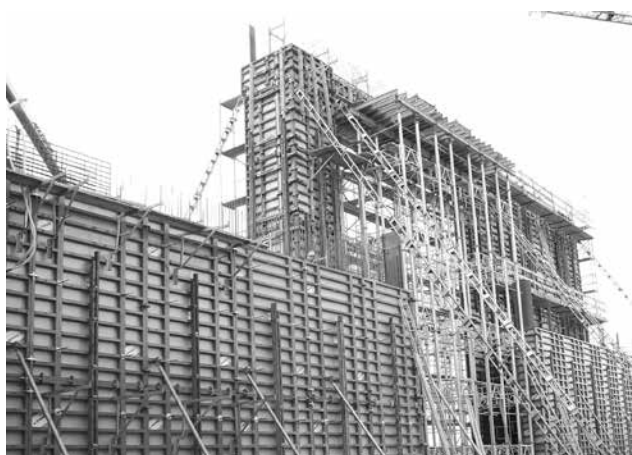


Mammut 350

Technical Instruction Manual



Product features

The Mammut 350 wall formwork is a crane-dependent formwork system made of steel. It is ideally suited for use in high-rise, public, commercial and industrial construction as well as civil engineering projects that require a top architectural concrete surface.

The Mammut 350 has the following characteristics:

- Seven multi-function profiles
- Tie holes at multi-function profile level
- Bump notches for panels that are 250 and 125 cm wide
- Symmetry on the inside and outside
- An even tie hole and joint pattern
- Compatible with Mammut XT and Mammut
- Same accessories used for Mammut XT, Mammut 350 and Mammut

The steel frames of the Mammut 350 panels are hot-dip galvanised both internally and externally and post-treated. This ensures improved corrosion protection, making them durable and easy to clean.

Mammut 350 panels are available with heights 350, 300, 250 and 125 cm. A complete formwork set including accessories weighs approx. 62 kg/m²

The MEVA multi-function profile with welded-in DW-threaded nuts makes the attachment of accessories easier, for example:

- Push-pull props and alignment rails with flange screws
- Walkway brackets with integrated self-locking pin
- DW tie rods of any length that are used to bridge problem areas

The Mammut 350 panels are equipped with the 20 mm thick alkus all-plastic facing made of polypropylene and aluminium. The facing is riveted to the panel on the pouring side. In addition, the facings are protected with silicone. The tried-and-tested polypropylene and aluminium composite facing has all the positive properties of plywood plus important advantages: longer lifespan, greater load-bearing capacity, better nail-holding ability, fewer and easier repairs, 100% recyclability.

The admissible fresh-concrete pressure is 100 kN/m² if DW 20 tie rods are used (required for panel widths from 100 cm upwards). This high load capacity results in short pouring cycles, since walls up to a pouring height of 400 cm can be poured without considering the rate of placing. The fresh-concrete pressure can be determined easily and precisely with MEVA's online concrete pressure calculator available in the download area on the MEVA website. Go to www.meva-international.com --> Download --> Working Tools --> Concrete Pressure Calculator. The concrete pressure calculator is also available as a mobile app for use on the construction site.

Abbreviations, measurements, figures and tables, etc.

The abbreviation M 350 is used for the Mammut 350 system series and the abbreviation M for the Mammut system series. DIN means Deutsche Industrie-Norm (German Industrial Standard).

E DIN (E = Entwurf / draft) means that the DIN is in draft status and not yet approved. Any further abbreviations are explained where they are used for the first time.

TÜV means Technischer Überwachungsverein. This is the independent German organisation that tests the safety of technical installations, machinery and motor vehicles. If a product passes the test, it is permitted to carry the GS seal. GS stands for Geprüfte Sicherheit (approved safety).

Measurements: This manual uses the metric system, i.e. m (for metre), cm (for centimetre) and mm (for millimetre).

Non-defined dimensions are in cm.

The page numbers in this manual start with M350. The figures and tables are numbered per page. Depending on its product abbreviation, a cross reference in the text refers to a page, table or figure in this or in another manual. This is indicated by the product code with which the cross-reference begins.



Contents

Please note

This Technical Instruction Manual contains information, instructions and tips that describe how to use the MEVA equipment on the construction site in a proper, quick and economic way. Most examples shown are standard applications that will occur in practice most often. For more complicated or special applications not covered in this manual, please contact the MEVA experts for advice. They will help you without delay.

When using our products, the federal, state and local occupational health and safety regulations must be observed. Please observe the assembly instructions that your local contractor or employer has created for the site on which the MEVA equipment is used. Such instructions are intended to minimise site-specific risks and must contain the following details:

- The order in which all working steps including assembly and disassembly must be carried out
- The weight of the panels and other system parts
- The type and number of ties and braces as well as the distance between them
- The location, number and dimensions of working scaffolds including the working area and fall protection equipment required
- Attachment points for panel transport by crane. With regard to panel transport, please observe this manual. Any deviation will require structural verification.

Important: Generally, only well-maintained material may be used. Damaged parts must be replaced. Use only original MEVA spare parts for replacement.

Attention: Never wax or oil assembly locks!

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Wall formwork

The Mammut 350 panel

Fig. 4.1
Tie hole with conical anchor sleeve (see page M350-8).

Fig. 4.2
Panel connection with the M assembly lock (see page M350-7).

Fig. 4.3
Cross stiffener made of sturdy closed steel profile.

Fig. 4.4
Quick and secure attachment of accessories using welded-in DW 15 threaded nuts (see page M350-12).

Fig. 4.5
Transport hole to attach the crane slings 60, allowing for fast loading and unloading of panel stacks or moving them at ground or slab level (see pages M350-66 and -67).

Fig. 4.6
The steel frames are made of closed hollow profiles with welded-in mitred joints. The profiles are provided with a groove and edge protection. Panels with a width of 125 and 250 cm are equipped with four bump notches that are diagonally welded in, allowing exact panel positioning without a hammer.

Note
For a list of the available panels including their designations and reference numbers refer to the Product List.

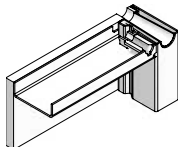


Fig. 4.1

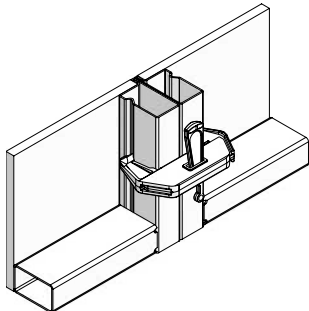


Fig. 4.2

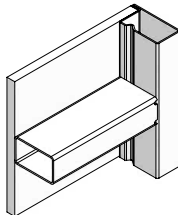


Fig. 4.3

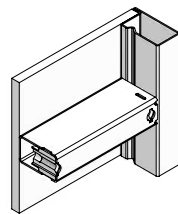


Fig. 4.4

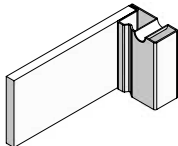


Fig. 4.5

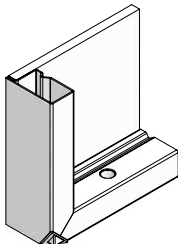
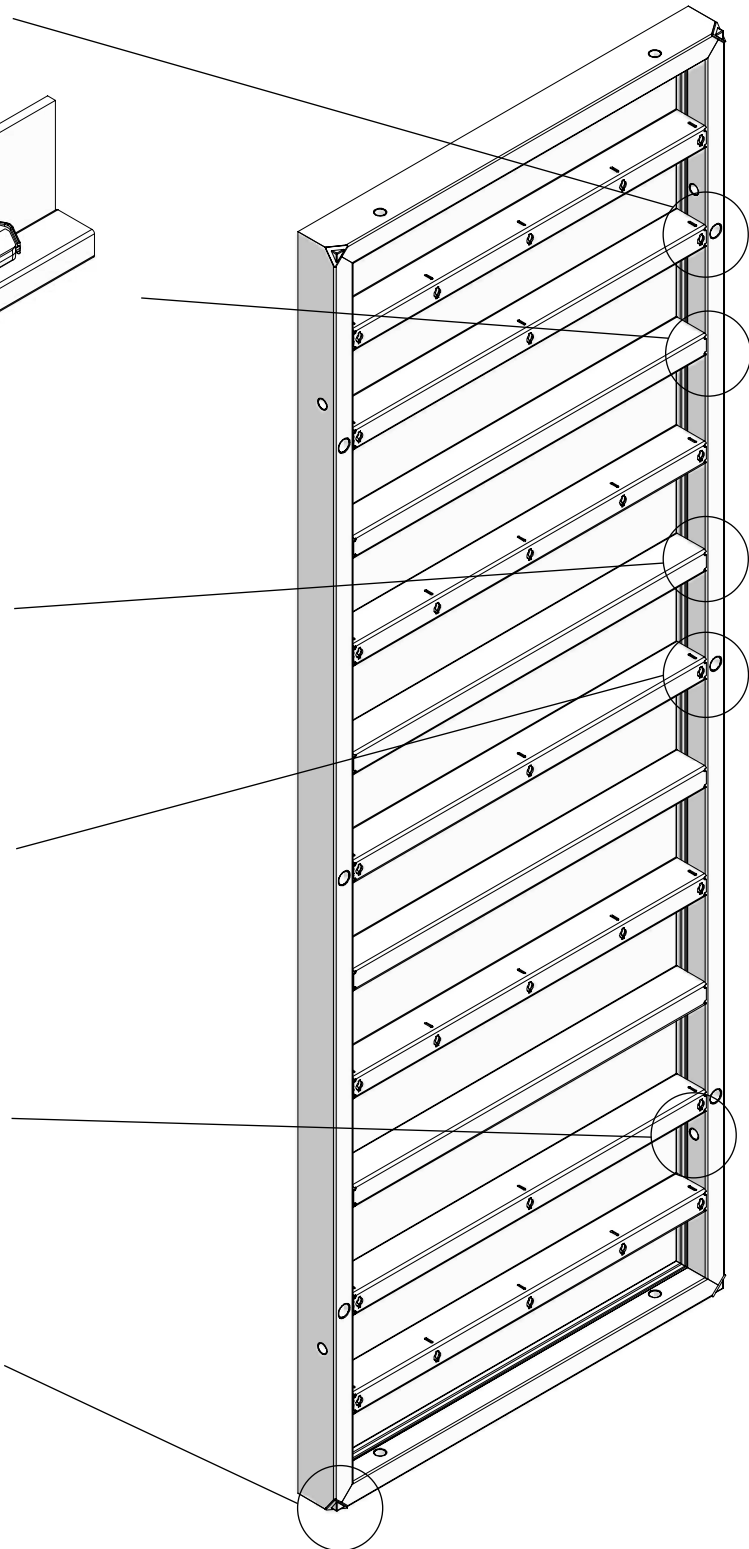


Fig. 4.6



The Mammut 350 panel

The large-size panels 350/250 (Fig. 5.1) and 300/250 (Fig. 5.2)

These panels are ideally suited for vertical and horizontal use. Since the tie holes are located inside the panel, the 8.75 m² forming area of the 350/250 panel requires only six ties and the 7.50 m² forming area of the 300/250 panel only four ties.

The panels can be connected to existing walls without alignment rails or fillers. They can overlap by up to 50 cm (see page M350-39).

If 250 cm high panels are used horizontally and mounted on top of each other, an even joint pattern with continuous vertical joints is assured.

Vertical and horizontal panels can be combined freely.

Panels with a width of 125 and 250 cm are equipped with 4 bump notches that are diagonally welded in, allowing exact panel positioning without a hammer. The panels can be positioned in all directions without a hammer (M350 Fig. 4.6).

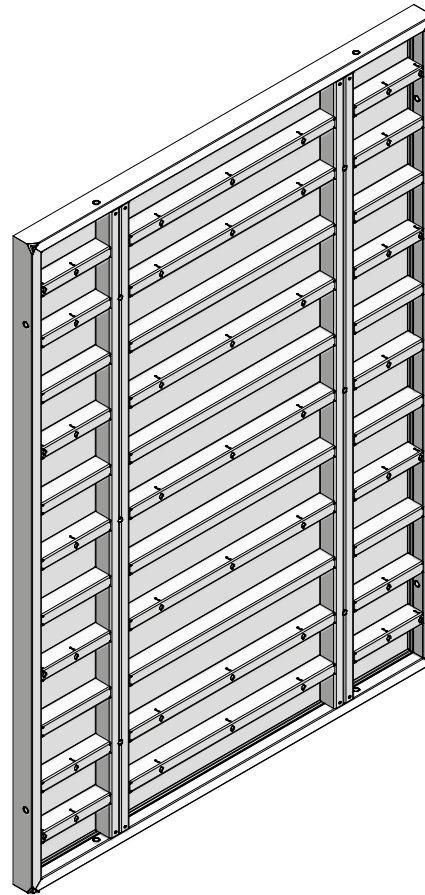


Fig. 5.1

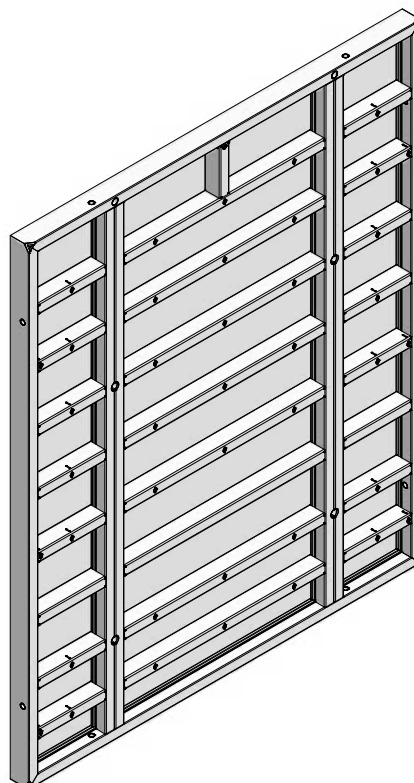


Fig. 5.2

Description	Ref. No.
M 350 panel AL 20	
350/250.....	23-005-05
300/250.....	23-006-05

Wall formwork

alkus all-plastic facing

The tried-and-tested polypropylene and aluminium composite facing (Fig. 6.3) has all the positive properties of plywood plus important advantages: longer lifespan, greater load-bearing capacity, better nail-holding ability, fewer and easier repairs, 100% recyclability.

Besides the obvious advantages such as considerably reduced cleaning effort, minimum consumption of release agent and an excellent, uniform concrete finish, alkus offers substantial ecological benefits.

Substituting plastic for wood saves valuable timber resources. Also, alkus avoids the release of highly toxic dioxin that is released when burning plywood bonded with phenolic resin.

Used or damaged alkus facings can be recycled to produce new facings. They are 100% recyclable and subject to a global return policy.

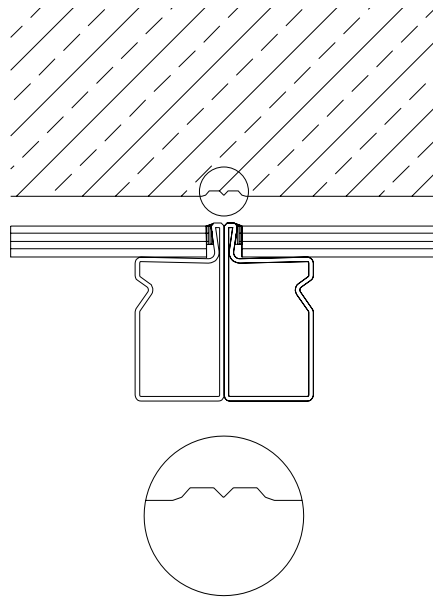


Fig. 6.1 Frame profile with plywood facing: Negative imprint in the concrete when using panels with a conventional plywood facing

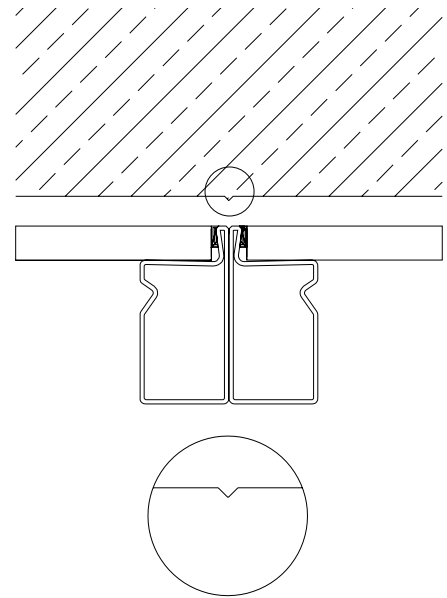


Fig. 6.2 Frame profile with alkus facing: Smooth and even concrete surface as there are no projecting profiles

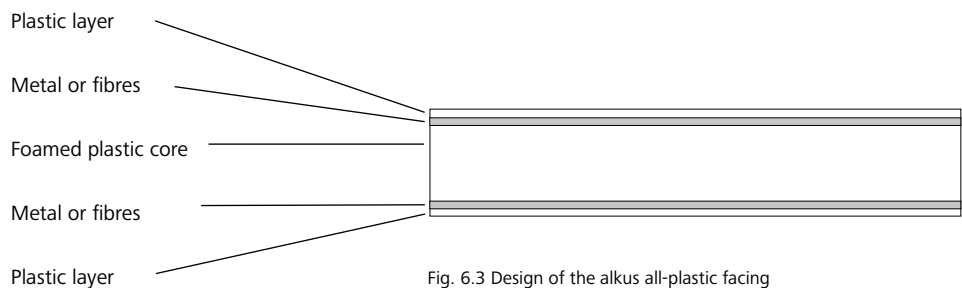


Fig. 6.3 Design of the alkus all-plastic facing

Wall formwork

Panel connection

Fast and efficient connection of the panels is accomplished with the M assembly lock (Fig. 7.1) whether the panels are assembled side by side or on top of each other (height-extended). The assembly lock can be attached at any position on the panel joint between the cross stiffeners. Since it weighs only 3 kg, it can be easily attached with only one hand.

Its 5-point contact (Figures. 7.2 and 7.3) draws the panels together and aligns them. Secure connection and perfect alignment are achieved with only a few hammer blows. The assembly lock locks into a fail-safe position immediately and automatically.

Panels up to a height of 300 cm are connected with two assembly locks and panels with a height of 350 cm are connected with three assembly locks.

When pouring architectural concrete with SB3 quality (German architectural concrete class for immaculate architectural concrete surface), panels that are 250 cm high or higher require an additional assembly lock.

Horizontal panel connections generally require two assembly locks.

For the quantity of assembly locks required for outside corners and columns refer to pages M350-22 and -23 as well as M350-53.

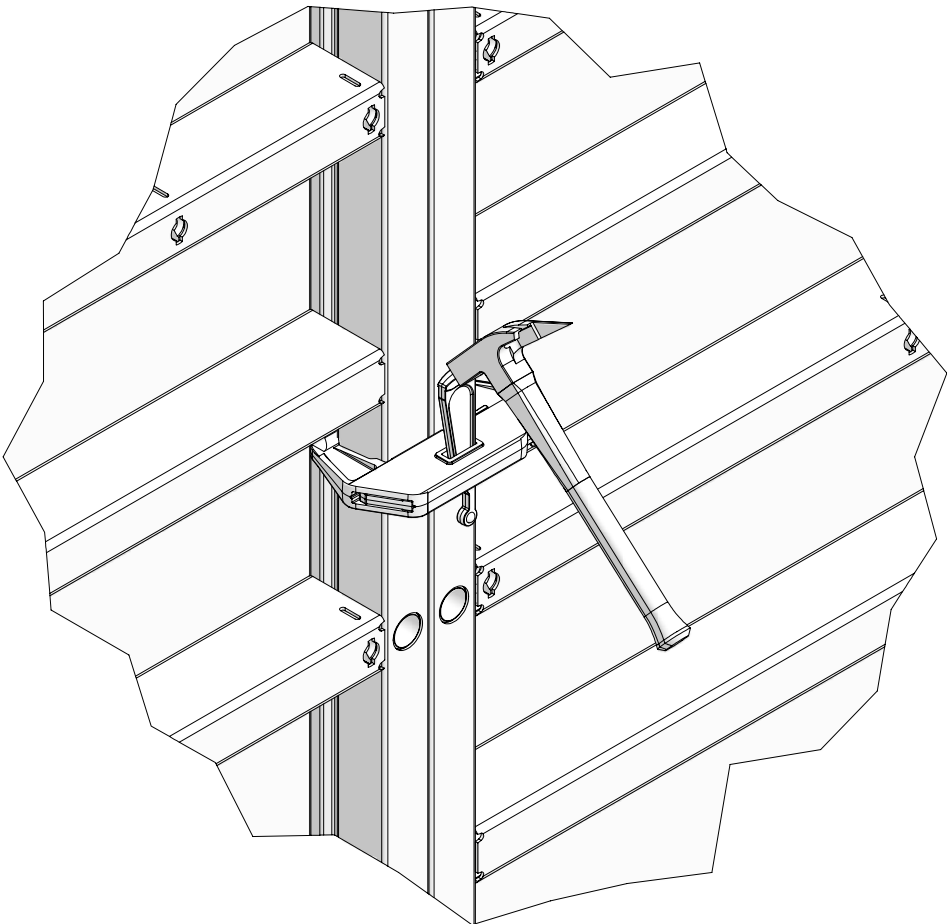


Fig. 7.1

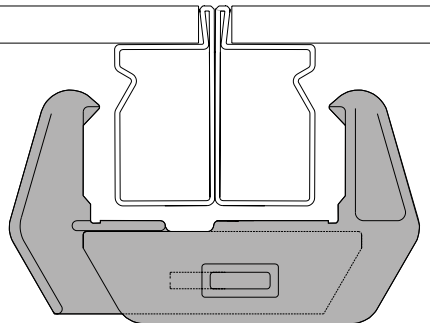


Fig. 7.2

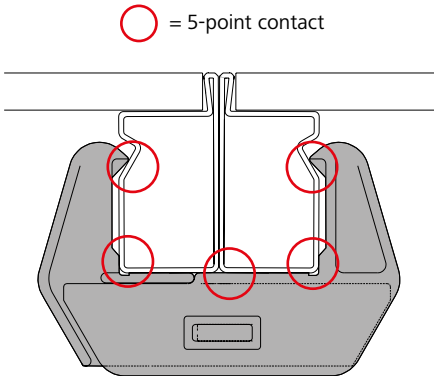


Fig. 7.3

Description	Ref. No.
M assembly lock	29-400-71

Wall formwork

Tie holes

The conical anchor sleeve (Fig. 8.1) for DW 15 and DW 20 tie rods is welded to the frame.

The M 350 formwork can be inclined up to 8 cm/m with DW 15 tie rods or 5 cm/m with DW 20 tie rods (Figures 8.2 and 8.3). Inclined panels require articulated flange nuts and must be secured against uplift. Articulated flange nuts 15/ 120 are used for DW 15 tie rods, articulated flange nuts 20/ 140 for DW 20 tie rods.

Use a hammer or 27 mm spanner (Fig. 8.4) to handle articulated flange nuts 15/120 without damaging them and a hammer or 36 mm spanner for articulated flange nuts 20/140.

When connecting panels with different widths, always anchor them through the wider panel (Fig. 8.6).

All usable tie holes must be used for tying and non usable ones must be closed with plug D27/30.

Panels can also be tied outside the panel using a Uni-tie claw (Fig. 8.5).

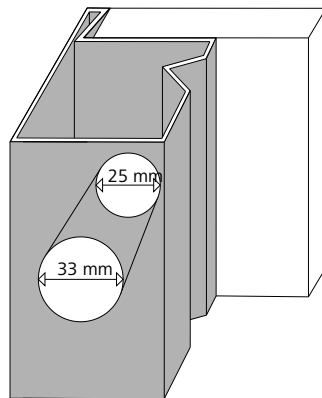


Fig. 8.1

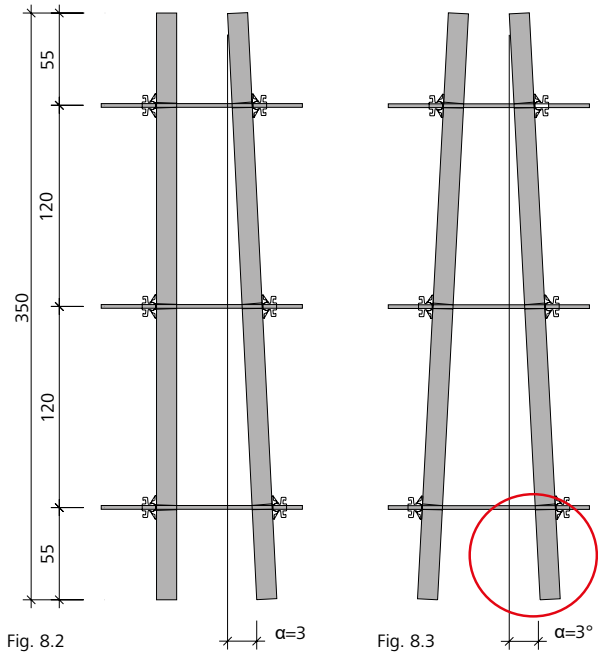


Fig. 8.2

Fig. 8.3

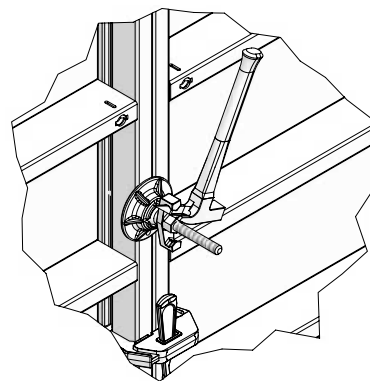
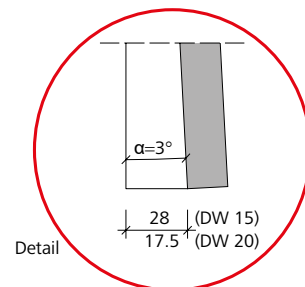


Fig. 8.4



Detail

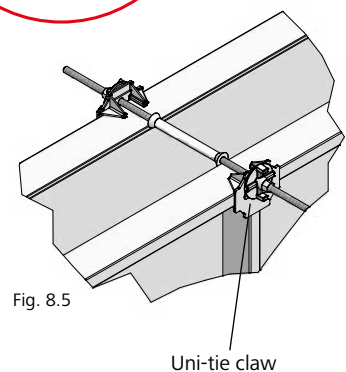


Fig. 8.5

Uni-tie claw

Description	Ref. No.
Tie rod DW 15/90	29-900-80
Tie rod DW 20/120	29-900-97
Flange nut 100	29-900-20
Uni-tie claw	29-901-41
Plug D27/30.....	29-902-61
Articulated flange nut	
15/120.....	29-900-10
20/140.....	29-900-05
Spanner size 27	29-800-10
Spanner size 36	29-800-15

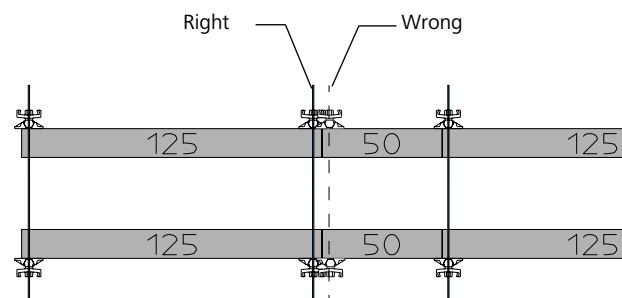


Fig. 8.6

Rules for concrete pouring

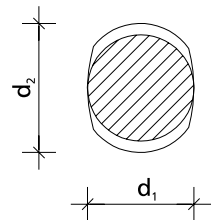
The rules for concrete pouring

- For walls higher than 4.00 m observe the values in Table M350-10.1 or Table M350-10.2 depending on the type of anchoring material.
- According to DIN 4235, concrete should be placed in layers whose thickness can vary from 0.50 to 1.00 m.
- Concrete must not be placed above heights of 1.50 m (or higher) in free fall.
- When vibrating the concrete, which is done layer by layer, the vibrator must not penetrate more than 50 cm into the layer below.
- A final vibrating step over the overall concrete height is not recommended. It does not provide any advantage, since concrete that has been vibrated once cannot be compacted further. This may result in water bubbles (shrinkage cavities) on the concrete surface.

Specific values of tie rods DW 15 and DW 20

Tie rod DW	15	20
d ₁ [mm]	15	20
d ₂ [mm]	17	22.4
Nominal cross-section [mm ²]	177	314
Permissible working load according to DIN 18216 [kN]	90	160
Tie rod elongation when using the permissible working load [mm/m]	2.5	2.35

Table 9.1



Wall formwork

Rate of placing

→ Walls up to 4.00 m
Concrete can be poured without considering the rate of placing.

→ Walls higher than 4.00 m
The permissible rate of placing can be precisely determined according to DIN 18218:2010-01 using MEVA's online calculation programme available on the MEVA website. Go to www.meva-international.com --> Download --> Working Tools --> Concrete Pressure Calculator. The concrete pressure calculator is also available as a mobile app for use on the construction site. Or refer to the rates of placing shown in Tables 10.1 and 10.2. Note that you cannot use the tables unless you know the end of setting of the concrete, t_{ϵ} . This value can be determined on-site using MEVA's ultrasonic SolidCheck measuring device or using the knead-bag test as described in DIN 18218:2010-01. Or simply ask the concrete supplier for the concrete's end of setting.

Tables 10.1 and 10.2 show the recommended rates of placing according to DIN 18218:2010-01 that are compatible with the fresh-concrete pressure and applicable when using DW 15 tie rods and articulated flange nuts 15/120 (Table 10.1) or when using DW 20 tie rods with articulated flange nuts 20/140 (Table 10.2).

Maximum rate of placing v_b (depending on the concrete's consistency and end of setting t_{ϵ})* in m/h					
Mammut (DW 15)		$t_{\epsilon} = 5 \text{ h}$	$t_{\epsilon} = 7 \text{ h}$	$t_{\epsilon} = 10 \text{ h}$	$t_{\epsilon} = 15 \text{ h}$
Consistency range	F3	3.00	2.43	1.81	1.14
	F4	2.53	1.76	1.08	0.47
	F5	1.17	0.83	0.58	0.39
	F6	0.92	0.66	0.46	0.31
	SCC	1.06	0.76	0.53	0.35

Table 10.1

Maximum rate of placing v_b (depending on the concrete's consistency and end of setting t_{ϵ})* in m/h					
Mammut (DW 20)		$t_{\epsilon} = 5 \text{ h}$	$t_{\epsilon} = 7 \text{ h}$	$t_{\epsilon} = 10 \text{ h}$	$t_{\epsilon} = 15 \text{ h}$
Consistency range	F3	5.64	4.72	3.72	2.63
	F4	4.71	3.46	2.36	1.38
	F5	2.40	1.71	1.20	0.80
	F6	1.89	1.35	0.95	0.63
	SCC	2.18	1.56	1.09	0.73

Table 10.2

* According to DIN 18218:2010-01 (fresh-concrete pressure on vertical formwork)

t_{ϵ} = End of setting of the concrete

v_b = Maximum rate of placing

Flatness of surface

The permissible deflection of formwork parts is defined in DIN 18202 (flatness tolerances), Table 3, lines 5 to 7 (Table 11.1). Here, the maximum permissible deflection is defined in relation to the distance between the measuring points. The permissible fresh-concrete pressure that is in line with the flatness tolerances as defined in DIN 18202, Table 3, line 7 is 100 kN/m² for full load.

DIN 18202, Table 3, lines 5 to 7

Column	1	2	3	4	5	6
		Distances as limiting values in mm for distances between measuring points in m				
Line	Reference	0.1	1*	4*	10*	15*
5	Unexposed walls and undersides of slabs	5	10	15	25	30
6	Exposed walls and undersides of slabs, e.g. plastered walls, panelling, suspended ceilings	3	5	10	20	25
7	Like line 6, but with stricter requirements	2	3	8	15	20

Table 11.1

* Intermediate values can be found in Fig. 11.2. Round up values found to full mm.

The measuring lath is placed on the highest protruding points of the surface and the deflection is measured at the deepest point in-between.

The distance between measuring points corresponds to the distance between the highest protruding points.

Flatness tolerances of walls and undersides of slabs

(according to DIN 18202, Table 3)

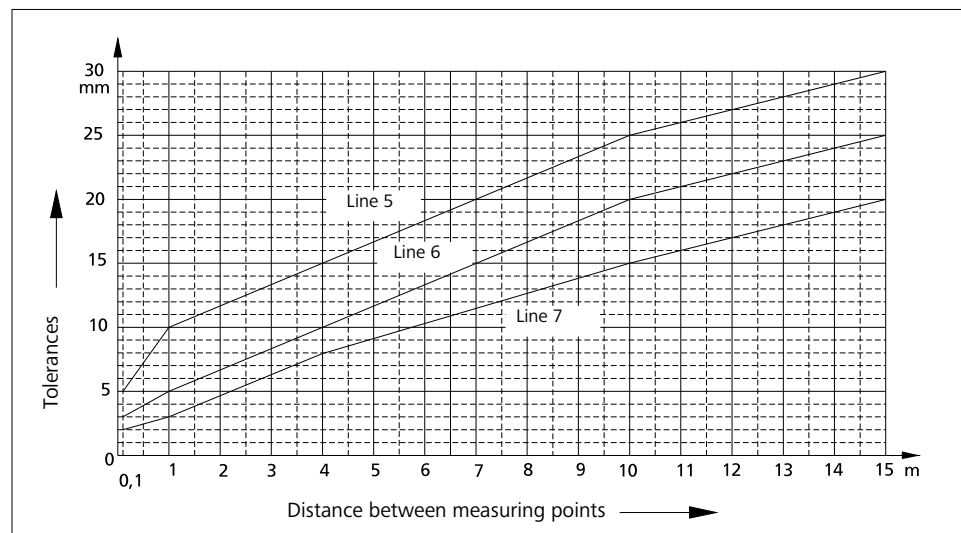


Fig. 11.2

Wall formwork

Attachment of accessories

All panels are provided with multi-function profiles with welded-in Dywidag-threaded nuts (Fig. 12.1). The difference between the multi-function profiles and the cross stiffeners is that the multi-function profiles allow accessories to be attached.

Walkway brackets are provided with integrated self-locking pins (Fig. 12.2) and are mounted on the multi-function profiles and secured with a flange screw 18.

Formwork is set vertically using push-pull props attached to the panel with formwork-prop connectors as shown in Fig. 12.4.

Alignment rails should be attached to the multi-function profiles with flange screws in order to:

- stabilise ganged panels when lifting them by crane
- bridge problem areas
- brace and stabilise the fillers used to bridge gaps between the panels.

The tie rod holder can be attached to the multi-function profile of the vertical or horizontal panel. It can hold up to two DW tie rods with articulated flange nuts (Fig. 12.5).

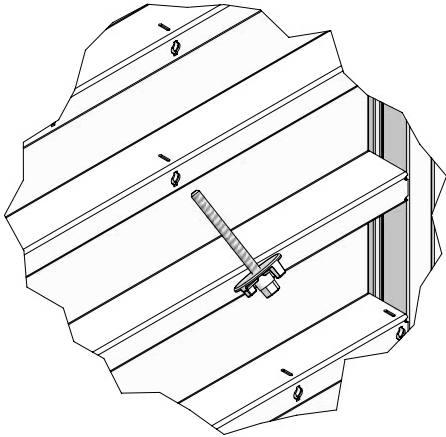


Fig. 12.1

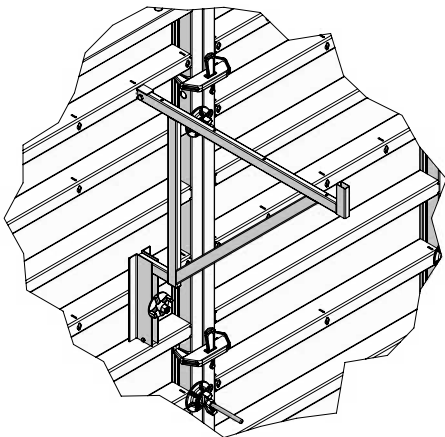


Fig. 12.2

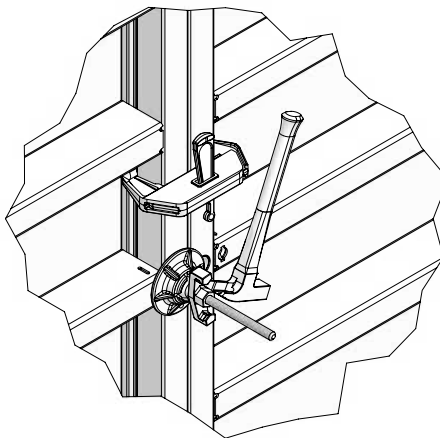


Fig. 12.3

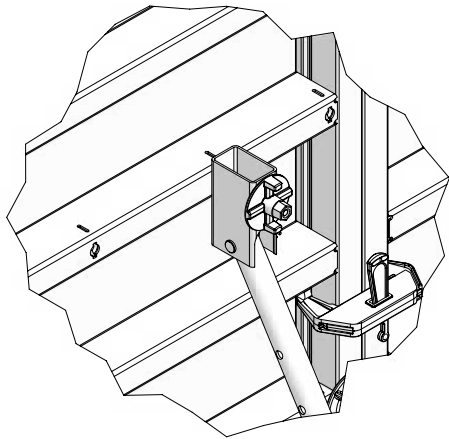


Fig. 12.4

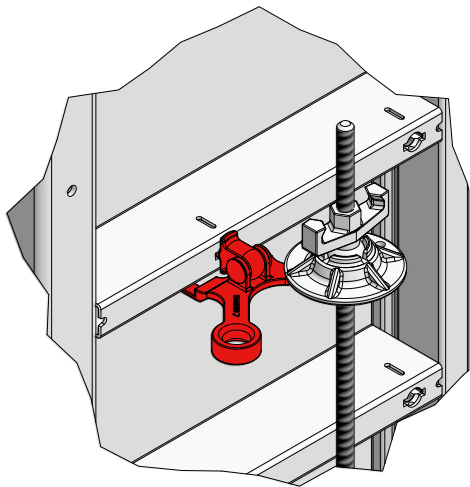


Fig. 12.5

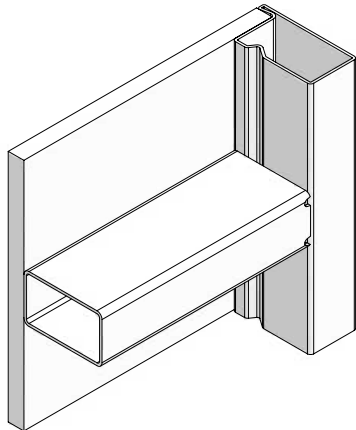


Fig. 12.6

Description	Ref. No.
Tie rod holder	29-927-10

Wall braces

Push-pull props and brace frames are attached to the multi-function profiles with formwork-prop connectors and flange screws 18 (Fig. 13.1). When used to align wall formwork, we recommend a max. spacing of 4.00 m. In order to withstand wind loads, a max. spacing of 2.50 m is recommended (Table 13.2). For further applications contact MEVA.

Please note

- Brace frames and push-pull props must be anchored to the ground with foot plates and dowels.
- Before anchoring the formwork to the ground, verify the properties of the ground and the rating of the dowels according to the federal, state and local codes and regulations that may apply. Observe any regulations that apply for work on high walls.
- The formwork height and the length of the push-pull props should be identical and the angle between push-pull prop and ground should not exceed 60° (Fig. 13.1).
- We recommend using the MEVA heavy-duty braces Triplex R for formwork higher than 6.00 m.

Brace frame 250

This brace frame consists of a push-pull prop R 250, a brace SRL 120 and a double-jointed foot plate.

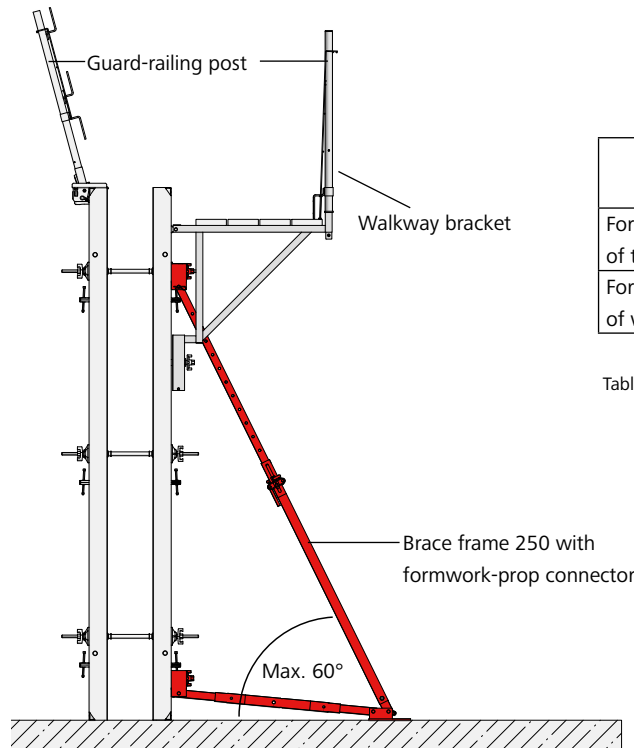
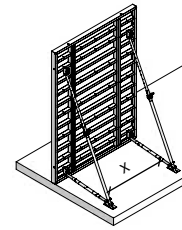


Fig. 13.1

Spacing of push-pull props / brace frames	
For alignment of the formwork	Max. 4.00 m
For transfer of wind loads	Max. 2.50 m

Table 13.2

Description	Ref. No.	Adjustment range [m]	Perm. pressure [kN]	Perm. force [kN]	Weight [kg]	Recommended use
Braces SRL						
SRL 120	29-108-80	0.90–1.50	20.0	30.0	8.3	Horizontal alignment of the bottom formwork, brace frame 250 or climbing formwork
SRL 170	29-108-90	1.20–2.20	25.0	40.0	10.5	Folding shaft formwork
Push-pull props R						
R 160	29-109-40	1.35–2.00	25.0	25.0	11.0	Horizontal and vertical alignment
R 250	29-109-60	1.90–3.20	25.0	30.0	18.5	Upper prop of brace frame 250 for formwork up to 4.05 m
R 460	29-109-80	3.40–5.20	20.0	30.0	35.8	Wall formwork up to 6.00 m
R 630	29-109-85	5.10–7.60	9.5	25.0	68.0	Wall formwork up to 9.00 m
Formwork above 6.00 m						
Triplex R 680	—	6.40–7.20	45.0	45.0	123.0	Wall and column formwork
Triplex R 780	—	7.40–8.20	45.0	45.0	139.0	Wall and column formwork
Triplex R 880	—	8.40–9.20	45.0	45.0	149.0	Wall and column formwork
Triplex R 980	—	9.40–10.20	45.0	35.0	160.0	Wall and column formwork

Table 13.3

Description	Ref. No.
Brace frame 250 with formwork-prop connector.....	29-109-20
Flange screw 18.....	29-401-10
Formwork-prop connector.....	29-804-85
Double-jointed foot plate.....	29-402-32

Wall formwork

Wall braces for high walls

For walls up to 6.00 m we recommend assembling a brace frame on-site consisting of the push-pull props R 250 and R 460. The required formwork-prop connectors and double-jointed foot plates must be ordered separately (Fig. 14.1).

Walls higher than 6.00 m

We recommend assembling a brace frame on-site consisting of the push-pull props R 630 and R 250 or R 460 or the Triplex R heavy-duty push-pull props. The Triplex R is especially designed to brace and align high wall formwork (see Table M350-13.3).

Please observe the Triplex Technical Instruction Manual.

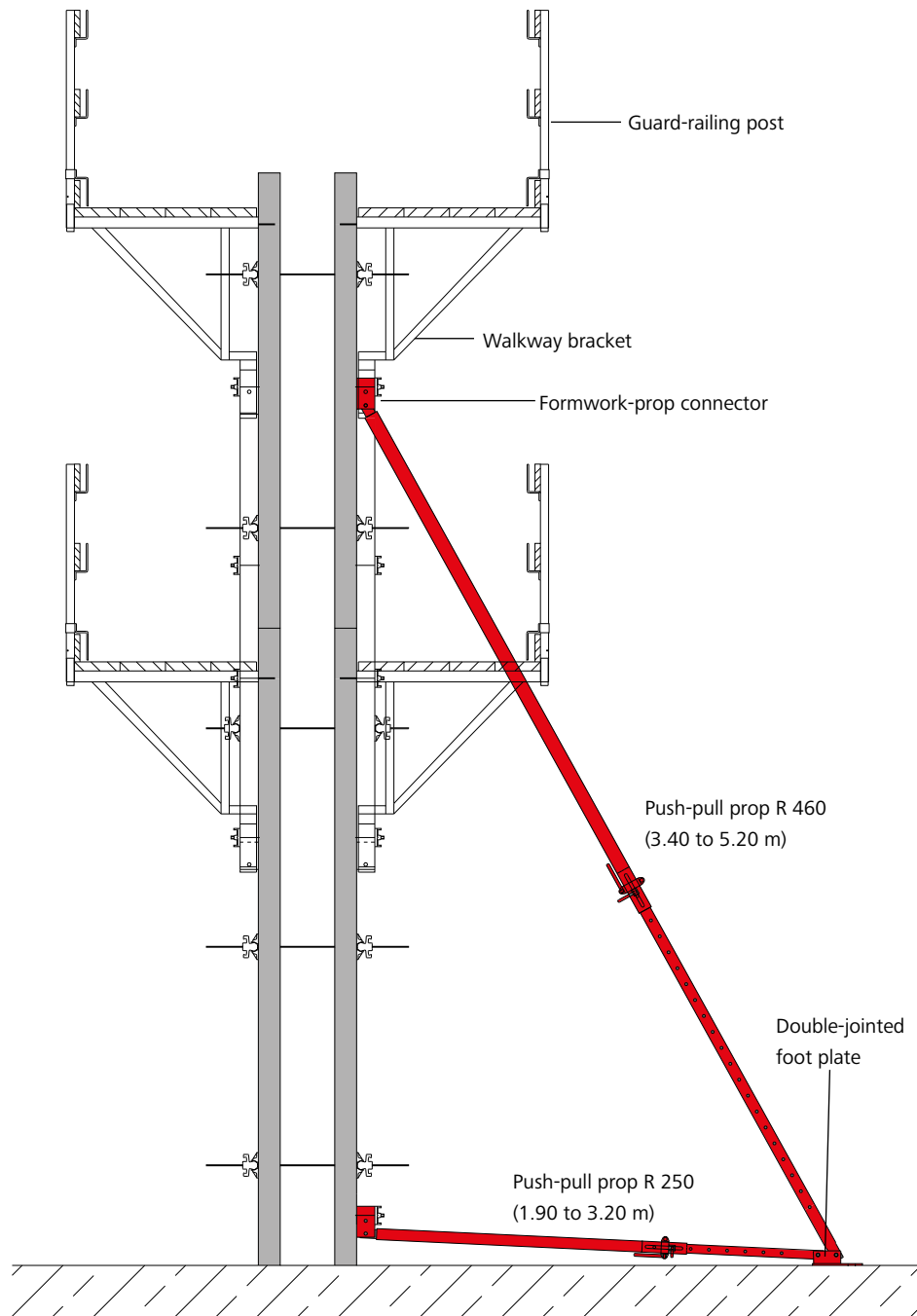


Fig. 14.1

Description	Ref. No.
Push-pull prop R 460	29-109-80
Push-pull prop R 250	29-109-60
Formwork-prop connector	29-804-85
Double-jointed foot plate.....	29-402-32

Working scaffolds – Folding access platform BKB 125

The ready-made folding access platform BKB 125 with folding guardrailing provides safe access and a 125 cm wide working platform (Fig 15.2). It enables quick and safe installation of working scaffolds.

The 48 mm thick planks have a rough surface and a metal lining at the edges.

Its length of 235 cm allows the BKB 125/235 to be easily transported, as it fits crosswise on any truck. The stacking height is only 17 cm and the permissible load is 2 kN/m² (200 kg/m²).

The guardrailing can be set to an angle of 90° or 105° (Fig. 15.1). The BKB 125 side railing is mounted to the platform with two flange screws.

Attention

Do not crane formwork units when the working platform is attached to the formwork.

When using our products, the federal, state and local codes and regulations must be observed.

Note

MEVA's SecuritBasic safety system offers platforms, ladder access and other safety equipment for safe and efficient work at all heights. The SecuritBasic platforms are fully compatible with the Mammut 350 wall formwork.

For more information refer to the SecuritBasic Technical Instruction Manual.

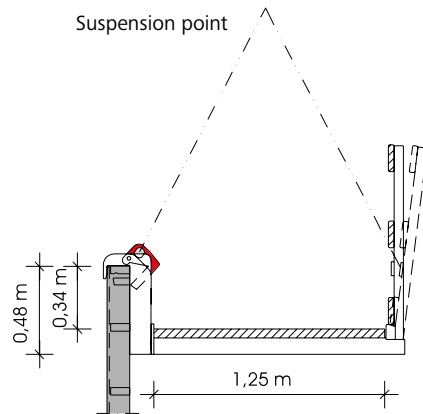


Fig. 15.1

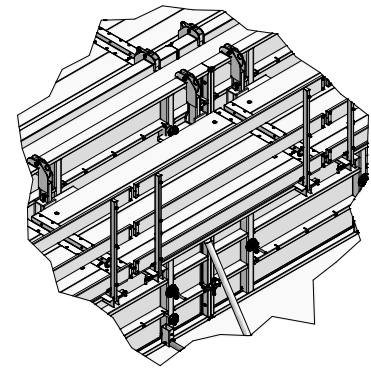
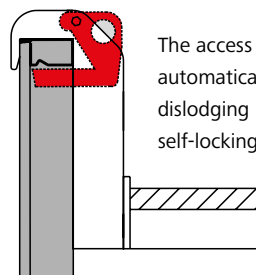


Fig. 15.2



The access platform is automatically secured against dislodging by the integrated self-locking mechanism.

Fig. 15.3

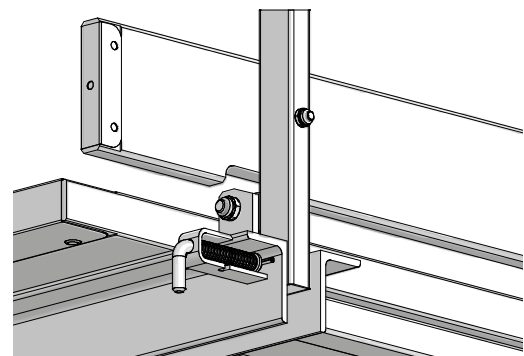


Fig. 15.4

Examples for corner configurations and length compensation

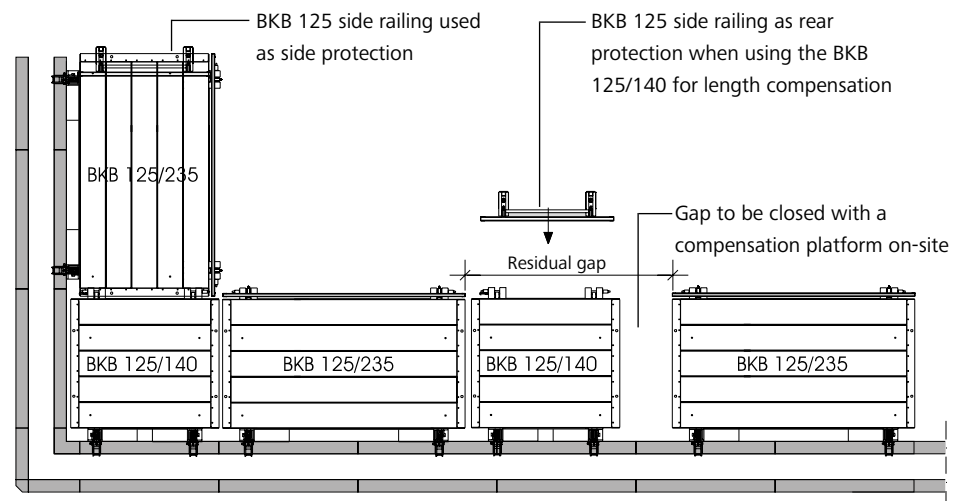


Fig. 15.5

Description	Ref. No.
Folding access platform	
BKB 125/140	29-417-00
BKB 125/235	29-417-10
BKB 125/300	29-417-20
Side railing BKB 125.....	29-417-30

Working scaffolds / walkway brackets

Walkway bracket

The pluggable walkway bracket 90 (Fig. 16.2) is mounted to a multi-function profile. To insert the bracket, turn it by 45°, then turn it back to the vertical position and secure it with a flange screw 18 to the multi-function profile below. The planks can then be bolted to the brackets. Maximum bracket spacing for a load of 150 kg/m² (scaffold group 2): 2.50 m according to DIN 4420. The minimum thickness of the planks is 4.5 cm and their minimum width is 24 cm.

Guardrailing posts and side railing

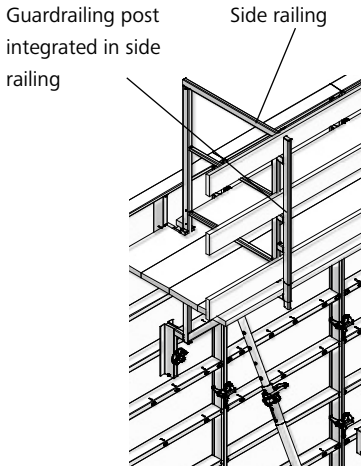
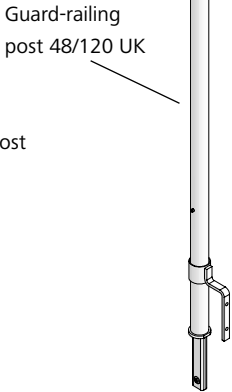
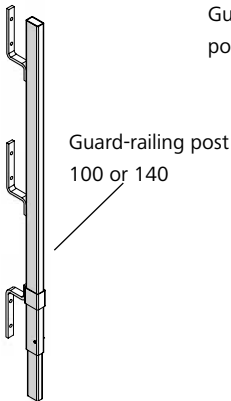
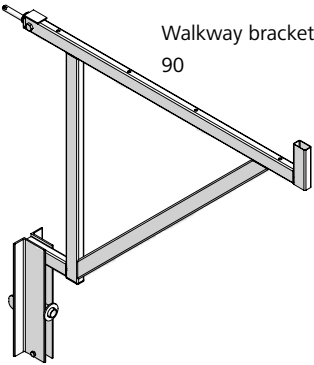
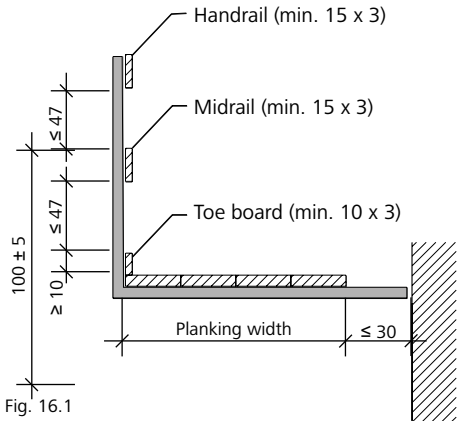
The guardrailing posts and the side railing (Figures 16.3 to 16.5) are inserted into the walkway brackets. If the fall height exceeds 2.00 m, a side railing (Fig. 16.5) is required. Note that this regulation is valid for Germany.

Always observe the federal, state and local regulations of the country where the formwork is used.

The guardrailing post 48/120 UK can be used to allow scaffold tubes to be installed as a fall protection measure. These guardrailing posts are made of round tube with a diameter of Ø 48 mm. Swivel-joint couplers for the scaffold tubes are attached to the guardrailing posts. The round guardrailing posts are inserted into the walkway brackets with their rectangular adapters (Fig. 16.4).

Note
Minimum cross section of handrail and midrail:
For a post spacing of up to 2.00 m: 15 x 3 cm
For a post spacing of up to 3.00 m: 20 x 4 cm (Fig. 16.1).

Working scaffold according to DIN 4420, Part 1



Description	Ref. No.
Walkway bracket 90	29-106-00
Guard-railing post 100	29-106-75
Guard-railing post 140	29-106-85
Guard-railing post 48/120 UK	29-106-80
Guard-railing post 48/134	29-920-80
Side railing 90/100	29-108-20
Side railing 125/100	29-108-30
Coupler 48/48	29-412-52
Scaffold tube 48/200	29-412-23
Scaffold tube 48/300	29-412-26
Scaffold tube 48/400	29-412-27
Scaffold tube 48/500	29-412-25
Scaffold tube 48/600	29-412-28

Working scaffold – Ladder fixture for wall formwork

The ladder fixture for wall formwork enables a ladder or an extension ladder to be firmly attached to the horizontal or vertical wall formwork panel and thus ensures safe access to the working scaffold, e.g. walkway bracket or BKB folding access platform.

The upper ladder fixture for wall formwork is attached to a multi-function nut of the formwork panel with the integrated flange screw. This is used to hook on the ladder. The integrated safety lever prevents the ladder lifting out accidentally.

The lower ladder fixture for wall formwork is attached to the bottom of the wall formwork panel with the integrated flange screw. It is used to secure the ladder.

Both the ladder and the extension ladder can be equipped with a safety cage.

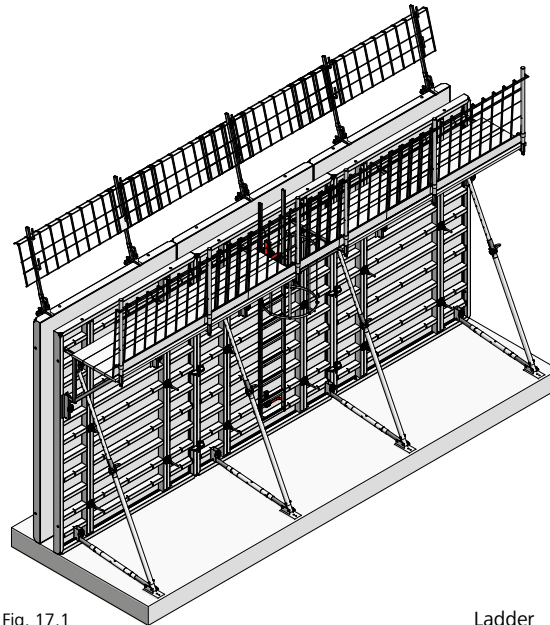


Fig. 17.1

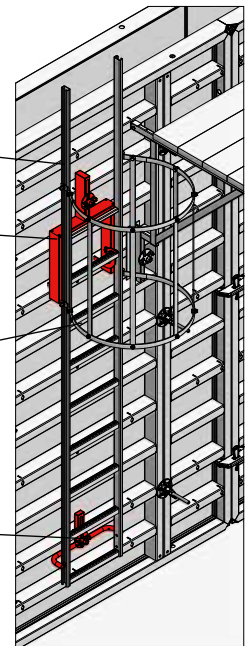


Fig. 17.3

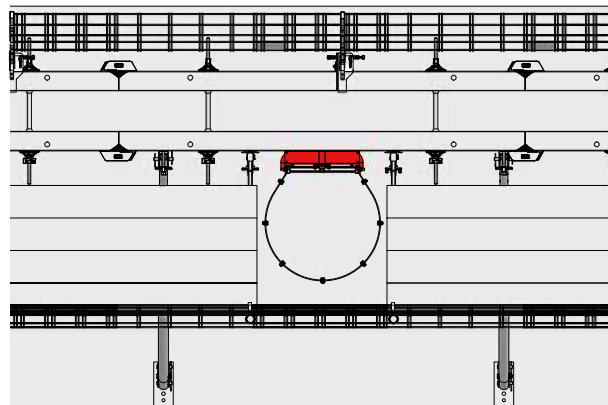


Fig. 17.2

Description	Ref. No.
Ladder fixture for wall formwork upper.....	29-416-82
lower.....	29-416-84
Ladder 348.....	29-414-50
Ladder 318.....	29-414-55
Ladder 243.....	29-416-50
Extension ladder 270.....	29-416-52
Extension ladder 210.....	29-416-60
Extension ladder 120.....	29-416-55
Extension ladder 90.....	29-416-60
Extension ladder 60.....	29-416-62
Safety cage 210.....	29-414-85
Safety cage 85.....	29-414-90
Safety cage 40.....	29-416-90

Working scaffolds – Tilting bracket 40/60

An additional fall protection device on the opposite side of the working scaffolds, i.e. on the other side of the formwork, is required for heights above 2.00 m. Note that this regulation is valid for Germany. Make sure to observe the federal, state and local regulations of the country where the formwork is used.

The tilting bracket 40/60 (Fig. 18.1) is designed for the MEVA wall formwork systems Mammut XT, Mammut 350, Mammut and StarTec/AluStar and is used to attach MEVA Guard-railing posts to create a fall protection system.

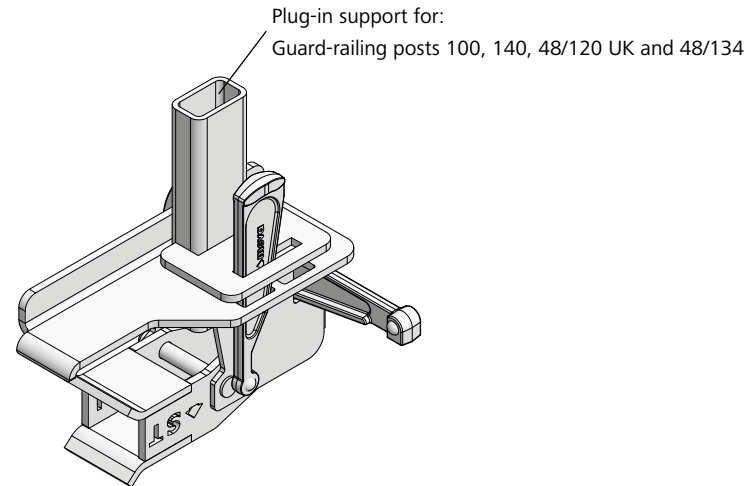


Fig. 18.1

It is attached to the panel's frame profile with the integrated wedge (Fig. 18.2).

MEVA Guard-railing posts 100, 140, 48/120 UK and 48/134 can be connected to the bracket.

The tilting bracket can be turned so that it is vertical to facilitate the installation of safety meshes or railing boards. It can also be tilted by 15° to create sufficient room for the concrete bucket (Fig. 18.2).

One Guard-railing post per bracket must be ordered separately.

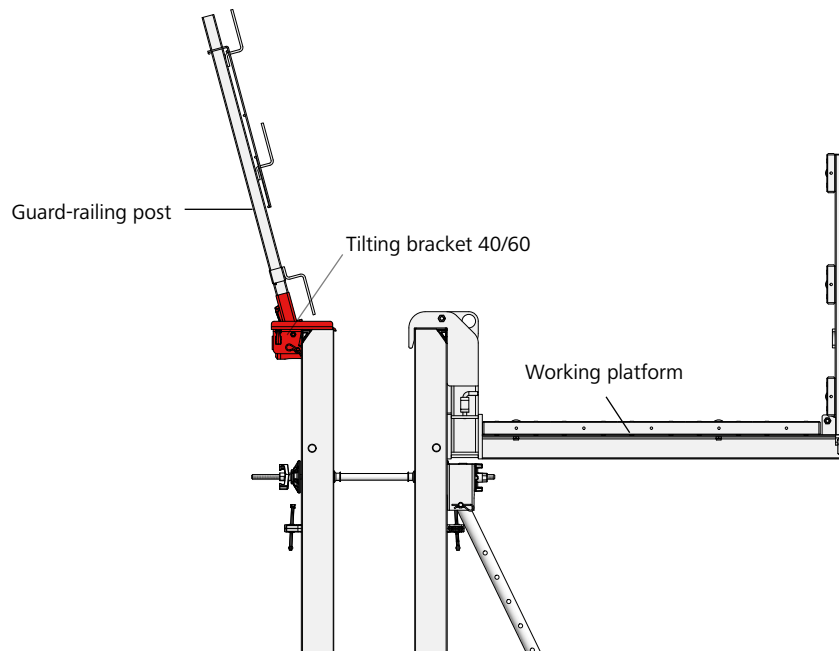


Fig. 18.2

Description	Ref. No.
Tilting bracket 40/60.....	29-920-82
Guard-railing post 100.....	29-106-75
Guard-railing post 140.....	29-106-85
Guard-railing post 48/120 UK	29-106-80
Guard-railing post 48/134.....	29-920-80

Wall formwork

Crane hook

The permissible load of a Mammut crane hook (Fig. 19.1) is 15 kN (1.5 t).

Handling

1. Open the safety lever as far as possible (Fig. 19.3).
2. Push the crane hook over the panel profile until the claw engages completely in the groove.
3. Release the safety lever and press it back to its start position so that the crane hook is locked completely (Fig. 19.4).

Attention

Always use two crane hooks, even when moving single panels. Always attach the crane hooks symmetrically to the centre of gravity.

When moving single horizontal panels, both crane hooks must be attached at the centre of gravity over the cross stiffeners of the profile (Fig. 19.6). When moving several panels at once, make sure each crane hook is attached at a panel joint to prevent the crane hook slipping.

When to replace the crane hook

hook
If the reference dimension exceeds 61 mm, the crane hook must be replaced immediately. This also applies if only one side of the hook exceeds this dimension (Fig. 19.2).

Safety check

Always check the crane hook before use. Do not overload the crane hook. Overloading causes damage. A damaged crane hook is not capable of supporting the full load and its safe use can no longer be guaranteed.

Safety regulations

When using our products, the federal, state and local codes and regulations must be observed.

Also observe the operating instructions delivered with the crane hook.

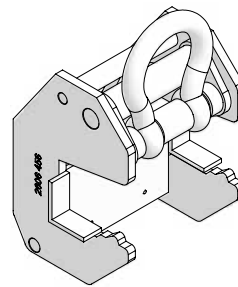


Fig. 19.1

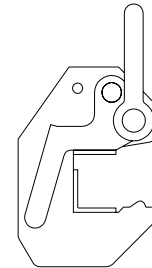


Fig. 19.2

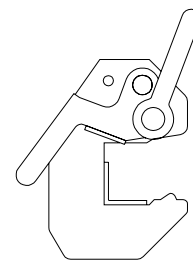


Fig. 19.3

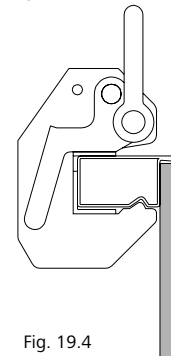


Fig. 19.4

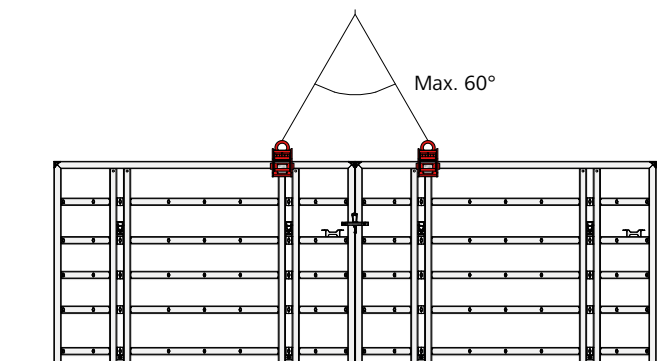


Fig. 19.5

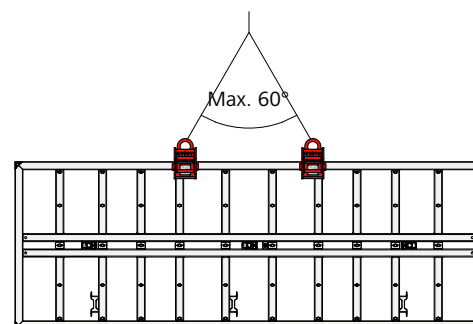


Fig. 19.6

Description	Ref. No.
M crane hook	29-401-21

Wall formwork

Inside corner 90°

The Mammut 350 inside corner is galvanised and has an alkus all-plastic facing.

The inside corner has tie holes. Only three assembly locks per joint are required for height 350 cm, all other heights require two assembly locks per joint. Each corner side is 25 cm long (Figures. 20.1 to 20.3).

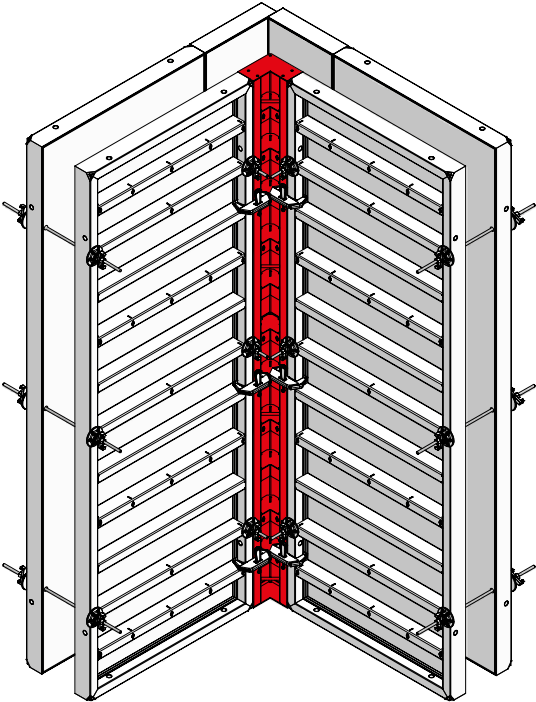


Fig. 20.1

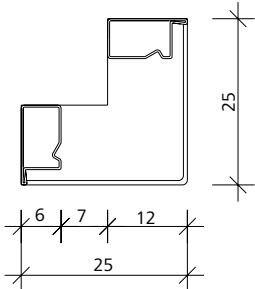


Fig. 20.2

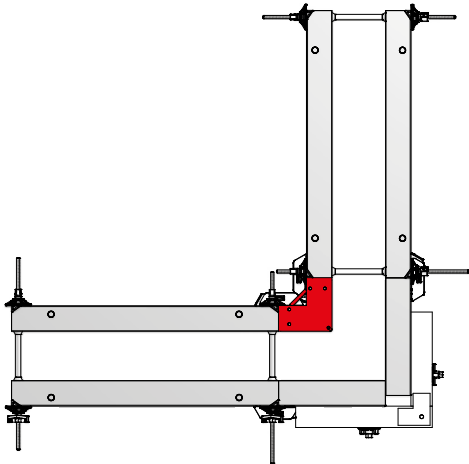


Fig. 20.3

Description	Ref. No.
M 350 inside corner	
350/25 AL 20.....	23-136-40
300/25 AL 20.....	23-136-50
250/25 AL 20.....	23-136-60
125/25 AL 20.....	23-136-70
M cross stiffener 44	29-401-02
M assembly lock	29-400-71
Uni-assembly lock 22	29-400-85
Uni-assembly lock 28	29-400-90
RS assembly lock.....	23-807-70

Wall formwork

Outside corner 90°

Together with M 350 panels and M assembly locks, the M 350 outside corner provides a solid 90° corner solution (Figures 21.1, 21.2 and 21.5).

For the number of AS assembly locks required for an outside corner (a) as well as for the next panel joint (b) refer to Table 21.3. For the assembly locks and alignment rails required for height-extended outside corners refer to page M350-22.

If an outside corner is made with two panels, the corner angle 40/60 can be used and is attached with flange screws at multi-function profile level (Fig. 21.6).

The number of corner angles required is determined by the formwork height (Table 21.4).

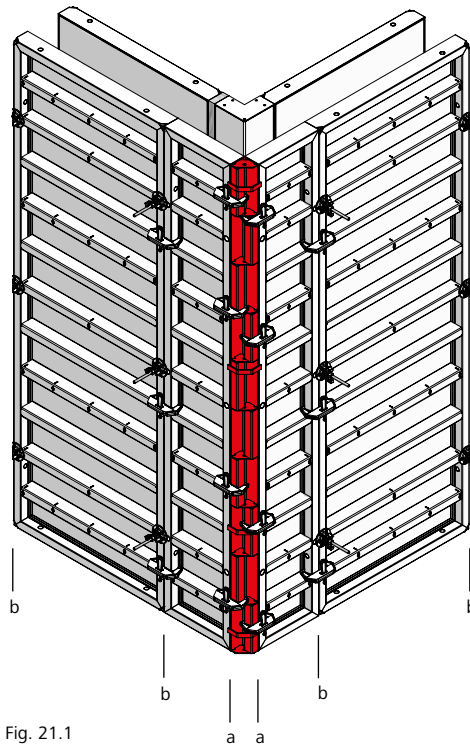


Fig. 21.1

Panel height (in cm)	Number of assembly locks	
	(a)	(b)
350	4	3
300	3	2
250	2	2
125	2	2

Table 21.3

Panel height (in cm)	Number of corner angles
350	5
475	7
600	8
700	10

Table 21.4

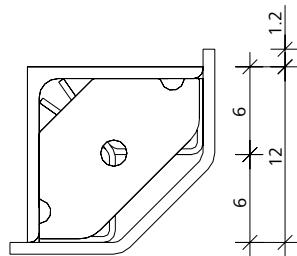


Fig. 21.2

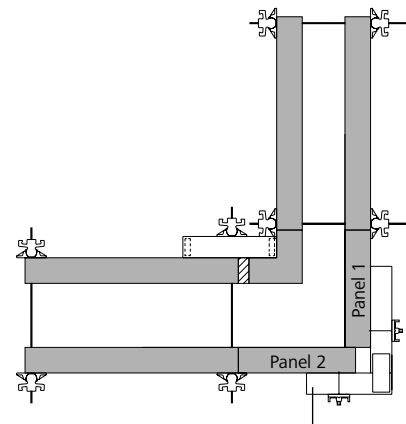


Fig. 21.6

Corner angle 40/60

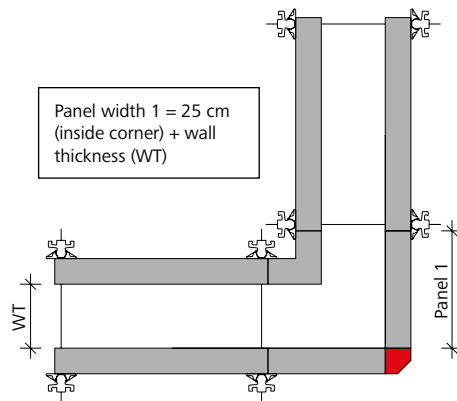


Fig. 21.5

Description	Ref. No.
M 350 outside corner 350	23-140-30
M outside corner 300	23-140-00
M outside corner 250	23-140-10
M outside corner 125	23-140-20
M assembly lock	29-400-71
Uni-assembly lock 22	29-400-85
Uni-assembly lock 28	29-400-90
RS assembly lock	23-807-70
Corner angle 40/60	29-402-25
Flange screw 18	29-401-10

How to determine the panel widths for 90° corners (without M outside corner)

- ➔ Panel 1 = Inside corner (side length 25 cm) + wall thickness
- ➔ Panel 2 = Inside corner (side length 25 cm) + wall thickness + 5 or 10 cm

Height-extended 90° outside corner

Height-extended outside corner

Pouring heights of 4.25 m (or higher) require the number of assembly locks and alignment rails shown in Table 22.3.

The alignment rails must be attached to the panels with two flange screws 18. Always start attaching the alignment rails at the bottom multi-function profile, i.e. the first alignment rail must be attached to the bottom multifunction profile of the bottom outside corner. Note that the alignment rails must cover the next panel joint and be bolted at the corners (Figures 22.1 and 22.2).

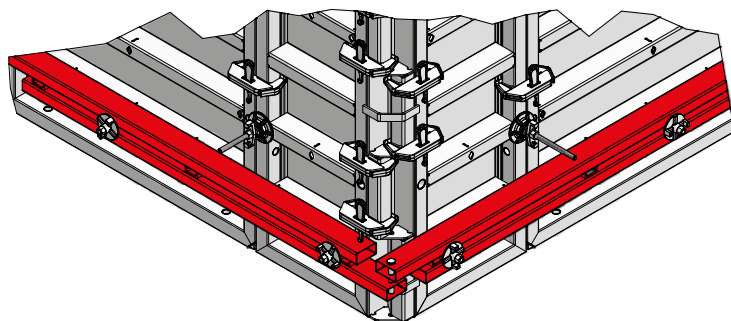


Fig. 22.1

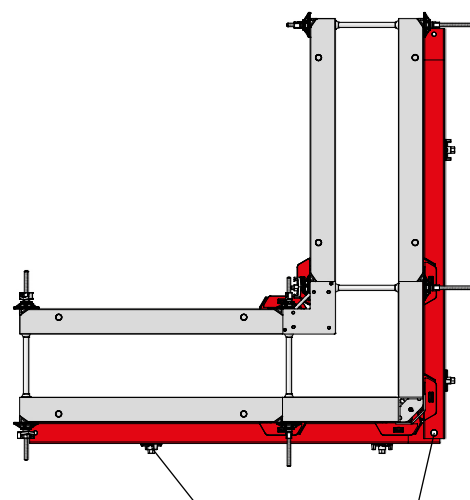


Fig. 22.2

Flange screw 18

Alignment rails bolted at corner

Height-extended outside corner						
Pouring height [cm]	Number of alignment rails (from bottom to top)					Number of M assembly locks
	Wall thickness [cm]					
	0–25	26–50	51–75	76–100	101–125	
425	—	—	—	—	1	10
475	—	—	—	1	1	10
500	—	—	—	1	1	10
550	—	—	—	1	1	11
600	—	—	—	2	2	12
650	—	—	1	2	2	13
700	1	1	1	2	2	14
750	1	1	1	2	2	15
800	1	1	1	2	2	16
850	2	2	2	3	3	17
900	2	2	2	3	3	18
950	2	2	2	3	3	19

Table 22.3

Wall formwork

90° corner with filler

The filler is attached with two RS or Uni-assembly locks up to a height of 300 cm or with three RS or Uni-assembly locks for panel height 350 cm.

Wide filler area:

- RS assembly lock from 0 to 8.5 cm
- Uni-assembly lock 22 from 0 to 12 cm
- Uni-assembly lock 28 from 0 to 16 cm

For stabilisation, an alignment rail must be attached with a flange screw 18 at each tie hole level (one alignment rail per tie hole level) (Figures. 23.1 and 23.2).

The M350 aluminium filler can be used for a 5 cm gap. The filler has tie holes.

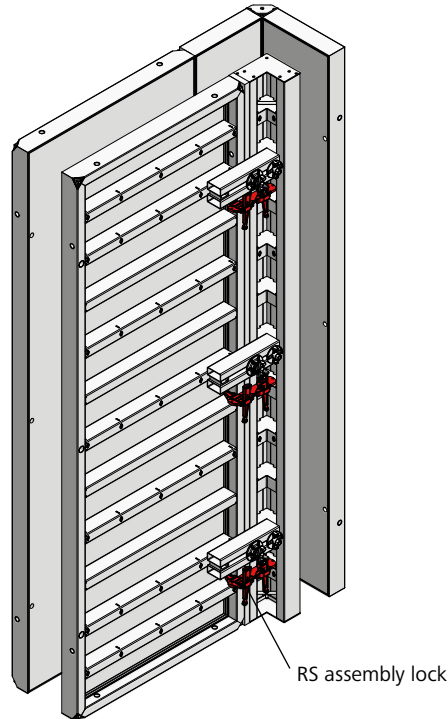


Fig. 23.1

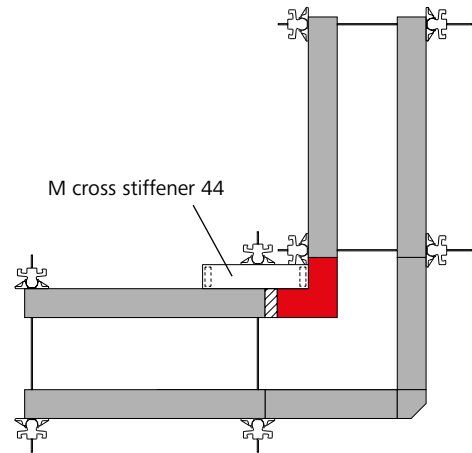


Fig. 23.2

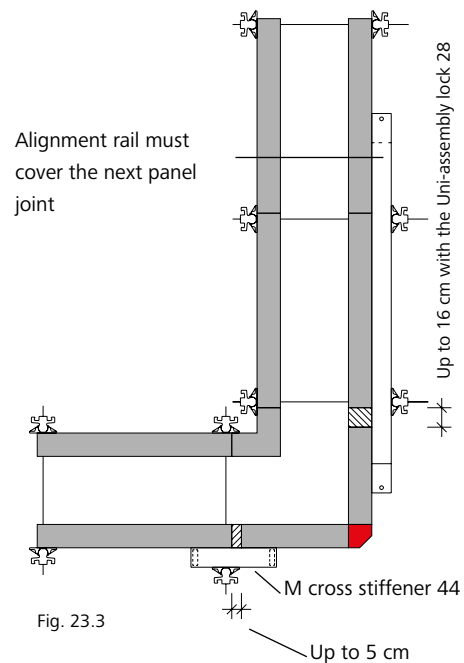


Fig. 23.3

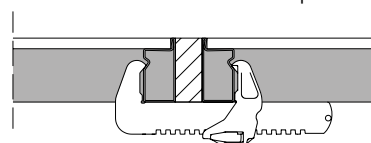


Fig. 23.4 Detailed view of the Uni-assembly lock

Description	Ref. No.
M 350 aluminium filler	
350/5.....	29-300-30
300/5.....	29-300-32
250/5.....	29-300-35
125/5.....	29-300-40
Uni-assembly lock 22.....	29-400-85
Uni-assembly lock 28.....	29-400-90
RS assembly lock.....	23-807-70

90° corner – Combinations

A 90° corner can be made in increments of 5 cm with just a few panel widths.

The M 350 aluminium filler can be used for a 5 cm gap (Fig. 24.3). A 10 cm gap can be filled with two M 350 aluminium fillers and the M cross stiffener 44 (Fig. 24.4). The filler has tie holes.

For the width and number of Mammut 350 panels and M 350 aluminium fillers for wall thickness between 15 and 50 cm refer to Table 24.5.

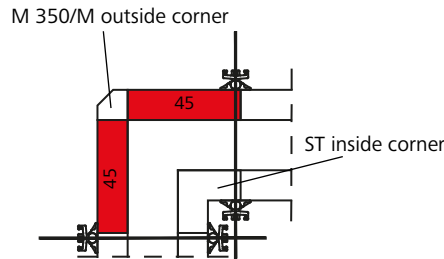


Fig. 24.1 Wall thickness 20 cm

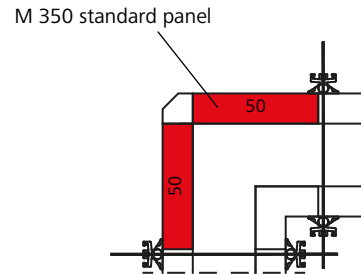


Fig. 24.2 Wall thickness 25 cm

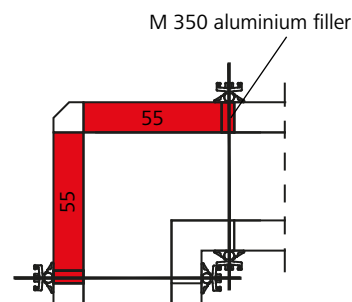


Fig. 24.3 Wall thickness 35 cm

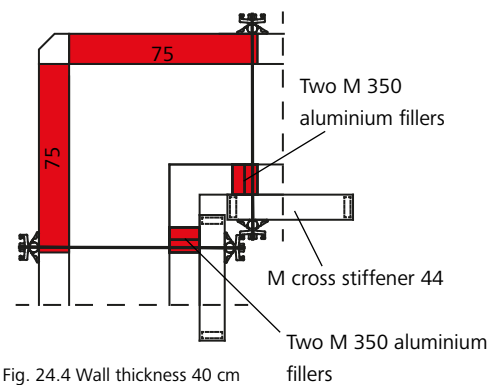


Fig. 24.4 Wall thickness 40 cm

Wall thickness (in cm)	M 350/M outside corner	M 350 inside corner	M 350 standard panel				M 350 aluminium filler
			45	50	55	75	
15	1	1	2				2 inside
20	1	1	2				
25	1	1		2			
30	1	1			2		
35	1	1			2		2 outside
40	1	1				2	4 inside
45	1	1				2	2 outside
50	1	1				2	

Table 24.5 Combinations

Description	Ref. No.
M 350 aluminium filler	
350/5.....	29-300-30
300/5.....	29-300-32
250/5.....	29-300-35
125/5.....	29-300-40
M cross stiffener 44	29-401-02

Wall formwork

Hinged corners

Acute and obtuse angled corners are formed using hinged inside and outside corners (Fig. 25.1).

At the outside corner, alignment rails must be attached to the multi-function profiles with flange screws.

Timber fillers and Uni-assembly locks are used for length compensation (Figures. 25.1 and 25.3).

The hinged outside and inside corners can be set to an angle of 70°, 90°, 120°, 135° or 180° with a locking device (Fig. 25.2).

Side length

- Outside corner 12.5 cm
- Inside corner 40 cm

Adjustment range

60° to 180°

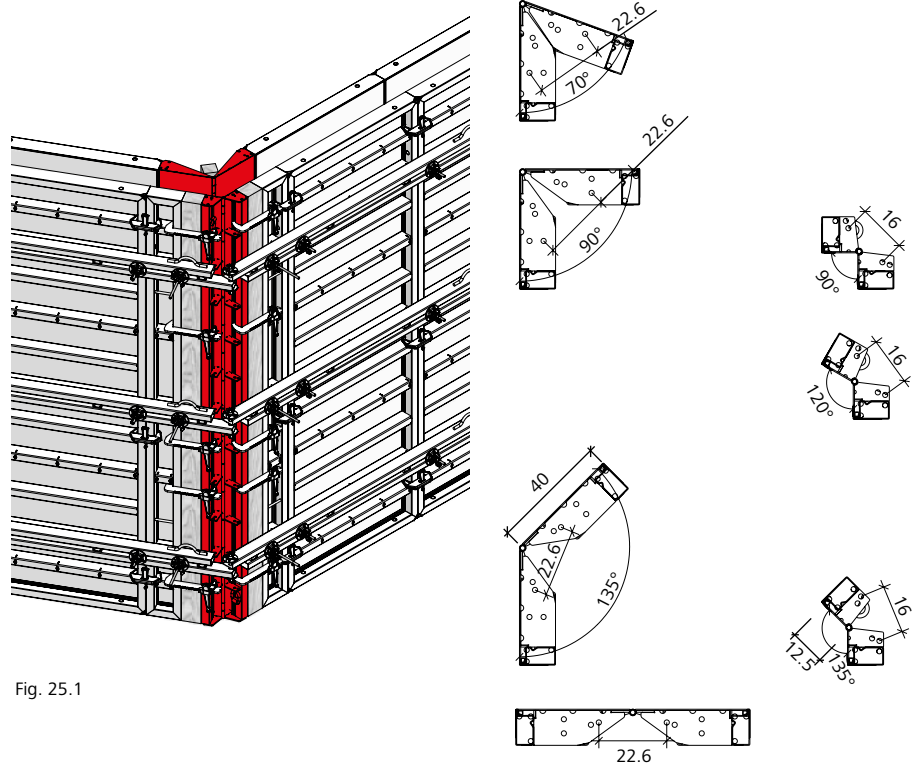


Fig. 25.1

Locking device



Locking device



Fig. 25.2

Description	Ref. No.
M 350 hinged corner	
outside 350/12.5	23-137-70
inside 350/40	23-137-30
M hinged corner	
outside 300/12.5	23-137-71
inside 300/40	23-137-31
outside 250/12.5	23-137-81
inside 250/40	23-137-41
outside 125/12.5	23-137-91
inside 125/40	23-137-51

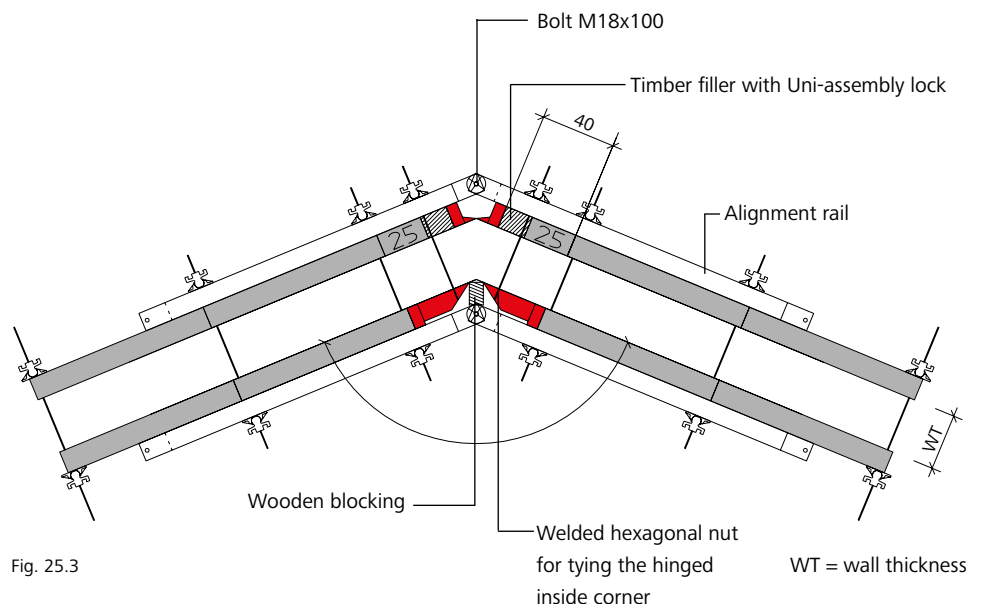


Fig. 25.3

Hinged corners

The tie rods are screwed into the welded-in hexagonal nuts of the hinged inside corner. For this purpose, holes are drilled at the required positions of the timber filler (Fig. 26.1).

If the inside angle α is greater than 100° , alignment rails and a wooden blocking are required on the inside (see Fig. 24.3 on page M350-25).

See Table 26.2 to determine the width (y) between the hinged outside corner and the first panel where a tie can be used.

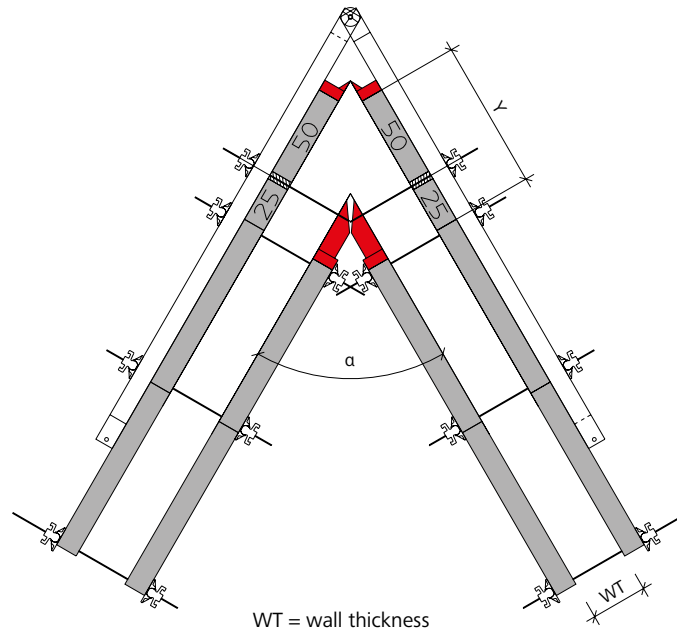


Fig. 26.1

$$\text{Equation to calculate the width } y = \frac{WT}{\tan \frac{\alpha}{2}} + 27.5 \text{ [cm]}$$

Inside angle (α)	Wall thickness (WT)						
	24 cm	25 cm	30 cm	35 cm	40 cm	45 cm	50 cm
60°	Y = 69.1	Y = 70.8	Y = 79.5	Y = 88.1	Y = 96.8	Y = 105.4	Y = 114.1
65°	Y = 65.2	Y = 66.7	Y = 74.6	Y = 82.4	Y = 90.3	Y = 98.1	Y = 106.0
70°	Y = 61.8	Y = 63.2	Y = 70.3	Y = 77.5	Y = 84.6	Y = 91.8	Y = 98.9
75°	Y = 58.8	Y = 60.1	Y = 66.6	Y = 73.1	Y = 79.6	Y = 86.1	Y = 92.7
80°	Y = 56.1	Y = 57.3	Y = 63.3	Y = 69.2	Y = 75.2	Y = 81.1	Y = 87.1
85°	Y = 53.7	Y = 54.8	Y = 60.2	Y = 65.7	Y = 71.2	Y = 76.6	Y = 82.1
90°	Y = 51.5	Y = 52.5	Y = 57.5	Y = 62.5	Y = 67.5	Y = 72.5	Y = 77.5
95°	Y = 49.5	Y = 50.4	Y = 55.0	Y = 59.6	Y = 64.2	Y = 68.7	Y = 73.3
100°	Y = 47.6	Y = 48.5	Y = 52.7	Y = 56.9	Y = 61.1	Y = 65.3	Y = 69.5
105°	Y = 45.9	Y = 46.7	Y = 50.5	Y = 54.4	Y = 58.2	Y = 62.0	Y = 65.9
110°	Y = 44.3	Y = 45.0	Y = 48.5	Y = 52.0	Y = 55.5	Y = 59.0	Y = 62.5
115°	Y = 42.8	Y = 43.4	Y = 46.6	Y = 49.8	Y = 53.0	Y = 56.2	Y = 59.4
120°	Y = 41.4	Y = 41.9	Y = 44.8	Y = 47.7	Y = 50.6	Y = 53.5	Y = 56.4
125°	Y = 40.0	Y = 40.5	Y = 43.1	Y = 45.7	Y = 48.3	Y = 50.9	Y = 53.5
130°	Y = 38.7	Y = 39.2	Y = 41.5	Y = 43.8	Y = 46.2	Y = 48.5	Y = 50.8
135°	Y = 37.4	Y = 37.9	Y = 39.9	Y = 42.0	Y = 44.1	Y = 46.1	Y = 48.2
140°	Y = 36.2	Y = 36.6	Y = 38.4	Y = 40.2	Y = 42.1	Y = 43.9	Y = 45.7
145°	Y = 35.1	Y = 35.4	Y = 37.0	Y = 38.5	Y = 40.1	Y = 41.7	Y = 43.3
150°	Y = 33.9	Y = 34.2	Y = 35.5	Y = 36.9	Y = 38.2	Y = 39.6	Y = 40.9
155°	Y = 32.8	Y = 33.0	Y = 34.2	Y = 35.3	Y = 36.4	Y = 37.5	Y = 38.6
160°	Y = 31.7	Y = 31.9	Y = 32.8	Y = 33.7	Y = 34.6	Y = 35.4	Y = 36.3
165°	Y = 30.7	Y = 30.8	Y = 31.4	Y = 32.1	Y = 32.8	Y = 33.4	Y = 34.1
170°	Y = 29.6	Y = 29.7	Y = 30.1	Y = 30.6	Y = 31.0	Y = 31.4	Y = 31.9
175°	Y = 28.5	Y = 28.6	Y = 28.8	Y = 29.0	Y = 29.2	Y = 29.5	Y = 29.7
180°	Y = 27.5	Y = 27.5	Y = 27.5	Y = 27.5	Y = 27.5	Y = 27.5	Y = 27.5

Table 26.2

Wall formwork

Stripping corner

The M stripping corners 350 (Fig. 27.1), 300, 250 and 125 allow the formwork to be removed safely and quickly from poured shaft walls, for example, without damaging the walls or formwork. They function according to the "jumping jack" principle.

The stripping corner is a three-piece design to permit inward movement of the lateral parts. (Fig. 27.4)

The side length is 25 cm.

The height of the stripping corner can be increased easily (Fig. 27.1).

After pouring and when the concrete has set sufficiently, the entire shaft formwork can be detached from the concrete by activating all stripping corners (Fig. 27.2 and pages M350-31 to -33). The shaft formwork can then be lifted out in one piece by crane (Fig. 27.3). The formwork must be completely detached from the concrete before it can be lifted out by crane.

Note

Before pouring, cover the joints on the sides of the stripping corner with adhesive tape to make it easier to clean.

Attention

When slinging with several strands, only two strands may be considered to be load-bearing according to the Berufsgenossenschaft (the German employers' liability insurance association). This does not apply if it has been ensured that the load is distributed evenly over further strands or if the permissible loading of the individual strands is not exceeded in the event of an unequal load distribution.

The maximum permissible loading of the crane eye per stripping corner is 10 kN (1 tons). This results in a permissible total weight of the complete shaft formwork of 40 kN (4 tons) if it has been ensured that the load is evenly distributed (the contractor is responsible for this). Otherwise, the permissible total weight is 20 kN (2 tons). The permissible loading of the M crane hook is 15 kN (1.5 tons). This results in a permissible total weight of the complete shaft formwork of 60 kN (6 tons) if it has been ensured that the load is evenly distributed (the contractor is responsible for this). Otherwise, the permissible total weight is 30 kN (3 tons). For higher loads, a spreader beam must be used.

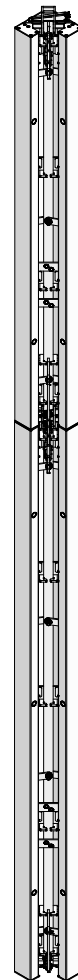


Fig. 27.1

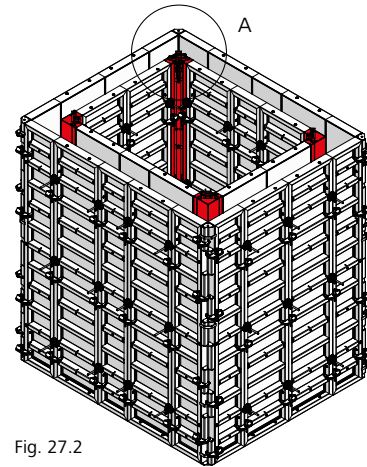


Fig. 27.2

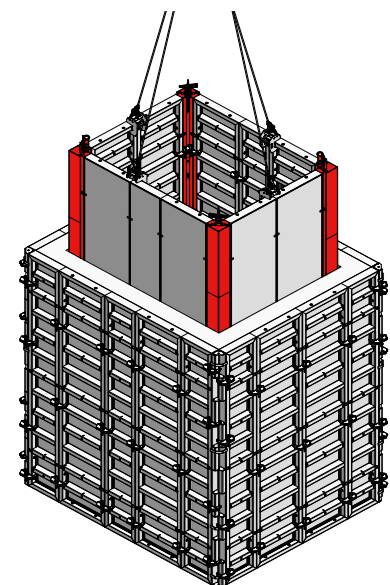


Fig. 27.3

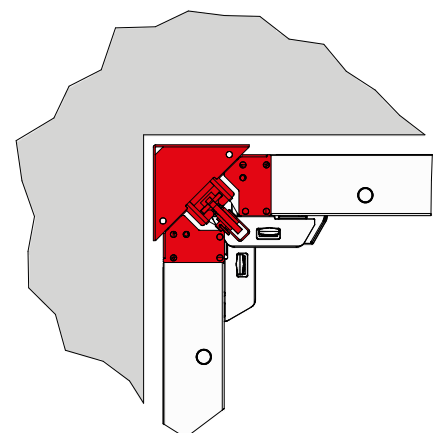


Fig. 27.4 Detail A

Description	Ref. No.
M 350 stripping corner	
350/25.....	23-151-00
300/25.....	23-151-10
250/25.....	23-151-20
125/25.....	23-151-30
Adhesive tape.....	41-912-10

Stripping corner

Attachment and position of assembly locks

The function of the M 350 stripping corner 350/25 can only be guaranteed if the M assembly locks connecting the stripping corner to the panels are positioned in certain areas of the stripping corner.

No assembly locks can be attached and positioned in the grey shaded areas.

Height 350 cm requires three assembly locks (Fig. 28.1).

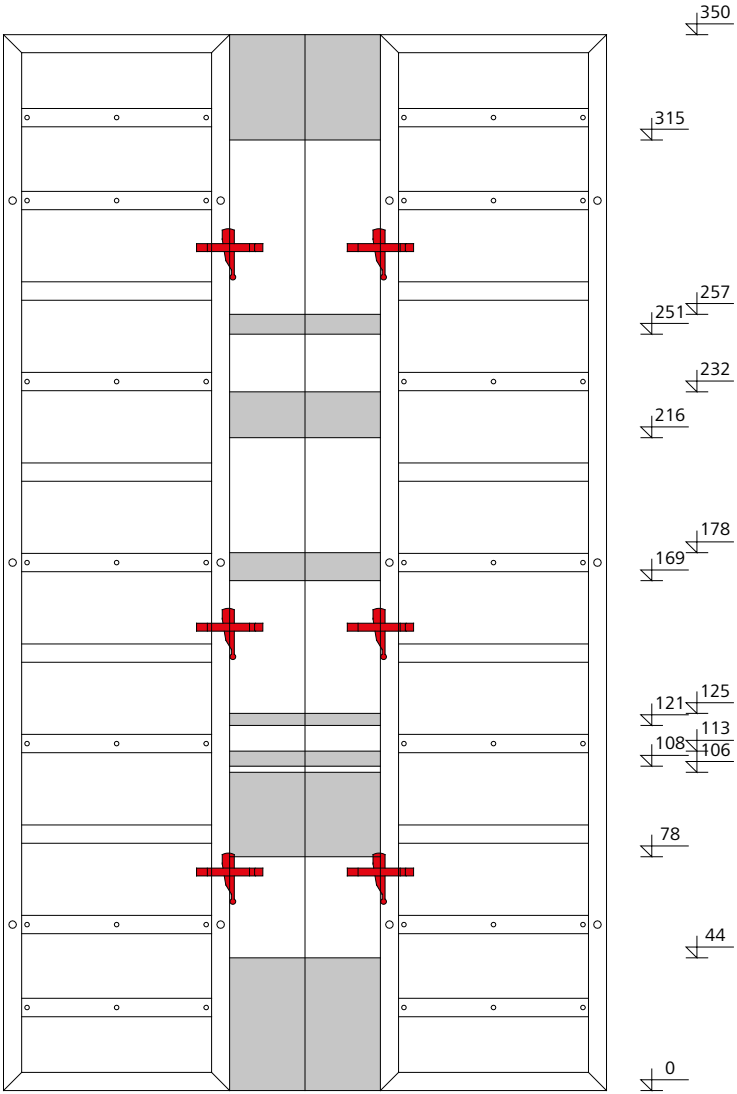



Fig. 28.1 M stripping corner 350/25

 No assembly locks possible in grey shaded areas!

Description	Ref. No.
M 350 stripping corner 350/25.....	23-151-00

Stripping corner

Attachment and position of assembly locks

The function of the M 350 stripping corner 300/25 can only be guaranteed if the M assembly locks connecting the stripping corner to the panels are positioned in certain areas of the stripping corner.

No assembly locks can be attached and positioned in the grey shaded areas.

Height 300 cm requires two assembly locks (Fig. 29.1).

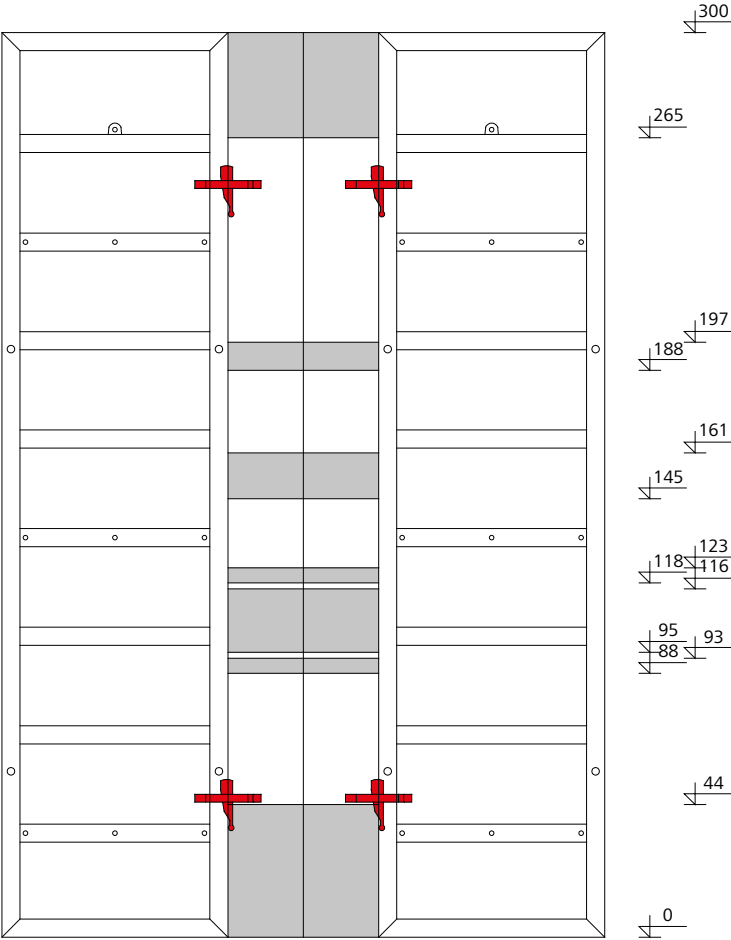



Fig. 29.1 M stripping corner 300/25

 No assembly locks possible in grey shaded areas!

Description	Ref. No.
M 350 stripping corner 300/25.....	23-151-10

Stripping corner

Attachment and position of assembly locks

The function of the M 350 stripping corner can only be guaranteed if the M assembly locks connecting the stripping corner to the panels are positioned in certain areas of the stripping corner.

No assembly locks can be attached and positioned in the grey shaded areas.

Up to a height of 250 cm two assembly locks are required (Figures 30.1 and 30.2).

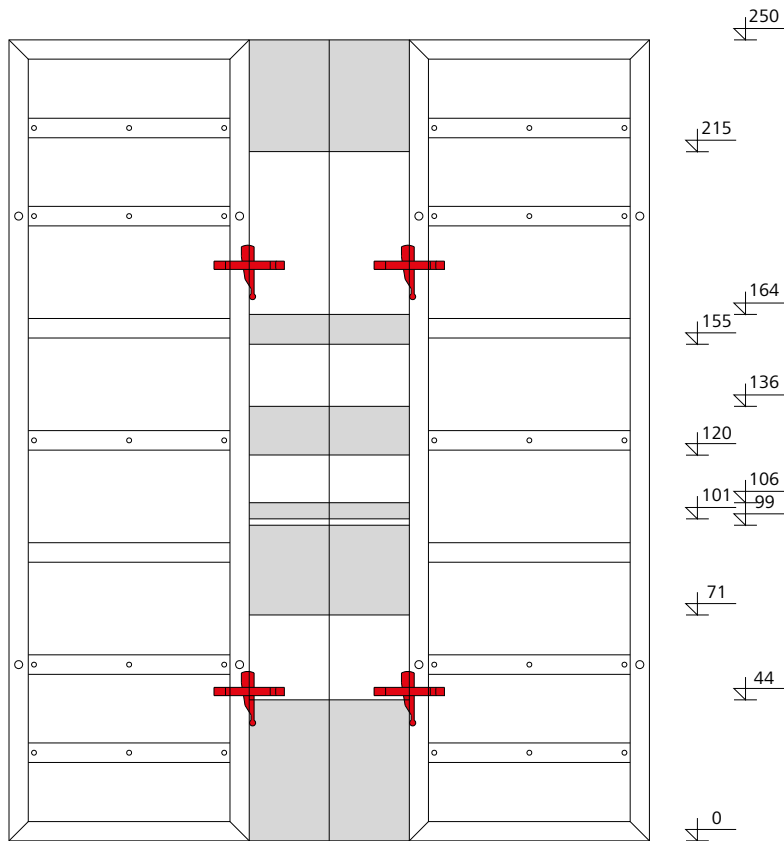


Fig. 30.1 M stripping corner 250/25

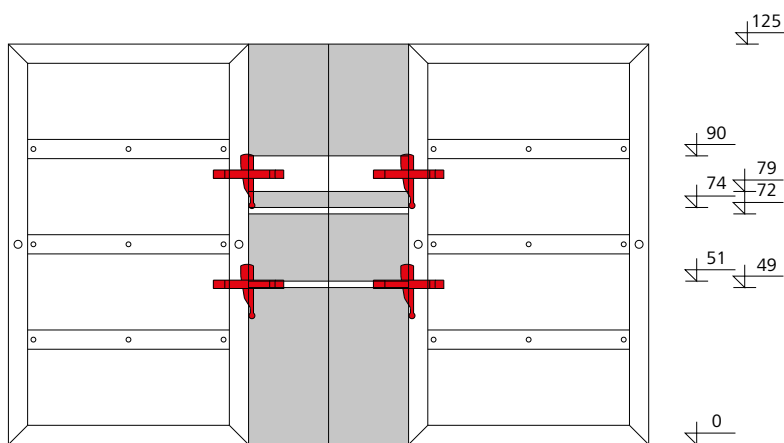



Fig. 30.2 M stripping corner 125/25

 No assembly locks possible in grey shaded areas!

Description	Ref. No.
M 350 stripping corner	
250/25.....	23-151-20
125/25.....	23-151-30

Stripping corner

Set-up and handling

1. Insert the wedge integrated into the stripping corner into the connecting device (Position C, Fig. 31.6).
2. Connect the stripping corners and panels (see pages M350-28 and -30).
3. Remove the wedges after pouring and prior to stripping.
4. Activate the stripping corner with a crowbar. The bell-crank lever is pushed upwards using the crowbar. The crowbar can be applied at the bottom at position A (Fig. 31.3) or in the middle at position B (Fig. 31.4). This breaks the bond between the formwork facing and the concrete without much effort.

Pages M350-32 and -33 describe how to activate the stripping corner with the stripping support.

5. Attach the stripping corners with crane slings to the crane gear. Make sure the entire formwork is completely removed from the poured walls before lifting it by crane.
6. The entire formwork is moved in one single lift and detached from the crane when it is in its new position.
7. The stripping corner can be reset for the next pour by positioning the crowbar at position C (Fig. 31.5) and pushing the bell-crank lever down.
8. Reinsert the wedge into the connecting device (Fig. 31.6).
9. A few hammer blows to the wedge will move the lateral parts of the stripping corner outwards and keep them in the pouring position.

Height extension

Two stripping corners can be connected to each other easily by joining their bell-crank levers. The integrated pin must be secured with the cotter pin (Position D, Fig. 31.1).

Position D

Bolt with cotter pin

Bell-crank lever

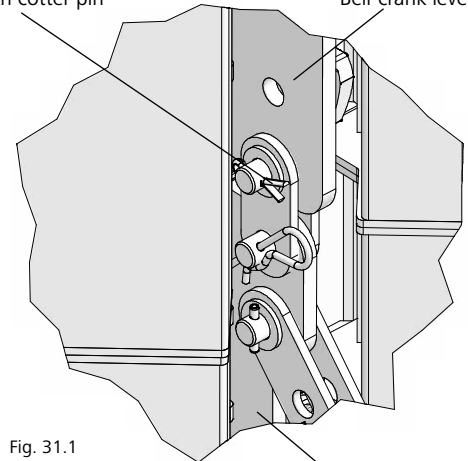


Fig. 31.1

Bell-crank lever

Position B

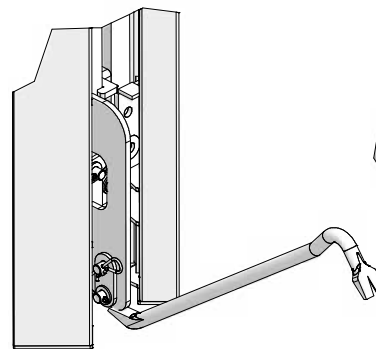


Fig. 31.3

Position B

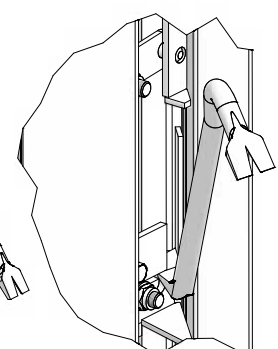


Fig. 31.4

Position C

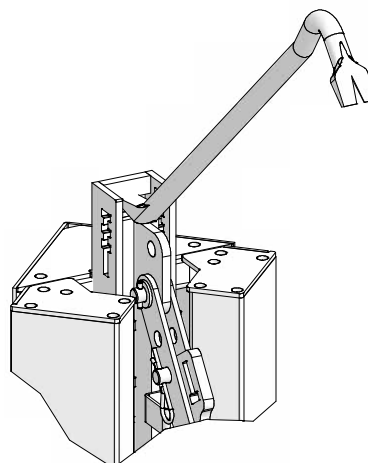


Fig. 31.5

Connecting device

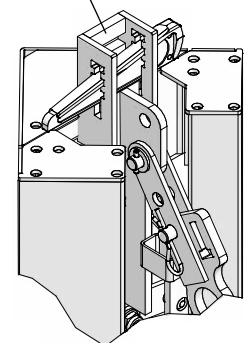


Fig. 31.6 Pouring position

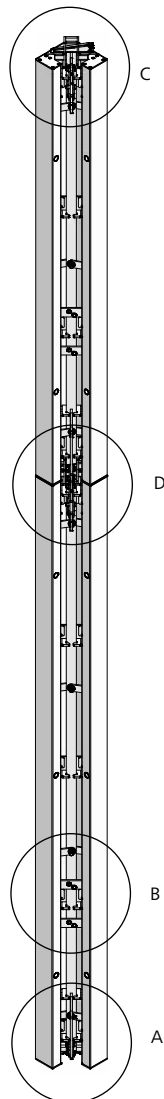


Fig. 31.2

Description	Ref. No.
M 350 stripping corner	
350/25.....	23-151-00
300/25.....	23-151-10
250/25.....	23-151-20
125/25.....	23-151-30

Stripping corner

Stripping support

The stripping support (Fig. 32.1) is used to easily activate the stripping corner from above

with a power screwdriver, a ratchet spanner or a spanner. Tools with width across flats of 27, 30 or 36 mm are to be used.

Assembly

1. Place the stripping support onto the connecting device at the top of the stripping corner. Make sure the suspension is inclined downwards (Fig. 32.2).
2. Connect the stripping support to the stripping corner with the head bolt 16/40 and cotter pin 4 that are both integrated into the tensioning screw of the stripping support (Fig. 32.2).
3. Lock the stripping support to the stripping corner by driving the stripping corner's wedge with a few hammer blows into the opening of the stripping support (Fig. 32.2).

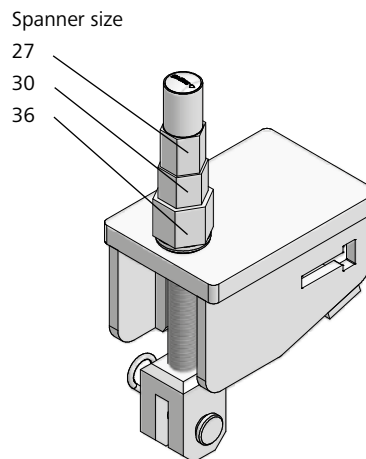


Fig. 32.1

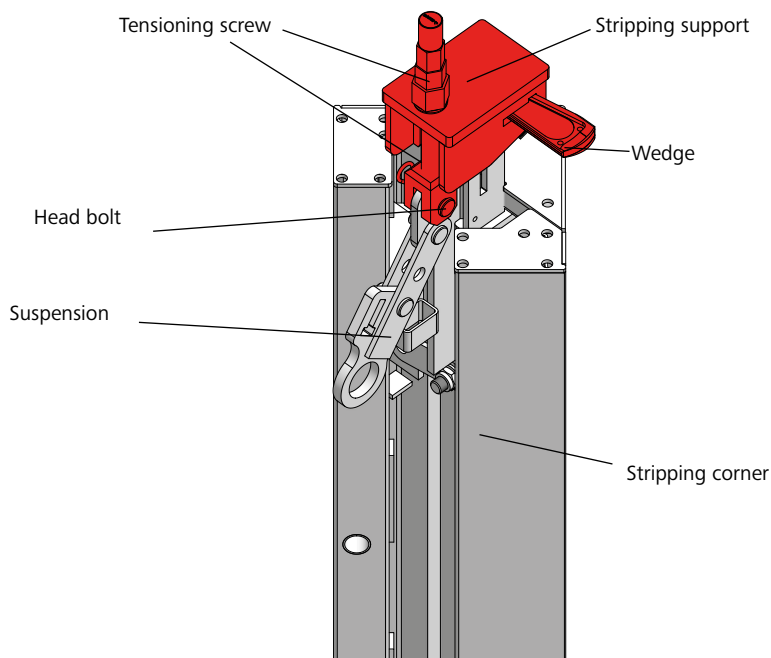


Fig. 32.2

Description	Ref. No.
Stripping support.....	29-306-30
Spanner size 27	29-800-10

Stripping corner

Working principle of the stripping support

The stripping support has three hexagonal nuts that are operated with tools with width across flats of 27, 30 and 36 mm.

Turning the hexagonal nut on the tensioning screw with a power screwdriver (Fig. 33.1), a ratchet spanner (Fig. 33.2) or a spanner moves the bell-crank lever upwards.

This activates the stripping corner and separates the shaft formwork from the poured walls (Fig. 33.4).

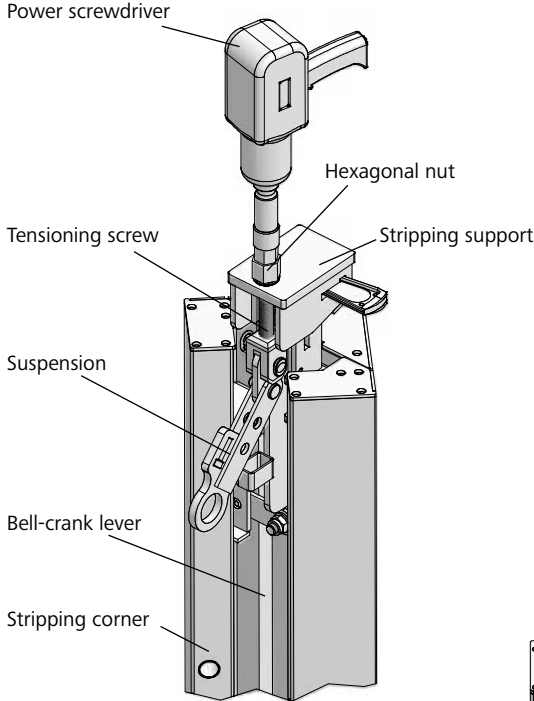


Fig. 33.1

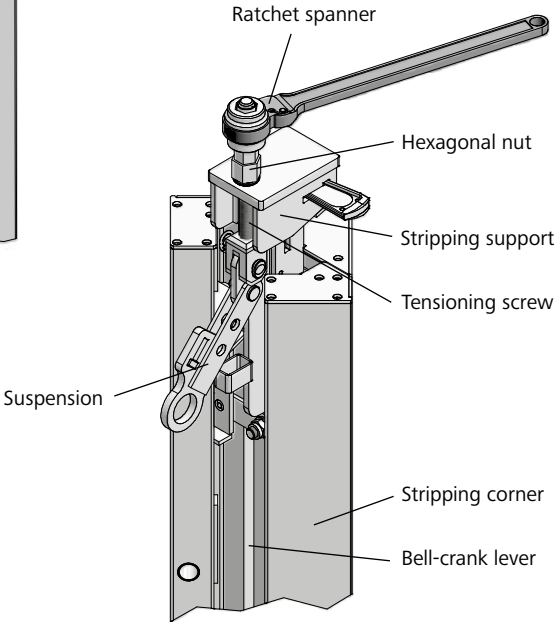


Fig. 33.2

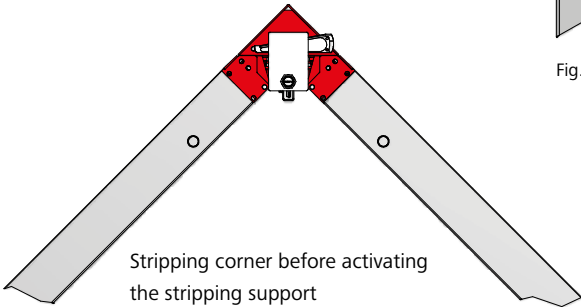


Fig. 33.3

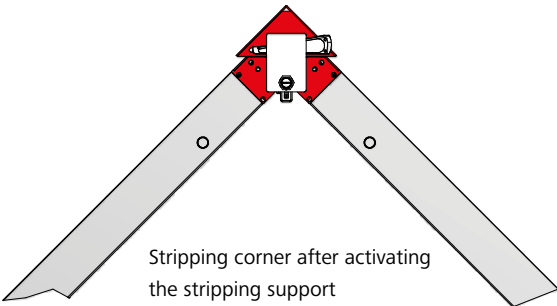


Fig. 33.4

Description	Ref. No.
Stripping support.....	29-306-30
Spanner size 27	29-800-10

Stripping corner

The M stripping corner can also be used as a stripping support for panels between corners inside a room. In this case, the stripping corner is used to reduce the tension between the panels so that they can easily be removed from the poured wall between the corners.

Steps

- 1. Remove the M assembly locks connecting the stripping corners to the panels (Fig. 34.1).
- 2. Activate the M stripping corner (Fig. 34.2 and pages M350-31 to -33).
- 3. Lift the stripping corners off, then strip the panels (Fig. 34.3).

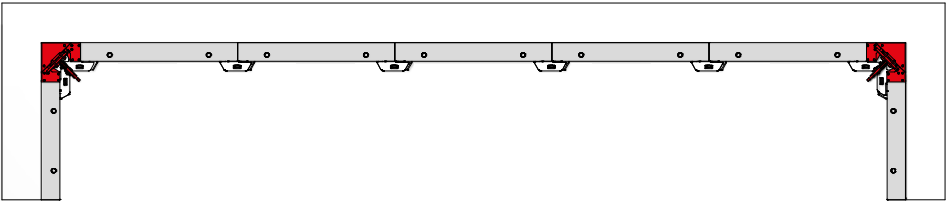


Fig. 34.1

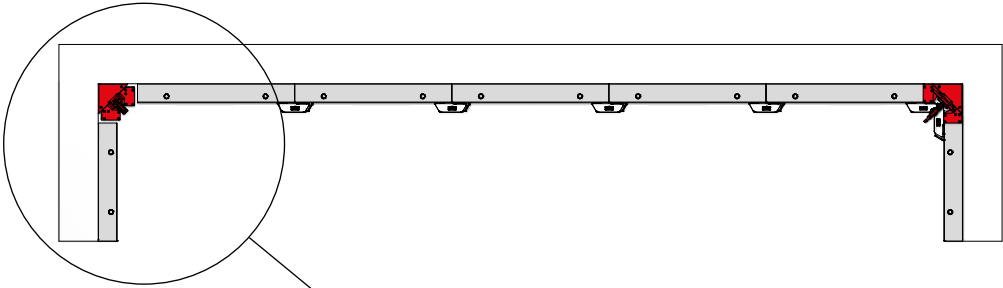


Fig. 34.2

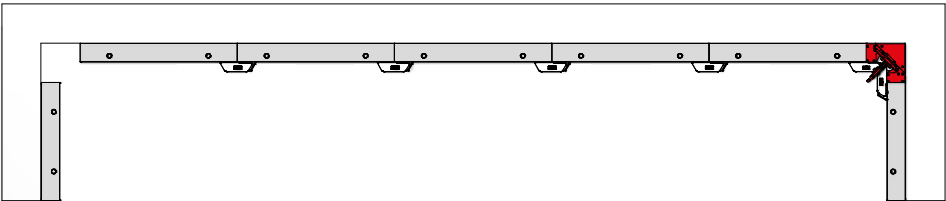


Fig. 34.3

Stripping panel – For stripping support of short walls

Walls of less than 6 m require a filler for easy formwork stripping.

The M stripping panel (Fig. 35.1) allow inside formwork to be easily stripped.

Steps

1. Remove the M assembly locks connecting Part 2 of the stripping panel with the adjoining panel (Fig. 35.3).
2. Screw the integrated flange screws out of the assembly threads, then screw them into the stripping threads of Part 2 until Part 2 has been removed from the poured wall (Fig. 35.4).
3. Part 2 can now be removed while Part 1 of the stripping panel remains connected to the panel.
4. With Part 2 removed, there is no longer any tension between the wall formwork panels. They can now easily be removed from the wall one at a time or in groups.

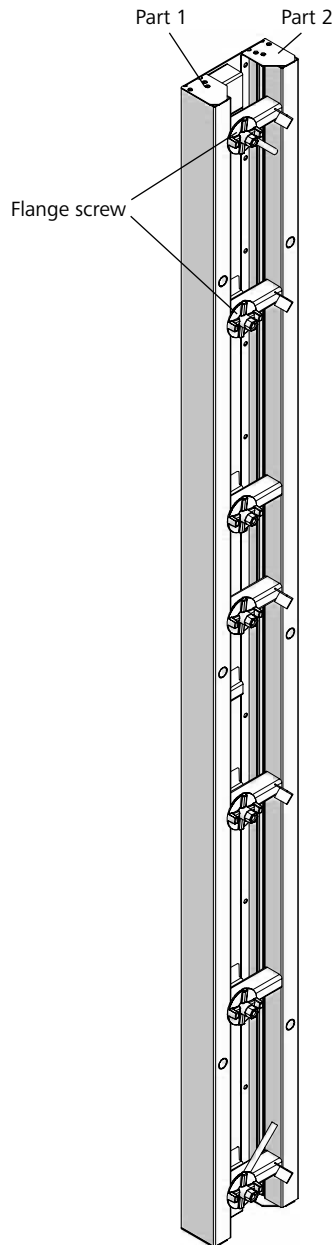


Fig. 35.1
M 350 stripping panel

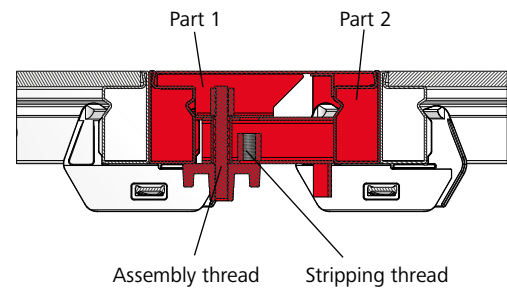


Fig. 352
Stripping panel in assembled formwork

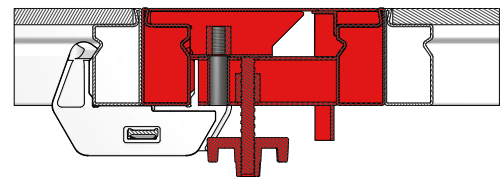


Fig. 353
Step 1 when stripping

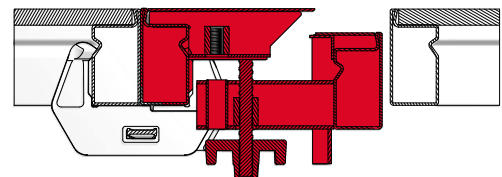


Fig. 354
Step 2 when stripping

Description	Ref. No.
M 350 stripping corner	
350/30.....	23-135-05
M stripping panel 300/30.....	23-135-10
M stripping panel 250/30.....	23-135-20
M stripping panel 125/30.....	23-135-30

Wall formwork

Length compensation

Timber filler

Gaps up to 10 cm can be filled on-site using timber fillers and Uni-assembly locks 22, while for gaps up to 16 cm timber fillers and Uni-assembly locks 28 are used. The compensation areas are reinforced with alignment rails, which must always be attached to the panels' multi-function profiles.

Timber profile

Timber profiles are used for gaps exceeding 17 cm. A facing is cut to size and attached to the timber profiles. Reinforcement is achieved using alignment rails which are attached to the tie holes of the multifunction profiles with articulated flange nuts (Figures 36.1 and 36.2).

For problem areas, job-built formwork is attached to the panels using M timber profiles and M assembly locks (Figures 36.3 to 36.5).

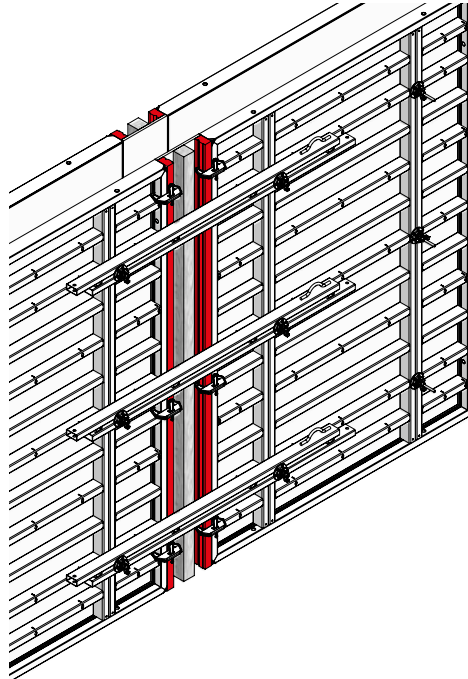


Fig. 36.1

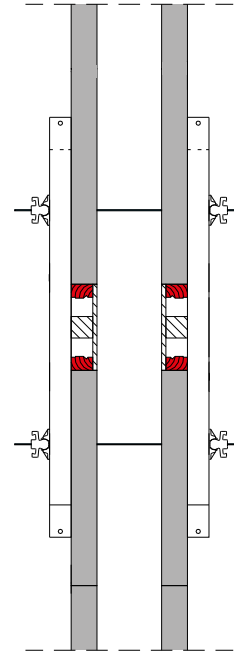


Fig. 36.2

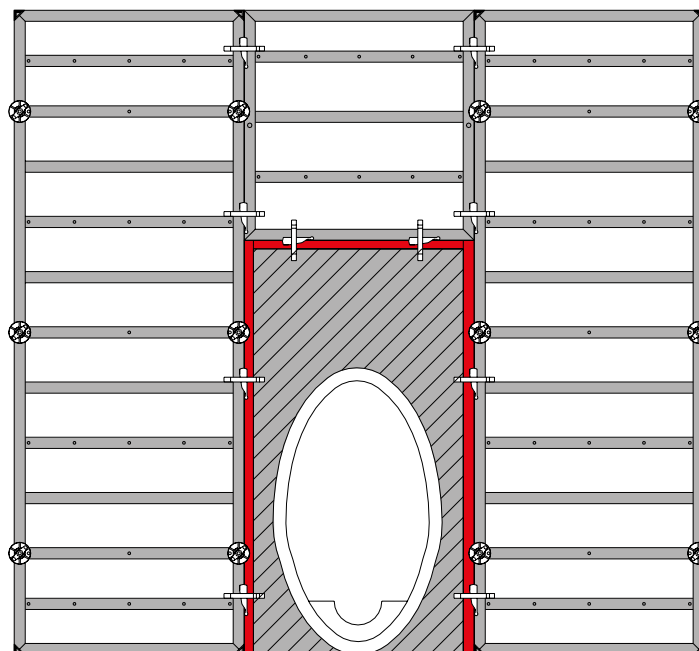


Fig. 36.3

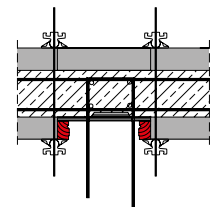


Fig. 36.4

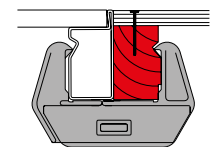


Fig. 36.5

Description	Ref. No.
Uni-assembly lock 22	29-400-85
Uni-assembly lock 28	29-400-90
M timber profile 350/21	29-400-02
M timber profile 300/21	29-400-05
M timber profile 250/21	29-400-15
M timber profile 125/21	29-400-17
M 350 aluminium filler 350/5	29-300-30
300/5	29-300-32
250/5	29-300-35
125/5	29-300-40

Length compensation

The maximum filler width X for the bracing at tie hole level (Figures 37.1 and 37.2) is determined by the permissible fresh-concrete pressure and the type of alignment rail used, see Table 37.3.

Note

When compensating for gaps near outside corners or stop ends, the vertical tensile force must be taken into consideration. In this case, fasten the alignment rail with flange screws on both sides of the filler at tie hole level (Fig. 37.1).

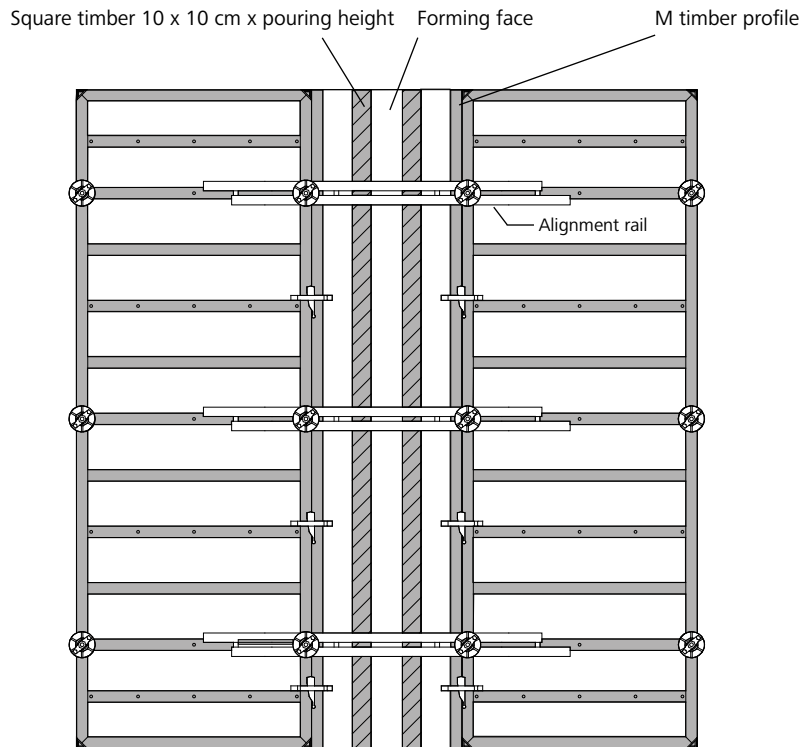


Fig. 37.1 Alignment rails at tie hole level

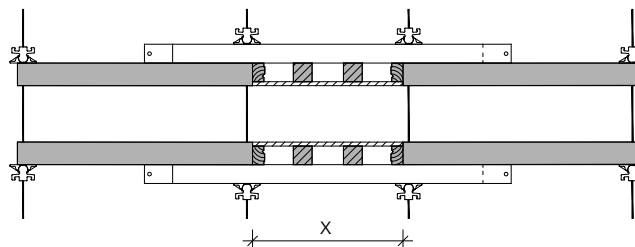


Fig. 37.2

Table to determine the permissible compensation width X depending on the bracing and permissible fresh-concrete pressure (flatness according to DIN 18202, Table 3, line 6)

Alignment rail	Cross-section	Compensation width X	
		Tie hole level	
		70 kN/m ²	100 kN/m ²
M alignment rail 180	2 RR 100 x 50 x 3	1.00 m	1.00 m *
M alignment rail 250		1.10 m	1.00 m *
Crossbeam 300	2 RR 100 x 60 x 4	1.75 m	1.45 m *
M alignment rail 450		1.75 m	1.45 m *
M alignment rail 450 reinforced	2 U profiles 140	2.65 m	2.25 m *

Table 37.3

* refers to multiple-span beams

Description	Ref. No.
M alignment rail 450 reinforced	29-402-38
M alignment rail 450	29-402-40
M alignment rail 350 reinforced	29-402-45
M alignment rail 250	29-402-50
M alignment rail 180	29-400-92
Uni-assembly lock 22	29-400-85
Uni-assembly lock 28	29-400-90
M assembly lock	29-400-71
M cross stiffener 44	29-401-02

T wall connections

Figures 38.1 to 38.4 show a T-wall connection using two inside corners.

Different wall widths can be compensated for using timber fillers (Fig. 38.4).

For the load capacity of the alignment rails see page M350-37.

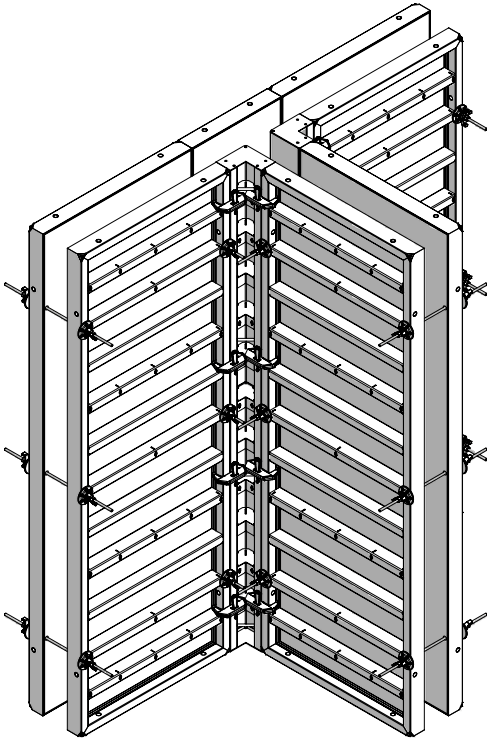


Fig. 38.1

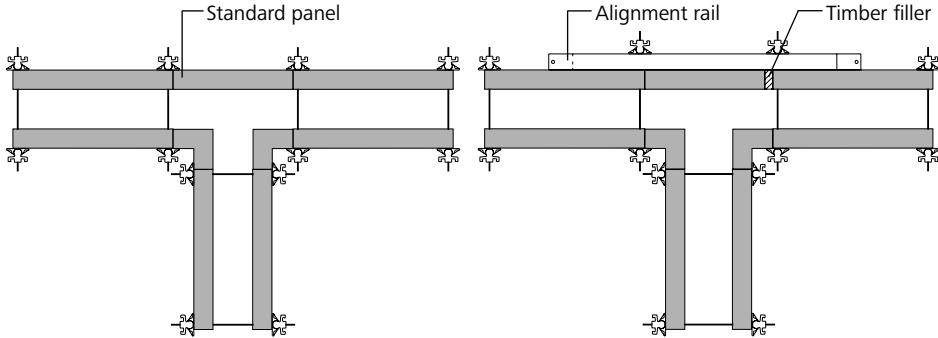


Fig. 38.2

Fig. 38.3

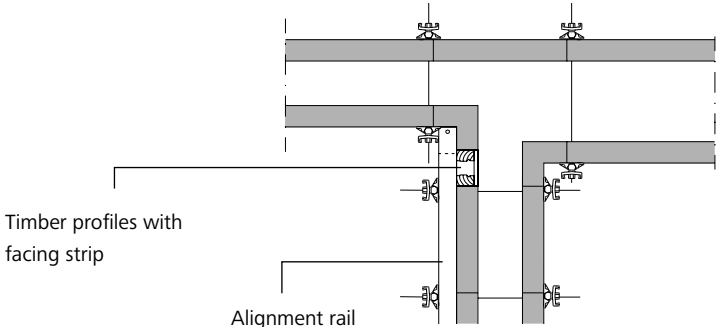


Fig. 38.4

Wall formwork

Connection to existing walls

Figures 39.1 to 39.6 show various options for connecting formwork to an existing wall. Depending on the wall layout and conditions on the construction site, the most suitable solution may vary from case to case.

Always make sure the formwork is firmly pressed up against the existing wall and attached to it without gaps in order to avoid leakage of the fresh concrete and a patchy concrete surface.

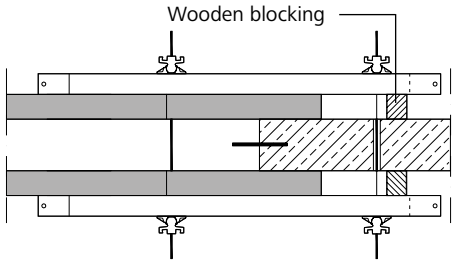


Fig. 39.1

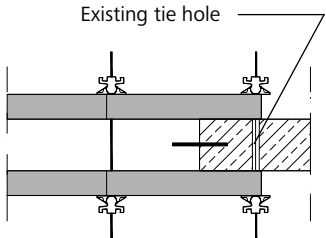


Fig. 39.2

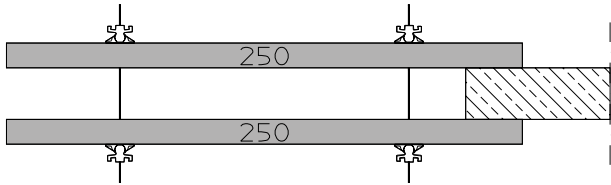


Fig. 39.3

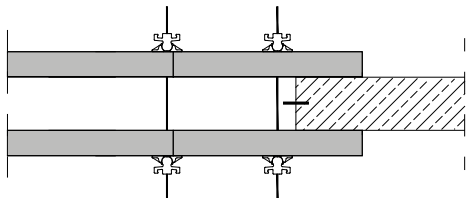


Fig. 39.4

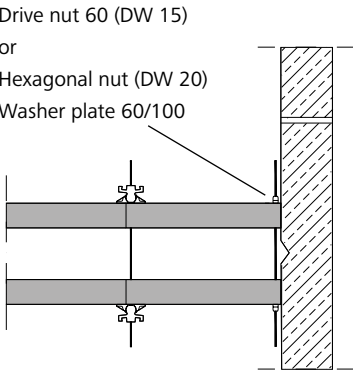


Fig. 39.5

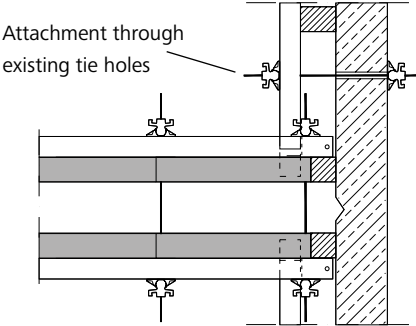


Fig. 39.6

Wall formwork

Stop ends

With outside corners and standard panels

Stop ends can also be formed using outside corners and standard panels (Figures 40.1 to 40.3).

Panels that are 50 cm wide or wider require additional bracing with alignment rails (Fig. 40.3). One alignment rail is required for reinforcement at each tie hole level.

For the number of assembly locks required at the outside corner and at the first panel joint refer to Table 40.4.

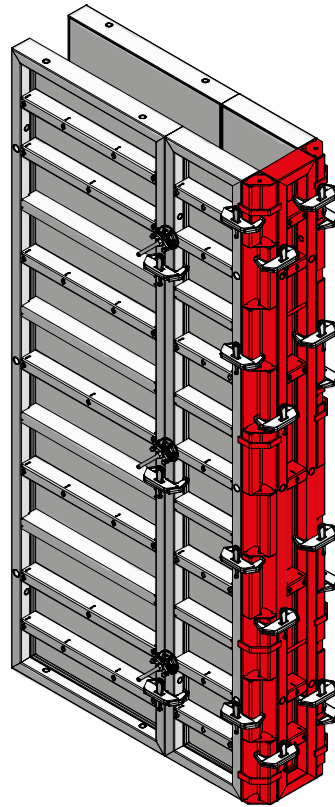


Fig. 40.1 Height 350 cm

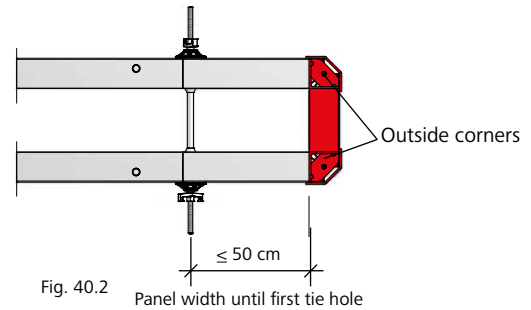


Fig. 40.2

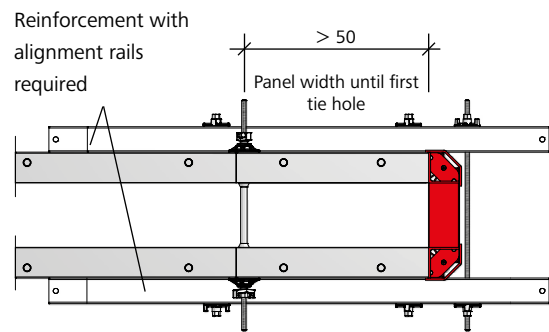


Fig. 40.3

Description	Ref. No.
M 350 outside corner 350	23-140-30
M outside corner 300	23-140-00
M outside corner 250	23-140-10
M outside corner 125	23-140-20

Pouring height	Number of M assembly locks	
	Corner (a)	At panel joint (b)
h = 1.25 m	2	2
h = 2.50 m	2	2
h = 3.00 m	3	2
h = 3.50 m	4	3
h = 3.75 m	5	4
h = 4.25 m	6	5
h = 4.75 m	6	5
h = 5.00 m	6	5
h = 5.50 m	7	6
h = 6.00 m	8	7
h = 7.00 m	8	7

Table 40.4

Wall formwork

Stop ends

A stop end can be formed either with a stop end bracket, column clamp and alignment rail or a size 1 M column bracket and standard panels. The stop end bracket is placed at tie hole level and replaces the tie rod (Fig. 41.1). Round stop ends can be formed with the Circo circular steel column formwork (Fig. 41.2).

Column clamps with alignment rails are attached at tie hole level (Fig. 41.3). Tying is done either outside the panels with Uni-tie claws and tie rods (Figures 41.3 and 41.4) or through the tie holes. Size 1 column brackets are attached to the multifunction profiles at tie hole level. The stop end can be built with square timbers and a facing (Fig. 41.5) or with standard panels that match the wall thickness (Fig. 41.6). Tying is done through the column bracket.

Attention

Never use DW tie rods for stop ends if these are going to be subject to shear stress. Tying must always be done at the column bracket.

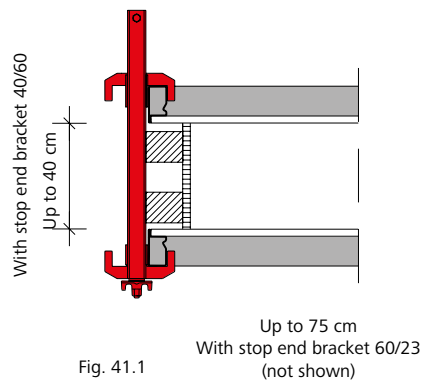


Fig. 41.1

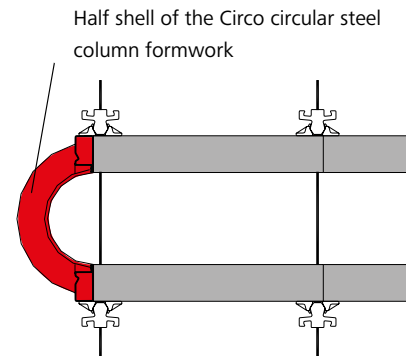


Fig. 41.2: Use M assembly lock for walls up to 60 cm thick. From 65 cm use Circo-Mammut transition lock.

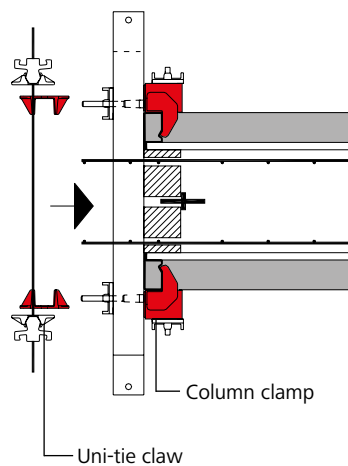


Fig. 41.3

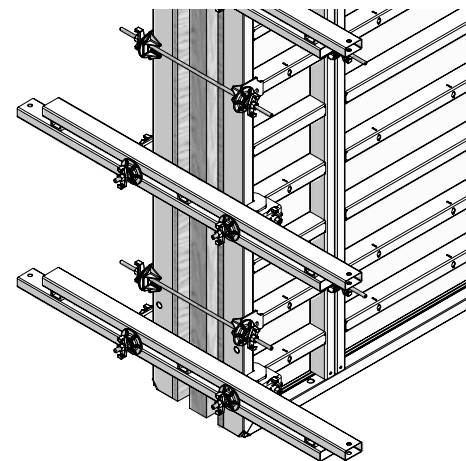


Fig. 41.4

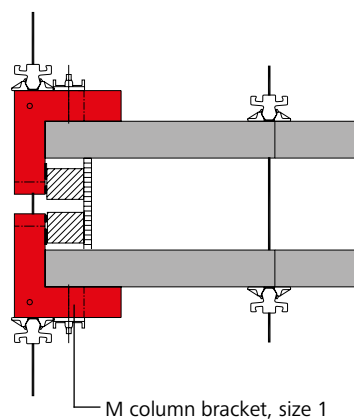


Fig. 41.5

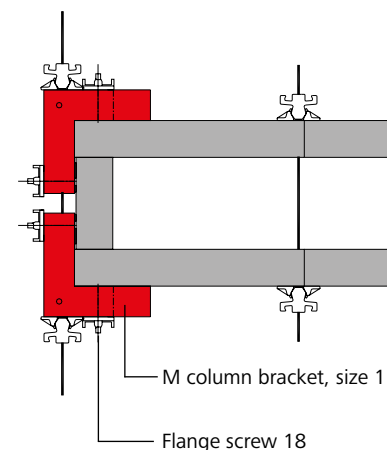


Fig. 41.6

Description	Ref. No.
Stop end bracket 60/23	29-105-60
Stop end bracket 40/60	29-105-50
M column bracket, size 1	79-402-13
Column clamp 21	29-402-70
Uni-tie claw	29-901-41
M assembly lock	29-400-71
Transition lock	
Circo-Mammut	29-400-80

Wall formwork

Wall offset

One-sided wall offsets of up to 10 cm are formed by moving back the standard panel (Figures 42.1 and 42.4).

For offsets greater than 13 cm inside corners should be used (Figures 42.2 and 42.5).

A wall offset as depicted in Fig. 42.3 can be created using inside corners and M outside corner brackets.

All types of wall offset require alignment rails for reinforcement.

If the panels are offset as shown in Fig. 42.3, they can be connected with Uni-assembly locks, see Fig. 42.5.

Tie rods of any length can be used to firmly bridge problem areas, e.g. pilasters, wall offsets, projecting building parts. They can be attached at all multi-function profiles irrespectively of the tie holes.

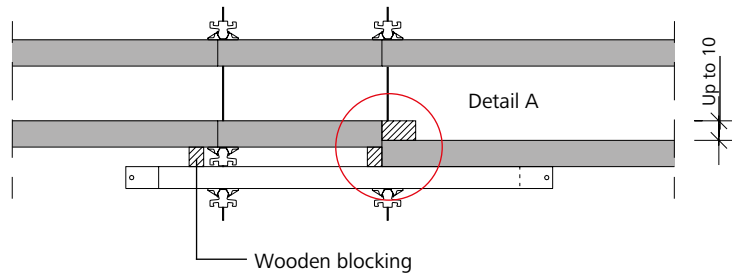


Fig. 42.1

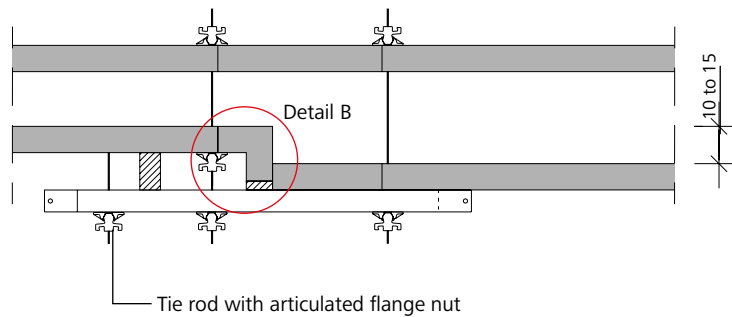


Fig. 42.2

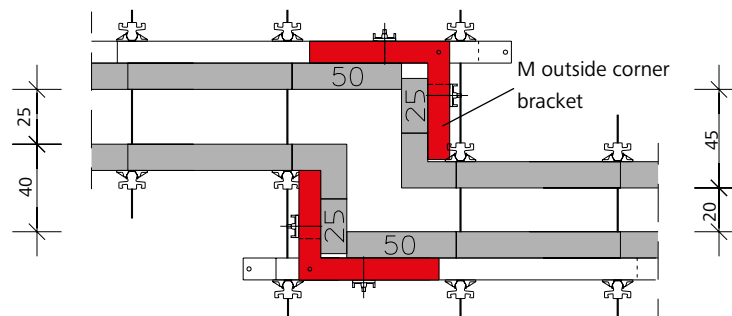


Fig. 42.3

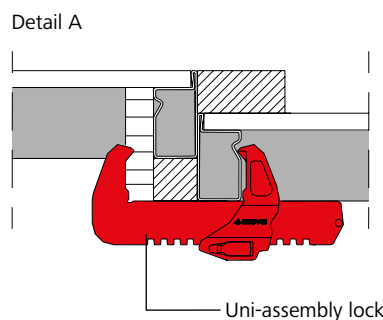


Fig. 42.4

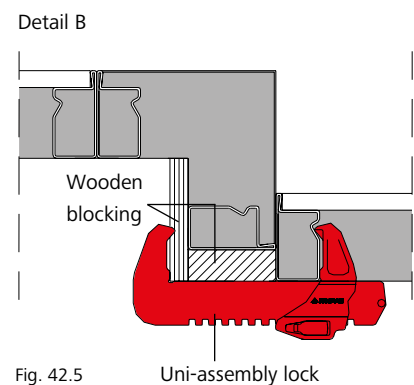


Fig. 42.5

Description	Ref. No.
M outside corner bracket.....	23-137-63
Uni-assembly lock 22	29-400-85
Uni-assembly lock 28	29-400-90

Pilasters

Standard pilasters are easily formed with inside corners, standard panels and, where necessary, wooden blockings. Stop end brackets and alignment rails must be attached for reinforcement (Figures 43.1 to 43.4).

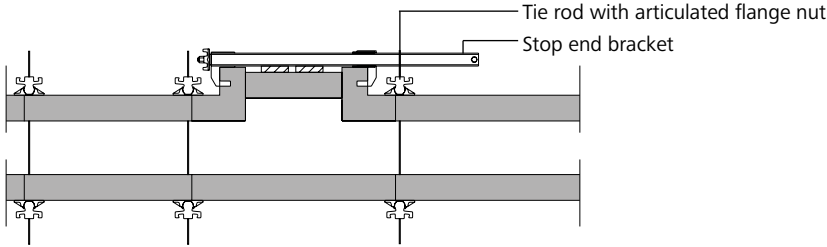


Fig. 43.1

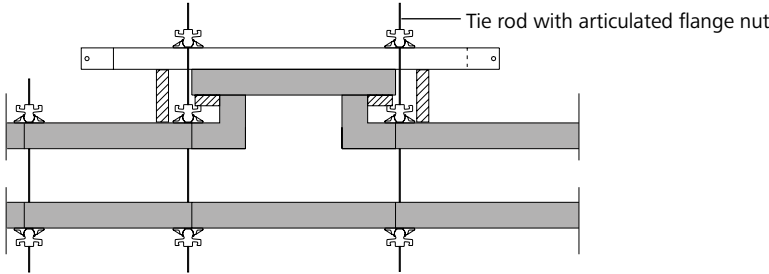


Fig. 43.2

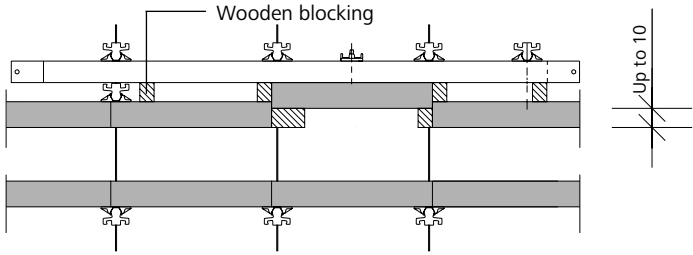


Fig. 43.3

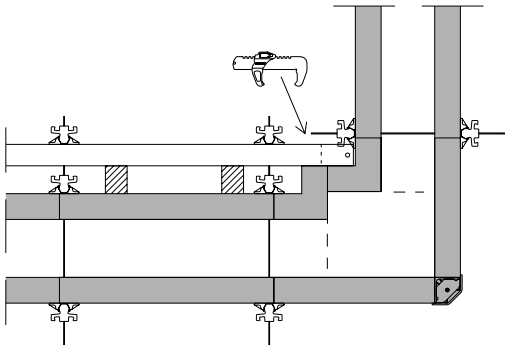


Fig. 43.4

Description	Ref. No.
Stop end bracket 40/60	29-105-50
Stop end bracket 2.5'-60/23 .	29-105-60

Differences in height

The assembly lock can be attached at any position on the frame profile (Fig. 44.1). The formwork's grid-free design does not require additional accessories for panel connection. Vertical, horizontal and inclined panels can all be safely and firmly connected with M assembly locks, even with differences in height.

A job-built length compensation is produced using timber profiles and an alkus facing cut to the size required or a wooden board. If required, use square timbers for reinforcing. A compensation larger than 36 cm requires a centred square timber to support the facing.

Square timbers and the facing are simply connected with M assembly locks. Pay special attention when using wood fillers (see page M350-35). It may be necessary to use alignment rails and/or wooden blockings.

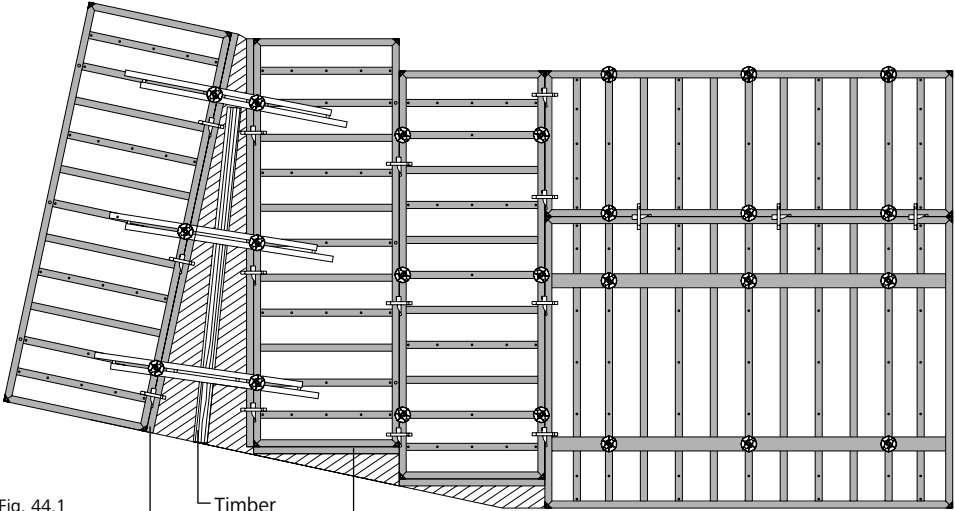


Fig. 44.1

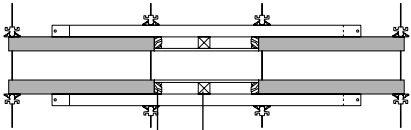


Fig. 44.2

Wall formwork

Horizontal panels

A lot of forming problems can easily be solved by arranging panels horizontally. These include basin walls in water treatment plants, foundations and strip footings which often require a certain height.

When using foundation tapes and tensioners M (Figures 45.1 and 45.2), there is no need to put tie rods through the lower tie holes, which is very time-consuming. The tensioner M for foundation tape is clamped to the panel.

When using panels horizontally, tie rods can nevertheless be installed in the bottom tie holes. In this case the drive nut 60 must be used (Figures 45.3 and 45.4).

Top ties: Instead of tying through the tie holes and the concrete, the Uni-tie claw can be used for tying above the panel and outside the concrete. Two Uni-tie claws, one tie rod DW 15 and two flange nuts 100 are required per tie connection (Figures 45.1 to 45.4). We also recommend the use of a plastic tube. It serves as a spacer and protects the tie connection against contamination.

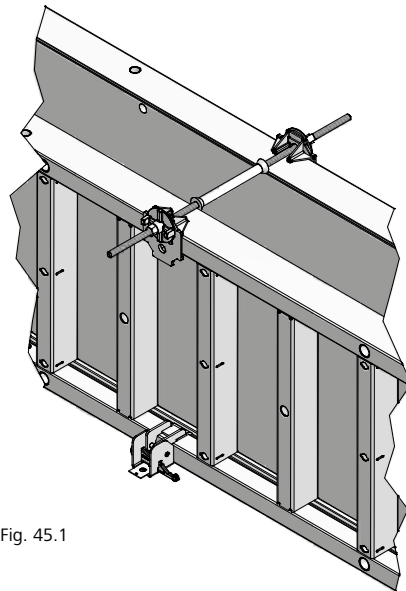


Fig. 45.1

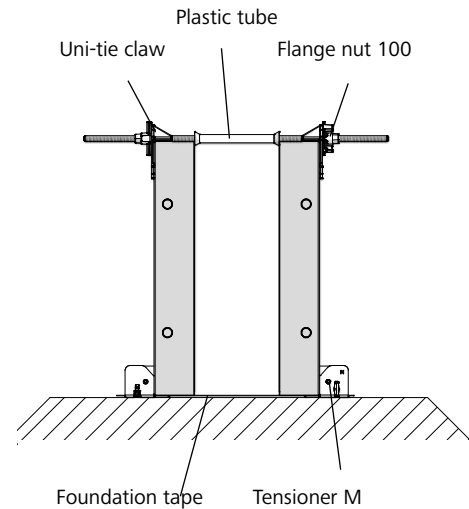


Fig. 45.2

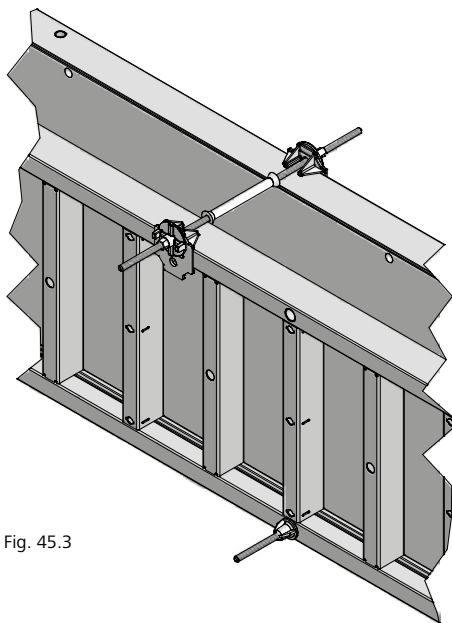


Fig. 45.3

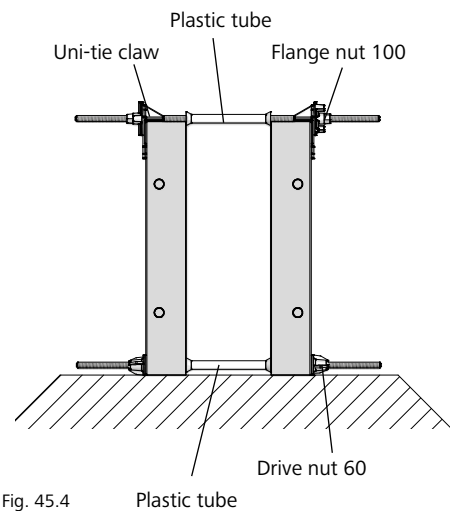


Fig. 45.4

Description	Ref. No.
Foundation tape 50 m roll.....	29-307-50
Tensioner M	29-307-60
Trolley for foundation tape.....	29-307-55
Uni-tie claw	29-901-41
Drive nut 60.....	29-900-23

Maximum tensioner spacing	
Pouring height 75 cm	185 cm
Pouring height 100 cm	120 cm
Pouring height 135 cm	70 cm

Table 45.5

Horizontal panels

When using Mammut 350 panels 125/125 with central tie holes (e.g. for foundations, roof parapets or concrete beams), push-pull struts or job-built wooden blockings must be used (Figures 46.1 and 46.2).

The maximum spacing of the push-pull struts or wooden blockings is 1.25 m.

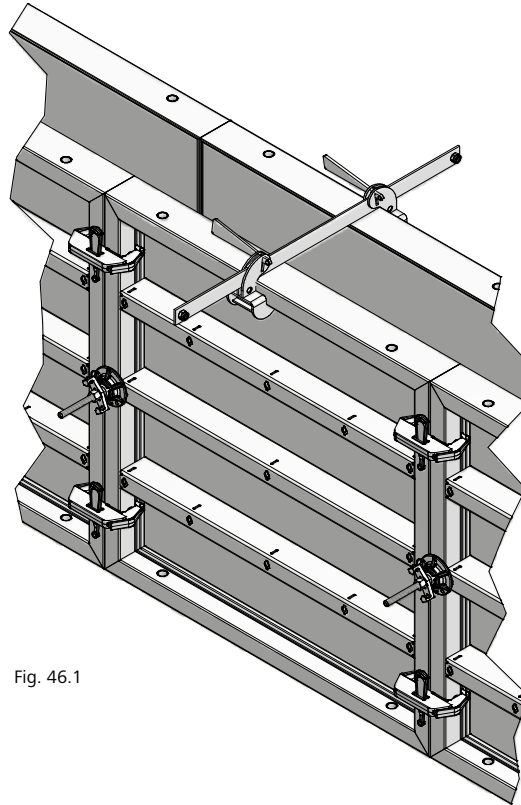


Fig. 46.1

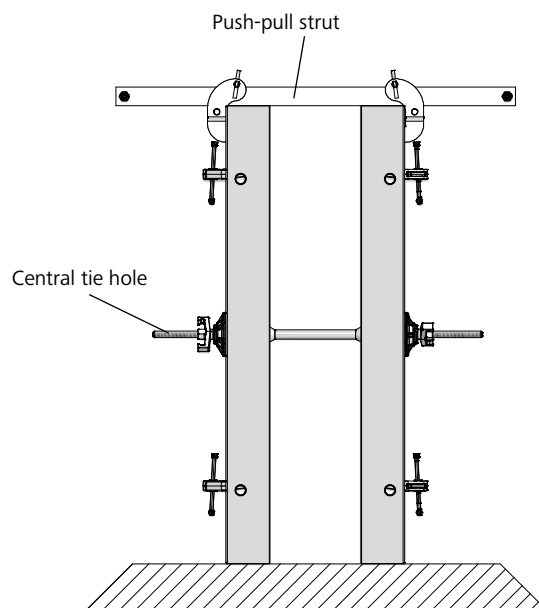


Fig. 46.2

Substitution of ties

In certain cases there is no need to install tie rods in certain tie holes, or tie rods can be replaced with alignment rails.

→ Panels with a height of 3.50 m do not require tying at the top tie holes if the pouring height does not exceed 3.00 m (Fig. 47.1).

→ For a pouring height up to 3.50 m, a Uni-tie claw can be attached over the panel instead of installing ties in the top tie holes (Fig 47.2).

→ When increasing the height of the formwork with a top panel lying horizontally, no tying is required through the top panel if the top panel has a maximum width of 30 cm and if the total formwork height does not exceed 3.80 m (Fig. 47.3) provided the walkway bracket is attached to the panel below. However, if the walkway bracket is attached to the top panel, ties must be installed in its top tie holes. The Uni-tie claw in conjunction with a tie rod and a flange nut 100 can also be used to tie this configuration.

→ If the horizontal top panel for height extension has a maximum width of 1.25 m and the total formwork height does not exceed 4.75 m, the top panel does not need tying at its bottom tie holes if two alignment rails RS 180 are used (Fig. 47.4).

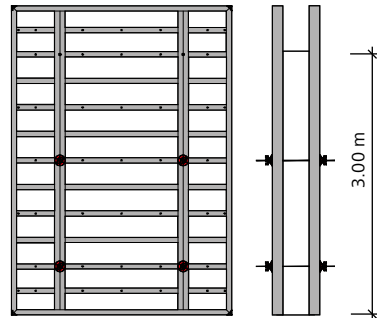


Fig. 47.1

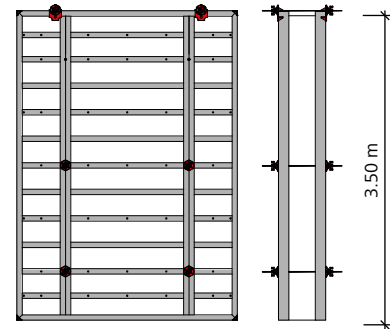


Fig. 47.2

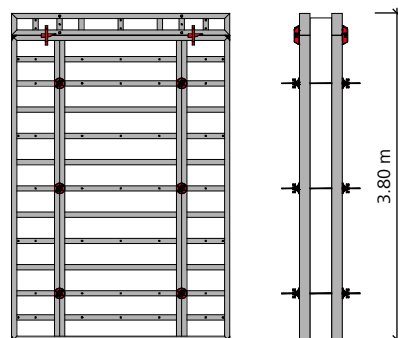


Fig. 47.3

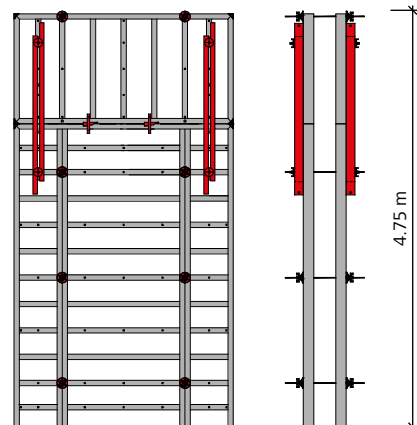


Fig. 47.4

Substitution of ties

→ When height-extending with two horizontal panels, each with a maximum width of 1.25 m, and if the total formwork height does not exceed 6.00 m, the ties in the bottom extension panel can be replaced by two RS 250 alignment rails (Fig. 48.1).

→ When combining two vertical M 350 panels for a total formwork height of 7.00 m, the top ties of the top panel can be replaced by Uni-tie claws that are attached above the top panel (Fig. 48.2).

→ A formwork height of 8.25 m is achieved by extending a vertical M 350 panel with another vertical M 350 panel and a horizontal panel that is 1.25 m wide. For this configuration no ties need to be installed in the bottom tie holes of the top panel if using alignment rails (Fig. 48.3). The same is true when adding another panel with a width of 1.25 m in horizontal position for a total formwork height of 9.50 m (Fig. 48.4).

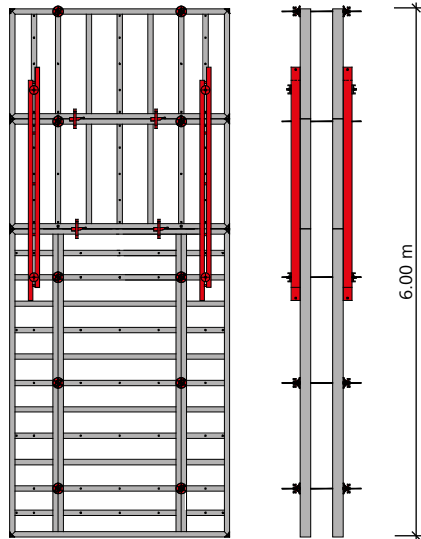


Fig. 48.1

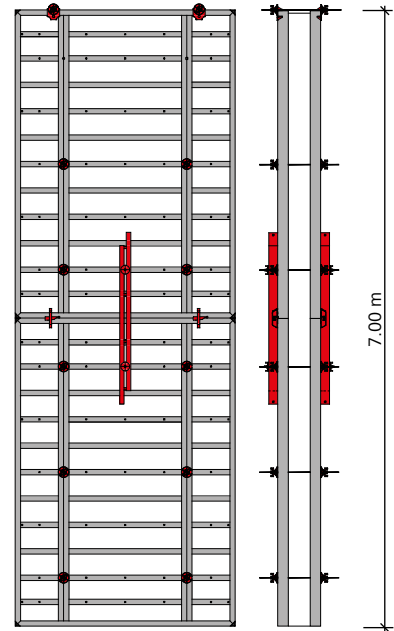


Fig. 48.2

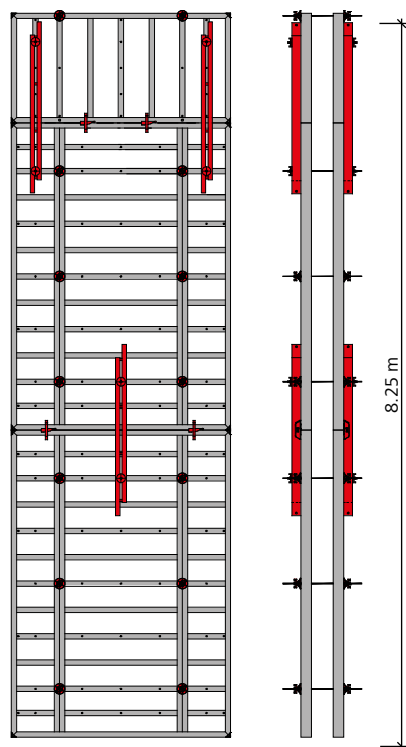


Fig. 48.3

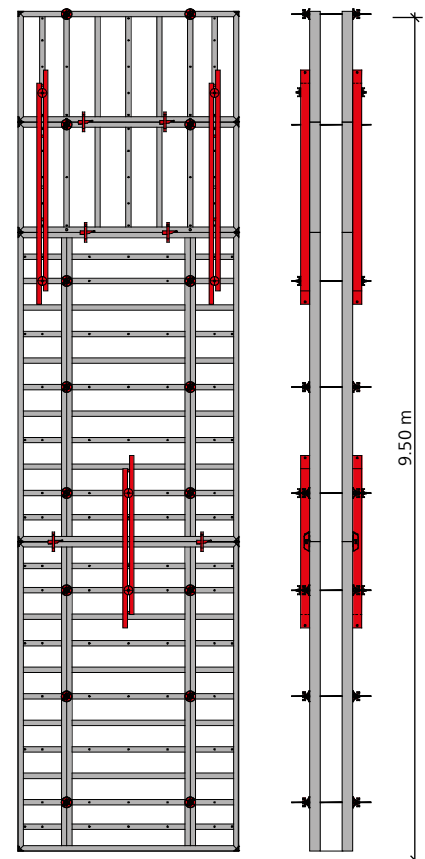


Fig. 48.4

Height extension

Free combination of vertical and horizontal panels

All panels can be combined vertically or horizontally (Figures 49.1 and 49.2). They must always be connected with the M assembly lock (see page M350-7).

Height extension in increments of 25 cm

The ability to freely combine all panels vertically or horizontally allows for economic height extension in increments of 25 cm with an even joint and tie hole pattern.

Functionality

The continuous grooves on the panels allow the assembly locks to be positioned steplessly.

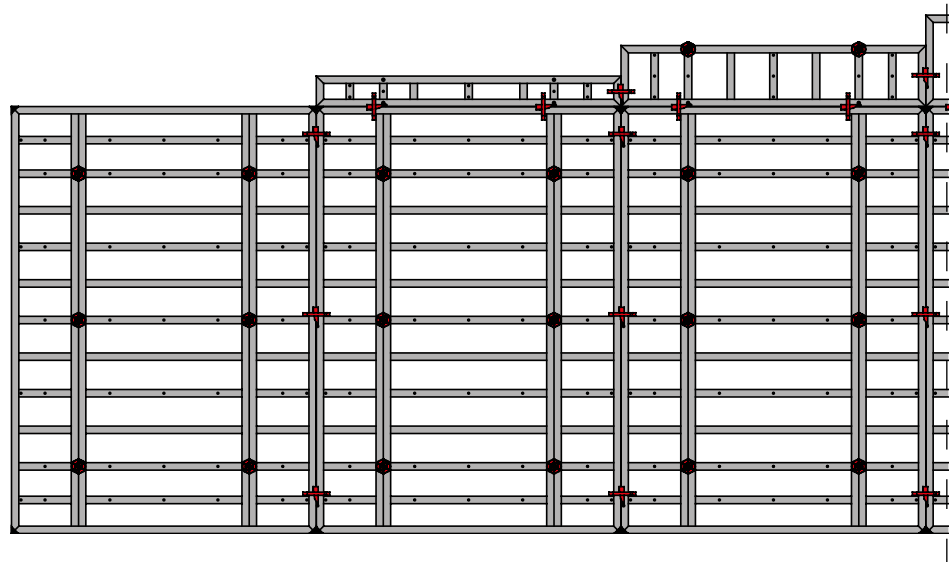


Fig. 49.1

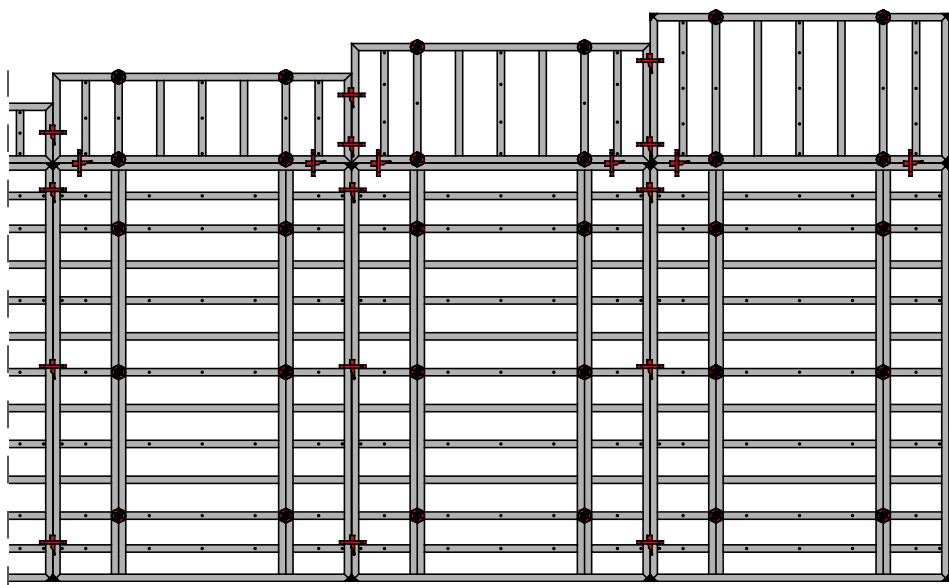


Fig. 49.2

Height extension

Free combination of vertical and horizontal panels

All panels can be combined vertically or horizontally (Fig. 50.1). They must always be connected with the Mammut assembly lock (see page M350-7).

Economic and time-saving

Panel height 3.50 m requires only three tie rods and three assembly locks.

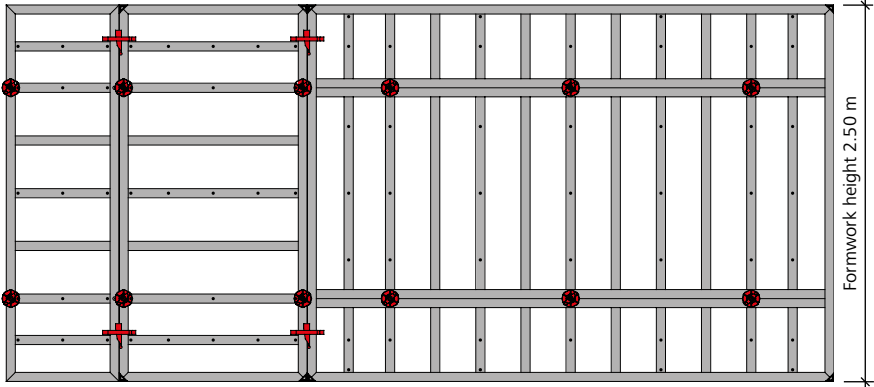


Fig. 50.1

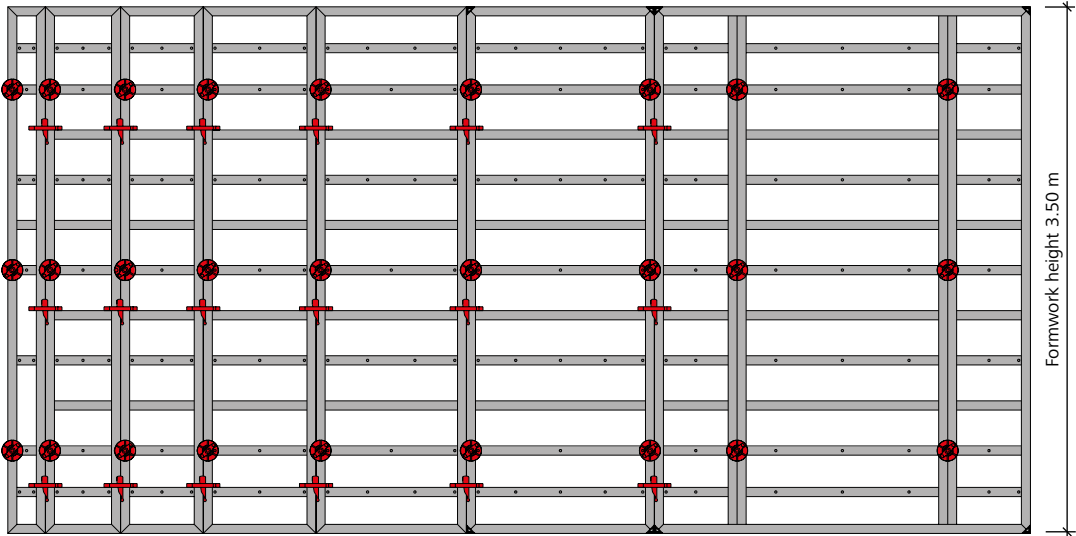


Fig. 50.2

Crane ganging

Each transport unit requires two M crane hooks with a load capacity of 15 kN (1.5 tons) attached symmetrically to the centre of gravity!

In order to provide the necessary flexural rigidity when lifting and laying down gangs, alignment rails must be mounted to the panels with flange screws (Figures 51.2 and 51.3).

For gangs with horizontal panels at the top, the crane hooks must be attached above the cross stiffeners to prevent them from slipping (Fig. 51.2).

Fig. 51.1

Panel unit
 $3.50 \times 5.00 \text{ m} = 17.50 \text{ m}^2$
 Weight 1200 kg

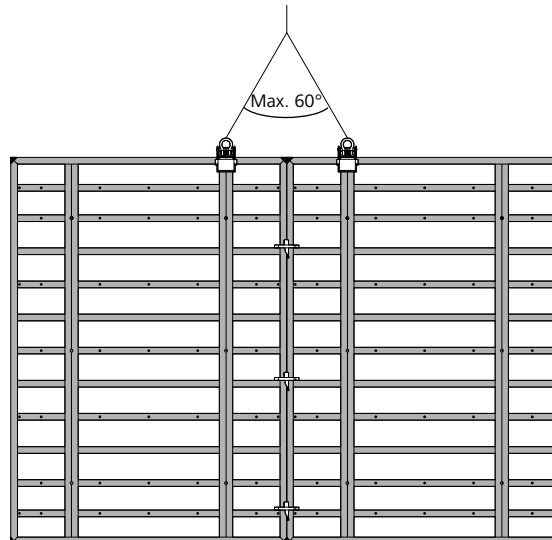


Fig. 51.1

Fig. 51.2

Panel unit
 $4.75 \text{ m} \times 2.50 \text{ m} = 11.88 \text{ m}^2$
 with one M alignment rail 180
 Weight 820 kg

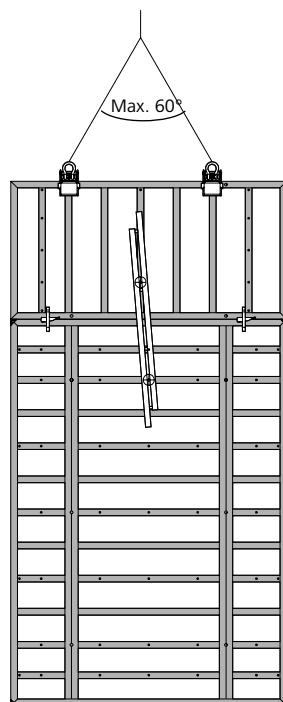


Fig. 51.2

Fig. 51.3

Panel unit
 $7.00 \text{ m} \times 3.75 \text{ m} = 26.25 \text{ m}^2$
 with two M alignment rails 250
 Weight 1710 kg

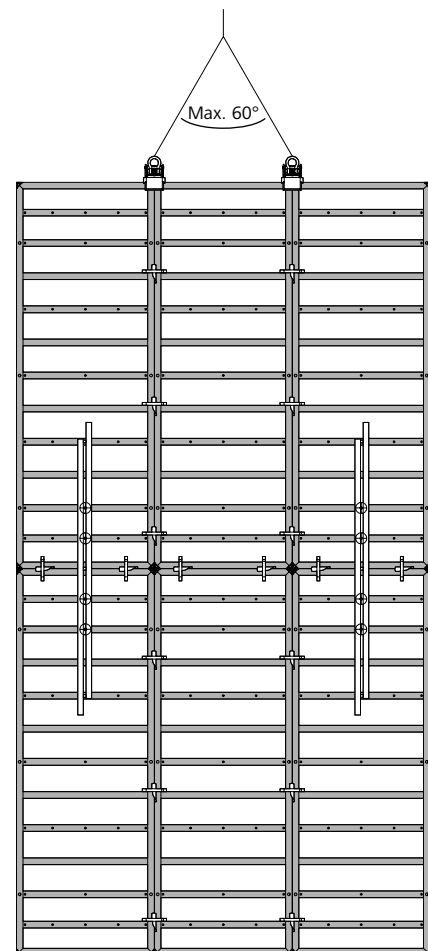


Fig. 51.3

Wall formwork

Crane ganging

Fig. 52.1
Panel unit
3.75 m x 3.50 m = 13.13 m²
with two M alignment rails 180
Weight 830 kg

Fig. 52.2
Panel unit
7.00 m x 5.00 m = 35.00 m²
with two M alignment rails 250
and two M cross stiffeners 44
Weight 2500 kg

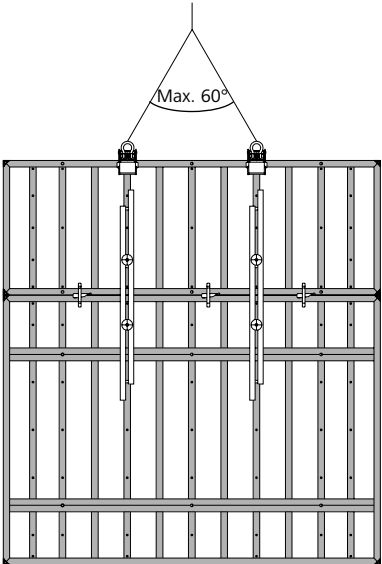


Fig. 52.1

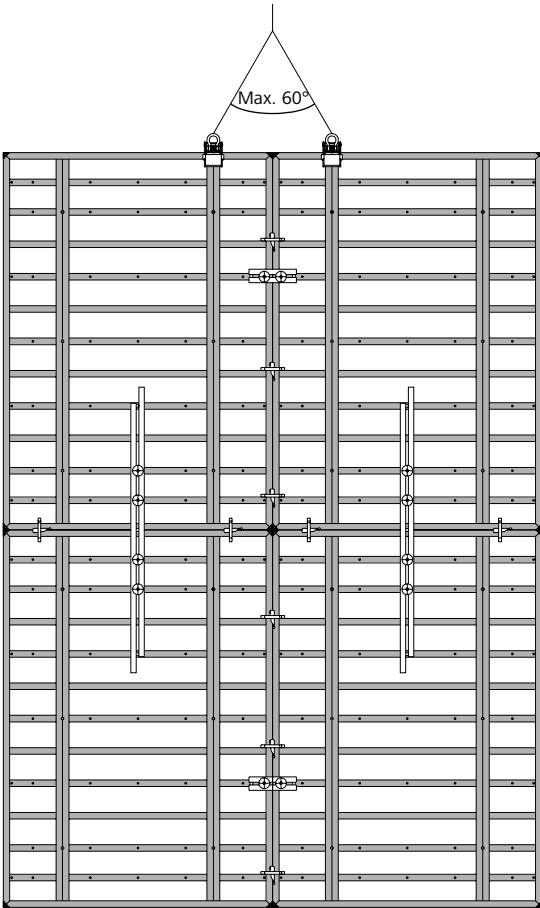


Fig. 52.2

Wall formwork

Column formwork – With standard panels and outside corners

Columns with a maximum side length of 100 cm and a pouring height below 425 cm (Fig. 53.3) can be formed using standard panels and outside corners (Fig. 53.2).

Columns with a side length exceeding 100 cm and a minimum height of 425 cm require additional stabilisation with M alignment rails and tie rods DW 15. Refer to Table 53.1 to determine the number of alignment rails and M assembly locks for required stabilisation, depending on the pouring height and the column side length.

Each alignment rail must be attached to the panel with two flange nuts 18. Ensure that alignment rails are attached to all multi-function profiles all around the column, starting at the lowest multi-function profile (Fig. 53.4). Also observe DIN 18218 for fresh-concrete pressure and DIN 4235 for compacting concrete with a vibrator.

Pouring height [cm]	Number of alignment rails (from bottom to top)					Number of M assembly locks
	Column side length [cm]					
	25	50	75	100	125	
125	—	—	—	—	—	3
250	—	—	—	—	—	5
300	—	—	—	—	—	6
350	—	—	—	—	—	7
425	—	—	—	—	1	10
475	—	—	—	1	1	10
500	—	—	—	1	1	10
550	—	—	—	1	1	11
600	—	—	—	2	2	12
650	—	—	1	2	2	13
700	1	1	1	2	2	14
750	1	1	1	2	2	15
800	1	1	1	2	2	16
850	2	2	2	3	3	17
900	2	2	2	3	3	18
950	2	2	2	3	3	19

Table 53.1

Number of M assembly locks required for the horizontal joints of all standard panels:
 → 4 for panel width 125 cm
 → 3 for panel width 100 cm
 → 2 for panel widths below 100 cm

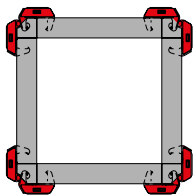


Fig. 53.2

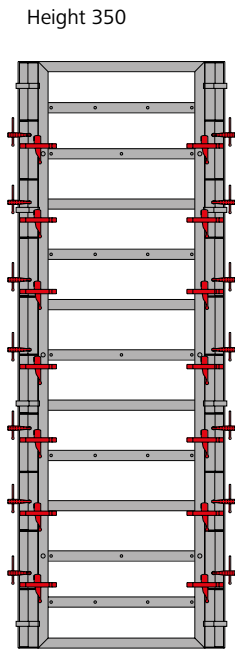


Fig. 53.3

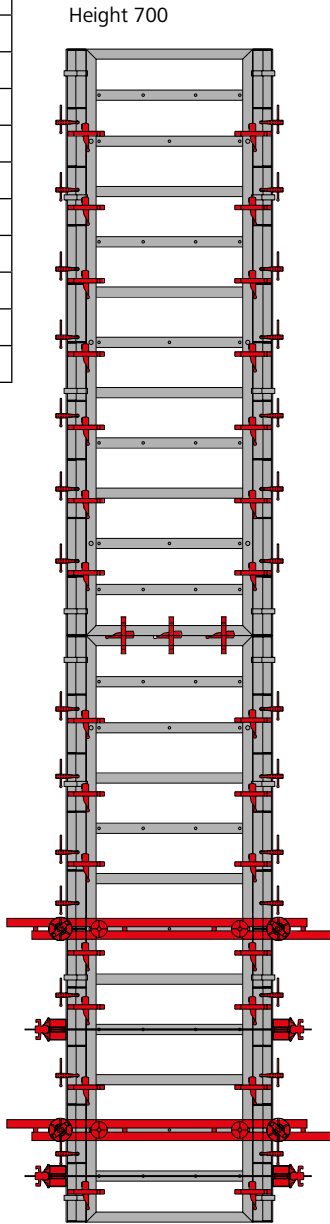


Fig. 53.4

Column formwork – With column panels and access platform

The column panels (Fig. 54.1) can be used to pour columns with a side length of up to 105 cm.

The column panel is 125 cm wide and available in heights 350, 300, 250 and 125 cm.

The perforated profile (Fig. 54.3) is used to precisely set column cross sections in increments of 5 cm up to a maximum cross section of 105 cm by 105 cm.

The alkus facing is not perforated and thus results in a smooth concrete surface. The required tie holes need to be pre-drilled using a 25 mm diameter drill.

When pouring, do not exceed the admissible fresh-concrete pressure of 100 kN/m². Also observe DIN 18218 for fresh-concrete pressure and DIN 4235 for compacting concrete with a vibrator.

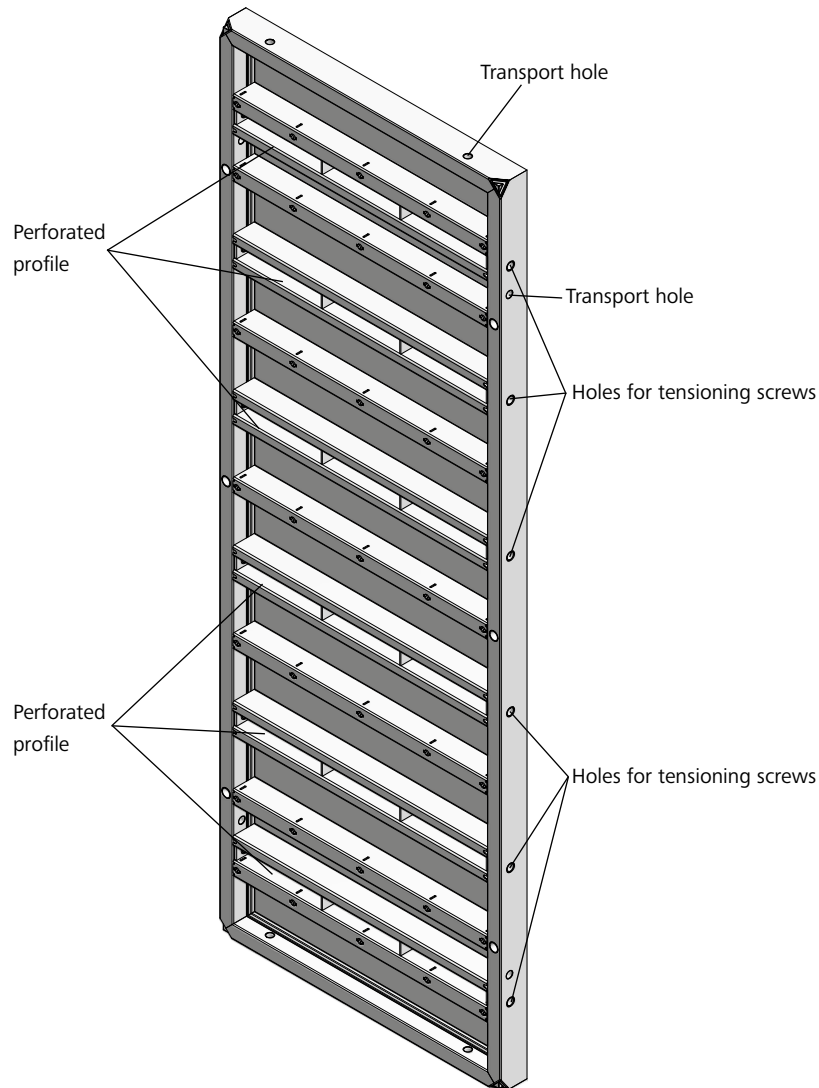


Fig. 54.1
M 350 column panel 350 x 125 AL

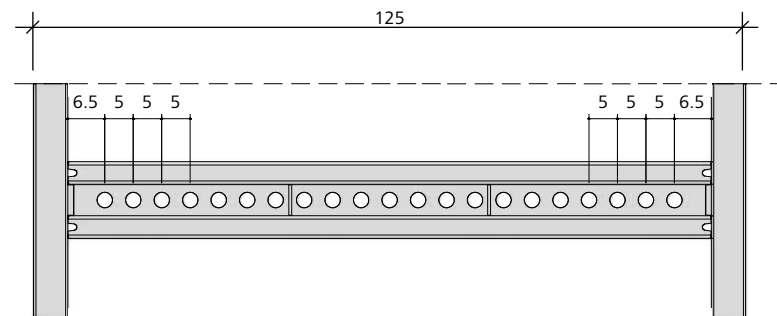


Fig. 54.3 Perforated profile

Description	Ref. No.
M 350 column panel	
350/125 AL.....	23-005-96
300/125 AL.....	23-006-96
250/125 AL.....	23-007-96
125/125 AL.....	23-008-96
Tensioning screw M 350	29-402-97
Flange nut 100	29-900-20
Articulated flange nut	
15/120.....	29-900-10

Column formwork – With column panels and access platform

The perforated profile is used to precisely set the rectangular (Fig. 55.1) or square (Fig. 55.2) column cross sections in increments of 5 cm up to a maximum cross section of 105 cm by 105 cm.

The column panels are connected with each other using tensioning screws (Figures 55.3 and 55.4) and flange nuts or articulated flange nuts.

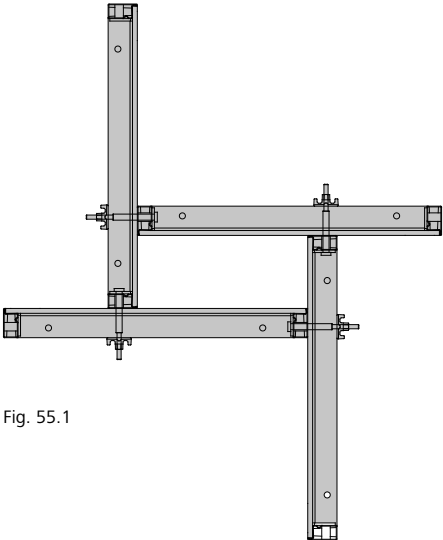


Fig. 55.1

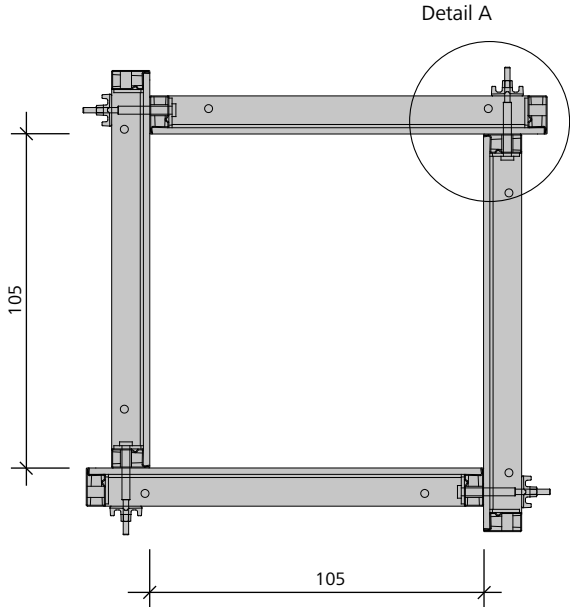


Fig. 55.2

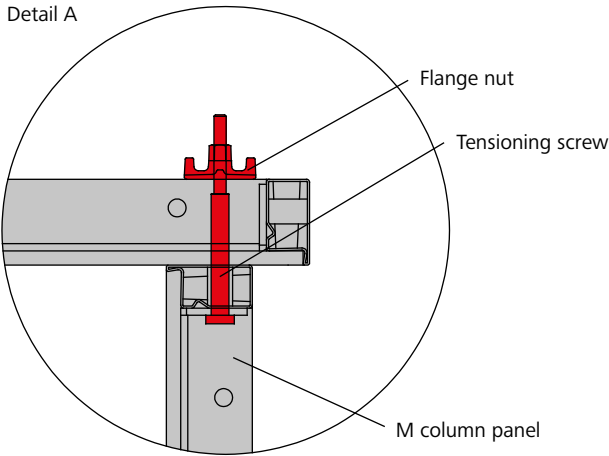


Fig. 55.3

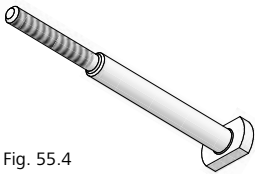


Fig. 55.4

Column formwork – With column panels and access platform

Ladder access and access platform

The column formwork made up of M 350 column panels can be equipped with the CaroFalt (CF) access platform and ladder access to allow work to be performed safely at all heights (Fig. 56.1). It thus ensures work safety at all heights.

Ladder 348 with safety cage allows workers to access the platform safely. It can be extended to the required formwork height by adding extension ladders.

Three M 24/160 transport devices attached to the column formwork allow the entire column formwork including access platform and ladder(s) to be lifted by crane as a single unit.

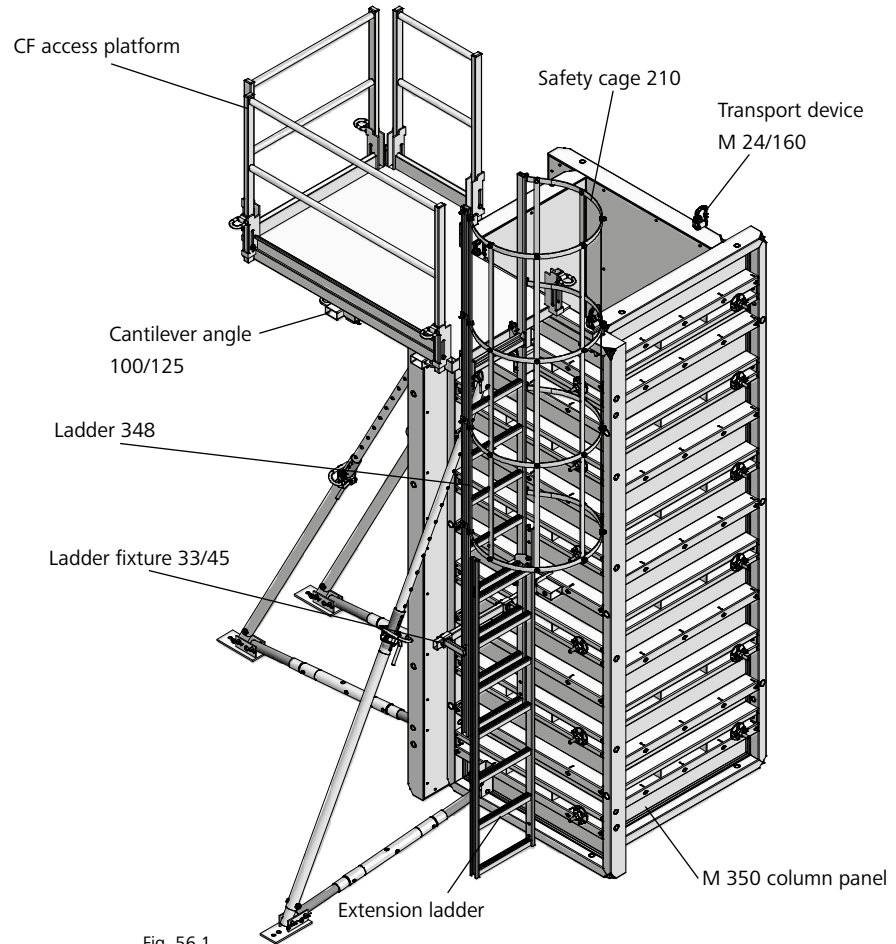


Fig. 56.1

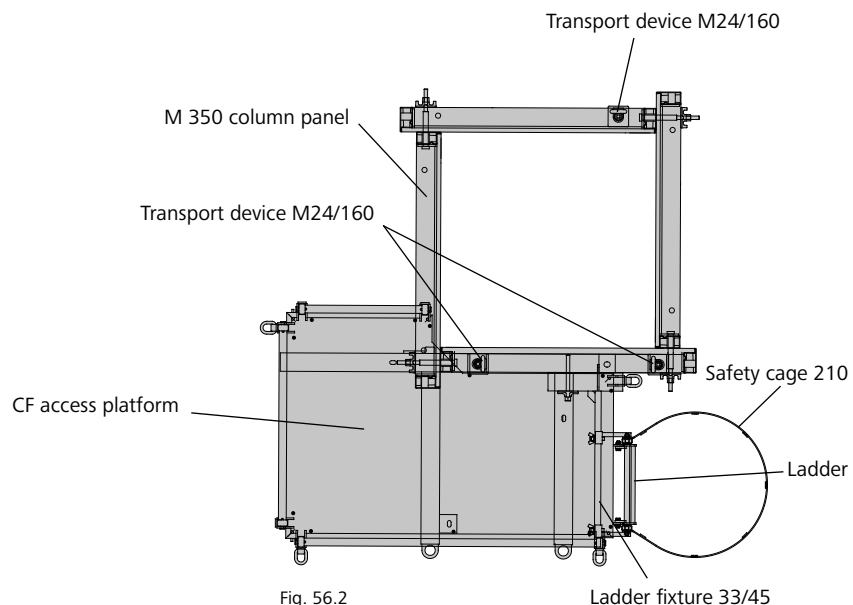


Fig. 56.2

Description	Ref. No.
Cantilever angle 100/125.....	29-404-25
Transport device M 24/160.....	29-404-30
Ladder fixture 33/45.....	29-404-35
CF access platform.....	29-414-10
Ladder 348.....	29-414-50
Ladder 318.....	29-414-55
Ladder 243.....	29-416-50
Extension ladder 270.....	29-416-52
Extension ladder 210.....	29-414-60
Extension ladder 120.....	29-416-55
Extension ladder 90.....	29-416-60
Extension ladder 60.....	29-416-62
Ladder connector.....	29-414-70

Column formwork – With column panels and access platform

Assembly of the access ladder

The platform and ladder access are assembled while the column formwork equipped with brace frames lies flat on the ground.

1. Attach the cantilever angle 100/125 with two transport devices M 24/160 to the two transport holes in the frame of the column panel. Screw the scaffold bracket integrated into the cantilever angle with a flange screw 18 to the multi-function nut of the column panel (Fig. 57.1).
2. Fold up the guardrailing of the access platform and attach a 2-rope crane sling to the crane eyes of the access platform (Fig. 57.1).
3. Align the platform with the transport device M 24/160 and the stoppers of the scaffold bracket and of the cantilever angle.
4. Screw the hammer-head screws into the access platform and tighten the wing nuts (Fig. 57.2).

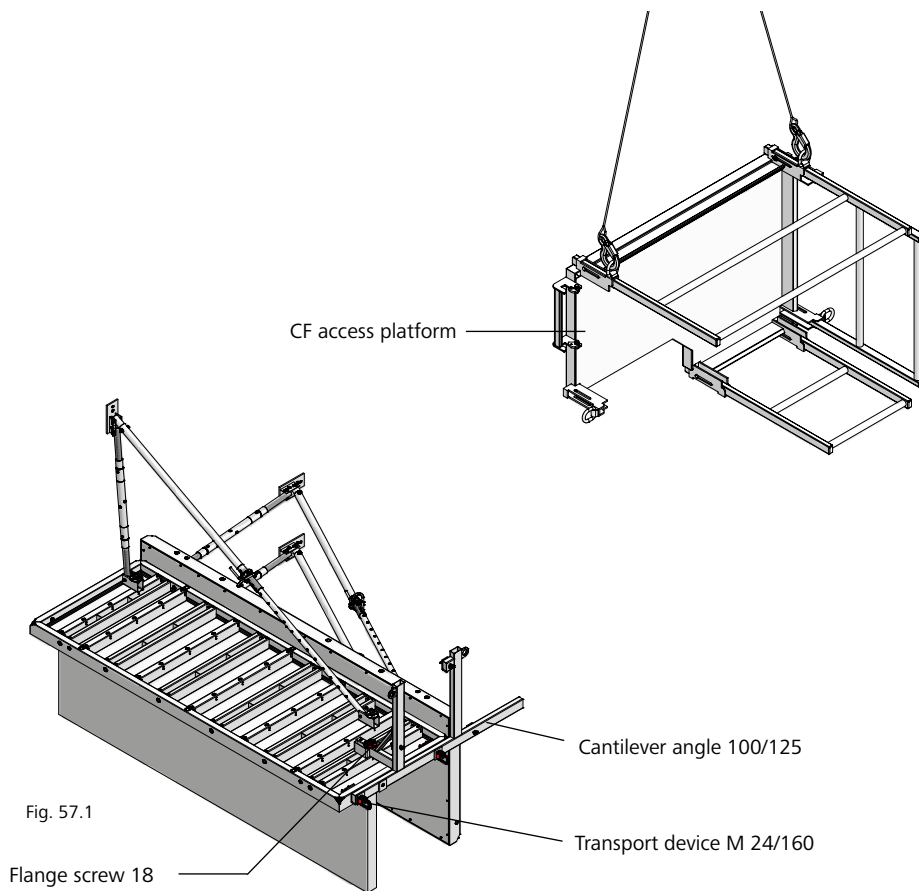


Fig. 57.1

Attention

Screw in the hammerhead screws correctly.

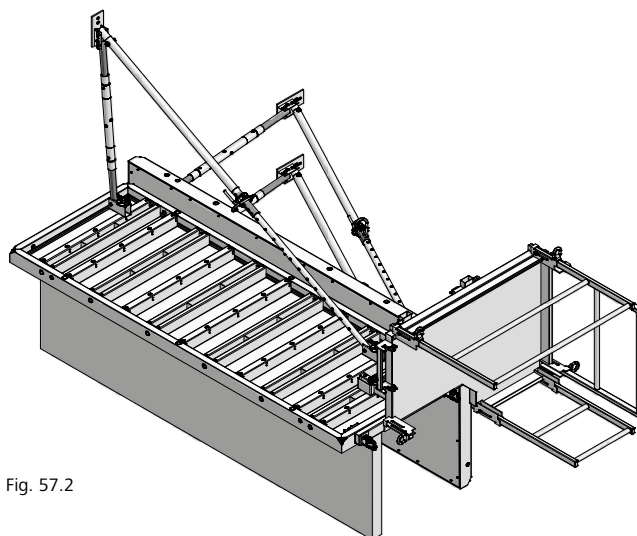


Fig. 57.2

Description	Ref. No.
CF access platform.....	29-414-10
CF scaffold bracket	29-414-15
Cantilever angle 100/125.....	29-404-25
CF front railing.....	29-414-25
Transport device M 24/160.....	29-404-30
Flange screw 18.....	29-401-10

Column formwork – With column panels and access platform

Assembly of the access ladder

The ladder is always installed while the column panel unit is lying flat on the ground.

1. Screw the safety cage to the top end of the ladder (Fig. 58.1).
2. Attach the ladder fixture with a flange screw 18 to the panel's multi-function profile (Fig. 58.2).
3. Hang the pre-assembled ladder onto the access platform. Make sure the safety flaps are completely engaged (Fig. 58.4 Detail).
4. Loosen the clamping angle and attach the ladder to the ladder fixture.
5. Screw the clamping angle firmly to the ladder fixture (Figures 58.3 and 58.5).

Extension ladders

These are required when the access platform cannot be accessed with only one ladder due to the formwork's height. The extension ladders are hooked onto the basic ladders. In addition, an additional ladder fixture must be attached to the lower end of the column formwork. See page M350-59 for the number of ladders, ladder fixtures and safety cages required.

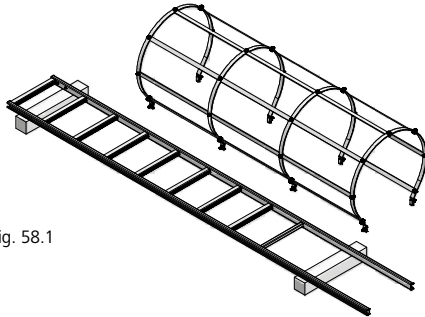


Fig. 58.1

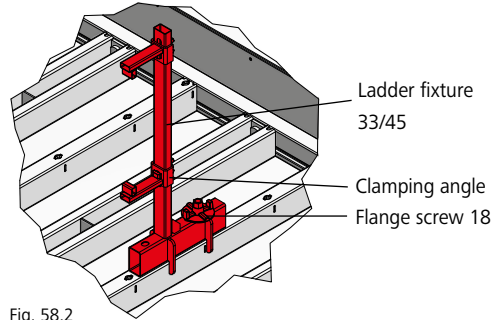


Fig. 58.2

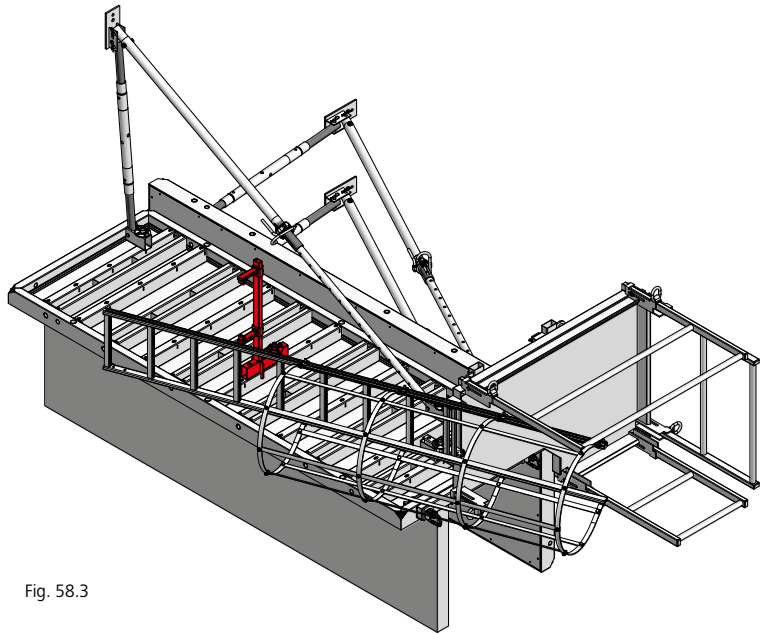


Fig. 58.3

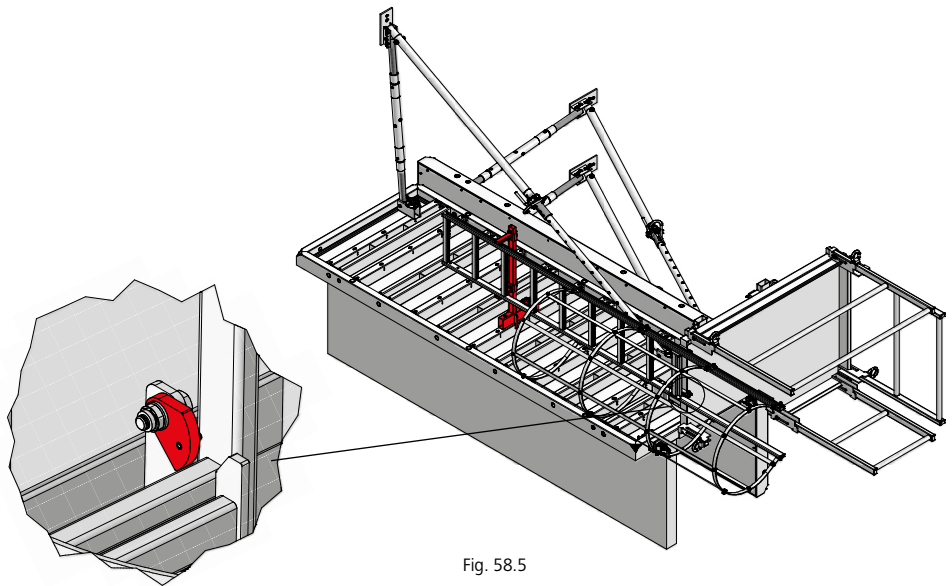


Fig. 58.5

Fig. 58.4 Detail

Description	Ref. No.
Ladder 348	29-414-50
Ladder 318	29-414-55
Safety cage 210	29-414-85
Safety cage 85	29-414-90
Safety cage 40	29-416-90
Extension ladder 210	29-414-60
Ladder fixture 33/45	29-404-35
Flange screw 18	29-401-10

Column formwork – With column panels and access platform

Material list

Table 59.1 shows all items required to assemble the column formwork for the various column heights.

Ref. no.	Description	Column height (cm)																	
		125	250	300	350	375	425	475	500	550	600	650	700	750	800	850	900	950	
23-005-96	M 350 column panel 350/125 AL				4			4				4	8			4		4	
23-006-96	M 350 column panel 300/125 AL			4			4			4	8	4			4		12	8	
23-007-96	M 350 column panel 250/125 AL		4			4			8	4				12	8	8			
23-008-96	M 350 column panel 125/125 AL	4				4	4	4											
29-402-97	Tensioning screw M 350	8	16	20	24	24	28	32	32	36	40	44	48	48	52	56	60	64	
29-900-20	Flange nut 100 or	8	16	20	24	24	28	32	32	36	40	44	48	48	52	56	60	64	
29-900-10	Articulated flange nut 15/120																		
29-400-71	M assembly lock					8	8	8	8	8	8	8	8	12	12	12	12	12	
29-404-30	Transport device M 24/160	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
29-109-20	Brace frame 250 with formwork-prop connector		3	3						3	3	3	3	3					
29-109-60	Push-pull prop R 250				3	3	3	3	3						3	3	3	3	
29-109-80	Push-pull prop R 460				3	3	3	3	3						3	3	3	3	
29-109-85	Push-pull prop R 630									3	3	3	3	3					
29-407-90	Triplex R 300 (right-hand thread) with foot plate														3	3	3	3	
29-407-55	Triplex intermediate piece R 100														3				
29-407-60	Triplex intermediate piece R 200															3	3		
29-407-65	Triplex intermediate piece R 300																	3	
29-407-93	Triplex R 300 (left-hand thread)														3	3	3	3	
29-804-85	Formwork-prop connector				6	6	6	6	6	3	3	3	3	3	9	9	9	9	
29-402-32	Double-jointed foot plate				3	3	3	3	3	3	3	3	3	3	3	3	3	3	
29-414-10	CF access platform		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
29-404-25	Cantilever angle 100/125		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
29-414-25	CF front railing		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
29-401-10	Flange screw 18		8	9	9	9	10	10	10	10	11	11	12	12	15	16	16	17	
29-414-50	Ladder 348		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
29-416-52	Extension ladder 270										1	1	1	1	2	1	2	1	
29-414-60	Extension ladder 210								1	1				1		1		2	
29-416-55	Extension ladder 120					1		1	1			1				1			
29-416-60	Extension ladder 90			1	1		2	1		1	1		2				1		
29-404-35	M 350 ladder fixture 33/45		1	2	2	2	3	3	3	3	4	4	5	5	5	6	6	7	
29-414-70	Ladder connector			1	1	1	2	2	1	2	2	2	3	2	2	3	3	3	
29-414-85	Safety cage 210			1	1	1	1	1	1	2	2	2	2	3	3	3	3	4	
29-414-90	Safety cage 85		2				1	1	2		1	1	2			1	1		
29-401-45	Crane sling 60	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	

Table 59.1

Wall formwork

Panel with filling nozzle / concreting window

The M panel 250/50 with a filling nozzle (Fig. 60.1) is used when concrete cannot be poured from above, e.g. in the case of tunnel formwork.

The manual gate valve SK (Fig. 60.2) prevents the concrete from flowing back when pumping is interrupted. It is attached to the filling nozzle with the lever coupling SK-H (Fig. 60.3).

After taking off the supply hose, the filling nozzle cleaner SK (Fig. 60.4) is attached to the manual gate valve with the lever coupling, the manual gate valve opened and the concrete pressed behind the forming face. One sealing washer A SK is required for each lever coupling.

The panel with concreting window (Fig. 60.6) has a covered 25 x 36 cm opening. This makes it possible to look behind the formwork. To do this, undo the four flange screws and remove the window cover.

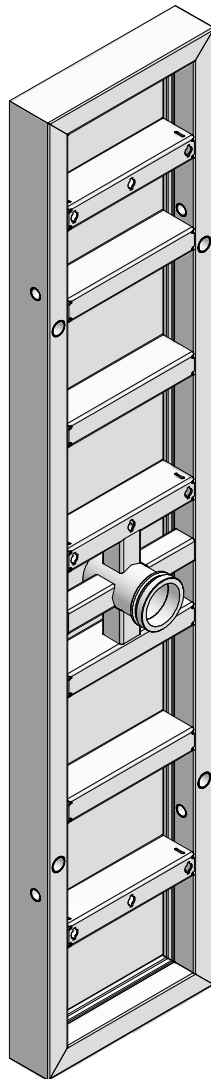


Fig. 60.1 Panel with filling nozzle

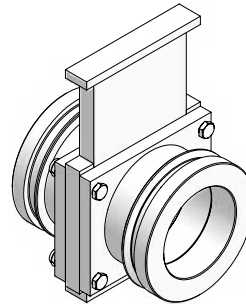


Fig. 60.2 Manual gate valve SK

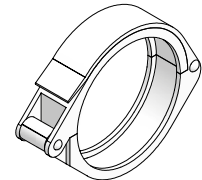


Fig. 60.3 Lever coupling SK-H

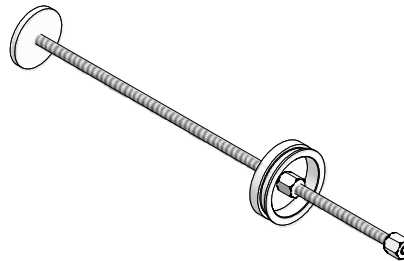


Fig. 60.4 Filling nozzle cleaner SK

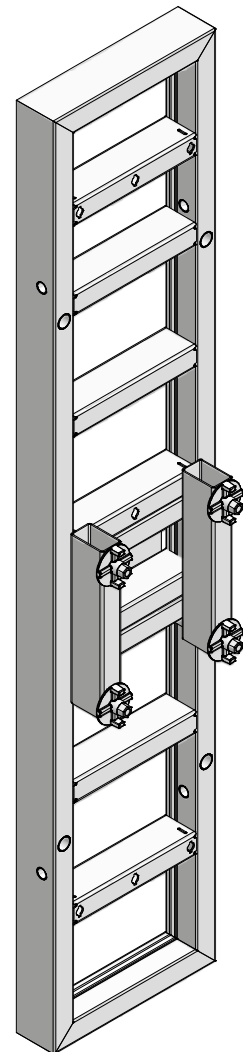


Fig. 60.6 Panel with concreting window

Description	Ref. No.
M panel 250/50 AL 20 with filling nozzle	23-121-05
concreting window 25x36	23-121-10
Manual gate valve SK 100 - 4 1/2	29-914-50
Filling nozzle cleaner SK 100/800	29-207-50
Lever coupling SK-H DN 100 - 4 1/2	29-207-60
Seal A SK 100 - 4 1/2	62-031-55

Description	Quantity
M panel 250/50 with filling nozzle	1
Manual gate valve SK	1
Seal A SK	2
Lever coupling SK-H	2
Filling nozzle cleaner SK	1

Table 60.5 Material required for a panel with filling nozzle

Single-sided formwork / climbing formwork

STB support frame for single-sided formwork

The M 350 formwork – together with STB support frames – can also be used when concrete has to be poured against earth, rock, an existing wall or the like, i.e. when a single-sided formwork is required.

STB 300 support frames allow for walls up to 3.30 m, while STB 450 support frames together with height extensions allow for wall heights of up to over 12 m.

Observe the technical instruction manual for the support frame if required.

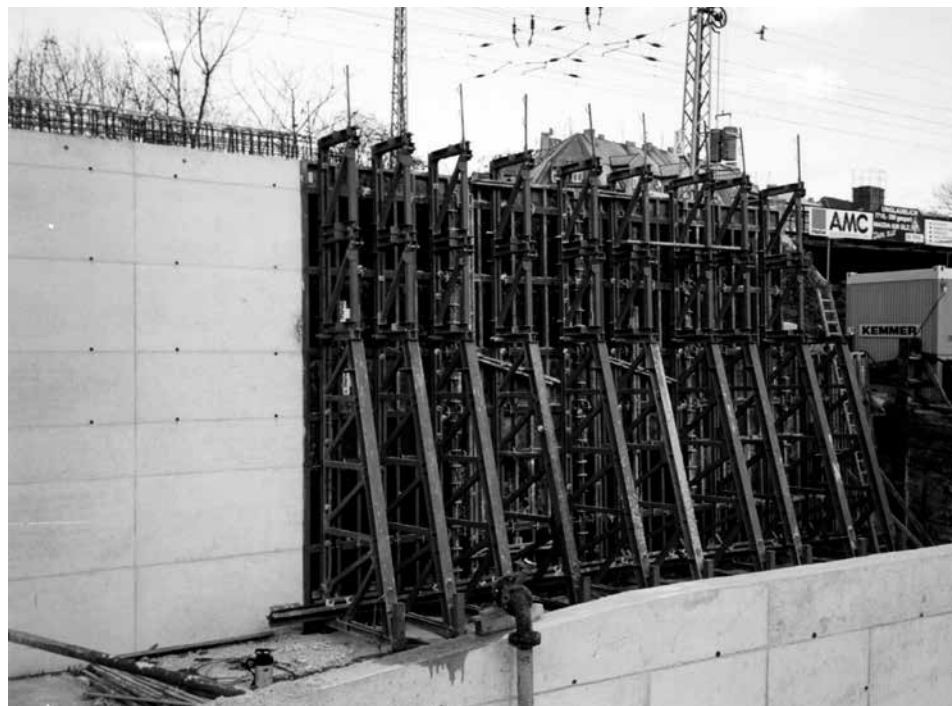


Fig. 61.1

KLK 230 climbing scaffold

When forming high walls, façades, pillars, staircase or elevator shafts, the Mammut formwork can be placed and secured on the KLK 230 climbing scaffold.

Observe the technical instruction manual for the KLK 230 climbing scaffolds if required.

Please note

The use of STB support frames and KLK 230 climbing scaffolds requires detailed formwork planning.

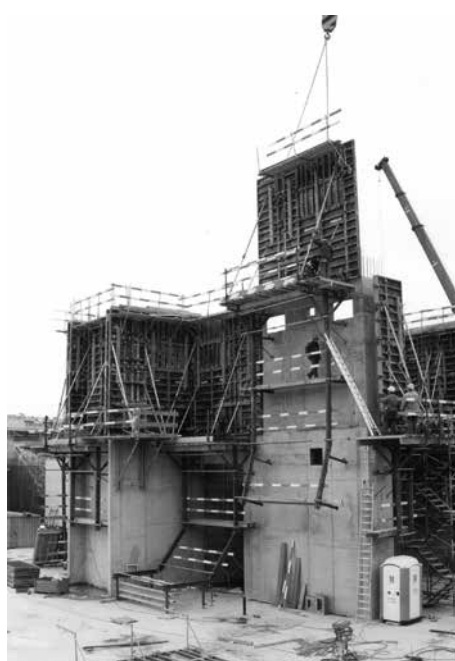


Fig. 61.2



Fig. 61.3

Formwork assembly and stripping

Important!

When assembling and stripping formwork, strictly observe the local accident prevention rules. When using our formwork and systems always observe federal, state and local codes and regulations.

Attention

Above a formwork height of 2.00 m both sides of the formwork must be secured against falling.

Planning

If you want to benefit fully from the efficient and economical use that the formwork offers, we recommend you first plan and prepare its use. Start planning by determining the optimum formwork quantity to be held in stock (the quantity is usually based on the amount of formwork required for a one day's work). When determining the quantity, consider the following:

- The formwork weight
- The time required for formwork assembly and stripping
- Transport of gangs from one pour to the next considerably reduces assembly and stripping effort and time
- Capacity of the lifting devices
- A logical cycle plan that takes into account corner configurations, reinforcements, etc.

Once all these aspects have been considered, the quantities of formwork items can be specified.

Ground

The ground on which the formwork is going to be placed should be clean, even and capable of bearing the expected load, as this will help reduce the time required for the assembly and stripping.

Panel transport

When unloading panels or moving panel stacks, make sure to use appropriate transport devices that can bear the load. For detailed information see pages M350-66 to M350-67.

The steps required for assembly

For ergonomic reasons the outside formwork is usually assembled and placed first. Start assembly in a corner or at a defined position and perform the following steps:

Step 1 – Place and brace the outside formwork

Step 2 – Define and mark the pouring height, install the reinforcements and boxouts

Step 3 – Place the inside formwork and tie the outside and inside formwork

Refer to the following pages for a detailed description of these steps including the installation of the working platform and formwork stripping.

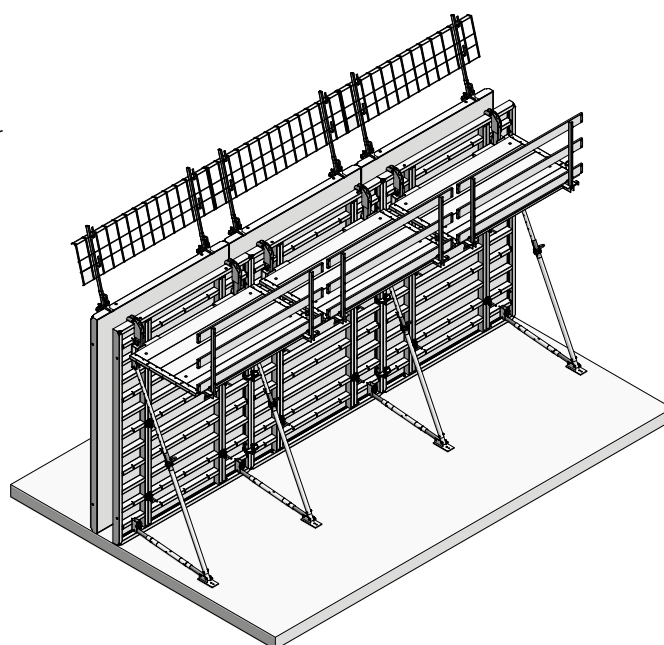


Fig. 62.1 Double-sided formwork

Formwork assembly and stripping

Step 1

Place and brace the outside formwork

The following description is based on a straight wall. Before starting, keep in mind:

→ When pre-assembling large panel units on an even surface, attach the wall braces and the walkway bracket as well, i.e. before performing step 1.

→ Walls of less than 6 m require a filler in the inside formwork for easy stripping (Fig. 63.3), as the formwork may otherwise become wedged and stick to the concrete when it is stripped.

1. Spray the facing with the release agent MevaTrenn pro.

2. Place the first panel and immediately attach it to the ground or concrete slab with two brace frames to prevent it falling over (Fig. 63.1). The foot plate must be firmly connected to the ground or concrete slab – in earth with two ground pegs, in concrete with two heavy-duty dowels.

After placing vertical panels, always reinforce them immediately with push-pull props or brace frames so they can withstand tensile and compressive forces and are protected against displacement and wind. The prop spacing is determined by the application.

If the walkway bracket was not pre-assembled before step 1, you can now assemble and install the working platform. Fig. 64.2 on page M350-64 shows a working platform being lifted with a crane for attachment to a braced outside formwork.

3. String further panels together and connect them with M assembly locks see page M350-7.

Panels with a height of 350 cm are usually connected with three assembly locks. However, outside corner configurations require four assembly locks (Fig. 63.2).

Step 2

Pouring height, reinforcements and boxouts

After performing step 1, the pouring height is defined and marked. Then the reinforcements and boxouts, if required, are installed.

Step 3

Place the inside formwork and tie the outside and inside formwork

The inside formwork is placed after the outside formwork. Then the inside and outside formwork are tied firmly with tie rods and articulated flange nuts.

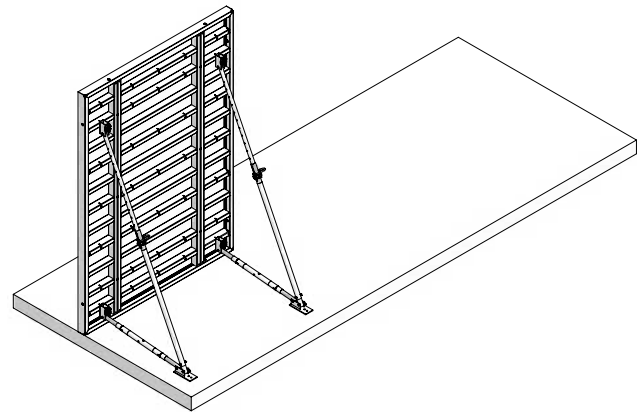


Fig. 63.1

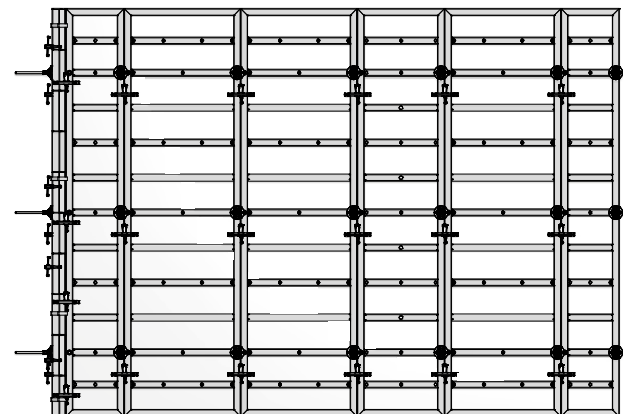


Fig. 63.2

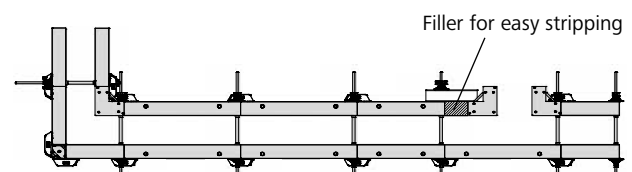


Fig. 63.3

Formwork assembly and stripping

Working scaffold

The plug-in walkway bracket (Fig. 64.1) is used to support the working scaffold. The maximum bracket spacing for a load of 150 kg/m^2 (platform group 2) is 2.50 m as defined in DIN 4420. The planking must be at least 4.5 cm thick.

The planking and walkway bracket can be firmly connected. Do not install any planks before securing the formwork with push-pull props or before tying the inside and the outside formwork.

Do not forget to attach a side railing to the working scaffold.

Pouring concrete

Once you have placed, tied, braced and closed the formwork, you can start pouring concrete. When doing so, observe the permissible rate of placing taking the setting behaviour and the consistency of the cement into account (see page M350-10).

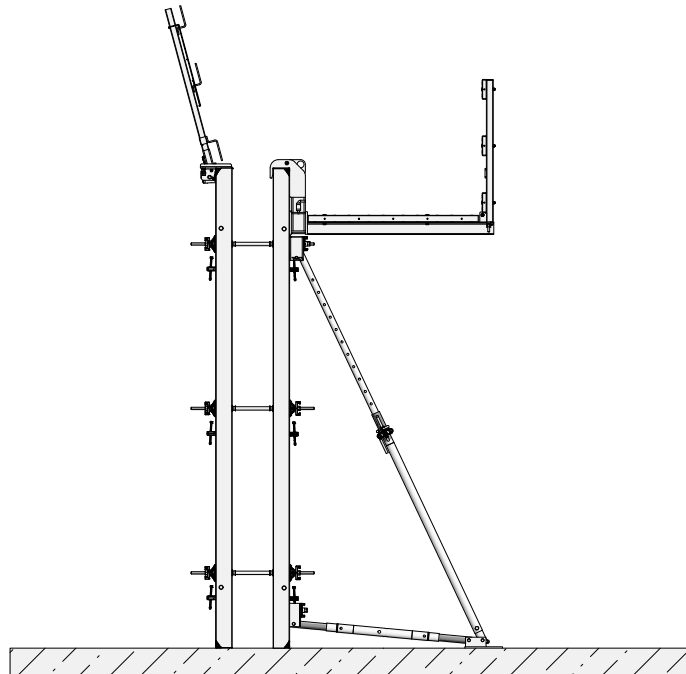


Fig. 64.1

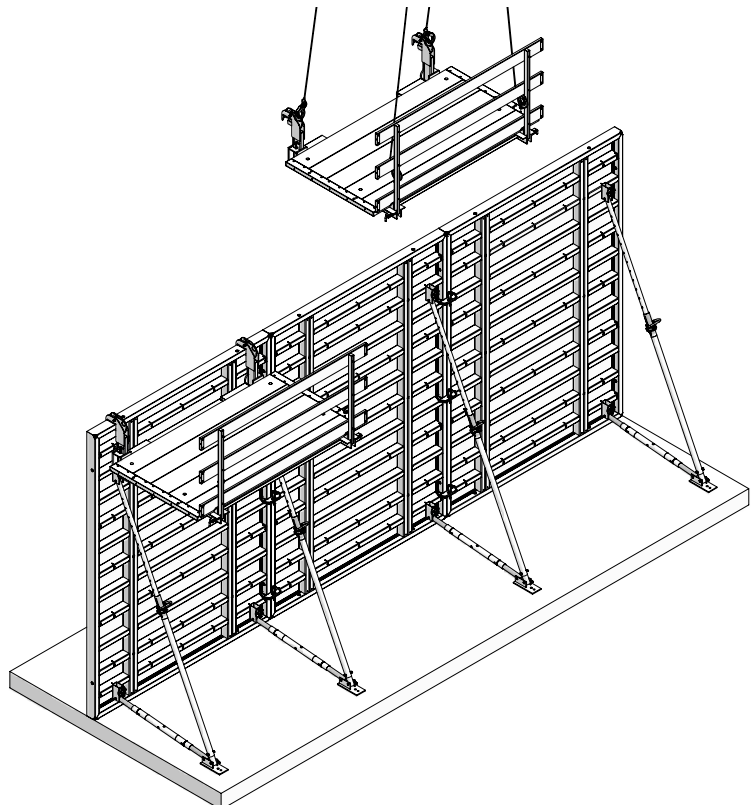


Fig. 64.2

Formwork assembly and stripping

Stripping

Do not start stripping before the concrete has set to the point where it can no longer deform. It is best to start stripping at the stop ends or at a short corner. Start stripping with the inside formwork. Stripping of both the outside and inside formwork is performed as follows:

1. Remove the working scaffold.
2. Remove the articulated flange nuts and tie rods section by section. Make sure the unbraced formwork is immediately secured to prevent it falling over or strip it immediately.
3. On the formwork panels or large panel units the assembly locks are removed at the joints, and the panels or panel units are then lifted out by hand or by crane. Before transporting by crane, the formwork must be detached from the concrete!
4. Clean the facing and remove any concrete. Before the next use, spray the facing with the release agent MevaTrenn FT8 (for alkus facings). Observe the operating instructions for the alkus facing.

Note

The release agent must not be stored in galvanized containers.

Please note

When stripping manually, detach and disassemble the working scaffold and the brace frames before stripping the panels.

When transporting large panel units with a crane, the working scaffold and wall braces are moved together with the panel units. While vertical, all components are cleaned and sprayed with release agent before being lifted together to the next cycle (see pages M350-51 and 52).

If there is no further use for the panel units, the working scaffold and wall braces are detached and disassembled in a horizontal position, and cleaned and stacked for transport.

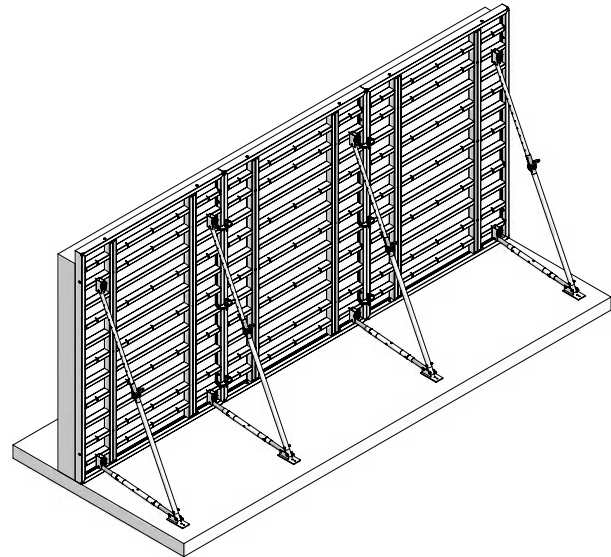


Fig. 65.1

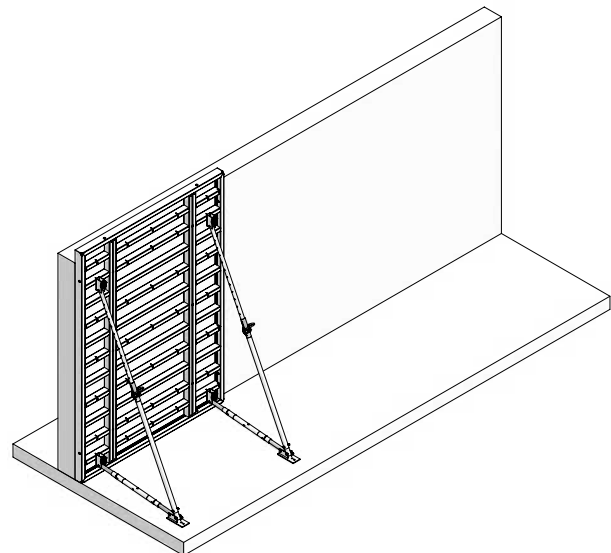


Fig. 65.2

Crane slings 60

The crane slings (Fig. 66.1) help to quickly load and unload trucks and move panel stacks near the ground. The lifting hooks are inserted into the welded sleeves of the bottom panel frame. After tightening the crane slings, check that the hooks are safely locked (Fig. 66.3).

Attention

A lifting hook must only be used if its eccentric is easy to turn or falls automatically into the locked position (Fig. 66.3). Never use a lifting hook if you need force to turn its eccentric. Turning the eccentric with force may not lock the lifting hook but only make it appear to be in the locked position. This may cause the lifting hook to slip when lifting the panel stack.

Technical data

- Max. load 20 kN (2 tons).
- Max. stack height: Three M 350 panels 350/250 or ten M 350 panels with a max. width of 125 cm.

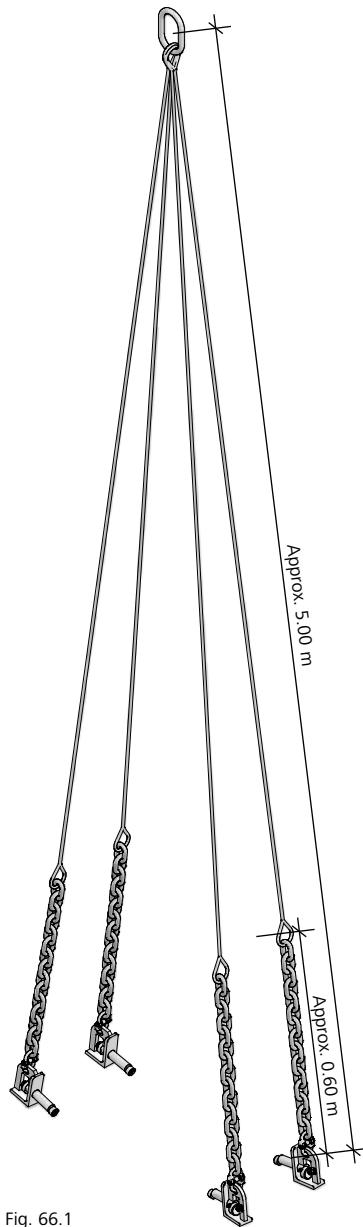


Fig. 66.1

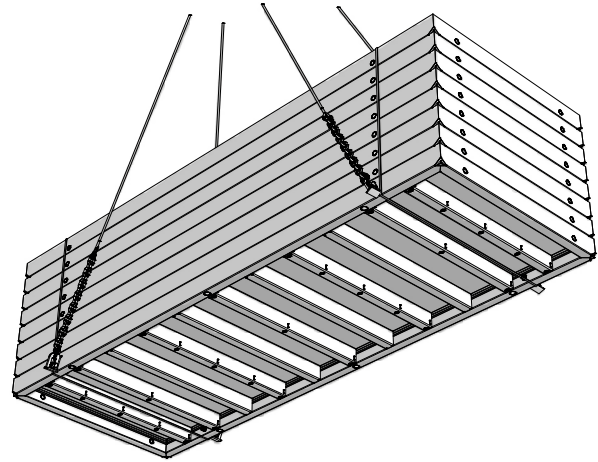


Fig. 66.2

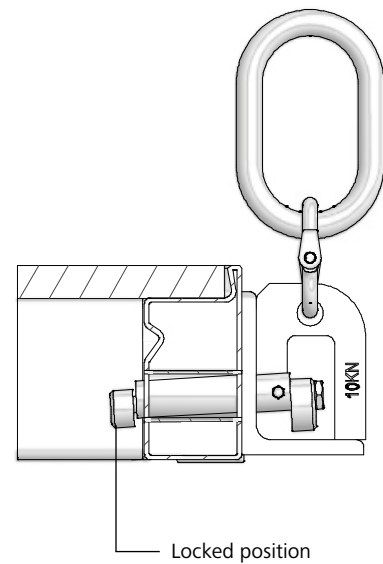


Fig. 66.3

Description	Ref. No.
Crane sling 60	29-401-45

Lifting hook 60

The lifting hook (Figures. 67.1 and 67.2) can be used with any 4-rope crane sling on the construction site to transport panel stacks. Always use four hooks at once. To calculate the permissible load-bearing capacity, assume that only two hooks are used.

Attention

A lifting hook must only be used if its eccentric is easy to turn or falls automatically into the locked position (Fig. 66.3 on page M350-66). Never use a lifting hook if you need force to turn its eccentric. Turning the eccentric with force may not lock the lifting hook but only make it appear to be in the locked position. This may cause the lifting hook to slip out when lifting the panel stack.

Technical data

- Weight 2.0 kg
- Max. load 10 kN (1 ton)

Moving panel stacks

When moving panel stacks, make sure the panels are secured against sliding! MEVA secures them with safety bolts and, for truck transport, also with ratchet straps (see page M350-68).

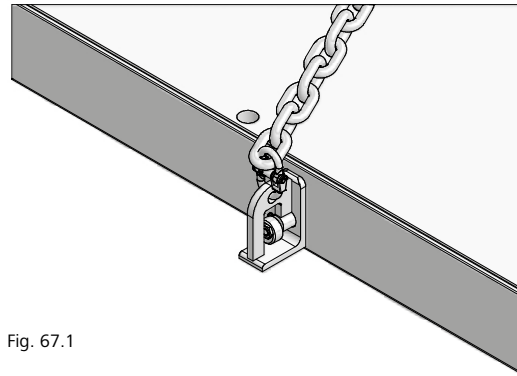


Fig. 67.1

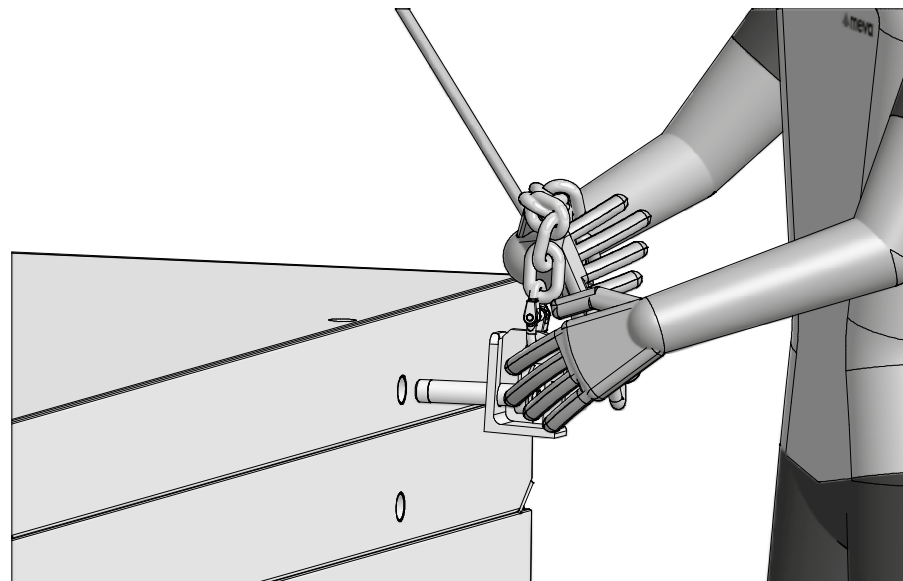


Fig. 67.2

Description	Ref. No.
Lifting hook 60	29-401-40

Wall formwork

Transport

Make sure that all material is secured properly.

Guidelines

Use one ratchet strap per metre of cargo. This means that 14 ratchet straps are required for a fully loaded truck with a trailer length of 13.60 m.

Depending on their size, the M 350 panels require two or three straps during transport. Due to their low weight, M 350 corners require only two straps.

When moving panel stacks, make sure the panels are secure. MEVA secures the 250 cm wide M 350 panels with the safety bolt M 350/250 grey (Fig. 68.2) and all other M 350 panels with the safety bolt M black. These safety devices should also be used when returning the material from building site.

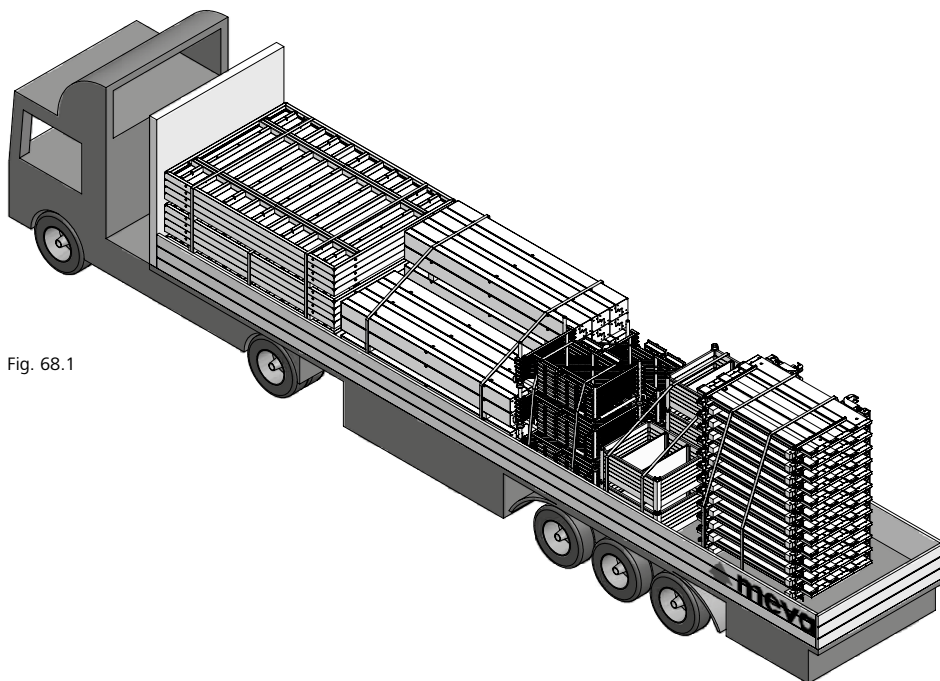


Fig. 68.1

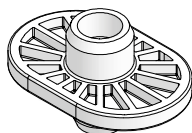


Fig. 68.2

Description	Ref. No.
Safety bolt	
M black	40-131-20
M 350/250 grey	40-131-25

Wall formwork

Services

Cleaning

The formwork is cleaned professionally using industrial equipment upon return.

Reconditioning

Reconditioning is carried out as follows: The frames are checked and, if necessary, repaired, coated with a high-quality powder coating and provided with a new facing. As long as the formwork equipment still has its full load capacity, correct dimensions and is fully functional, reconditioning will always be a more economical solution than purchasing new formwork. Please note that the cleaning and reconditioning service is not available in all countries in which MEVA does business.

Rentals

As we have a comprehensive range of equipment in stock, we offer our customers the option of renting supplementary material at peak times. The MEVA logistics centre guarantees rapid delivery throughout Europe. We also give prospective customers the chance to test MEVA formwork so they can see its benefits for themselves in actual use.

RentalPlus

For a flat-rate fee MEVA's "fully comprehensive insurance" for rental formwork and equipment covers all secondary costs that occur after return (excludes losses and write-offs). For the customer this means: Costing certainty instead of additional charges, an earlier end of the rental period and thus lower rental costs because you save the time required for cleaning and repairs.

Formwork drawings

Our application engineers worldwide work with CAD systems. This ensures that you always receive optimum formwork solutions and practice-oriented formwork and work cycle plans.

Special solutions

We can help with special parts, custom-designed for your project, to supplement our standard formwork systems.

Structural calculations

Generally, this is only necessary for applications such as single-sided formwork where the anchor parts are embedded in the foundation or the base slab. On request, we can perform structural calculations for such applications at an additional charge.

Formwork seminars

To ensure that all our products are used properly and efficiently, we offer formwork seminars. They provide our customers with a good opportunity to keep themselves up to date and to benefit from the know-how of our engineers.



Notes

A large grid of small dots for taking notes.