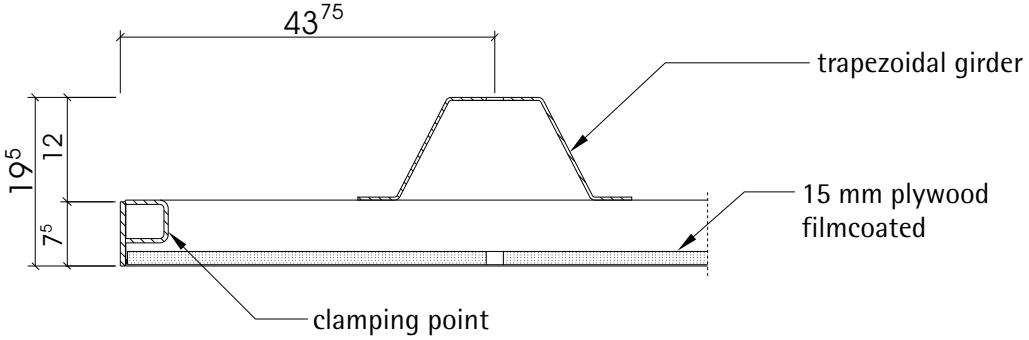


ill.2

The Modular formwork has a flat steel frame. The max. panel width is 100cm. The panel heights are 62.5cm, 75cm, 125cm and 150cm. Further dimensions see pages 6-15.
The frame has a depth of 7,5cm and a thickness of 6mm. The plywood is supported by horizontal and vertical girders. The girders are welded in a distances of 25cm.
The assembly instructions refer to standard executions with a maximum safe working pressure of 35kN/m² in compliance with DIN 18218.
The maximum pressure is applicable over the whole panel height without affecting the tolerances for deflection according to DIN 18202, table 3, line6.
As tie rods, only DW15 according to DIN 18216 should be used.
All applications surpassing these limitations necessitate a statically verification.



ill.3



ill.4

The GE panels are not a separate formwork system. They are used as large-size panels for walls. At forced points (such as corner, T-walls, etc.) they are completed by panels of the Modular formwork system.

Due to the similar frame conception (flat steel frame with holes for the keybolts), Modular and GE panels are vertically as well as horizontally compatible.

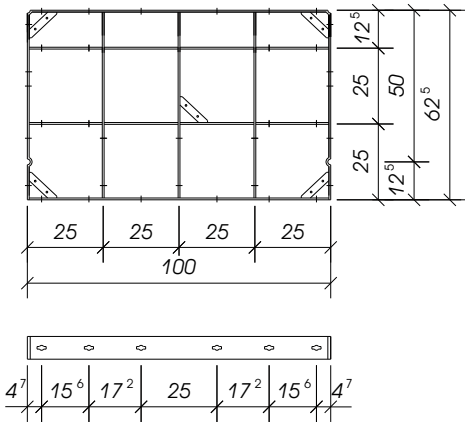
The frame depth of the GE panels inclusively the trapezoidal profile is 19.5cm.

The plywood is supported by rectangular hollow sections, which are welded into the frame.

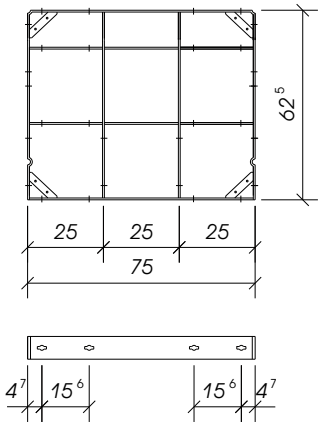
The technical information contains instructions for a maximum safe working concrete pressure of 60kN/m² according to DIN 18218. This max. pressure is valid across the whole GE panel height, obeying the tolerances of deflection according to DIN 18202, table 3, line 7.

Tie rods DW15 as per DIN 18216 are used as formwork anchor together with plate with ball-and-socket joint. For all applications exceeding these restrictions a static proof is indispensable.

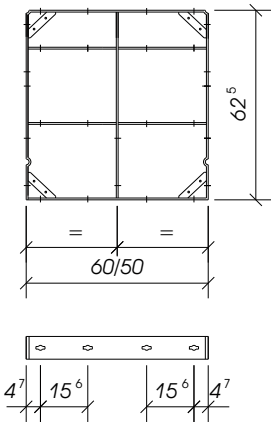
Panel
100x62.,5cm

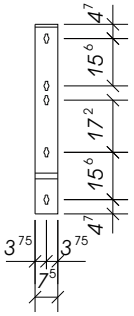


Panel
75x62.,5cm

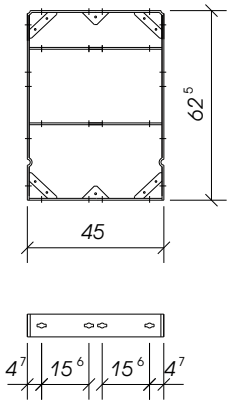


Panel
60/50x62.5cm

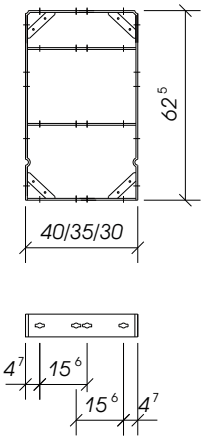




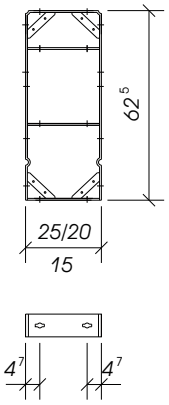
Panel
45x62.5cm



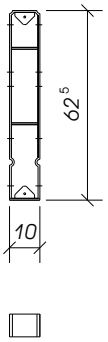
Panel
40/35/30x62.5cm



Panel
25/20/15x62.,5cm



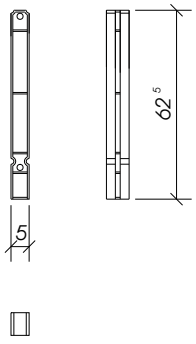
Panel
10x62.5cm



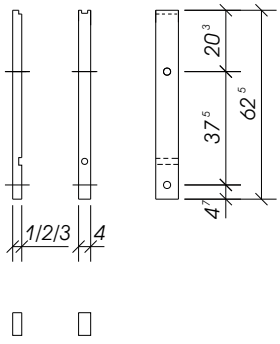
Art. N°	Item		Weight
100.001.1000	Panel	100 x 62.5cm	27.50 kg
100.001.0750	Panel	75 x 62.5cm	21.50 kg
100.001.0600	Panel	60 x 62.5cm	16.90 kg
100.001.0500	Panel	50 x 62.5cm	14.90 kg
100.001.0450	Panel	45 x 62.5cm	12.30 kg
100.001.0400	Panel	40 x 62.5cm	11.30 kg
100.001.0350	Panel	35 x 62.5cm	10.50 kg
100.001.0300	Panel	30 x 62.5cm	9.60 kg
100.001.0250	Panel	25 x 62.5cm	8.80 kg
100.001.0200	Panel	20 x 62.5cm	8.00 kg
100.001.0150	Panel	15 x 62.5cm	7.10 kg
100.001.0100	Panel	10 x 62.5cm	6.30 kg

General outlay of panels

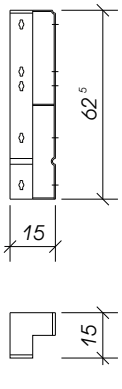
Filler post
5 x 62.5cm



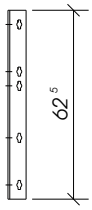
Plastic filler piece (PE)
1/2/3/4 x 62.5cm



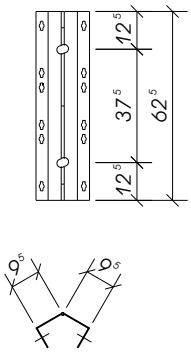
Inside corner post
15x15 x 62.5cm



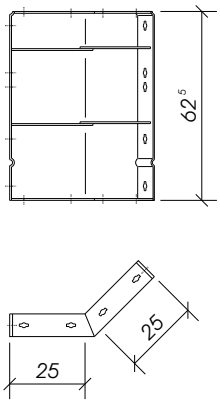
Outside corner post
62.5cm



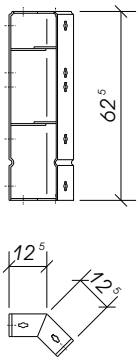
Hinged corner post
9.5x9.5 x 62.5cm



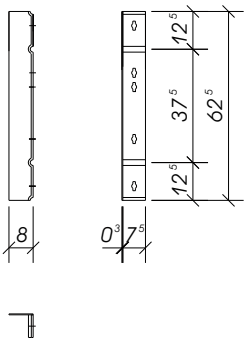
Outside corner 135°
25x25 x 62.5cm



Inside corner 135°
12.5x12.5 x 62.5cm

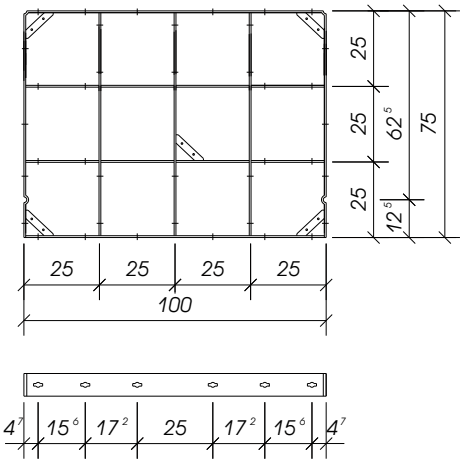


Filler plate
8 x 62.5cm

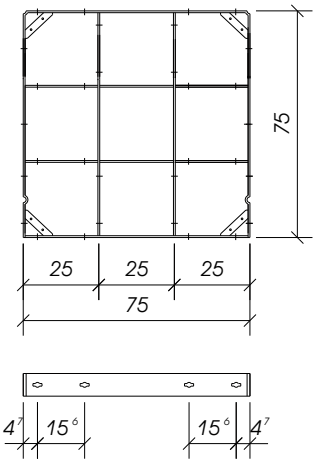


Art. N°	Items	Weight
100.003.0050	Filler post 5 x 62.5cm	4.70 kg
100.011.1010	Plastic filler piece (PE) 1 x 62.5cm	0.43 kg
100.011.1020	Plastic filler piece (PE) 2 x 62.5cm	0.85 kg
100.011.1030	Plastic filler piece (PE) 3 x 62.5cm	1.28 kg
100.011.1040	Plastic filler piece (PE) 4 x 62.5cm	1.70 kg
100.005.0150	Inside corner post 15 x 15 x 62.5cm	8.00 kg
100.006.0000	Outside corner post 62.5cm	3.20 kg
100.007.0001	Hinged corner post 9.5 x 9.5 x 62.5cm without holes for ties	8.90 kg
100.007.0002	Hinged corner post 9.5 x 9.5 x 62.5cm with holes for ties	8.90 kg
100.017.0001	Outside corner 135° 25 x 25 x 62.5cm	18.10 kg
100.017.0002	Inside corner 135°12.5 x 12.5 x 62.5cm	11.00 kg
100.012.0005	Filler plate 8 x 62.5cm	3.25 kg

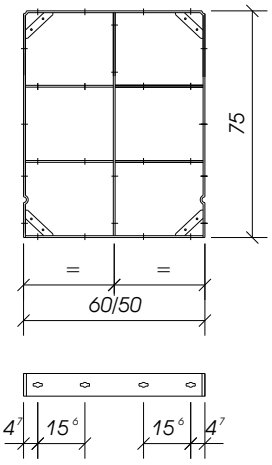
Panel
100x75cm

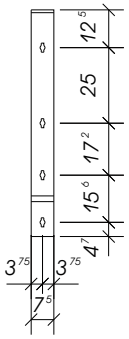


Panel
75x75cm

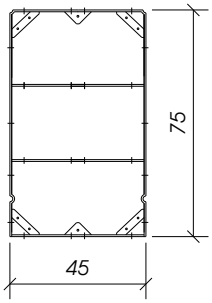


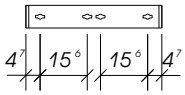
Panel
60/50x75cm



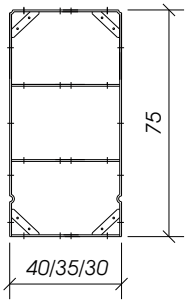


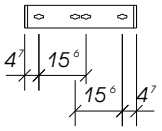
Panel
45x75cm



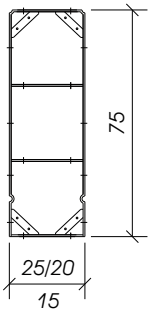


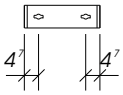
Panel
40/35/30x75cm



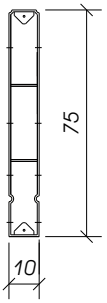


Panel
25/20/15x75cm





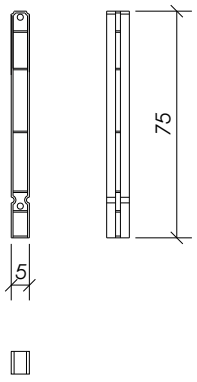
Panel
10x75cm



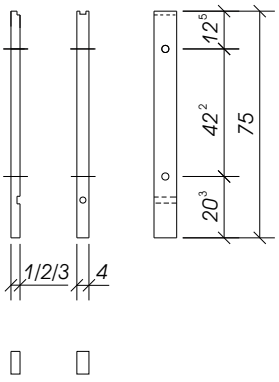
Art. N°	Item		Weight
101.001.1000	Panel	100 x 75cm	30,00 kg
101.001.0750	Panel	75 x 75cm	24,10 kg
101.001.0600	Panel	60 x 75cm	19,10 kg
101.001.0500	Panel	50 x 75cm	16,80 kg
101.001.0450	Panel	45 x 75cm	14,10 kg
101.001.0400	Panel	40 x 75cm	13,10 kg
101.001.0350	Panel	35 x 75cm	12,10 kg
101.001.0300	Panel	30 x 75cm	11,10 kg
101.001.0250	Panel	25 x 75cm	10,10 kg
101.001.0200	Panel	20 x 75cm	9,10 kg
101.001.0150	Panel	15 x 75cm	8,10 kg
101.001.0100	Panel	10 x 75cm	7,10 kg

General outlay of panels

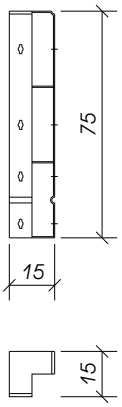
Filler post
5 x 75cm



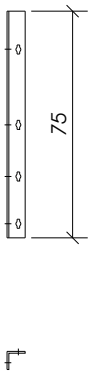
Plastic filler piece (PE)
1/2/3/4 x 75cm



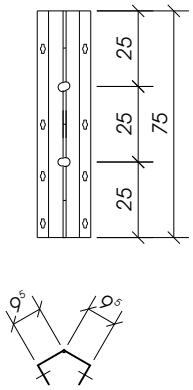
Inside corner post
15x15 x 75cm



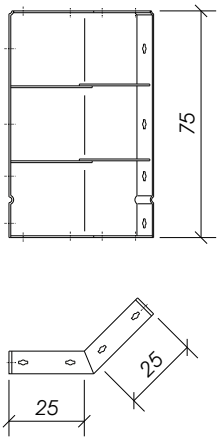
Outside corner post
75cm



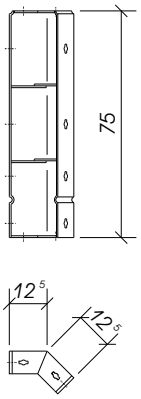
Hinged corner post
9.5x9.5 x 75cm



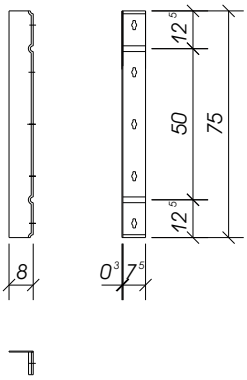
Outside corner post 135°
25x25 x 75cm



Inside corner 135°
12.5x12.5 x 75cm

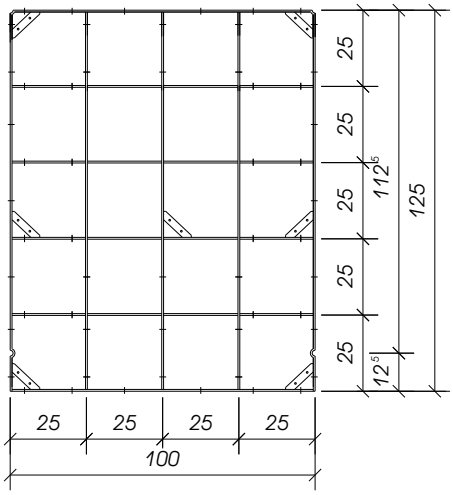


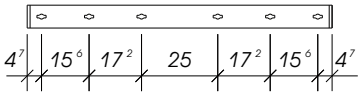
Filler plate
8 x 75cm



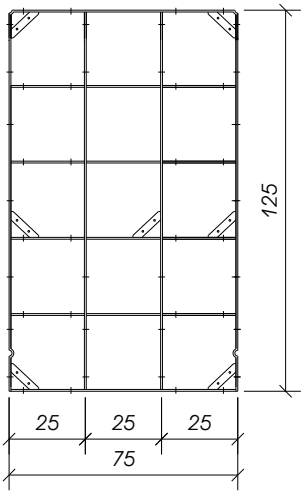
Art. N°	Item		Weight
101.003.0050	Filler post	5 x 75cm	5.40
101.004.1010	Plastic filler piece (PE)	1 x 75cm	0.50
101.004.1020	Plastic filler piece (PE)	2 x 75cm	1.00
101.004.1030	Plastic filler piece (PE)	3 x 75cm	1.50
101.004.1040	Plastic filler piece (PE)	4 x 75cm	2.00
101.005.0150	Inside corner post	15 x 15 x 75cm	9.60
101.006.0000	Outside corner post	75cm	3.60
101.007.0001	Hinged corner post without holes for ties	9.5 x 9.5 x 75cm	10.60
101.007.0002	Hinged corner post with holes for ties	9.5 x 9.5 x 75cm	10.60
101.017.0001	Outside corner 135°	25 x 25 x 75cm	20.50
101.017.0002	Inside corner 135°	12.5 x 12.5 x 75cm	12.60
101.012.0005	Filler plate	8 x 75cm	3.90

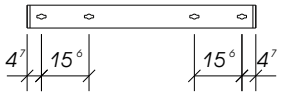
Panel
100x125cm



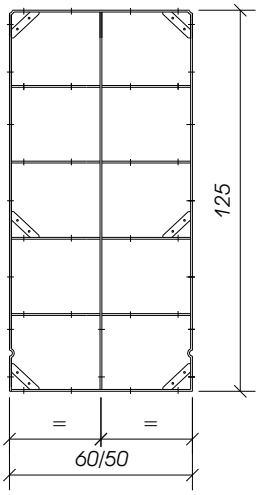


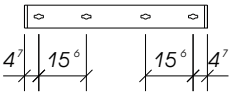
Panel
75x125cm

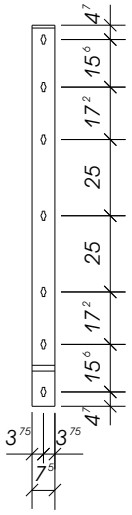




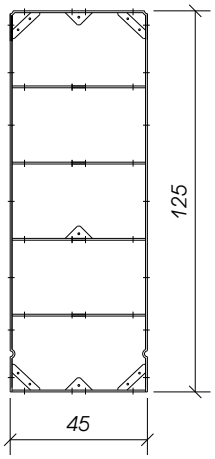
Panel
60/50x125cm

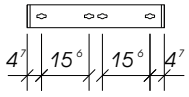




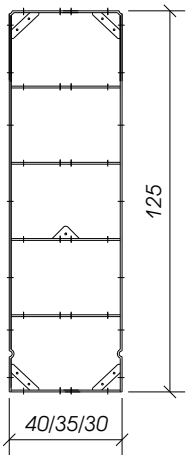


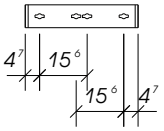
Panel
45x125cm



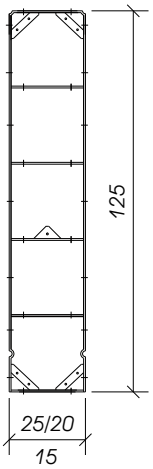


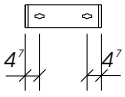
Panel
40/35/30x125cm



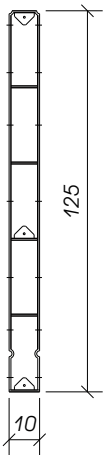


Panel
25/20/15x125cm



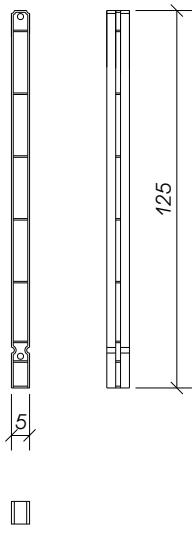


Panel
10x125cm

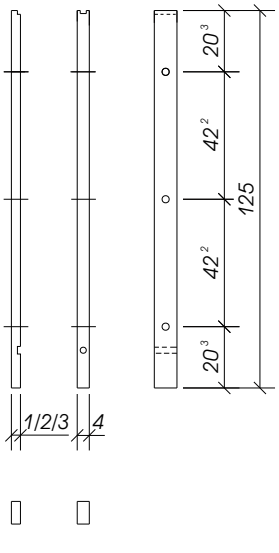


General outlay of panels

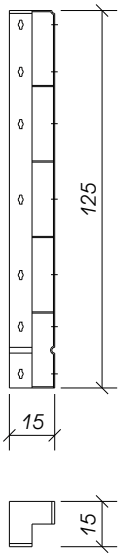
Filler post
5 x 125cm



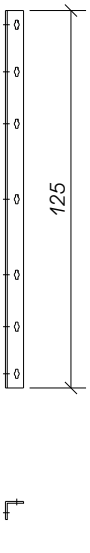
Plastic filler piece (PE)
1/2/3/4 x 125cm



Inside corner post
15x15 x 125cm

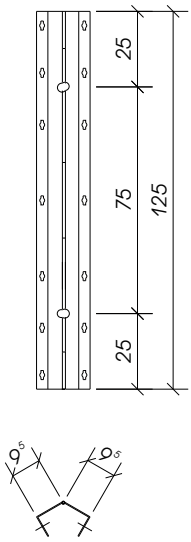


Outside corner post
125cm

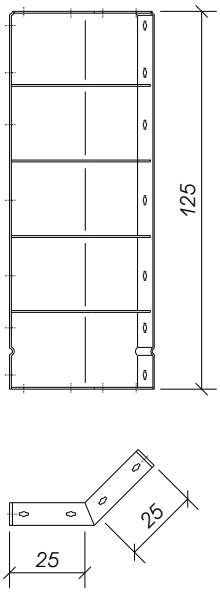


Art. N°	Item		Weight
103.001.1000	Panel	100 x 125cm	49.50 kg
103.001.0750	Panel	75 x 125cm	37.50 kg
103.001.0600	Panel	60 x 125cm	29.30 kg
103.001.0500	Panel	50 x 125cm	26.30 kg
103.001.0450	Panel	45 x 125cm	21.60 kg
103.001.0400	Panel	40 x 125cm	20.10 kg
103.001.0350	Panel	35 x 125cm	18.60 kg
103.001.0300	Panel	30 x 125cm	17.10 kg
103.001.0250	Panel	25 x 125cm	15.60 kg
103.001.0200	Panel	20 x 125cm	14.10 kg
103.001.0150	Panel	15 x 125cm	12.60 kg
103.001.0100	Panel	10 x 125cm	11.10 kg
103.003.0050	Filler post	5 x 125cm	8.60 kg
103.011.1010	Plastic filler piece (PE)	1 x 125cm	0.85 kg
103.011.1020	Plastic filler piece (PE)	2 x 125cm	1.70 kg
103.011.1030	Plastic filler piece (PE)	3 x 125cm	2.55 kg
103.011.1040	Plastic filler piece (PE)	4 x 125cm	3.45 kg
103.005.0150	Inside corner post	15 x 15 x 125cm	16.00 kg
103.006.0000	Outside corner post	125cm	6.40 kg

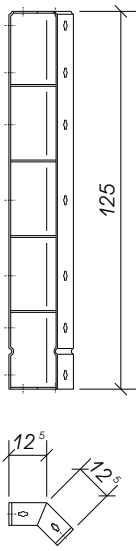
Hinged corner post
9.5x9.5 x 125cm



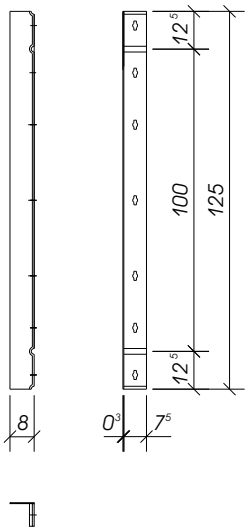
Outside corner 135°
25x25 x 125cm



Inside corner 135°
12.5x12.5 x 125cm



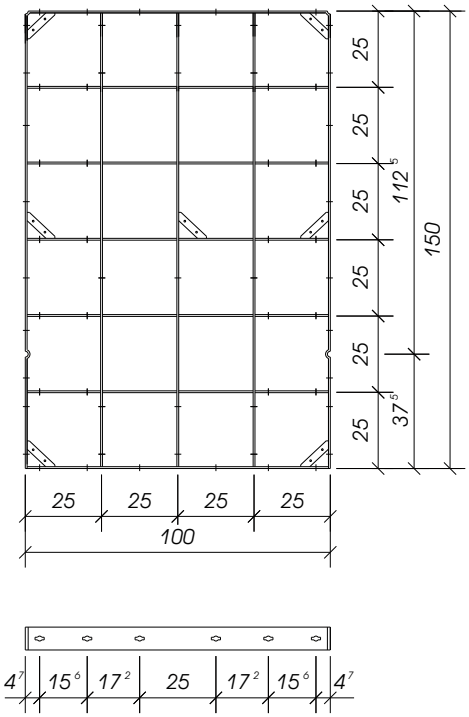
Filler plate
8 x 125cm



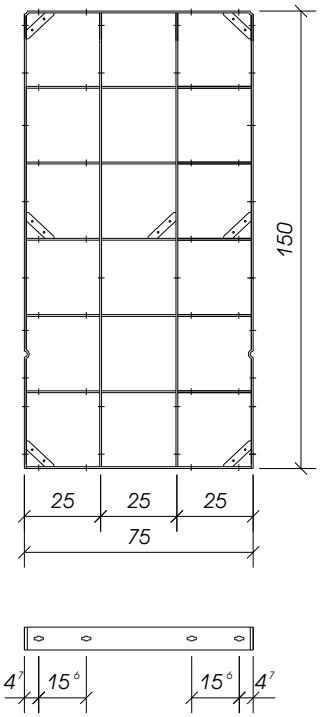
Art. N°	Item	Weight
103.007.0001	Hinged corner post 9.5 x 9.5 x 125cm without holes for ties	17.70 kg
103.007.0002	Hinged corner post 9.5 x 9.5 x 125cm with holes for ties	17.70 kg
103.017.0001	Outside corner 135° 25 x 25 x 125cm	32.60 kg
103.017.0002	Inside corner 135° 12.5 x 12.5 x 125cm	20.20 kg
103.012.0005	Filler plate 8 x 125cm	6.50 kg

General outlay of panels

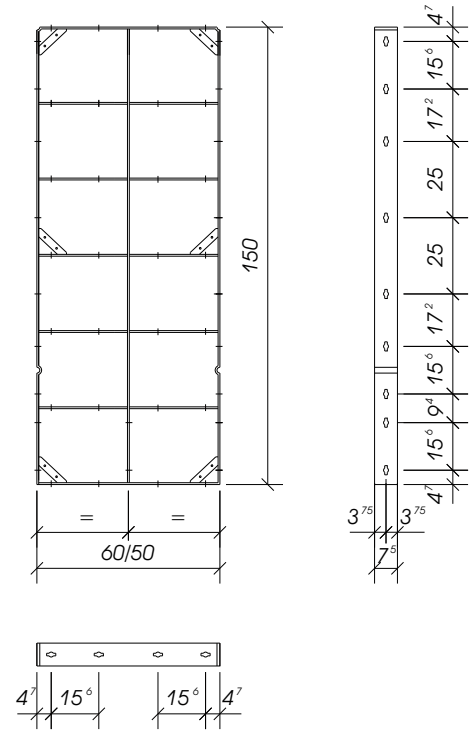
Panel
100x150cm



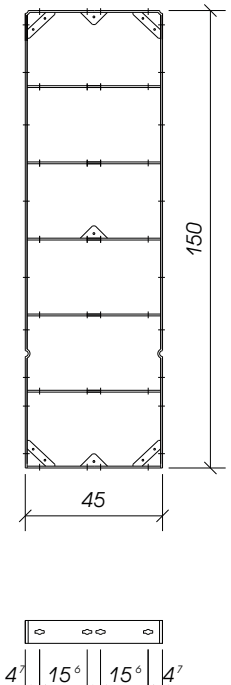
Panel
75x150cm



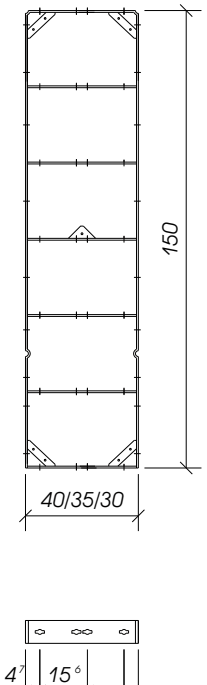
Panel
60/50x150cm



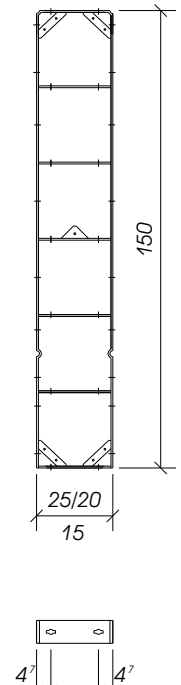
Panel
45x150cm



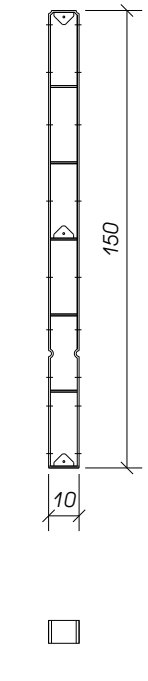
Panel
40/35/30x150cm



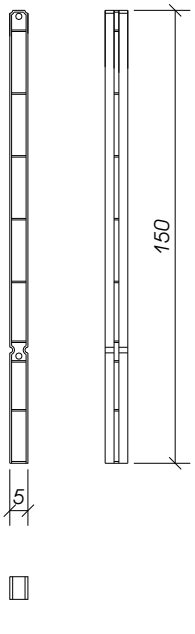
Panel
25/20/15x150cm



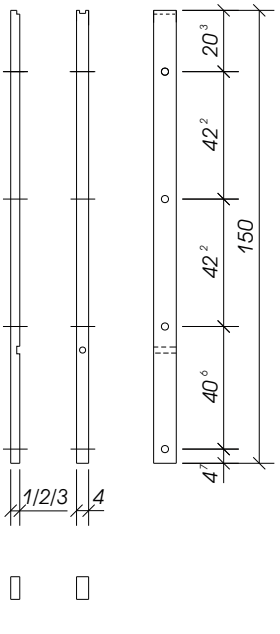
Panel
10x150cm



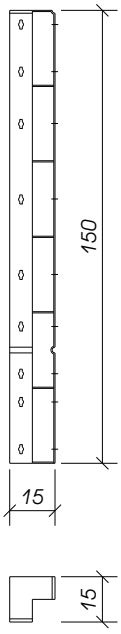
Filler post
5 x 150cm



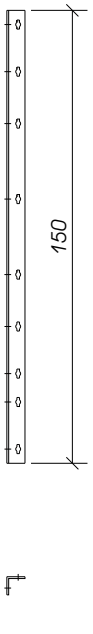
Plastic filler piece (PE)
1/2/3/4 x 150cm



Inside corner post
15x15 x 150cm



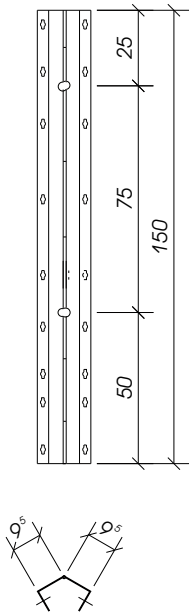
Outside corner post
150cm



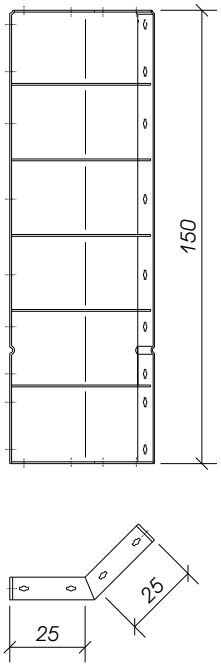
Art. N°	Item		Weight
104.001.1000	Panel	100 x 150cm	59.00 kg
104.001.0750	Panel	75 x 150cm	44.50 kg
104.001.0600	Panel	60 x 150cm	35.40 kg
104.001.0500	Panel	50 x 150cm	31.40 kg
104.001.0450	Panel	45 x 150cm	25.80 kg
104.001.0400	Panel	40 x 150cm	23.80 kg
104.001.0350	Panel	35 x 150cm	22.10 kg
104.001.0300	Panel	30 x 150cm	20.40 kg
104.001.0250	Panel	25 x 150cm	18.70 kg
104.001.0200	Panel	20 x 150cm	16.90 kg
104.001.0150	Panel	15 x 150cm	15.20 kg
104.001.0100	Panel	10 x 150cm	13.40 kg
104.003.0050	Filler post	5 x 150cm	11.00 kg
104.011.1010	Plastic filler piece (PE)	1 x 150cm	1.00 kg
104.011.1020	Plastic filler piece (PE)	2 x 150cm	2.00 kg
104.011.1030	Plastic filler piece (PE)	3 x 150cm	3.00 kg
104.011.1040	Plastic filler piece (PE)	4 x 150cm	4.00 kg
104.005.0150	Inside corner post	15 x 15 x 150cm	19.20 kg
104.006.0000	Outside corner post	150cm	7.60 kg

General outlay of panels

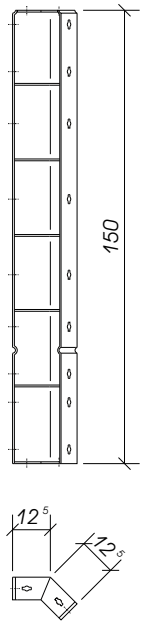
Hinged corner post
9.5x9.5 x 150cm



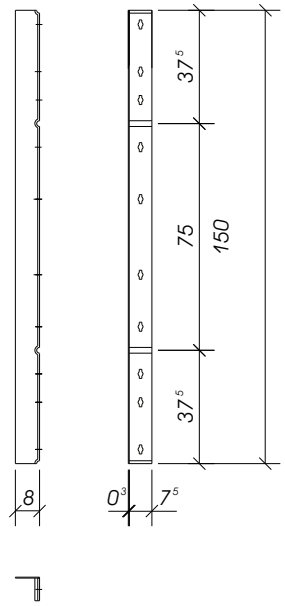
Outside corner 135°
25x25 x 150cm



Inside corner 135°
12.5x12.5 x 150cm

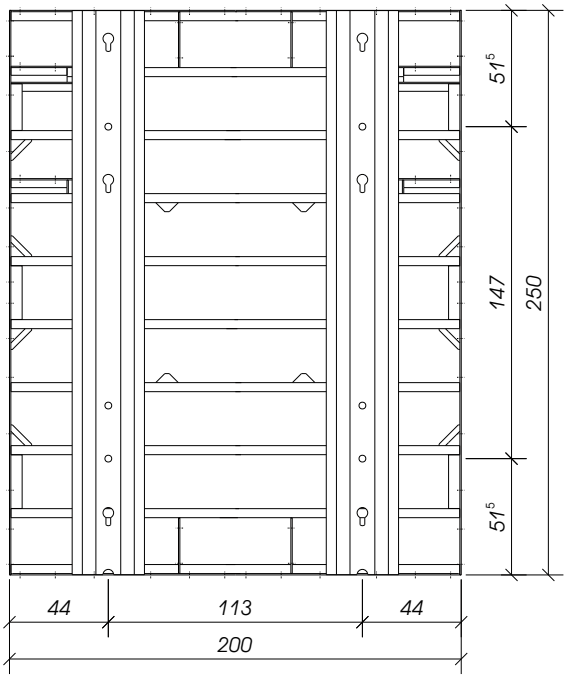


Filler plate
8 x 150cm

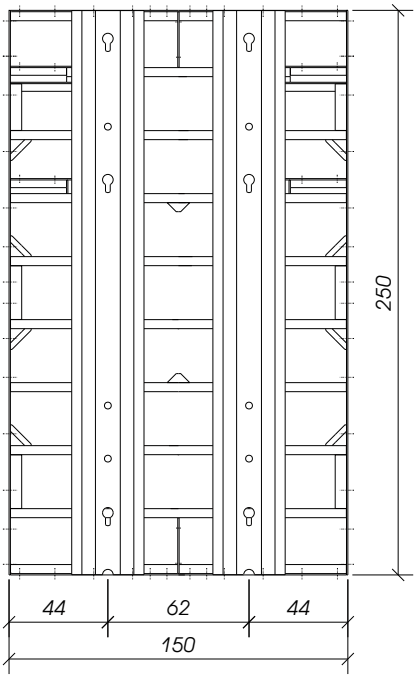


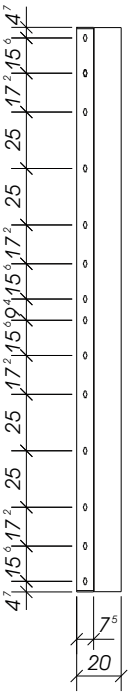
Art. N°	Item	Weight
104.007.0001	Hinged corner post 9.5 x 9.5 x 150cm without holes for ties	21.20 kg
104.007.0002	Hinged corner post 9.5 x 9.5 x 150cm with holes for ties	21.20 kg
104.017.0001	Outside corner 135° 25 x 25 x 150cm	38.90 kg
104.017.0002	Inside corner 135° 12.5 x 12.5 x 150cm	24.10 kg
104.012.0005	Filler plate 8 x 150cm	7.80 kg

Large-size panel
200 x 250cm

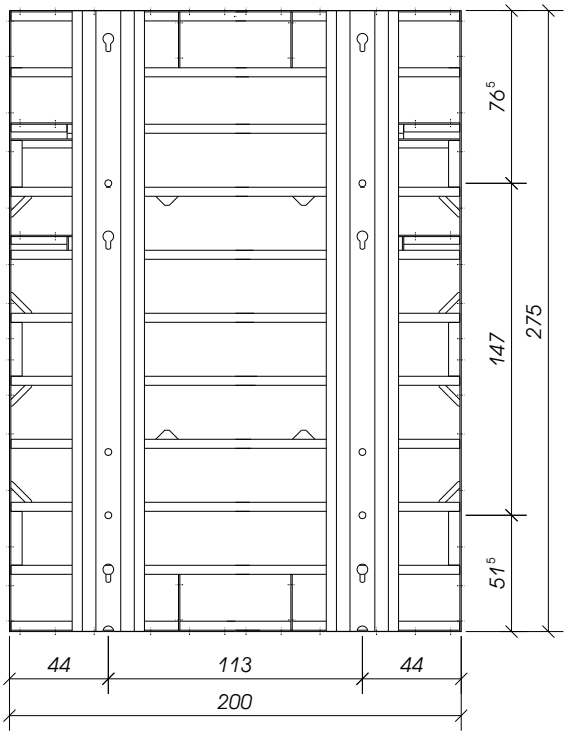


Large-size panel
150 x 250cm

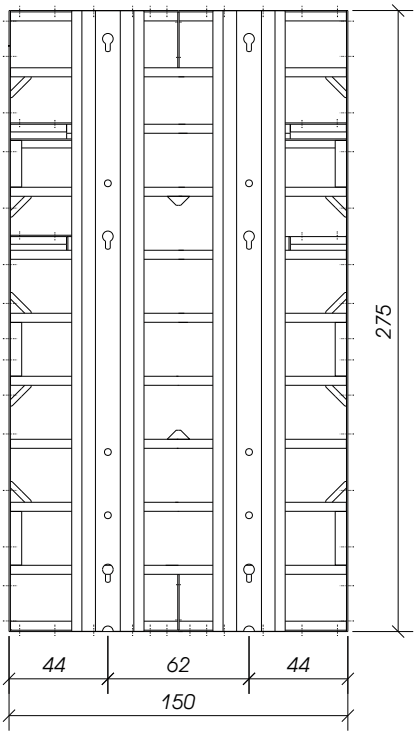


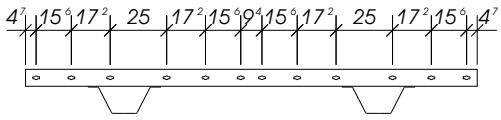


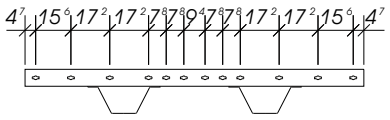
Large-size panel
200 x 275cm



Large-size panel
150 x 275cm

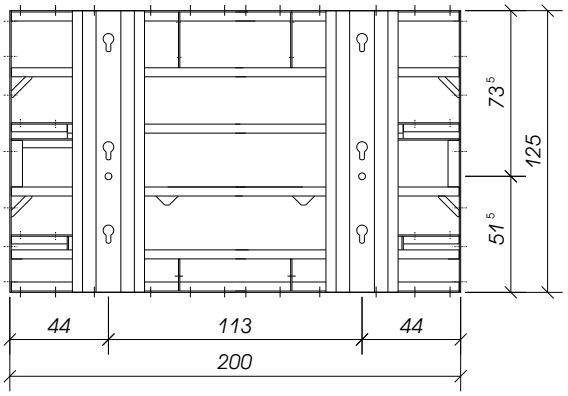




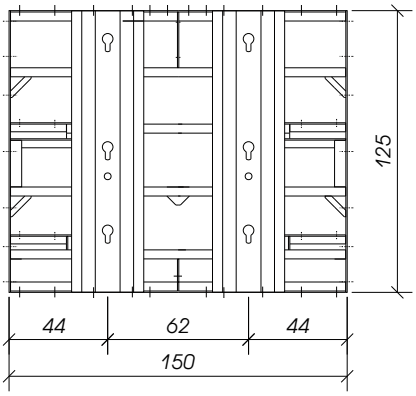


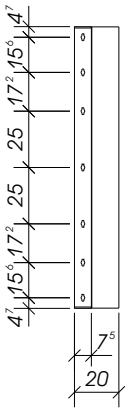
General outlay of panels

Extension panel GE
200 x 125cm

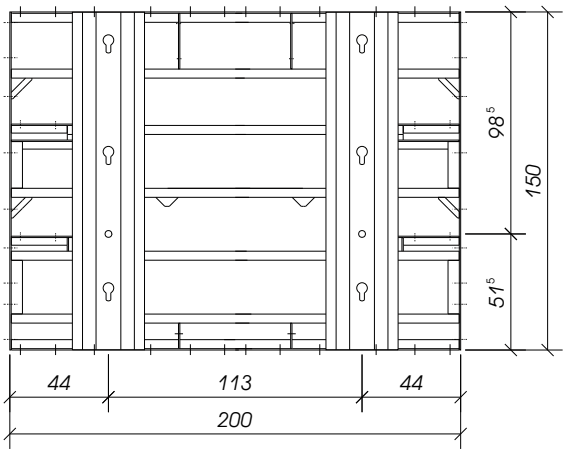


Extension panel GE
150 x 125cm

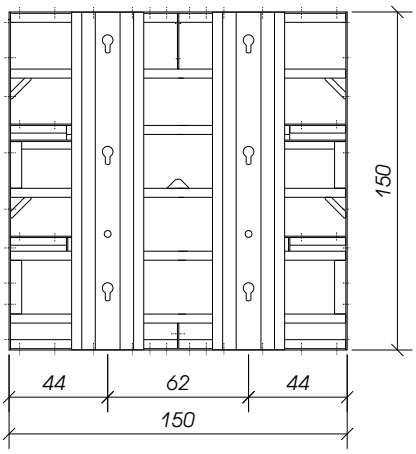


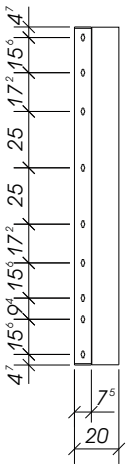


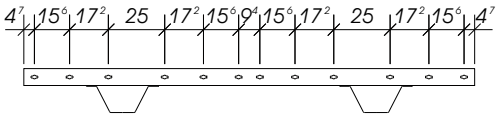
Extension panel GE
200 x 150cm

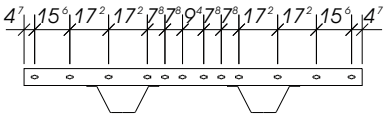


Extension panel GE
150 x 150cm







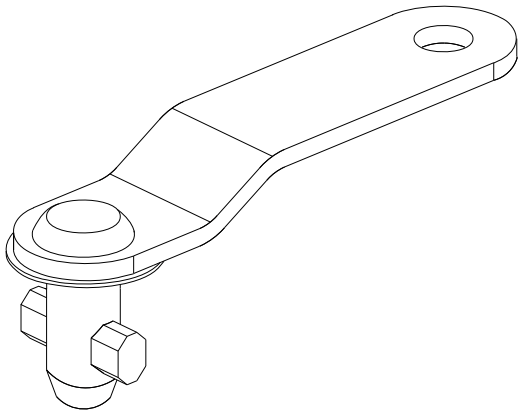


Art. N°	Item		Weight
115.502.2000	Large-size panel GE	200 x 250cm	258.00 kg
115.502.1500	Large-size panel GE	150 x 250cm	217.00 kg
116.502.2000	Large-size panel GE	200 x 275cm	280.00 kg
116.502.1500	Large-size panel GE	150 x 275cm	243.00 kg
113.502.2000	Extension panel GE	200 x 125cm	140.00 kg
113.502.1500	Extension panel GE	150 x 125cm	117.00 kg
114.502.2000	Extension panel GE	200 x 150cm	165.00 kg
114.502.1500	Extension panel GE	150 x 150cm	139.00 kg

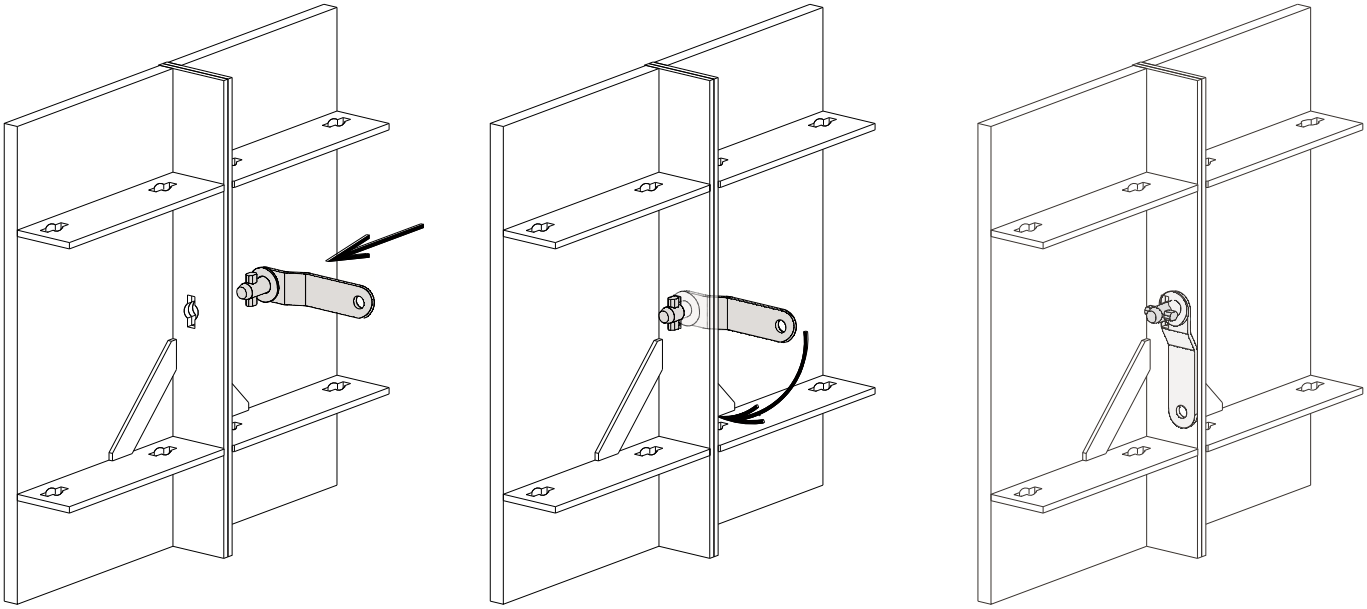
Keybolt

Art. N° : 189.001.0100

Weight : 0,19kg



ill.5



ill.6

For the panel connection at the vertical and horizontal joints, special keybolts D15.5mm (ill.5) are to be used to allow a safe connection of panels and an even fixation.

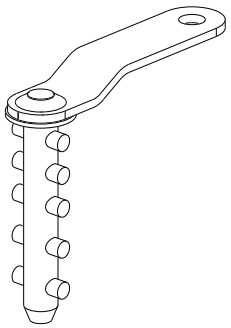
The keybolt is put through the holes of the panel frame and turned by 90 degrees (ill.6).

Connecting piece

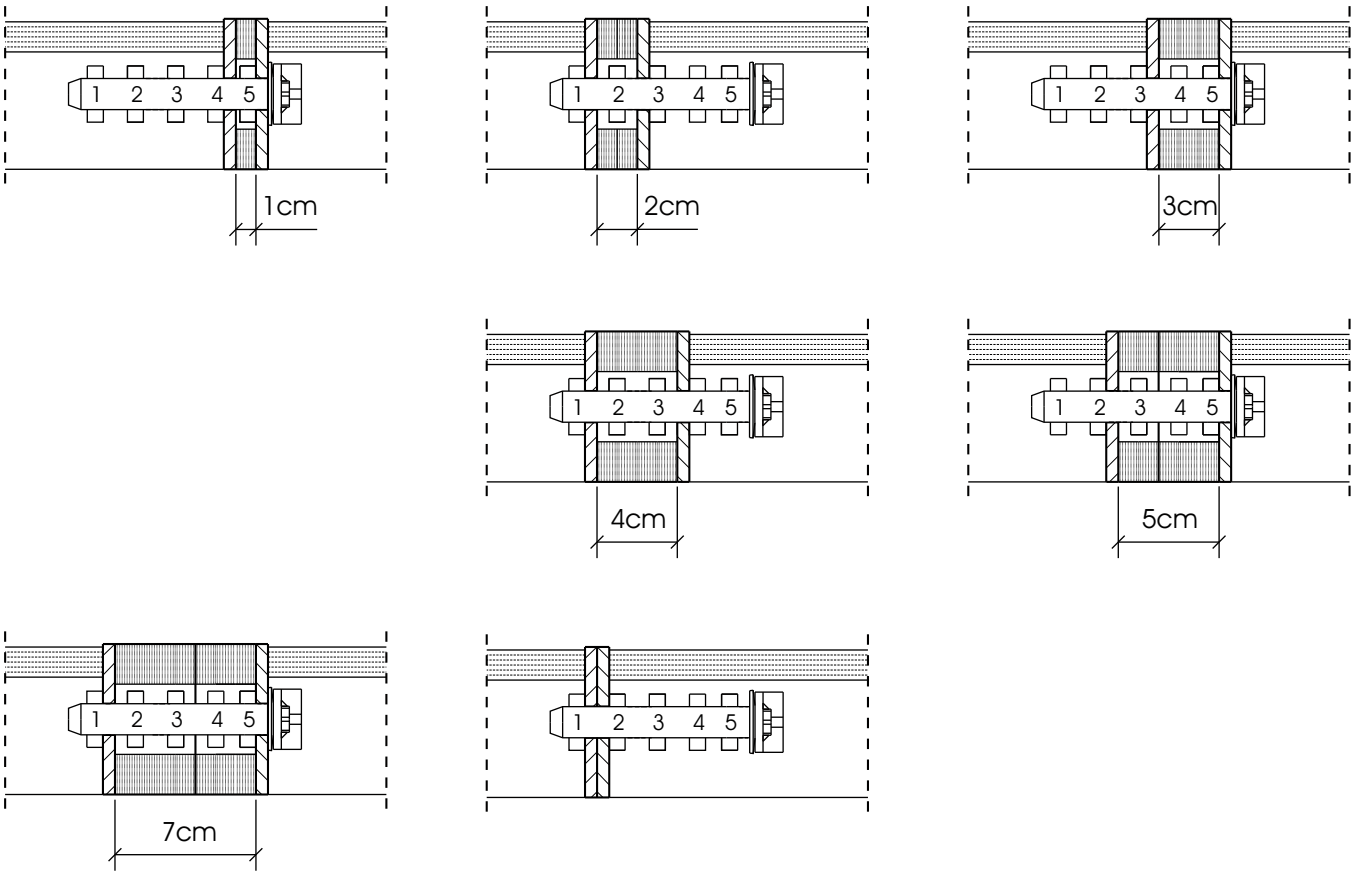
5-pin keybolt

Art. N° : 189.001.0105

Weight : 0,30kg



ill.7



ill.8

The 5-pin keybolt permits plastic filler adjustment between 1 and 5 cm, in graduations of 1cm, when PASCHAL modular formwork is employed.

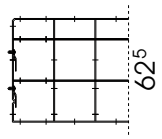
The 5-pin keybolt was developed to be able to keep the need for PASCHAL modular fitting elements on the building site to a minimum, and be able to carry out unexpected adjustments of up to 5cm accurately and rapidly.

Plastic filler piece are available in widths of 1cm, 2cm, 3cm and 4cm and the height 62.5cm, 75cm, 125cm and 150cm.

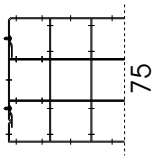
An adjustment width of 5cm can be achieved by combining an 2cm and an 3cm plastic filler piece.

The plastic filler piece supplied by PASCHAL contain all required holes and tensioning rod slots and can therefore be employed immediately, without necessitating further dressing on the building site.

Vertical joint Modular

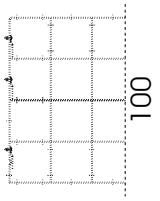


2 keybolts

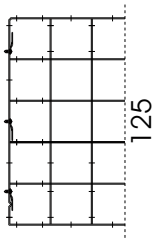


2 keybolts

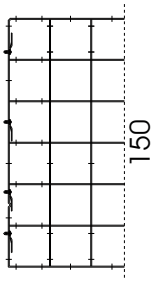
Discontinued model



3 keybolts

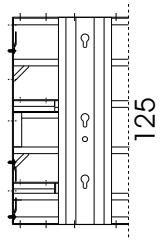


3 keybolts

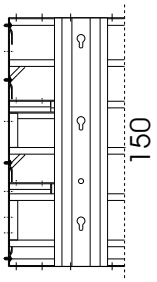


4 keybolts

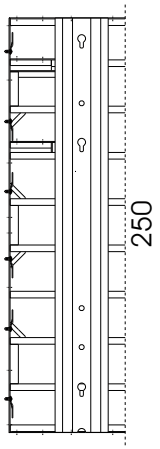
Vertical joint GE



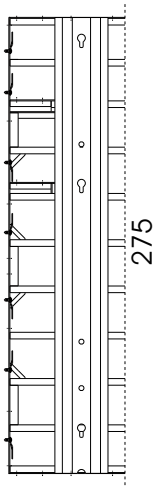
3 keybolts



4 keybolts

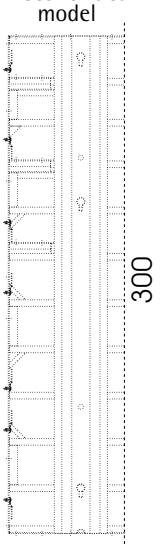


6 keybolts



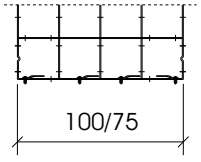
7 keybolts

Discontinued model

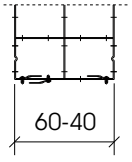


7 keybolts

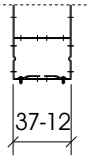
Horizontal joint Modular



4 keybolts

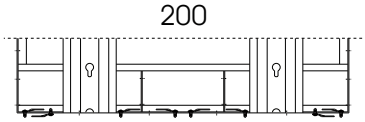


3 keybolts

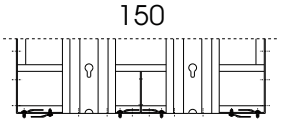


2 keybolts

Horizontal joint GE



8 keybolts



6 keybolts

ill.9

The number of keybolts depend on the panels.
Height of panel :

62.5cm – 2 keybolts
75cm – 2 keybolts
(100cm – 3 keybolts)
125cm – 3 keybolts
150cm – 4 keybolts
250cm – 6 keybolts
275cm – 7 keybolts
(300cm – 7 keybolts)

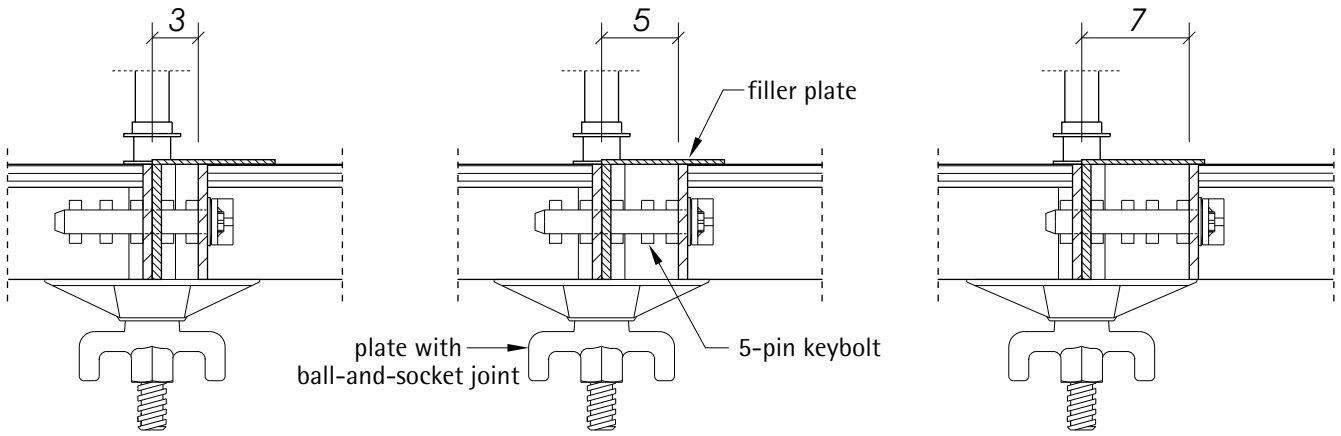
Width of panel :

100/75cm – 4 keybolts
60-40cm – 3 keybolts
35-15cm – 2 keybolts
200cm – 8 keybolts
150cm – 6 keybolts

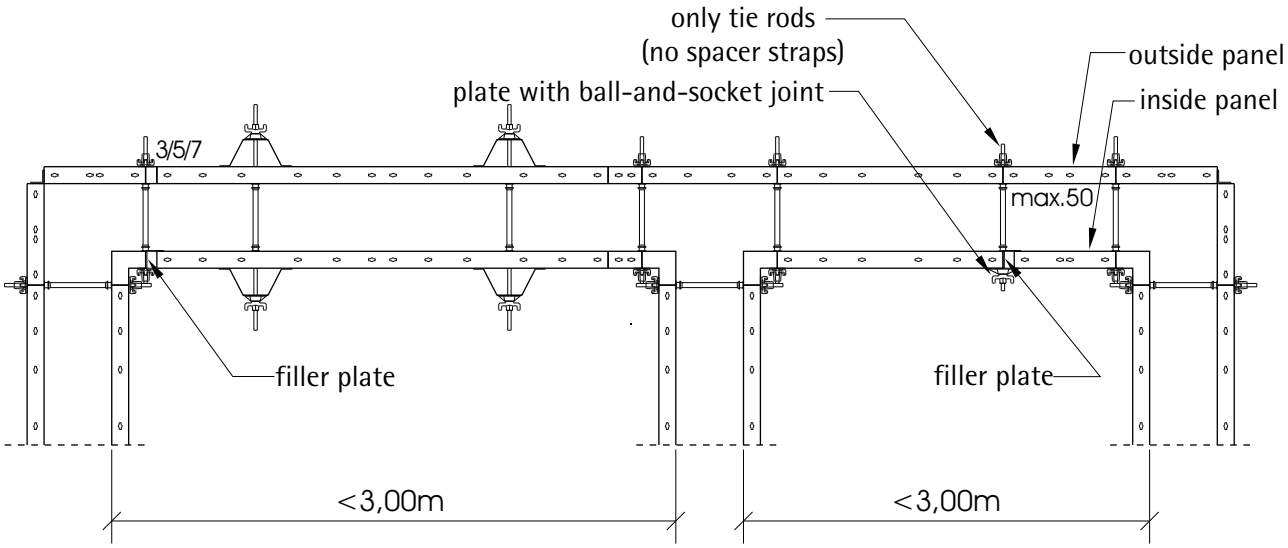
Column form : All bolt holes are to be bolted!
For calculation a formula can be used :
*number of keybolts = number of elements * factor of formwork height*
The number of elements include panels also inside, outside and hinged corner post ... Plastic filler piece are not count as elements.
Factor of formwork height :

2.50m – factor 4.50
2.75-3.25m – factor 4.75
3.75-4.50m – factor 5.00
5.00m – factor 5.25
6.25m – factor 5.50
7.50m – factor 5.75

Small wall length



ill.10



ill.11

Having short wall sections between two inner corners, the panels are pressed against each other due to the concrete pressure of the outgoing walls. The panels, standing under tension, can only be dismantled badly.

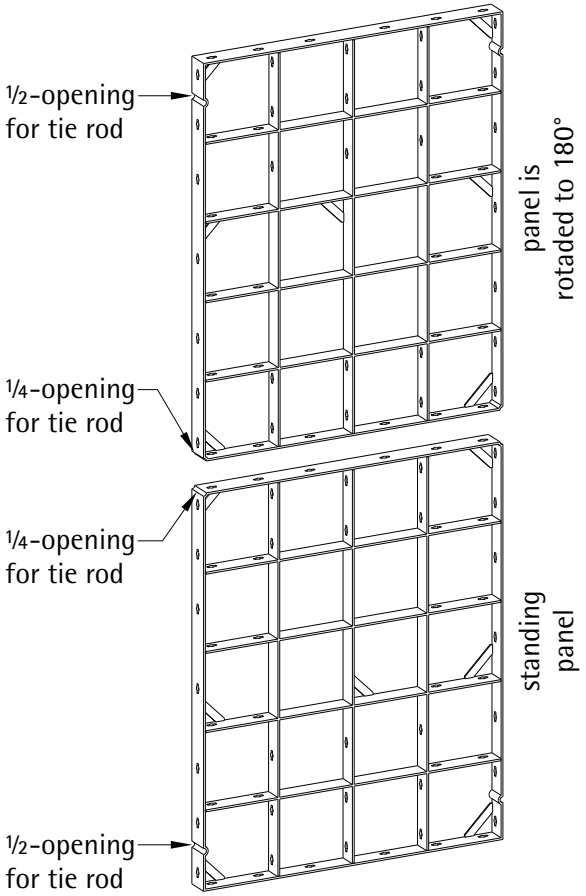
Therefore, the filler plate is used, if the distance between two outgoing walls is smaller than 3.00m. The filler plate allows dismantling margin of 3cm, 5cm and 7cm with the 5-pin keybolt.

In this connection, the panel of the outside formwork is accordingly longer than that on the inside formwork. The max. length of the outside panel is 50cm.

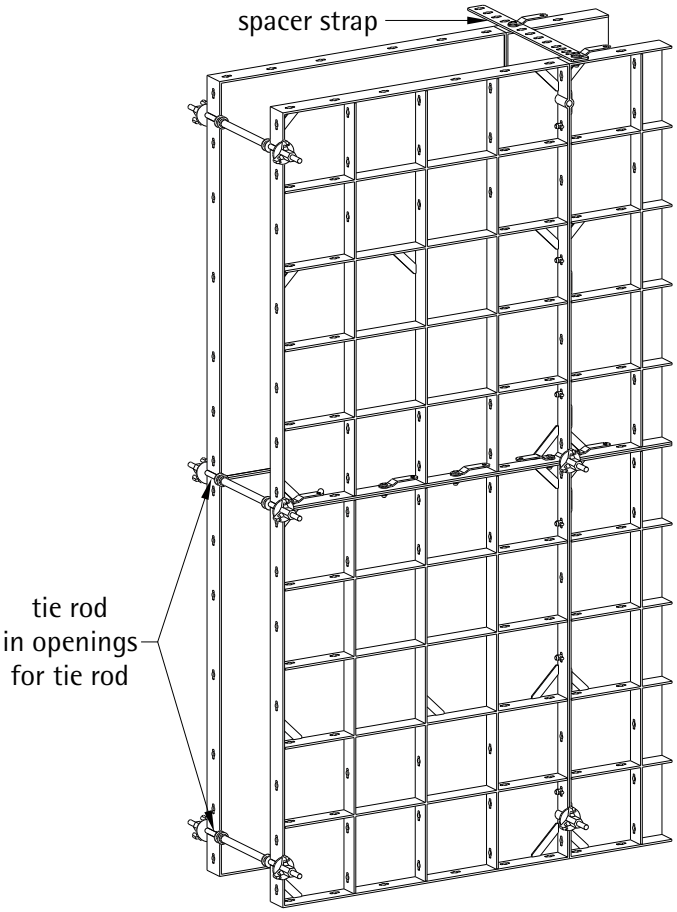
The upper tie is a tie rod (no spacer strap). Is no whole tie for the tie rod on the top, then a tie rod guide must be used.

On the filler plate must be used a plate with ball-and-socket joint for the tie rod.

For forming height of 1.50m or less is no filler plate necessary.



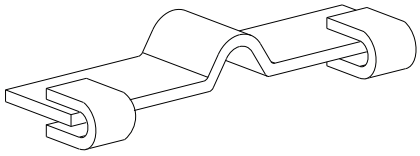
ill.12



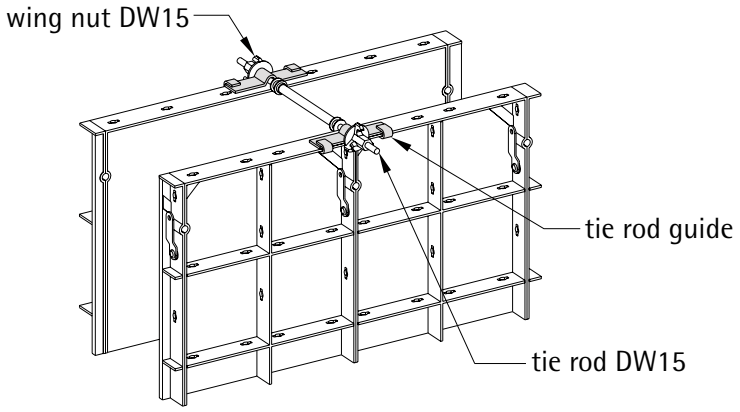
ill.13

Tie rod guide

Art. N° : 189.001.0086
Weight : 0.75kg



ill.14

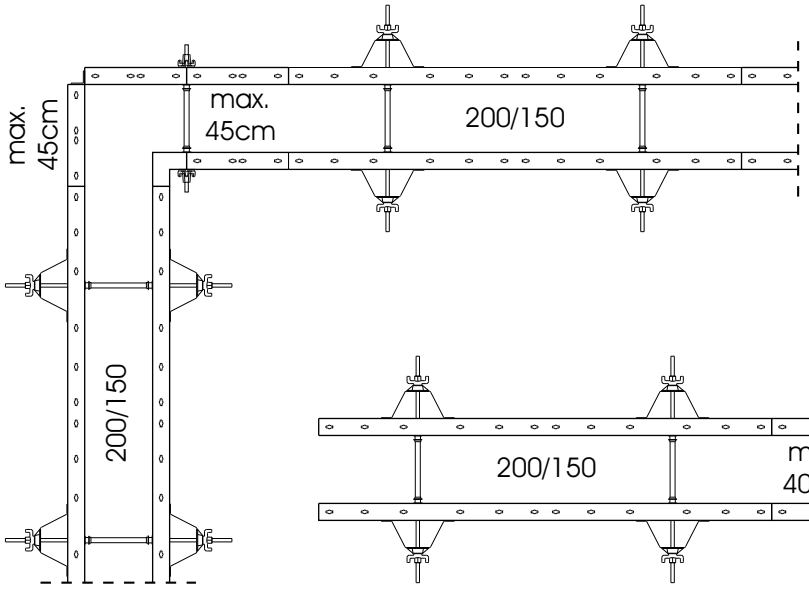


ill.15

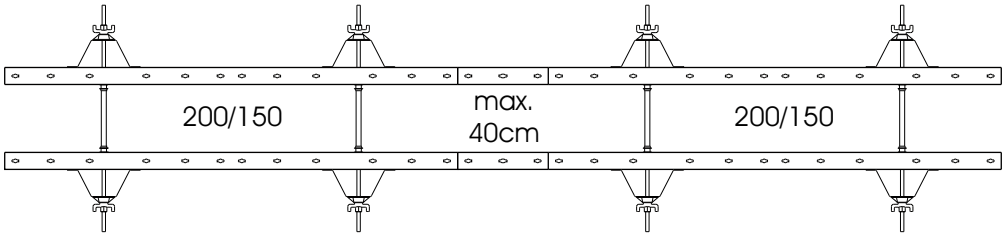
Ties must be used on joints between modular panels. For ties are openings in the side-frame of the panels. For height extensions the second panel must be rotated to 180°. Then the ¼ openings for tie rod are in a opposite position and you get a whole opening for tie rod and can place the tie.
Number and position of ties see "Sections and Elevations" page 62-81. For modular panels are used tie rod DW15 and wing nut.
The tie on the top is a spacer strap. That is not possible for 150cm high panel, which is rotated to 180°. Spacer strap 6-50cm is used for the most wall thickness' from 6cm to 50cm (page 30) and the spacer strap 50-120cm for wall thickness 50-120cm each 5cm.
It is not possible to used the spacer strap, then you can use the tie rod guide. The tie rod guide can be attached at any place of the formwork. It is not necessary that the tie openings or the keybolt-holes must face each other. The tie rod guide replace the upper tie opening of modular formwork.

Tie position

Forming height ≤ 2.75m

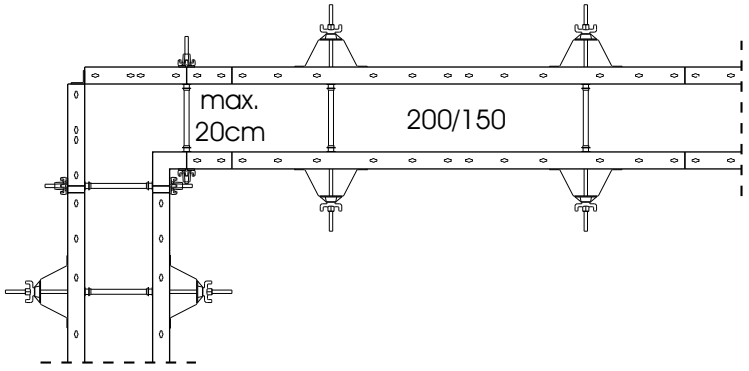


ill.16



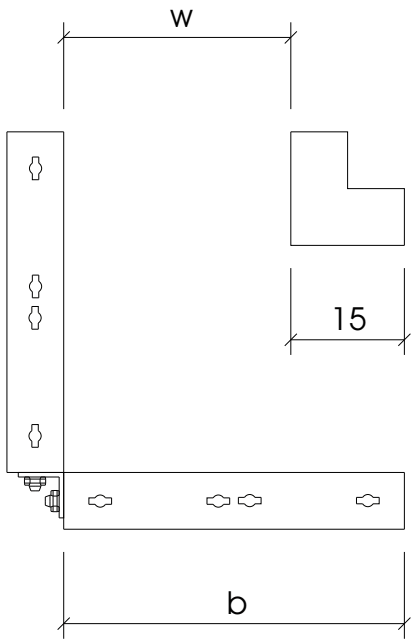
ill.17

Forming height >2.75m



ill.18

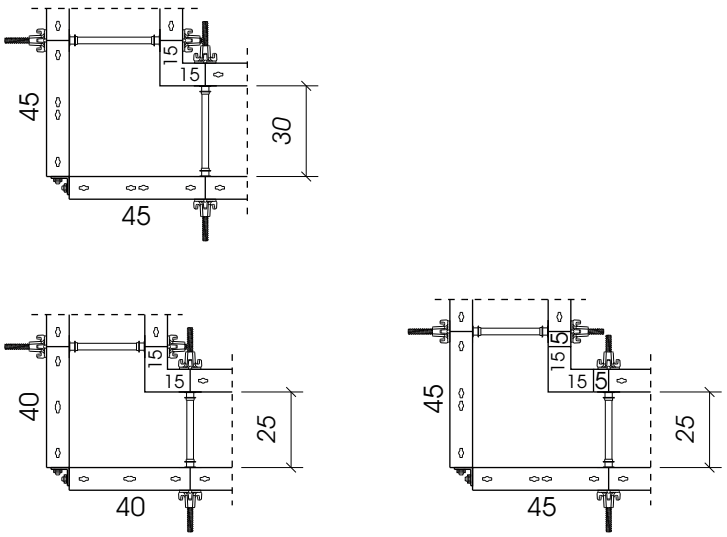
In the trapezoidal girder are openings for tie rods. There must be placed a tie rod DW15 and a plate with ball-and-socket joint.
A tie rod can't placed on the joint between GE and modular panel, because in the frame of the GE are no openings for tie rods. That's why a small modular panel, a plastic filler or a filler post must connected with the GE. Then on the next joint can be placed a tie rod.
Up to a forming height of 2.75m the max. width of the panel next to the GE is 45cm (ill.16). For greater forming height the width is 20cm (ill.18).
If a filler post or a plastic filler is next to the GE, then a tie rod is necessary between the filler and the next modular panel.
Up to a forming height of 2.75m any modular panel with a width of 40cm or less can be installed between 2 GE-panels (ill.17).



width of the filler panel:

b = w + 15cm

ill.19



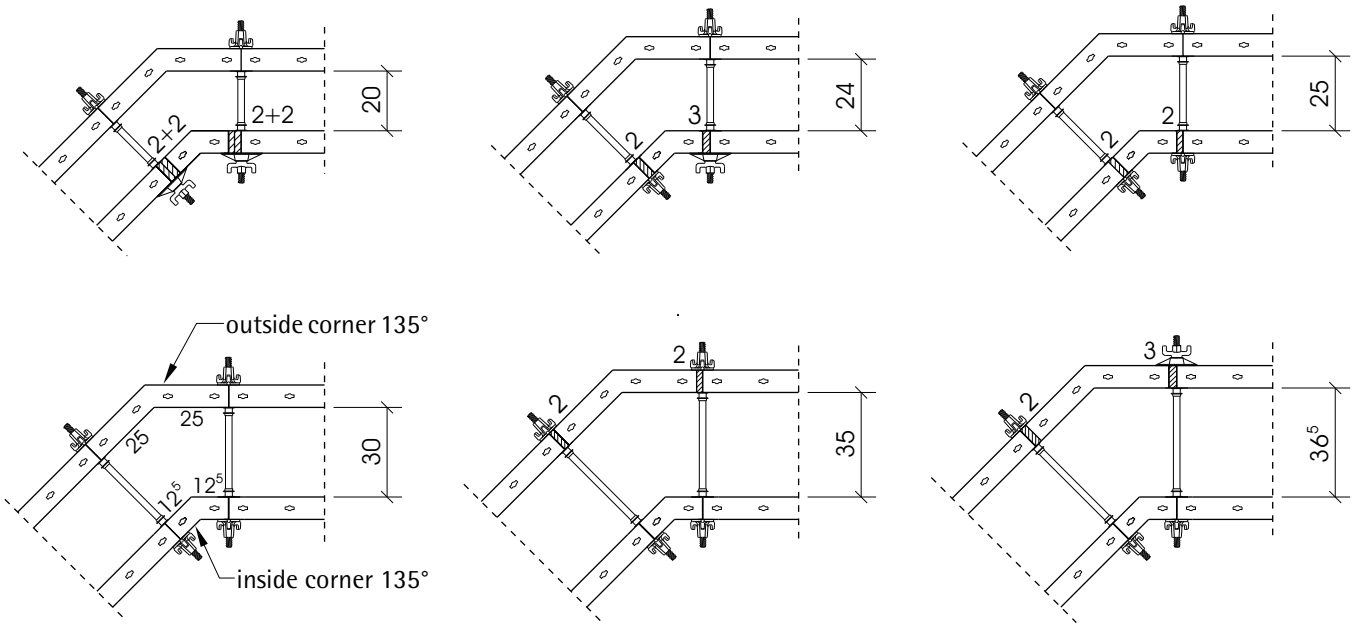
ill.20

Inside corner post, 2 modular panels and outside corner post are necessary to form a rectangular corner (ill.19).

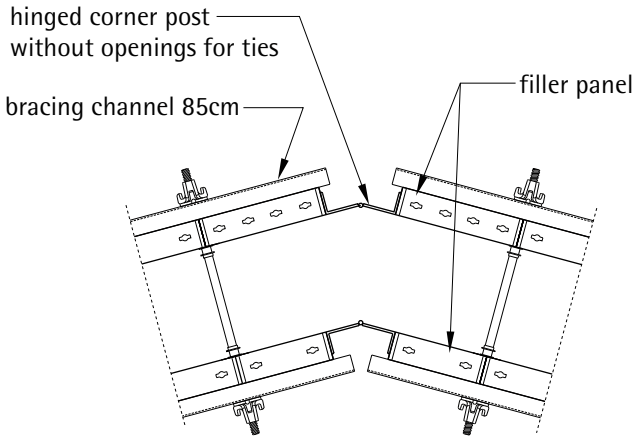
The width of the modular panels depends on the wall thickness.
In case the wall thickness does not fit the existing panels, a corresponding plastic filler or filler post must make up for the difference. These filler is fixed on the inside panel joint.

With filler post 5cm wall thicknesses of 25cm and 35cm can be formed without using further modular panels than those applied for a wall thickness of 30cm (ill.20). But it's also possible to use 40cm and 50cm panels.

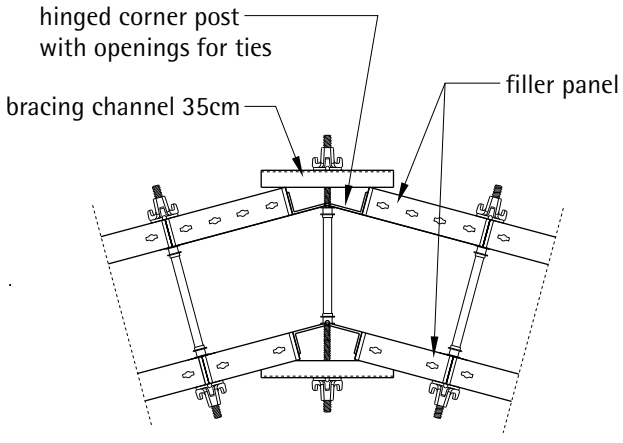
Corner with different angles



ill.21



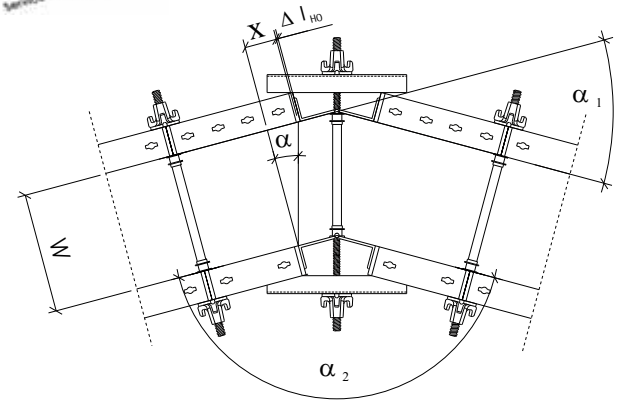
ill.22



ill.23

There exist outside corner 135° and inside corner 135° for forming edges of 135°.
The leg length of the inside corner 135° is 12.5cm and of the outside corner is 25cm.
The elements have openings for tie rod on the frame.
The inside and outside corner 135° are dimensioned for a wall thickness of 30cm. Is the wall thickness greater or smaller, than an additional plastic filler piece is necessary.

The hinged corner post exists for corners with different angles. There are two kind of hinged corners: hinged corner post without opening for tie rods and hinged corner post with opening for tie rod.
The leg length of the hinged corner post is 9.5cm.
Because the hinged corner post have no openings for tie rods, it is necessary to place a small modular panel, a plastic filler or a filler post next to the hinged corner post. Then you can bring a tie rod to the next joint.



x = differences of dimensions outside/inside

w = wall thickness

Δl_{HO} = differences of real lengths of hinged corner posts inside/outside in dependence of α_2

ill.24

α_1 [°]	α [°]	α_2 [°]	Δl_{HO}	w [cm]						
				20cm	24cm	25cm	30cm	35cm	36,5cm	40cm
5	2,5	175	0,0	0,9	1,0	1,1	1,3	1,5	1,6	1,7
10	5,0	170	0,1	1,8	2,2	2,3	2,7	3,2	3,3	3,6
15	7,5	165	0,1	2,7	3,3	3,4	4,0	4,7	4,9	5,4
20	10,0	160	0,1	3,6	4,3	4,5	5,4	6,3	6,5	7,2
25	12,5	155	0,2	4,6	5,5	5,7	6,9	7,9	8,3	9,1
30	15,0	150	0,2	5,6	6,6	6,9	8,2	9,6	10,0	10,9
35	17,5	145	0,3	6,6	7,9	8,2	9,8	11,3	11,9	12,9
40	20,0	140	0,3	7,6	9,0	9,4	11,2	13,0	13.6	14.9
45	22,5	135	0,3	8,6	10,2	10,7	12,7	14,8	15,4	16,9
50	25,0	130	0,4	9,7	11,6	12,1	14,4	16,7	17,4	19,1
55	27,5	125	0,4	10,8	12,9	13,4	16,0	18,6	19,4	21,2
60	30,0	120	0,5	12,0	14,4	14,9	17,8	20,7	21,6	23,6
65	32,5	115	0,5	13,2	15,8	16,4	19,6	22,8	23,8	26,0
70	35,0	110	0,6	14,6	17,4	18,1	21,6	25,1	26,2	28,6
75	37,5	105	0,6	15,9	19,0	19,8	23,6	27,3	28,6	31,3
80	40,0	100	0,7	17,5	20,8	21,7	25,9	30,1	31,3	34,3
85	42,5	95	0,7	19,0	22,7	23,6	28,2	32,8	34,1	37,4
90	45,0	90	0,8	20,8	24,8	25,8	30,8	35,8	37,3	40,8
95	47,5	85	0,8	22,6	27,0	28,1	33,5	39,0	40,6	44,5
100	50,0	80	0,9	24,7	29,5	30,7	36,7	42,6	44,3	48,6
105	52,5	75	1,0	27,1	32,3	33,6	40,1	46,6	48,6	53,1

tab.1

It is possible to form corners from 74° to 180° inside and from 180° to 286° outside with hinged corner posts without openings for ties.
For hinged corner posts with openings for ties are the possible inside angles 82°-180°.
The leg length of the hinged corner post is 9.5cm. The differences of dimensions Δl_{HO} of real length depending on α_2.
The outside formwork is longer as the inside formwork. You can see the difference in table 1.

The modular panels next to the hinged corner should be choice in such a kind, that the difference of the outside and inside panel is the same as the difference in the table. It is not possible, then additional plastic filler piece or filler post are necessary.

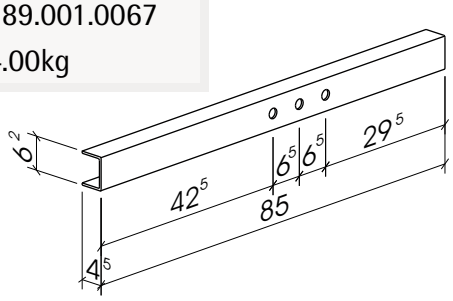
example:
α_2 = 120° w = 25cm
➔ x = 14,9cm
result : inside : 20cm wide panel
outside: 35cm wide panel

Corner with different angles

Bracing channel 85cm

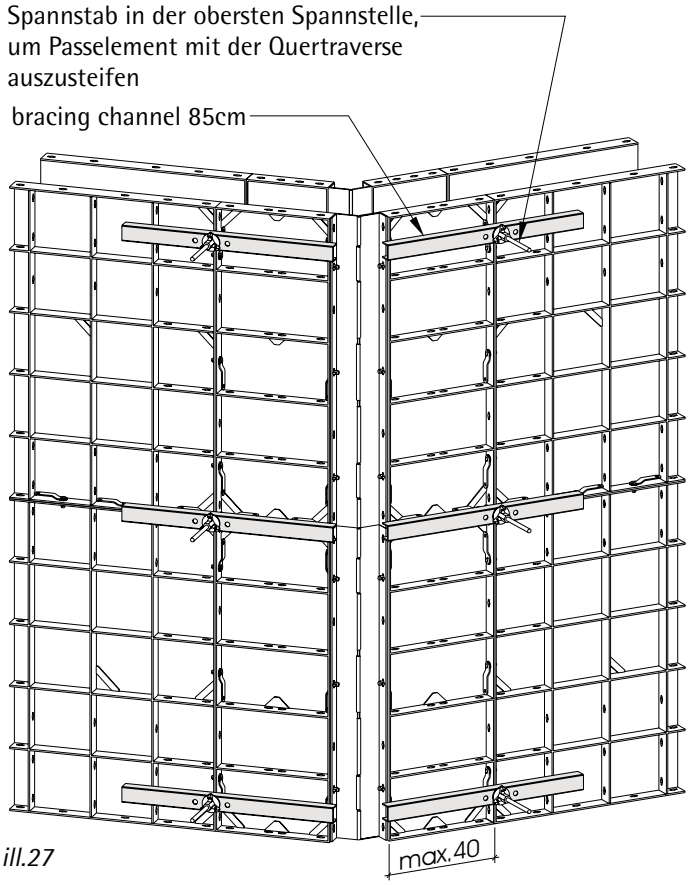
Art. N° : 189.001.0067

Weight : 4.00kg



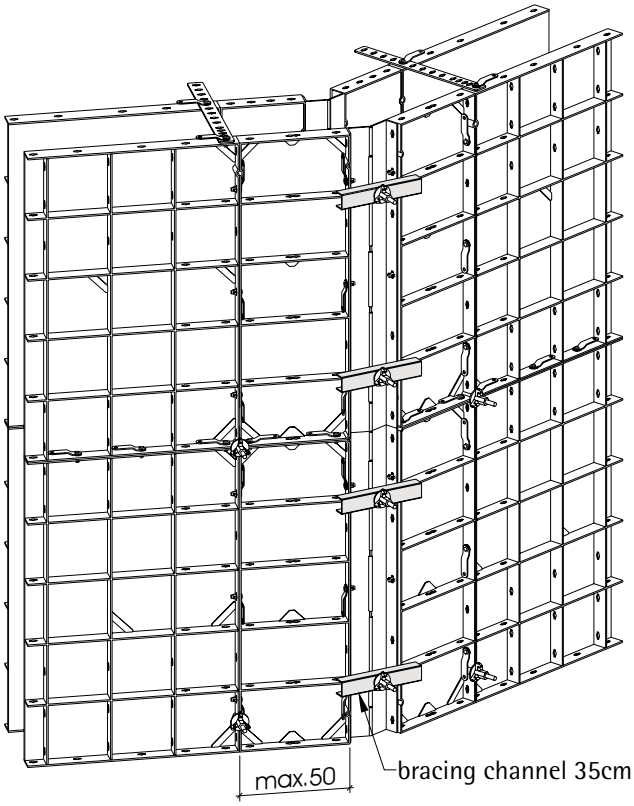
ill.25

Hinged corner post without opening for ties



ill.27

Hinged corner post with openings for ties



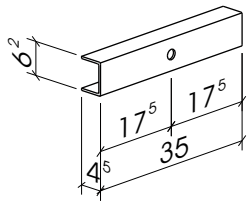
Je Scharnierecke sind stets 2 Spannstellen vorzusehen.

ill.26

Bracing channel 35cm

Art. N° : 189.001.0066

Weight : 1.50kg

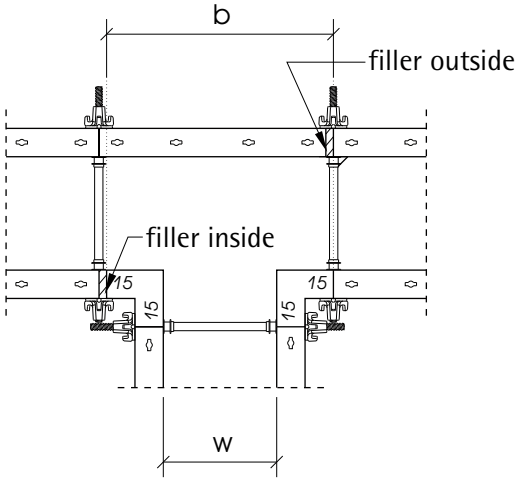


ill.28

For hinged corner post without openings for ties the panels must be braced with bracing channel 85cm. The max. width of the panel next the hinged corner post is 40cm (ill.27). For greater panels is a stronger bracing necessary.

For hinged corner post with openings for ties the bracing channel 35cm is arranged on the tie rods in the hinged corner post. The bracing channel sit on the frame of the modular panel. The max. width of the panel next the hinged corner post is 50cm (ill.26).

For greater panels are additional bracing necessary. If the angle inside is $\alpha_2 < 138°$ then it is possible to use a plate with ball-and-socket joint instead of the bracing channel and wing nut.

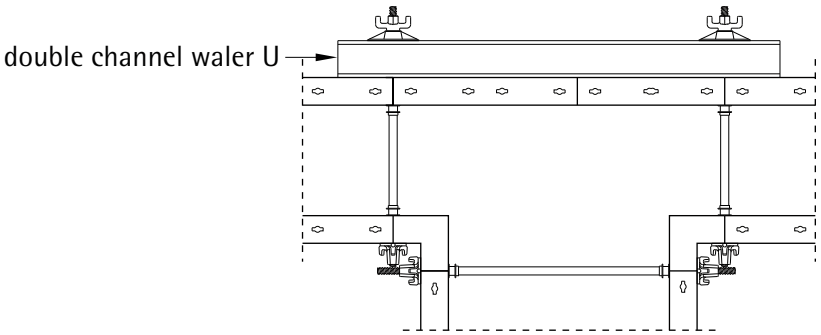


ill.29

w [cm]	b [cm]	filler panel
15	45	45
17,5	47,5	45 + 2 outside
20	50	50
24	54	50 + 4 outside
25	55	50 + 5 outside
30	60	60
35	65	60 + 5 outside
36,5	66,5	60 + 6 outside
40	70	75 + 5 inside

tab.2

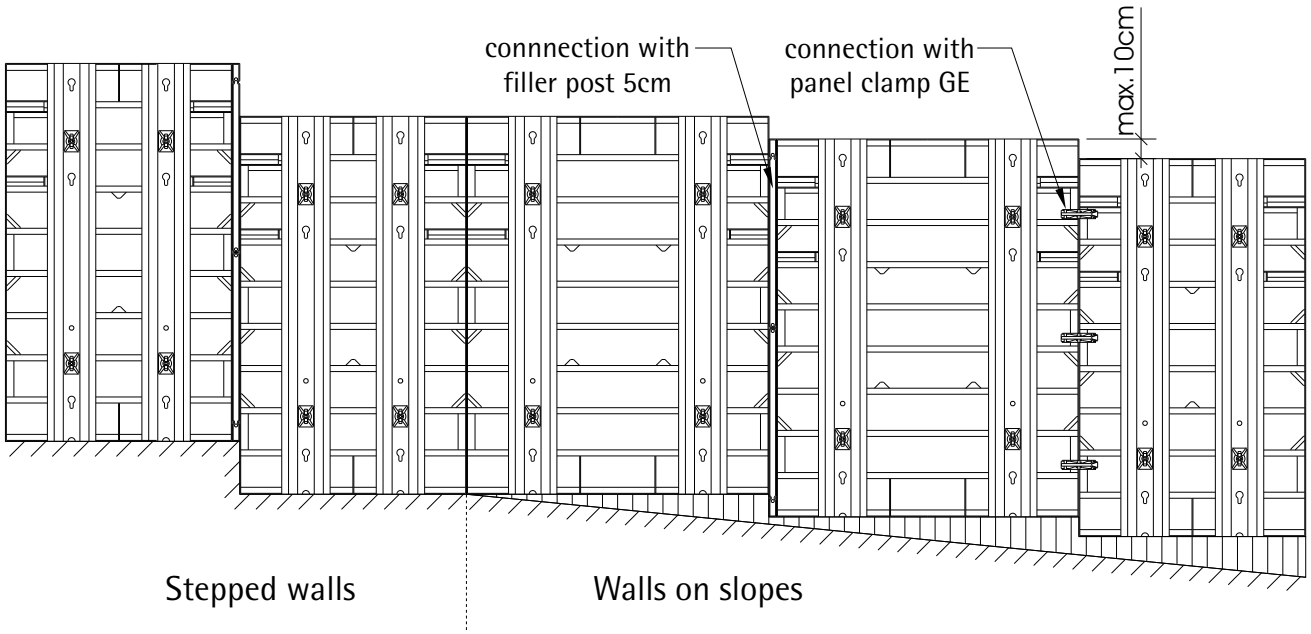
filler panel : $b = w + 2 * 15cm$



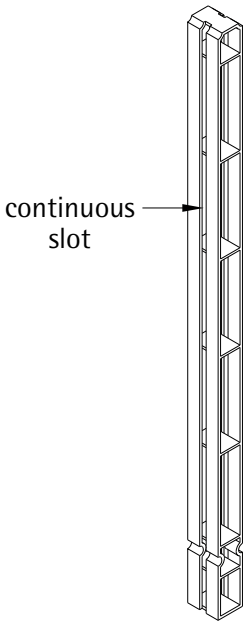
ill.30

The width of the filler panel "b" to be used on T-intersections depends on the wall thickness "w" of the outgoing wall resp. on the leg length of the inside corner post.
If there is no suitable filler panel available, a smaller panel together with a plastic filler or a steel filler post can be used. It is also possible to use a larger panel and to extend the inside corner with a plastic filler or a filler post.
Bigger differences can be covered by compensations on both sides of the filler panel or on the inside corner post.
Two filler panels cann also be used outside if the wall thickness "w" is too big for one. Both panels have then to be braced with a double channel waler.
Table 2 shows some combinations of panels for usual wall thicknesses.

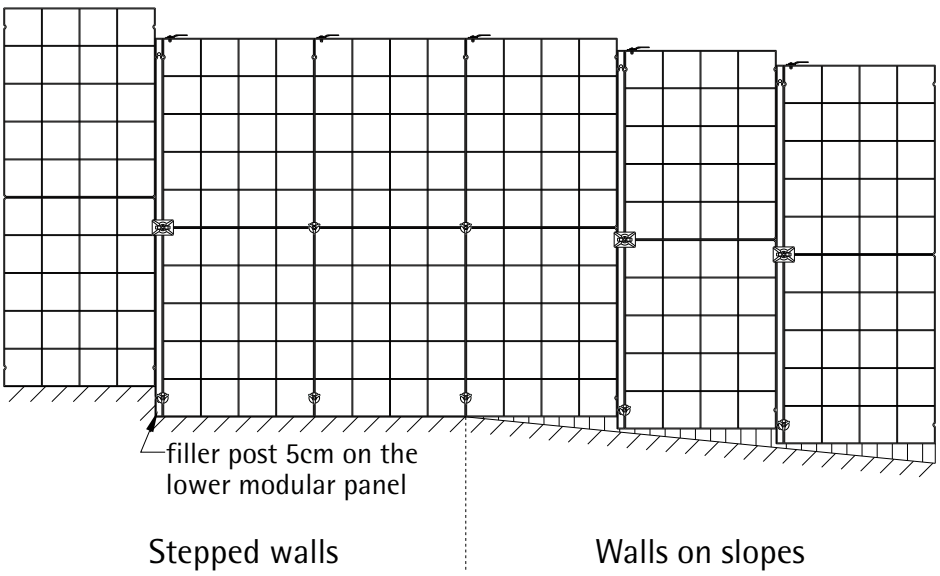
Stepped walls / walls on slopes



ill.31



ill.32



ill.33

Steps in foundation or flat footing need a vertical displacement of the panels.

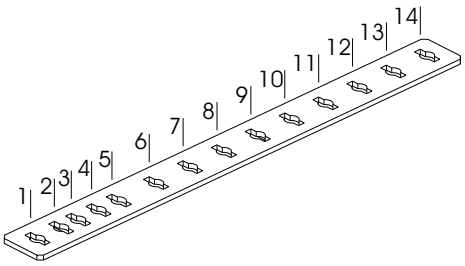
If the GE-panels are connected with panel clamps GE there is a vertical displacement of max. 10cm possible.

In the other case a filler post 5cm is necessary. The filler post are provided with continuous lateral slits instead of the existing bolt holes. The lateral slits enable the connection of formwork elements to each other with an infinitely variable adjustment of height.

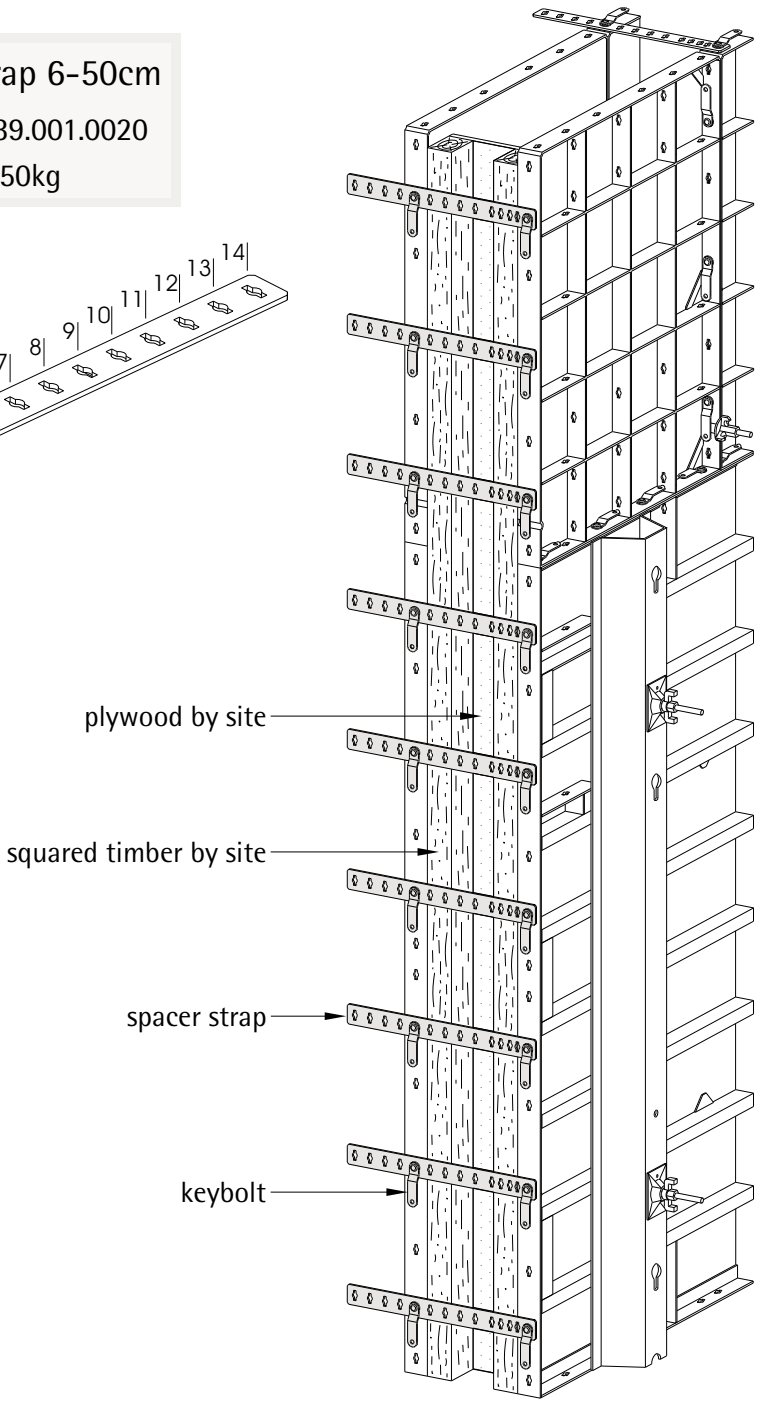
Spacer strap 6-50cm

Art. N° : 189.001.0020

Weight : 1.50kg



ill.34



ill.35

wall thickness [cm]	holes N°
6	4 - 7
6,5	2 - 6
7,5	6 - 9
8	5 - 8
9	3 - 7
10	1 - 6
11	4 - 8
11,5	2 - 7
12,5	6 - 10
13	5 - 9
14	3 - 8
15	1 - 7
16	4 - 9
16,5	2 - 8
17,5	6 - 11
18	5 - 10
19	3 - 9
20	1 - 8
21	4 - 10
21,5	2 - 9
22,5	6 - 12
23	5 - 11
24	3 - 10
25	1 - 9
26	4 - 11
26,5	2 - 10
27,5	6 - 13
28	5 - 12
29	3 - 11
30	1 - 10
31	4 - 12
31,5	2 - 11
32,5	6 - 14
33	5 - 13
34	3 - 12
35	1 - 11
36	4 - 13
36,5	2 - 12
38	5 - 14
39	3 - 13
40	1 - 12
41	4 - 14
41,5	2 - 13
44	3 - 14
45	1 - 13
46,5	2 - 14
50	1 - 14

tab.3

When concreting in phases, sealing strips have to be installed in the construction joints.
The reinforcement has to be extended through a stop end / bulk head are transferred to spacer straps (ill.34) which are fixed with keybolts to the panels.
The openings allow an adjustment to wall thicknesses from 6-50cm, see table 3.

Spacer straps connected to modular panels also replace the ties normally placed at the stop end.
Tensioning of large size panels is always necessary.

The end of a wall is also formed the same way.

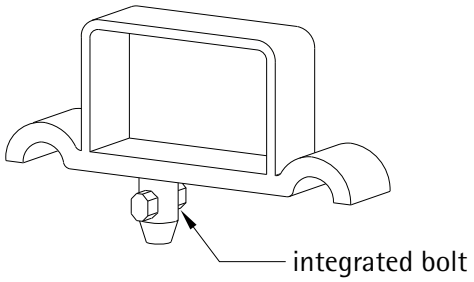
The number of the spacer straps depends from the formwork height

62.5-75cm - 2 pieces ; 250cm - 6 pieces
100-125cm - 3 pieces ; 275-325cm - 7 pieces
150cm - 4 pieces ; 337.5-350cm - 8 pieces
187.5-225cm - 5 pieces ; 375cm - 9 pieces

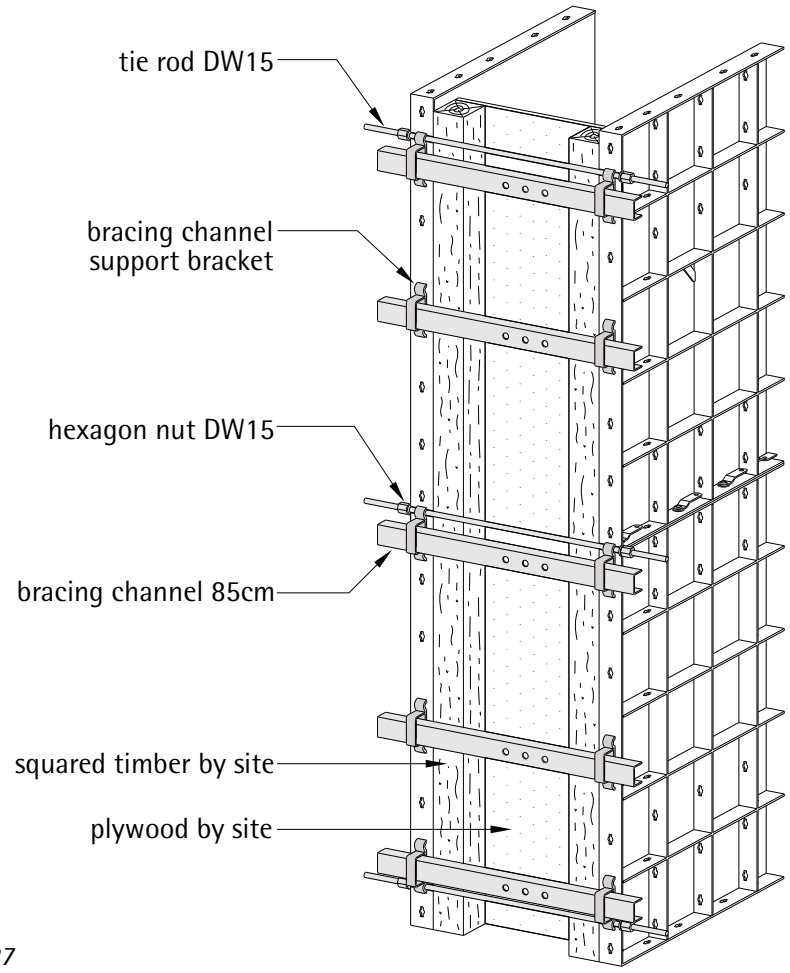
Bracing channel support bracket

Art. N° : 189.001.0071

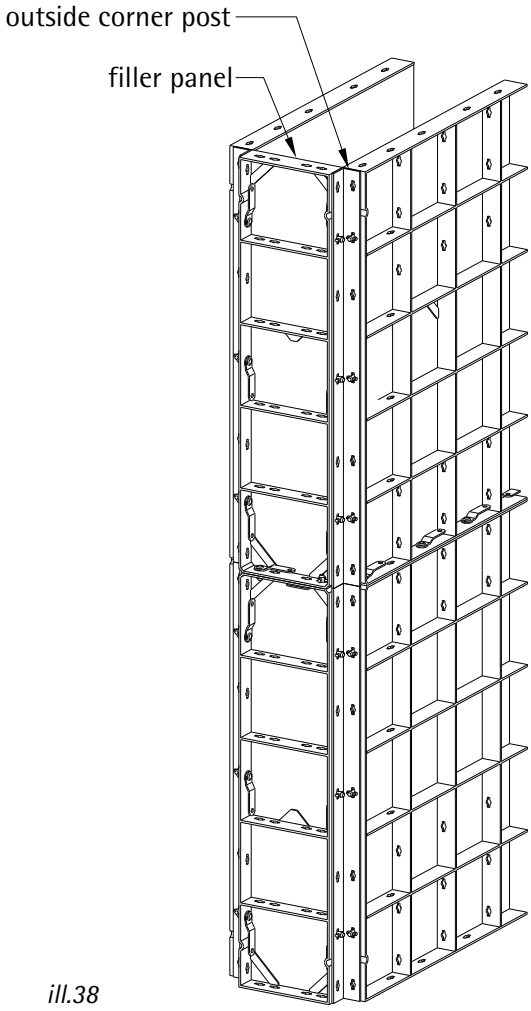
Weight : 0.60kg



ill.36



ill.37



ill.38

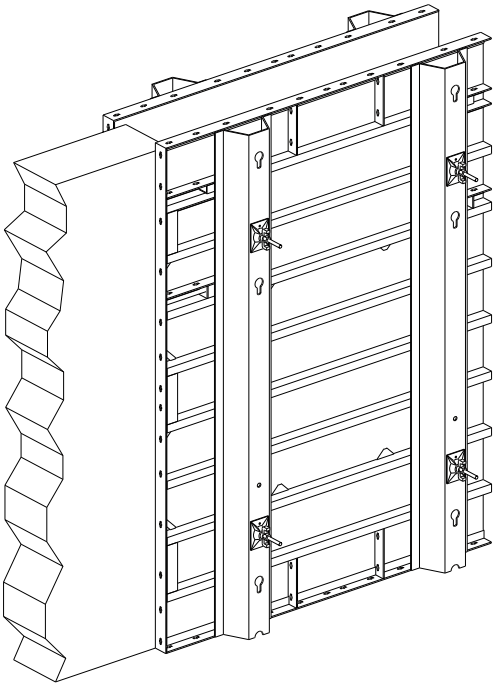
The transfer of the loads on wall thickness from 51cm to 70cm, conical shaped walls and wall thickness, that are not possible to make with the spacer strap, is taken by the bracing channel 85cm with its infinitely variable adjustment. It is fitted with the bracing channel support bracket.

In this case it is always necessary to place ties at the stop end. There are openings for ties in the panel frame and openings for ties on the bracing channel support bracket. The bracing channel support bracket must be assembled in such a position, that is on the panel frame a whole opening for ties.

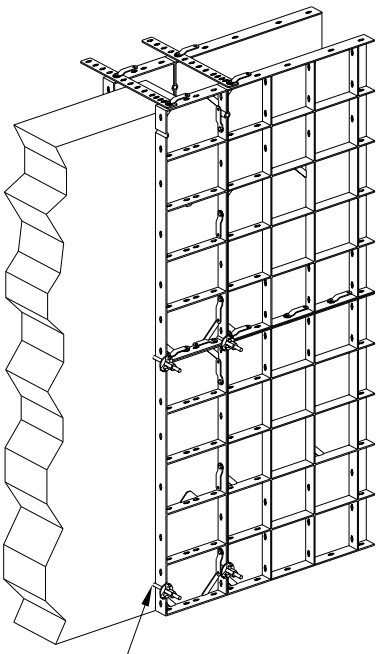
The number of the bracing channels depends on the formwork height

62.5-75cm e 2 pieces;
100-150cm - 3 pieces;
187.5-225cm - 4 pieces;
250cm - 5 pieces;
275-325cm - 6 pieces
350cm - 7 pieces
375-400cm - 8 pieces

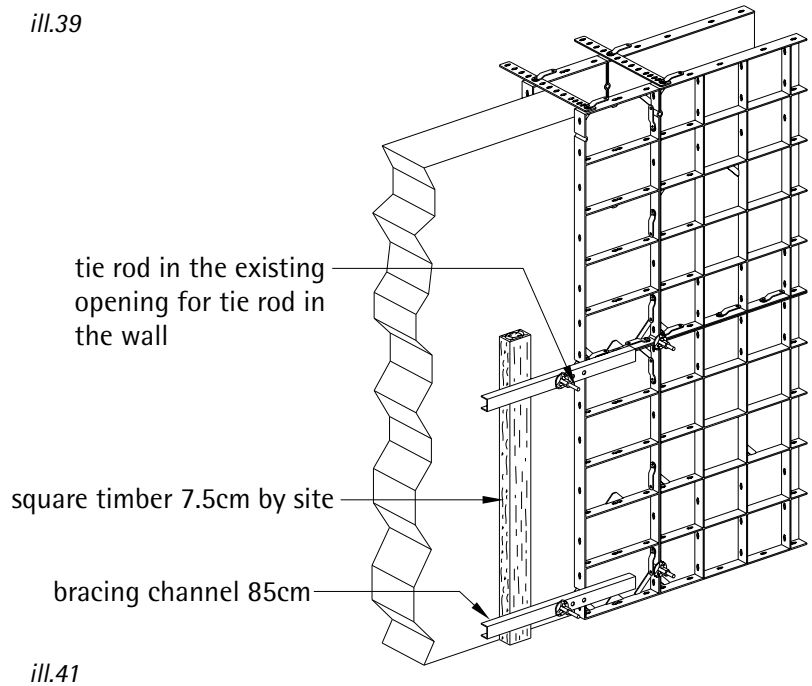
Another possibility to form a stop end ist to use a filler panel and 2 outside corner posts. However, it cannot be applied where the reinforcement has to be extended to the outside.



ill.39



ill.40



ill.41

The tie rod openings of GE-panels are located inside the panel. The edges of the existing walls can be overlapped.

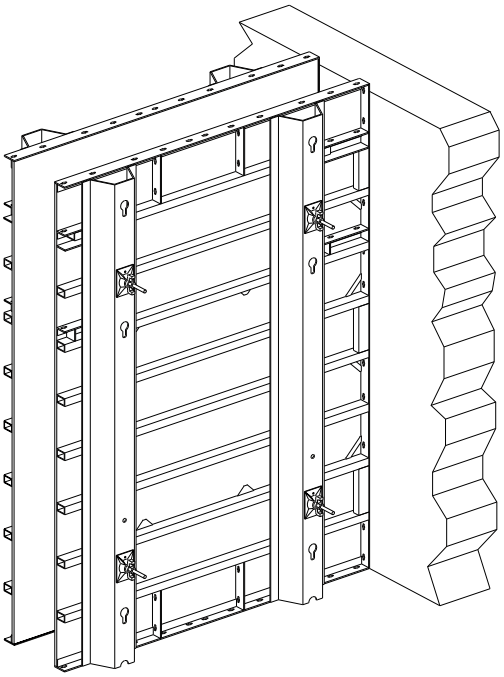
If the connection has to be made with modular panels, the first tie rod holes of the existing wall are used for tensioning the modular panels (ill.40).

The panel is placed on the tie rod in the existing wall and the wing nut have a connection to the panel frame.

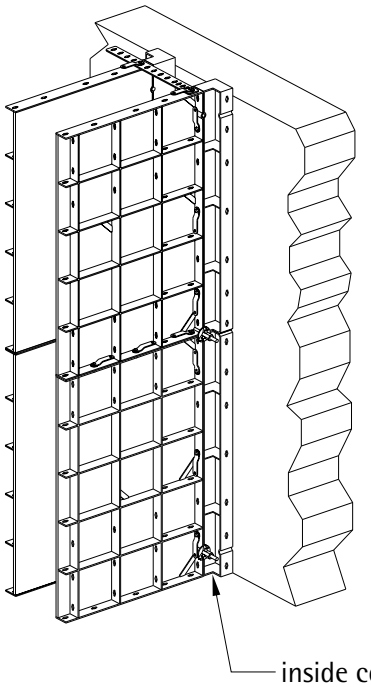
Is the panel not placed direct on the tie rod, then a bracing channel 85cm is necessary (ill.41). The distance between panel frame and tie rod in the existing wall should be not greater as 15cm if the panels is 50cm or smaller. For 100cm width panel the max. distance between panel frame and tie rod is 6cm.

One side of the bracing channel is on the panel frame. On the other side a 7.5cm high square timber is necessary.

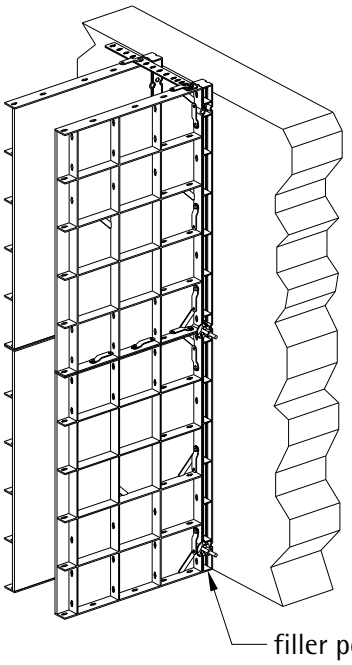
Connection to existing concrete walls



ill.42



ill.43



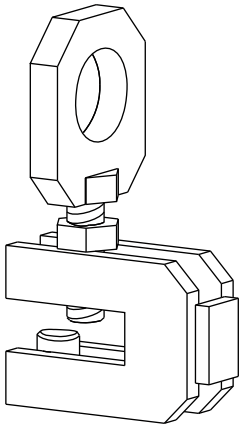
ill.44

On rectangular wall the GE-panel is placed directly to the wall (ill.42). There is enough space to set the first tie rods.
On rectangular wall connection with modular panel s either a filler post (ill.44) or a inside corner post (ill.43) must be mounted because of the location of the tie rod openings between wall and panel.

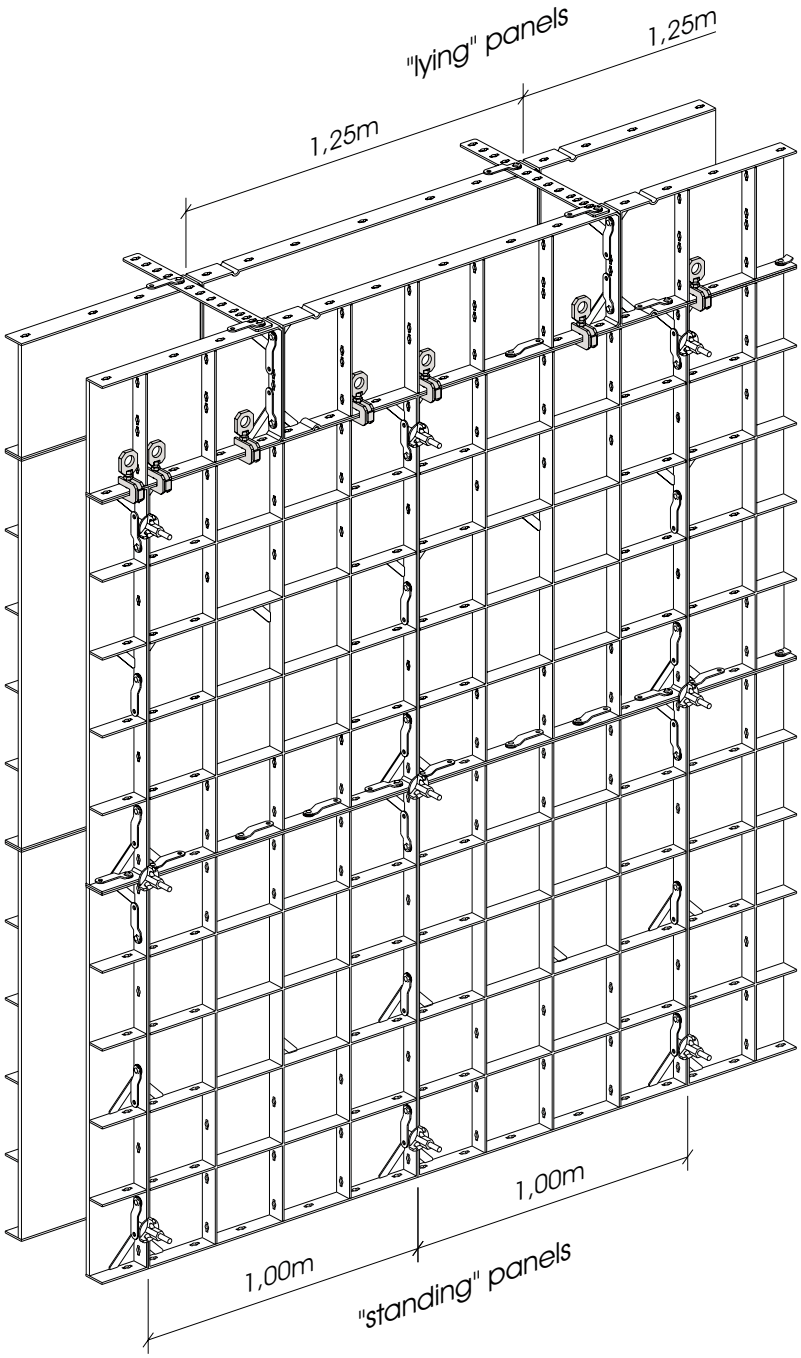
Panel clamp

Art. N° : 189.001.0079

Weight : 0.85kg



ill.45



ill.46

For height extension it is also possible to use small panels as lying panels. In this case you must use the panel clamp to connect the panels where holes are not in line preventing use of keybolt.

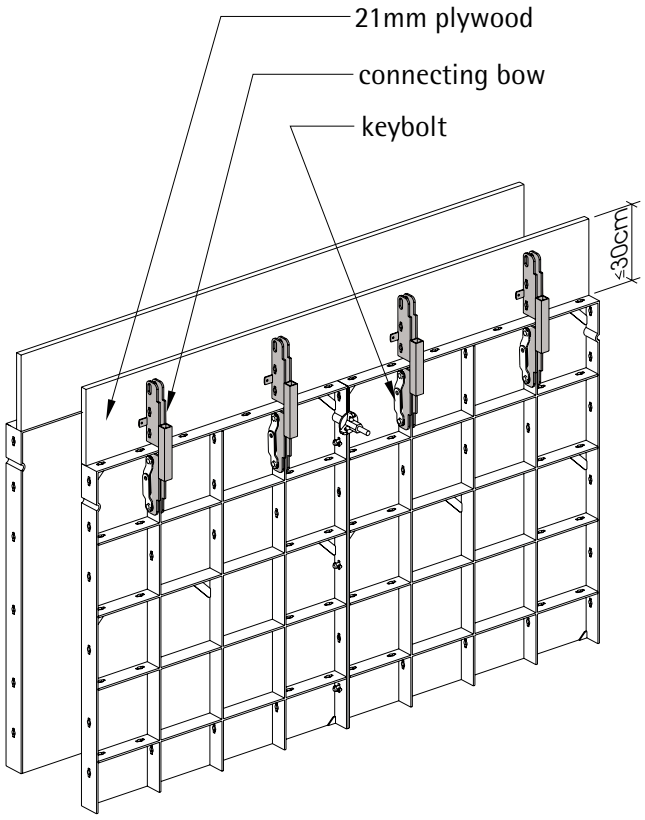
Height extension

Connecting bow for plywood 21mm

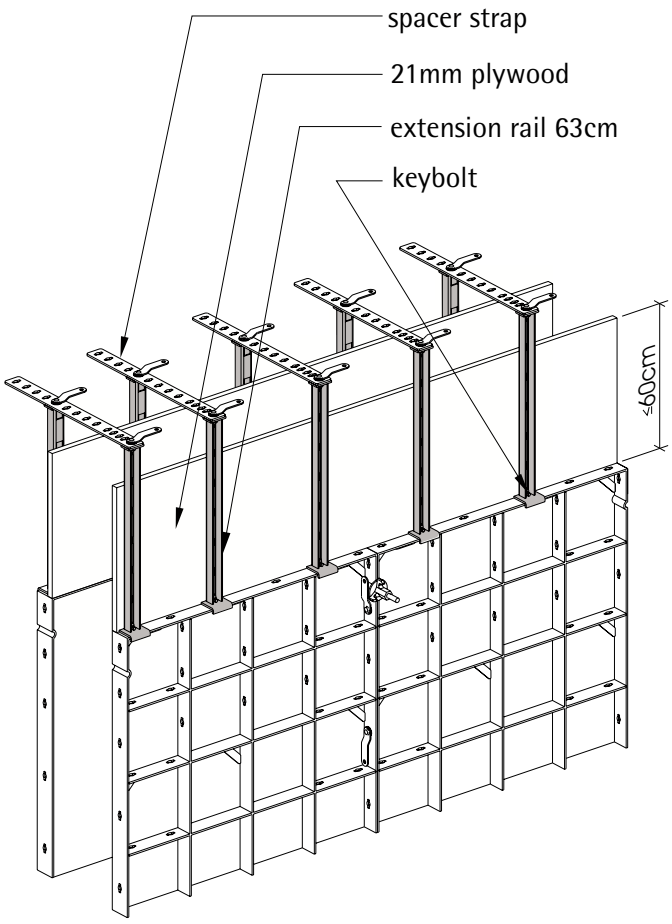
Art. N° : 189.001.0084
Weight : 2.45kg

Extension rail 63cm for 21mm plywood

Art. N° : 189.001.0080
Weight : 2.10kg



ill.47



ill.48

The connecting bow for plywood 21mm is used for formwork vertical extension of up to 30cm. In the connecting bow there are keybolt holes and hole for screwing plywood extension. The max. distance between two connecting bow is 50cm. Ties are be placed in the last panel, so that no tie rod in the extension are necessary.

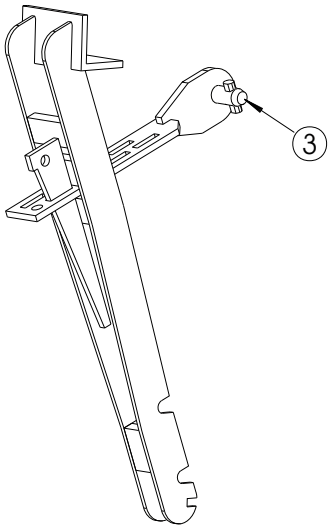
The extension rails 63cm are fixed to the upper sections of the panels by means of modular keybolts in the upright position.

The fitted rails are inset by 22mm from the formwork surface of the modular panels.
This enables formwork panels of standard dimensions to be used for heightening.
The distance between the extension rails should not exceed 40cm and the lateral overhang of the formwork panels should not be exceed 15cm.
The rails have to be fitted opposite to one another on either side of the formwork to enable them to be connected by means of spacer straps on the top.

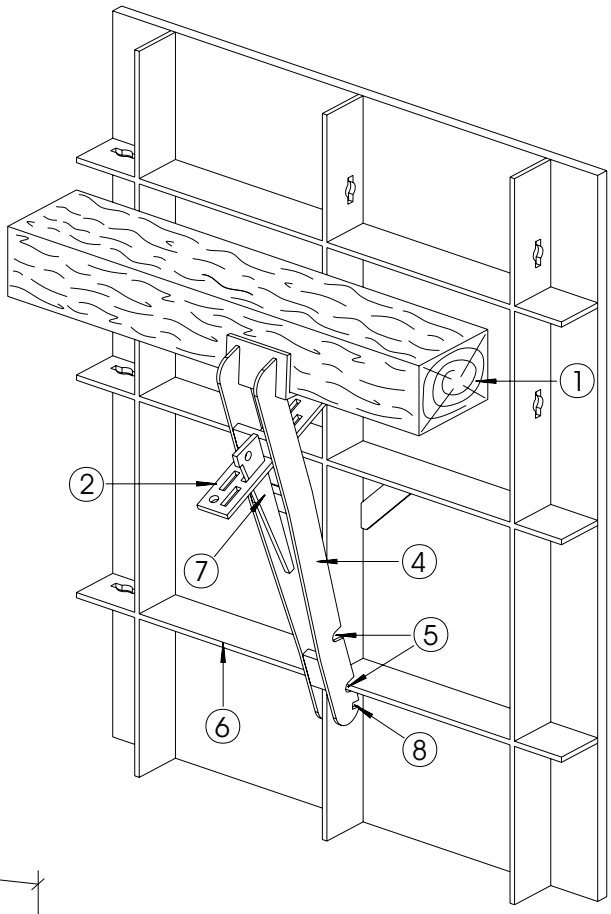
Waling clamp with wedge
(for walers 8-20cm)

Art. N° : 180.000.0008

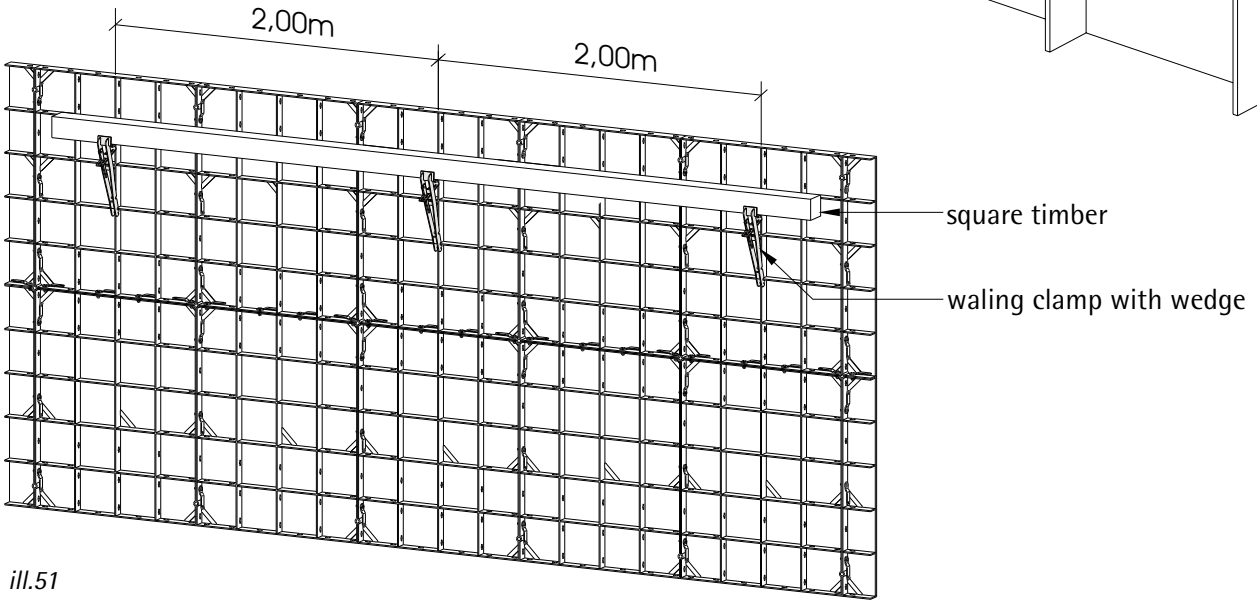
Weight : 2.70kg



ill.49



ill.50



ill.51

In order to align the formwork it is advisable to fix horizontal and vertical squared timbers. These squared timbers also stabilise preassembled panel units e.g. during the crane transport.

The waling clamp (4) with wedge (7) enables a fast and reliable fastening of all customary squared timbers (1) up to 20cm high wooden formwork beams or the like.

The handling of the waling clamp is really simple :

The clamping piece is suspended at the desired spot.

The waling clamp is directed over the clamping piece, and it s embrasures (5/8) are engaged in the siffening profile (6) of the modular formwork.

The wedge (7) is inserted into a suitable slit of the clamping piece and fixed by a few hammer blows.

The embrasure (8) is used when fixing 20cm high beams.

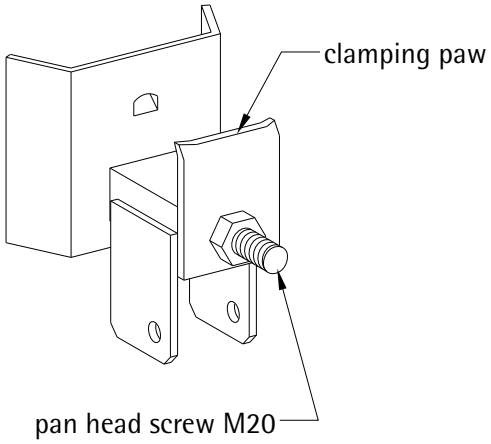
The distance between the waling clamp with wedge for horizontal timbers is normally 2.00m.

For forming high of 3.75m and more an additional vertical squared timber is necessary.

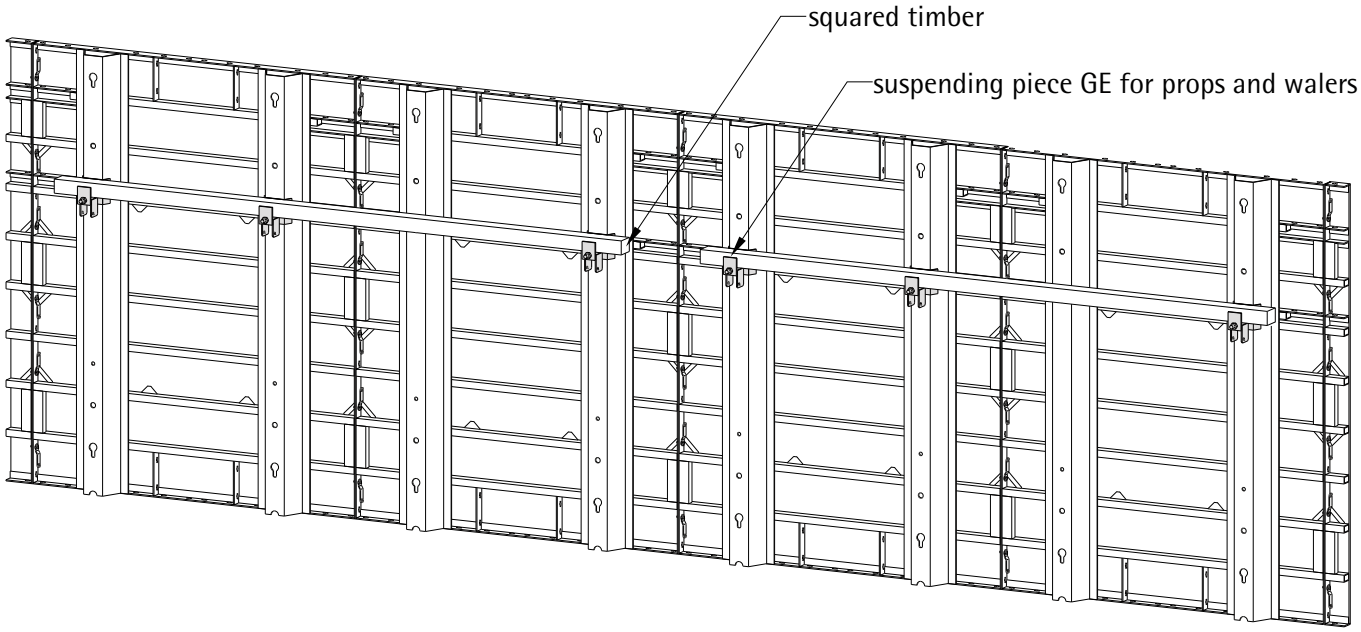
Suspending piece GE for props and walers

Art. N° : 181.000.0004

Weight : 4.30kg



ill.52



ill.53

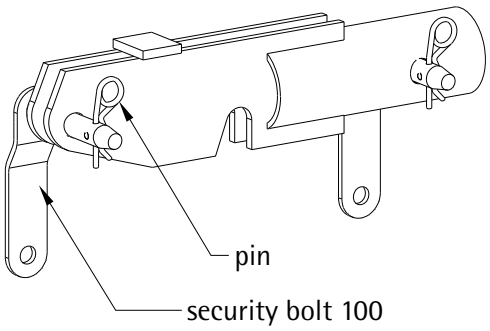
The suspending piece GE for props and walers has a important task for fixing a horizontal squared timber, which serves for the stiffing of several connected GE panels being removed by crane and for the alignment of the formwork.

Assembly:
At the head of the pan head screw the suspending piece GE for props and walers is hanged into the keyhole-shaped opening at the trapezoidal girder.
Then the squared timber can be put in.
Now the hexagon nut is tightened.
The squared timber is safely held by the claw-shaped edges of the clamping paw.

Suspending piece for props

Art. N° : 180.000.0025

Weight : 2.50kg

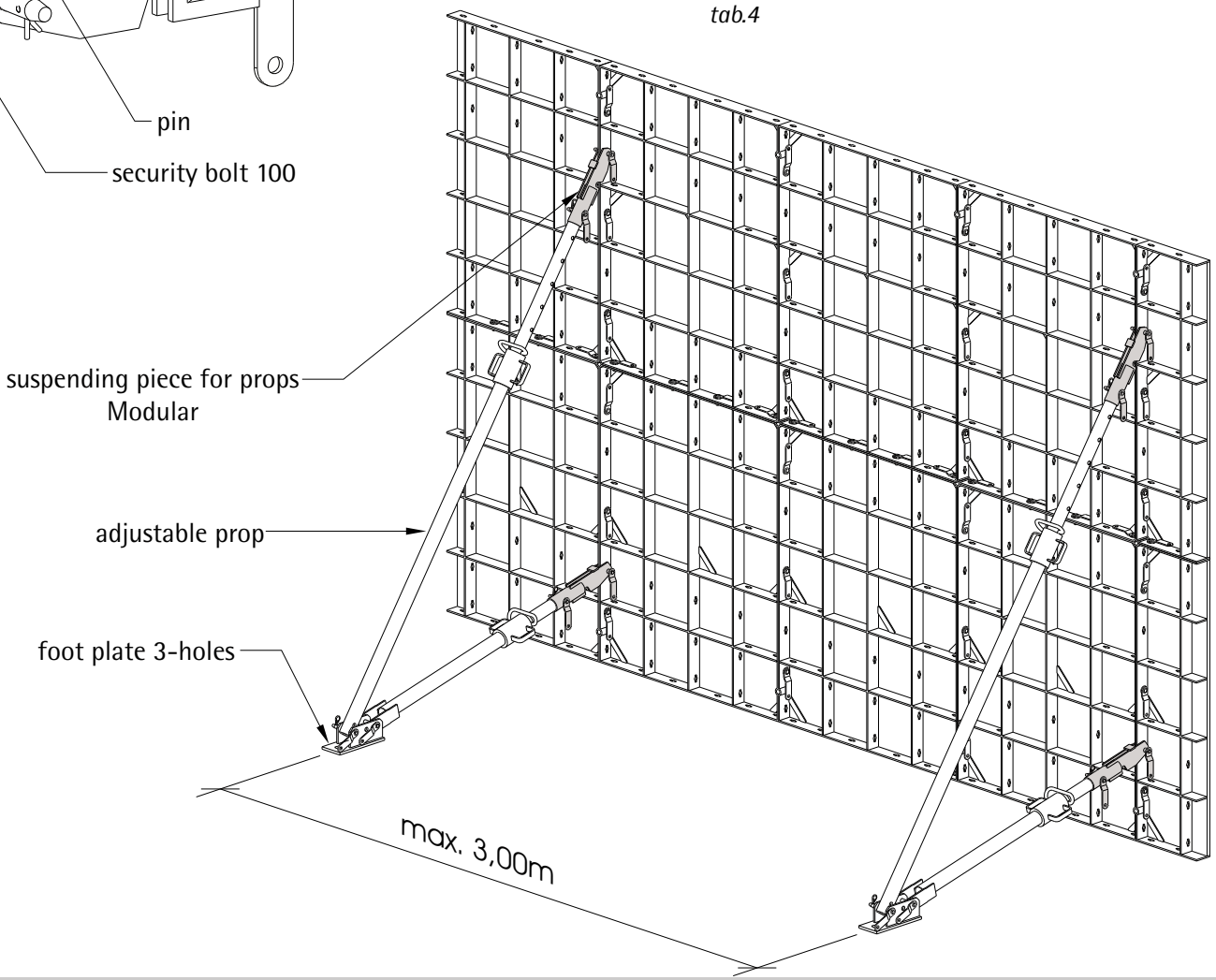


ill.54

admissible loads of adjustable props

	length [cm]	pressure [kN]	tension [kN]
RS2	180-290	37,0 – 22,0	15,0
RSK4	260-400	40,0 – 14,6	40,0
RSK6	460-600	24,6 – 12,5	40,0
RSK8	620-760	30,0 – 21,0	40,0

tab.4



ill.55

Adjustable props are fixed for a perpendicular adjustment of the formwork and the diversion of wind forces into the bottom plate.
The connection piece is the suspending piece for props which is fixed to the panel by means of a security bolt.
Adjustable prop and bottom plate are connected by a foot plate plugged by dowels in the concrete.

The size of the adjustable prop depends on the formwork height.

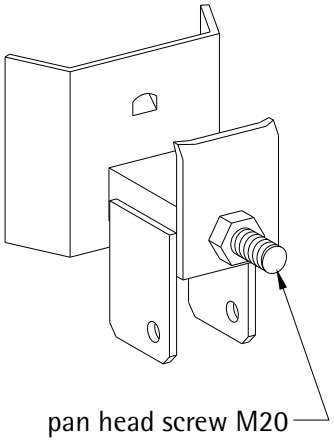
The distance between each adjustable prop must not exceed 3.00m.

The suspending piece for props can also be assembled on the large-size panel GE.

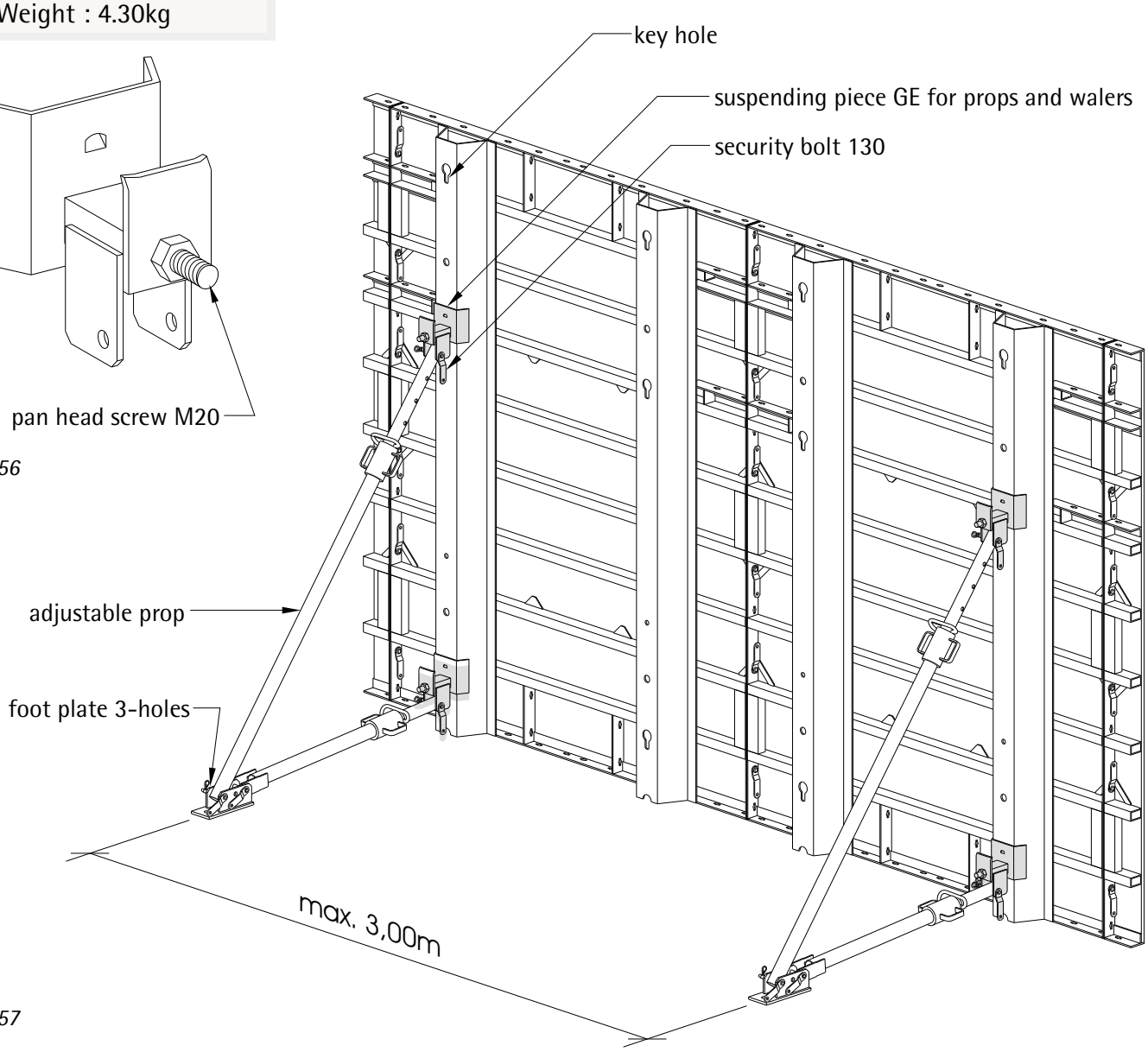
Suspending piece GE for props and walers

Art. N° : 181.000.0004

Weight : 4.30kg



ill.56



ill.57

An other possibility for the large-size panel GE is the suspending piece GE for props and walers.

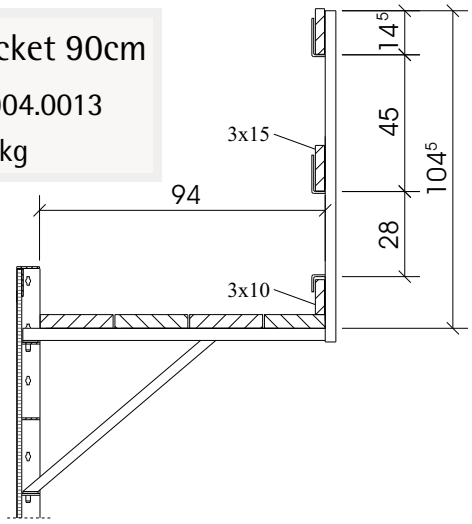
The suspending piece GE will be connected with a pan head screw M20 in the key hole of the trapezoidal girder of the large-size panel GE.

At the underside of the suspending piece GE for props and walers an adjustable prop can be fixed by a security bolt 130 between the two welded butt straps.

Platform bracket 90cm

Art. N° : 189.004.0013

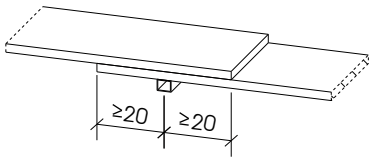
Weight : 11.00kg



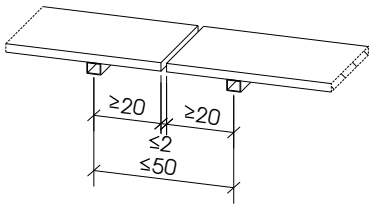
ill.58

planks have to be tightened, they should neither move nor escape

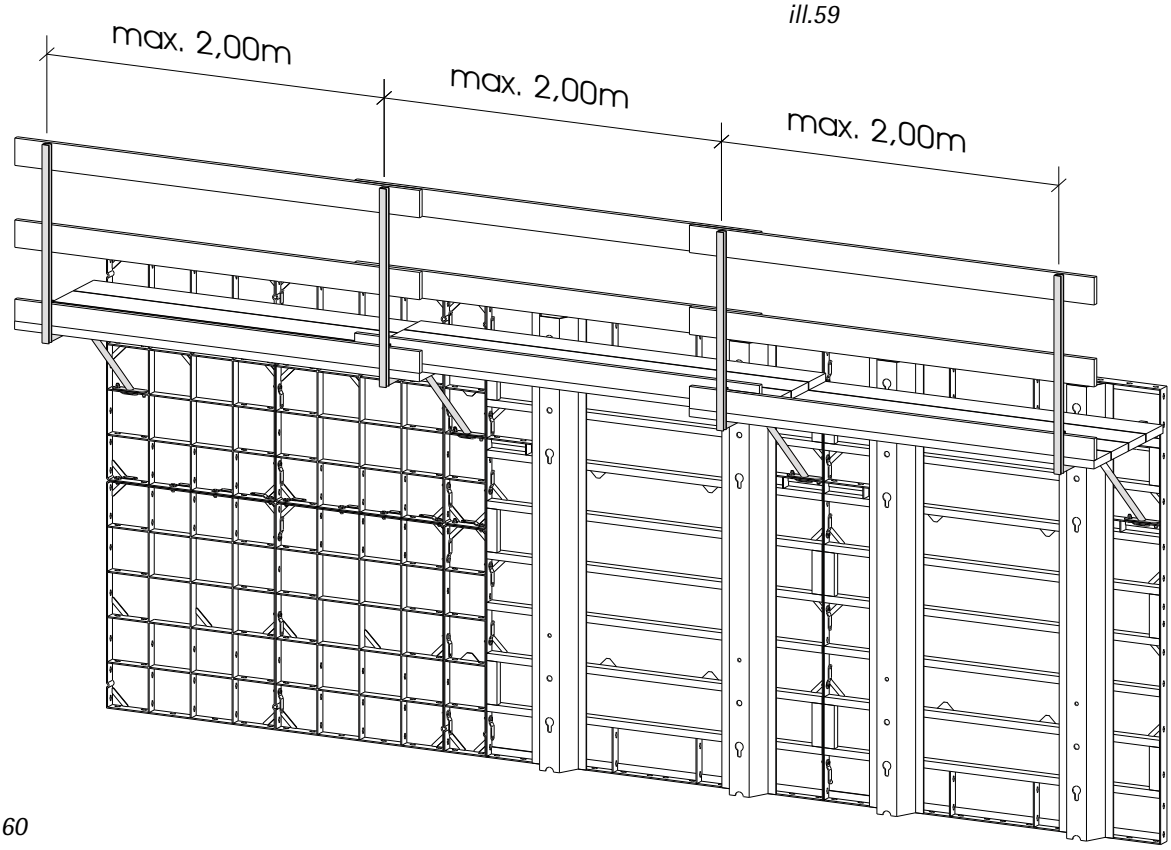
a) overlapping



b) flush



ill.59



ill.60

For pouring, vibrating, reworks on the top of the concrete and similar activities a working platform is necessary.
Therefore, platform brackets are to be fixed at the panel, railing post and platform timber to be fastened on site.

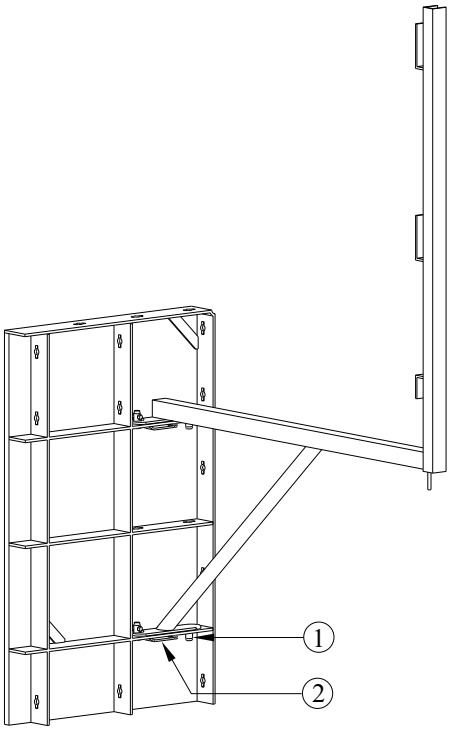
The live load is 3.00kN/m².
Consider the regulations as per DIN 4420 part 1 "working and protection scaffolding".

For the transportation of the panel units, the timber and the platform bracket must be screwed together. Otherwise, they have to be removed and to be fastened after having erected the formwork.

The joints of the platform timbers must be on the bracket. An overlapping of min. 40cm is required (see ill.106).

The distance of the platform brackets must not exceed 2.00m.

Platform bracket

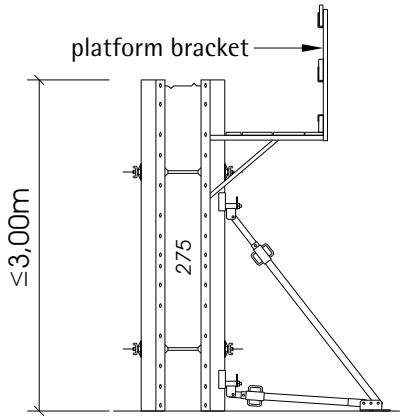


ill.61

admissible spacings in m for scaffolding planks (DIN 4420, part 1)

category	width of planks [cm]	thickness of planks [cm]				
		3,0	3,5	4,0	4,5	5,0
1, 2, 3	20	1,25	1,50	1,75	2,25	2,50
	24 and 28	1,25	1,75	2,25	2,50	2,75
4	20	1,25	1,50	1,75	2,25	2,50
	24 and 28	1,25	1,75	2,00	2,25	2,50

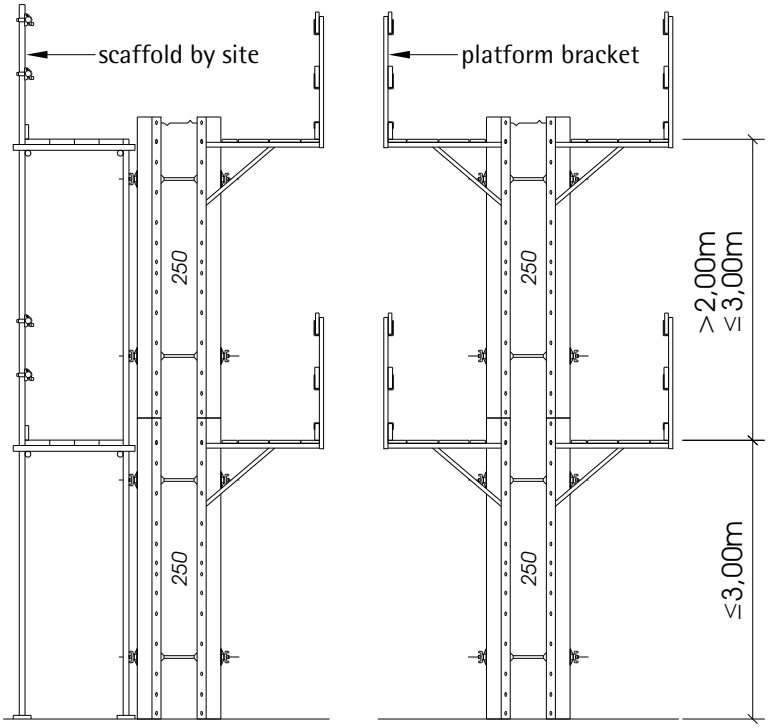
tab.5



ill.62

platform brackets and scaffold by site

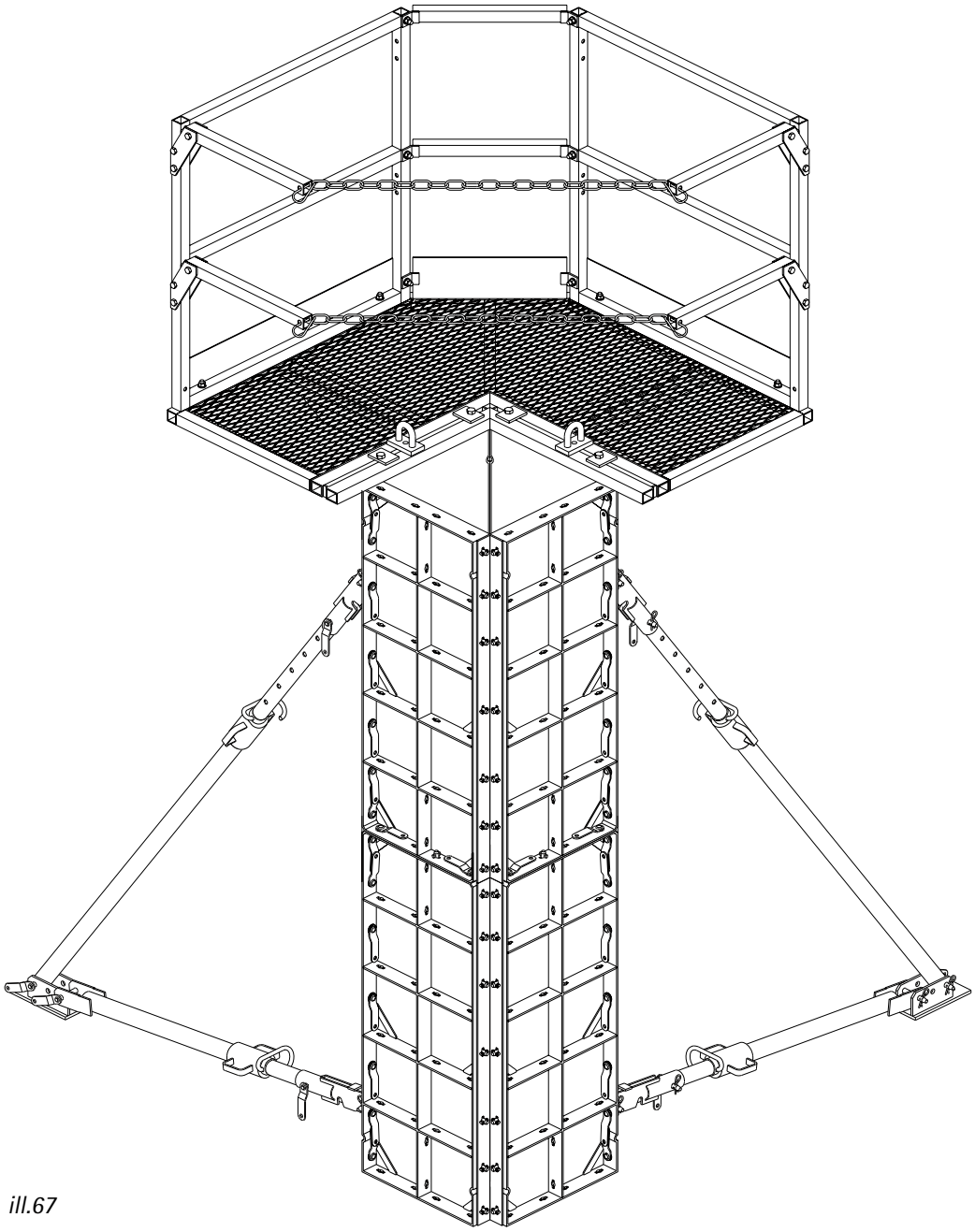
platform brackets on both sides



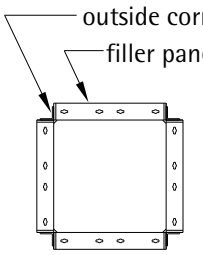
ill.63

Assembly:
Arranging the platform bracket at the cross gird (putting the pins of the fixing points of the platform bracket (1) into the bolt holes of the cross gird).
Fastening the platform bracket with 2 keybolts (2).

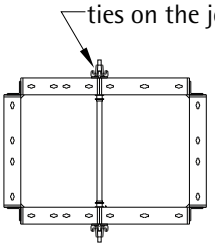
By great forming height there is the danger of falling. On this case it is necessary, to have platform brackets on both sides or to have on the second side an additional scaffold.



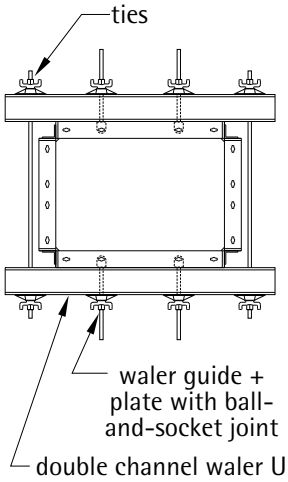
ill.67



ill.64



ill.65



ill.66

Forming of columns is effected with outside corner posts and modular panels (ill.64). The size of the panels must be so great as the length and the width of the column.
For columns length >50cm it is necessary to form these column side with two or more panels. A tie is necessary on the joint of the panels (ill.65).
It is not possible to place a tie rod in the column, than double channel waler U must be placed on the column and the tie rod is placed on the waler (ill.66).

All bolt holes are to be bolted with keybolts.

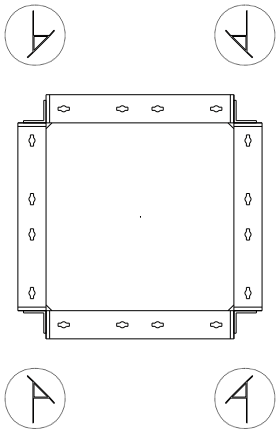
For columns with a max. length and with of 50cm the maximum safe working pressure is 68kN/m².

Working platform are needed for concreting and vibrating.

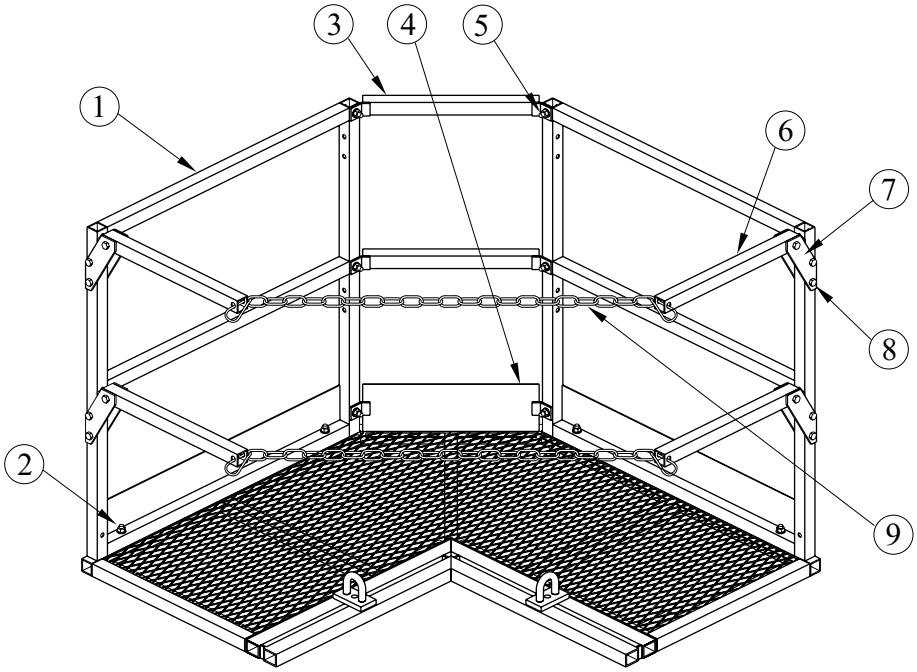
Working platform

Art. N° : 170.003.0018

Weight : 98.,00kg



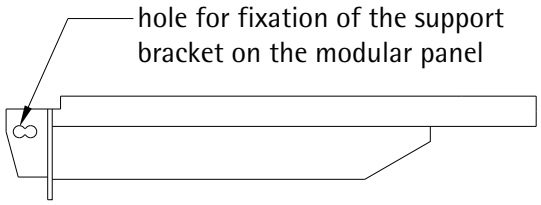
ill.68



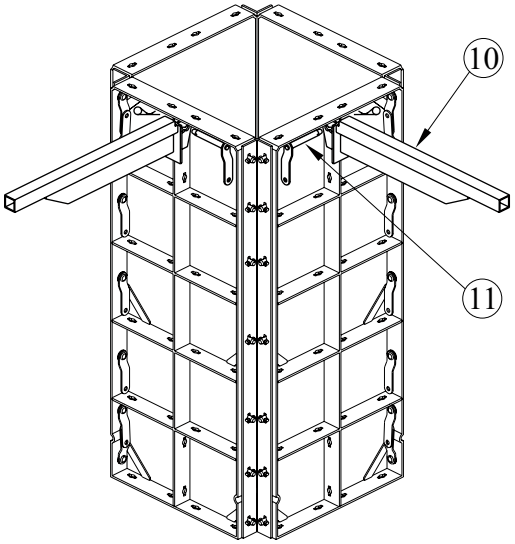
Support bracket on Modular for working platform

Art. N° : 189.004.0082

Weight : 9.00kg



ill.69



ill.70

Assembly of the working platform:

Fix the lateral guard railing (1) to the walkway by 4 screws M12x100 (2).

Fix the middle guard railing (3) and the middle curb plate (4) to the lateral guard railing by 6 screws M12x70 (5).

Fix the barriers (6) to the lateral guard railing by connecting plate (7) and 12 screws M12x70 (8).

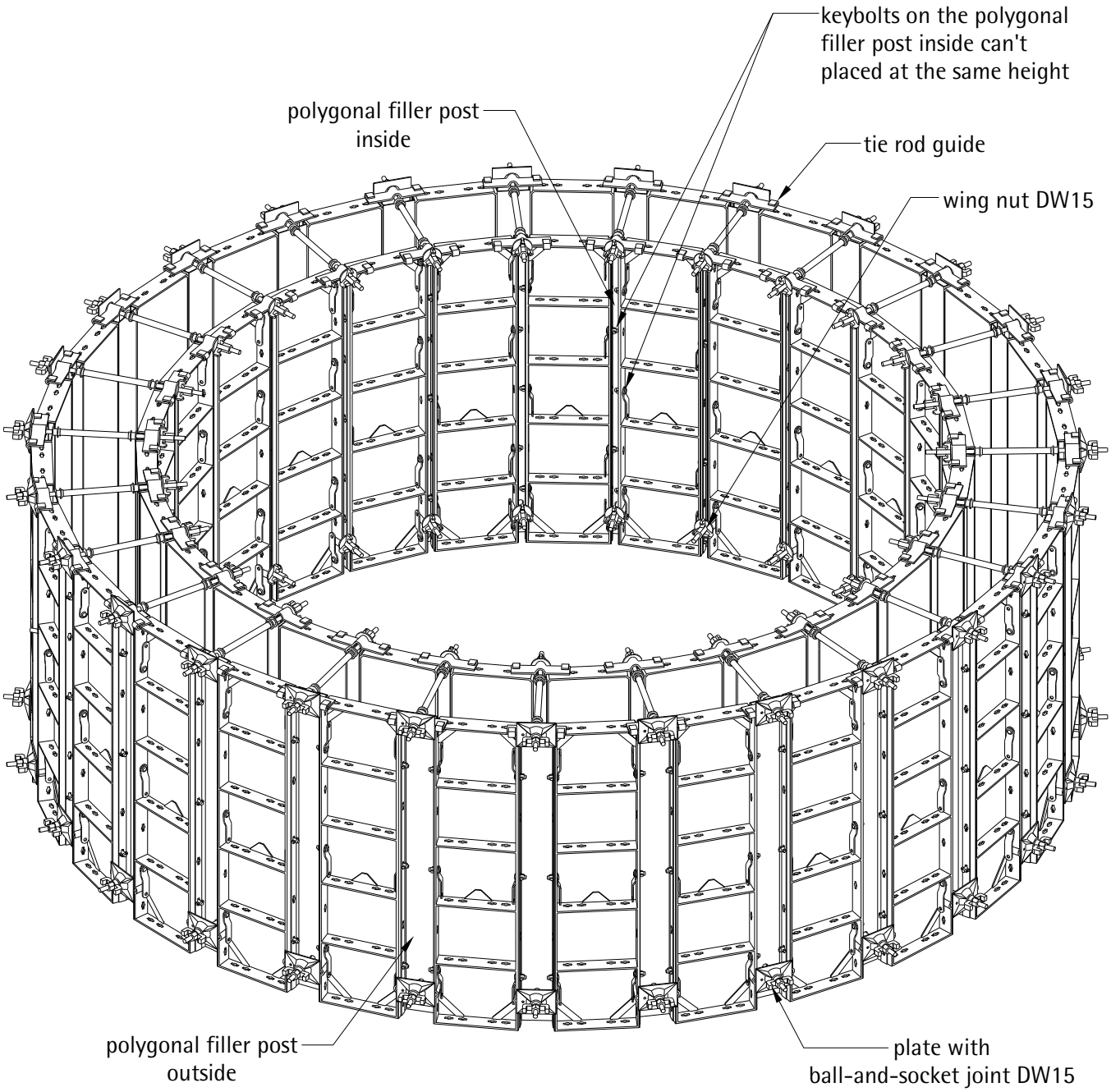
Fix the chains (9) to the barriers by snap hooks.

Fix the support bracket (10) to the modular panels by security bolts (11).

Fix the working platform to the modular panels by 4 screws M12x100 and plates.

The support bracket is connected on the middle vertical girder. For panels smaller as 50cm the support bracket is fixed to outer joints (2 edges on a diagonals).

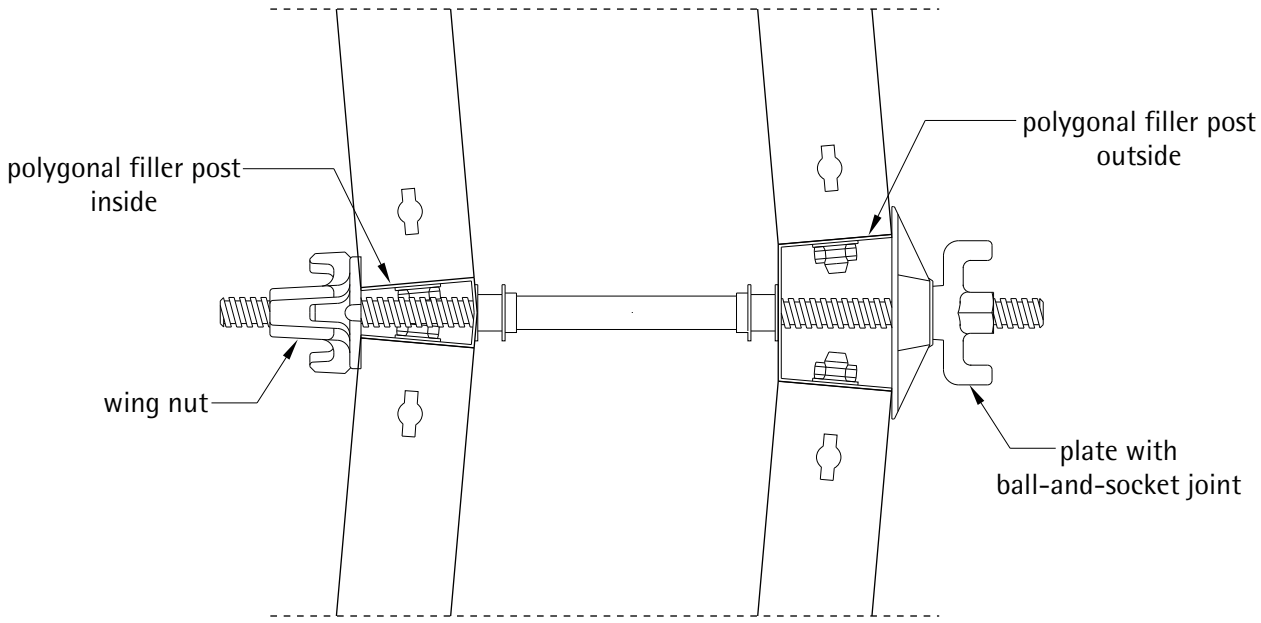
When using chamfer angles, taken into consideration that the overlaps for nailing are fixed parallel in order avoid a torsion of the column formwork.



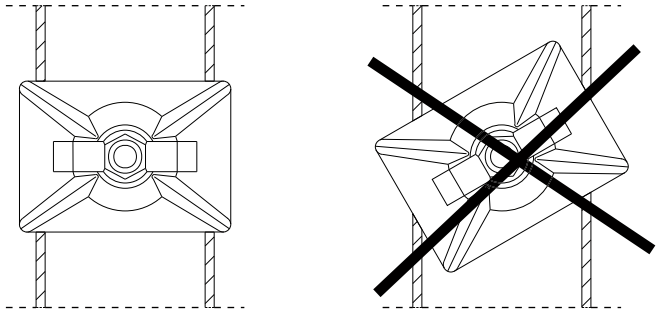
ill.71

Modular formwork panels can also be used to form circular walls as polygons. For this purpose, polygonal filler posts are used at every panel joint.
The size of the diameter being formed stipulates the required panel width:
large diameters ➔ large panel with
small diameters ➔ small panel with

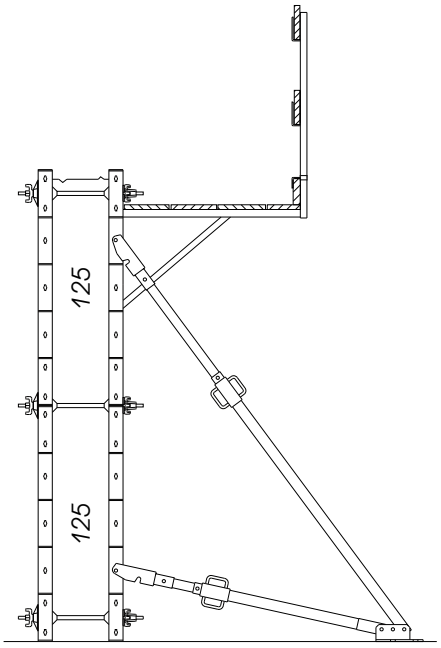
All panel widths and accessory parts (connecting pieces, platform brackets, supports etc.) can be used for this formwork method. Apart from the filler posts no special parts are necessary.
In addition to circular arcs, it is also possible to form all other curved shapes, such as ellipses and similar.



ill.72



ill.73

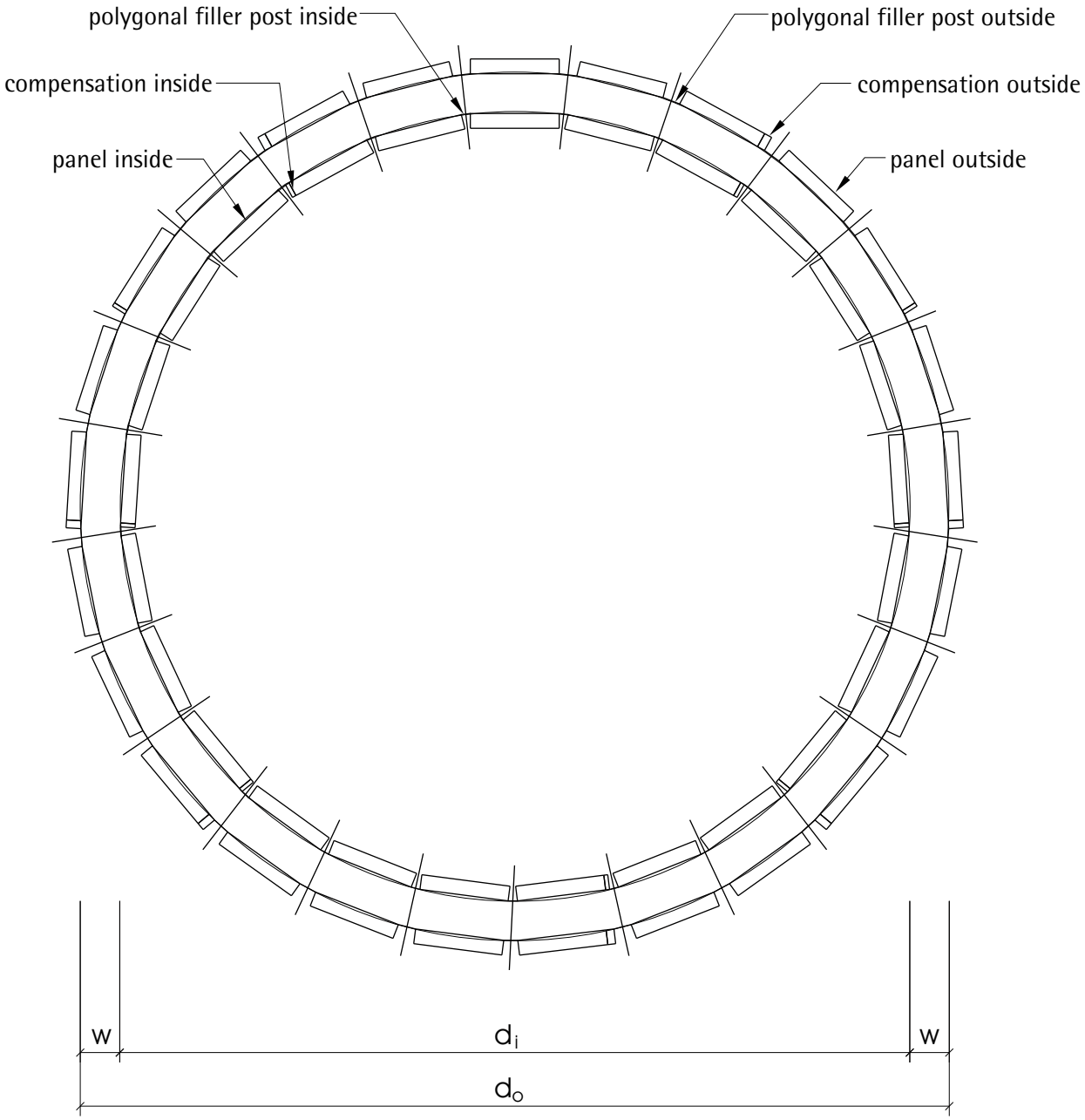


ill.74

When using the PASCHAL-Modular formworks for the constructions of tanks and round staircase shafts you have to insert some variable filler posts between the modular panels.

It is not possible to use the spacer strap as upper tie rod. Use a tie rod (ill.74) and if it is necessary a tie rod guide.

With the 5-pin keybolt you only can compensate in length either 2cm or 4cm as a result of the space shortage at the right and left side of the polygonal filler post inside.



ill.75

Exemple : $d_i = 400cm$; $w = 20cm$

Calculation:

$d_o = d_i + 2*w = 400cm + 2*20cm = 440cm$

$U_i = \pi * d_i = \pi * 400cm = 1256,6cm$

$U_o = \pi * d_o = \pi * 440cm = 1382,3cm$

⇨ $n = 25$ (min. number of panel-units)

$Pu_i = U_i / n = 1256,6cm / 25 = 50,26cm$

$Pu_o = U_o / n = 1382,3cm / 25 = 55,29cm$

$b_i = Pu_i - 4,66cm = 50,26cm - 4,66cm = 45,6cm$

$b_o = Pu_o - 9,02cm = 55,29cm - 9,02cm = 46,27cm$

⇨ $b_i = b_o = 45cm$ (max. width of panel)

$C_i = U_i - n * (b_i + 4,66cm)$

$= 1256,6cm - 25*(45cm+4,66cm) = 15,1cm$

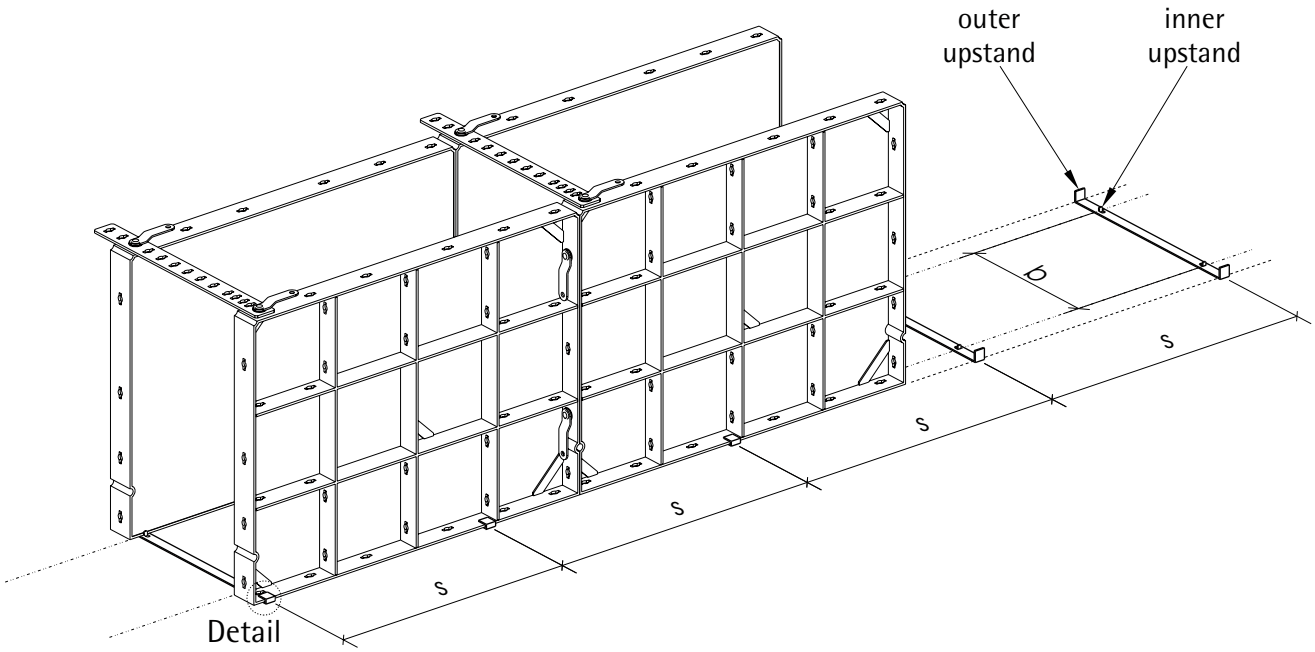
$C_o = U_o - n * (b_o + 9,02cm)$

$= 1382,3cm - 25*(45cm+9,02cm) = 31,8cm$

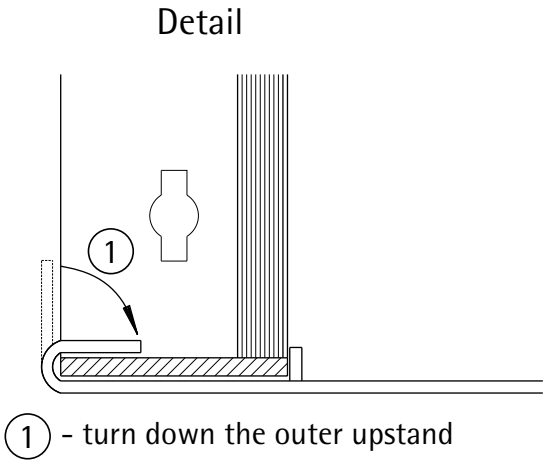
⇨ Compensation inside : 7 x 2cm plastic filler pieces

⇨ Compensation outside : 7 x 4cm plastic filler pie.
2 x 2cm plastic filler pieces

The 2cm compensation at the inside is arranged at the opposite side of the 4cm compensation at the outside.



ill.76



ill.77

concreting height	distance of foundation straps *s*
50cm	ca. 100cm
75cm	ca. 75cm
100cm	ca. 50cm
125cm	ca. 25cm

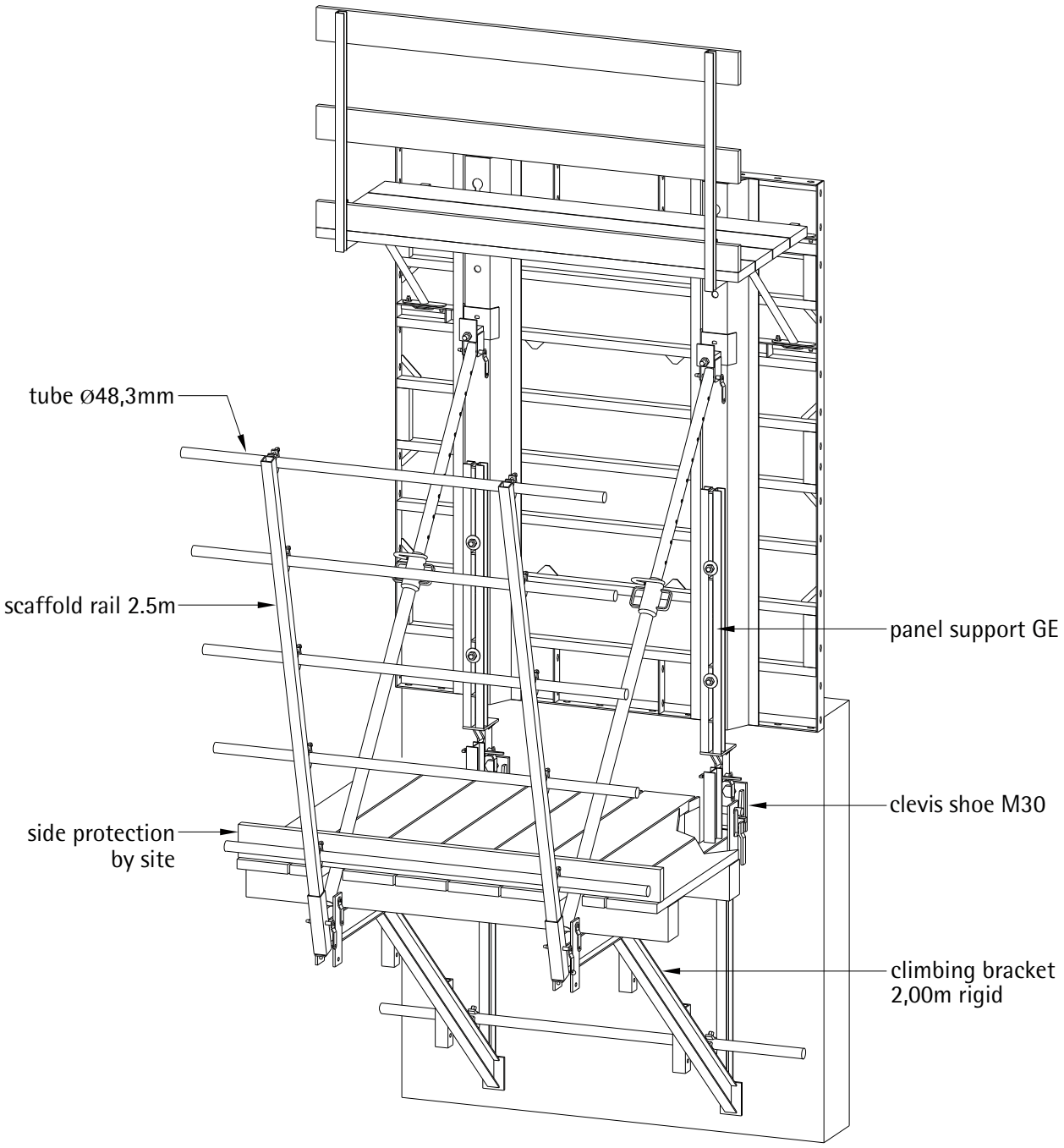
tab.6

The foundation strap can be used for panel heights 62.5cm, 75cm, 100cm and 125cm.

The foundation strap replaces the necessary tie rod at the bottom area as lost tension anchor.
Thereby, the distance of the foundation straps directs to the concrete height (tab.6).

It will be tensioned at the top of the panel as usual.

Note:
In order to guarantee the whole anchor force, the outer upstands have to be turned down at 90° inwards until they lie on the panel frame (ill.77).



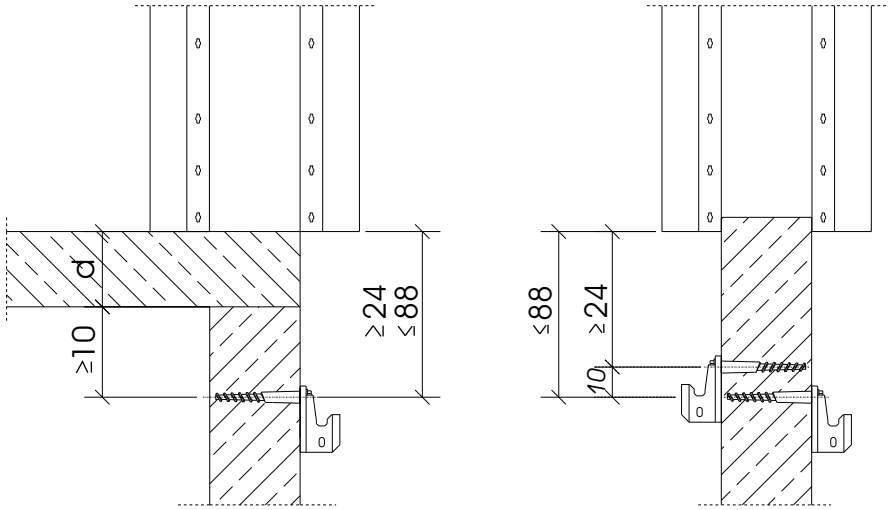
ill.78

Modular panels or large-size panels GE, fixed to 2m wide rigid or slideable brackets can be employed for climbing, either on one side or on both sides. Admissible loads and construction of these climbing brackets are in conformity with DIN 4420 part 1.

Please check if our equipment meets your national and local structural / statical quality standards!

The climbing brackets with planking, provided and screwed on by site, are utilized as working platform. The formwork is attached to it. It also transfers all loads resulting of dead loads and wind loads through special anchors to the previously poured concrete (ill.78).

Climbing with GE

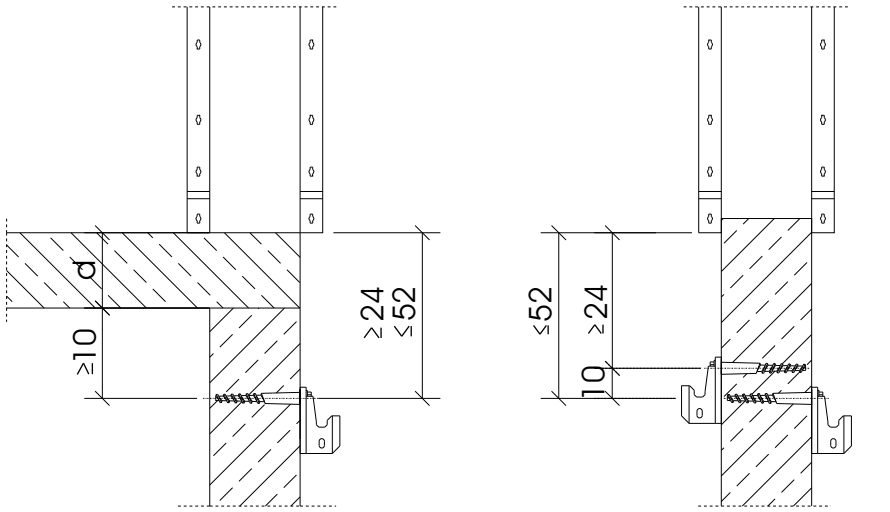


vertical position of anchor for one sided climbing

vertical position of anchor for both sided climbing

ill.79

Climbing with Modular



vertical position of anchor for one sided climbing

vertical position of anchor for both sided climbing

ill.80

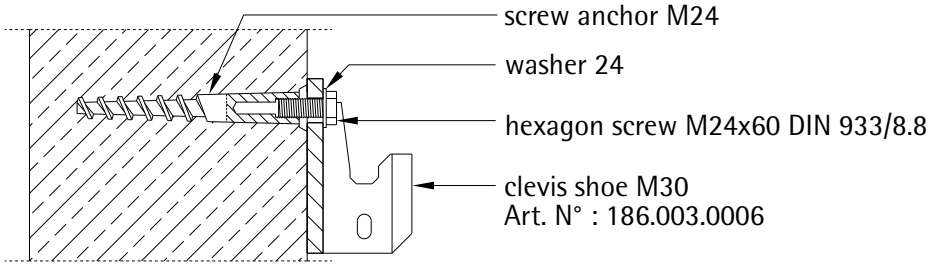
The anchors for fixing the brackets have to be embedded before, i.e. they have to be set on the first pour for the first lift.

Embedment of anchors

The height level of the embedded anchors are shown on ill.79+80.

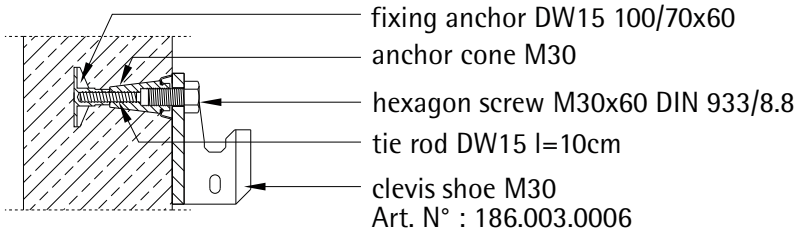
Attention:
Please observe installation instructions of the corresponding manufacturer of anchors!

Screw anchor



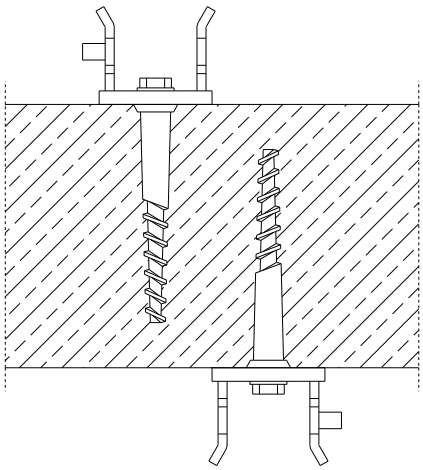
ill.81

Anchor cone



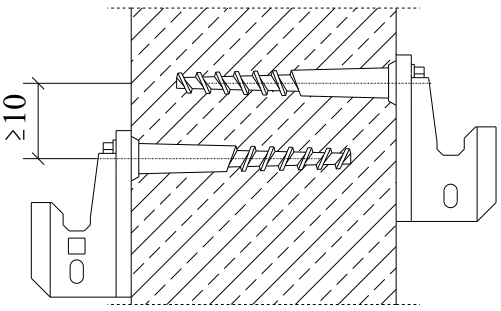
ill.82

screw anchors on different horizontal levels



ill.83

screw anchors on different horizontal levels



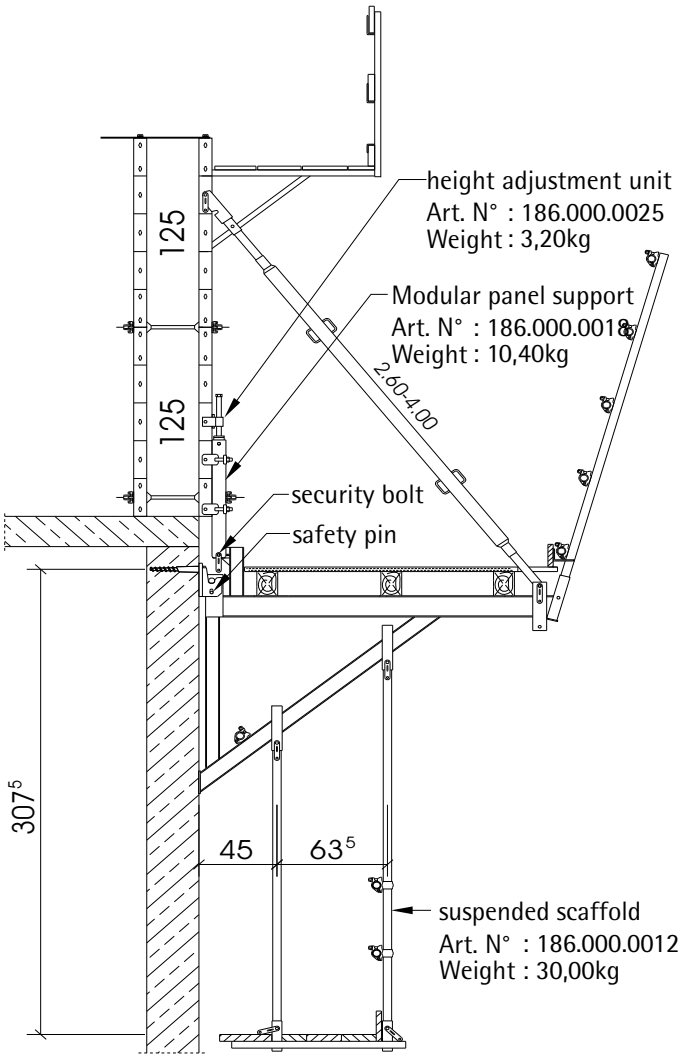
ill.84

Clevis shoes are attached to screw anchors (ill.81) with screws M24x60, according to DIN 933/8.8 or anchor cone (ill.82) with screws M30x60, according to DIN 933/8.8 after striking of the first pour.

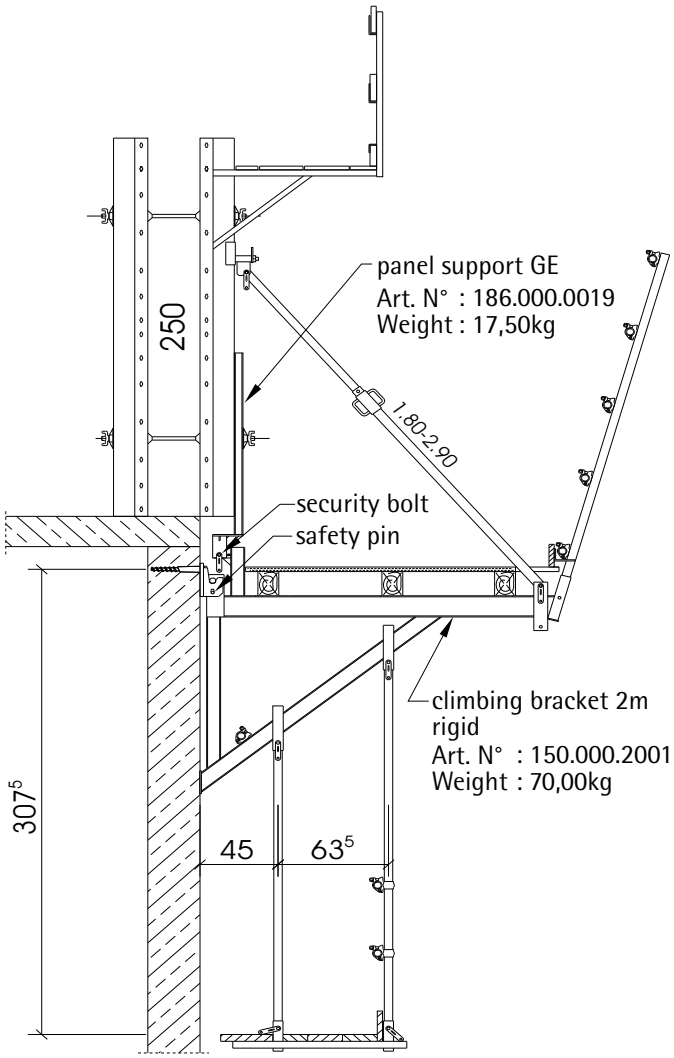
For climbing on both sides, every clevis shoe has to be anchored individulally in the concrete with a screw anchor or an anchor cone.

If the wall thickness is big enough, both clevis shoes can be attached opposite to each other.
Otherwise they have to be set on different vertical or horizontal levels (ill.83+84). The spacing of anchors with a different height level must be at least 10cm.

Installation of clevis shoes



ill.85



ill.86

The climbing brackets can be suspended after installation of the clevis shoes.

Suspension of climbing brackets

The climbing bracket have to be protected with the safety pin against unhooking.

Once the climbing brackets are completely assembled to unit(s), the formwork can be set up on it. The attachment to the brackets is effected with panel supports.

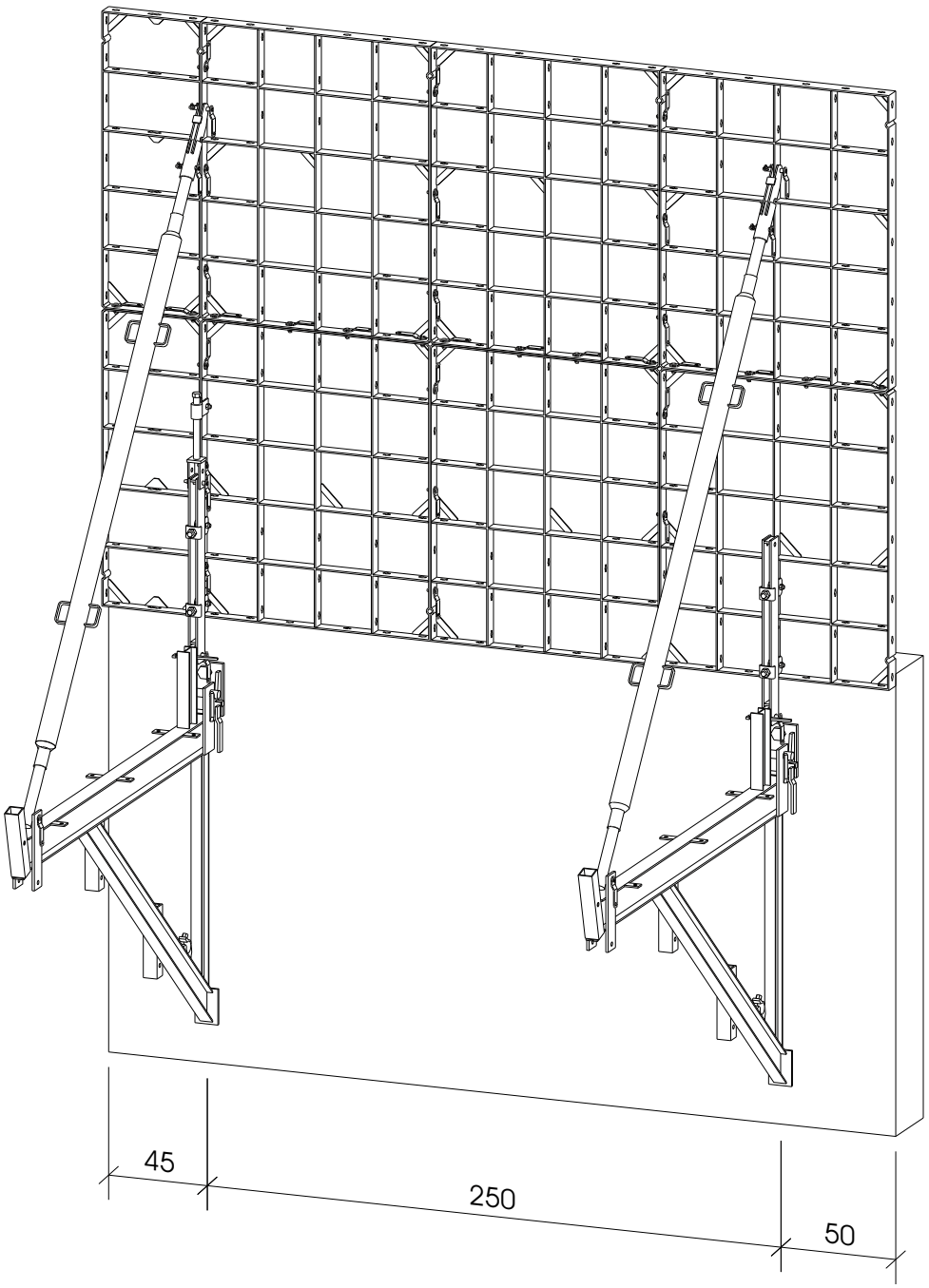
An adjustment unit allows the exact height adjustment. Modular panel support and height adjustment unit are fixed to the panel with screws in the keybolt holes and panel support GE are fixed with pan head screws in the keyhole-shaped openings at the trapezoidal girder. The panel support are attached to the climbing brackets with security bolts.

Adjustable props fitted to panels and brackets facilitate the alignment of the props.

Installation of formwork on climbing brackets

When climbing on both sides, the same procedure applies to both of them. Otherwise the inner

Example for climbing unit (not always applicable)



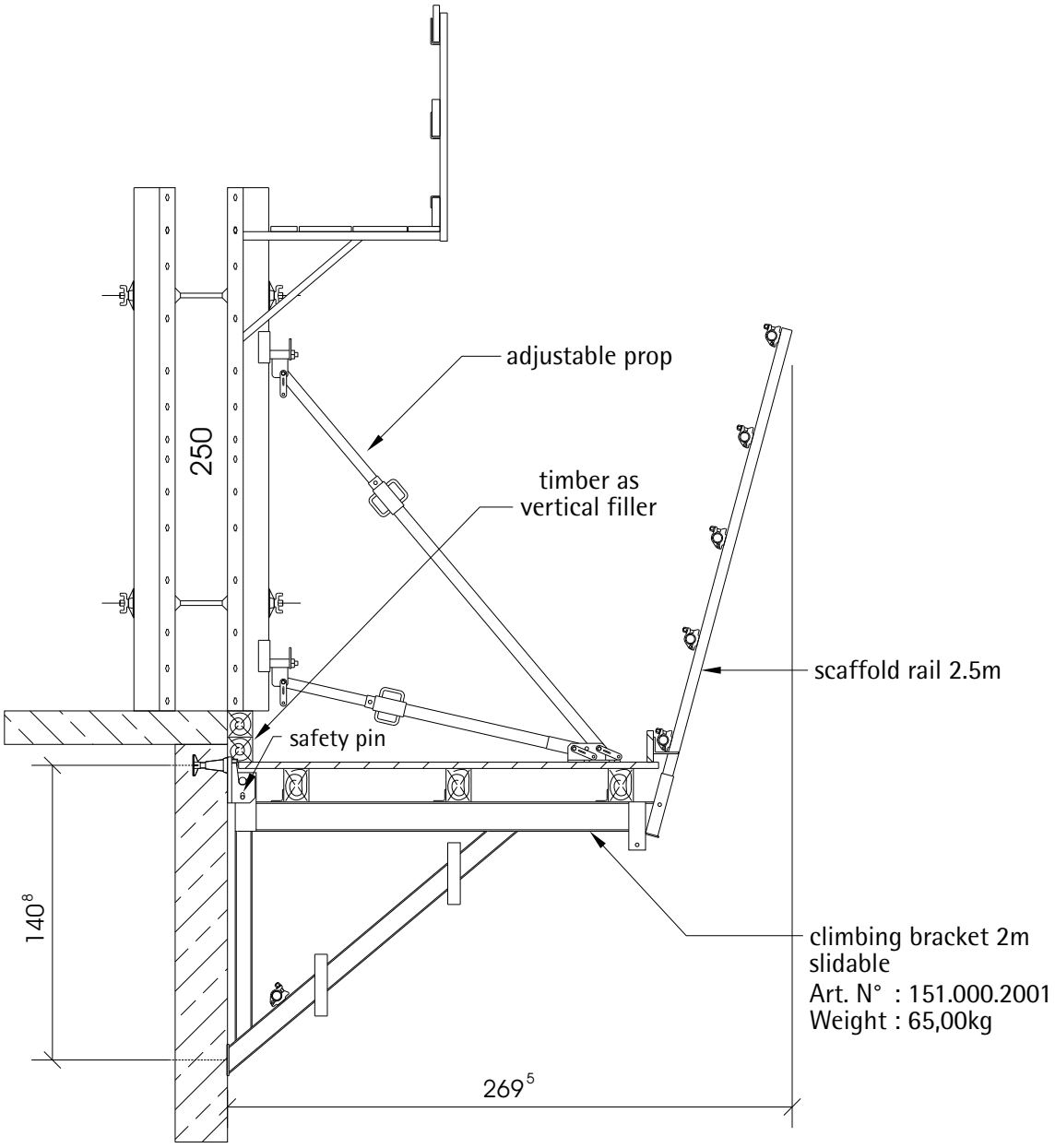
ill.87

formwork will be put on the existing slab.
The slideable 2m climbing brackets allow a displacement of one form, when climbing on both sides, see "Sections and Elevations" pages 88-89.
In case of repeated vertical lifts, it is adviseable to attach a suspended scaffold for removing of clevis shoes and closing of tie rod openings.
Planking and guard rail of the suspended scaffold have to be procured by customer.

attachment of suspended scaffold

A climbing unit consists of 3 levels:
1.) formwork with platform bracket
2.) climbing bracket with platform
3.) suspended scaffold.
All three can be connected together and can be (without dismantling) displaced completely with a single crane operation.
The length of a climbing unit depends on the load capacity of the crane available on site.
The admissible spacings between the 2m climbing brackets, rigid or slideable, depend on the forming

climbing bracket as working platform



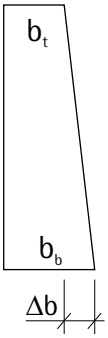
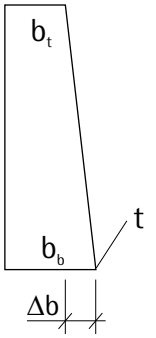
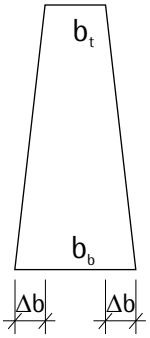
ill.88

height and the height above ground.

When utilizing climbing brackets only as working platform, panel support and height adjustment unit and may be even the suspended scaffold can be omitted.
The formwork then is – without direct connection – simply set on the brackets and braced. Formwork and working platform are displaced seperately.

Modular panels

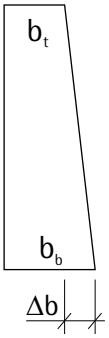
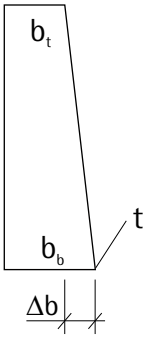
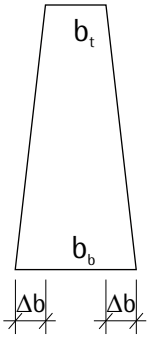
table for admissible inclinations Δb depending on forming height by b_t=25cm

forming height	battered without substructure [cm]	battered with substructure t [cm]	conical on both sides [cm]
			
2.50m	14.5	21.5 t=2.5cm	13
3.75m	19.5	34 t=2.5cm	19.5
5.00m	24	43.5 t=2.5cm 46 t=3.0cm	26

tab.7

Large-size panels GE

table for admissible inclinations Δb depending on forming height by b_t=25cm

forming height	battered without substructure [cm]	battered with substructure t [cm]	conical on both sides [cm]
			
2.50m	14.5	22.5 t=2.5cm	12.5
3.75m	19.5	34.5 t=2.5cm	19
5.00m	24	43.5 t=2.5cm 46 t=3.0cm	25

tab.8

Possible conical inclination of the panels depend on the tie rod openings in the GE panels or the modular panels.

At a formwork height of 2.50m, conical walls up to an inclination angle of 3.5 degrees can be formed as usual. The opening for the tie rod is big enough allowing the oblique tie rod to pass.

Δb = wall thickness on bottom
– wall thickness on top

If the inclination angle is larger, a timber filler or PE filler has to be placed at every panel joint, the openings for the tie rod being drilled into these timber fillers or PE fillers.

A timber substructure on the oblique formwork side allows this inclination also for larger formwork heights.

The stop end is made by means of bracing channels and bracing support brackets. Because it is not possible to used spacer straps on the top, use tie rod and tie rod guide on the top.

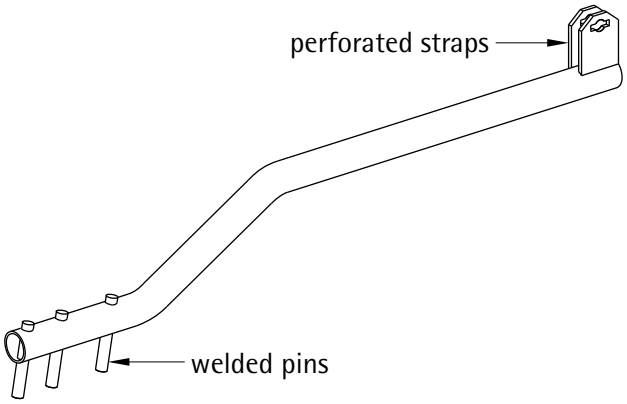
Please check, if a protection against ascending forces is necessary.

Assembly tool

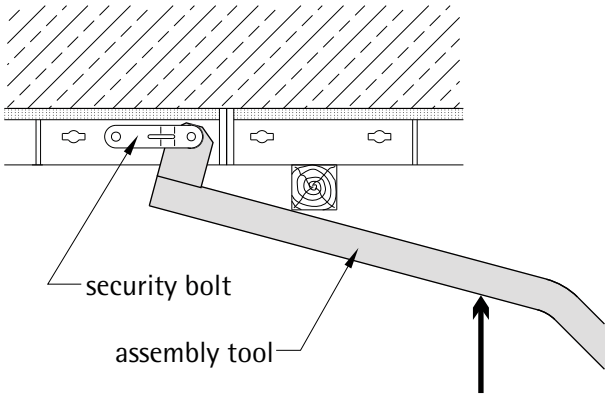
Assembly tool

Art. N° : 189.003.0000

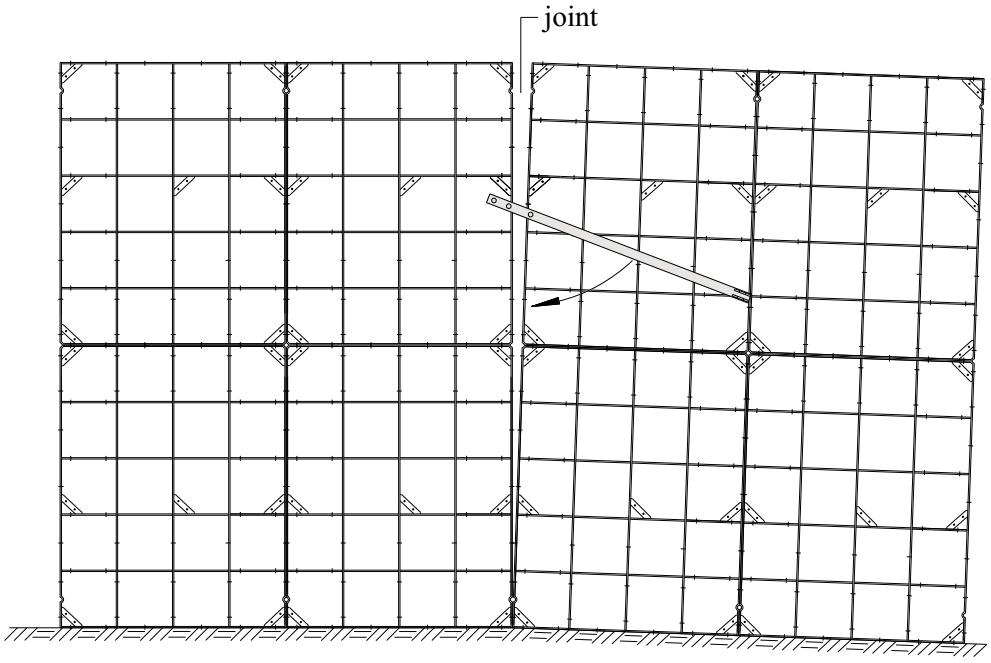
Weight : 3.90kg



ill.99



ill.89



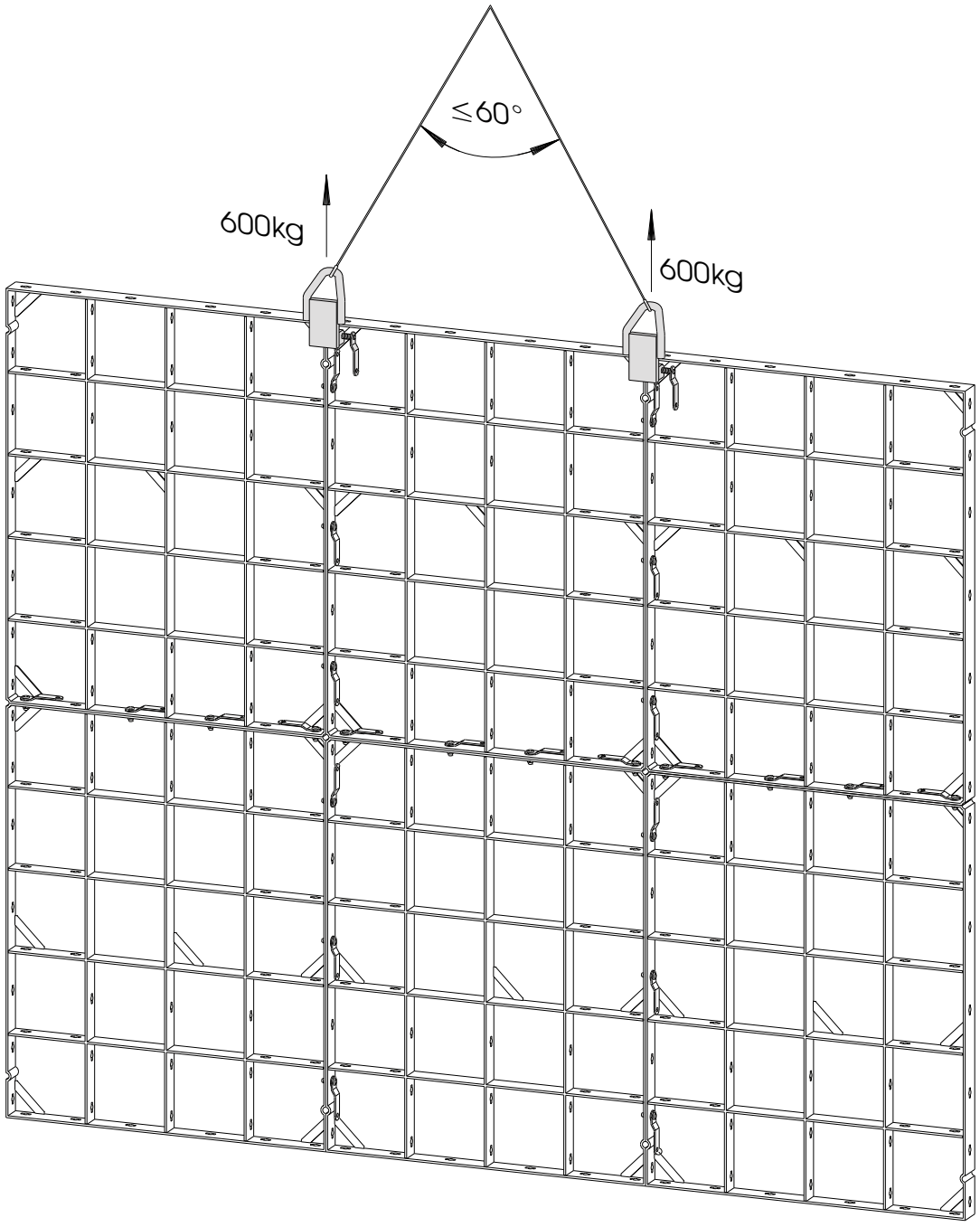
ill.100

The assembly tool is an auxiliary for assembly jobs that already has proved it s efficiency a thousand times.
Owing to its offset-form the assembly tool can be applied not only with the PASCHAL Modular form but also with the large-size panel GE and the Trapezoidal Girder Formwork.

The pins that are welded to the tool serve for the contracting of formwork sections as well as for the compensation of height during the bolting process.

It joins together the keybolt holes in the side parts of the panels congruently.

The two perforated straps serve for dismantling of interior formwork and slabs. As in these cases the panels are under compressive stress the dismantling of the first panel is rather difficult.
Owing to the lever action of the assembly tool this problem is solved very easily.
The assembly tool facilitates and accelerates forming jobs and should not be missing on any site.



ill.101

1. Application

The crane lifting clamp KA has been designed for crane transportation of several modular formwork panels bolted together (formwork wall) on the construction side and for crane transportation of several large-size panels GE single or bolted together. It is used when erecting a formwork wall or when forming and dismantling as well as when displacing formwork phases.

2. Load capacity

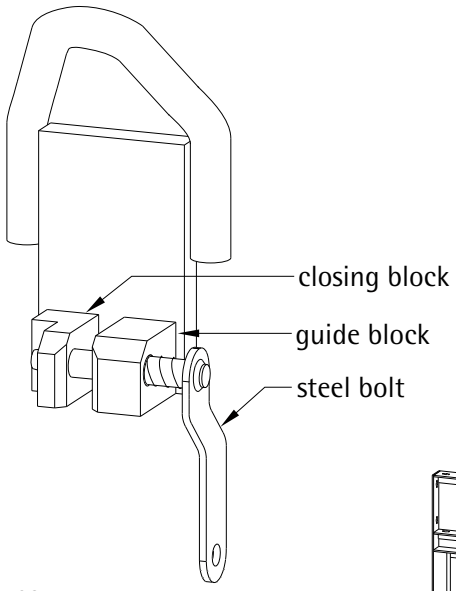
The load capacity of every crane lifting clamp KA is 600kg. The attachment strings are not to be spread more than 60°.

The fixing point for the crane lifting clamp KA is the upper keybolt hole of the corresponding vertical web plate. It must be checked for every use, if the load capacity of the crane lifting clamp is sufficient, taking the inclination angle into consideration.

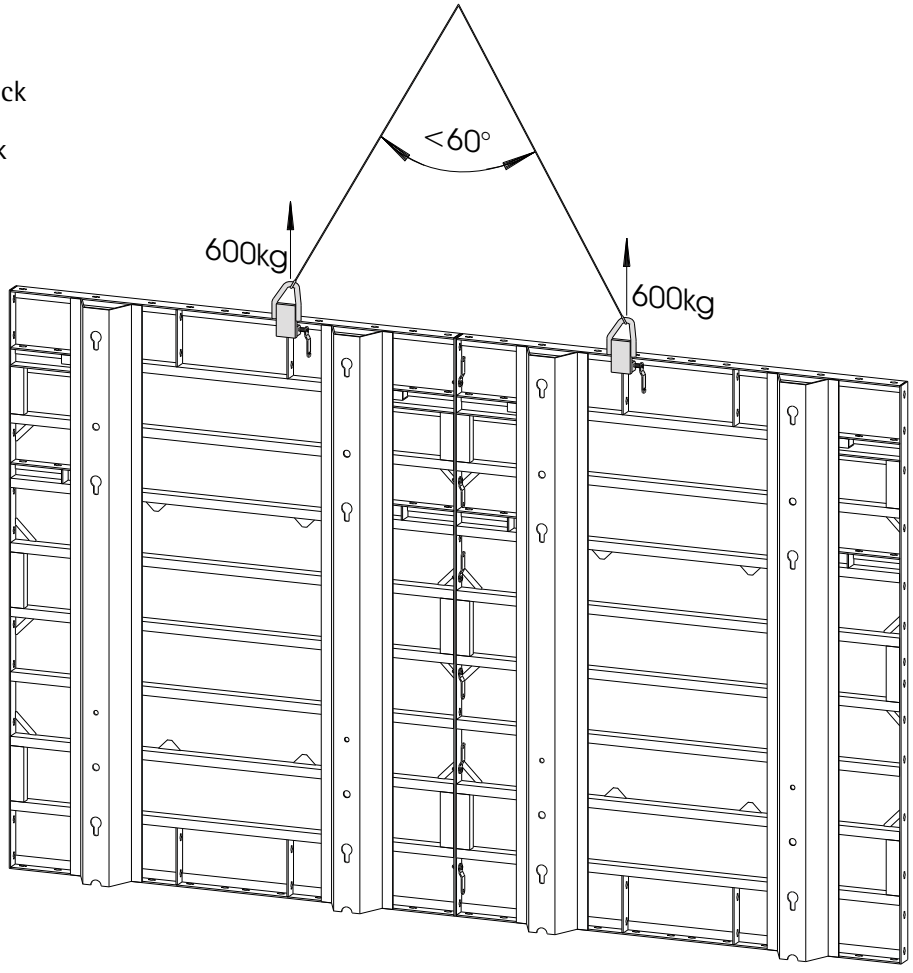
Crane lifting clamp KA

Art. N° : 189.002.0008

Weight : 4.00kg



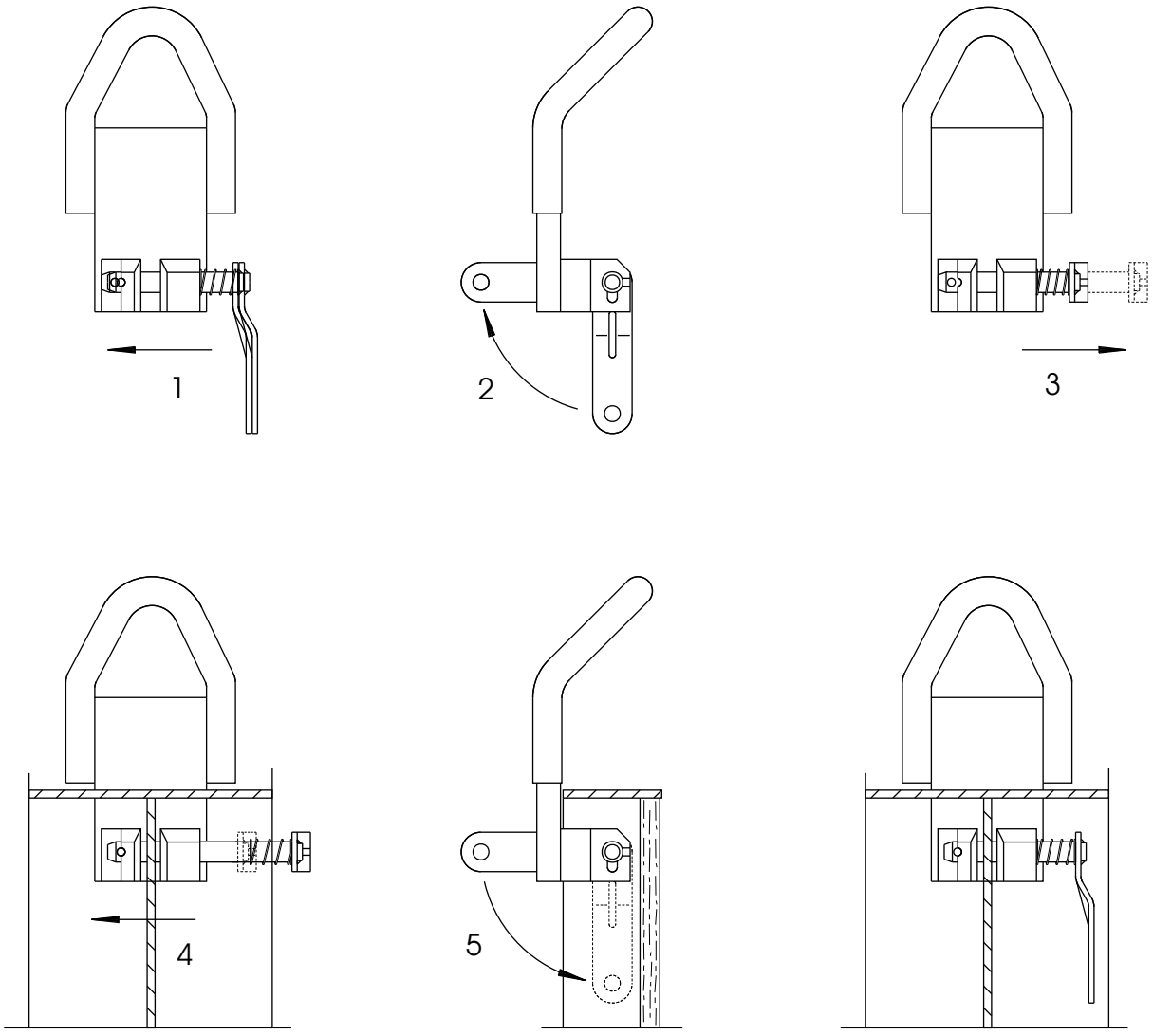
ill.102



ill.103

3. Handling

For fixing the crane lifting clamp the circular steel bolt must be slightly pushed in direction of the bolt pin (page 58, ill.104 - 1), in order to overpower the pressure of the spring.



ill.104

The circular steel bolt is turned upwards by 90 degrees (ill.104 - 2). By this, the transverse pin of the bolt is moved downwards.
Now, the bolt must be drawn out as far as possible (ill.104 - 3), so that the transversal pin locks in the guide block.
Then, the crane lifting clamp is positioned at a vertical web plate or a vertical joint of the modular panels.
For this, the bolt hole of the panel must be at the same height as the bolt hole of the crane lifting clamp. The circular steel bolt is pushed through the bolt hole of the modular panel and the closing block of the crane lifting clamp (ill.104 - 4).
At the end, the spring pressure must be overpowered again, so that the transversal pin comes out of the closing block. Now, the circular steel bolt is turned downwards by 90 degrees (ill.104 - 5), in order that the transversal pin locks into the circular hollow. By this, the self-opening of the crane lifting clamp is avoided.

4. Putting into service

Only qualified staff, familiar with lifting devices, are allowed to handle this equipment.

Before using lifting devices, they have to be checked and tested by an expert.
Any defects have to be repaired before operation.
These regulations have to be strictly observe before the first use or after working interruptions!

Attention!
Please check if our crane lifting clamp KA is in conformity with the standards and the quality requirements prevailing in your country.

Please keep in mind that all national and local safety regulations, instructions, quality standards and prescriptions are binding and have to be strictly observes in regard to
- stay in dangerous areas within the lifting device
- permanent examination and testing of lifting equipment
- maintenance
- repair, welding works
- safety regulations for dismantling of forms

Transportation angle for 12 panels of equal size

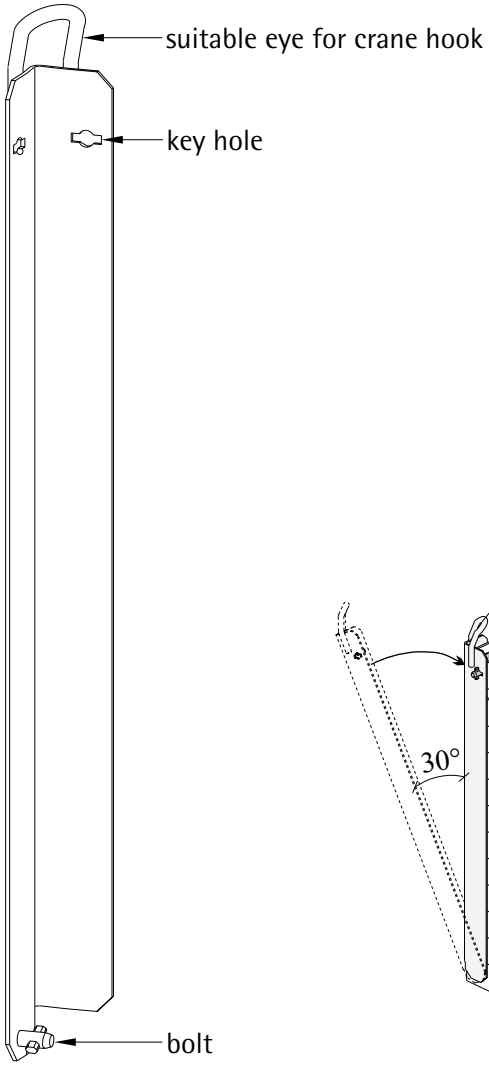
Art. N° : 180.000.0012

Weight : 4.70kg

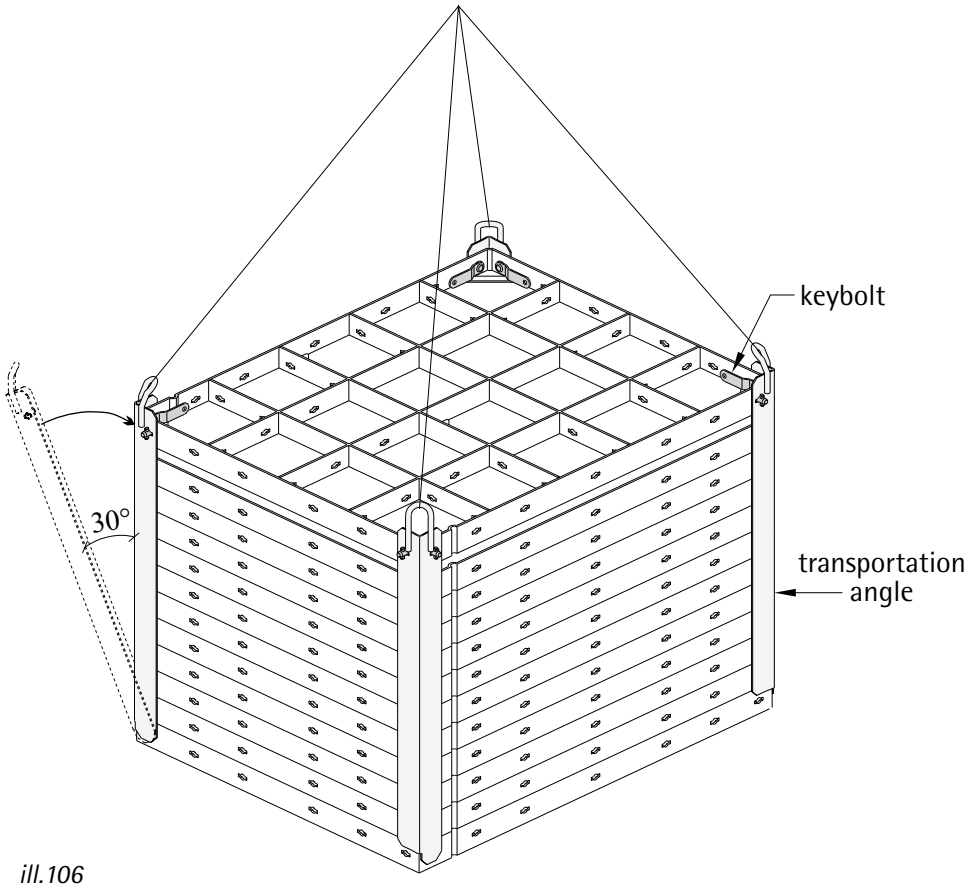
Transportation angle for 20 panels of equal size

Art. N° : 280.000.0042

Weight : 8.00kg



ill.105

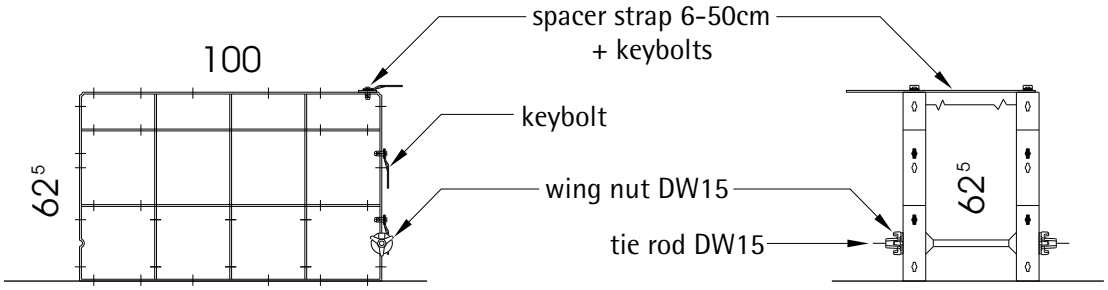


ill.106

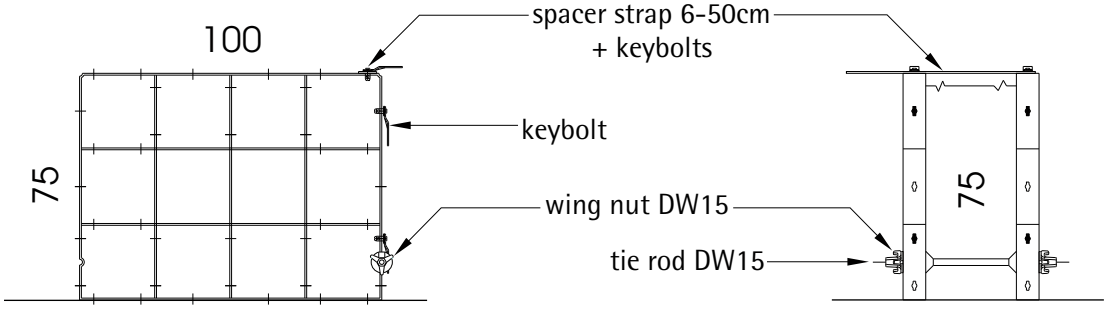
The transportation angles enable piles of 12 or 20 panels of equal dimensions with heights 150cm, 125cm or 62.5cm to be held together in such a manner that they are protected from breaking loose and dropping out during transportation by crane.

4 transportation angles and 8 keybolts are required for each pile of panels. The topmost panel of a pile should be placed in such a way that the formwork face is facing downwards. The transportation angle is tilted 30° to allow the transverse pin of the bolt welded to the bottom to lie in a horizontal position and to fit into the outermost bolt hole of the panel on the bottom. The transportation angle must then be swung into a vertical position. The transport angle and the upper panel (formwork face downwards) are bolted together by means of usual keybolts. For this, the keybolts are guided through the bolt holes in the panel and the transportation angle from the inside to the upper panel, with the handle facing upwards, and swung in horizontal position until the handles are located on the inside of the formwork panel. The keybolts should then be in a self-securing position.

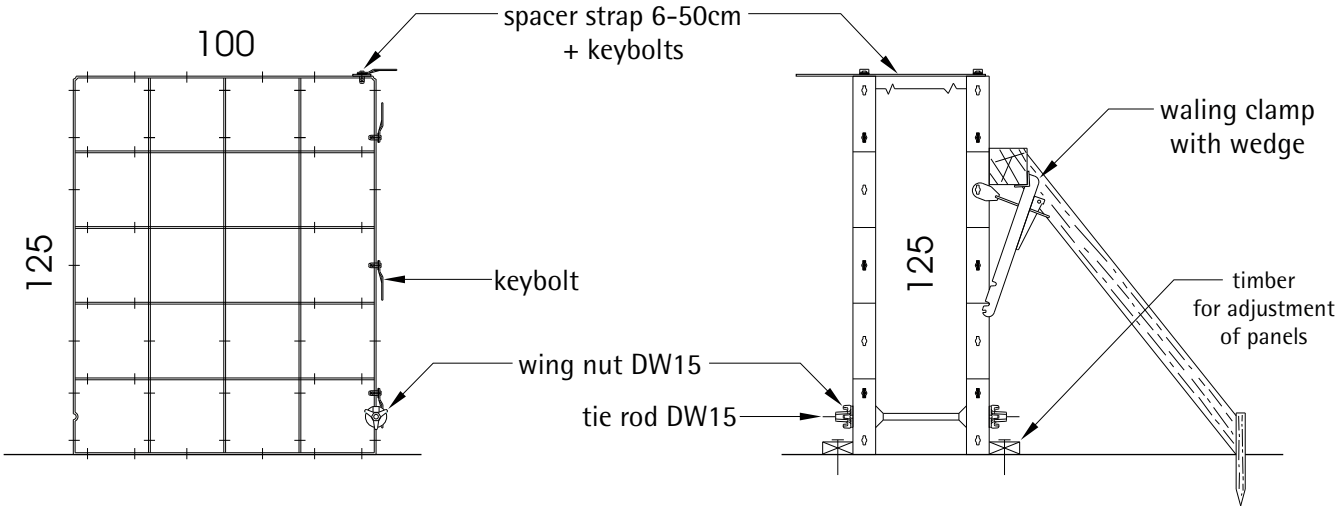
Modular: forming height 62.5cm



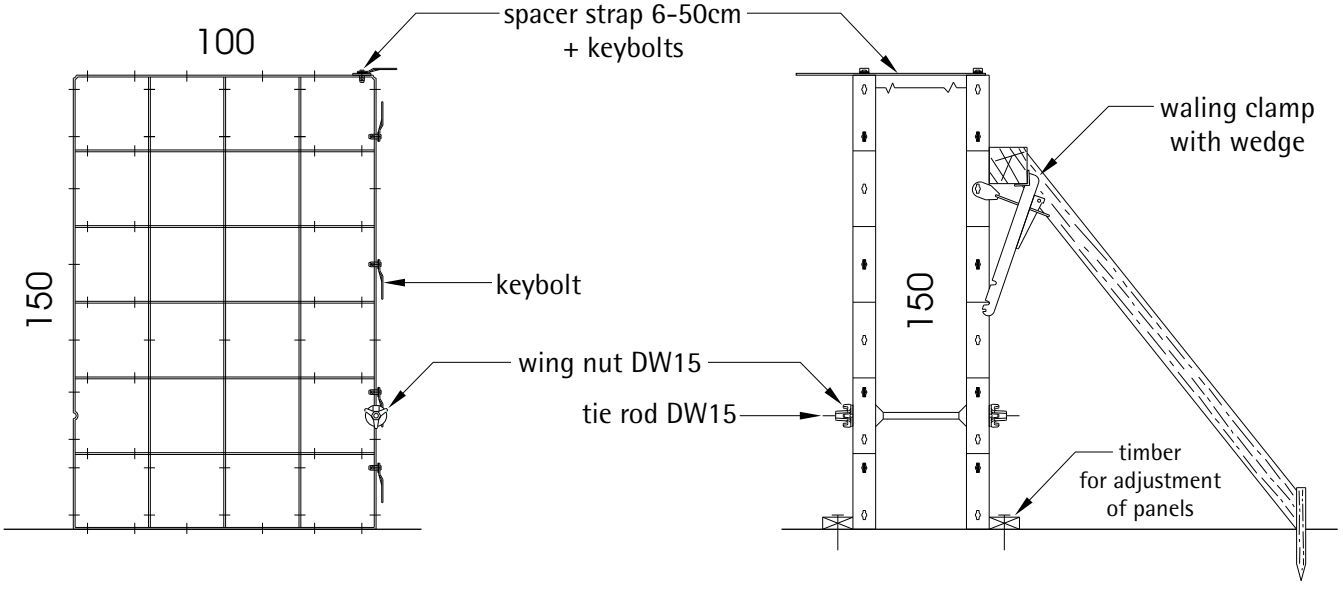
Modular: forming height 75cm



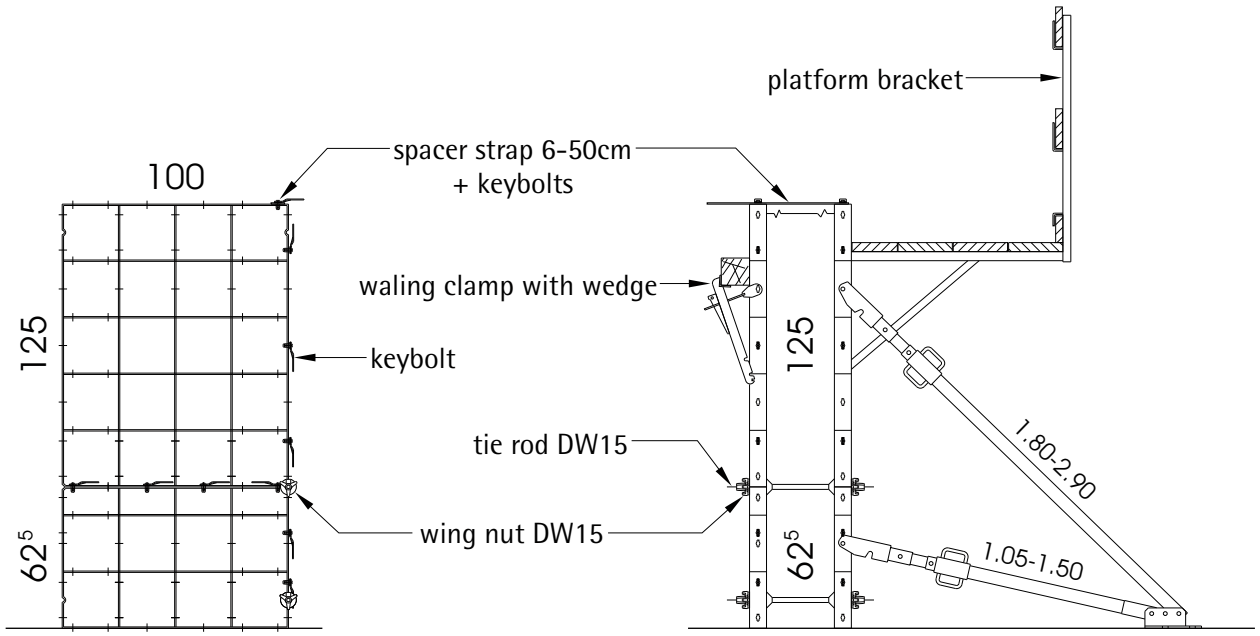
Modular: forming height 125cm



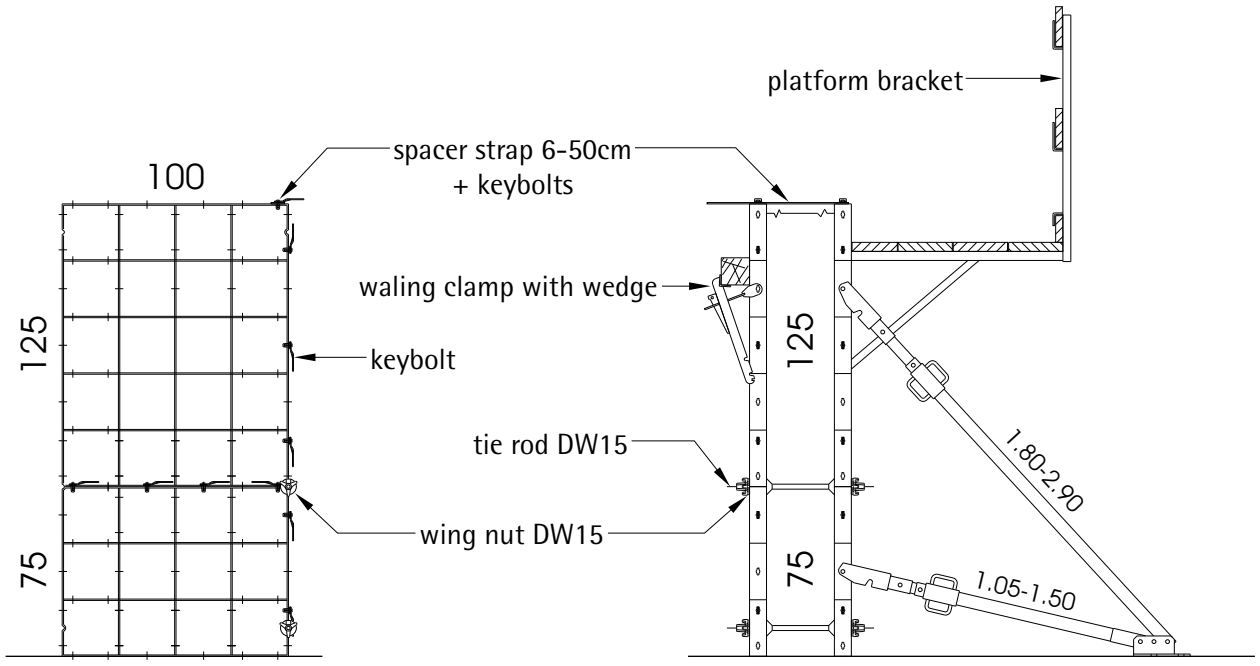
Modular: forming height 150cm



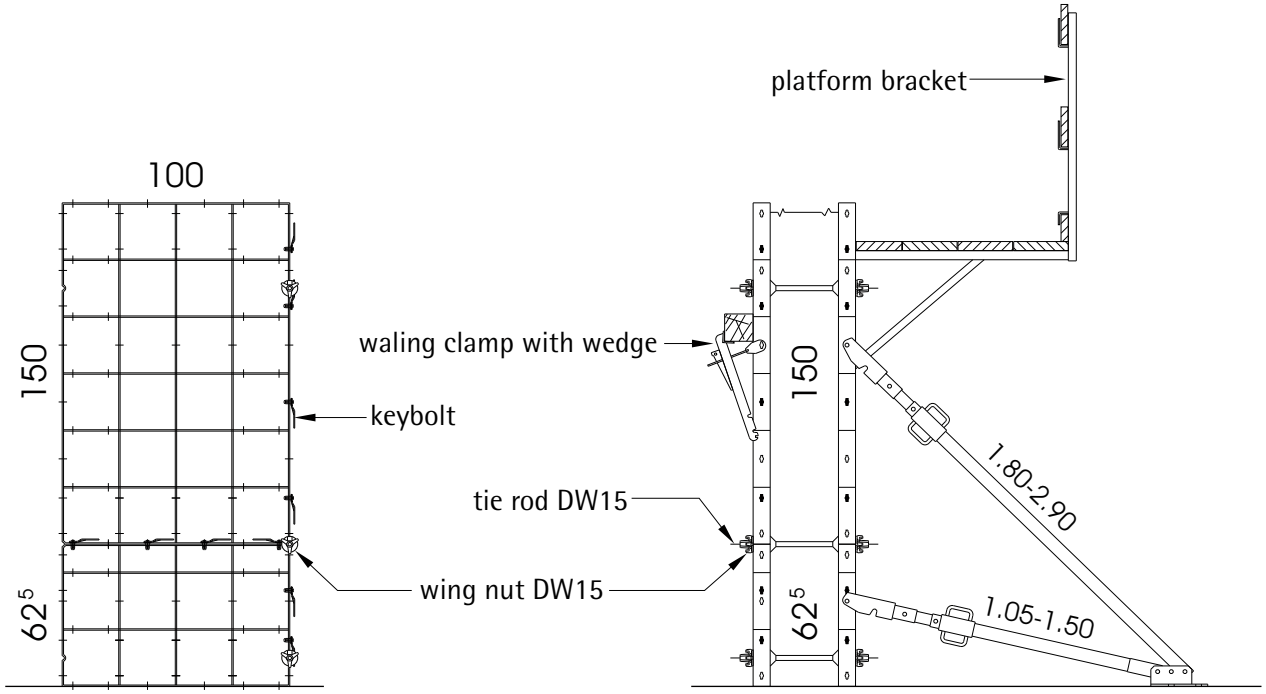
Modular: forming height 187.5cm



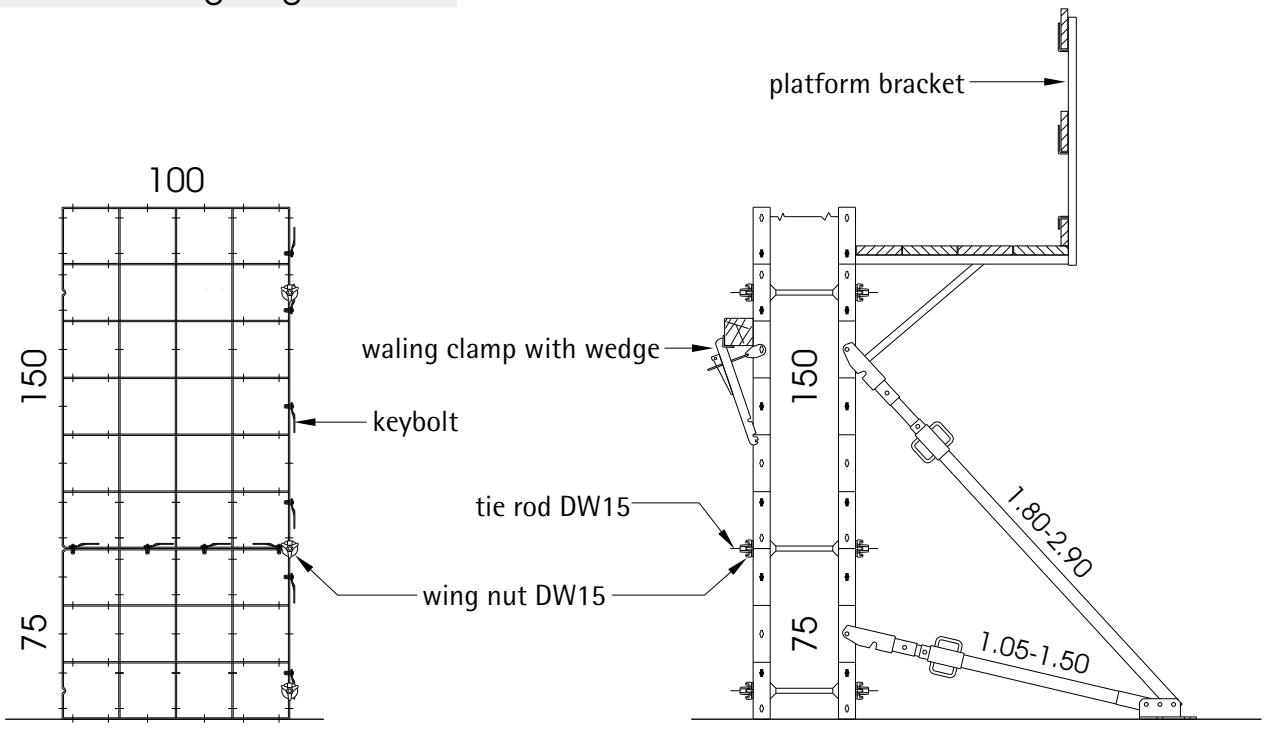
Modular: forming height 200cm



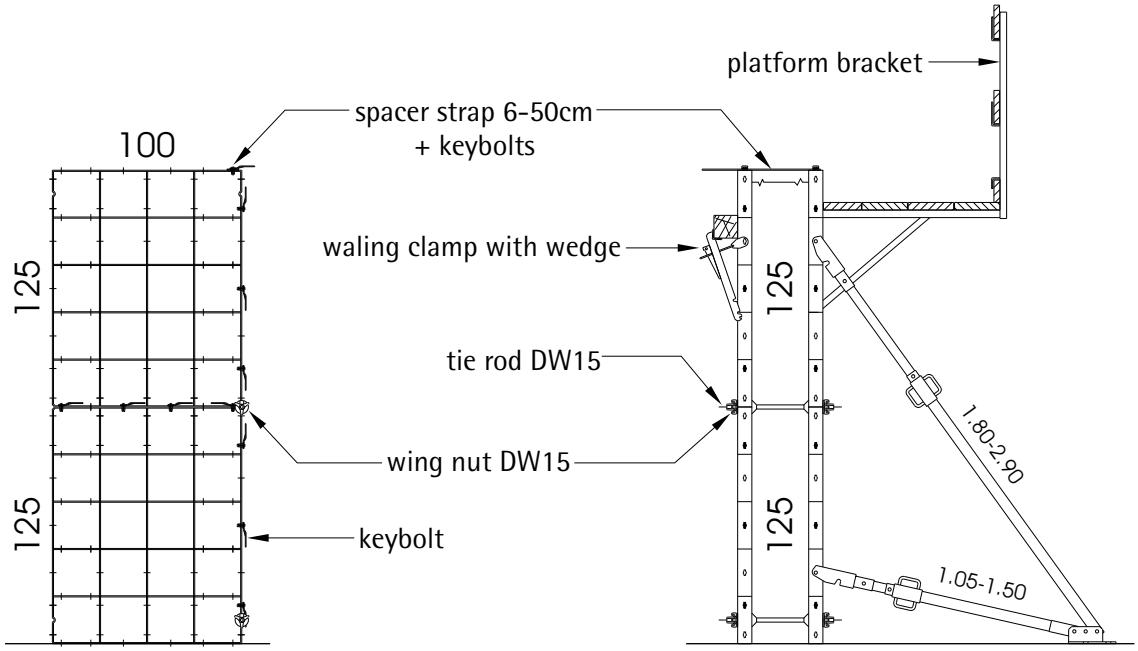
Modular: forming height 212.5cm



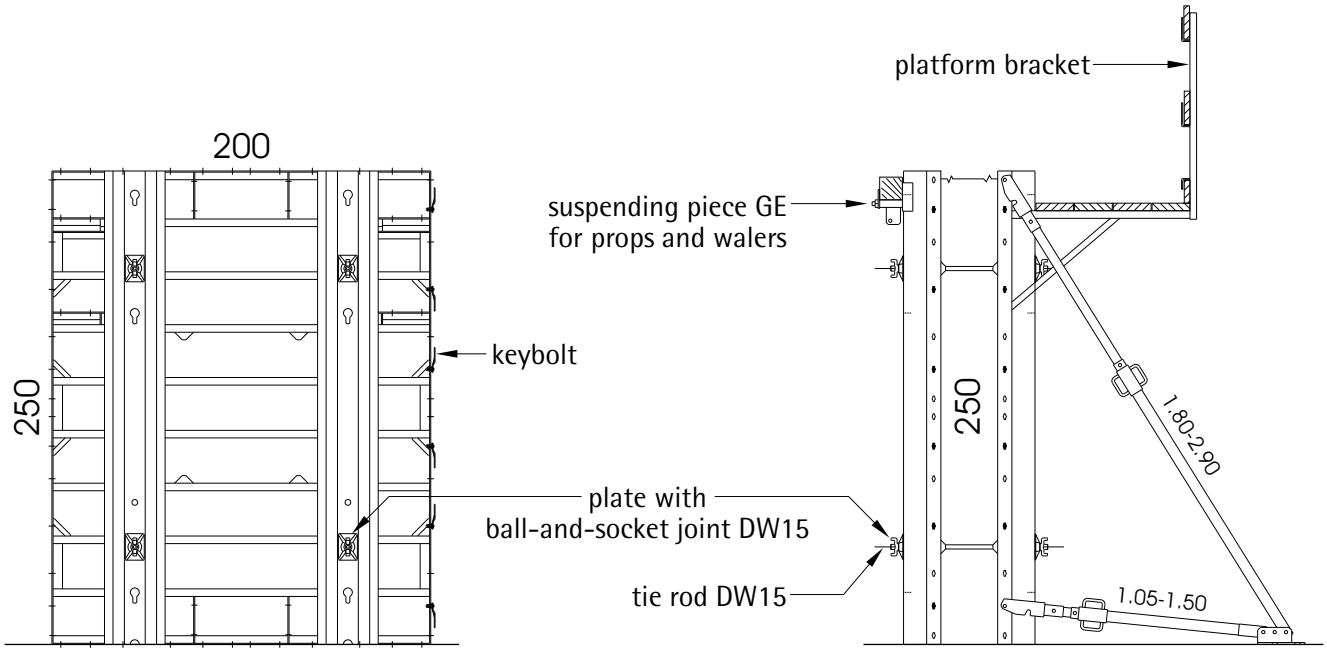
Modular: forming height 200cm



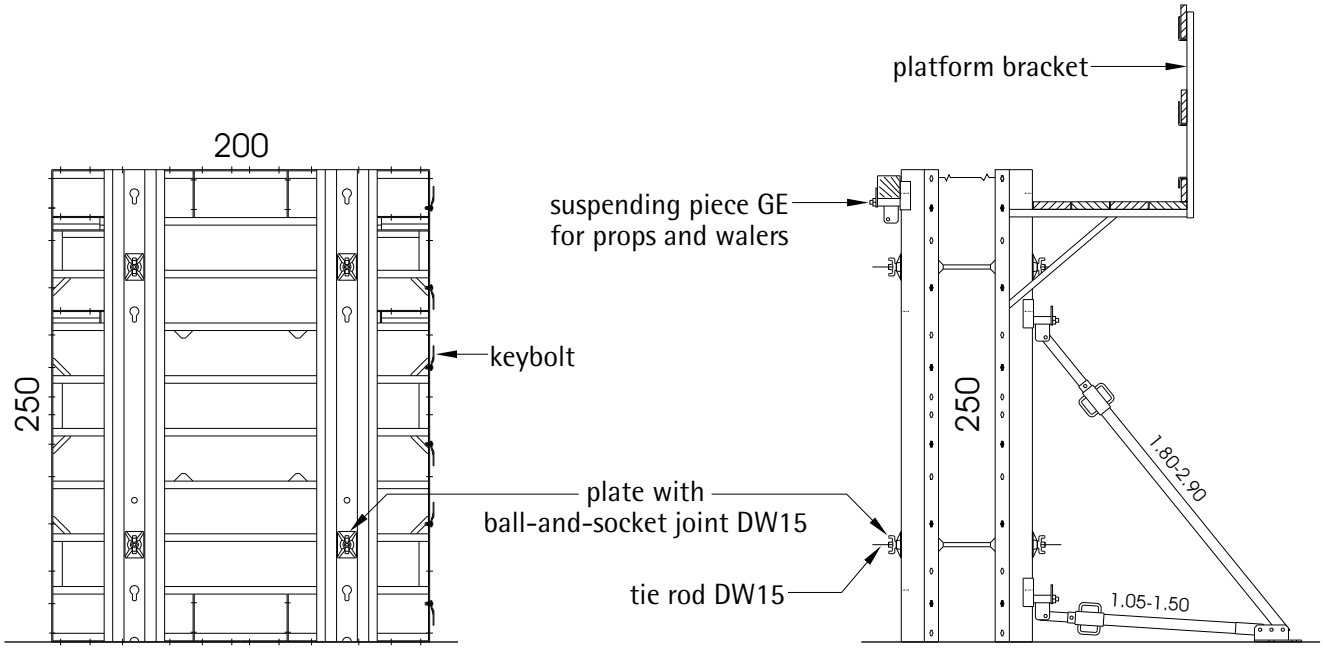
Modular: forming height 250cm



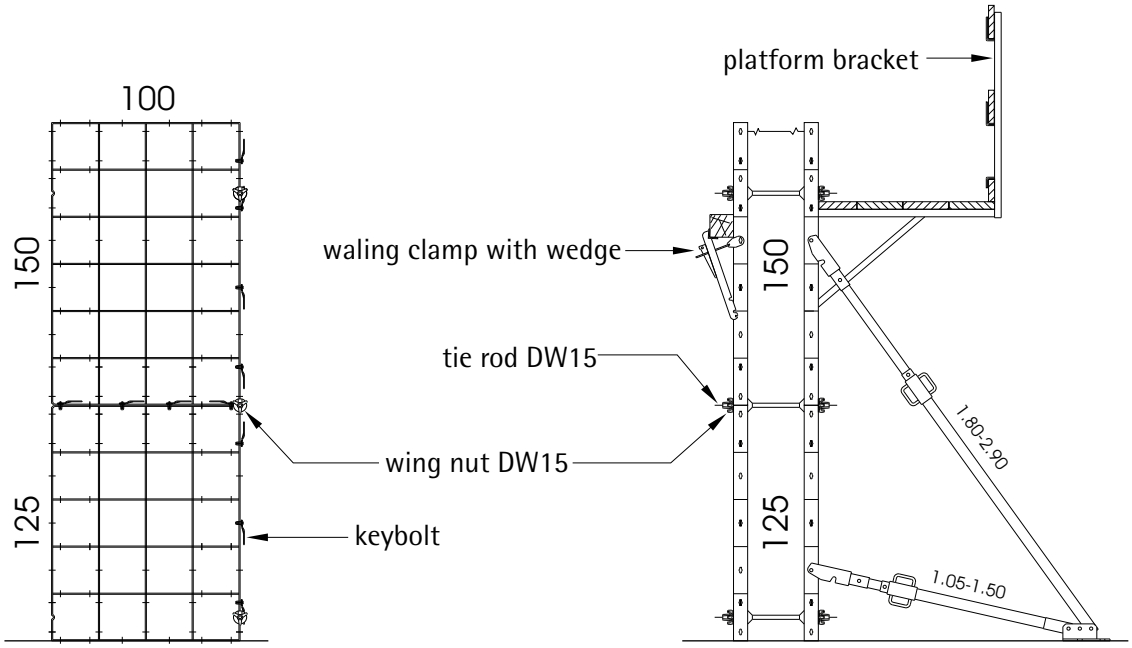
GE-panels: forming height 250cm



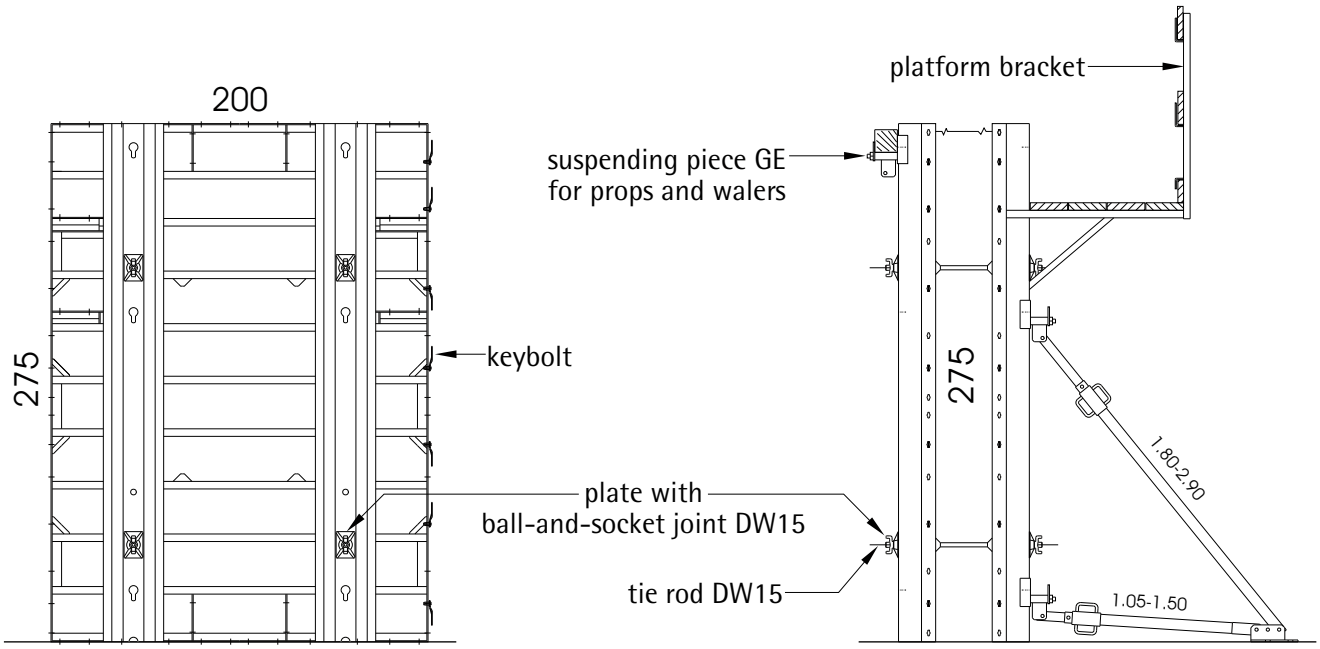
GE-panels: forming height 250cm



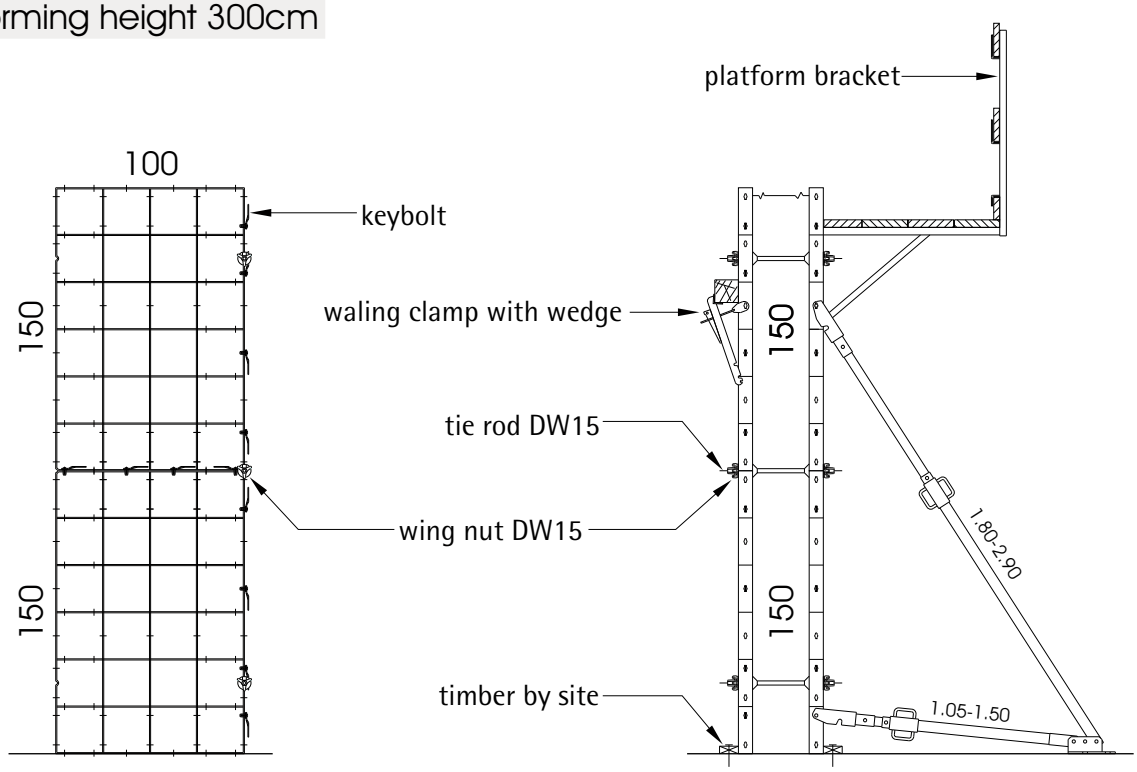
Modular: forming height 275cm



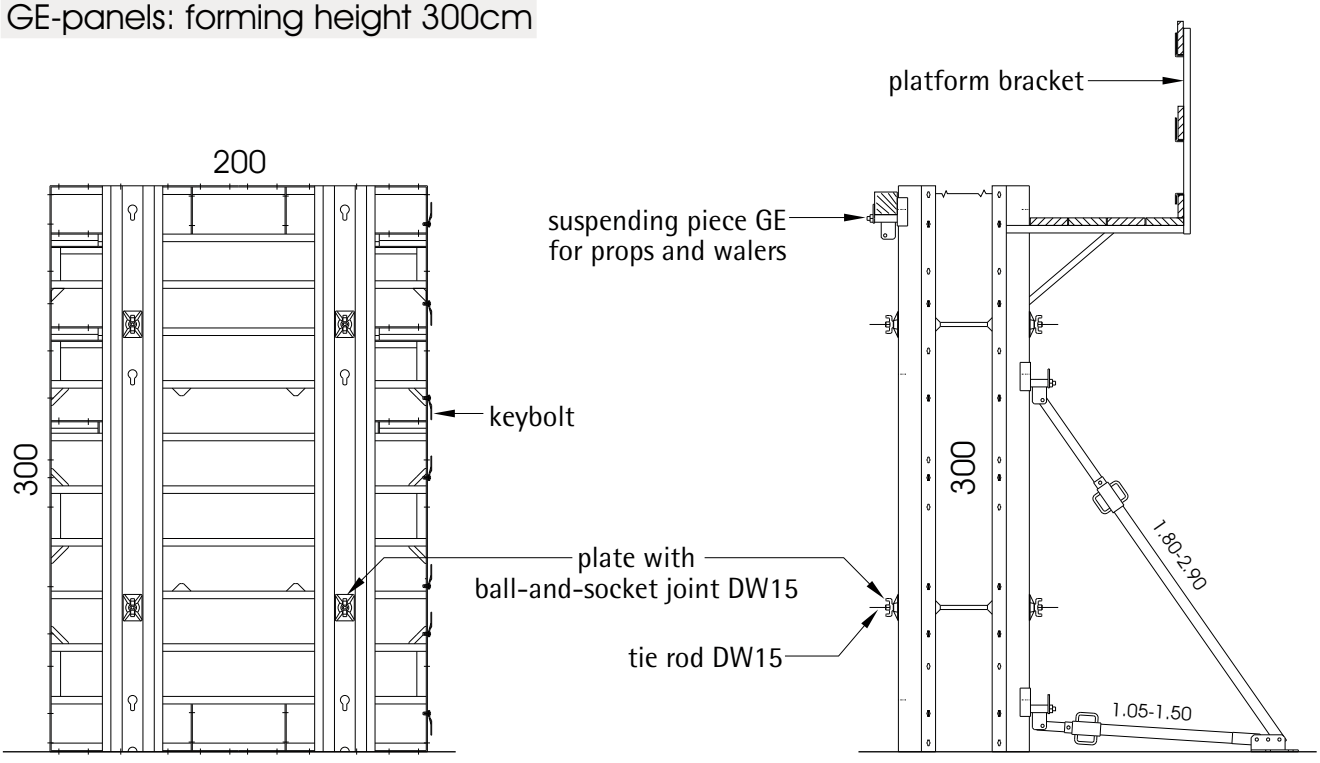
GE-panels: forming height 275cm



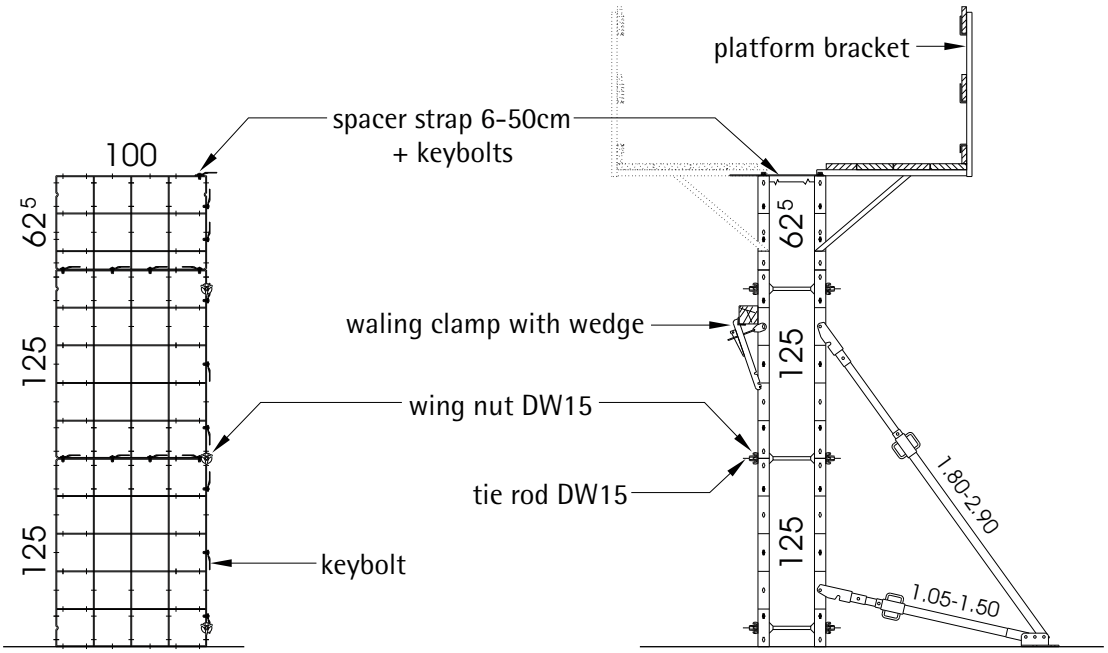
Modular: forming height 300cm



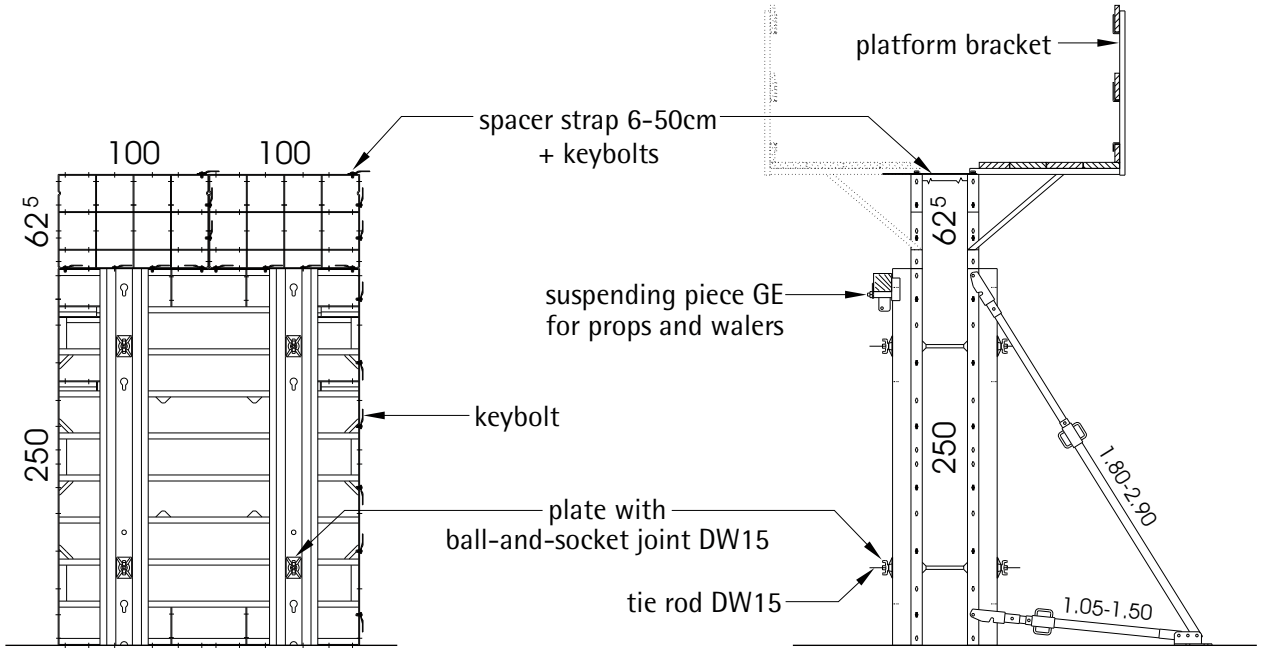
GE-panels: forming height 300cm



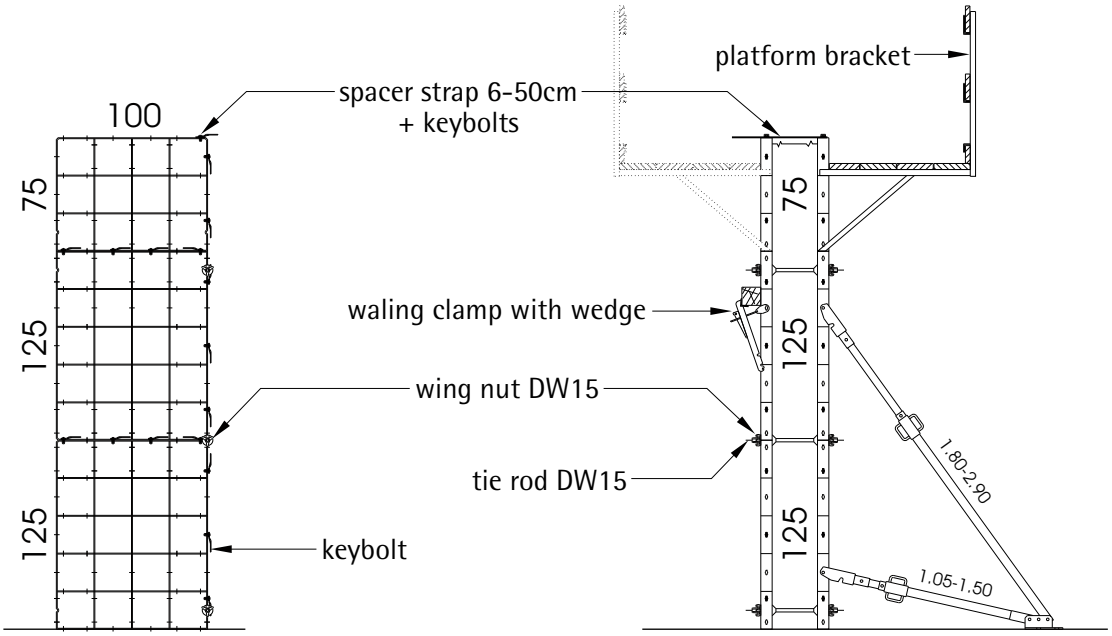
Modular: forming height 312.5cm



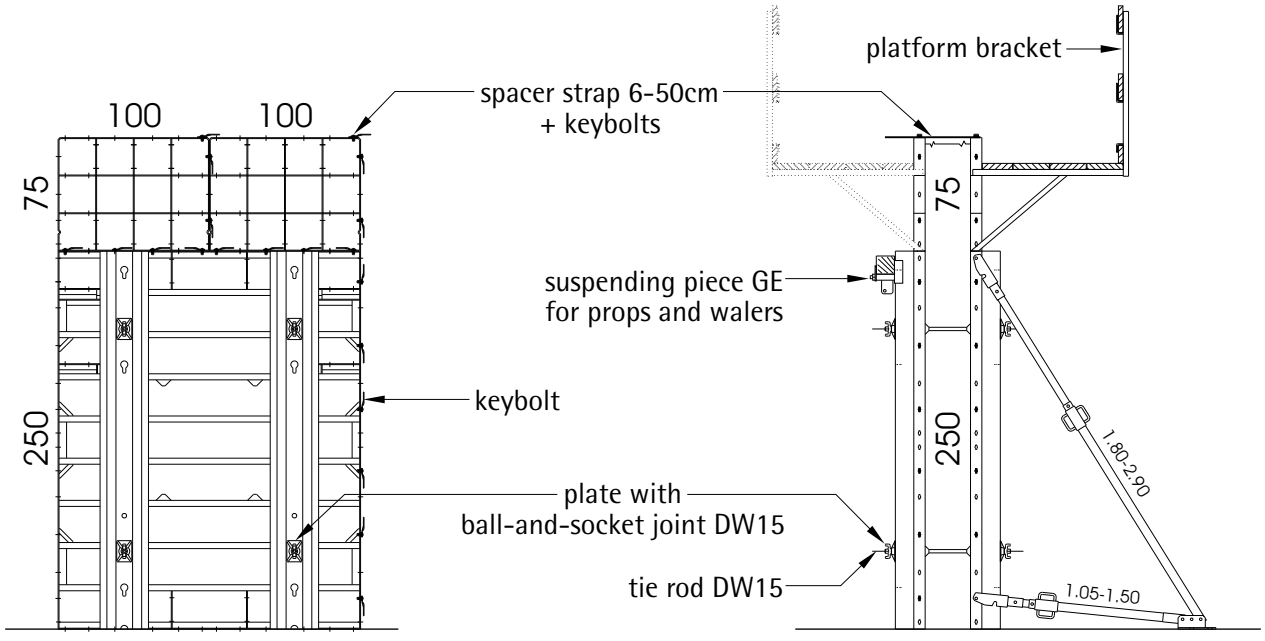
GE+Modular: forming height 312.5cm



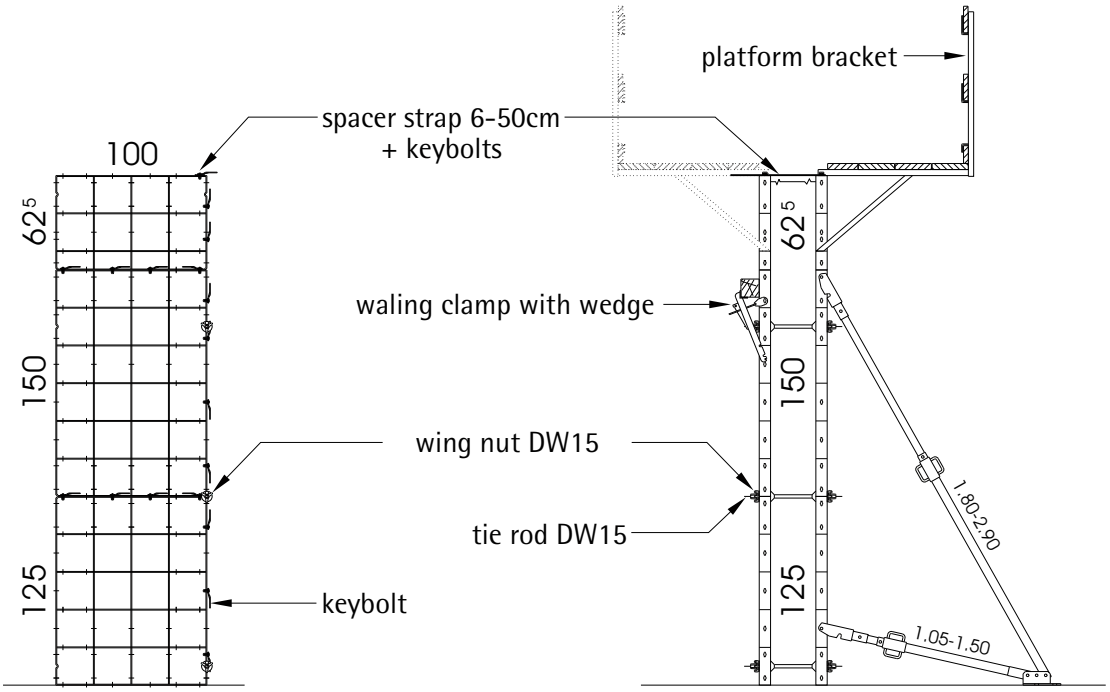
Modular: forming height 325cm



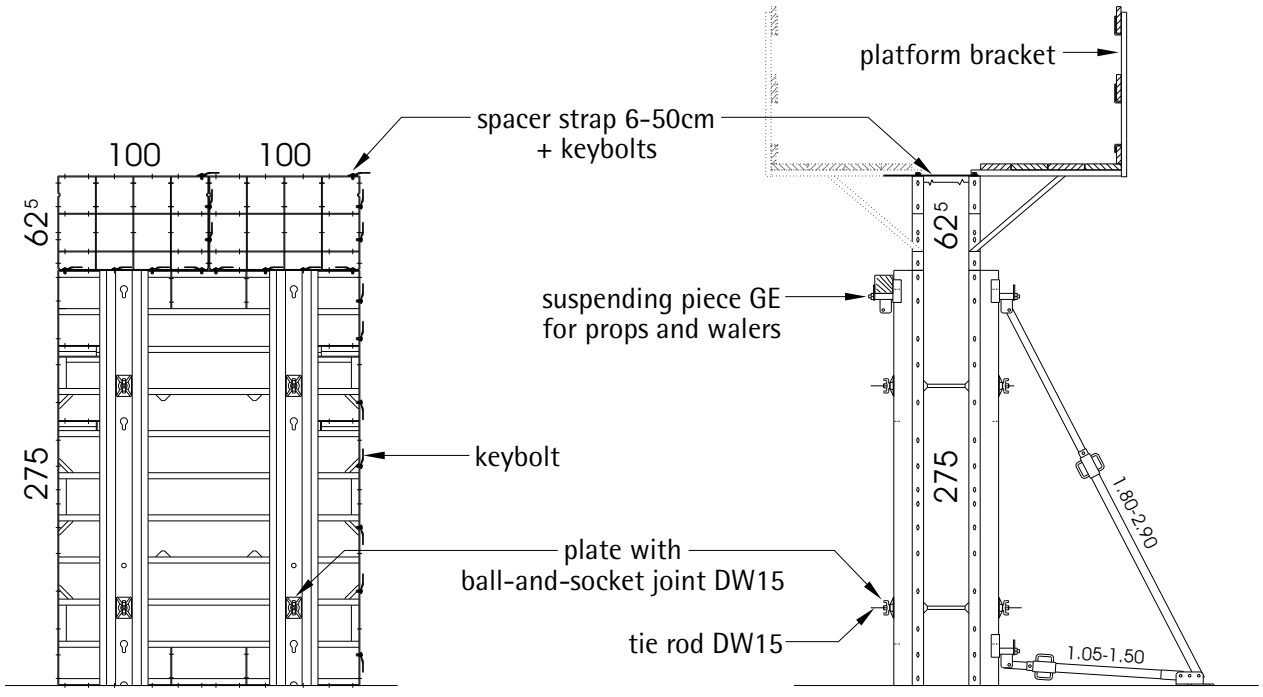
GE+Modular: forming height 325cm



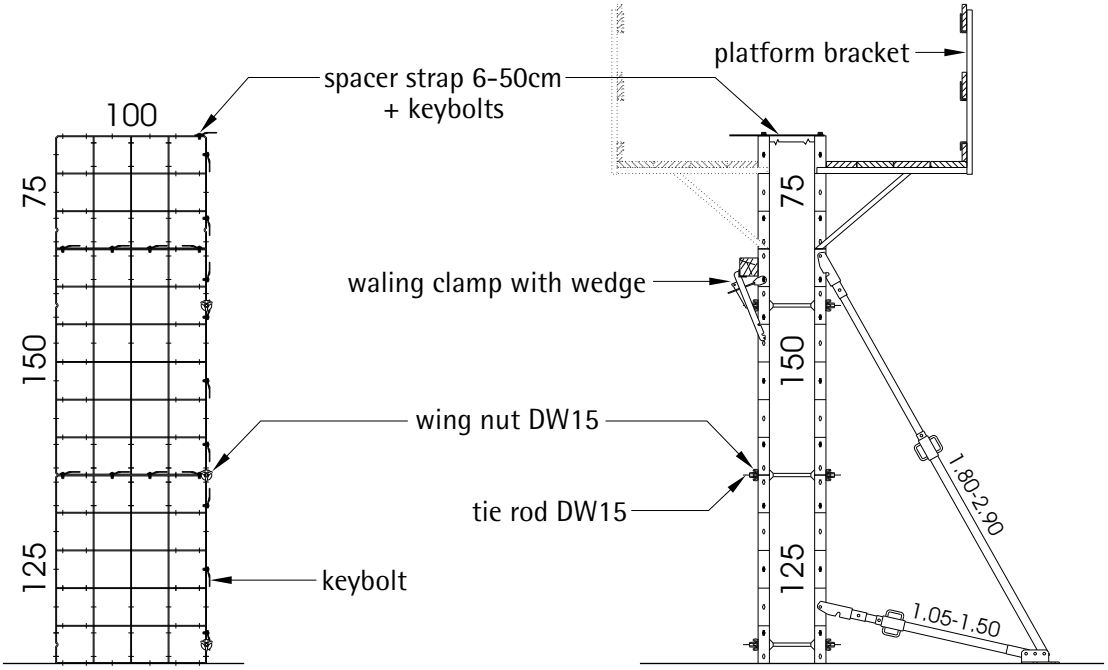
Modular: forming height 337.5cm



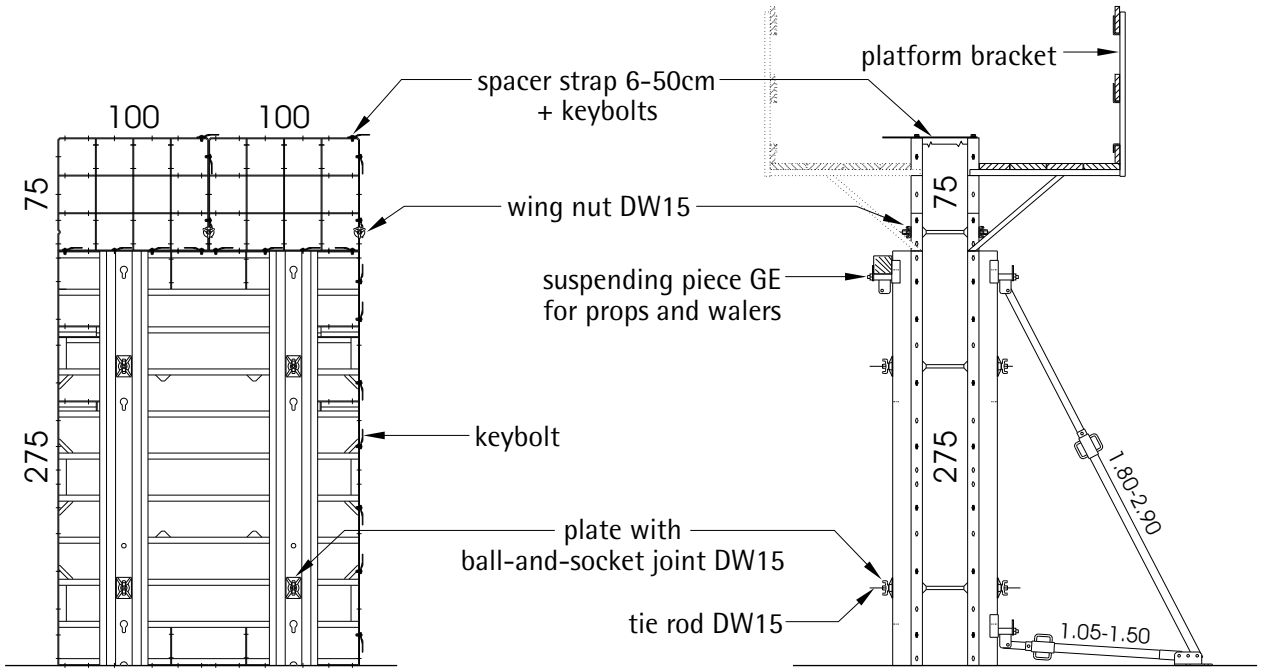
GE+Modular: forming height 337.5cm



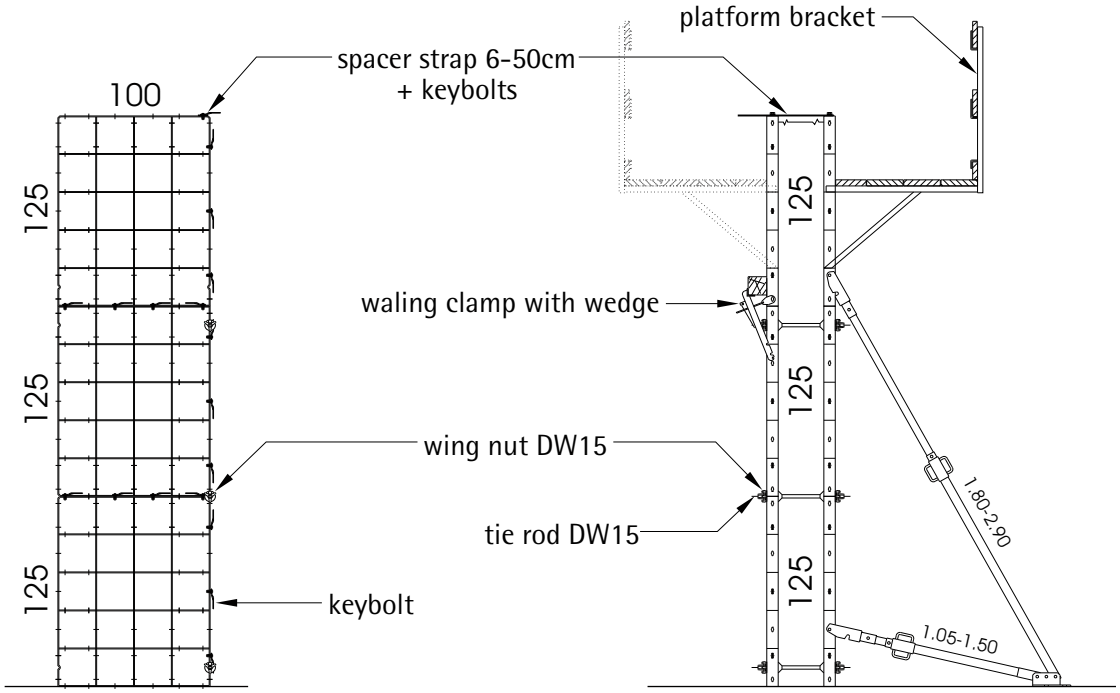
Modular: forming height 350cm



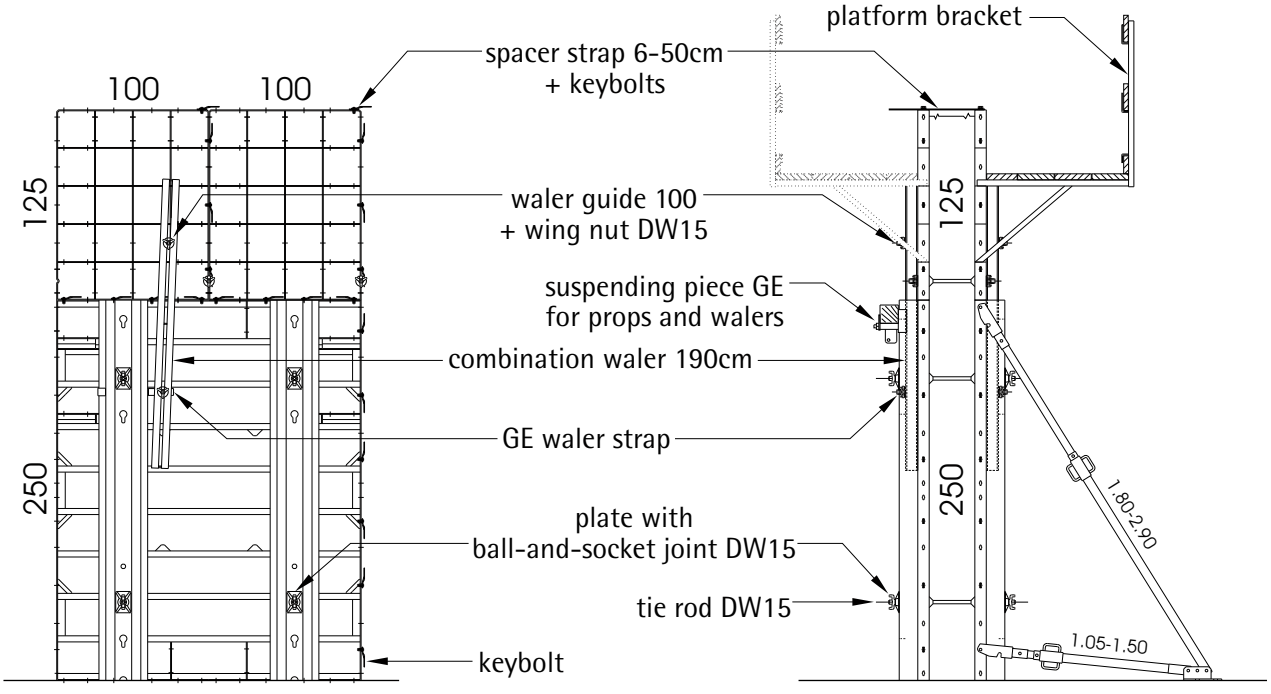
GE+Modular: forming height 350cm



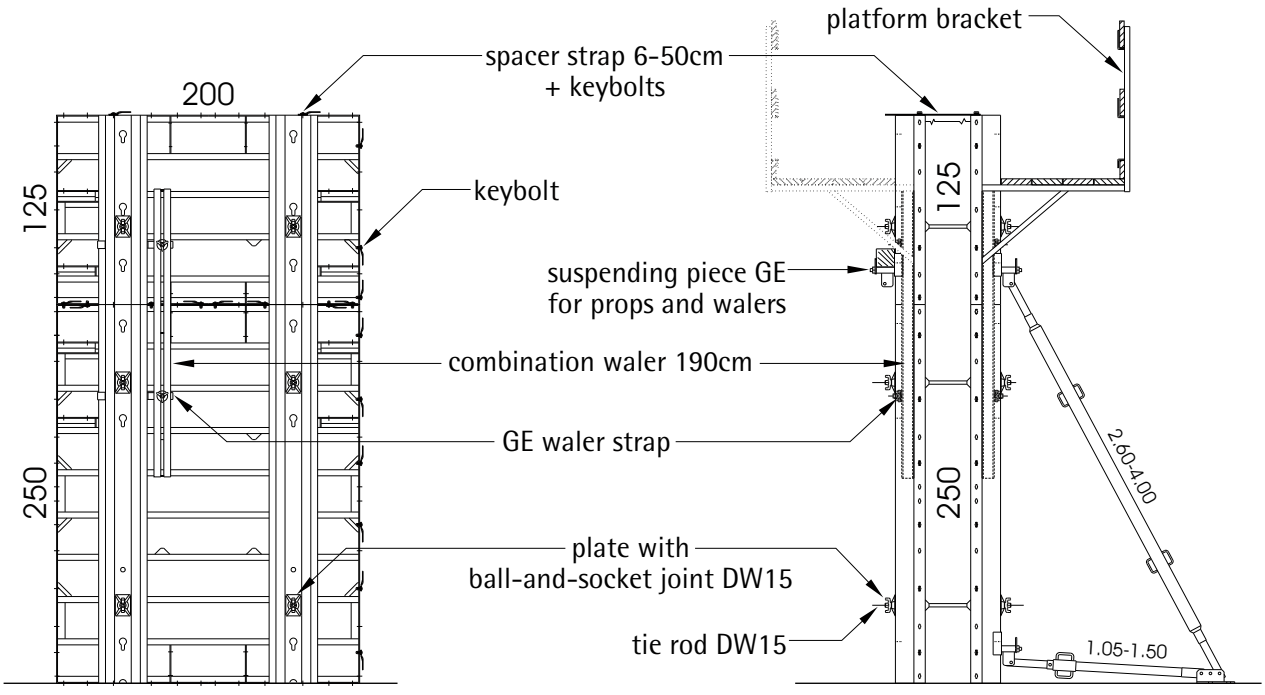
Modular: forming height 375cm



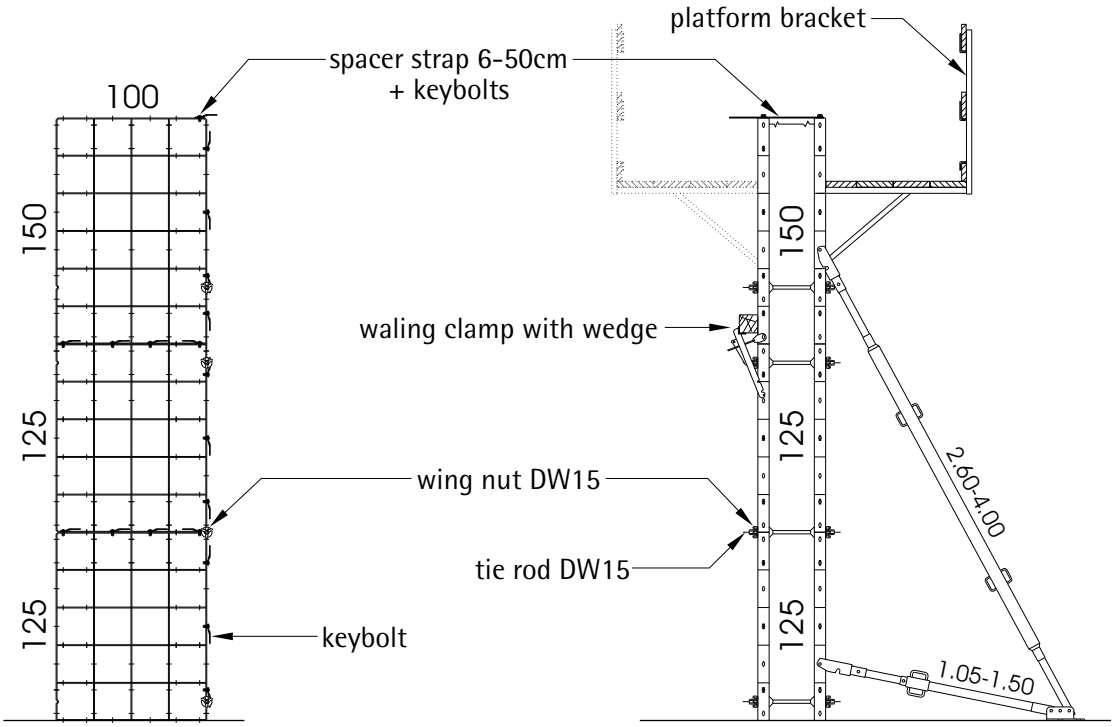
GE+Modular: forming height 375cm



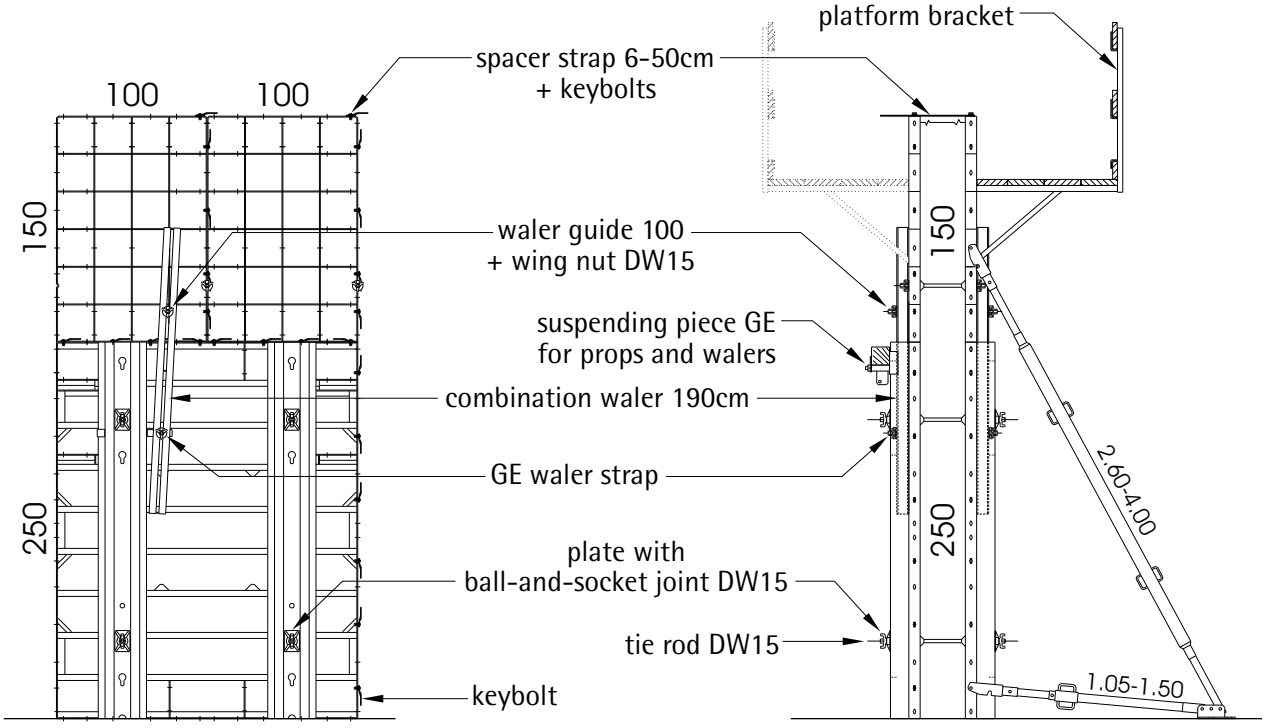
GE-panels: forming height 375cm



Modular: forming height 400cm



GE+Modular: forming height 400cm



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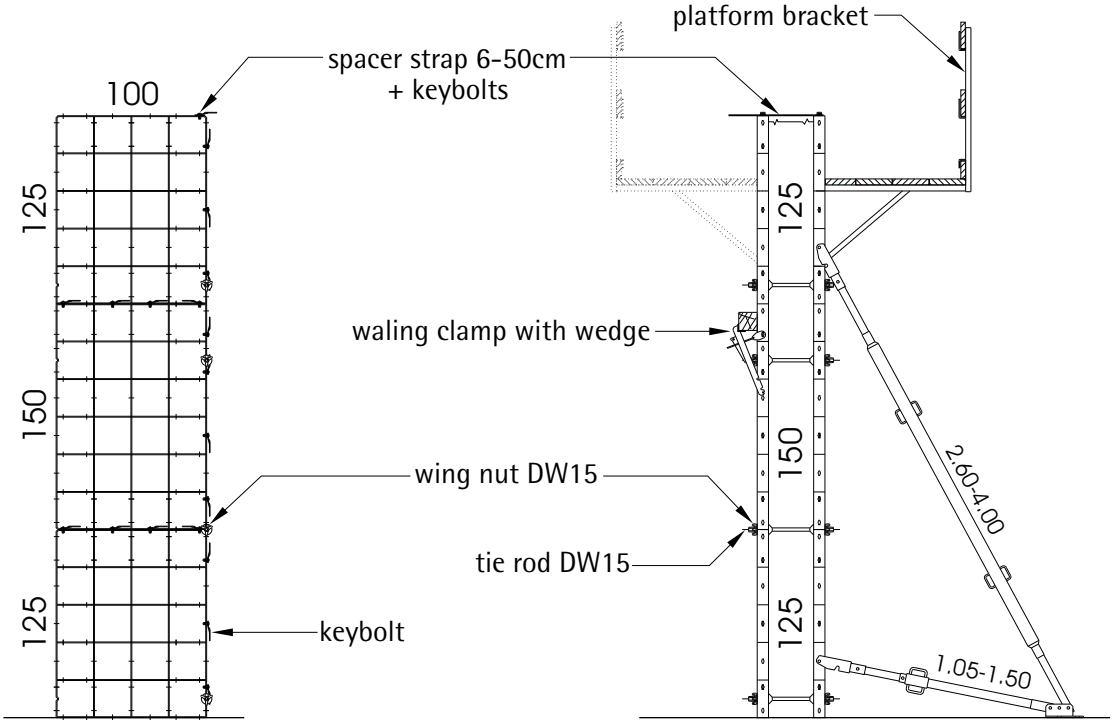
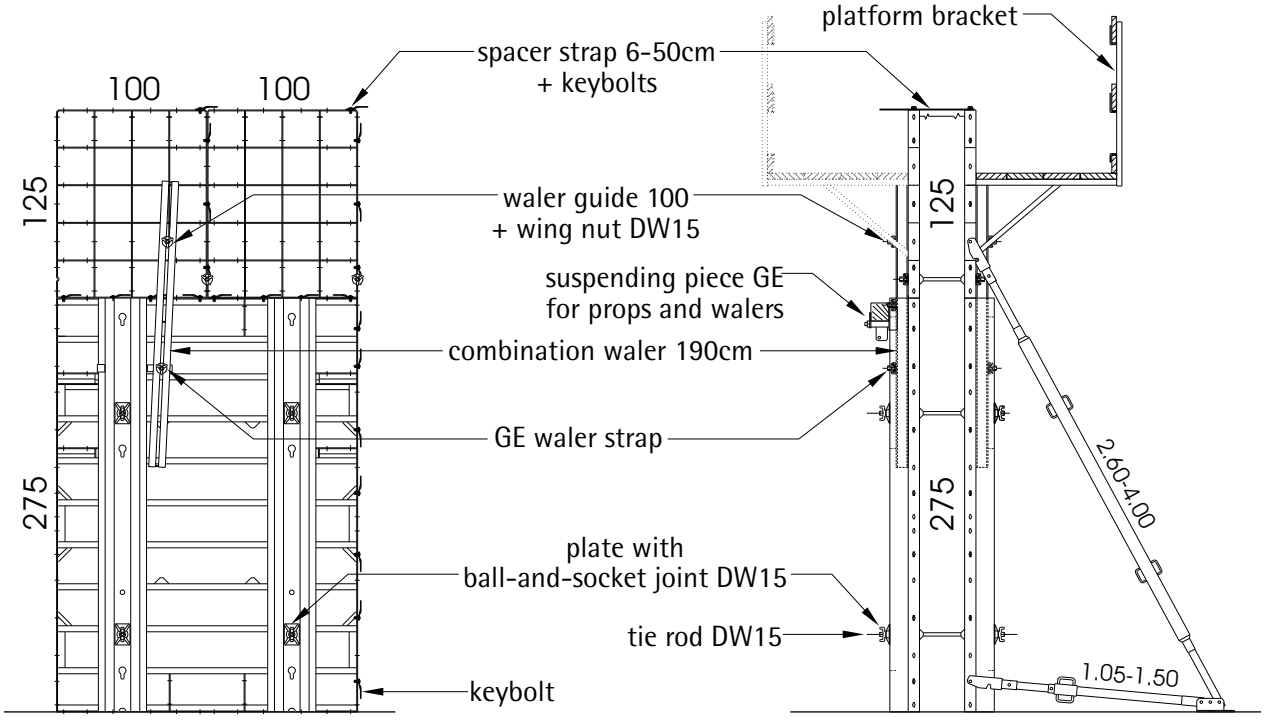
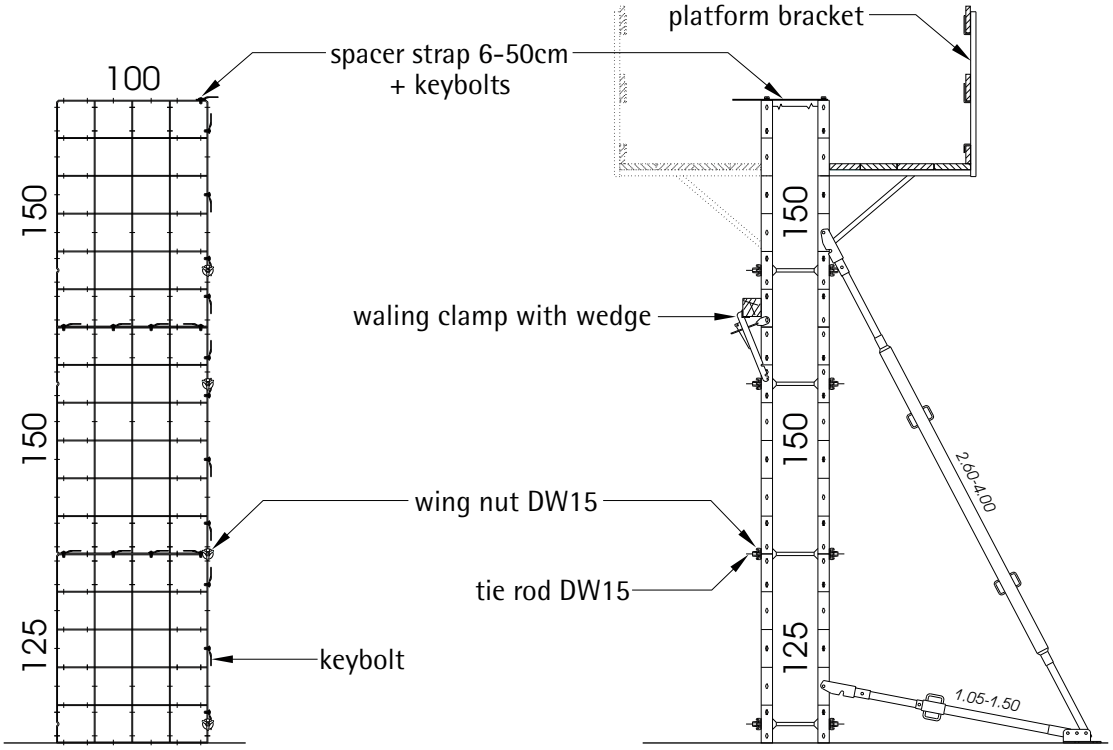


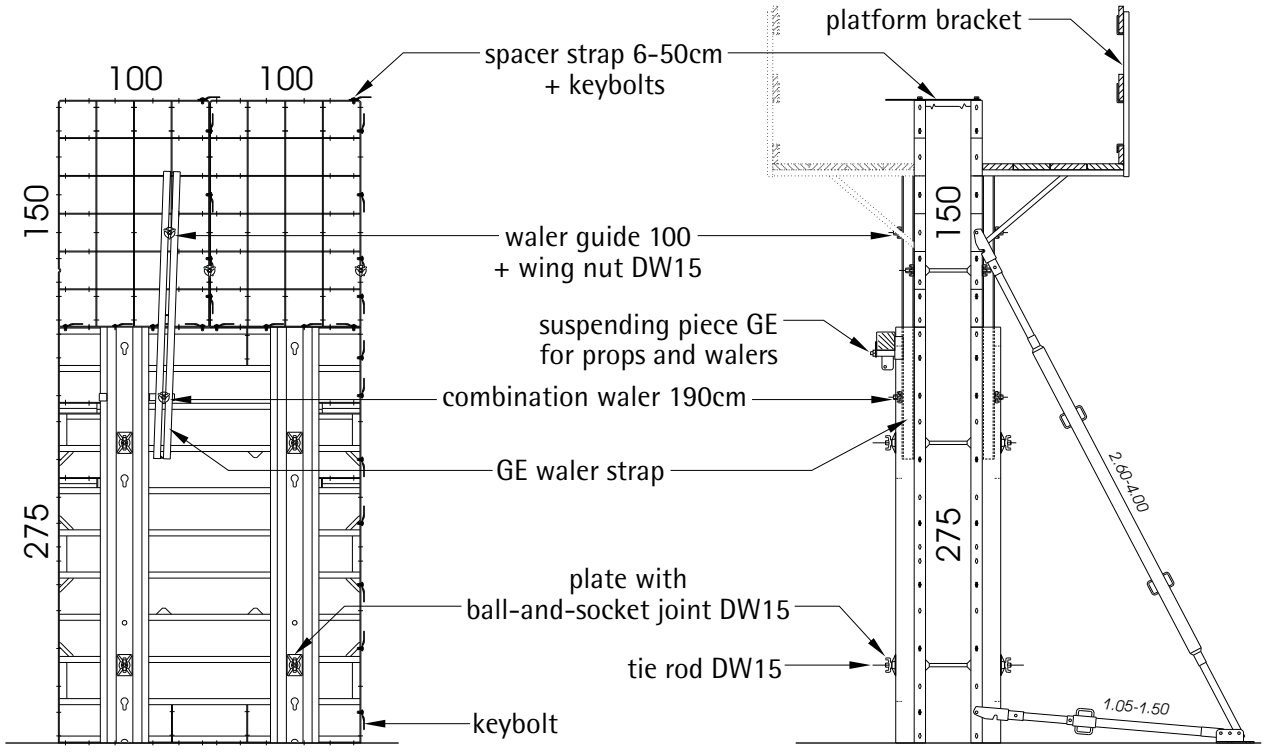
GE+Modular: forming height 400cm



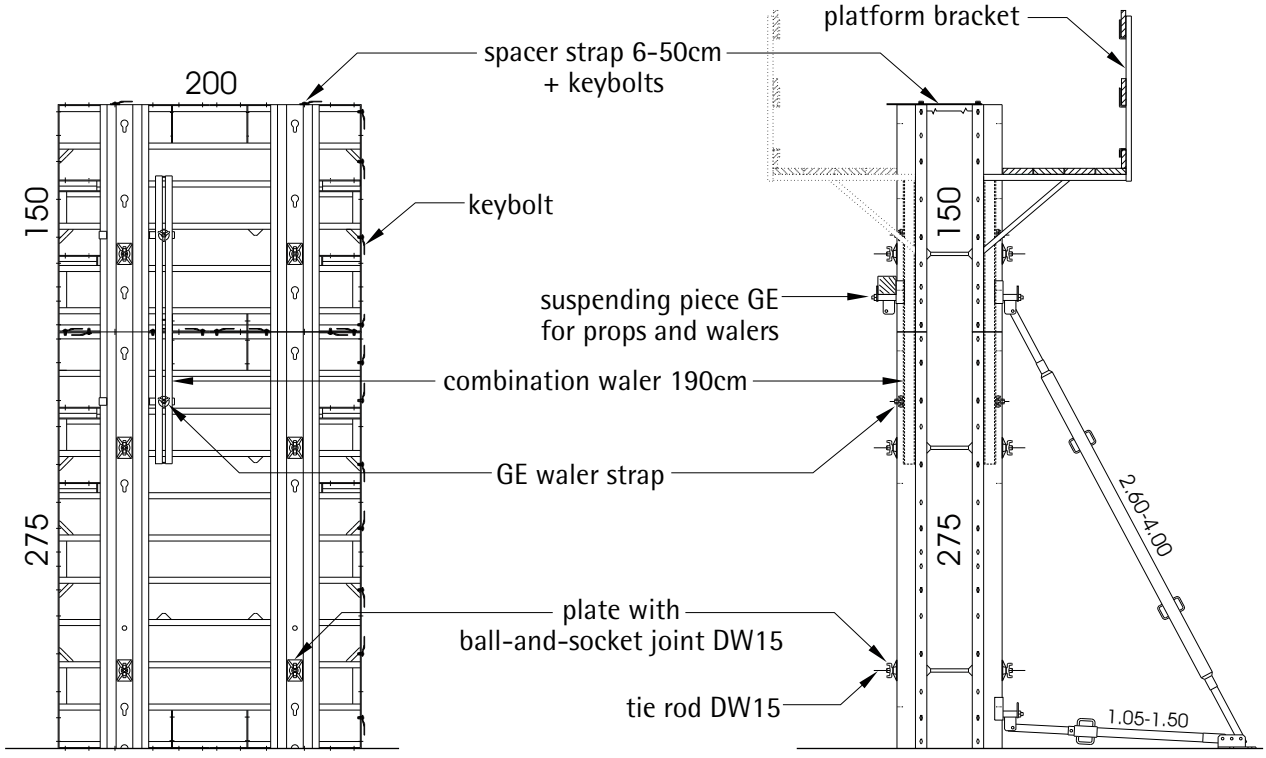
Modular: forming height 425cm



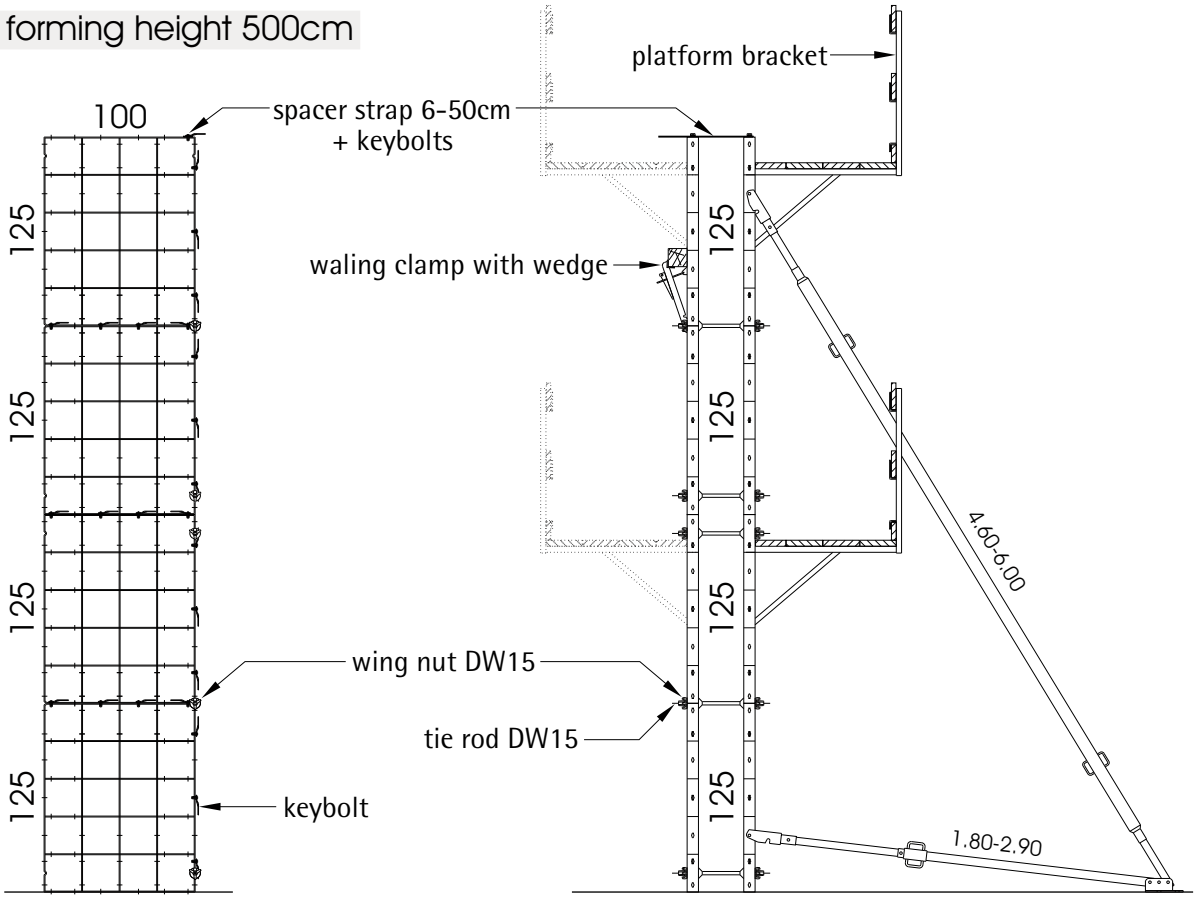
GE+Modular: forming height 425cm



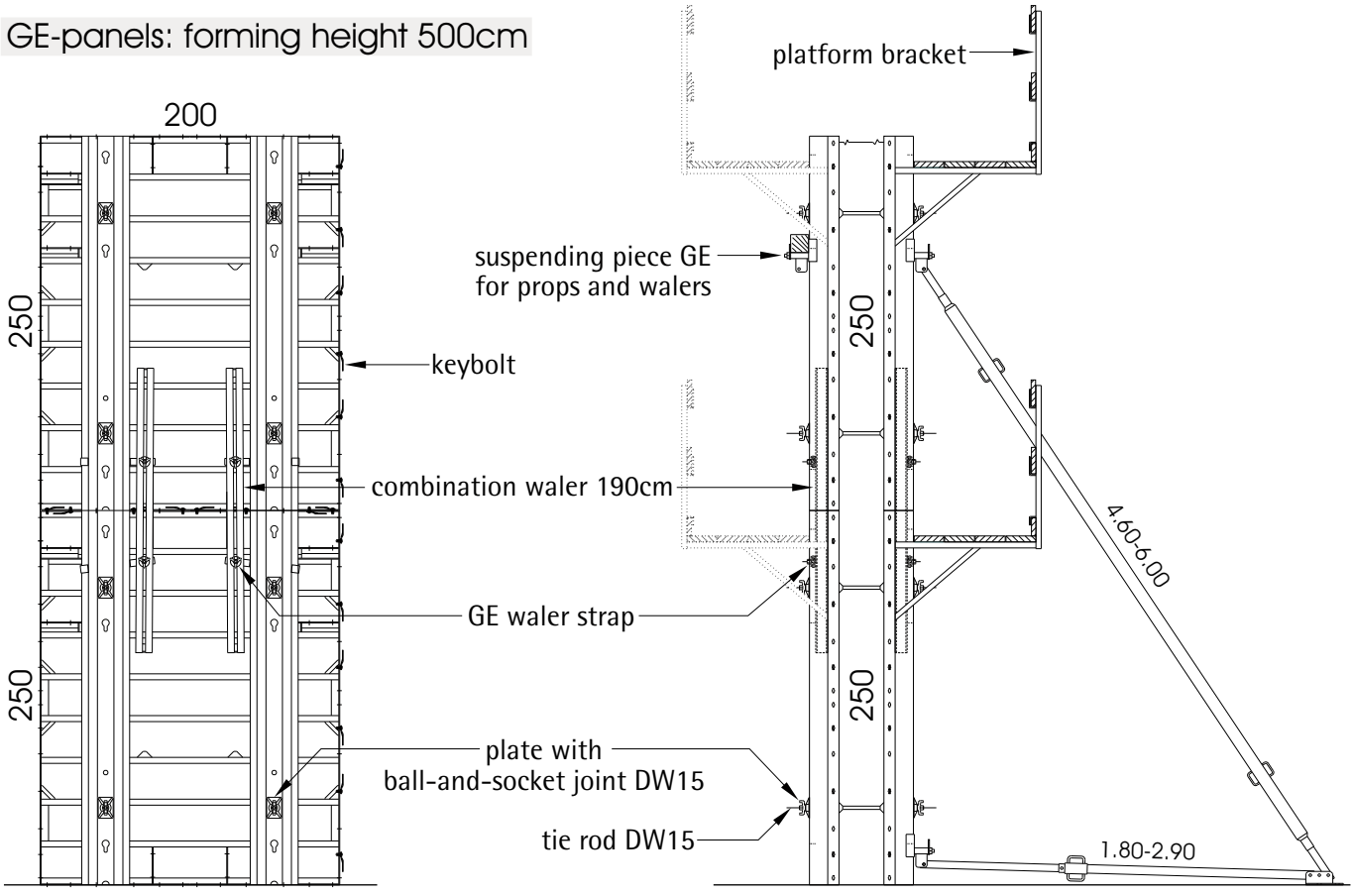
GE-panels: forming height 425cm



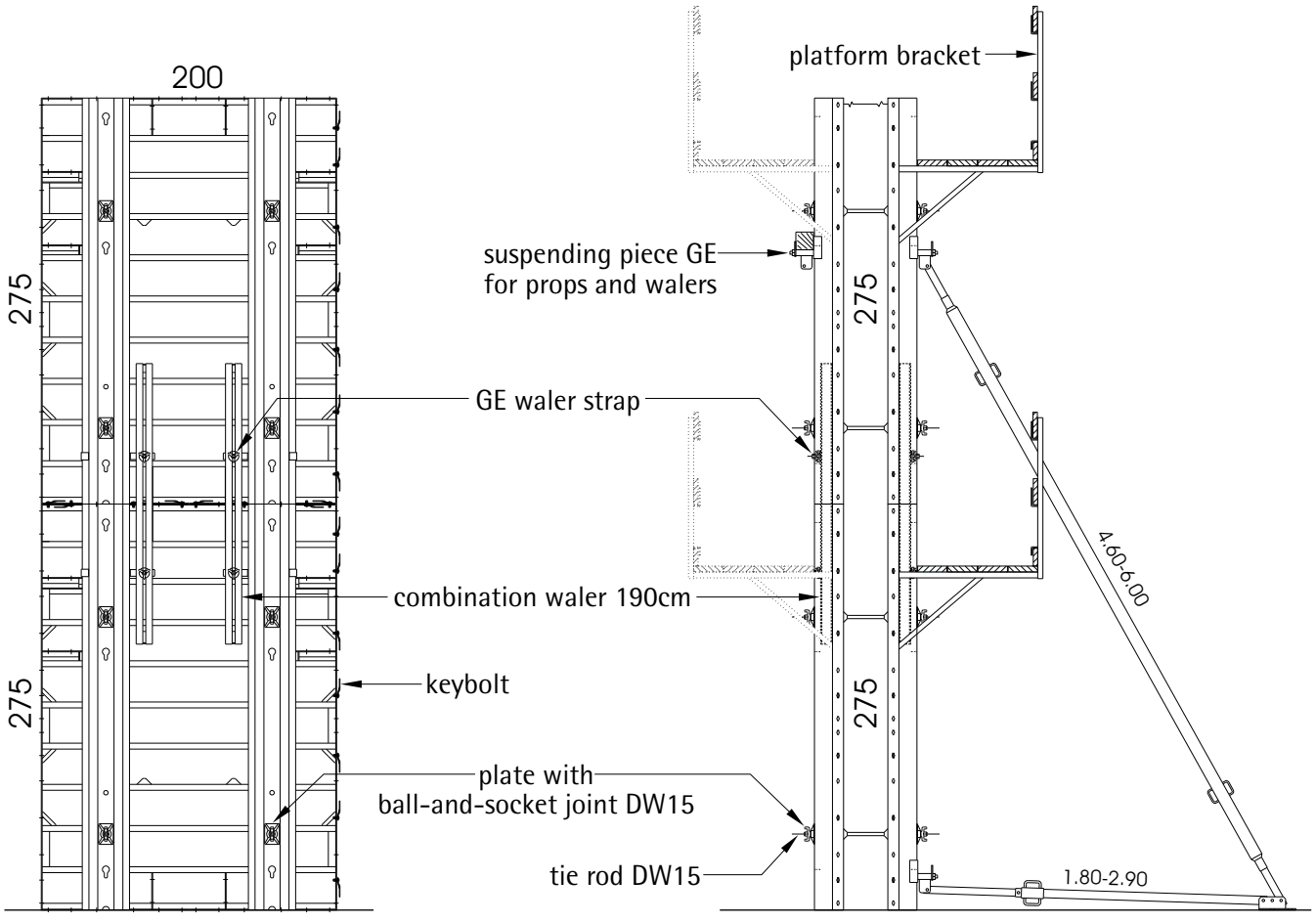
Modular: forming height 500cm



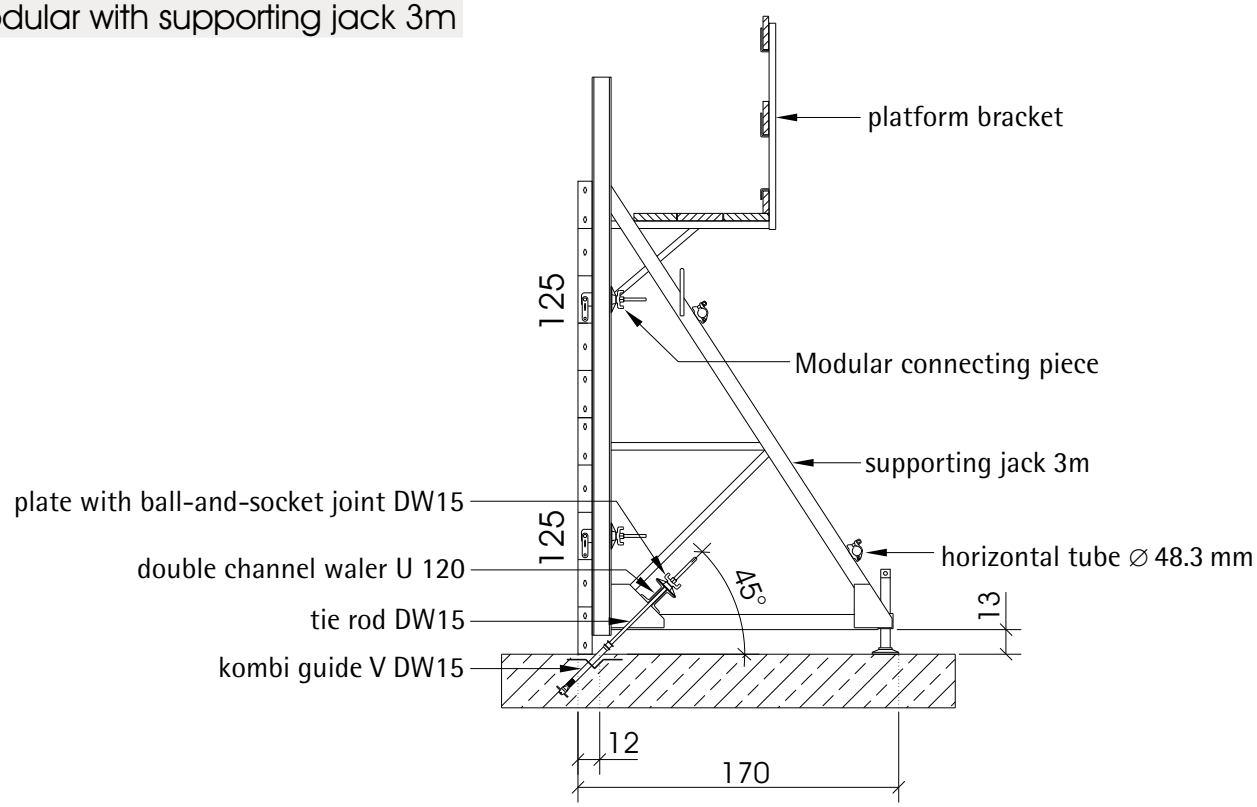
GE-panels: forming height 500cm



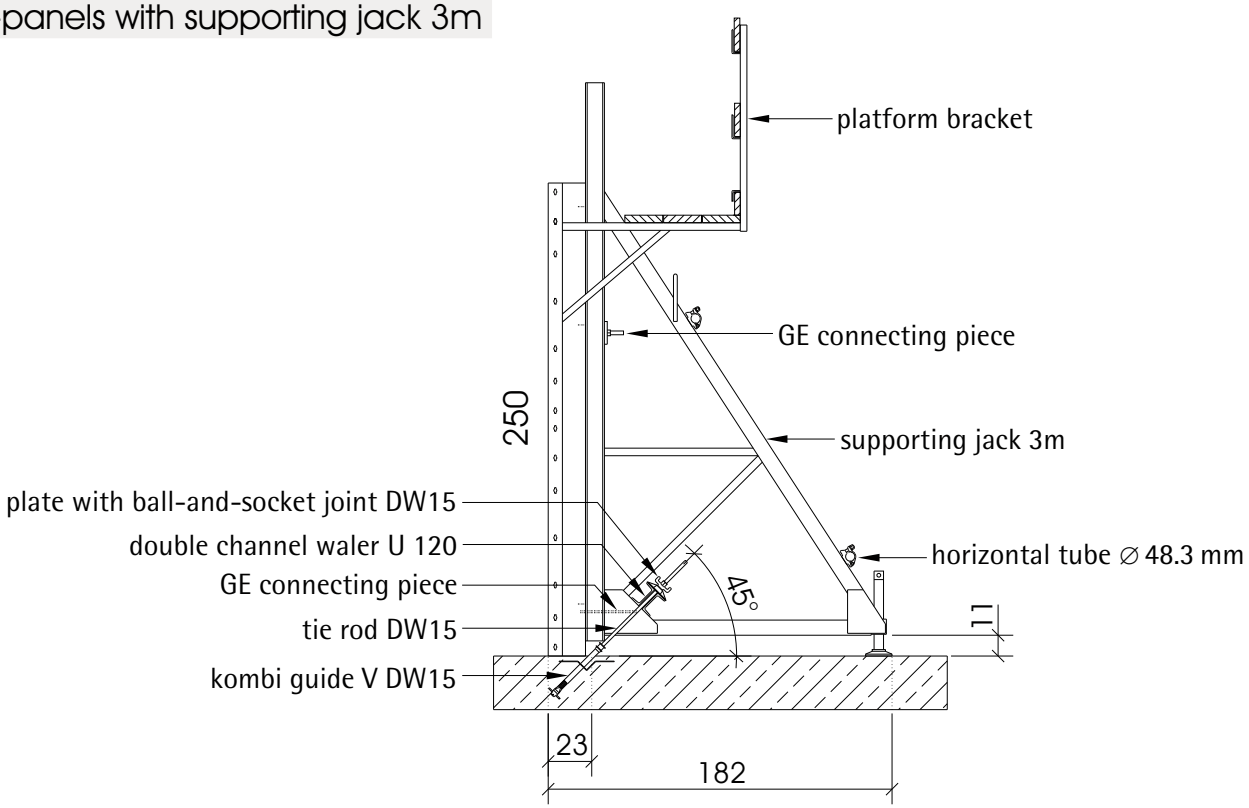
GE-panels: forming height 550cm



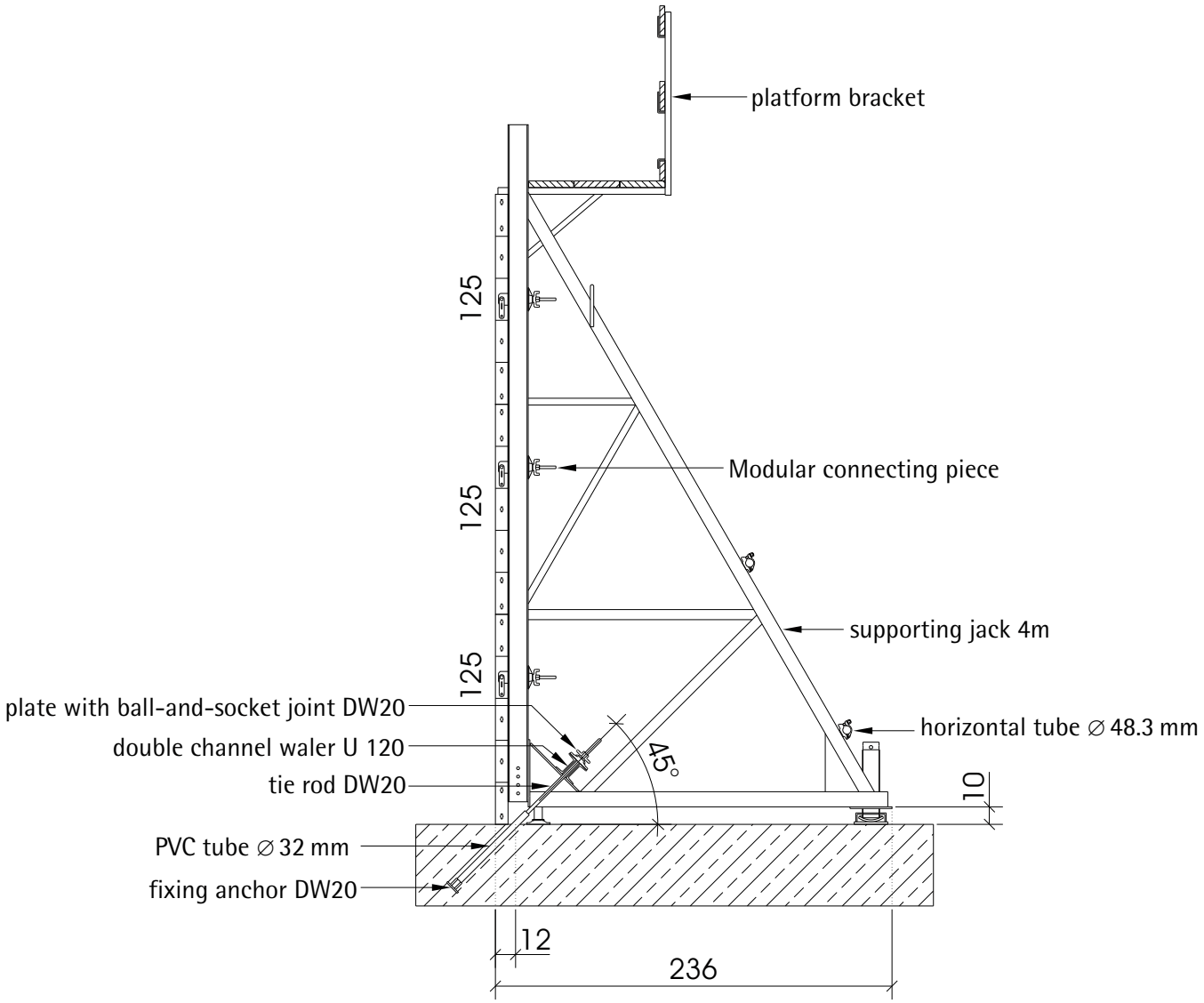
Modular with supporting jack 3m



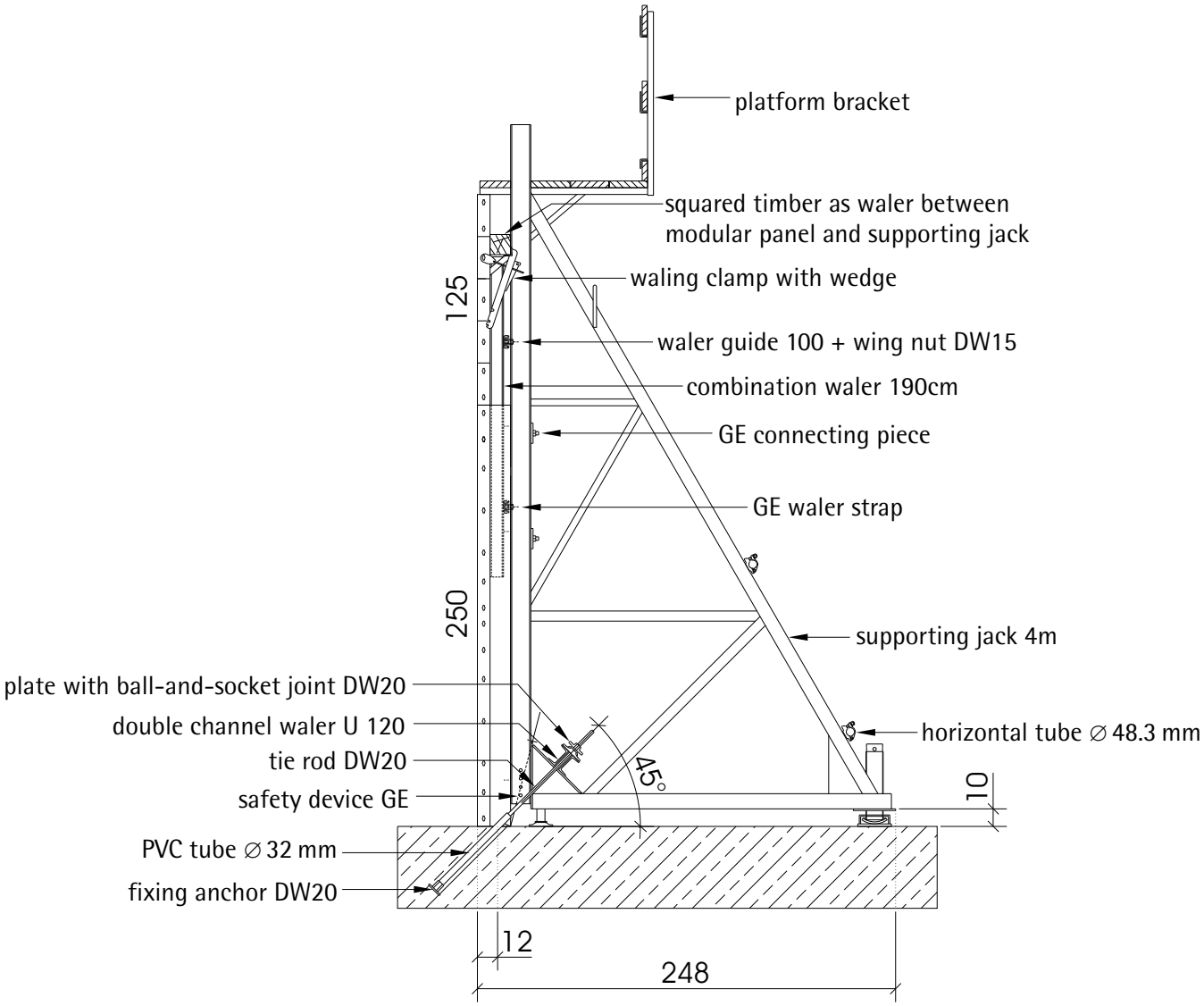
GE-panels with supporting jack 3m



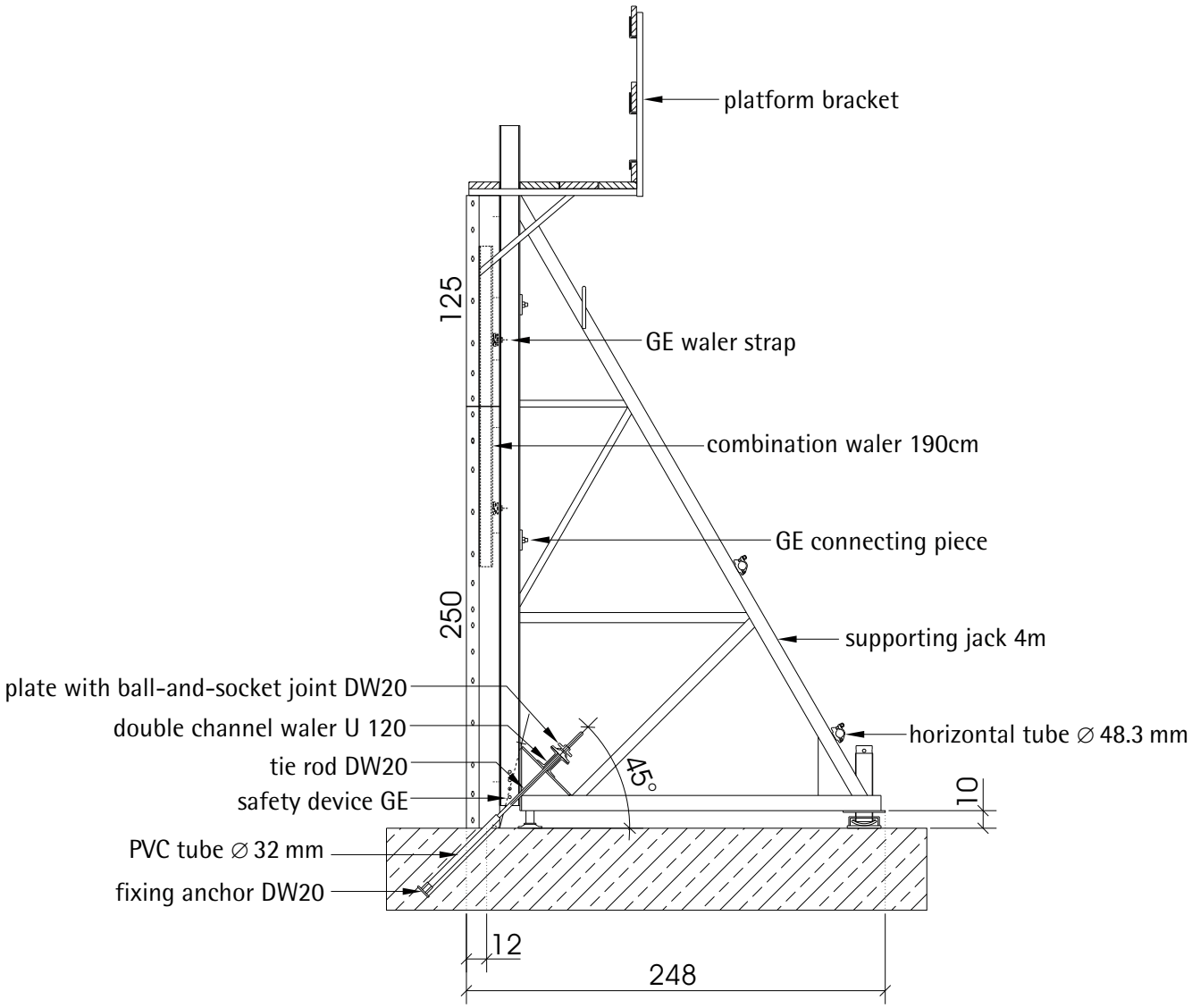
Modular with supporting jack 4m



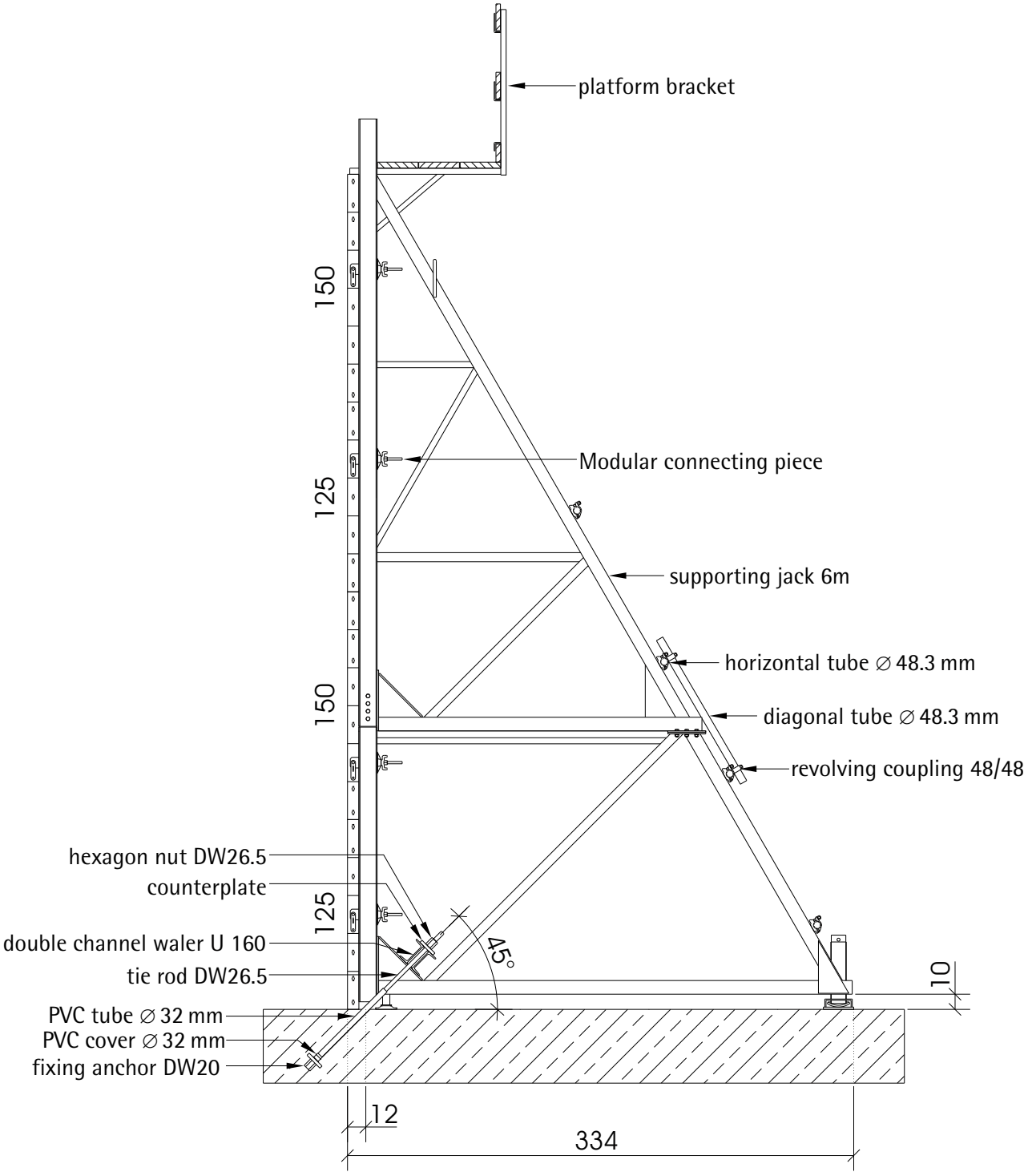
GE+Modular with supporting jack 4m



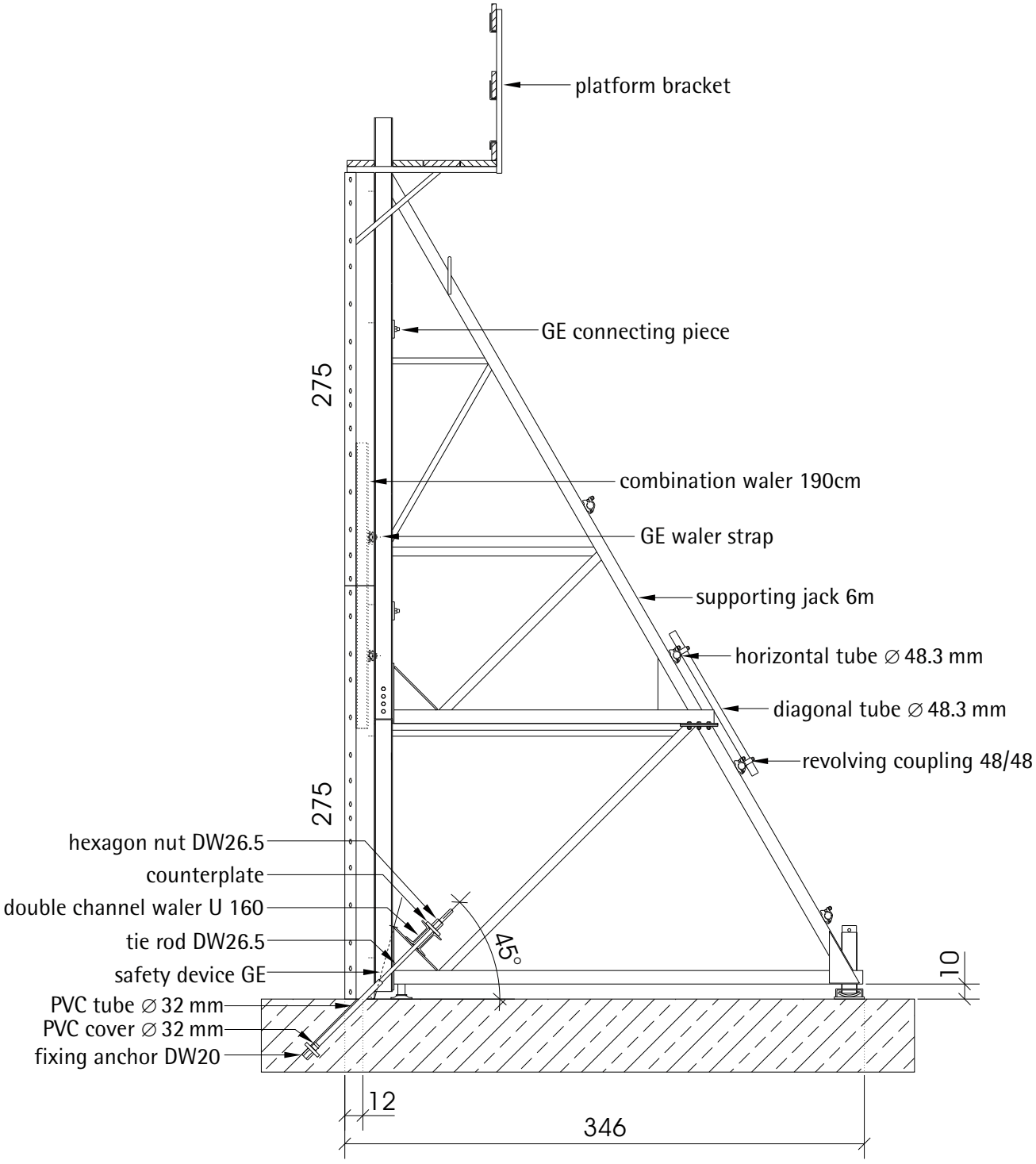
GE with supporting jack 4m



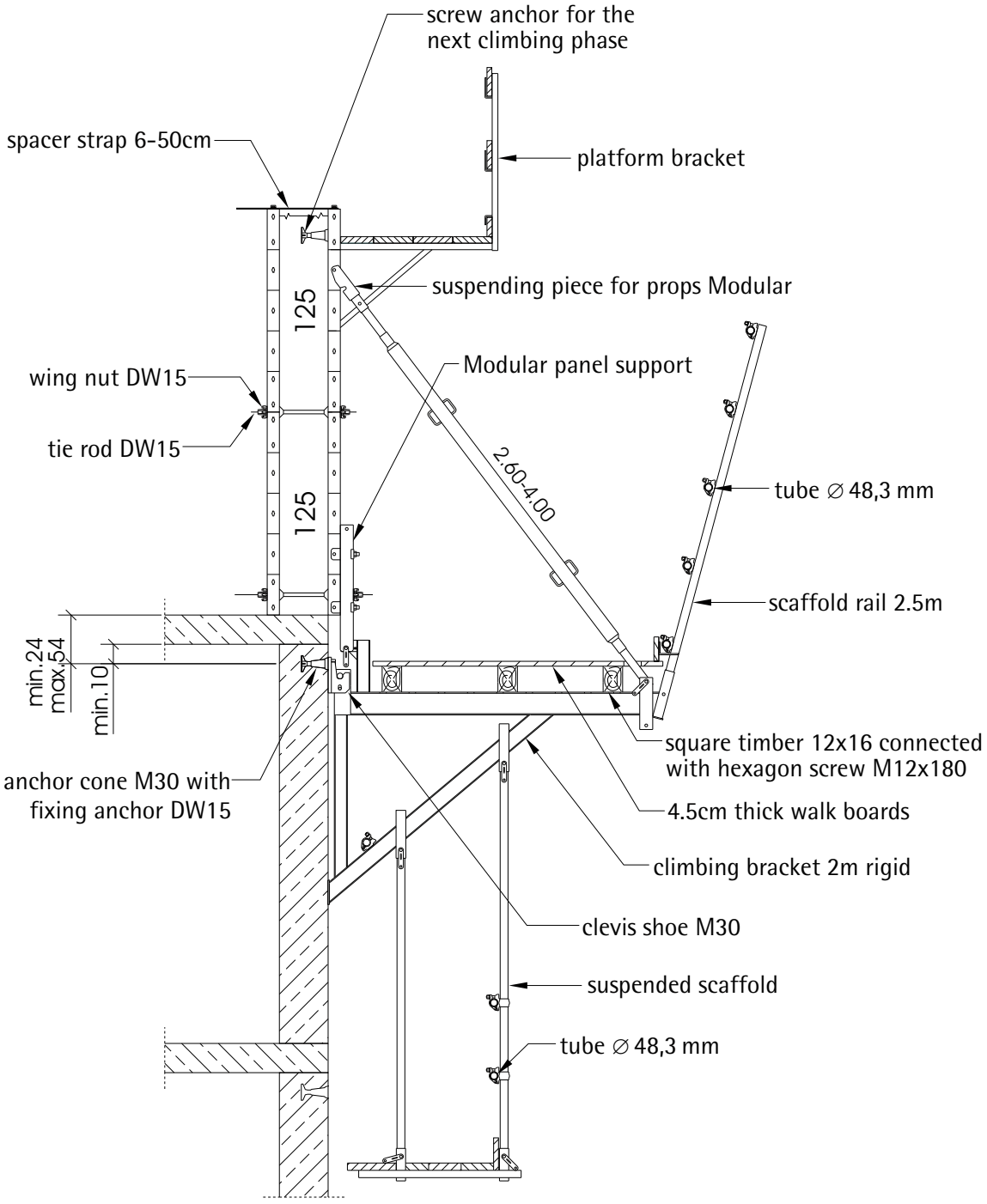
Modular with supporting jack 6m



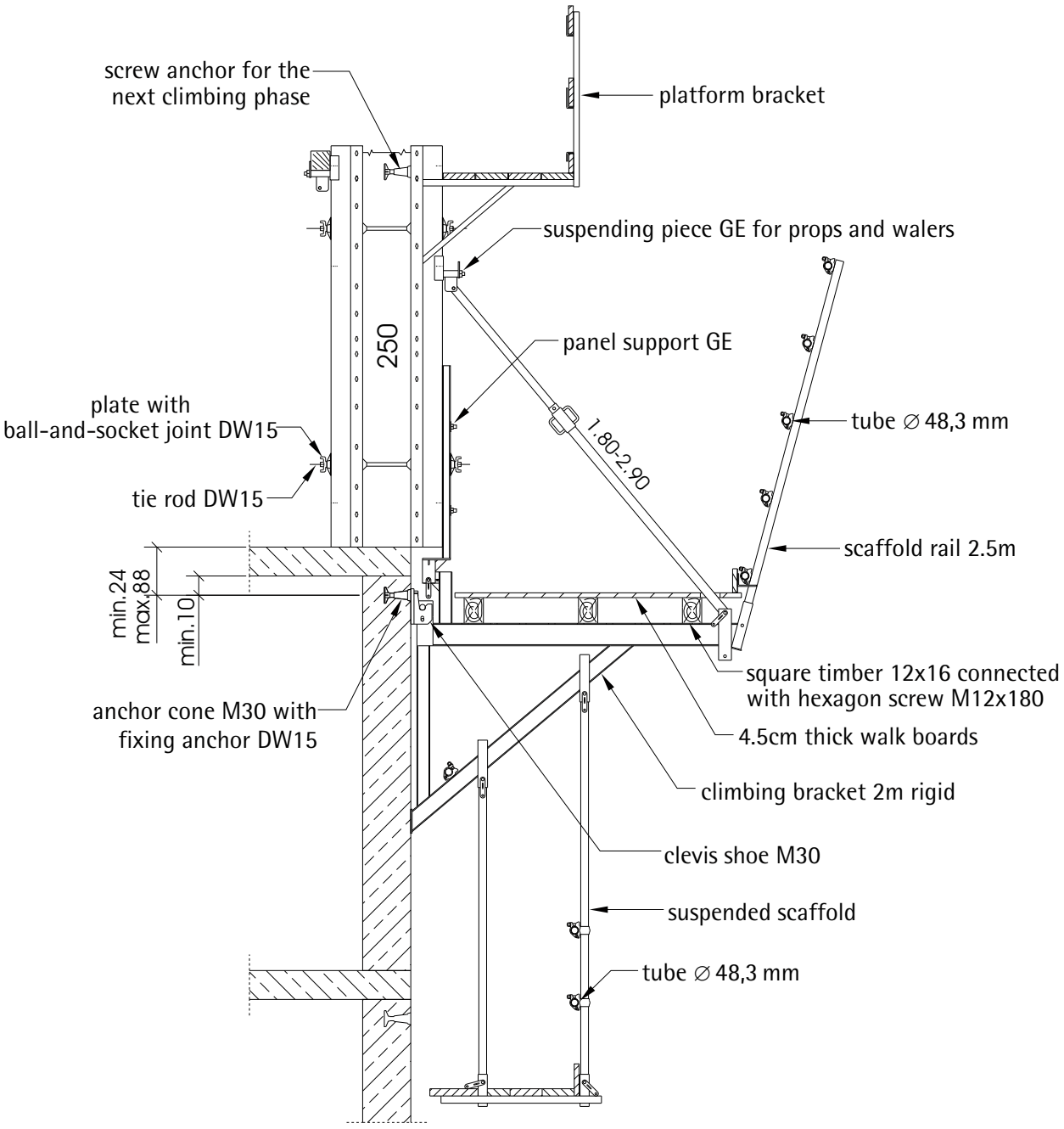
GE with supporting jack 6m



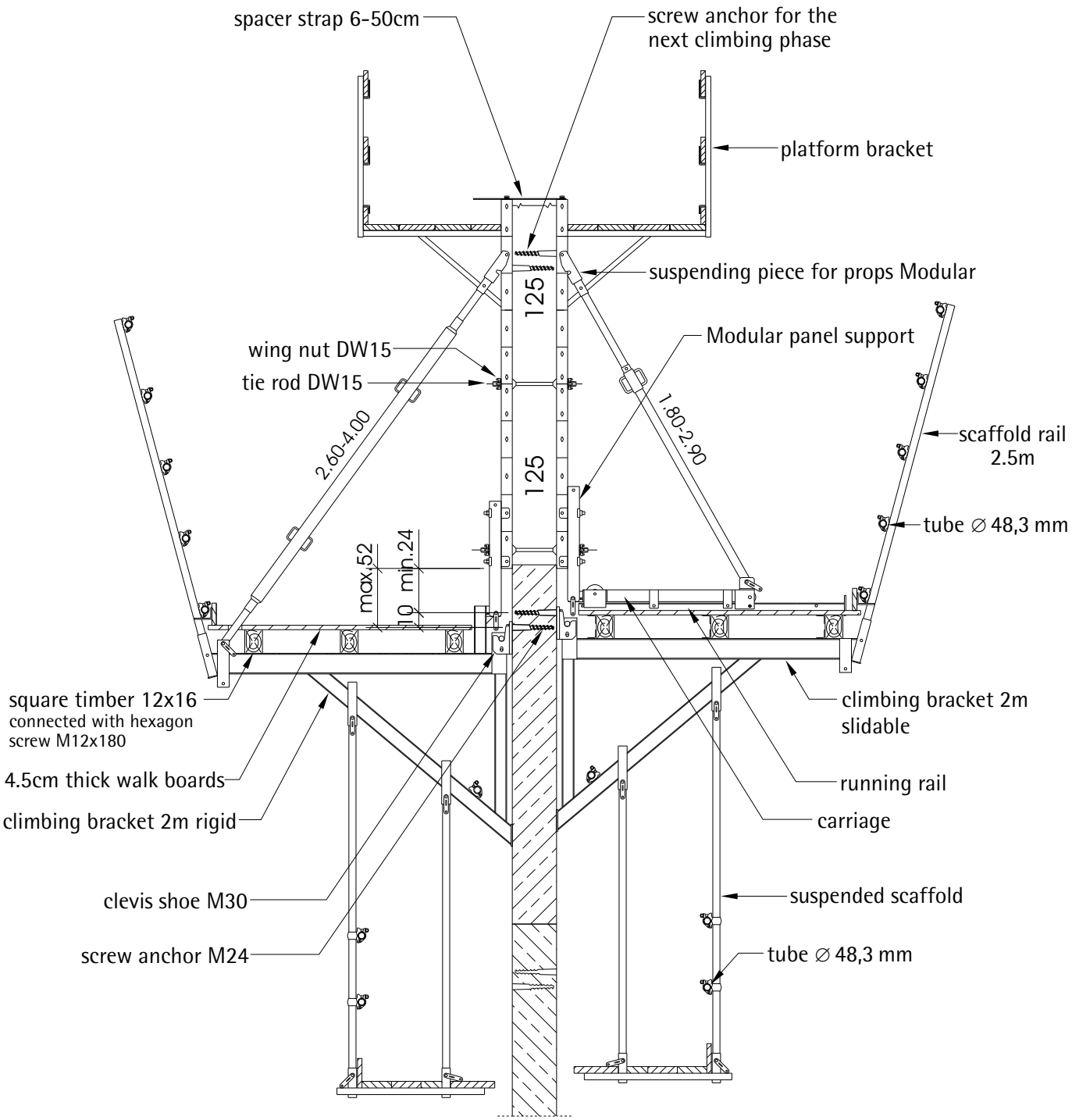
Modular with climbing bracket 2m rigid, one-sided climbing



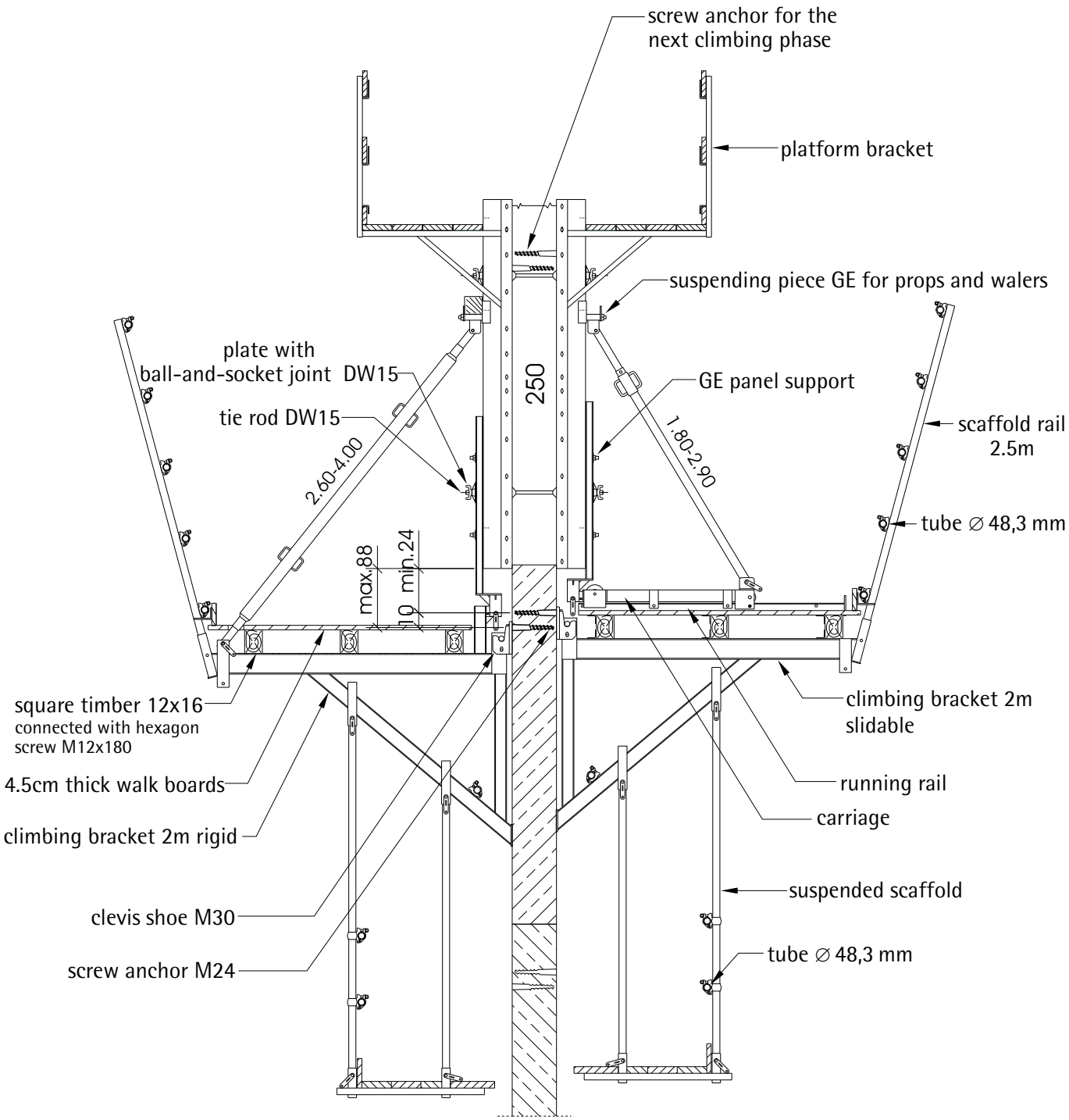
GE with climbing bracket 2m rigid, one-sided climbing



Modular with climbing bracket 2m rigid, both-sided climbing



GE with climbing bracket 2m rigid, both-sided climbing



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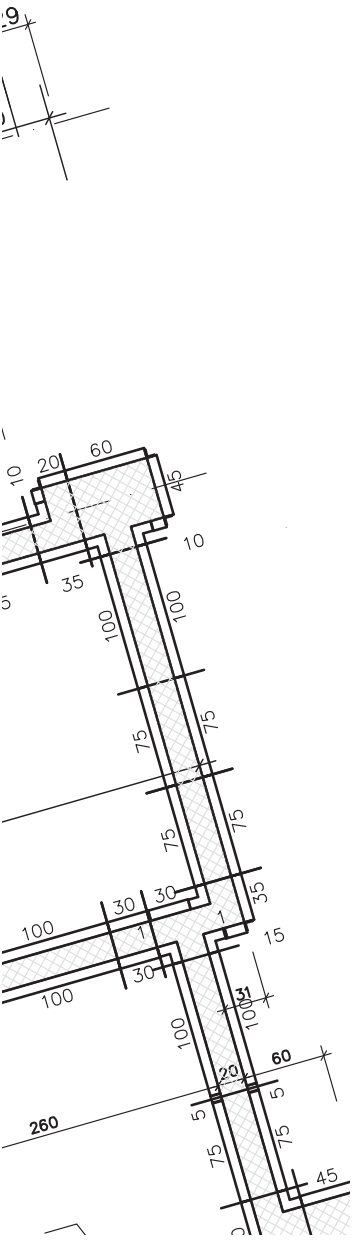

Service in Formwork + Shoring

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