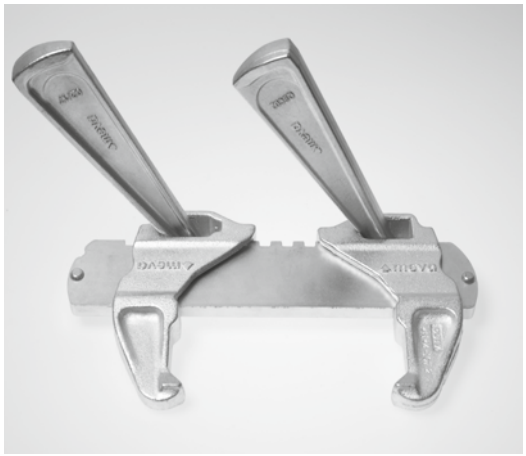


Circular formwork Radius

Technical Instruction Manual

meva

Product features

Radius is a circular formwork that allows adjustable radii.
Pre-assembled standard panels with powder-coated steel profiles provide the load-carrying system for resisting concrete pressures.

The required radius is adjusted on the job-site by means of an integrated spindle system. The smalles possible radius is 250 cm with an allowable concrete pressure of 60 kN/m².

Outer panels with a width of 250 and 125 cm, inner panels with a width of 240 and 120 cm and three different panel heights (350, 300, 150 cm) allow for an excellent adjustment to the job-site requirements.

The Radius panel consists of a high-quality and elastic 5 mm thick stell facing, which is welded to the stiffening profiles. The edge profiles protect the facing edges. All profiles are connected with push-pull spindles.

The arrangement of the spindles between the profiles reduces the overall form thickness, allowing easy stacking and storage.

For crane ganging each 250 and 240 cm wide panel is provided with eight crane eyes, 125 and 120 cm wide panels with four.

The connection of vertical panel joints is accomplished with the Mammut assembly lock, the Uni-assembly lock 22 (for panels at the inside) or Uni-assembly lock 28 (for panels at the outside).
All assembly locks can be attached to the panel frame at virtually any location. The Uni-assembly lock 28 permits up to 16 cm wide fillers between panels.

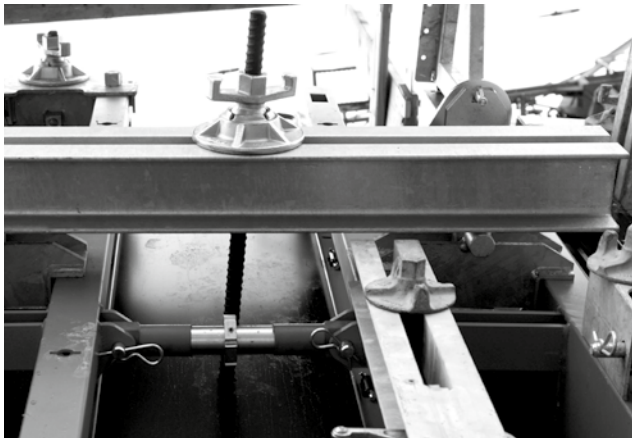
When Radius panels are extended in height the horizontal joint is covered with the alignment rail RS.
The Radius formwork is tied with anchoring rails which use the capacity of the DW 20 tie rod to its full extension.

Walkway brackets and wall braces for various heights make Radius a complete circular forming system.

All steel parts are galvanized, giving the system a long life span and low maintenance.

Abbreviations, measurements,figures and tables
The abbreviation RS is used for Radius. Any further abbreviations are explained where they are used for the first time.

The page numbers in this manual start with the product abbreviation RS. 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.



Please observe

This Technical Instruction Manual contains information, instructions and hints describing 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.

When using our products the federal, state and local codes and regulations must be observed. Many of the details shown do not illustrate the wall formwork system in the ready-to-pour condition as to the aforementioned safety regulations. Please adhere to this manual when applying the equipment described here. Deviations require engineering calculations and analysis to guarantee safety.

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 minimize 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 working area and protection against falling down
- Pick points for panel transport by crane. With the regard to the panel transport please observe this manual. Any deviation will require a static proof.

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

Attention: Never wax or oil assembly locks!

Contents

Product description

The circular formwork Radius has different panel sizes.
There are three different heights:
350 cm
300 cm
150 cm
and four different widths:
250 / 240 / 125 / 120
There are six outside panels available:
350/250
300/250
150/250
350/125
300/125
125/125
and 6 inside panels:
350/240
300/240
150/240
350/120
300/120
150/120

All Radius panels are already equipped with tie holes through the steel facing for tieing through anchoring rails.

By using the anchoring rail RS, the shoe for anchoring rail RS and the tie rod DW 20, a maximum concrete pressure of 60 kN/m² is possible with a radius not smaller than 250 cm.

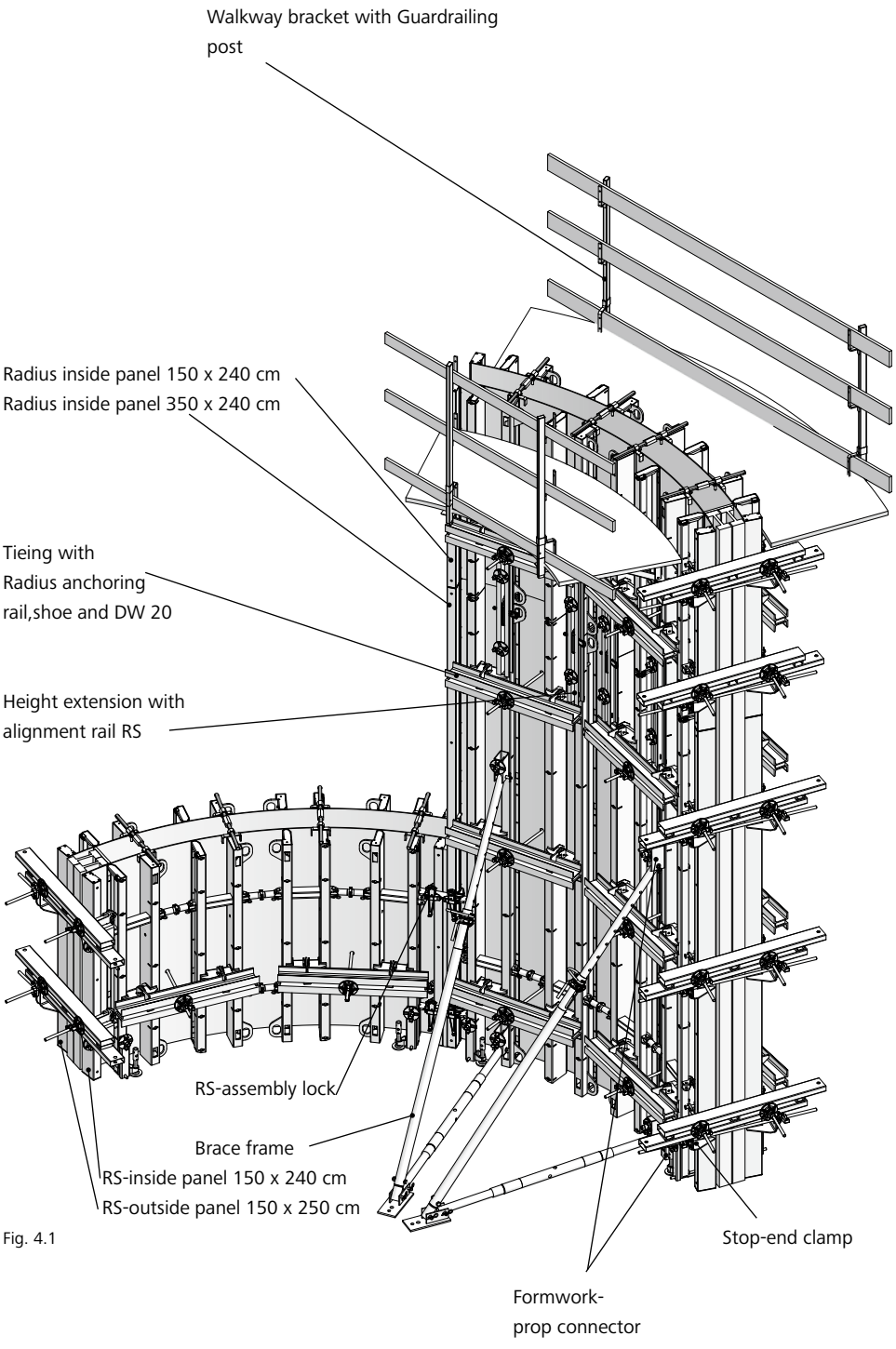


Fig. 4.1

Description	Ref.-No.
RS-outside panel	
350 x 250	**23-805-05**
300 x 250	**23-805-30**
150 x 250	**23-805-70**
350 x 125	**23-805-20**
300 x 125	**23-805-40**
150 x 125	**23-805-80**
RS-inside panel	
350 x 240	**23-806-05**
300 x 240	**23-806-30**
150 x 240	**23-806-70**
350 x 120	**23-806-20**
300 x 120	**23-806-40**
150 x 120	**23-806-80**
Radius shaped template	
outside	**41-291-10**
inside	**41-291-00**

Facing drilling

All Radius panels are already equipped with tie holes through the steel facing for tieing through anchoring rails (see page RS-11).

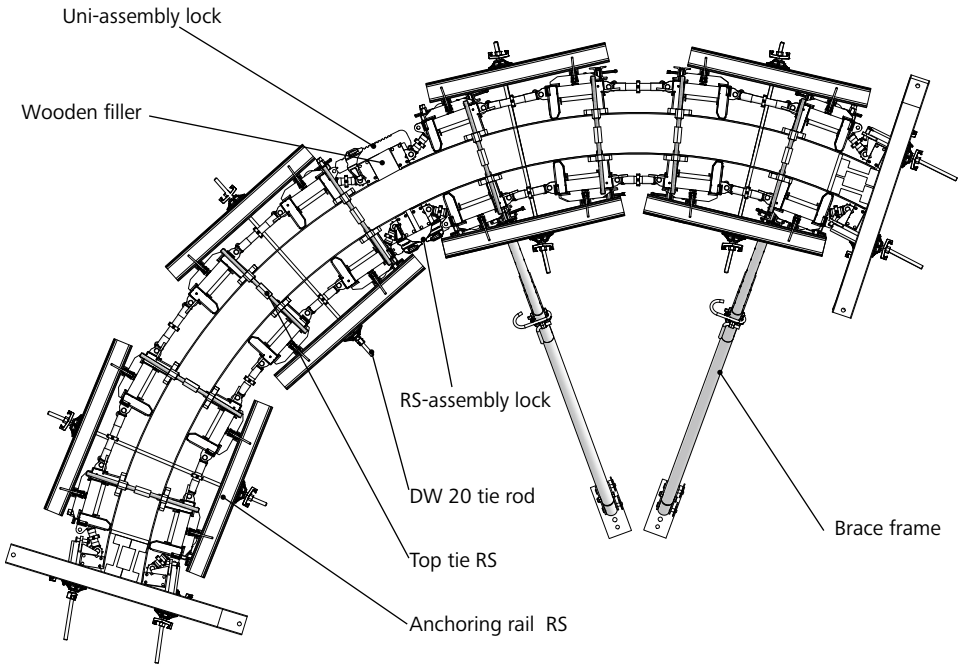


Fig. 5.1

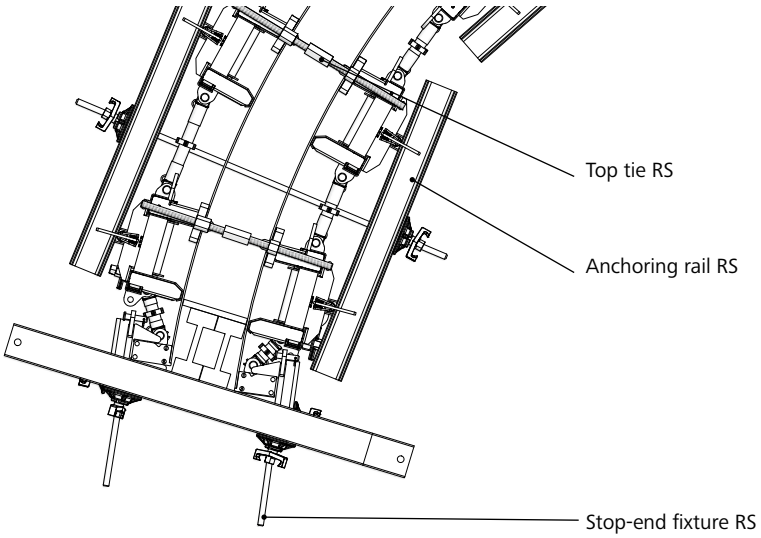


Fig. 5.2

Adjustment of radii

Preparations
All Radius panels are delivered to the jobsite as straight panels. Place panels on two trestles (Fig. 6.1) by using a crane.
In case of gang form, we recommend to build the gang before you start to adjust the radius. All spindles should be in a neutral position (spindle does not "bite" in either direction). Trestles should be levelled and stable enough to stand the load of panels.

The trestles should be placed parallel to the steel profiles (Fig. 6.1).
To be able to check the radius by using the template, trestles should be levelled and shorter than the adjusted panel (Fig. 6.2). Templates can be attached either at or on top of trestles.

The adjustment of radii should always be done by 2 persons who should be able to operate the spindels in both rows at the same time.

Exactly fabricated radius-shaped templates (longer than 2.50 m), made out of plywood, have to be provided by site for checking the exact adjustment of panels.
The inner and outer panels require different templates.

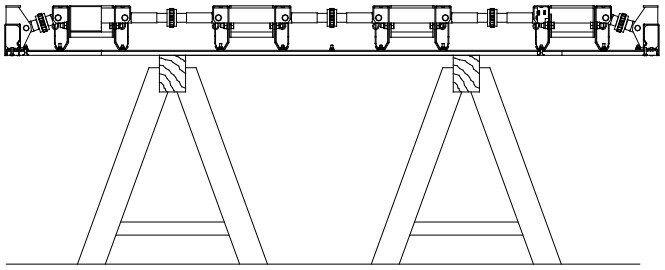


Fig. 6.1

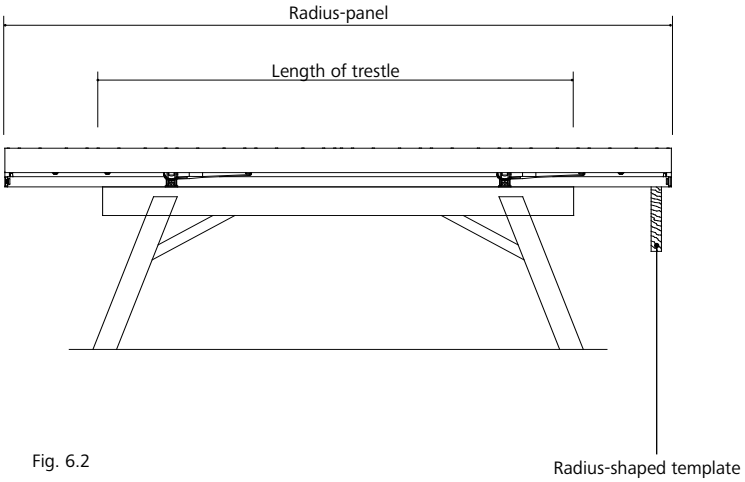


Fig. 6.2

Adjustment of radii

Adjusting procedure
At first, all RS-spindles should be in a neutral postion (spindle does not "bite" in either direction). Afterwards, the radius has to be adjusted step by step. The spindles should be operated according to the numbers given in the illustrations (Fig. 7.1 and 7.2).

Both rows of spindles must be operated simultaneously. This procedure has to be repeated until the radius is set. Between the different steps the actual radius should always be checked by using the template.
The ready-to-use Radius panel will then be lifted from the trestles by crane and put in place. Every Radius panel is either equipped with 4 or 8 crane eyes (depending on panel size).

Adjustment of upright panels
In general, all Radius panels can also be adjusted in (standing) upright position. In this case, panels should not be extended (single panels only).
All RS-spindles should be in a neutral position (spindle does not "bite" in either direction).

The adjusting procedure is the same as described before. For safety reasons, brace panels by using push-pull props to avoid tilting over.

Attention:
The steel facing can get damaged when adjusting the radius in upright position.

Note:
Regular cleaning and greasing of the spindles eases the adjusting procedure later on.

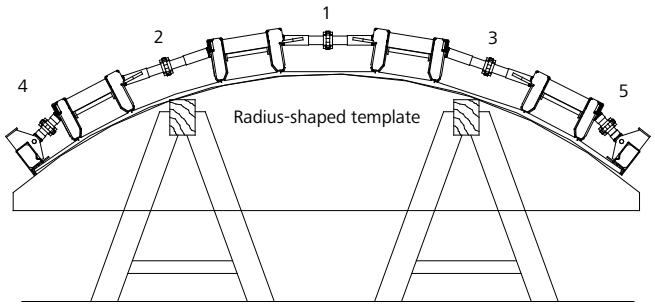


Fig. 7.1

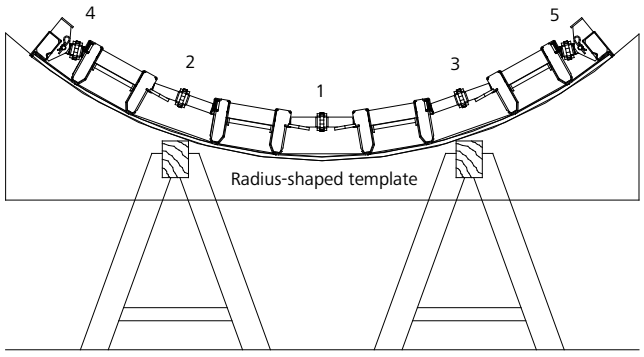


Fig. 7.2

Description	Ref.-No.
Radius shaped template	
outside	**41-291-10**
inside	**41-291-00**

Panel connection

The Radius panels are connected at the vertical joint by means of the M-assembly lock, Uni-assembly lock 22 or 28 (Fig. 8.1).

The locks can be attached to the frame at any position. Every one meter in height one lock should be mounted
(e.g. 5 locks for a 450 cm (300 + 150 cm) high form).

The Uni-assembly lock 22 spans up to 10 cm fillers.
For fillers up to 16 cm the Uni-assembly lock 28 can be used, mostly on the outside panels.

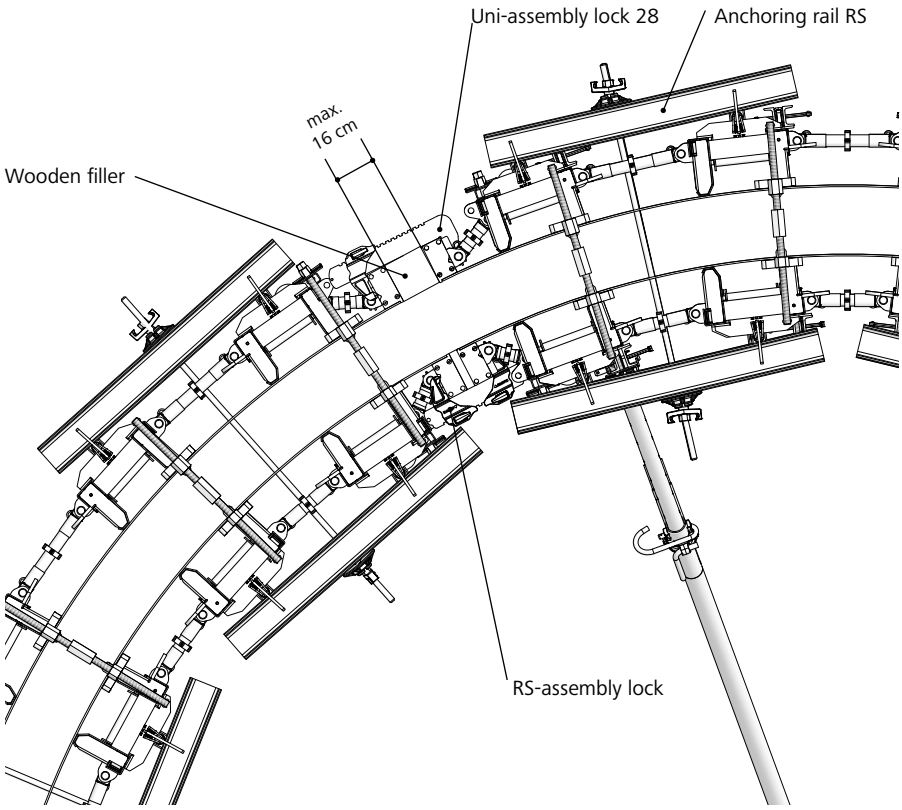


Fig. 8.1 Outer panels with wooden filler

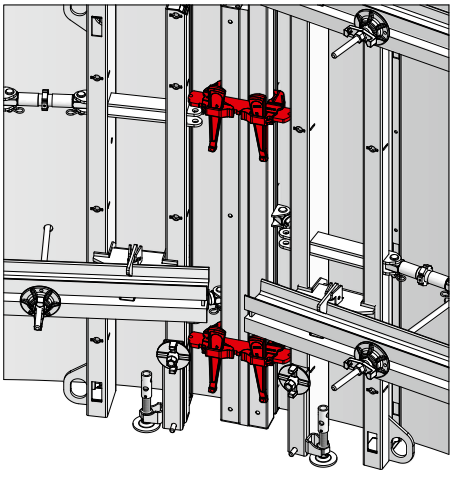


Fig. 8.2 Inner panels with M-assembly lock

Description	Ref.-No.
M-assembly lock	**29-400-71**
RS-assembly lock	**23-807-70**
Uni-assembly lock 22	**29-400-85**
Uni-assembly lock 28	**29-400-90**

Panel joint / Height adjustment

Tension spindle 270-390 RS
If the radius is greater than 5 m, attach tension spindles 270-390 RS at the spindle elevation on every panel joint with bolt and cotter pin on both sides of the formwork (Fig. 9.1).

Turn the tension spindle 270-390 RS until a tight connection is accomplished.

It is not required to use tools to tension the spindles; manually is sufficient.

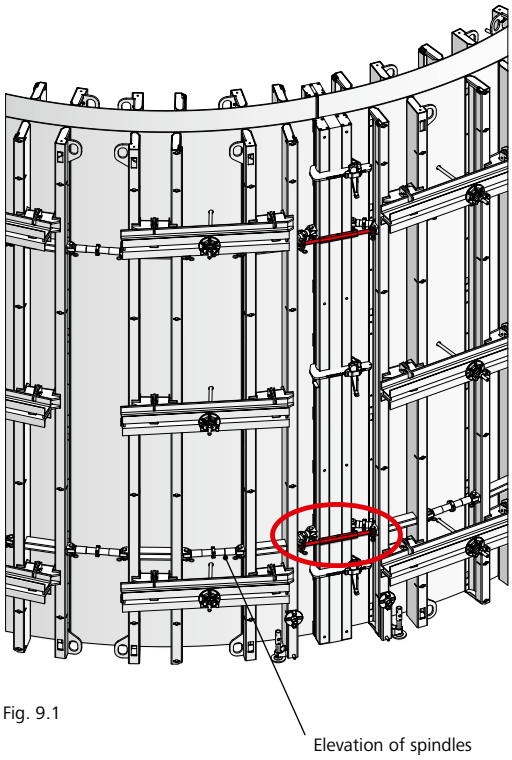
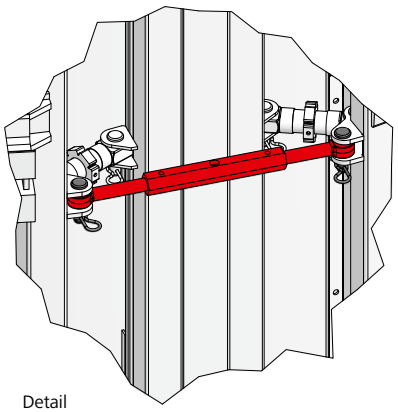


Fig. 9.1



Detail

Height adjustment
By attaching the screw jack foot RS (Fig. 9.2 and 9.3) it is possible to adjust the panels or panel units exactly in heigth.
The screw jack foot RS is mounted with a flange screw 18 to a DW-threaded nut of the panel (Fig. 9.3).

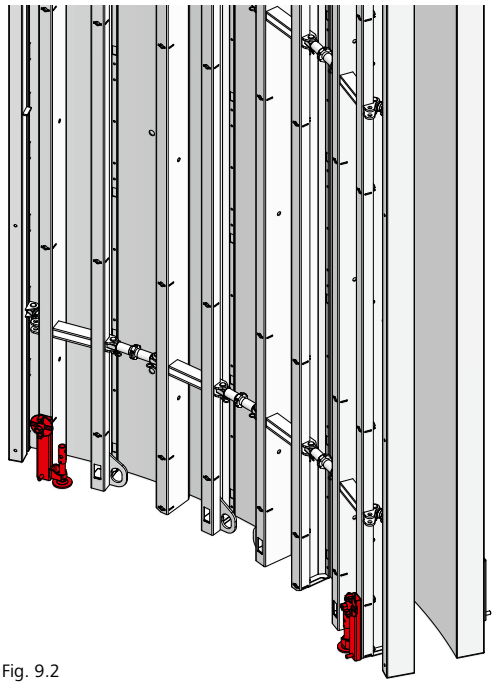


Fig. 9.2

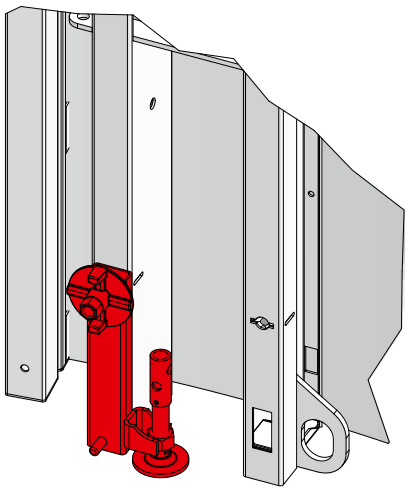


Fig. 9.3

Description	Ref.-No.
Tension spindle 270-390 RS	**23-807-60**
Screw jack foot RS	**23-807-35**
Flange screw 18	**29-401-10**
Uni-assembly lock 28	**29-400-90**

Heigth extension and height adjustment

To meet the requirements of the concrete structures the circular formwork Radius offers three different panel heights (150 cm, 300 cm, 350 cm) in an increment of 50 cm or 100 cm (Fig. 10.1).

Only panels with the same widths should be used for extensions.

The alignment rail RS with integrated assembly lock is used for extension of panels. The claws of the assembly lock fit into the reinforced openings of the steel member of the panels (Fig. 10.1 and 10.2).

In addition, the alignment rail RS is mounted to the panel with 2 flange screws 18.

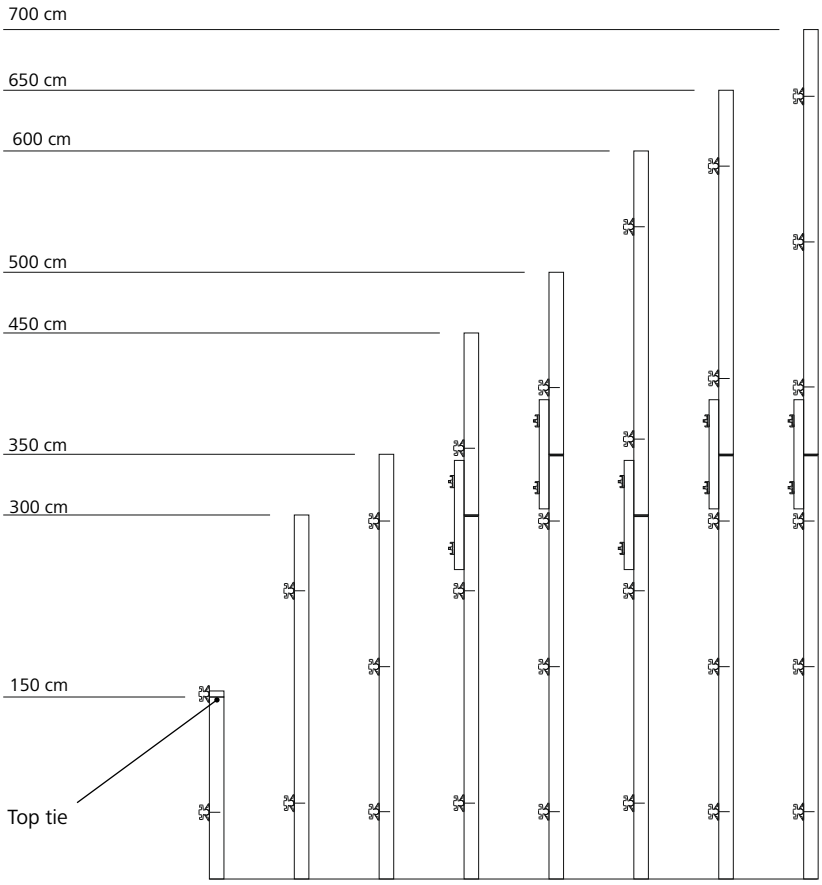


Fig. 10.1

Description	Ref.-No.
Alignment rail RS	**23-807-15**
Flange screw 18	**29-401-10**

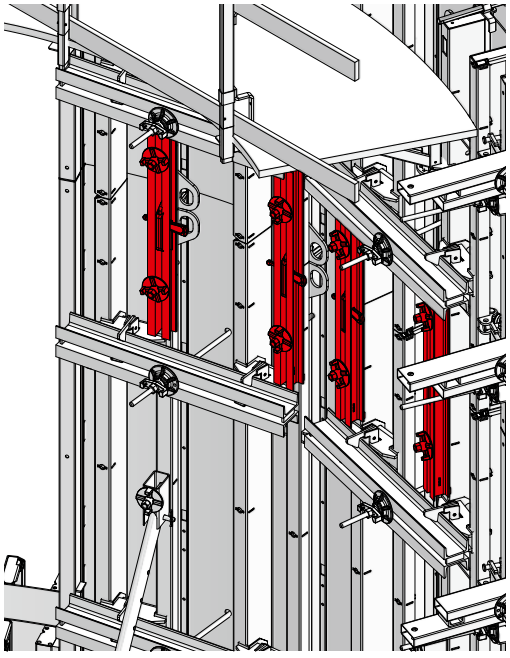


Fig. 10.2

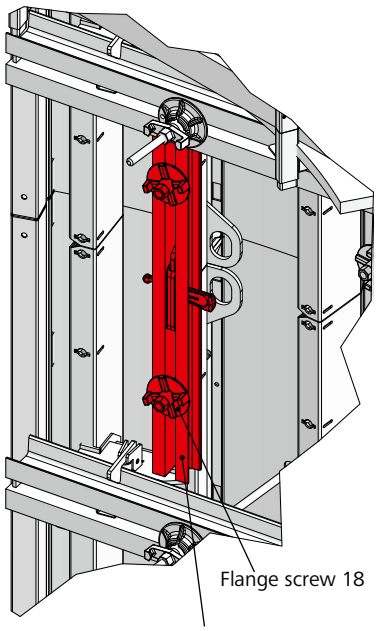


Fig. 10.3

Tieing

Tieing with anchoring rails
The panels are delivered with tie holes pre-drilled in the steel facing for using the anchoring rails (Fig. 11.1 and 11.2).
Because of the large influence area per tie it is required to use the tie rod DW 20.

The anchoring rail is mounted to the steel profiles of the Radius panels by using the shoe for anchoring rails at tie hole elevation.
The anchoring rail is just slipped onto the shoe. The "claws" of the shoes catch the anchoring rail to hold it in place while the rail still can be moved sideways.

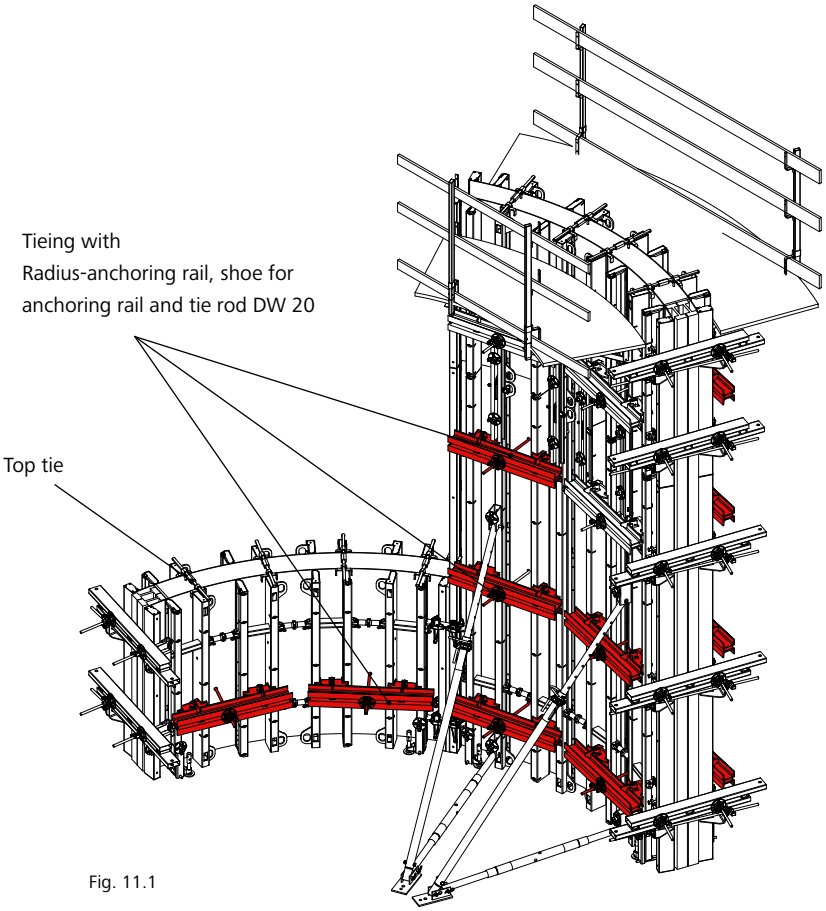


Fig. 11.1

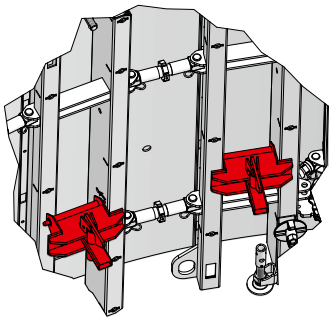


Fig. 11.2

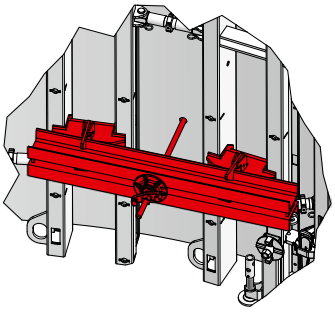


Fig. 11.4

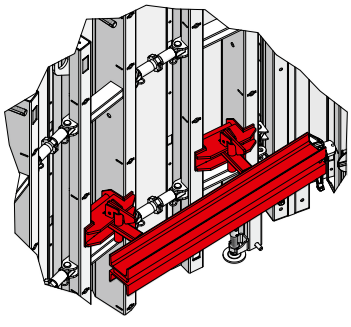


Fig. 11.3

Description	Ref.-No.
Anchoring rail RS	**23-807-30**
Shoe for anchoring rail RS	**23-807-25**
Tie rod DW 20/120	**29-900-97**
Ariculated flange nut 20/140	**29-900-05**

Tieing

Tieing with top tie claw RS

The tie position is defined through the drilled holes of the steel facing.

A 150 cm high formwork, not extended, always requires a top tie (Fig. 12.1 and 12.2).

The top tie consists of the top tie plate, a tie rod DW 20, two articulated flange nuts and two counter nuts with ball.

Through the counter nut with ball the top tie is tension and compression proof, so that it acts as a spacer at the same time.

We recommend the installation of the top tie at all times.

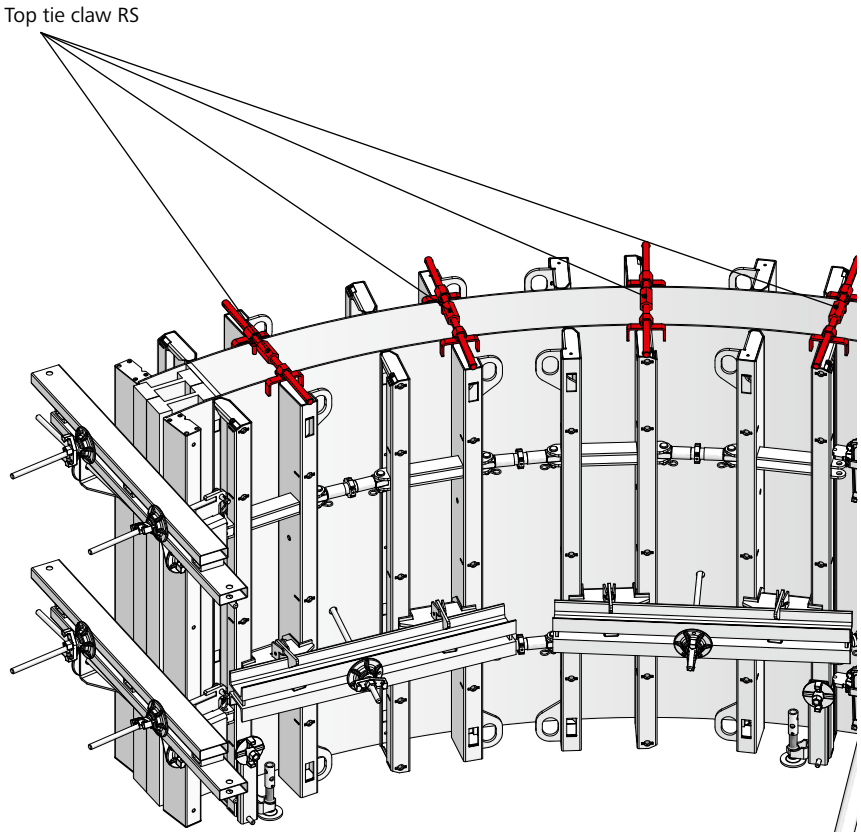


Fig. 12.1

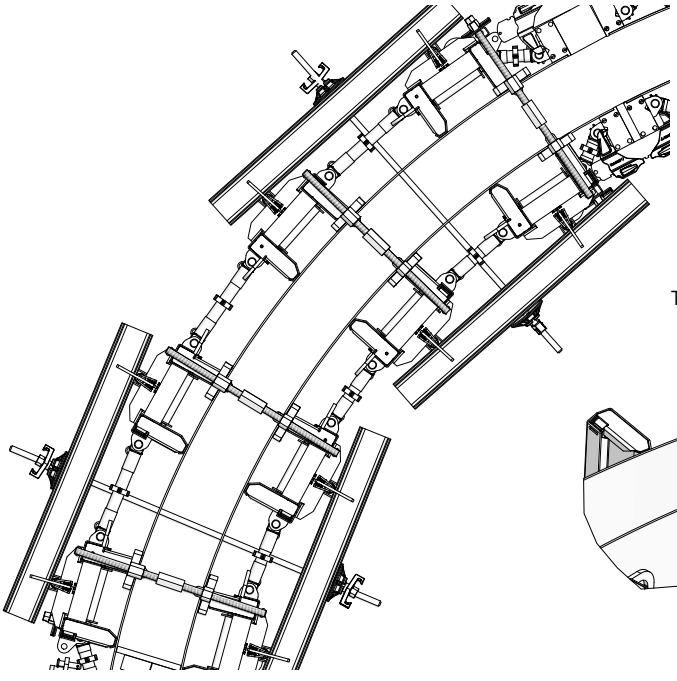


Fig. 12.2

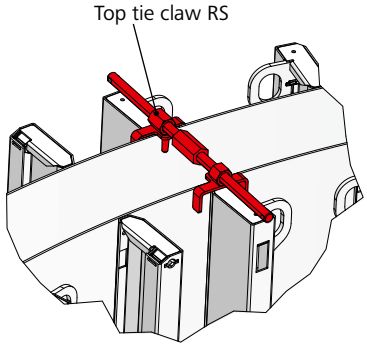


Fig. 12.3

Description	Ref.-No.
Top tie claw RS	23-807-50
M-Cross stiffener 44	29-401-02

Walkway brackets

Walkway bracket

The walkway bracket RS (Fig. 13.1, 13.2 and 13.4) is mounted to a DW-threaded nut of the Radius steel profile. To insert the bracket, turn it by 45°, then turn it back to vertical position and secure it with the clamps at the steel profile. The planks can be bolted to the brackets. The maximum bracket spacing for an admissible load of 150 kg/m² (scaffold group 2) is 2.50 m, depending on the type of planks and in line with DIN 4420. The minimum plank thickness is 4.5cm.

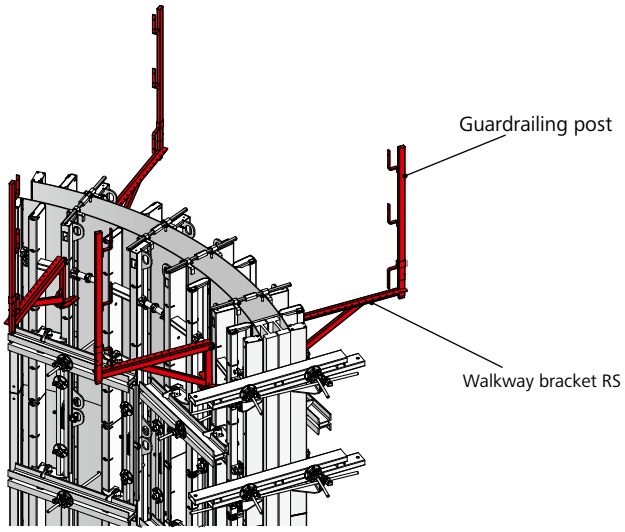


Fig. 13.1

Guardrailing post and side railing

The guardrailing post (Fig. 13.5 and 13.6) is plugged into the walkway bracket. If a fall protection with scaffold tubes or safety mesh is required, the guardrailing post 48/120 UK can be used.
It consists of a round pipe Ø 48 mm for the use of swivel-joint couplers, and has a rectangular transition piece to plug the guardrailing post into the walkway bracket (Fig. 13.6).

Note

The minimum section of the handrail and midrail is:

- → 15 x 3 cm for a post distance up to 2 m
- → 20 x 4 cm for a post distance up to 3 m

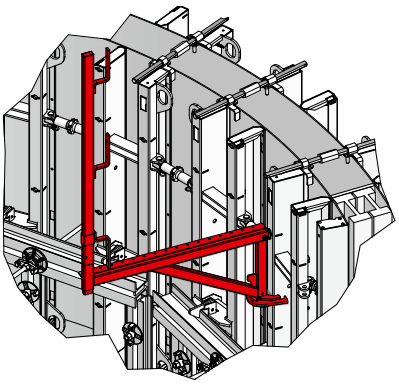


Fig. 13.2

Working scaffold according to DIN 4420, Part 1 and Sheet 8 - 10/01 of the Bauberufsgenossenschaft (German Professional Construction Association)

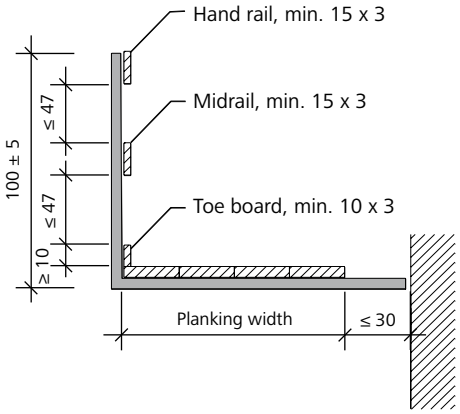


Fig. 13.3

Description	Ref.-No.
Walkway bracket RS	**23-807-20**
Guardrailing post 100	**29-106-75**
Guardrailing post 140	**29-106-85**
Guardrailing post 48/120 UK	**29-106-80**

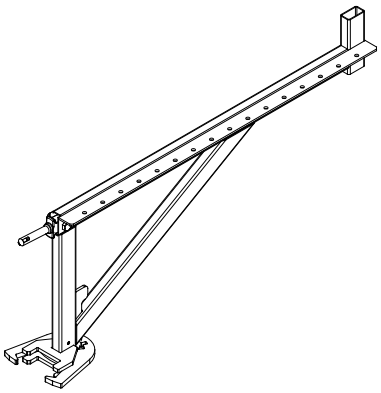


Fig. 13.4
Walkway bracket RS

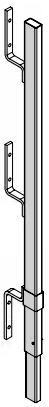


Fig. 13.5
Guardrailing post 100 or 140

Fig. 13.6
Guardrailing post 48/120 UK

Bracing

Wall braces are attached to the DW threade nuts of the panels with formwork-prop connectors and flange screws 18 (Fig. 14.1).

If braces are used to align wall formwork, we recommend a max. brace spacing of 4,00 m. For transfer of wind loads a max. spacing of 2,50 m is recommended (Tab. 14.2). For further applications please contact our technical department.

Please note

- → ■ Formwork height and length of braces should be identical. The angle between slab and brace should not exceed 60° (Fig. 14.1 and Tab. 14.3).
- → ■ Wall braces and push-pull props must be anchored to the ground by using foot plates and dowels.
- → ■ Before anchoring the formwork to the ground, the properties of the ground and the rating of the dowels or nails must be verified according to the federal, state and local codes and regulations.

Brace frame 250

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

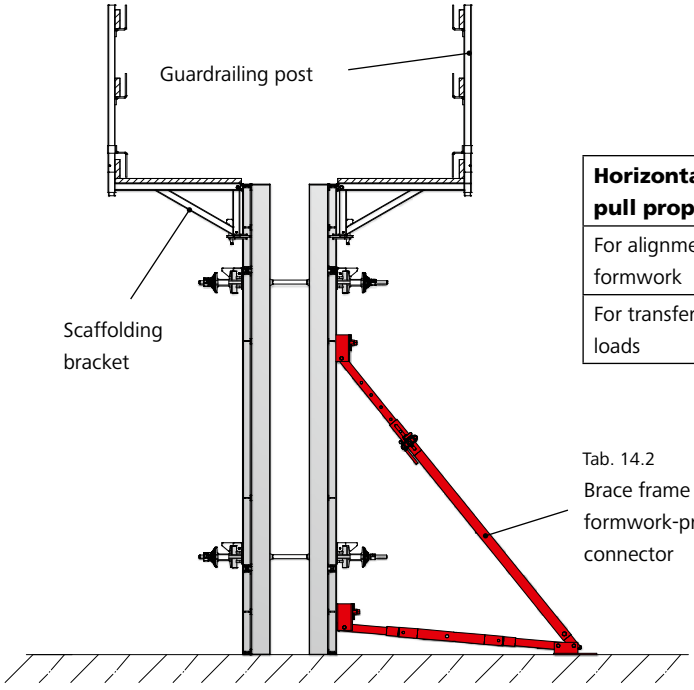
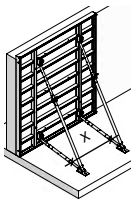


Fig. 14.1



Horizontal spacing (x) of push-pull props / brace frames	
For alignment of the formwork	Max. 4.00 m
For transfer of wind loads	Max. 2.50 m

Tab. 14.2

Brace frame 250 with formwork-prop connector

Description	Ref-No.:	Adjustment range [m]	Adm.pressure [kN]	Adm. tension [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, wall brace 250, 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 wall brace 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	67.8	Wall formwork up to 9.00 m
Triplex R for formwork higher than 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	35.0	45.0	160.0	Wall and column formwork

Tab. 14.3

Description	Ref.-No.
Brace frame 250 without formwork prop connector	**29-109-25**
Brace frame 250 with formwork prop connector	**29-109-20**
Flange screw 18	**29-401-10**

Bracing / High walls

Bracing
high formwork
For wall formwork up to 6.0 m we recommend assembling an on-site brace frame consisting of the push-pull props R 250 and R 460 or to use the brace frame 250 in addition to a R 460. (Fig. 15.1).

For wall formwork higher than 6.0 m we recommend assembling and attaching a brace frame consisting of the push-pull props R 630 and R 250 or R 460 or using the Triplex R push-pull prop (see also Tab. 14.3).

Please observe and follow the Triplex manual.

In both cases the formwork connection (formwork prop connectors or combi-lock with coupling) and the double-joint foot plate must be ordered separately.

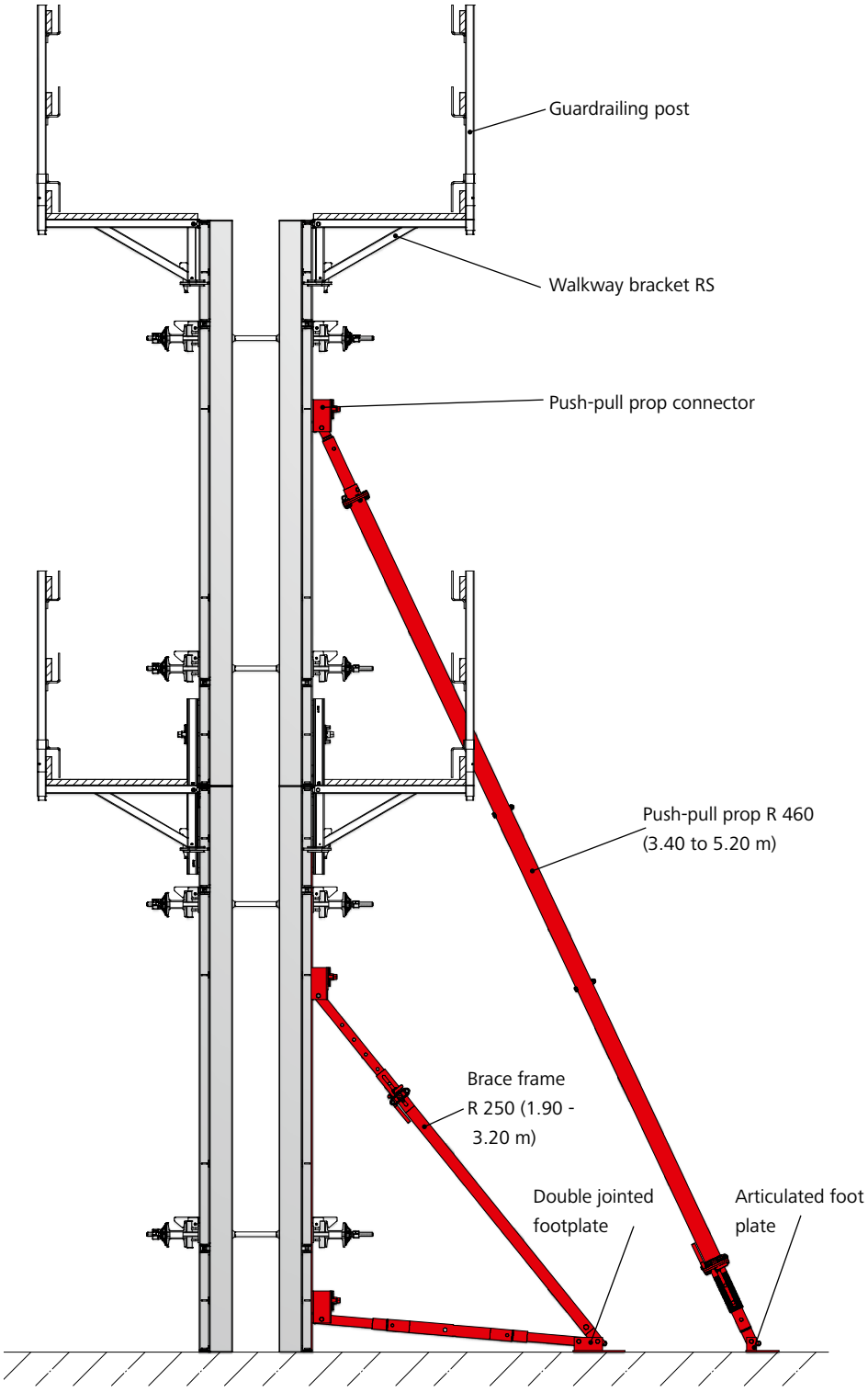


Fig. 15.1

Description	Ref.-No.
Push-pull prop R 630	**29-109-85**
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**
Combi-lock with coupler	**29-804-60**

Stop ends / Bulkheads

The loads resulting from the stop end are taken by the stop-end claw, an alignment rail, the stop-end fixture and a standard DW tie rod plus an articulated flange nut.
We recommend the following number of stop end assemblies:
- 2 for panel height 150cm,
- 3 panel height 300cm and 350cm.

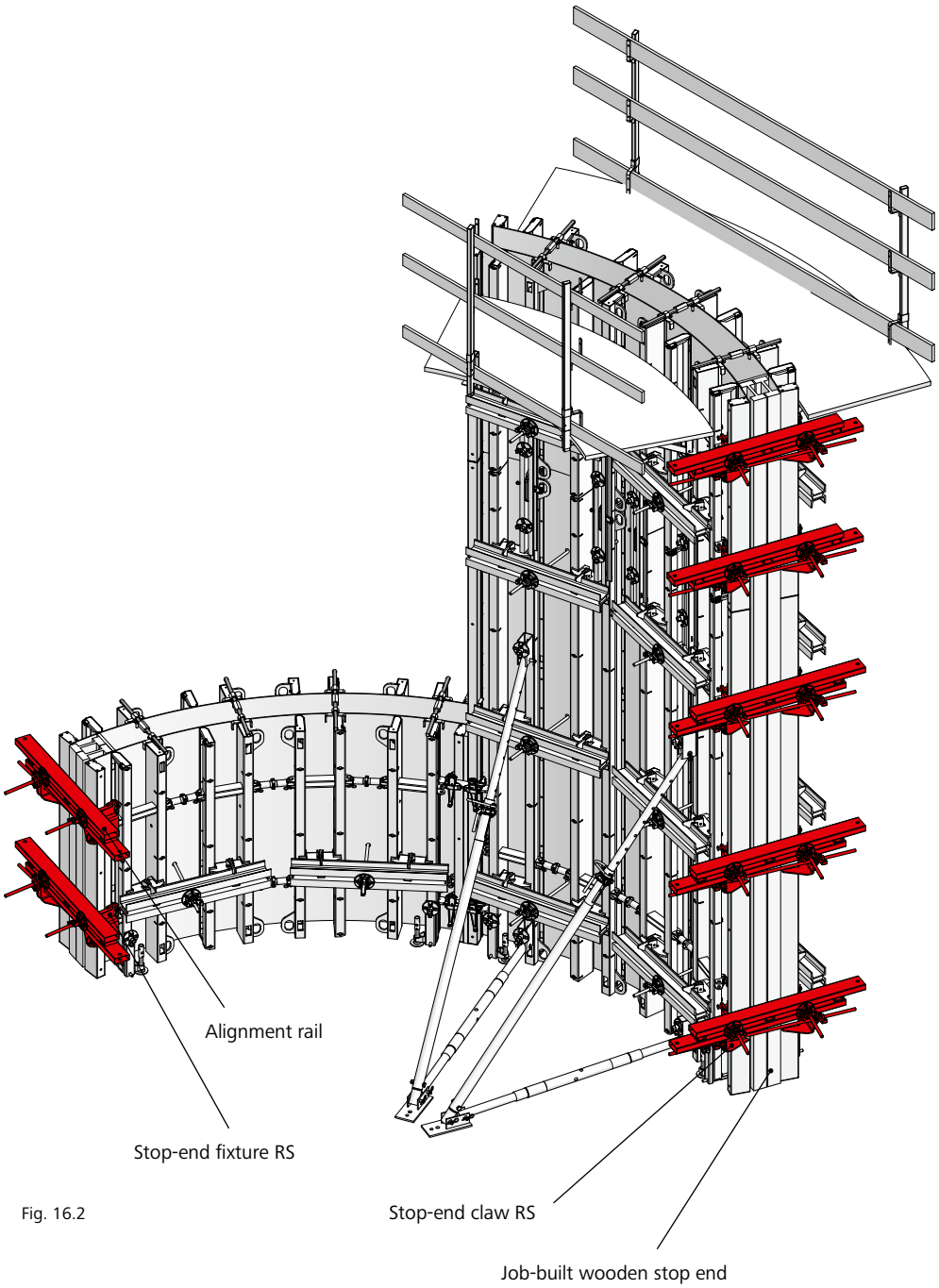


Fig. 16.2

Description	Ref.-No.
AS-alignment rail 125	**29-201-75**
Stop-end fixture RS	**23-807-55**
M-alignment rail 180	**29-400-92**
Stop-end claw RS	**23-807-10**
Tie rod DW 20/120	**29-900-97**
Articulated flange nut 20/140	**29-900-05**

Stop ends / Bulkheads

The stop end is mounted to the Radius panels as follows:

1. The tie rod DW is attached to the panel by using 2 stop-end claws and 2 articualted flange nuts. The tie takes the load resulting from the panels and avoids that the panels move apart (Fig. 17.1).

2. The stop-end fixture is inserted into the "keyhole" at the rear end of the stop-end claw (Fig. 17.2 A and Fig. 17.2 B). Alternatively, the stop-end fixture can be mounted directly to the panel with bolt and cotter pin (at the elevation of the spindles) (Fig. 17.3)

3. An alignment rail is slid over both stop-end fixtures and fixated with two flange nuts (Fig. 17.4).
The stop-end fixture has a 15mm DW-thread. The type of alignment rail depends on the wall thickness.
The stop-end fixtures, the articulated flange nuts and the alingment rail take the concrete pressure which acts on the stop end.

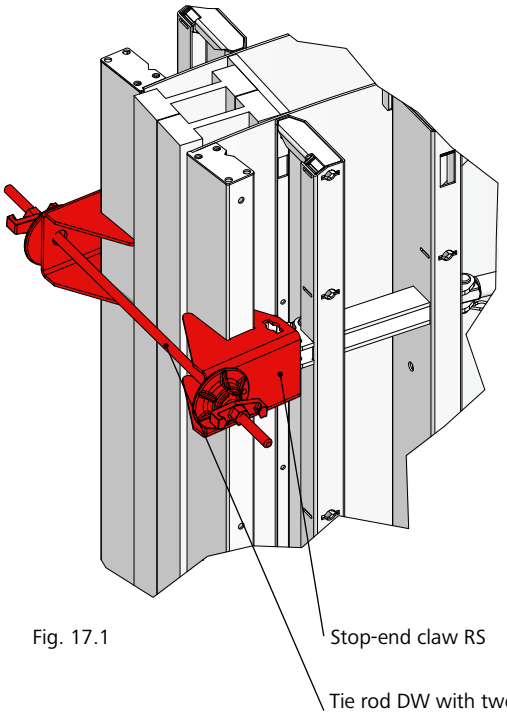


Fig. 17.1

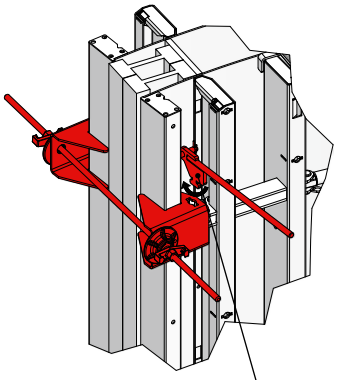


Fig. 17.2 A

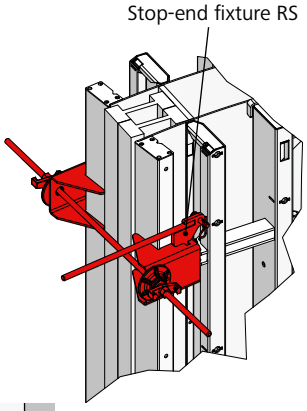


Fig. 17.2 B

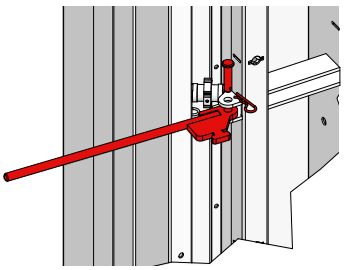


Fig. 17.3

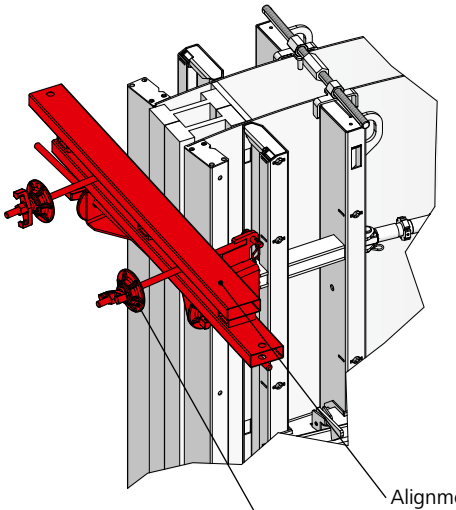


Fig. 17.4

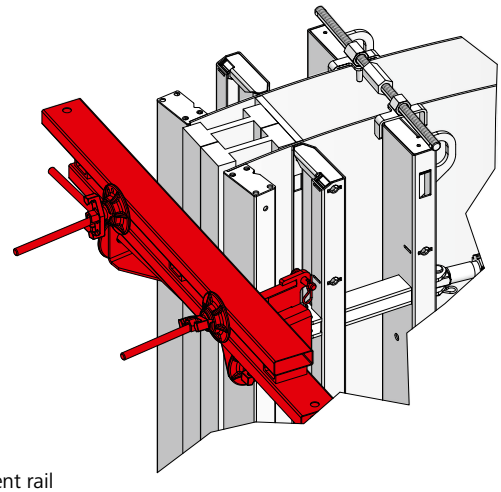


Fig. 17.5 Fully assembled stop end

Description	Ref.-No.
AS-alignment rail 125	**29-201-75**
Stop-end fixture RS	**23-807-55**
M-alignment rail 180	**29-400-92**
Stop-end claw RS	**23-807-10**
Tie rod DW 20/120	**29-900-97**
Articulated flange nut 20/140	**29-900-05**

Possible radii

Minimum radius 250 cm
Radius panels with a 5mm thick steel facing and a maximum concrete pressure of 60 kN/m² allow for a minimum radius of 2.50m (Fig. 18.1).

Maximum radius
The cirular formwork Radius allows for a maximum radius of 35m (Fig. 18.1).

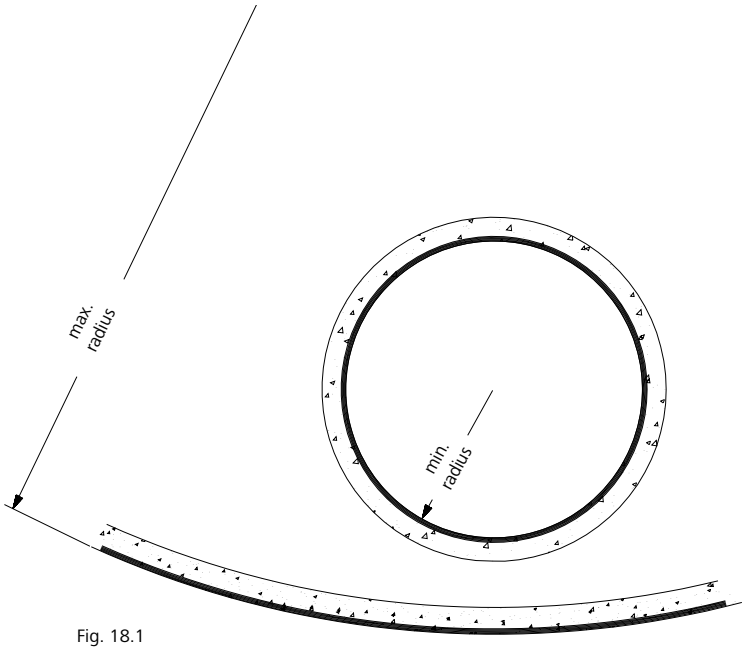


Fig. 18.1

Wall connection
When connecting Radius panels to an existing wall, the panels must overlap by at least 25 cm (Fig. 18.2).

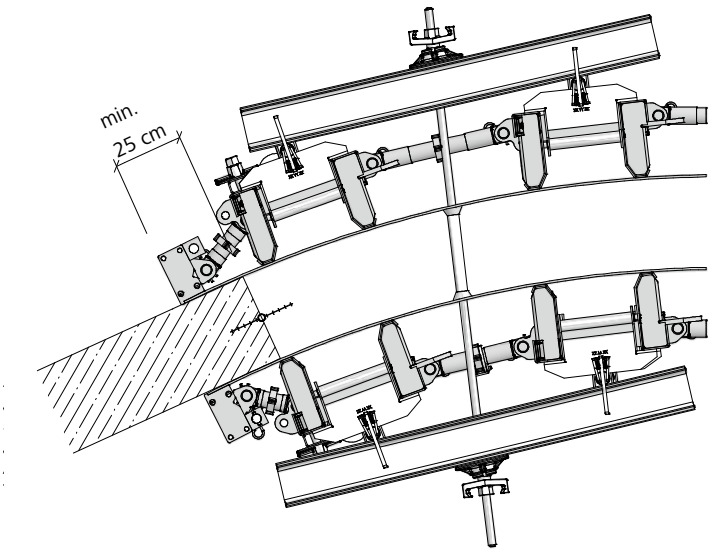


Fig. 18.2

Transport of panels

All Radius panels are equipped with 4 or 8 (depending on panel size) crane eyes which are welded to the steel profiles. The crane eyes allow attachment of crane slings for lifting and shifting panel units (Fig. 19.1). The maximum weight of one unit should not exceed 1000 kg (which is approx. the weight of 11 m² formwork).

Choose length of crane ropes in such a manner that diagonal pull can be minimized (angle between crane rope and panel ≥ 60°).

Note on safety

When moving stacks, crane ropes must be installed crosswise to the Radius steel profiles.
One stack should not exceed 4 panels.
When moving stacked panels make sure that they are straight (without any radius adjusted).
When transporting panel stacks, panels must be stacked face to face (Fig. 19.3).

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 slings.

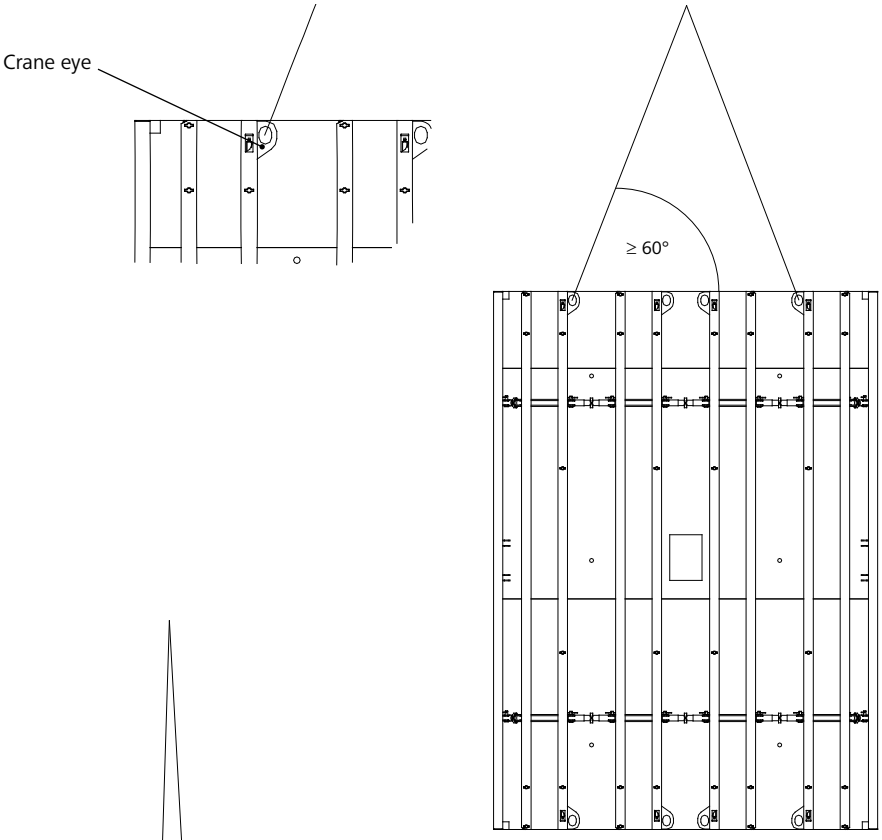
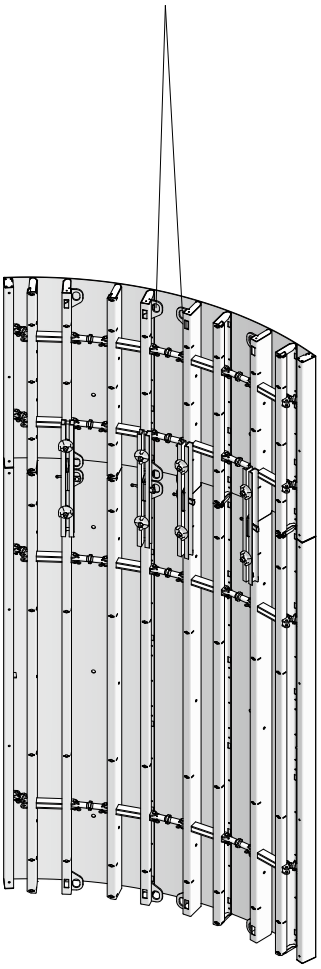


Fig. 19.1



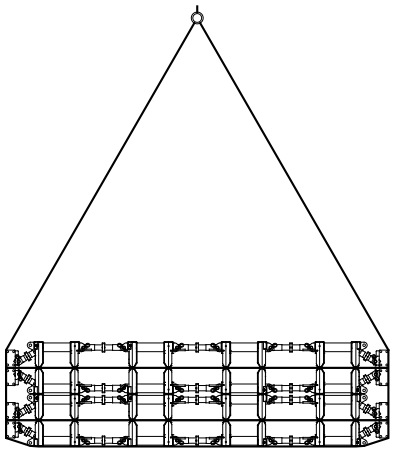


Fig. 19.3

Fig. 19.2 Choose length of crane ropes in such a manner that diagonal pull can be minimized (angle between crane rope and panel ≥ 60°). When moving units with stacked panels we recommend always to use the inner crane eyes. Otherwise it is possible to create deformations at the horizontal joint.

Wooden fillers

Wooden fillers can be used between panels to adapt the Radius formwork to the given requirements. The size of the filler depends on radius and wall thickness. The filler can be used between inside and/or outside panels (Fig. 20.1).

For filler sizes see table 21.1. Fillers for the outside formwork are marked with a "minus" sign.

Fillers not shown in the table have to be interpolated or calculated using the formulae shown on this page.

Specific radius and wall thickness combinations require same size panels to be placed on both sides, the inside and outside, to achieve the best possible pouring results. This is especially recommended and eases work when forming walls with large radii (see table 20.2). This table shows the panel configurations MEVA recommends for the listed radii and wall thicknesses. The first figure is the outside panel, the second figure is the inside panel. The panel configuration in parentheses is possible but not ideal. If two configurations are given, both are feasible.

Attention
The tie rods have to be installed as perpendicular as possible. If the flange nuts are tightened too strong, the adjusted radius can change.

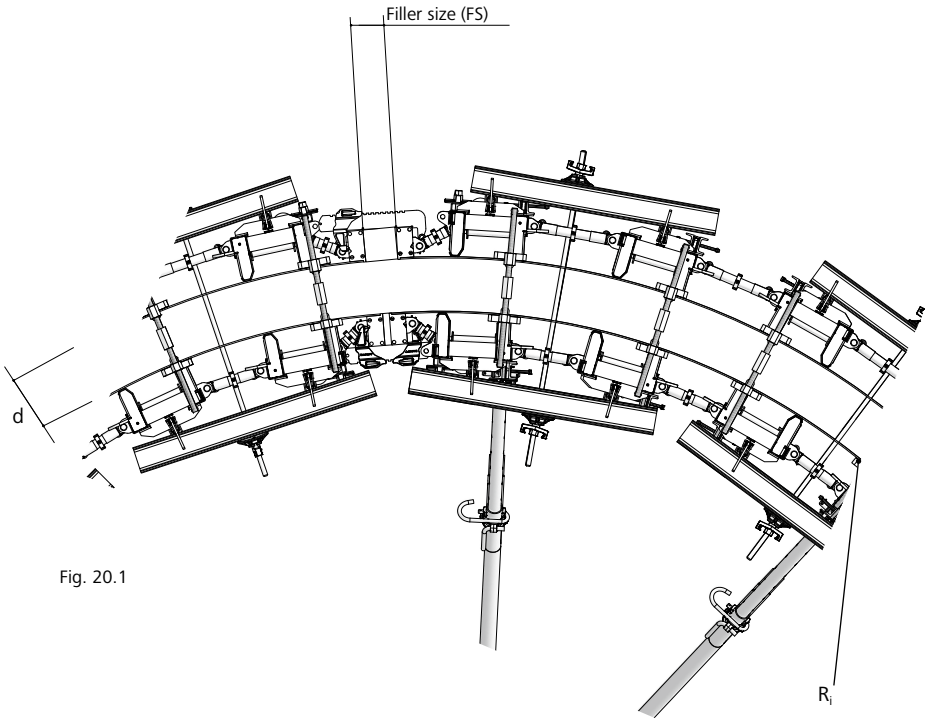


Fig. 20.1

Formula for outside formwork

$$FS_o = 250 - \frac{R_a \times 240}{R_i}$$

FS_o = Filler size outside

Formula for inside formwork

$$FS_i = \frac{R_i \times 250}{R_a} - 240$$

FS_i = Filler size inside

Panel Configuration									
Radius		R_i=**2.5** m	R_i=**3.5** m	R_i=**5** m	R_i=**7.5** m	R_i=**10** m	R_i=**12.5** m	R_i=**15** m	R_i=**20** m
Wall thickness	100 mm	250/240	250/240	250/240	250/250	250/250	250/250	250/250	250/250
	200 mm	250/240	250/240	250/240	250/240	250/240 250/250	250/250	250/250	250/250
	300 mm	(250/240)	(250/240)	250/240	250/240	250/240 (250/250)	250/250 250/240	250/250	250/250
	400 mm	(250/240)	(250/240)	250/240	250/240	250/240 (250/250)	250/240 250/250	250/240 250/250	250/250

Tab. 20.2 Recommended panel configuration

Description	Ref.-No.
Uni-assembly lock 22	**29-400-85**
Uni-assembly lock 28	**29-400-90**

Wooden fillers

The table is for wall thicknesses from 10 cm up to 75 cm and radii from 275 cm up to 3500 cm.

The shown fillers sizes are not valid for forming a full circle.

Ri = Radius inside (cm)	t = thickness of concrete wall (cm)													
	10	15	20	25	30	35	40	45	50	55	60	65	70	75
275	1,2	-3,1	-7,5	-11,8	-16,2	-20,5	-24,9							
400	3,9	1,0	-2,0	-5,0	-8,0	-11,0	-14,0							
500	5,1	2,7	0,4	-2,0	-4,4	-6,8	-9,2	-11,6	-14,0					
600	5,9	3,9	1,9	–	-2,0	-4,0	-6,0	-8,0	-10,0	-12,0	-14,0			
700	6,5	4,8	3,1	1,4	-0,3	-2,0	-3,7	-5,4	-7,1	-8,9	-10,6	-12,3	-14,0	
800	6,9	5,4	3,9	2,4	1,0	-0,5	-2,0	-3,5	-5,0	-6,5	-8,0	-9,5	-11,0	-12,5
900	7,3	5,9	4,6	3,2	1,9	0,6	-0,7	-2,0	-3,3	-4,7	-6,0	-7,3	-8,7	-10,0
1000	7,5	6,3	5,1	3,9	2,7	1,5	0,4	-0,8	-2,0	-3,2	-4,4	-5,6	-6,8	-8,0
1100	7,7	6,6	5,5	4,4	3,4	2,3	1,2	0,2	-0,9	-2,0	-3,1	-4,2	-5,3	-6,4
1200	7,9	6,9	5,9	4,9	3,9	2,9	1,9	1,0	–	-1,0	-2,0	-3,0	-4,0	-5,0
1300	8,1	7,1	6,2	5,3	4,4	3,4	2,5	1,6	0,7	-0,2	-1,1	-2,0	-2,9	-3,8
1400	8,2	7,3	6,5	5,6	4,8	3,9	3,1	2,2	1,4	0,5	-0,3	-1,1	-2,0	-2,9
1500	8,3	7,5	6,7	5,9	5,1	4,3	3,5	2,7	1,9	1,2	0,4	-0,4	-1,2	-2,0
1600	8,4	7,7	6,9	6,2	5,4	4,6	3,9	3,2	2,4	1,7	1,0	0,2	-0,5	-1,3
1700	8,5	7,8	7,1	6,4	5,7	5,0	4,3	3,6	2,9	2,2	1,5	0,8	0,1	-0,6
1800	8,6	7,9	7,3	6,6	5,9	5,2	4,6	3,9	3,2	2,6	1,9	1,3	0,6	0,0
1900	8,7	8,0	7,4	6,8	6,1	5,5	4,8	4,2	3,6	3,0	2,3	1,7	1,1	0,5
2000	8,8	8,1	7,5	6,9	6,3	5,7	5,1	4,5	3,9	3,3	2,7	2,1	1,5	1,0
2100	8,8	8,2	7,6	7,1	6,5	5,9	5,3	4,8	4,2	3,6	3,1	2,5	1,9	1,4
2200	8,9	8,3	7,7	7,2	6,6	6,1	5,5	5,0	4,4	3,9	3,4	2,8	2,3	1,8
2300	8,9	8,4	7,8	7,3	6,8	6,3	5,7	5,2	4,7	4,2	3,6	3,1	2,6	2,1
2400	9,0	8,4	7,9	7,4	6,9	6,4	5,9	5,4	4,9	4,4	3,9	3,4	2,9	2,4
2500	9,0	8,5	8,0	7,5	7,0	6,5	6,1	5,6	5,1	4,6	4,1	3,7	3,2	2,7
2600	9,0	8,6	8,1	7,6	7,1	6,7	6,2	5,7	5,3	4,8	4,4	3,9	3,4	3,0
2700	9,1	8,6	8,2	7,7	7,3	6,8	6,4	5,9	5,5	5,0	4,6	4,1	3,7	3,2
2800	9,1	8,7	8,2	7,8	7,3	6,9	6,5	6,0	5,6	5,2	4,8	4,3	3,9	3,5
2900	9,1	8,7	8,3	7,9	7,4	7,0	6,6	6,2	5,8	5,3	4,9	4,5	4,1	3,7
3000	9,2	8,8	8,3	7,9	7,5	7,1	6,7	6,3	5,9	5,5	5,1	4,7	4,3	3,9
3100	9,2	8,8	8,4	8,0	7,6	7,2	6,8	6,4	6,0	5,6	5,3	4,9	4,5	4,1
3200	9,2	8,8	8,4	8,1	7,7	7,3	6,9	6,5	6,2	5,8	5,4	5,0	4,6	4,3
3300	9,2	8,9	8,5	8,1	7,7	7,4	7,0	6,6	6,3	5,9	5,5	5,2	4,8	4,4
3400	9,3	8,9	8,5	8,2	7,8	7,5	7,1	6,7	6,4	6,0	5,7	5,3	5,0	4,6
3500	9,3	8,9	8,6	8,2	7,9	7,5	7,2	6,8	6,5	6,1	5,8	5,4	5,1	4,8

Tab. 21.1 Filler sizes in cm

Box Outs

To be able to attach box outs at a steel facing the use of magnets is required. The magnets have screw on options to attach timber, boards and the like. The magnets are light and can be easily and precisely attached to the facing (Fig. 22.1, 22.2 and 22.3). To get the magnet off of the steel facing the integrated excentric lever has to be used. For an averaged sized box out, 4 magnets are required; one magnet per corner. The box out (wood construction) itself has to be sturdy enough to withstand the conrete pressure. If the box out is larger than an average door, please contact our technical department.

To attach hollow electrical outlet boxes the outlet box magnet has to be used. With the electrical outlet box magnet, outlet boxes with a diameter between 60 and 80 mm can be attached to the steel facing (Fig. 22.4.).

To meet optical and creative demands, magnetic chamfer strips are available. The chamfer strips have an edge length of 15 or 20 mm (Fig. 22.5 / see also product list).

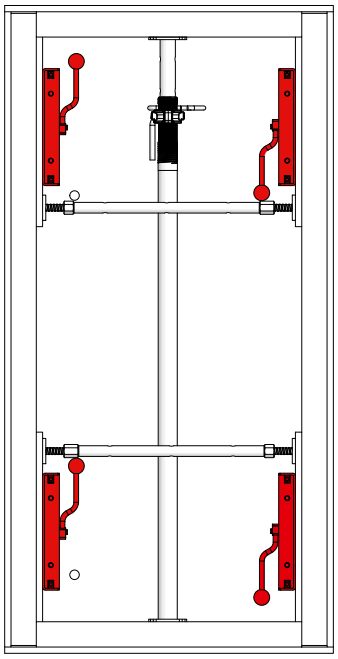


Fig. 22.1

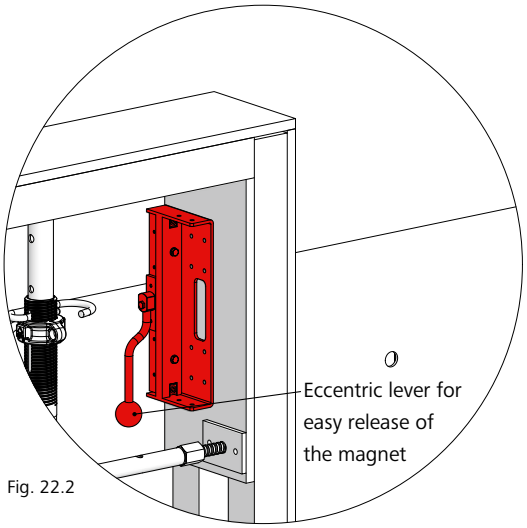


Fig. 22.2

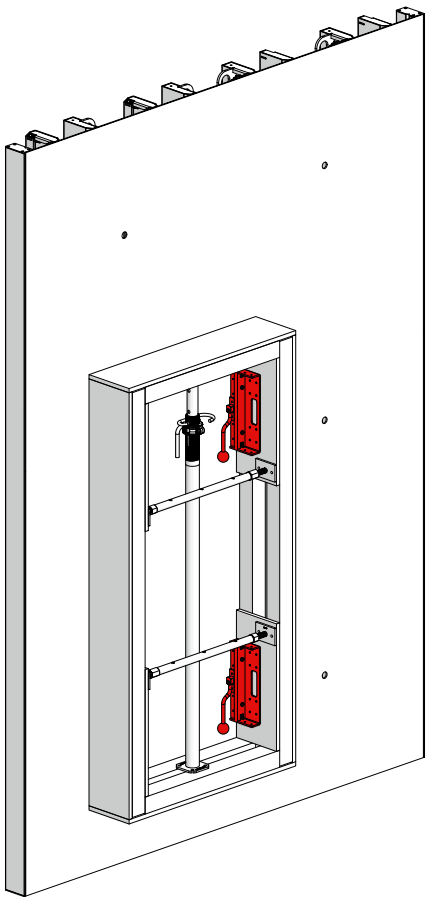


Fig. 22.3

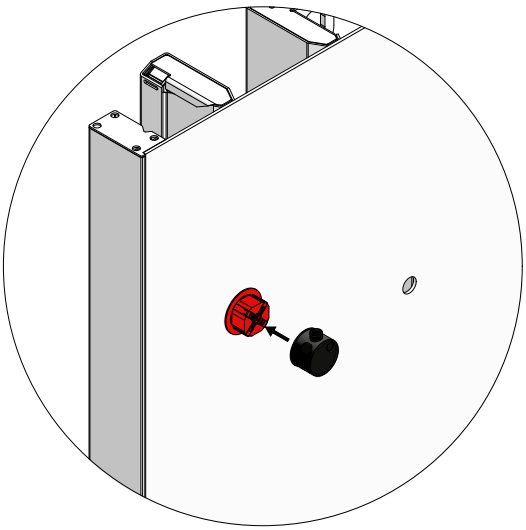


Fig. 22.4

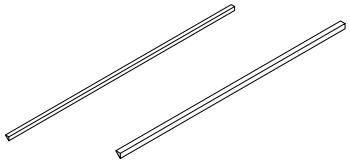


Fig. 22.5

Description	Ref.-No.
Magnet RS 360x60	**23-807-65**
Magnet RS d=60/80	**23-807-67**
Chamfer Strip 15/15 l=1.0	**29-903-00**
Chamfer Strip 15/15 l=2.0	**29-903-02**
Chamfer Strip 20/20 l=1.0	**29-903-05**
Chamfer Strip 20/20 l=2.0	**29-903-07**

Assembly and Stripping

Planning stage
Reasonable planning and work preparation guarantee most successful application of modern formwork systems.
First of all, the necessary quantity of formwork material has to be determined.

In this regard several factors of influence should be taken into account:
- weight of the form-work to be handled
- time allowed for assembly and stripping
- transport of the formwork from one pour to the next – either panel by panel, or in gangs (which considerably reduces the forming time)
- capacity of the lifting equipment
- size of pours, considering cornes, rebar and so on.
- With all the aspects considered, the quan-tities of formwork items can be specified.

Area of assembling
The area where the formwork is set should be clean, even and capable of taking the expected load.

Assembly of the formwork
In most cases it is recommended to set the outside formwork first. Always start at a convenient location and immediately attach a brace to the panels set in place. If you choose to pre-assemble large-size gangs on the ground, braces and working scaffold are attached before lifting the whole unit. You should have a flat surface for the pre-assembly. Don't forget to spray the plywood with release agent.

Bracing of the formwork
After erecting the panels, braces have to be attached immediately in order to prevent the panels from tilting over. Therefore, the foot plates of the braces have to be safely tied to the ground. If tied to the soil, ground nails are used, if tied to a concrete slab, heavy-duty dowels are required.

Working scaffold
The brackets are the basic item for the working scaffold. The walkboards can be bolted to the walkway brackets.
The walkboards must not be placed on the walkway brackets before
1. the braces are attached to the formwork, and
2. all ties are placed connecting the 2 sides of the formwork.

Closing of the formwork
After the setting and bracing of the outside formwork:
- mark the pouring height
- install blockouts and reinforcement
- install a tie in all tie locations when using threadbars
- install PVC sleeves over the ties
- set the inside formwork
- tighten the formwork either using standard or articulated flange nuts on both sides of the tie.

Stripping
Flange nuts and ties are removed section by section. The one side of the formwork without braces has to be stripped immediately or otherwise secured in order to prevent the panels from tilting over. The panel units are stripped by removing the assembly locks from the panel joints.
If the formwork is handled manually, the working scaffold and braces are removed prior to dismantling of the panels.
If the formwork is handled by crane, the working scaffold and braces remain on the large-size gangs. The dismantled units are cleaned in upright position and release agent is applied before moving them to the next pour.
When there is no further use for the large-size gangs they are placed face down to remove scaffold and braces. The panels are cleaned on the ground and piled up for trans-port after they are straightened out.

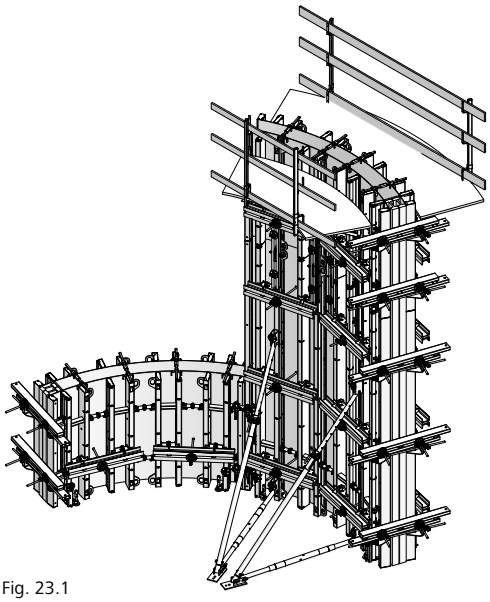


Fig. 23.1

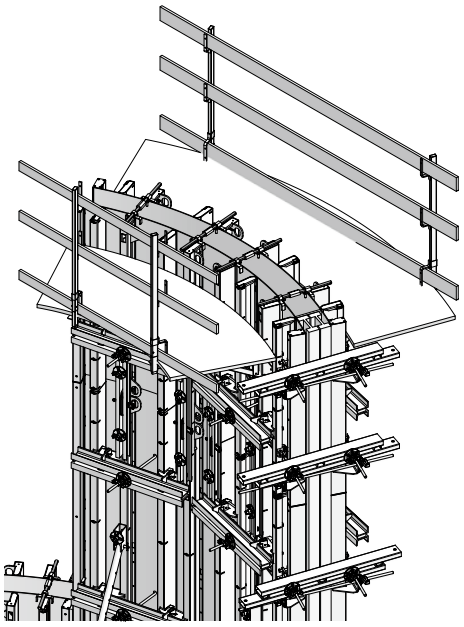


Fig. 23.2

Assembly and Stripping (step by step)

I. Unloading and assembly

1. For unloading panels from a truck a stack at a time use crane slings. The stacks usually come with panels face to face.
2. Lift one panel at a time and lay it down (face down) on trestles.
3. Remove lifting devices.
4. Adjust radius.
5. Mount the walkway brackets and braces.

II. Lifting and setting

1. For lifting the gang use at least 2 crane hooks plus standard crane slings (supplied on site).
2. Lift the gang to upright position and spray the plywood with release agent.
3. Move the gang into place and immediately secure the braces to the ground.
4. Remove the crane hook.
5. Proceed with the other gangs in the same way.

III. Closing of formwork

The opposite formwork is assembled the same way as described before.
For this formwork, however, you do not necessarily need braces.

1. Insert the ties through the first formwork up to the measure of the required wall thickness.

2. Install spacer cones and PVC sleeves over the ties.

3. Lift and move the second formwork into place.
4. Push the ties through the second formwork and secure them on both sides with flange nuts.
5. When using systems without spacers apply Z-bars to ensure constant wall thickness.

Attention:

Crane hooks must not be removed before both sides of the formwork are sufficiently secured with ties.

IV. Pouring

For the pouring of concrete the federal, state and local codes and regulations must be observed.

Attention:

The admissible fresh concrete pressure of 60 kN/m² must not be exceeded .

V. Stripping and dismantling

Stripping may only be started if the concrete has set to such an extent that it cannot deform anymore.
Always start with the second side of the formwork (the one without braces).
1. Mount the crane hooks to the gangs, attach the standard crane slings and pull them tight.
2. Remove the ties and assembly locks.
3. Pull the gang up vertically.

4. Move the gang to the next pour or a temporary storage, or dismantle it (as required).
5. If heavily soiled, you might need to clean the panels and spray them with release agent before the next use.

Attention:

Whenever gangs are moved by crane no workers are allowed on the formwork, and make sure that any
loose items (such as concrete remnants, tools, etc.) are removed.

Safety regulations

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

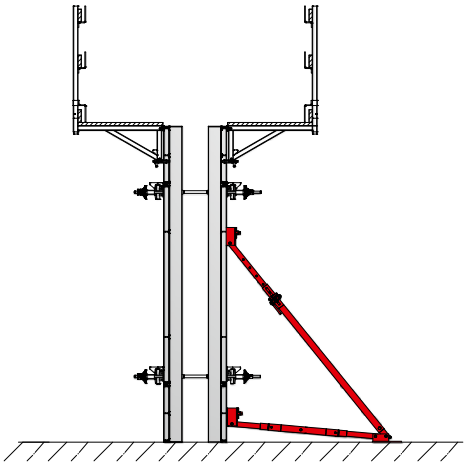


Fig. 24.1

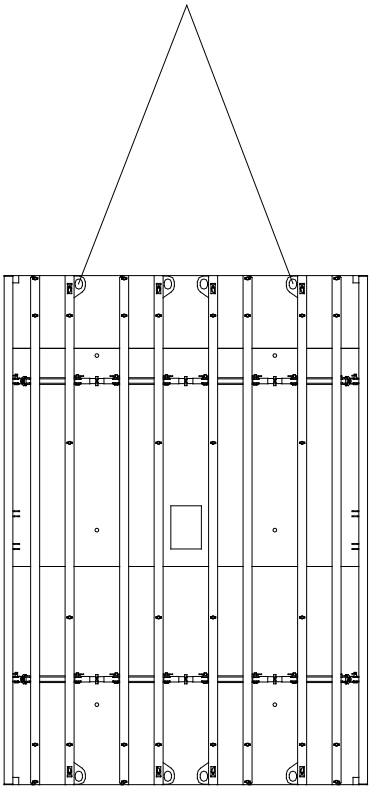


Fig. 24.2

Service

Cleaning
The formwork is cleaned professionally upon return. Cleaning is done using industrial equipment with assembly lines.

Regeneration
The regeneration is carried out as follows: The frames are checked and, if necessary, repaired, painted and provided with a new facing.

As long as the formwork equipment is up-to-date, a regeneration will always be a more economical solution than purchasing new formwork.

Please note that the cleaning and regeneration service is not available in all countries in which MEVA does business.

Rentals
With much equipment on stock, we offer our customers the option of renting supplementary material during peak times. We also give prospective customers the chance to test MEVA formwork so they can see its benefits for themselves in actual use.

RentalPlus
Since MEVA started the flat rate for cleaning and repair of rented formwork systems in early 2000, more and more contractors experience the outstanding advantages. Ask our representatives about the details!

Formwork drawings
Of course, all offices in our technical department have CAD facilities. You get expert, clearly represented plans and work cycle drawings.

MBS MEVA Basic Support
MBS is an addition to AutoCAD, developed by MEVA Formwork Systems in 2000. MBS is based on standard programs (AutoCAD and Excel) and can be used on any PC that has these two programs installed. It includes pull down menues for AutoCAD and applications to ease forming. It also includes the possibility to create take-offs.

Special solutions
We can help with special parts, custom-designed for your project, as a supplement to our formwork systems.

Static calculations
Generally, this is only necessary for applications like single-sided formwork where the anchor parts are embedded in the foundation or the base slab. If requested, we can perform static calculations for such applications at an additional charge.

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

Notes