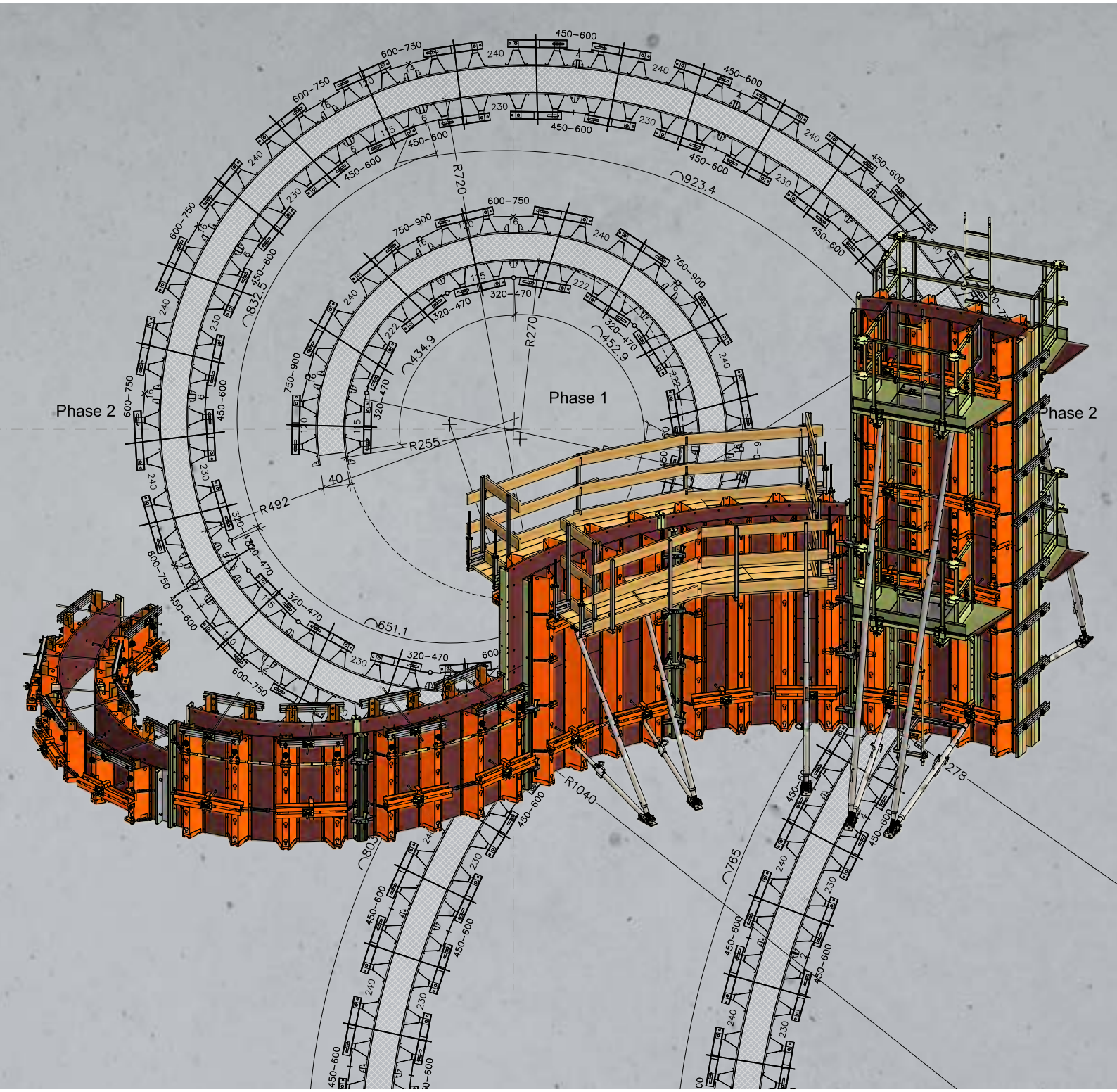
Circular Trapezoidal girder formwork with clamp connection

TECHNICAL INFORMATION



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Edition 01
as of: 13.03.2023
Item Number: N953.002.0063

GSV guidelines

Important information regarding the intended use and safe application of formwork and falsework

The contractor is responsible for drawing up a comprehenrisk assessment and a set of installation instructions.
The latter is not usually identical to the assembly instructions.

- **Rick Assessment**
  The contractor is responsible for the compilation, documentation, implementation and revision of a risk assessment for each construction site. His employees are obliged to implement the measures resulting from this in accordance with all legal requirements.
- **Installation Instructions**
  The contractor is responsible for compiling a written set of installation instructions. The assembly instructions forms part of the basic for the compilation of a set of installation instructions.
- **Assembly Instructions**
  Formwork is technical work equipment which is intended for commercial use only. The intended use must take place exclusively through properly trained personnel and appropriately qualified supervising personnel.
  The assembly instructions are an integral component of the formwork construction. They comprise at least safety guidelines, details on the standard configuration and intended use, as well as the system description. The functional instructions (standard configuration) contained in the assembly instructions are to be complied with as stated. Enhancements, deviations or changes represent a potential risk and therefore require separate verification (with the help of a risk assessment) or a set of installation instructions which comply with the relevant laws, standards and safety regulations. The same applies in those cases where formwork and/or falsework components are provided by the contractor.
- **Availability of the Assembly Instructions**
  The contractor has to ensure that the assembly instructions provided by the manufacturer or formwork supplier are available at the place of use. Site personnel are to be informed of this before assembly and use takes place, and that they are available at all times.
- **Representations**
  The representations shown in the assembly instructions are, in part, situations of assembly and not always complete in terms of safety considerations. The safety installations which havepossibly not been shown in these representations must nevertheless be available.
- **Storage and Transportation**
  The special requirements of the respective formwork constructions regarding transportation procedures as wellas storage must be complied with. By way of example, name the appropriate lifting gear to be used.
- **Material Check**
  Formwork and falsework material deliveries are to be checked on arrival at the construction site/ place of destination as well as before each use to ensure that they are in perfect conditionand function correctly. Changes to the formwork materials are not permitted.
- **Spare Parts and Repairs**
  Only original components may be used as spare parts. Repairs are to be carried out by the manufacturer or authorized repair facilities only.
- **Use of Other Products**
  Combining formwork components from different manufacturers carries certain risks. They are to be individually verified and can result in the compilation of a separate set of assembly instructions required for the installation of the equipment.
- **Safety Symbols**
  Individual safety symbols are to be complied with. Examples:

Safety information:
non-compliance can lead to damage tomaterials or risk to the health of sitepersonnel (also life).

Visual check:
the intended operation is to be carried out through a visual check.

Note:
supplementary information for safe, correct and professional execution of work activities.

- **Miscellaneous**

Technical improvements and modifications are subject to change without notice. For the safetyrelated applicationand use of the products, all current country-specific laws, standards as well as other safety regulations are to be complied with without exception. They form a part of the obligations of employers and employees regarding industrial safety. This results in, among other things, the responsibility of the contractor to ensure the stability of the formwork and falsework constructions as well as the structure during all stages of construction. This also includes the basic assembly, dismantling and the transport of the formwork and falsework constructions or their components. The complete construction is to be checked during and after assembly.

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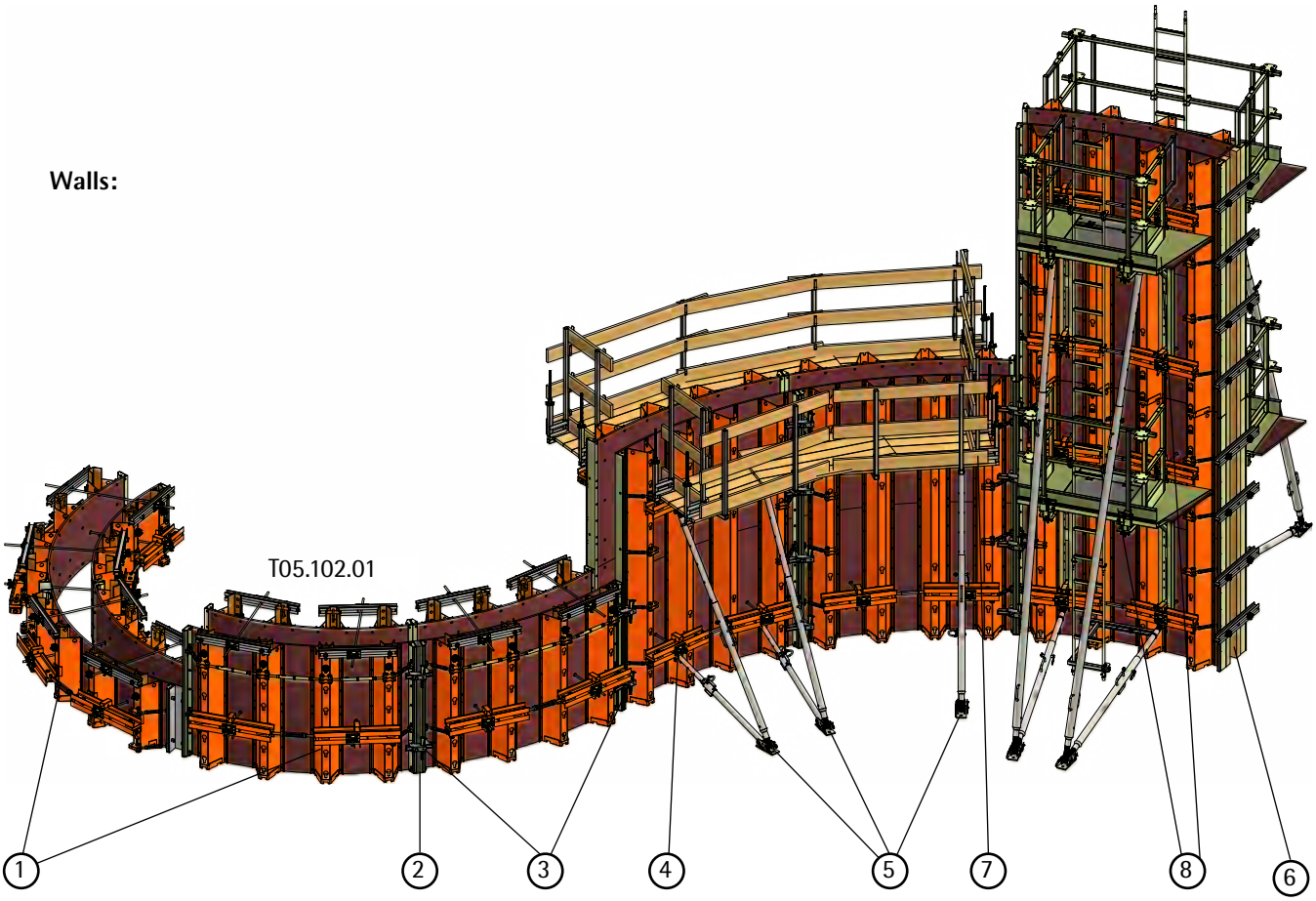
System description, technical data

- With the variable radii circular formwork TTK, all diameters can be set smoothly in the range fro 5.00 m to ∞ (straight).
- By turning the turnbuckles between the trapezoid girders and the adjustment screws in the waler, the 21 mm-thick plywood panel is curved to the desired diameter.
- Non-circular curves such as spirals, ovals and ellipses an also be set. Additionally, the plywood in the segment can be curved differently at the top and bottom for conical parts of the building.
- Different segment widths and system-related fillers adjust the formwork to any curve size.
- Segment heights available for delivery: 300 cm; 150 cm; 75 cm and 37,5 cm.
- The formwork absorbs an approved fresh-concrete pressure of 60 kN/m², whereby the evenness tolerances according to DIN 18202, Table 3, Line 7 are complied with. Tie rods DW15 are used as formwork anchors.
- The TTK multi-clamps are used as connecting pieces.

Walls:

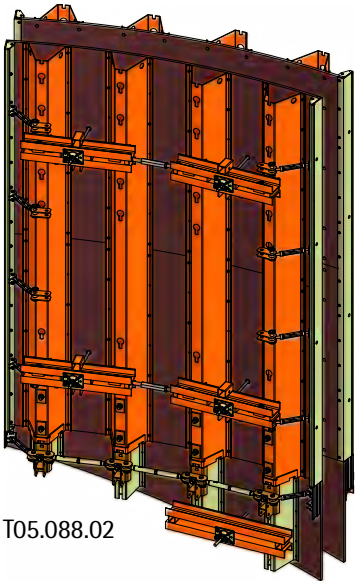


1. Segments
2. Fillers
3. Connecting piece
4. Tie points
5. Adjustable props
6. End stop
7. Platform bracket cpl. both sides
8. Multip

System description, technical data

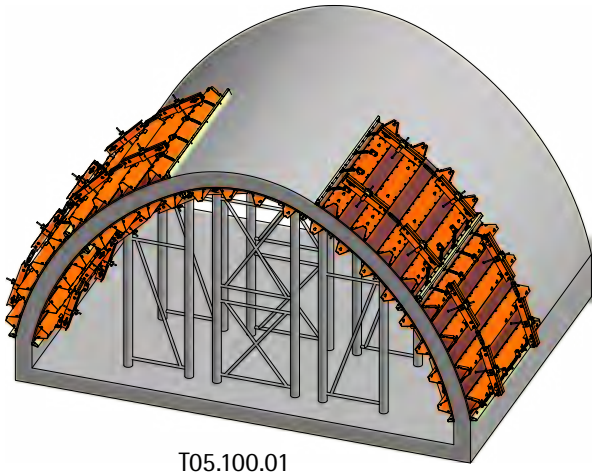
- For formworks on sloping surfaces, the telescopic girder adjusts the horizontally standing formwork segments to the skew installation surface.
- For tunnel-like projects, it is possible for the formwork to be used horizontally.
- Concrete haunches can also be erected in the system with the concrete haunch girder.
- The trapezoidal girder formwork TTK technical Information contains all the required specifications regarding the standard assemblies. Uses beyond these applications require consultation with application engineering department from the manufacturer and, if applicable, also a separate structural survey.
- For the safety-relevant application and use of PASCHAL products, the laws, standards and provisions for occupational safety and other safety provisions applicable at the respective place of use as amended must be observed.
- The drawings shown in the following Technical Information represent some of the assembly states and therefore are not always complete in respect of the technical safety.

Ramps, sloping surfaces:



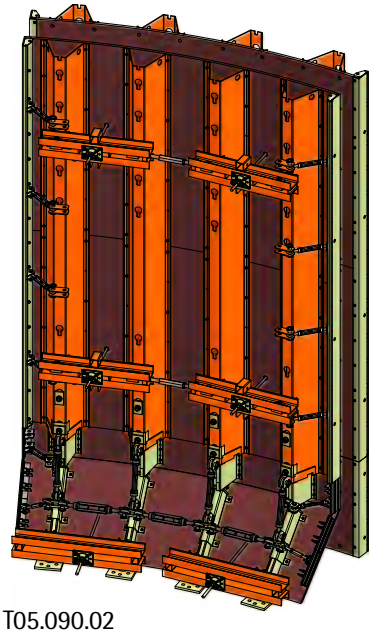
T05.088.02

Tunnels, ducts:



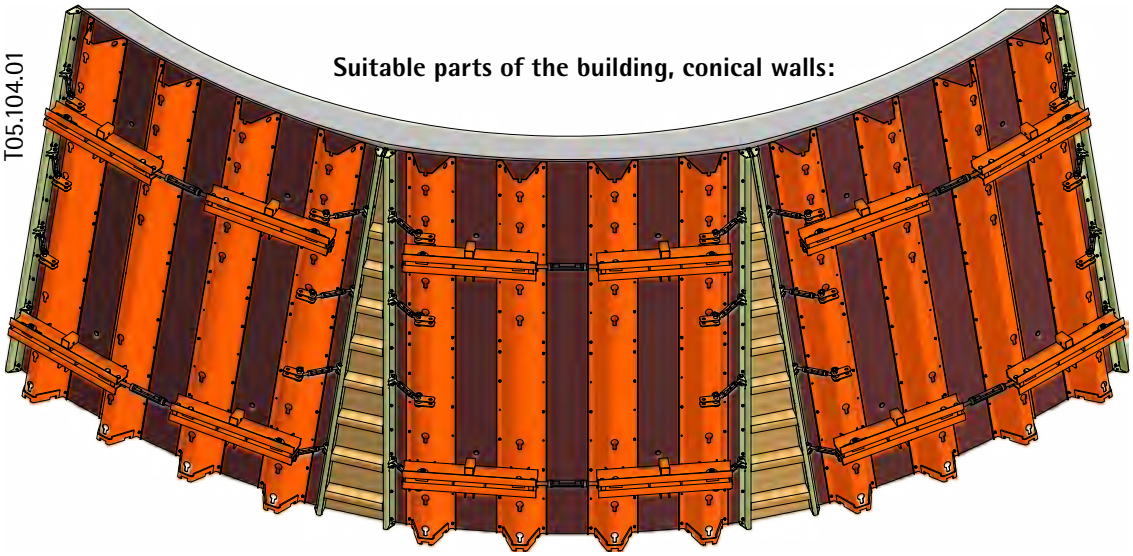
T05.100.01

Concrete haunches:



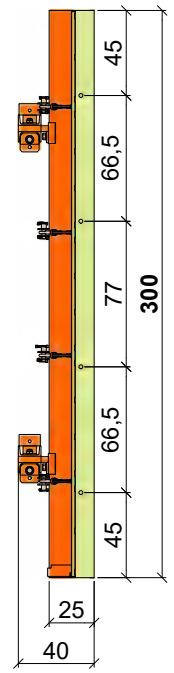
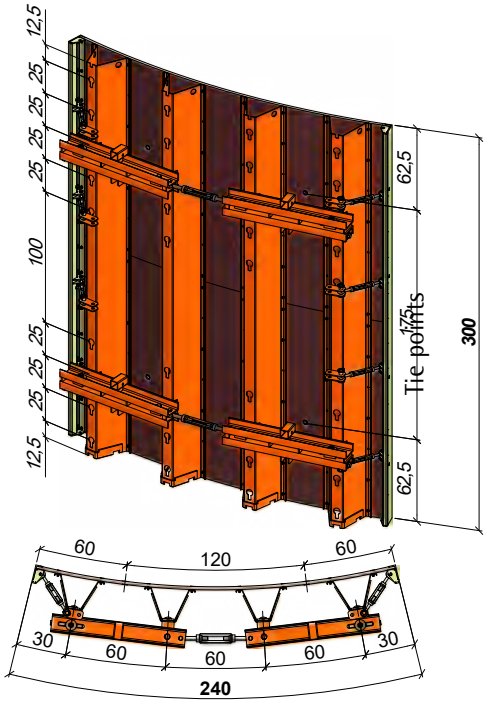
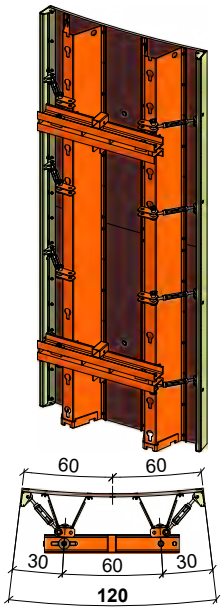
T05.090.02

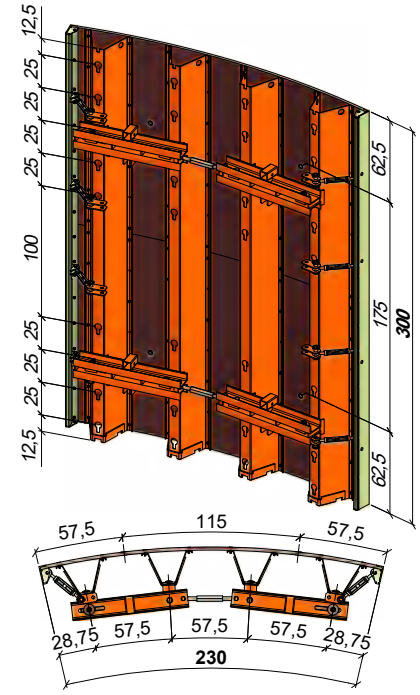
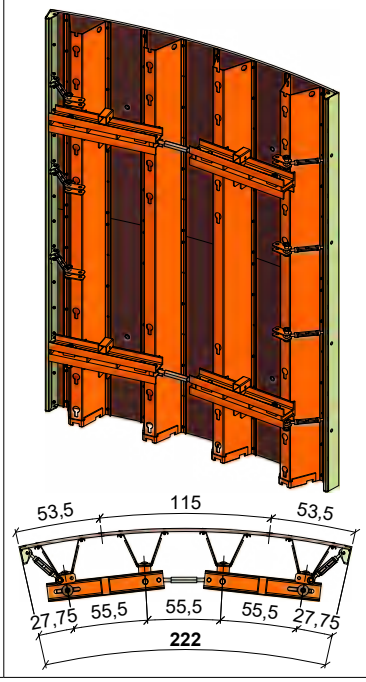
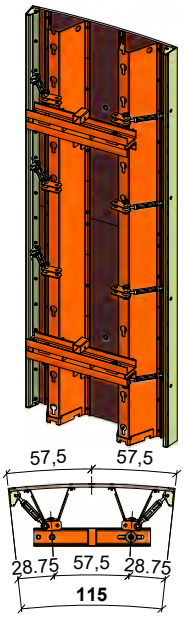
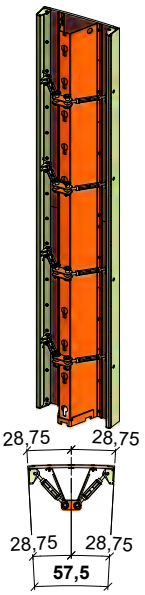
Suitable parts of the building, conical walls:



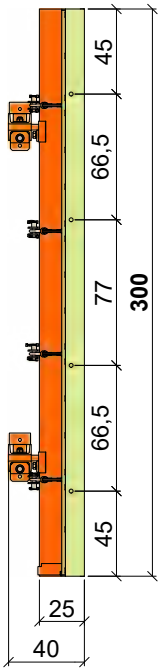
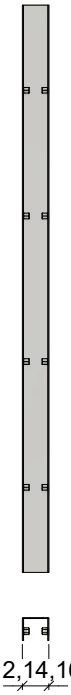
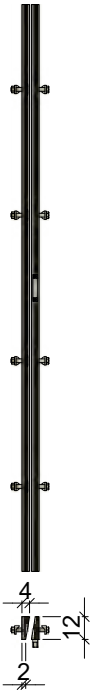
T05.104.01

Segment overview height 300 cm

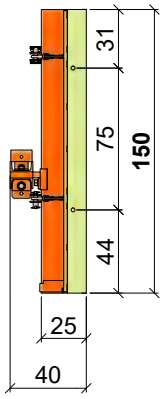
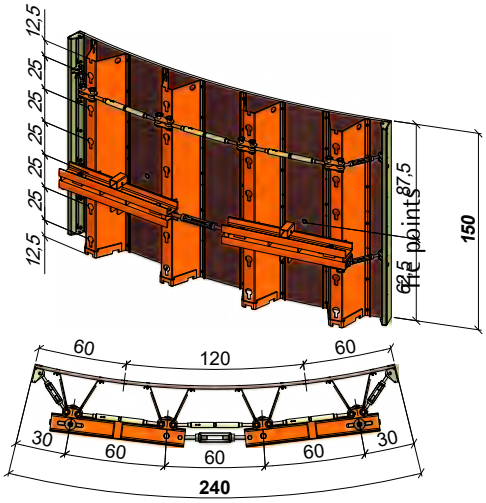
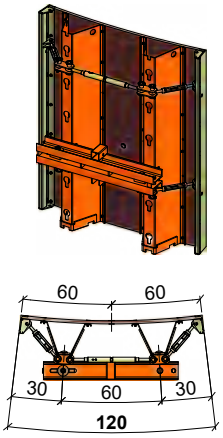
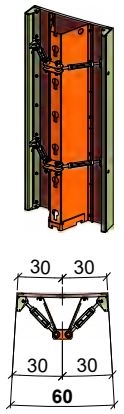
TTK **Outside segment** Art. No.: Weight	**240 x 300 cm** 122.108.0222 593.00 kg	**120 x 300 cm** 122.108.0233 340.00 kg	**60 x 300 cm** 122.108.0241 170.50 kg
			

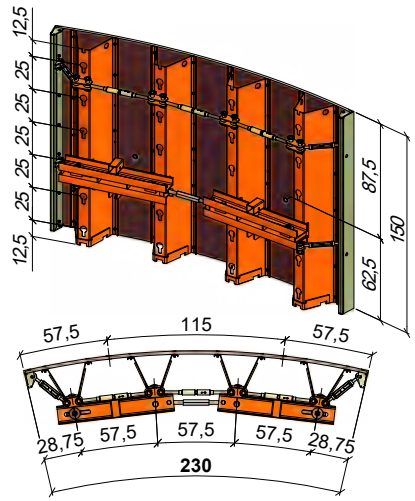
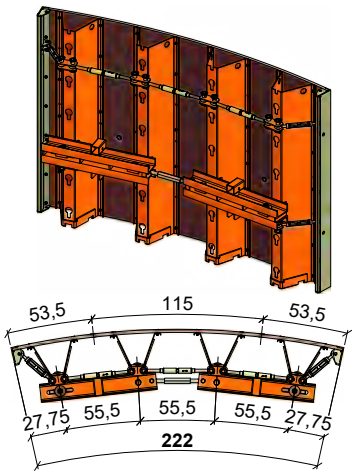
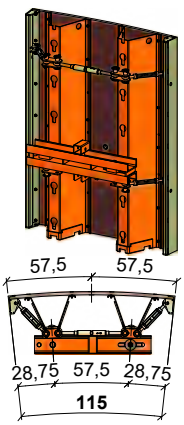
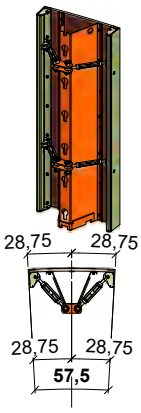
TTK **Inside segment** Art. No.: Weight	**230 x 300 cm** 122.108.0122 577.00 kg	**222 x 300 cm** 122.108.0022 573.00 kg	**115 x 300 cm** 122.108.0133 331.00 kg	**57.5 x 300 cm** 122.108.0141 169.50 kg
			

Fillers, connecting panel height 300 cm

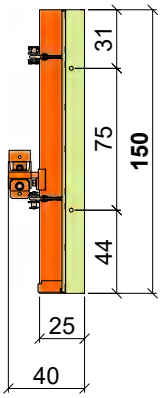
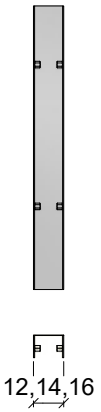
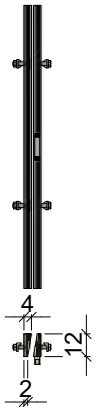
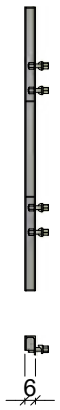
	TTK **Plastic filler piece** **2 / 4 / 6 x 300 cm cpl.**	**TTK** **Filler piece** **12 / 14 / 16 x 300 cm**	**TTK** **Dismantling wedge** **6x300 cm cpl.**	**TTK** **Connecting panel to TTR** **6 x 300 cm cpl.**
Art. No.: Weight	182.008.0021 / 0022 / 0023 6.90 / 13.80 / 20.50 kg	182.008.0040 / 0041 / 0042 39.80 / 40.80 / 41.80 kg	182.008.0034 24.00 kg	182.008.0010 31.80 kg
				

Segment overview height 150 cm

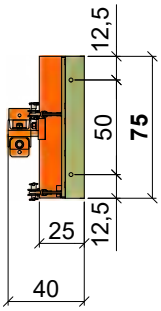
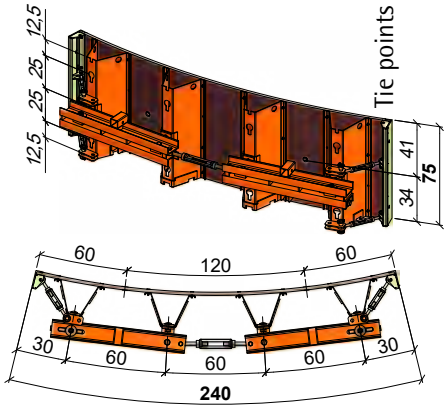
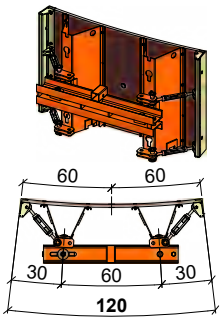
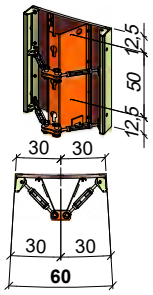
TTK **Outside segment** Art. No.: Weight	**240 x 150 cm** 122.108.0231 308.00 kg	**120 x 150 cm** 122.108.0236 174.00 kg	**60 x 150 cm** 122.108.0246 86.00 kg
			

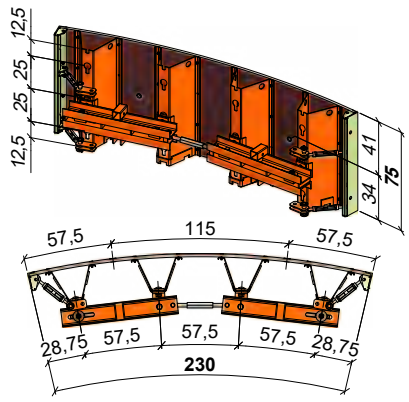
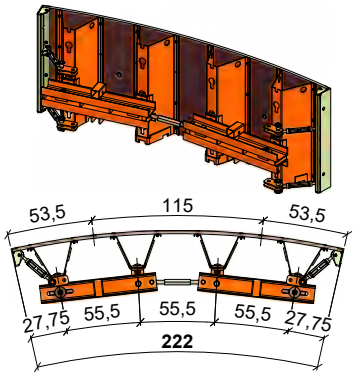
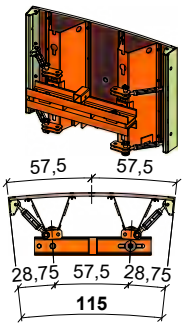
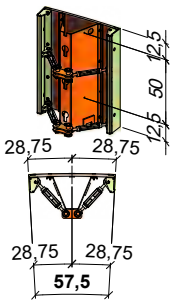
TTK **Inside segment** Art. No.: Weight	**230 x 150 cm** 122.108.0131 299.00 kg	**222 x 150 cm** 122.108.0031 297.00 kg	**115 x 150 cm** 122.108.0136 169.30 kg	**57.5 x 150 cm** 122.108.0146 85.60 kg
			

Fillers, connecting panel height 150 cm

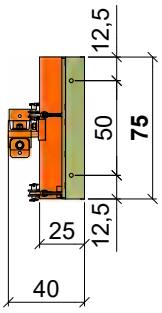
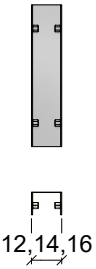
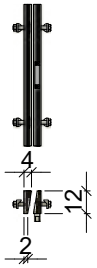
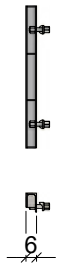
	TTK **Plastic filler piece** **2 / 4 / 6 x 150 cm cpl.**	**TTK** **Filler piece** **12 / 14 / 16 x 150 cm**	**TTK** **Dismantling wedge** **6x150 cm cpl.**	**TTK** **Connecting panel to TTR** **6 x 150 cm cpl.**
Art. No.: Weight	182.008.0024 / 0025 / 0026 3.40 / 6.80 / 10.20 kg	182.008.0044 / 0045 / 0046 19.90 / 20.40 / 20.90 kg	182.008.0035 12.00 kg	182.008.0011 16.30 kg
				

Segment overview height 75 cm

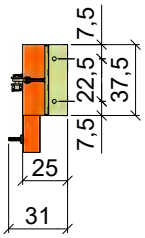
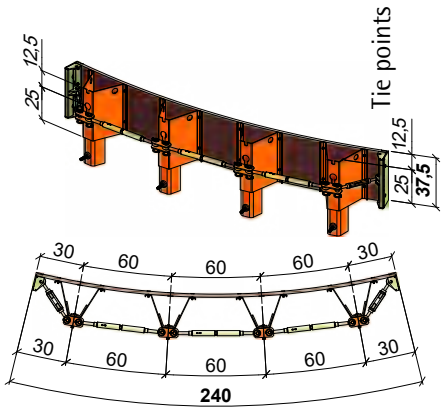
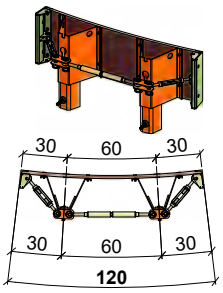
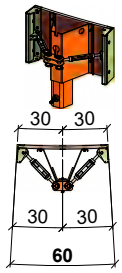
TTK **Outside segment** Art. No.: Weight	**240 x 75 cm** 122.108.0239 192.00 kg	**120 x 75 cm** 122.108.0237 107.60 kg	**60 x 75 cm** 122.108.0247 45.45 kg
			

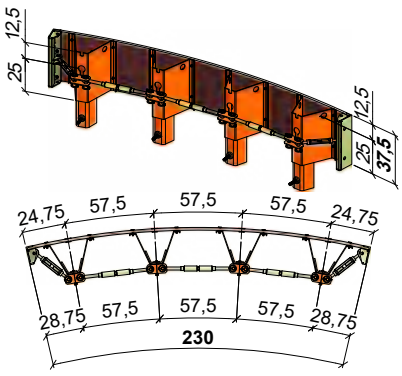
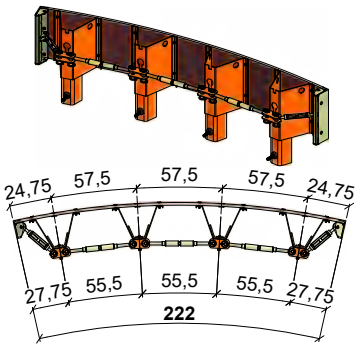
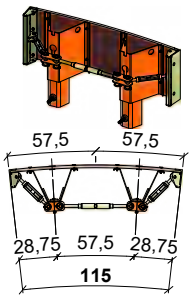
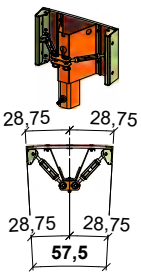
TTK **Inside segment** Art. No.: Weight	**230 x 75 cm** 122.108.0139 184.50 kg	**222 x 75 cm** 122.108.0039 184.00 kg	**115 x 75 cm** 122.108.0137 103.80 kg	**57.5 x 75 cm** 122.108.0147 45.20 kg
			

Fillers, connecting panel height 75 cm

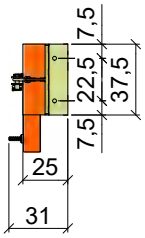
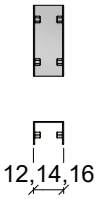
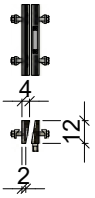
	TTK **Plastic filler piece** **2 / 4 / 6 x 75 cm cpl.**	**TTK** **Filler piece** **12 / 14 / 16 x 75 cm**	**TTK** **Dismantling wedge** **6x75 cm cpl.**	**TTK** **Connecting panel to TTR** **6 x 75 cm cpl.**
Art. No.: Weight	182.008.0027 / 0028 / 0029 1.70 / 3.40 / 5.10 kg	182.008.0048 / 0049 / 0050 10.20 / 10.40 / 10.60 kg	182.008.0036 6.00 kg	182.008.0012 8.50 kg
				

Segment overview height 37.5 cm

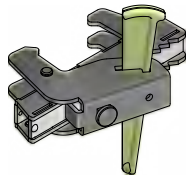
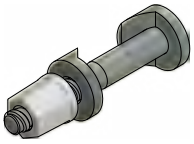
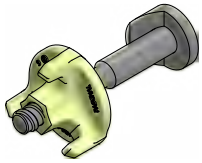
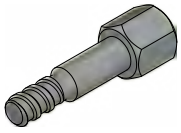
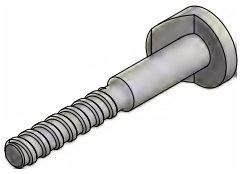
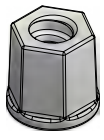
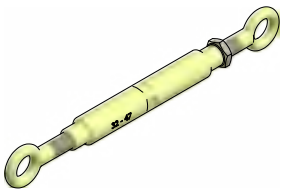
TTK **Outside segment** Art. No.: Weight	**240 x 37.5 cm** 122.108.0232 86.40 kg	**120 x37.50 cm** 122.108.0240 47.80 kg	**60 x 37.5 cm** 122.108.0245 28.00 kg
			

TTK **Inside segment** Art. No.: Weight	**230 x 37.5 cm** 122.108.0132 85.90 kg	**222 x 37.5 cm** 122.108.0032 86.00 kg	**115 x 37.5 cm** 122.108.0140 47.50 kg	**57.5 x 37.5 cm** 122.108.0145 28.00 kg
			

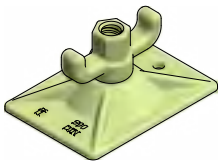
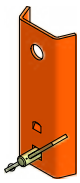
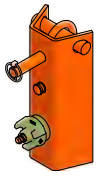
Fillers, connecting panel height 37.5 cm

	TTK **Plastic filler piece** **2 / 4 / 6 x 37.5 cm cpl.**	**TTK** **Filler piece** **12 / 14 / 16 x 37.5 cm**	**TTK** **Dismantling wedge** **6x37.5 cm cpl.**	**TTK** **Connecting panel to TTR** **6 x 37.5 cm cpl.**
Art. No.: Weight	182.008.0030 / 0031 / 0032 0.85 / 1.70 / 2.55 kg	182.008.0052 / 0053 / 0054 5.30 / 5.40 / 5.50 kg	182.008.0037 3.00 kg	182.008.0013 4.50 kg
				

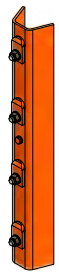
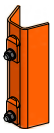
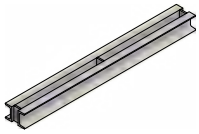
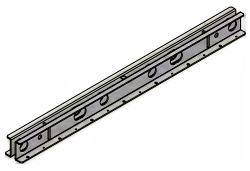
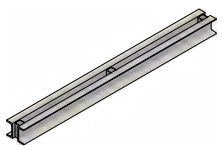
Connecting piece

	Article no.	Item Description	Weight [kg]
	182.008.0001	TTK multi-clamp 0-10 cm	4.40
	182.008.0003	TTK screw for segment cpl.	0.88
	182.008.0002	TTK screw for end stop cpl.	0.83
	182.008.0004	TTK screw Connecting panel and filler piece	0.32
	182.008.0005	TTK screw DW15x150	0.41
	182.008.0006	TTK washer	0.12
	189.001.0002	Hexagon nut DW15 malleable cast iron	0.20
	182.000.0210	Turnbuckle M 20 x 320	1.60
	182.000.0211	Turnbuckle M 20 x 450	2.10
	182.000.0212	Turnbuckle M 20 x 600	2.70
	182.000.0213	Turnbuckle M 20 x 750	3.30

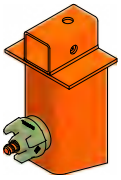
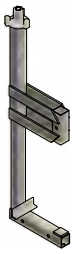
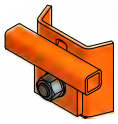
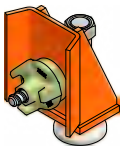
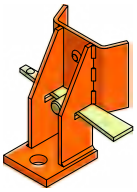
Tension material

	Article no.	Item Description	Weight [kg]
	189.006.1000	Tie rod DW15 x 100 cm	1.40
	189.006.1350	Tie rod DW15 x 135 cm	1.85
	189.006.1500	Tie rod DW15 x 150 cm	2.10
	189.001.0059	Plate with ball-and-socket joint DW15 10 x 14 cm inclination max. 12°	1.29
	182.000.0089	Tie rod guide with wedge T	2.56
	182.000.0263	Tie rod guide segment 37.5 cm TR / TK	2.40
	182.000.0223	Tie rod guide with crane suspension	7.80

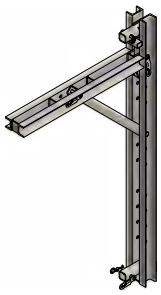
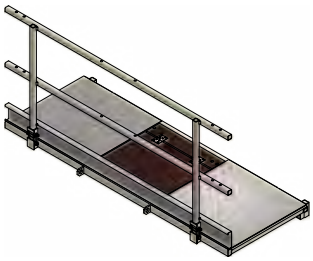
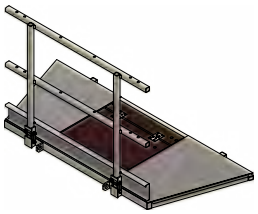
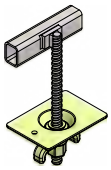
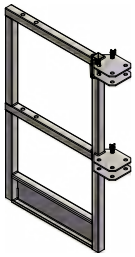
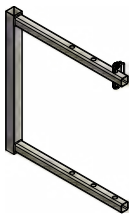
Rails

	Article no.	Item Description	Weight [kg]
	182.000.0009	Extension part trapezoid girder cpl. T	17.00
	282.000.0085	Extension part trapezoid girder cpl. Reinforced T	20.00
	282.000.0207	Extension part trapezoidal girder cpl. for segment height 75 cm	7.10
	182.000.0099	Telescopic girder 100 cm cpl. TR / TK	18.00
	182.000.0100	Telescopic girder 56.5 cm cpl. TR / TK	11.50
	189.001.0118	Double channel waler 60 x 800 mm	8.20
	187.500.0164	Multigurt 140	16.80
	189.001.0120	Double channel waler 120 x 1800 for supporting jack 3.00 and 4.00 m	50.50

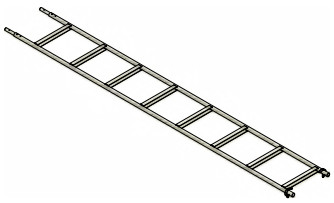
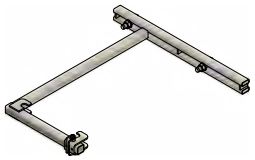
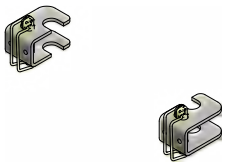
Occupational safety, supports

	Article no.	Item Description	Weight [kg]
	182.000.0053	Platform bracket cpl. 90 cm pluggable cpl. T	11.10
	182.000.0133	Platform bracket cpl. Fastening top T	5.50
	189.000.1021	Clamp lateral protection (up to 60 cm) Secuset	5.10
	182.000.0032	Stop end guide fitted T	2.90
	182.000.0219	Height-adjustable spindle fitted, admissible capacity 1500 kg T	2.90
	182.000.0284	Segment holder with wedge fitted T	2.50

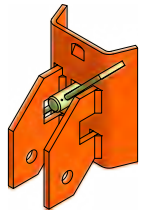
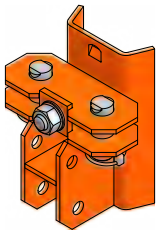
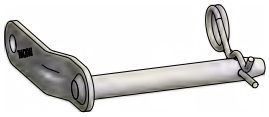
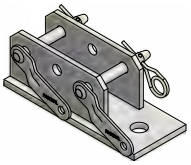
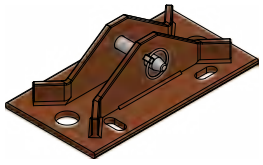
Occupational safety, platforms

	Article no.	Item Description	Weight [kg]
	182.000.0270	Connecting piece fitted for Multip T	55.00
	182.000.0271	Gangway 85 x 238 cm outside fitted for Multip T	133.00
	182.000.0272	Floorboard 85 x 210 cm inside fitted for Multip T	129.00
	182.000.0256	Fastening floorboard fitted for Multip T	1.80
	187.500.0065	Doors 60/105 cm complete for Multip L/T/A	11.50
	187.500.0066	Door extension complete for Multip L/T/A	4.00

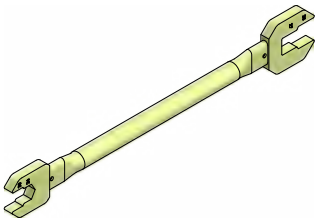
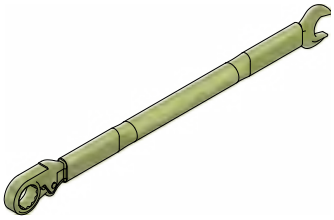
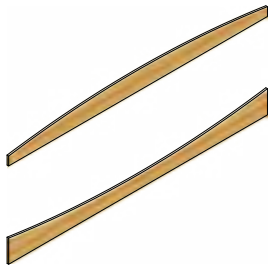
Occupational safety, platforms

	Article no.	Item Description	Weight [kg]
	187.500.0063	Ladder 260 cm complete for Multip	12.00
	187.500.0071	Ladder 130 cm complete for Multip	7.00
	182.000.0257	Ladder fastening fitted for Multip T	11.00
	187.500.0074	Ladder fastening guard railing post complete for Multip	2.00

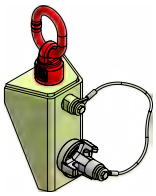
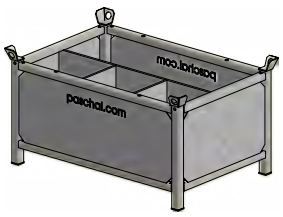
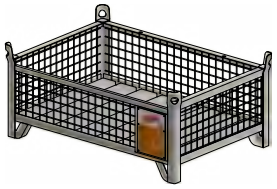
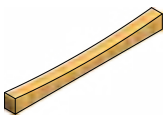
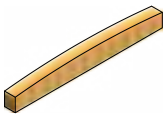
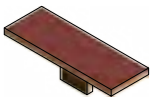
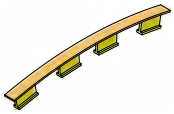
Supports

	Article no.	Item Description	Weight [kg]
	182.000.0096	Suspending piece for props T	3.00
	182.000.0055	2-hole turnbuckle coupling fitted T	5.40
	189.001.0069	Security bolt 130 cpl.	0.32
	189.005.0001	Spindle-type support 105-150 cm	9.50
	189.005.0014	Adjustable prop 175-285 cm galvanized	18.20
	189.005.0015	Adjustable prop 255-405 cm galvanized	33.50
	189.005.0016	Adjustable prop 400-620 cm galvanized	54.50
	189.005.0017	Adjustable prop 620-1000 cm galvanized	110.00
	189.005.0023	Base plate 3-hole cpl.	4.20
	189.005.0033	Panel end joint BKS fitted (for BKS and RS 620-1000 cm)	7.20

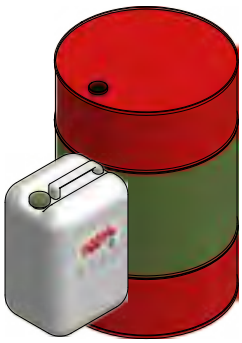
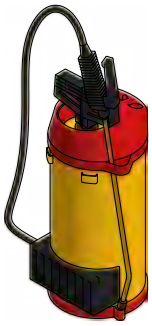
Tools

	Article no.	Item Description	Weight [kg]
	182.000.0215	Multi key SW 36 / 27-SW 30 / 24 T	1.40
	182.000.0093	Ratchet key SW 30 T	1.51
	182.000.0063	Template segment from di. 5.0 m T	2.00
	183.500.0014	Assembly and dismantling lever L/A	3.10

Transport and storage

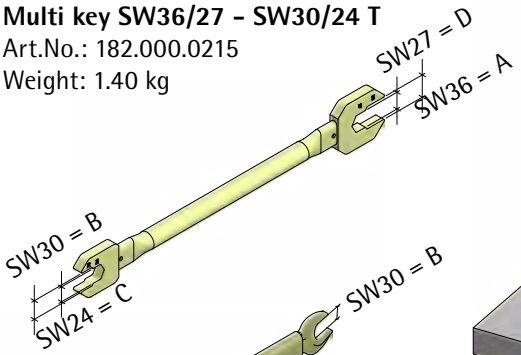
	Article no.	Item Description	Weight [kg]
	182.000.0069	Crane lifting eye KBT, admissible capacity 1700 kg TR / TK	5.77
	189.002.0003	Transportation box hot-dip galvanized	86.50
	940.009.0017	Pallet box PASCHAL 1200 x 810 x 930 mm	65.00
	940.009.0018	Pallet box small PASCHAL 1200 x 810 x 460 mm	50.00
	940.009.0019	Lid for box/transportation box	6.70
	182.000.0065	Moulded wood inside segment 4-T-S, radius project-dependent	5.00
	182.000.0066	Moulded wood outside segment 4-T-S, radius project-dependent	5.00
	182.000.0112	Storage block	2.00
	182.000.0296	Loading aid 222-240 moveable T	5.00

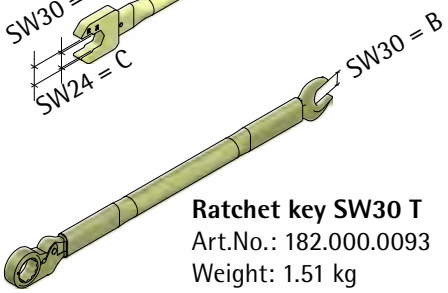
Care and consumables

	Article no.	Item Description	Weight [kg]
	189.003.0113	PASCHAL Parting compound MOVA-bio (200 litre barrel)	0.88 kg / l
	189.003.0103	PASCHAL Parting compound MOVA-bio (20 litre canister)	0.88 kg / l
	189.003.0011	PASCHAL Parting compound P 300 (200 litre vessel)	0.83 kg / l
	189.003.0013	PASCHAL Parting compound 300 (30 litre canister)	0.83 kg / l
	189.003.0009	Parting compound pistol 5 litres	4.30 kg
	189.003.0008	Parting compound pistol 10 litres	5.75 kg
	182.000.0283	Girder cover T	0.18
	935.000.0016	Assembly screws 16x130-10 pcs (incl. test sleeve)	2.10

Radius adjustment inside segment

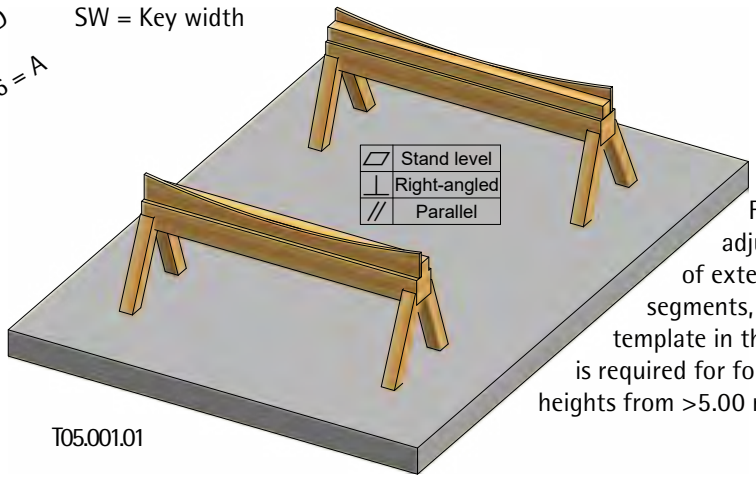
Multi key SW36/27 – SW30/24 T
Art.No.: 182.000.0215
Weight: 1.40 kg





Ratchet key SW30 T
Art.No.: 182.000.0093
Weight: 1.51 kg

SW = Key width



T05.001.01

For radius adjustment of extended segments, a third template in the middle is required for formwork heights from >5.00 m.

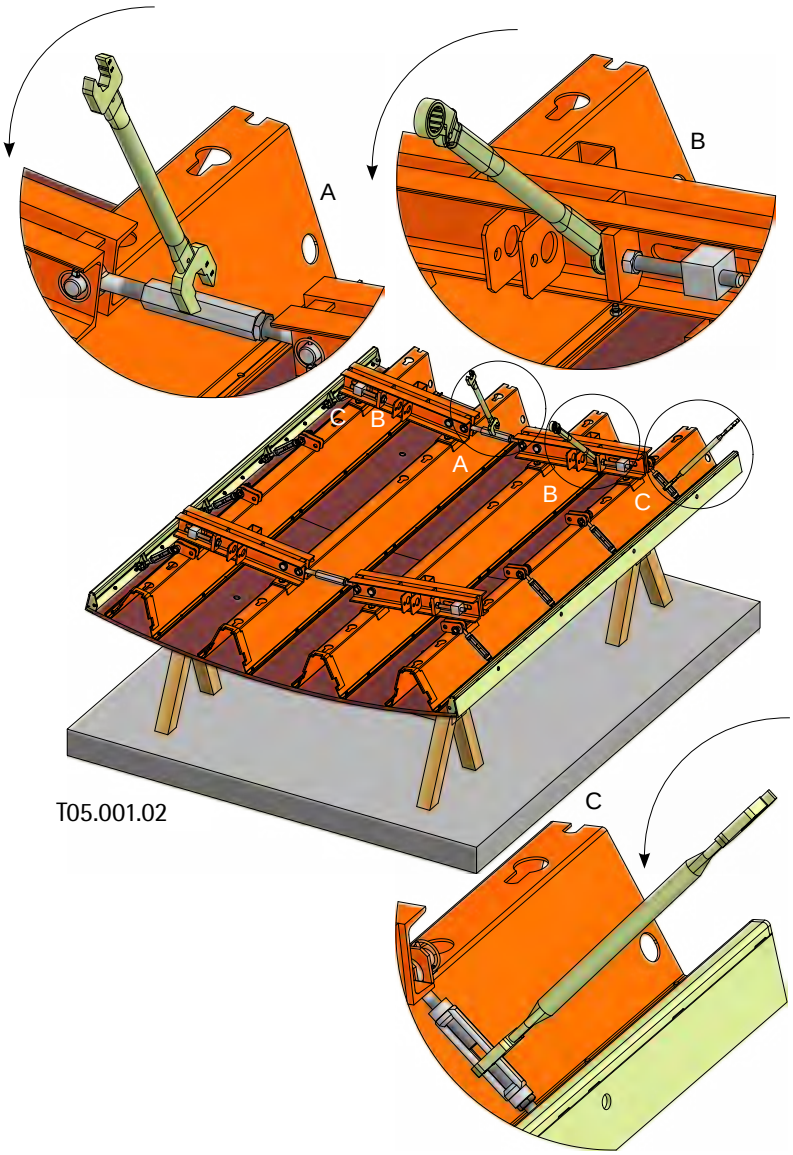
The radius adjustment of the 21mm-thick plywood panels is performed in the four-girder segment at different positions.

- Turnbuckle between the walers (A)
- Adjustment screw in waler (B)
- Turnbuckle between trapezoid girder and segment side piece (C)
- Turnbuckle (D)

Here the trapezoid girders are angled towards each other by turning the turnbuckles or adjustment screws, as a result of which the plywood boards are curved towards each other. Depending on the number of rotations, any diameter in the specified adjustment range can be set from straight.

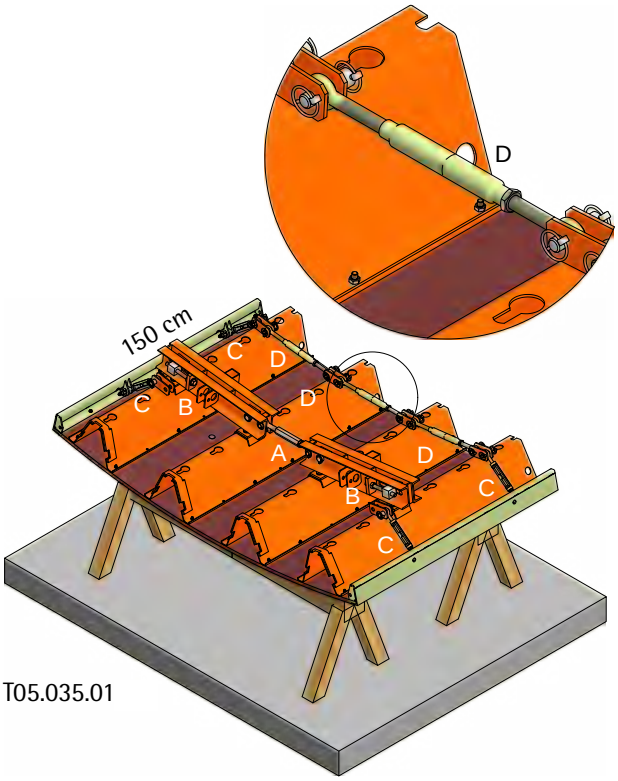
Note:
The segments are always rounded from the middle outwards.

Note:
In order to check the diameter, templates are tightened on blocks, which must be parallel and perpendicular to each other on a flat base so that the segment is not positioned askew. The segment must also be perpendicular to the trestles.

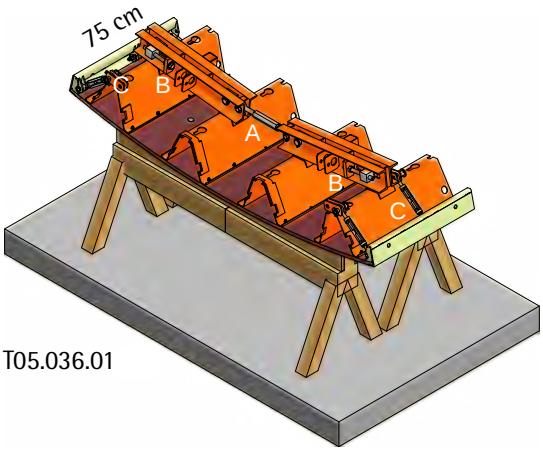


T05.001.02

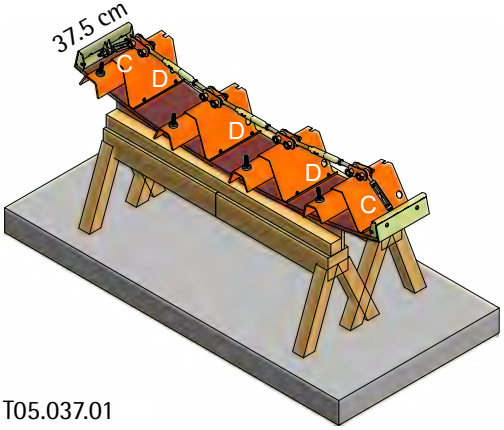
Radius adjustment inside segment



T05.035.01



T05.036.01



T05.037.01

The multi key and the ratchet key are available for operating the turnbuckles and adjustment screws. The adjacent illustrations show which key is used where with which key width.

Note:

- For inside segments, the direction of rotation is generally downward in the segment direction.
- Lock nuts at all positions have to be loosened before radius adjustment.
- After radius adjustment, the lock nuts at all positions have to be tightened again so that the diameter remains permanently set.

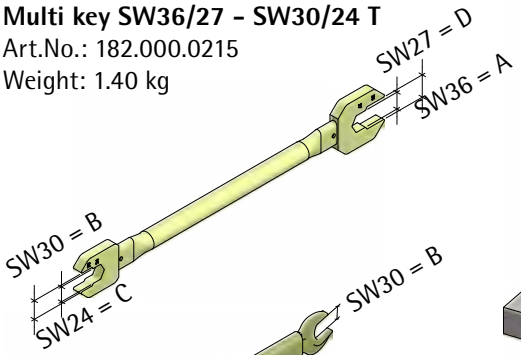
For segment height 150 cm, the diameter is set at the axis, on which the walers are fitted and at one other axis exclusively with turnbuckles.

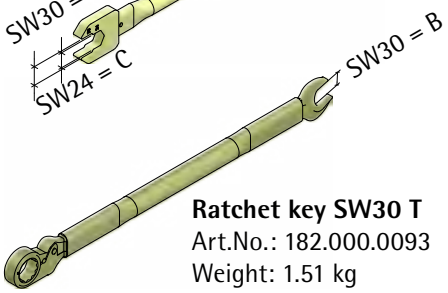
For segment height 75cm, the diameter is set exclusively on the axis, on which the walers are fitted.

For segment height 37.5cm, the diameter is set exclusively on the axis, on which the turnbuckles are fitted.

Radius adjustment outside segment

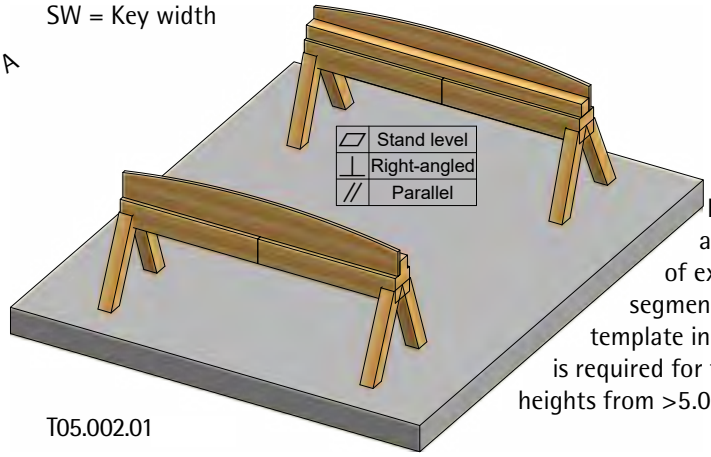
Multi key SW36/27 – SW30/24 T
Art.No.: 182.000.0215
Weight: 1.40 kg





Ratchet key SW30 T
Art.No.: 182.000.0093
Weight: 1.51 kg

SW = Key width



T05.002.01

For radius adjustment of extended segments, a third template in the middle is required for formwork heights from >5.00 m.

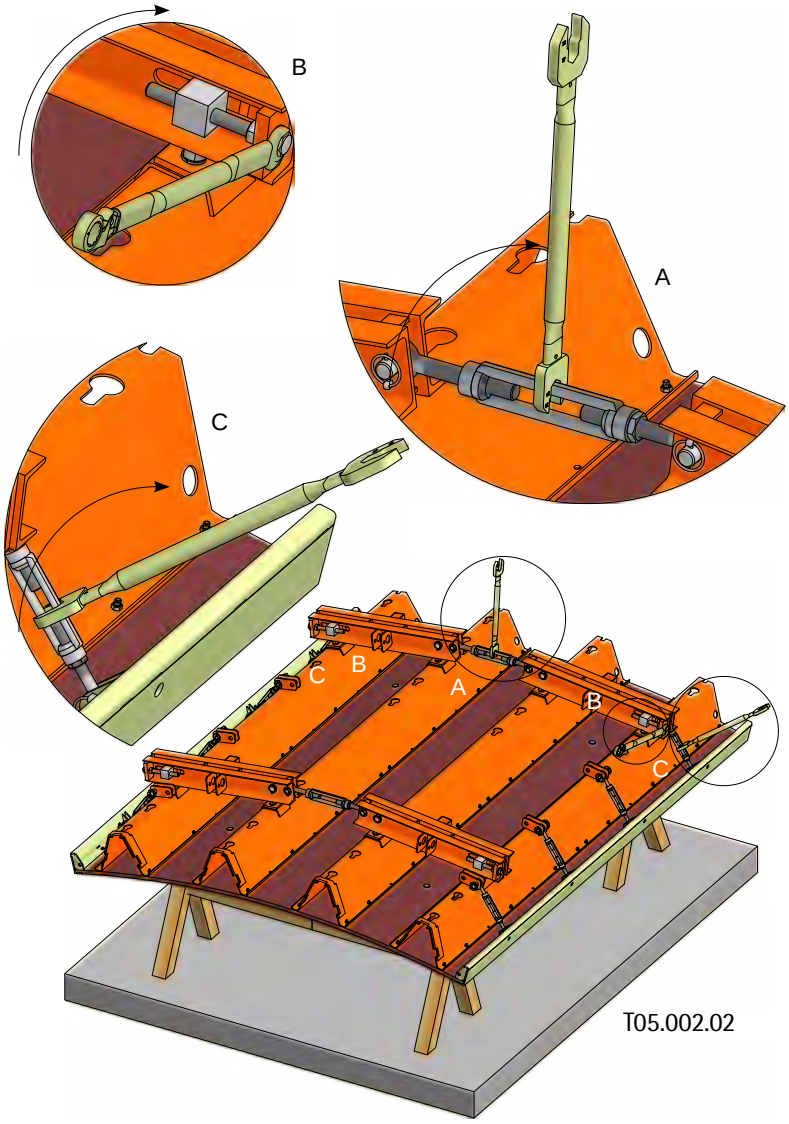
The radius adjustment of the 21mm-thick plywood panels is performed in the four-girder segment at different positions.

- Turnbuckle between the walers (A)
- Adjustment screw in waler (B)
- Turnbuckle between trapezoid girder and segment side piece (C)
- Turnbuckle (D)

Here the trapezoid girders are angled towards each other by turning the turnbuckles or adjustment screws, as a result of which the plywood boards are curved towards each other. Depending on the number of rotations, any diameter in the specified adjustment range can be set from straight.

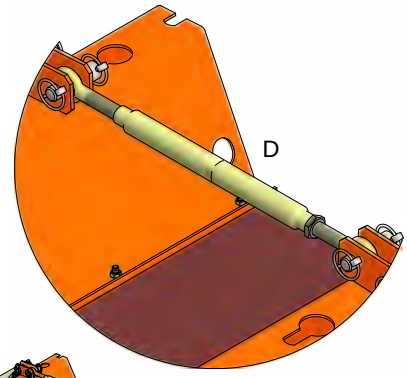
Note:
The segments are always rounded from the middle outwards.

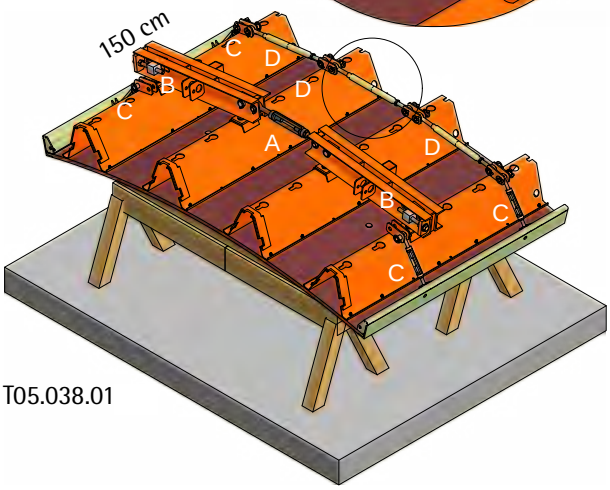
Note:
In order to check the diameter, templates are tightened on blocks, which must be parallel and perpendicular to each other on a flat base so that the segment is not positioned askew. The segment must also be perpendicular to the trestles.



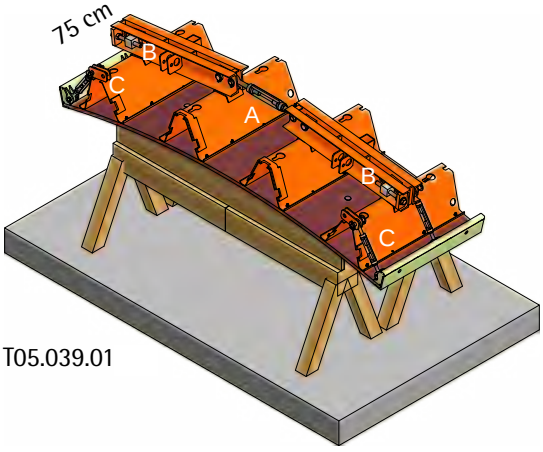
T05.002.02

Radius adjustment outside segment

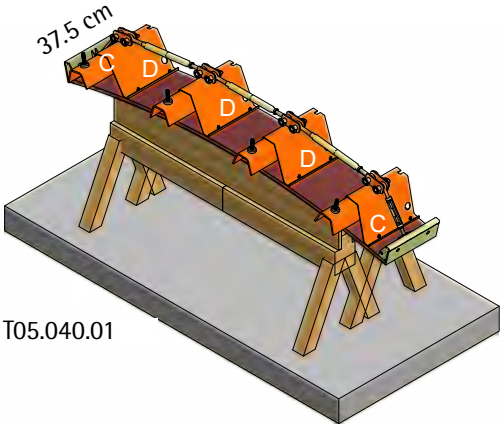




T05.038.01



T05.039.01



T05.040.01

The multi key and the ratchet key are available for operating the turnbuckles and adjustment screws. The adjacent illustrations show which key is used where with which key width.

Note:

- For outside segments, the direction of rotation is generally upwards in the segment direction.
- Lock nuts at all positions have to be loosened before radius adjustment.
- After radius adjustment, the lock nuts at all positions have to be tightened again so that the diameter remains permanently set.

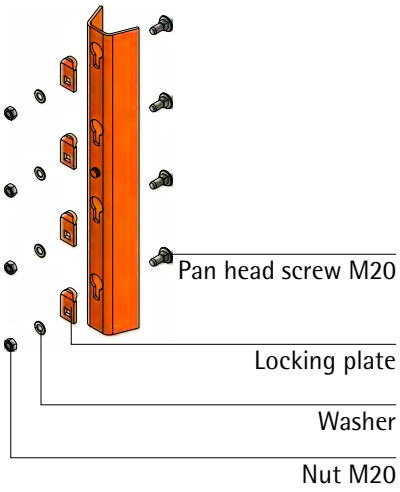
For segment height 150 cm, the diameter is set at the axis, on which the walers are fitted and at one other axis exclusively with turnbuckles.

For segment height 75cm, the diameter is set exclusively on the axis, on which the walers are fitted.

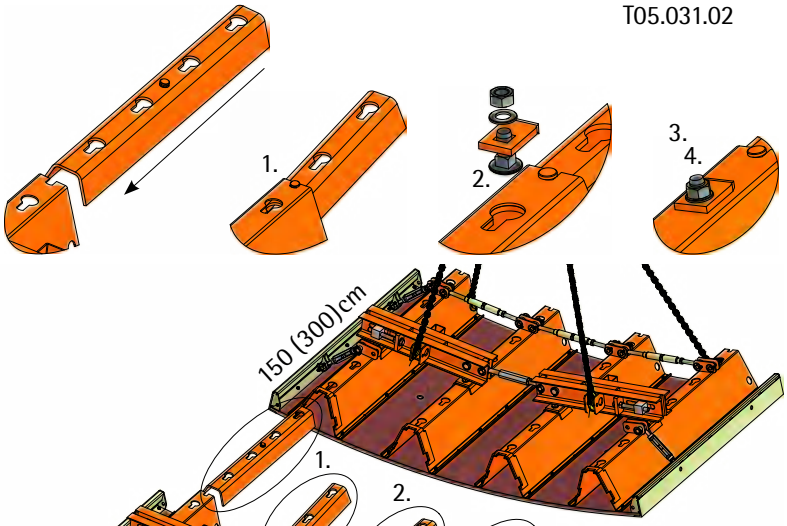
For segment height 37.5cm, the diameter is set exclusively on the axis, on which the turnbuckles are fitted.

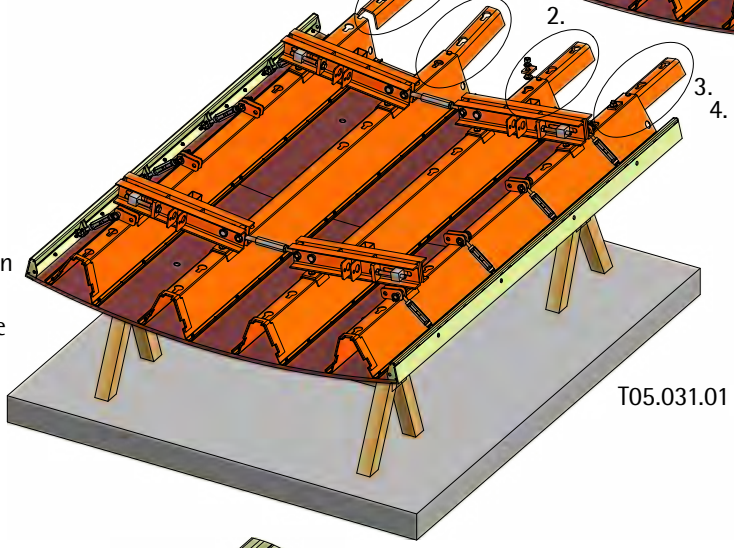
Height extension

Extension part trapezoid girder complete T
Art.No.: 182.000.0009
Weight: 16.90 kg



T05.031.02





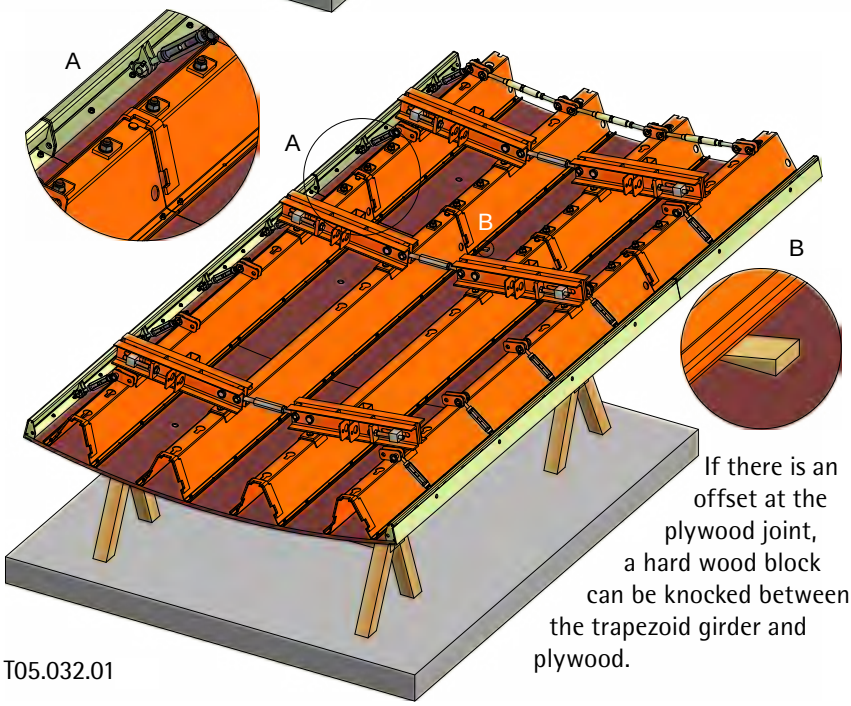
T05.031.01

For an extension, two or more segments are connected with extension posts at each girder joint. Two screws must be used per extension post above and below the segment joint.

1. Suspend extension part form the trapezoid girder.
2. Insert pan head screw M20 with locking plate, washer and nut in the round hole of the keyhole.
3. Push pan head screw into the slot of the keyhole until the locking plate inside is touches the round area.
4. Tighten nut M20 securely with 150 Nm.

For larger extension heights, a reinforced extension post must be used (page 32 et seq.).

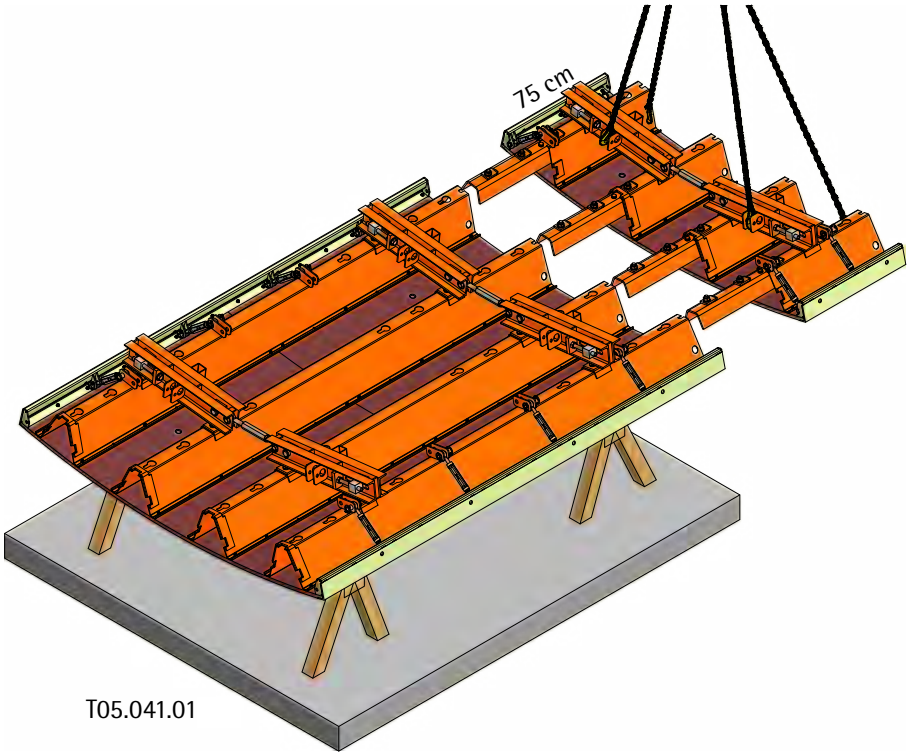
Note:
In order to prevent any leaking of concrete slurry, it is recommended that a sealing tape be stapled to the end.



T05.032.01

If there is an offset at the plywood joint, a hard wood block can be knocked between the trapezoid girder and plywood.

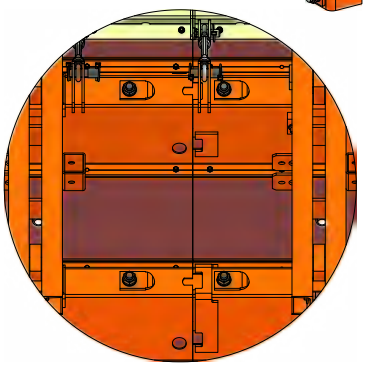
Height extension



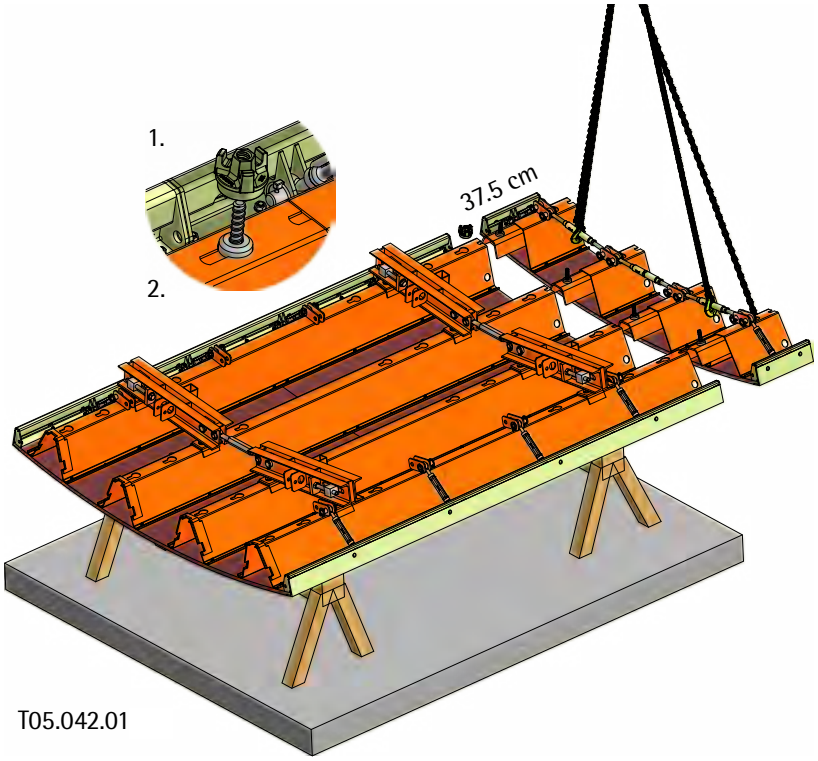
T05.041.01

For segment height 75 cm, the extension posts are installed together with the walers at the middle keyhole of the trapezoid girder.

Extension part trapezoidal girder complete for segment height 75 cm
Art.No.: 282.000.0207
Weight: 7.10 kg



If two 75 cm segments have to be extended, the connection is made via the shorter extension post for segment height 75 cm. It is screwed once on each side of the joint.



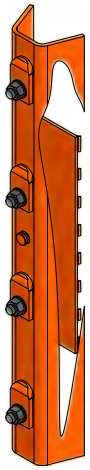
T05.042.01

The height 37.5 cm segments have shortened, welded extension posts.

1. Insert the connection of the extension post into the round area of the keyhole.
2. Securely unscrew wing nut.

Height extension

Extension part trapezoid girder complete reinforced T
Art.No.: 282.000.0085
Weight: 19.80 kg

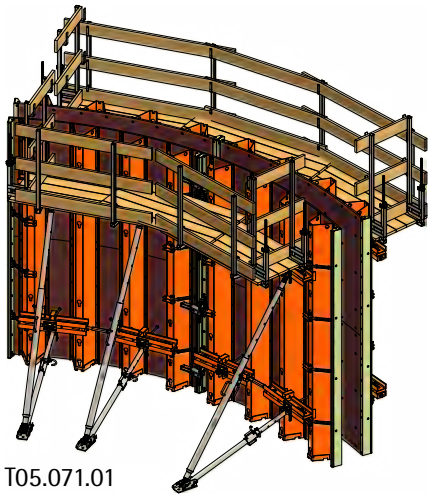


For segment heights of more than 9.00 m

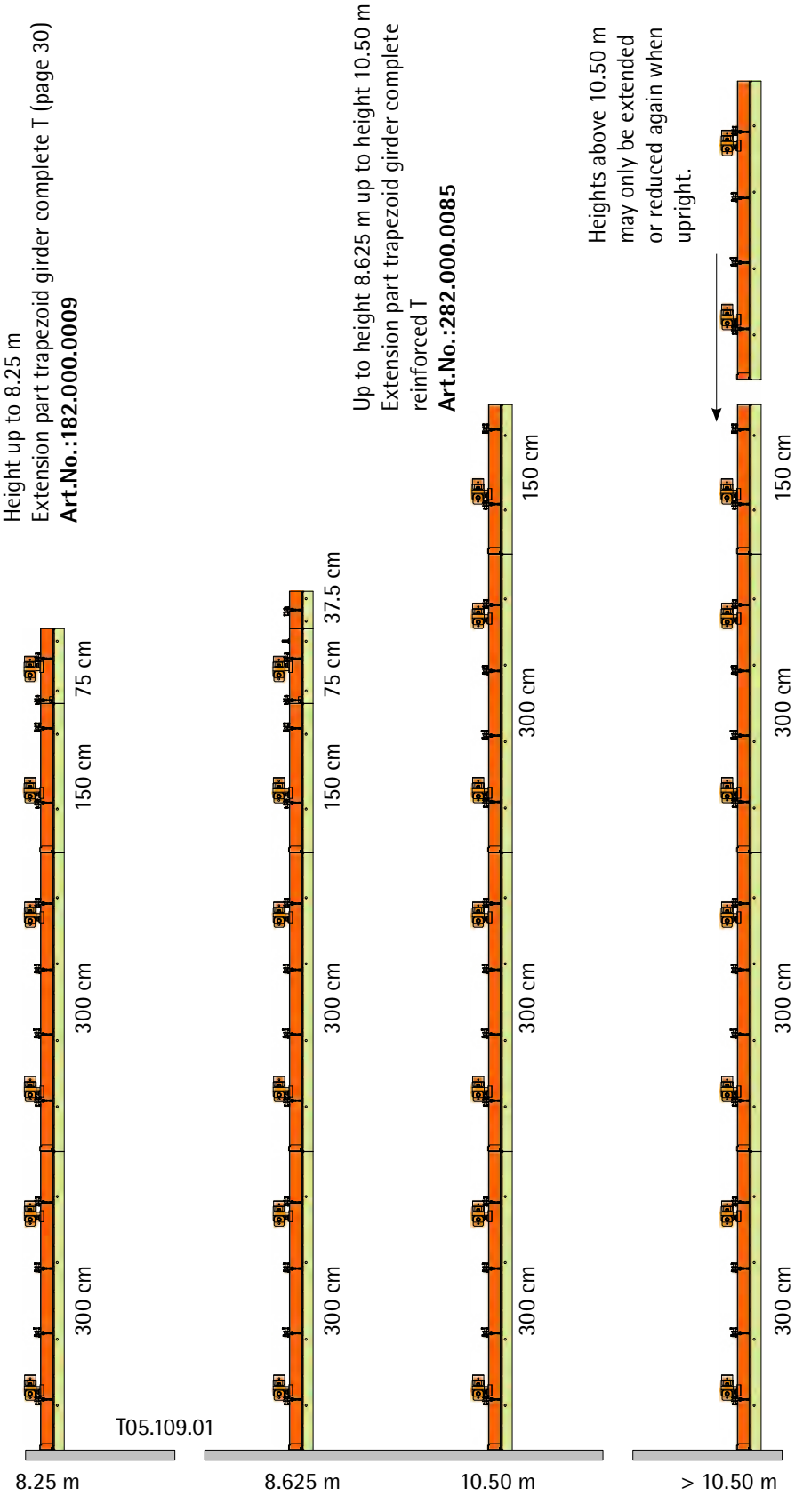
For large formwork and extension heights, larger bend loads occur on the segment joints when lifting or lowering the segment group. The reinforced extension post has to be installed here.

Attention:
If the segment group (maximum width = 240 cm) contains segments of height 37.5 cm, the maximum size of the group is 8.625 m when lifting and lowering.

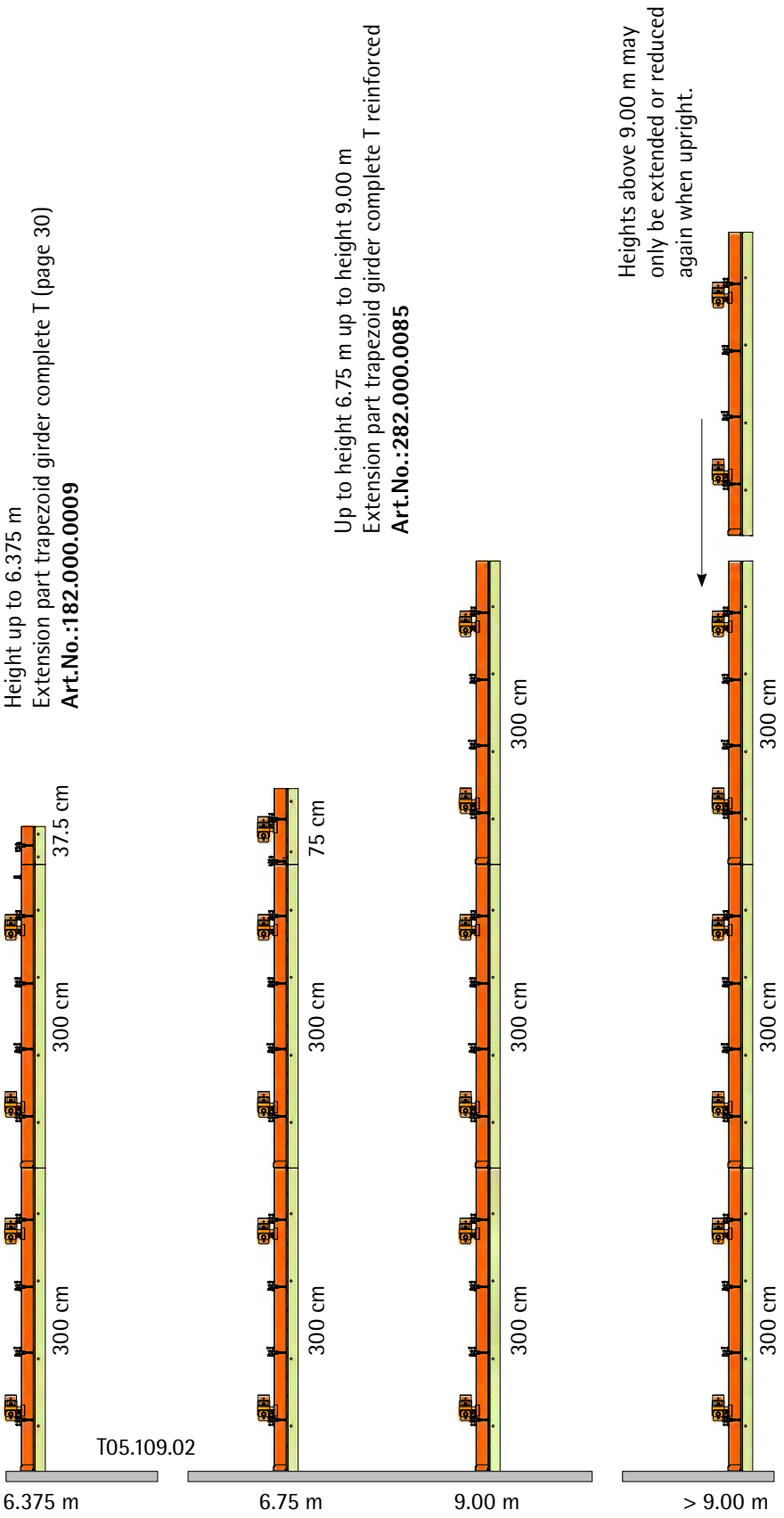
When using platform bracket cpl. with floorboards as lightweight working and protective scaffolding, the adjacent regulations apply to the use of the two extension posts.

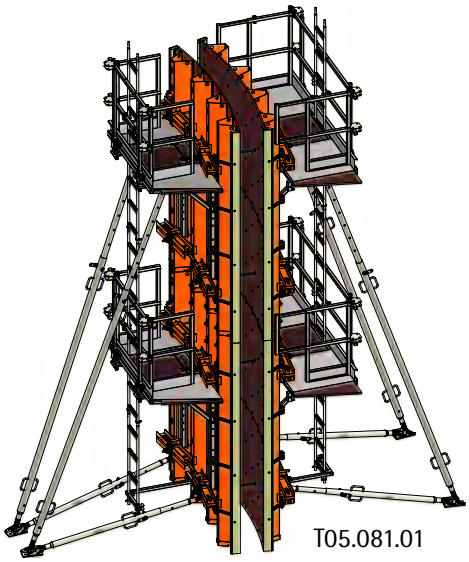


T05.071.01



Height extension





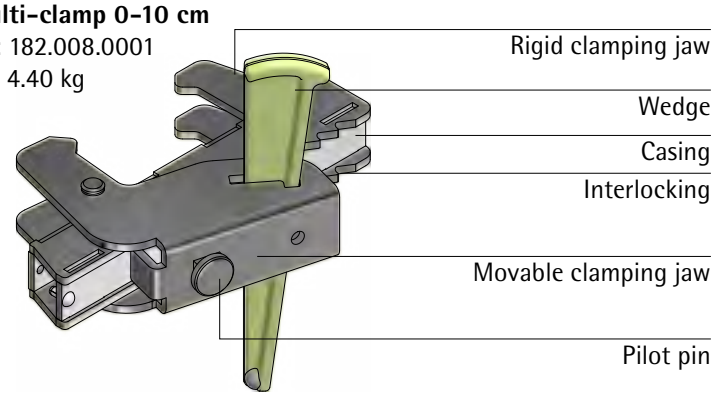
When using the multi-functional platform Multip as a heavy-duty working and protective scaffolding, the adjacent regulations apply to the use of the two extension posts.

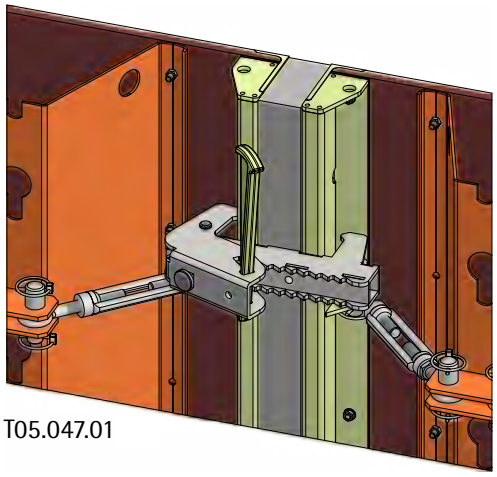
Attention:
If the segment group (maximum width = 240 cm) contains segments of height 37.5 cm, the maximum size of the group is 6.375 m when lifting and lowering.

TTK multi-clamp 0-10 cm

The TTK multi-clamp 0-10 cm, which is closed and opened with the formwork hammer, has to be used for connecting segments at the vertical joint. For a sealed segment joint, the clamping jaws must extend into the openings of the segment frames and the wedge must be hammered tight. The multi-clamp 0-10 cm connects two segments directly, fillers with widths up to 10 cm can also be installed. The number and position of the required multi-clamps 0-10 cm for the various segment heights for the standard application cases are shown on the opposite page.

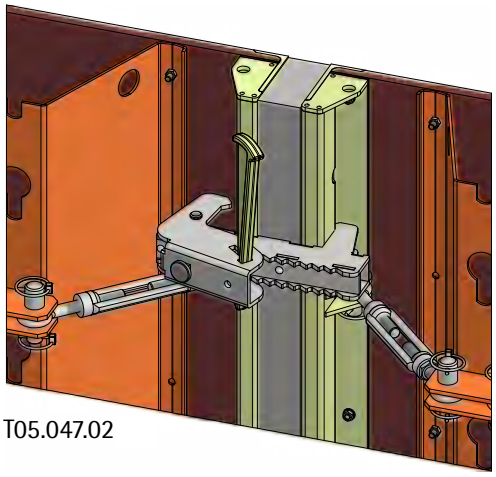
TTK multi-clamp 0-10 cm
Art.No.: 182.008.0001
Weight: 4.40 kg





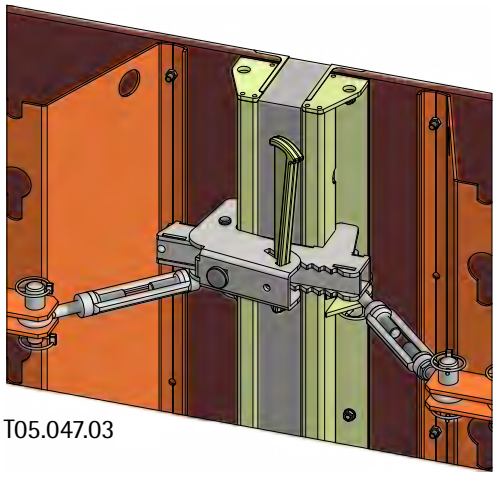
T05.047.01

1. Open clamp with wedge upwards.



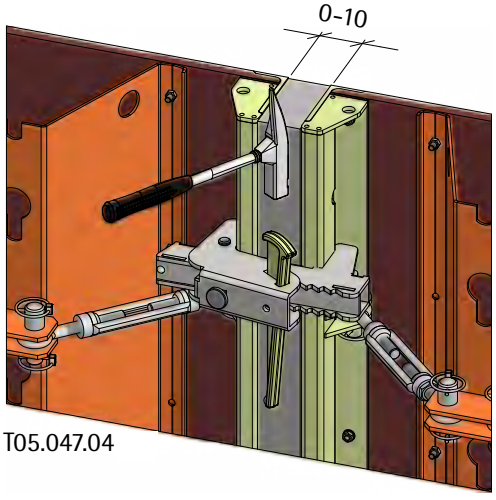
T05.047.02

2. Place casing on the frame and rigid clamping jaw (right) in the opening of the frame.



T05.047.03

3. Slide movable clamping jaw (left) in the opening of the element frame, the wedge turns inwards.

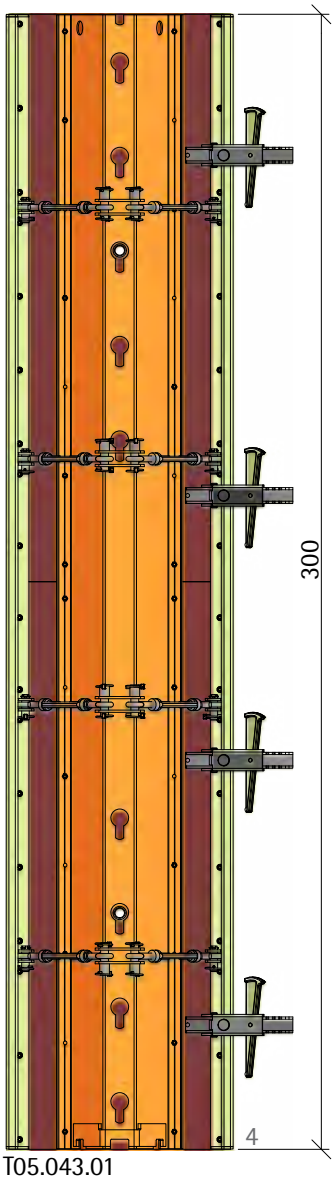


T05.047.04

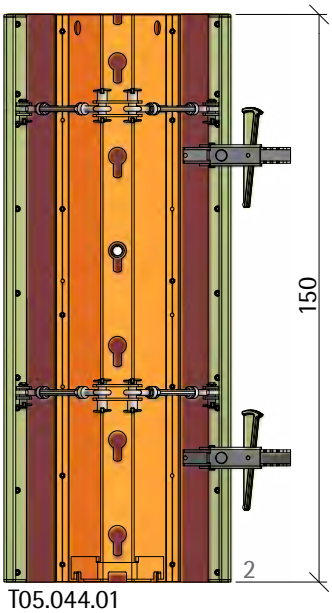
4. Hit the wedge down firmly into the interlocking of the casing.

TTK multi-clamp 0-10 cm

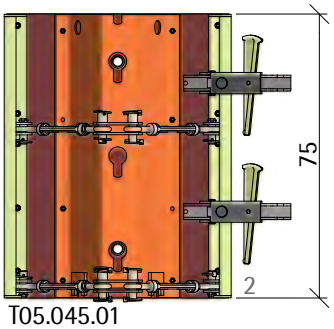
Segment heights:



T05.043.01

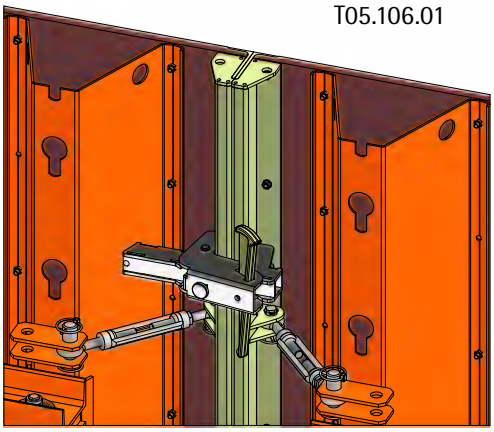


T05.044.01



T05.045.01

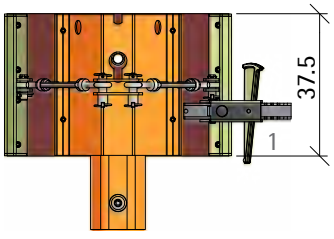
T05.106.01



TTK clamp on the direct segment joint, without filler

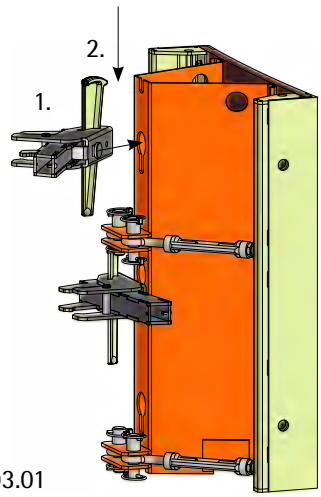
Number and position of TTK multi-clamps depending on the segment height.

T05.046.01



1. Insert multi-clamp with the pilot pin into the keyhole of the trapezoid girder

2. Push the multi-clamp down in the slot of the keyhole.

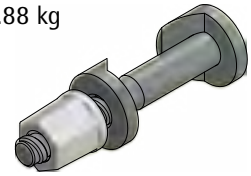


T05.103.01

Before the first use and thereafter when erecting the formwork, the multi-clamps 0-10 cm can be parked on the segments. After loosening the multi-clamps, this is suspended with the pilot pin in a keyhole of the trapezoid girder. All multi-clamps are installed together with the segment in this way and are immediately to hand at any height when the formwork is erected again.

TTK screw for segment

TTK screw for segment complete
Art.No.: 182.008.0003
Weight: 0.88 kg



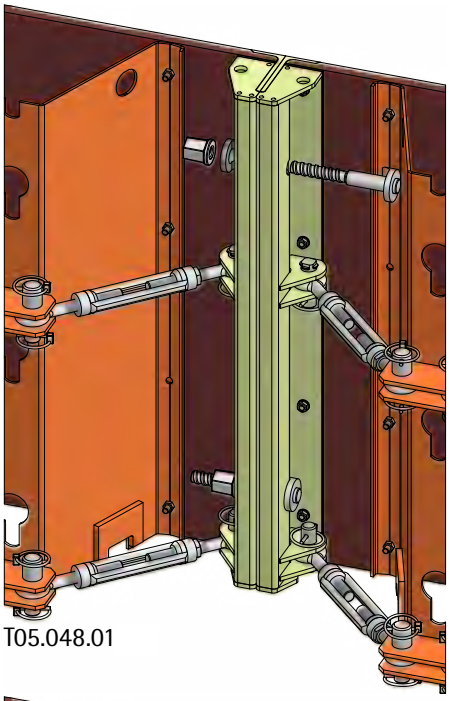
As an alternative to the TTK multi-clamp 0-10 cm, segments can also be screwed together. The TTK screw for segments is used for this.

1. Insert the TTK screw Dw15x115 through the holes in the segment frame.
2. Fit and screw the TTK washer and hexagon nut until the frames are connected together tightly and permanently.

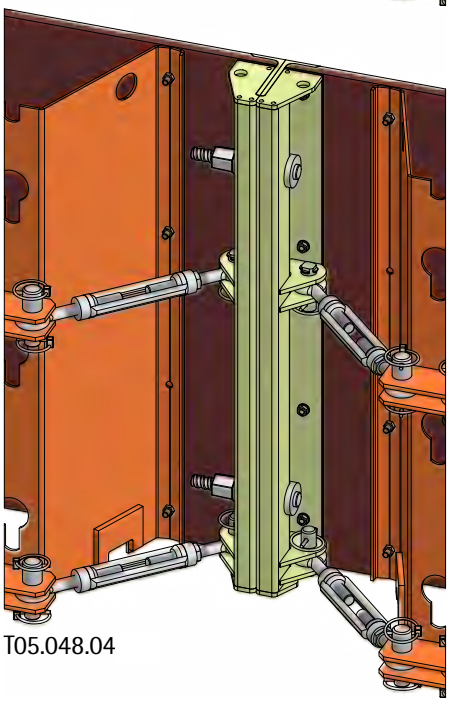
Note:
The TTK screw and the TTK nuts must be positioned such that their form is adjusted to the geometry of the frame.

The number and position of the required TTK screws for the various segment heights for the standard application cases are shown on the opposite page.

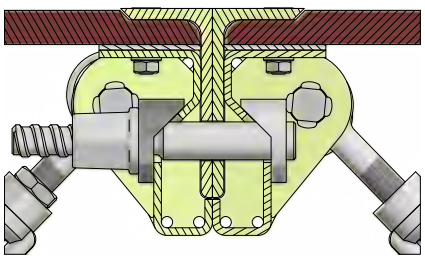
It is not possible to fit fillers here.



T05.048.01



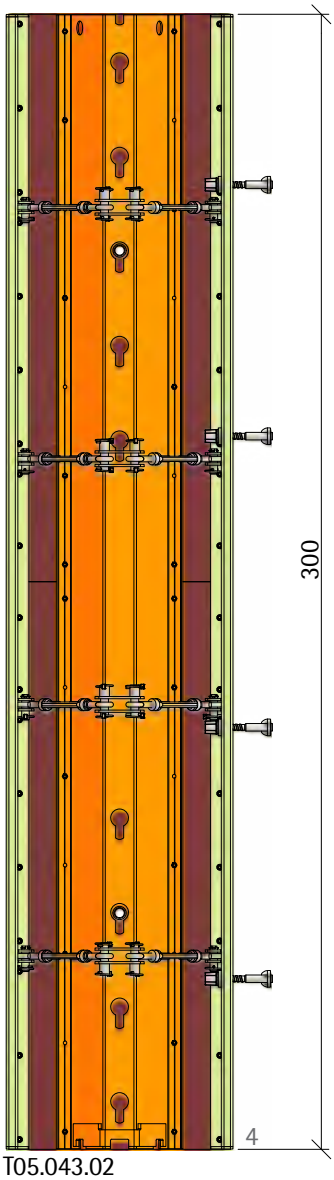
T05.048.04



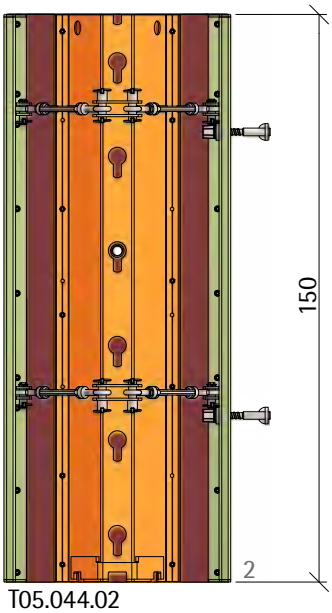
T05.048.05

TTK screw for segment

Segment heights:

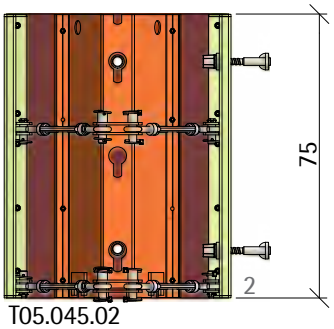


T05.043.02

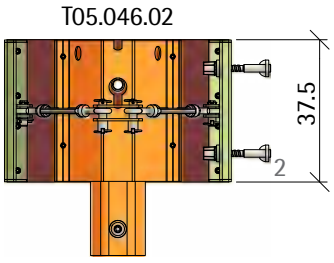


T05.044.02

Number and position of TTK screws depending on the segment height.

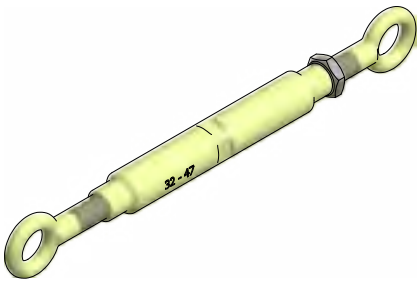


T05.045.02



Note:
For height extensions with the 37.5 cm segment, one screw is enough

Turnbuckle on the joint



Turnbuckle M20 320
Art.No.: 182.000.0210
Weight: 1.60 kg

Turnbuckle M20 450
Art.No.: 182.000.0211
Weight: 2.10 kg

Turnbuckle M20 600
Art.No.: 182.000.0212
Weight: 2.70 kg

Turnbuckle M20 750
Art.No.: 182.000.0213
Weight: 3.30 kg

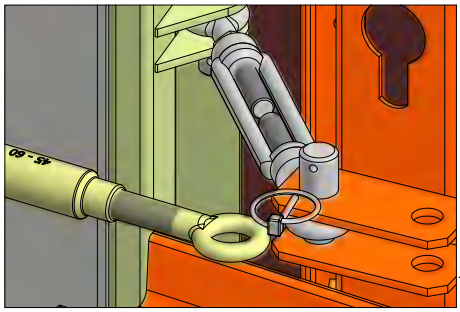
In order to achieve sufficient rigidity when erecting larger formwork units, turnbuckles M20 have to be fitted at all segment joints.
The individual segment can also be turned to the precise position when being set, in particular for small diameters.
The suspension bolts needed for fastening the turnbuckles are already fitted in the segments.

Note:
The turnbuckle can be inserted both from above and from below using the suspension bolts (see p. 37)

1. Remove the linchpin from the suspension bolt.
2. Place the eyes of the turnbuckle over the suspension bolt.
3. Re-insert the linchpin as a lock.
4. For the inside formwork, tighten the turnbuckle gradually, for the outside formwork with pressure.

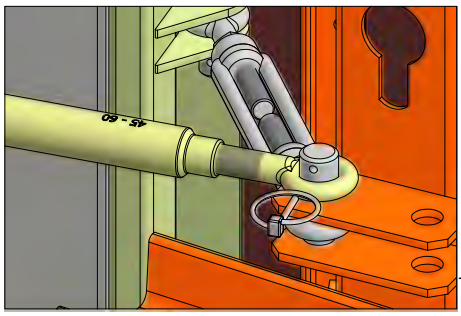
T05.085.01

1.



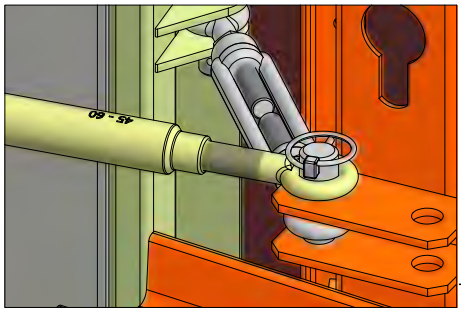
T05.086.01

2.



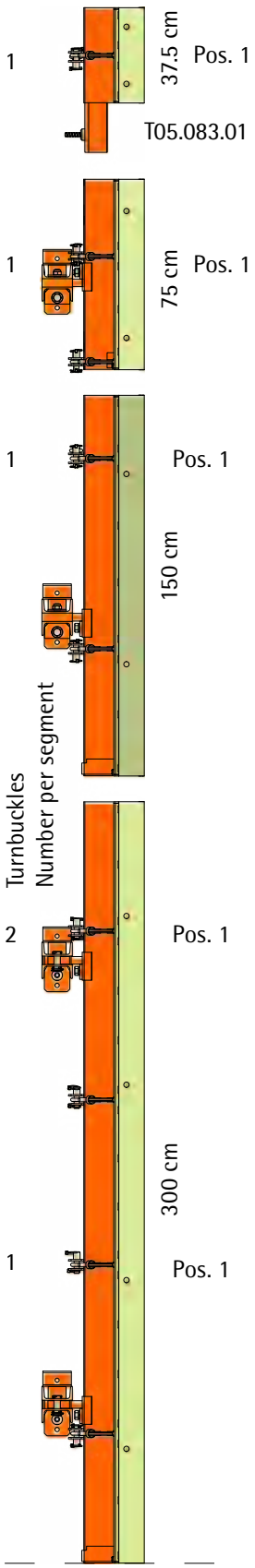
T05.086.02

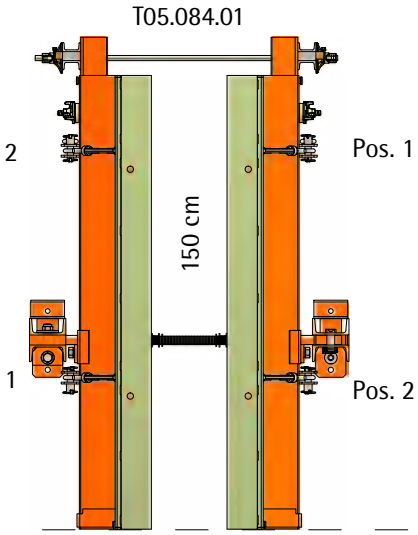
3.

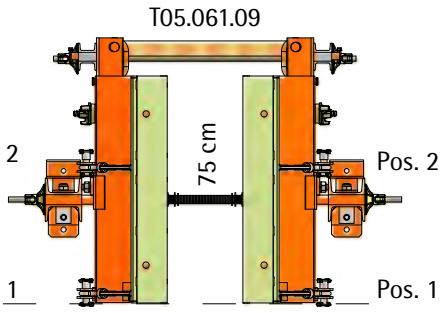


T05.086.03

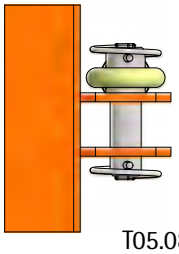
Turnbuckle on the joint

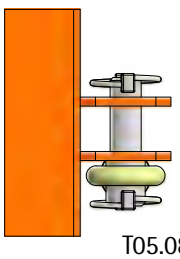






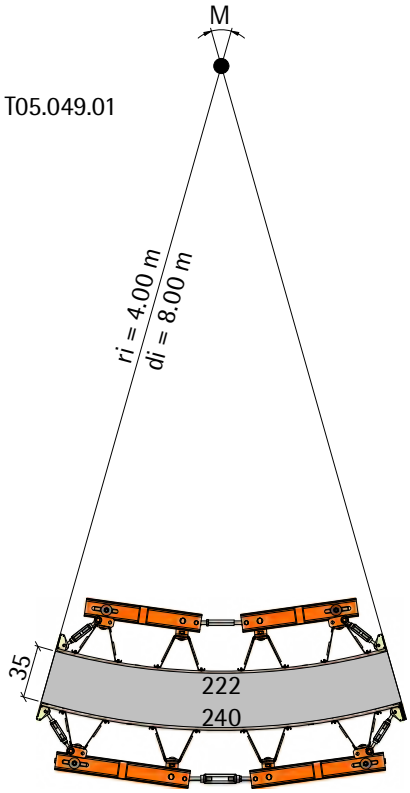
The number of required turnbuckles depends on the segment height, and also whether the segments are erected as an extended unit or as single segments.
Two turnbuckles are always needed for small formwork heights 150 cm or 75 cm.



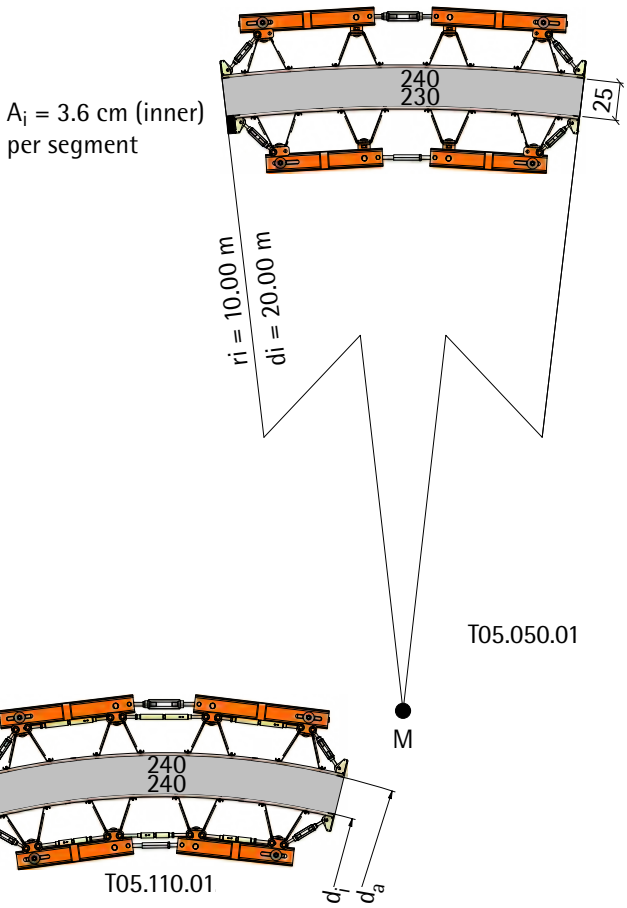


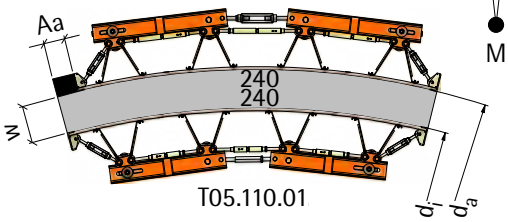
For hight extensions with 300 cm-high segments, two turnbuckles are always needed, each of the heights 150 cm, 75 cm and 37.5 cm required an extra one.

Fillers



Aa = 3.3 cm (outer) per segment





The different curve lengths inside/ outside the formed layout are equalised by the differences in the segment widths 240 cm/230 cm or 240 cm/ 222 cm.
As these differences do not always precisely fit every diameter or wall thickness, fillers are still needed outside/inside the segment joint (page 40 et seq.).

Note:
During radius adjustment, the widths of the segments change for a diameter below 26.00 m. For the inside segments 222 cm and 230 cm, the veneer layer in contact with the concrete is pulled, i.e. the segments are millimetres wider. For the outside segment 240 cm, the veneer layer in contact with the concrete is compressed so that this width is slightly reduced.
The measurable segment widths according to the set diameter can be seen in the table on page 44.
The required filler widths are also calculated with these values.

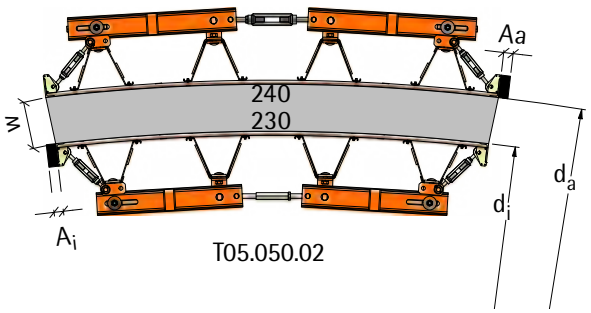
Equalisation between 2 segments for segments 240/240

di [m]	w=15 [cm]	w=20 [cm]	w=25 [cm]	w=30 [cm]	w=35 [cm]	w=40 [cm]	w=50 [cm]
30	2.4a	3.2a	4.0a	4.8a	5.6a	6.4a	8.0a
31	2.3a	3.1a	3.9a	4.6a	5.4a	6.2a	7.7a
32	2.2a	3.0a	3.7a	4.5a	5.2a	6.0a	7.5a
33	2.1a	2.9a	3.6a	4.4a	5.1a	5.8a	7.3a
34	2.0a	2.8a	3.5a	4.2a	4.9a	5.6a	7.0a
35	2.0a	2.7a	3.4a	4.1a	4.8a	5.5a	6.8a
36	1.9a	2.6a	3.3a	4.0a	4.7a	5.3a	6.7a
37	1.9a	2.6a	3.2a	3.9a	4.5a	5.2a	6.5a
38	1.8a	2.5a	3.1a	3.8a	4.4a	5.1a	6.3a
39	1.8a	2.5a	3.0a	3.7a	4.3a	4.9a	6.1a
40	1.8a	2.4a	3.0a	3.6a	4.2a	4.8a	6.0a
41	1.7a	2.3a	2.9a	3.5a	4.1a	4.7a	5.8a
42	1.7a	2.3a	2.9a	3.4a	4.0a	4.6a	5.7a
43	1.7a	2.2a	2.8a	3.3a	3.9a	4.5a	5.6a
44	1.6a	2.2a	2.7a	3.3a	3.8a	4.4a	5.5a
45	1.6a	2.1a	2.7a	3.2a	3.7a	4.3a	5.3a

Determining the fillers

Filler between 2 segments for segments 230/240

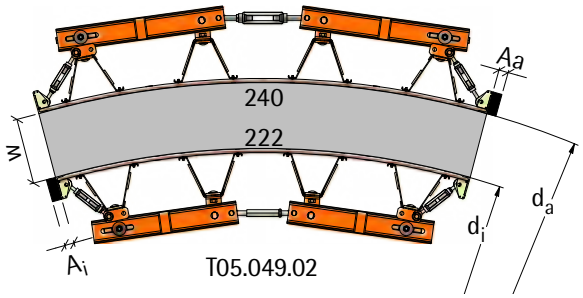
di [m]	w=15 [cm]	w=20 [cm]	w=25 [cm]	w=30 [cm]	w=35 [cm]	w=40 [cm]	w=50 [cm]
5	5.8 a	10.5 a					
6	3.5 a	7.4 a	11.2a				
7	1.8 a	5.4 a	8.4a	11.7a			
8	0.5 a	3.3 a	6.2a	9.1a	12.0a		
9	0.6 i	2.1 a	4.7a	7.1a	9.6a	12.0a	
10	1.4 i	0.8 a	3.1a	5.4a	7.8a	10.1a	
11	2.1 i	0.0	2.1a	4.2a	6.2a	8.3a	
12	2.8 i	0.9 i	1.0a	3.0a	5.0a	6.8a	10.6a
13	3.3 i	1.5 i	0.2a	2.1a	3.8a	5.5a	9.0a
14	3.8 i	2.2 i	0.5i	1.1a	2.7a	4.4a	7.7a
15	4.2 i	2.7 i	1.1i	0.4a	2.0a	3.4a	6.5a
16	4.6 i	3.2 i	1.7i	0.3i	1.1a	2.5a	5.4a
17	4.9 i	3.6 i	2.2i	0.9i	0.4a	1.8a	4.5a
18	5.3 i	4.0 i	2.7i	1.5i	0.2i	1.0a	3.6a
19	5.6 i	4.3 i	3.1i	1.9i	0.8i	0.4a	2.9a
20	5.8 i	4.7 i	3.6i	2.4i	1.3i	0.2i	2.1a
21	6.1 i	5.0 i	3.9i	2.8i	1.7i	0.7i	1.5a
22	6.4 i	5.3 i	4.3i	3.2i	2.2i	1.2i	0.9a
23	6.6 i	5.6 i	4.6i	3.6i	2.6i	1.6i	0.3a
24	6.8 i	5.8 i	4.9i	3.9i	3.0i	2.1i	0.2i
25	7.0 i	6.1 i	5.1i	4.3i	3.5i	2.4i	0.7i
26	7.2 i	6.3 i	5.5i	4.6i	3.7i	2.8i	1.1i
27	7.3 i	6.5 i	5.6i	4.8i	3.9i	3.1i	1.4i
28	7.4 i	6.6 i	5.8i	5.0i	4.1i	3.3i	1.7i
29	7.5 i	6.7 i	5.9i	5.1i	4.3i	3.5i	2.0i
30	7.6 i	6.8 i	6.0i	5.3i	4.5i	3.8i	2.3i
31	7.7 i	6.9 i	6.2i	5.4i	4.7i	4.0i	2.5i
32	7.8 i	7.0 i	6.3i	5.6i	4.8i	4.1i	2.7i
33	7.8 i	7.1 i	6.4i	5.7i	5.0i	4.3i	2.9i
34	7.9 i	7.2i	6.5i	5.8i	5.1i	4.5i	3.1i
35	8.0 i	7.3i	6.6i	5.9i	5.3i	4.6i	3.3i
36	8.0 i	7.3i	6.7i	6.0i	5.4i	4.8i	3.5i
37	8.1 i	7.4i	6.8i	6.1i	5.5i	4.9i	3.7i
38	8.1 i	7.5i	6.9i	6.2i	5.6i	5.0i	3.8i
39	8.2 i	7.5i	7.0i	6.3i	5.7i	5.2i	4.0i
40	8.2 i	7.6i	7.0i	6.4i	5.9i	5.3i	4.1i



T05.050.02

Equalisation between 2 segments for segments 222/240

di [m]	w=15 [cm]	w=20 [cm]	w=25 [cm]	w=30 [cm]	w=35 [cm]	w=40 [cm]	w=50 [cm]
5	2.5i	1.8a	6.3a				
6	4.6i	1.1i	2.6a	6.3a	10.0a		
7	6.2i	2.9i	0.2a	3.4a	6.2a	9.4a	
8	7.5i	4.8i	2.1i	0.5a	3.3a	6.1a	11.7a
9	8.6i	6.1i	3.6i	1.2i	1.3a	3.8a	8.5a
10		7.2i	5.0i	2.9i	0.8i	1.4a	5.8a
11		8.1i	6.1i	4.1i	2.1i	0.1i	3.9a
12			7.0i	5.2i	3.4i	1.6i	2.0a
13				6.1i	4.5i	2.7i	0.6a
14				7.7i	5.4i	3.9i	0.8i
15					6.2i	4.8i	1.9i
16						5.6i	2.9i
17						6.3i	3.7i
18						7.0i	4.6i
19							5.3i
20							6.0i



T05.049.02

The table values specify the width of the required filler depending on the diameter di and wall thickness w of the layout being formed.

i = Filler is required inside

a = Filler is required outside

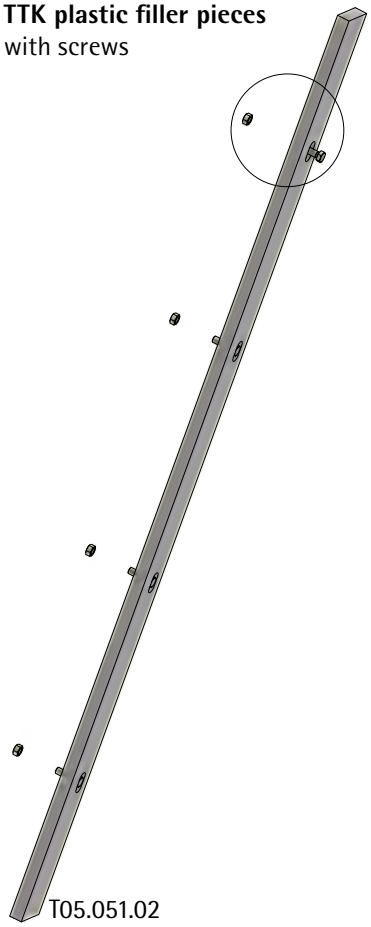
Note:

The fillers are always needed per segment 222 cm; 230 cm or 240 cm. For two-girder and single-girder segments, these have to be halved or quartered.
The table values can be interpolated according to the deliverable filler widths.

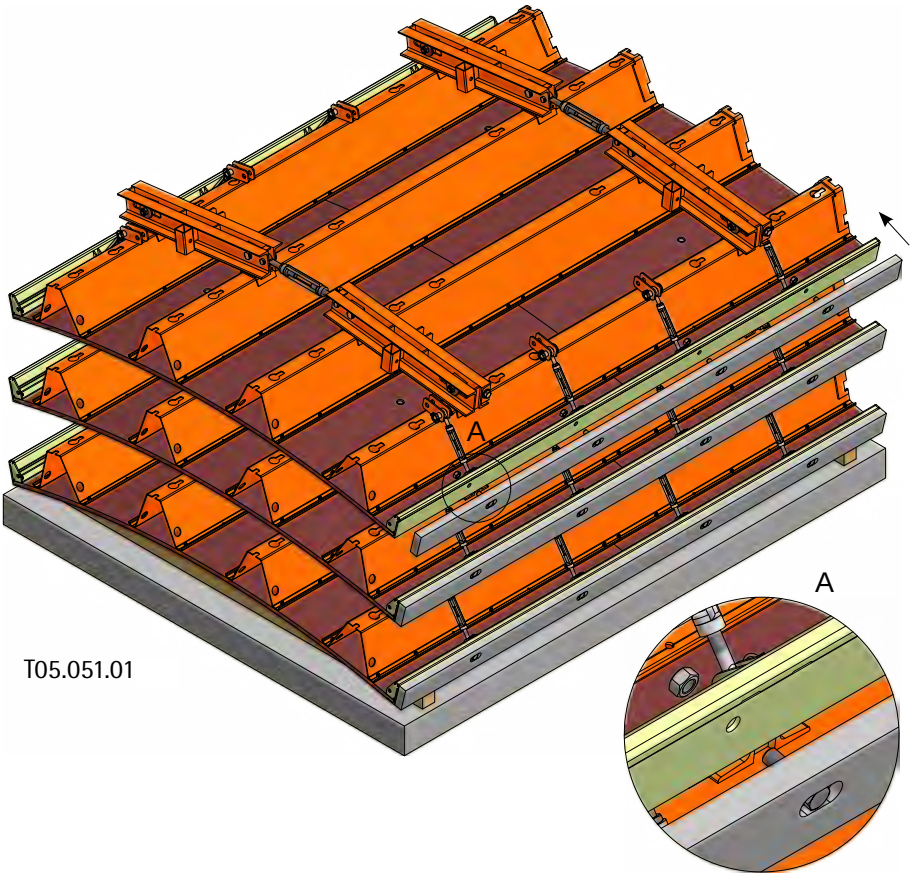
The total of all distributed fillers, divided by the number of segments, should match the table value.

Plastic filler pieces

TTK plastic filler pieces
with screws



T05.051.02



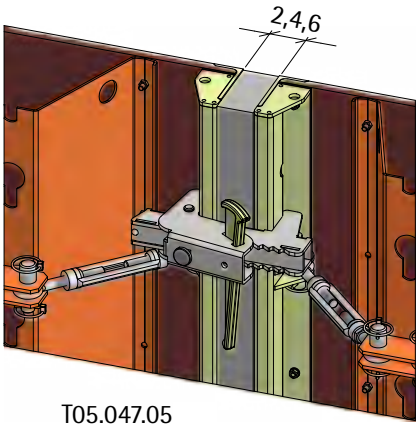
T05.051.01

After determining the size and location of the fillers (page 40 et seq.), these are installed as plastic pieces with widths between 2 cm and 10 cm. Assembly can take place on the lying segment, as the fillers can be screwed with screws through the holes in the side section.

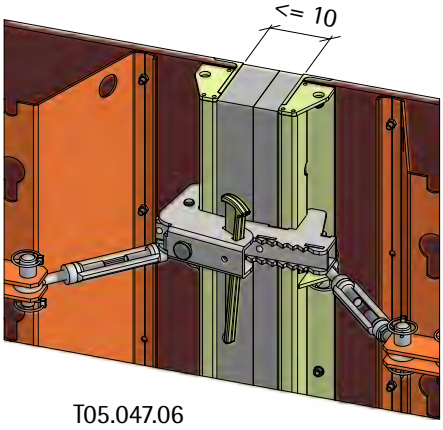
The plastic filler pieces are available for all segment heights for compensations of 2 cm, 4 cm and 6 cm (see parts list, pages 9 to 15).

For wider fillers, two parts are combined, which are then screwed to the segment on the left of the joint and the right of the joint.

The segment joints are connected to the installed fillers using the TTK multi-clamp 0-10 cm.

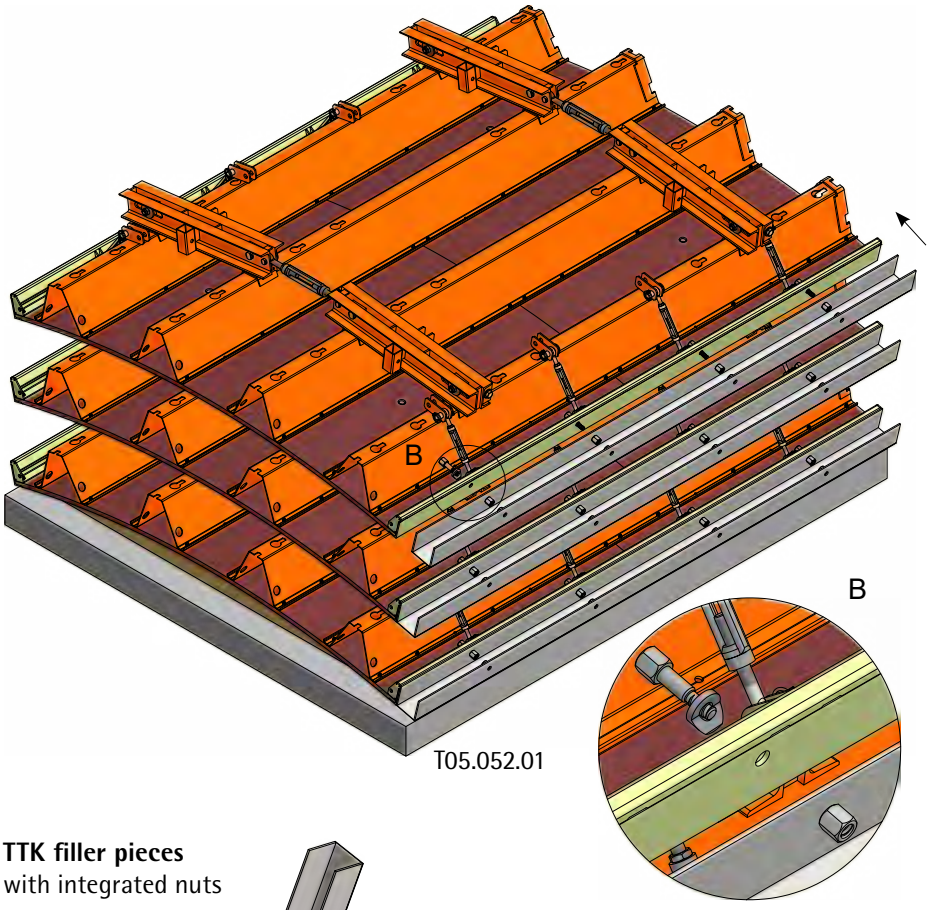


T05.047.05



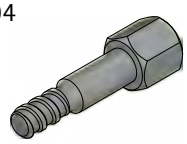
T05.047.06

Filler pieces



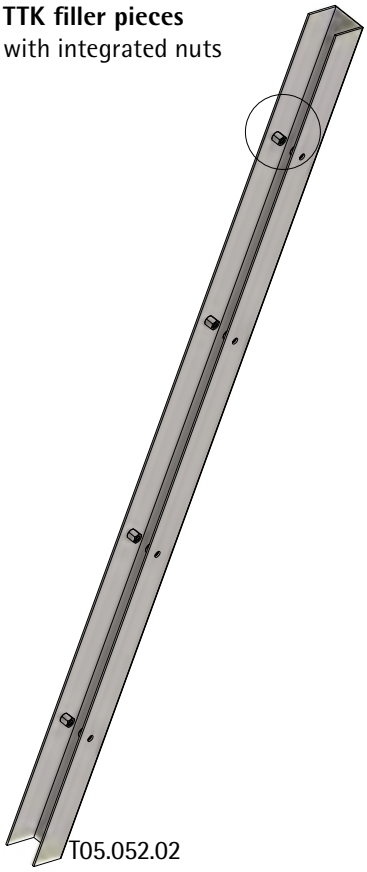
T05.052.01

TTK screw Connecting panel and filler piece
Art.No.: 182.008.0004
Weight: 0.32 kg

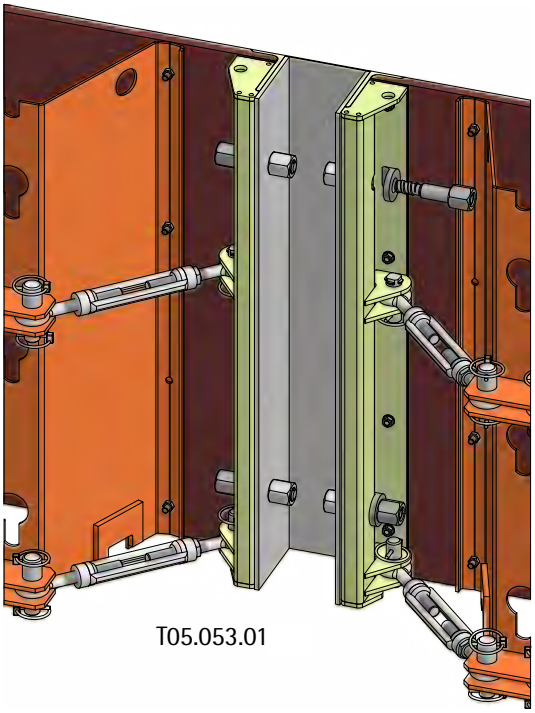


TTK washer
Art.No.: 182.008.0006
Weight: 0.12 kg

TTK filler pieces
with integrated nuts



T05.052.02



T05.053.01

For compensation of more than 10 cm, TTK steel filler pieces are used. Assembly can take place on the lying segment, as the filler pieces can be screwed with screws through the holes in the side section.

The TTK filler pieces are available for all segment heights for compensations of 12cm, 14cm and 16cm (see parts list, pages 9 - 15).

Note:
The combination of TTK plastic filler pieces and TTK filler pieces at a joint is not possible.

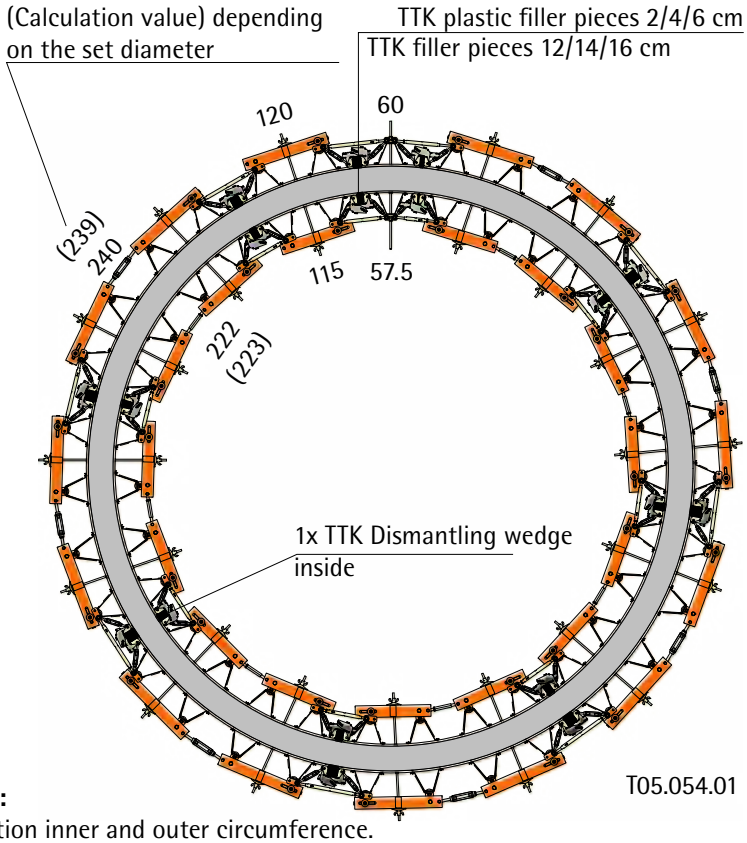
Height offset is not possible at the segment joint when using TTK filler pieces.

Closed layouts

For closed layouts or for formworks between existing building parts, the circular formwork must be precisely planned.

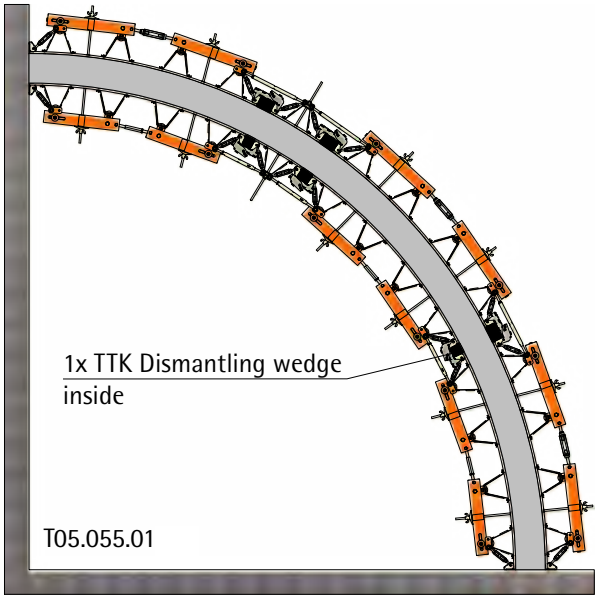
Note:
During radius adjustment, the widths of the segments change for a diameter below 26.00 m. For the inside segments 222 cm and 230 cm, the veneer layer in contact with the concrete is pulled, i.e. the segments are millimetres wider. For the outside segment 240 cm, the veneer layer in contact with the concrete is compressed so that this width is slightly reduced.
The measurable segment widths according to the set diameter can be seen in the table.

di [m]	GLa 2.40m SLa [cm]	GLi 2.30m SLi [cm]	GLi 2.22m SLi [cm]
5	239.00	231.00	223.00
6	239.00	231.00	223.00
7	239.05	230.95	222.95
8	239.10	230.90	222.90
9	239.15	230.85	222.85
10	239.20	230.80	222.80
11	239.25	230.75	222.75
12	239.30	230.70	222.70
13	239.35	230.65	222.65
14	239.40	230.60	222.60
15	239.45	230.55	222.55
16	239.50	230.50	222.50
17	239.55	230.45	222.45
18	239.60	230.40	222.40
19	239.65	230.35	222.35
20	239.70	230.30	222.30
21	239.75	230.25	222.25
22	239.80	230.20	222.20
23	239.85	230.15	222.15
24	239.90	230.10	222.10
25	239.95	230.05	222.05
26	240.00	230.00	222.00

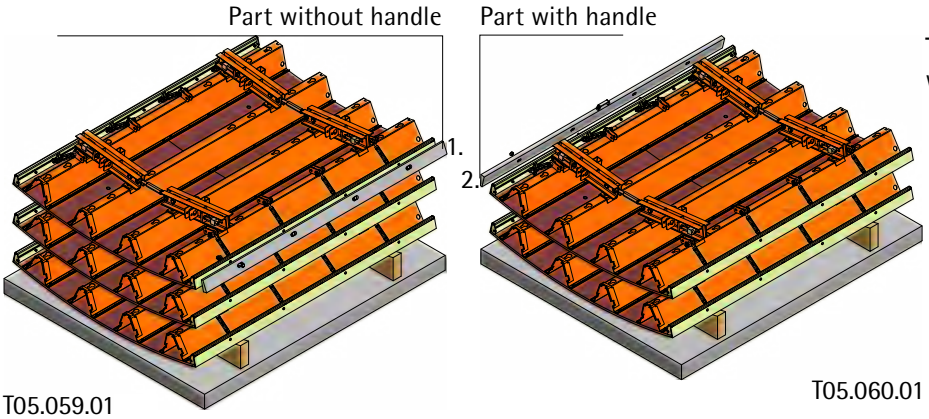


Calculation:

1. Calculation inner and outer circumference.
2. Calculation of the required number of segments with four, two or one beam (note SLi; SLa according to table).
3. **Total remaining minimum inside and outside preferably distributed across multiple plastic filler pieces or filler pieces at the joints.** If there are deviations from the values SLi and SLa (example: moisture absorption, issues), the formwork can then always be adjusted at a joint along the entire length.
4. A **TTK dismantling wedge** must be included in the plan for the inside formwork.
5. **Check:** all segments (SLi and SLa) and fillers when added up must be the inside or outside circumference.

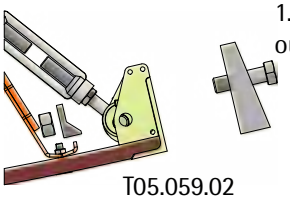


Dismantling



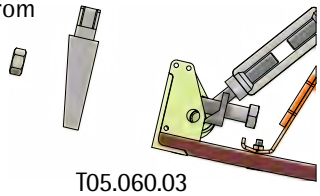
T05.059.01

T05.060.01



1. Screw from outside

T05.059.02

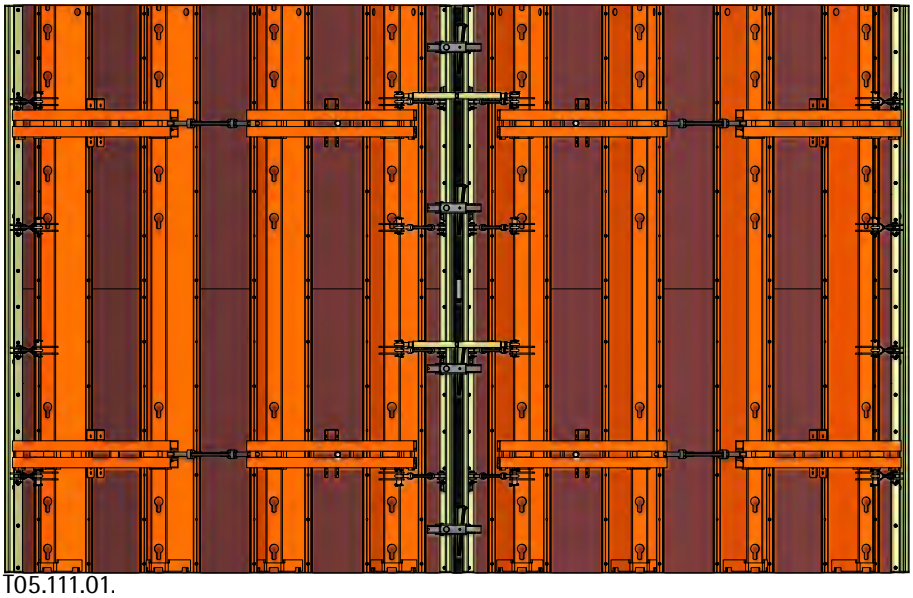


2. Screw from inside

T05.060.03

TTK Dismantling wedges
with screws

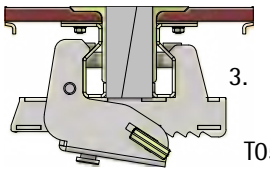
T05.060.02



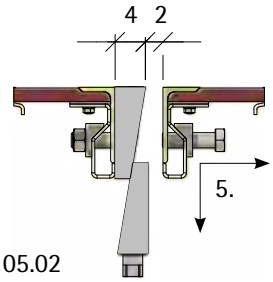
T05.111.01.

To dismantle the layouts shown on page 44, at least one TTK dismantling wedge must be planned for the inside formwork.
The assembly of the two-section dismantling wedge is performed at two segments, as both parts are screwable with screws through the holes in the side parts.

1. Screw left part, without handle, to the right segment edge.
2. Screw right part, with handle, to the left segment edge.
3. After positioning the segments, connect the joint with the integrated dismantling wedge with the TTK multi-clamp.
4. Remove TTK multi-clamp.
5. Loosen the right part of the TTK dismantling wedge, with handle, and pull out by the integrated handle.



T05.105.01



T05.105.02

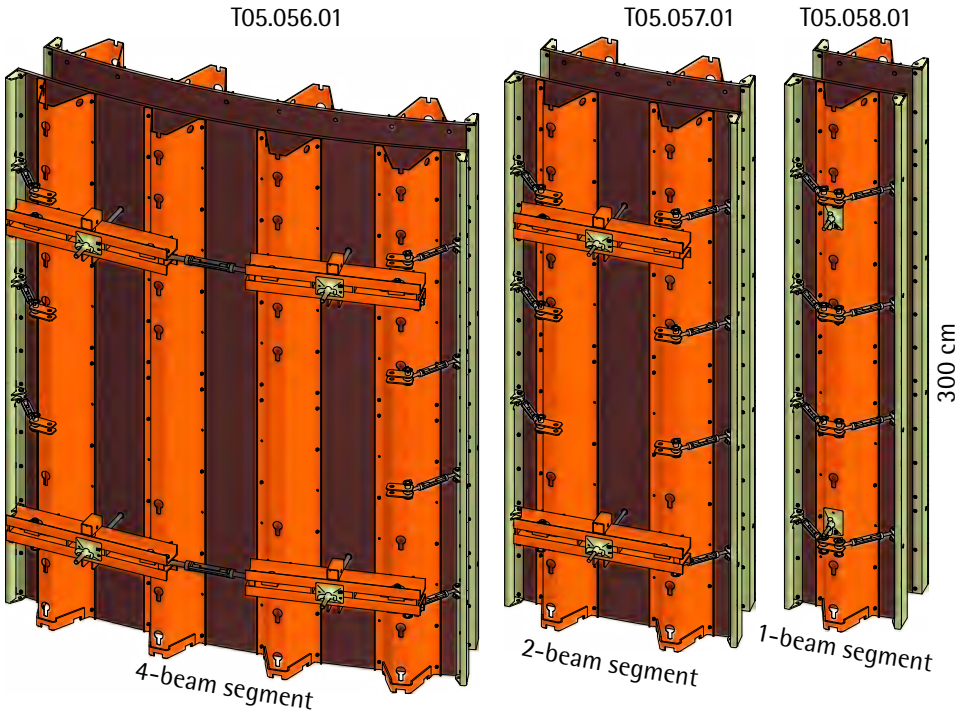
Tie point arrangement

The 300 cm segment are tightened twice at height. This results in:

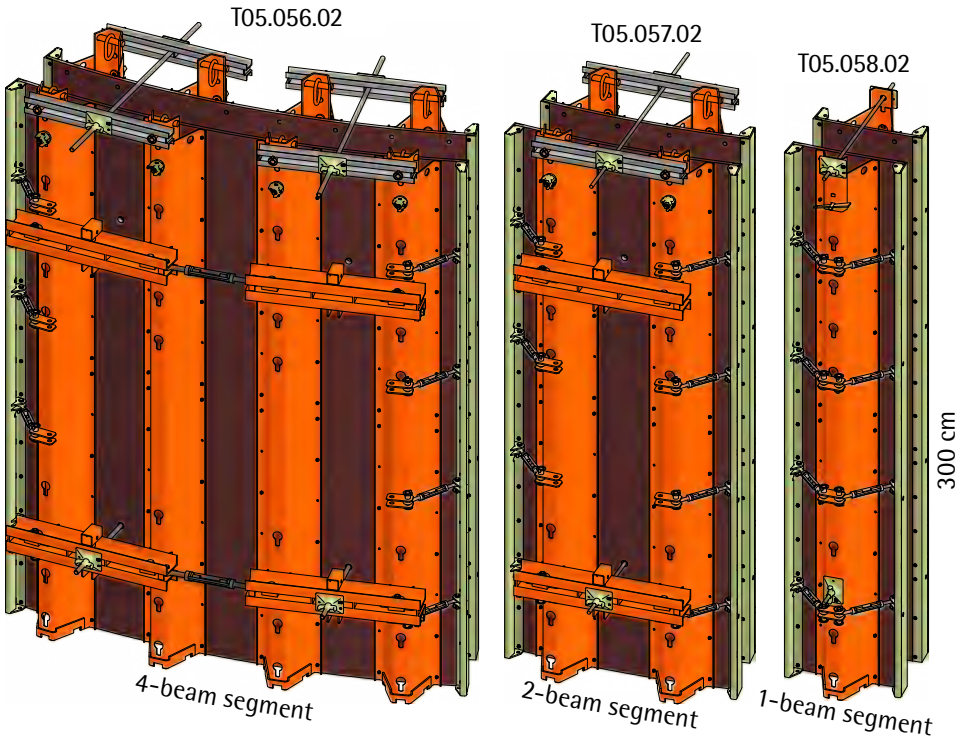
4 tie points in the 4-beam segment through the existing holes in the plywood and via the integrated walers.

2 tie points in the 2-beam segment through the existing holes in the plywood and via the integrated walers.

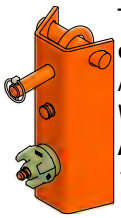
2 tie points in the 1-beam segment through the existing holes in the plywood and via the trapezoid girder.



If the number of tie points in the concrete is to be reduced, it is possible to position the upper tie points with the tie rod guides above the formwork.

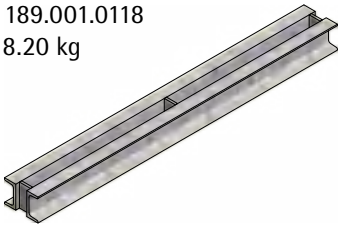


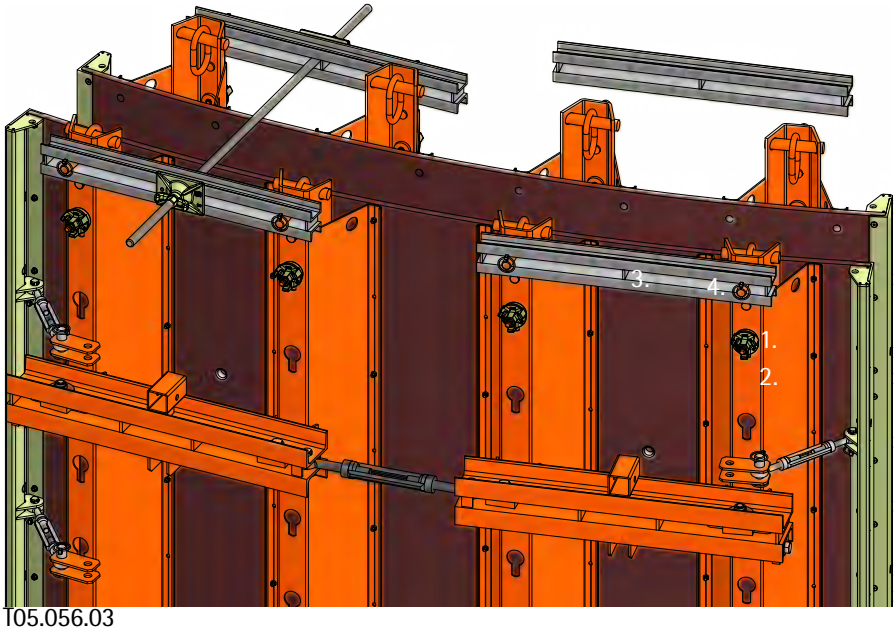
Tie point arrangement



Tie rod guide with crane suspension
Art.No.: 182.000.0223
Weight: 7.80 kg
Admissible capacity: 1700 kg

Double channel waler 60x800 mm
Art.No.: 189.001.0118
Weight: 8.20 kg





T05.056.03

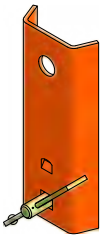
Tie rod guide with crane suspension:

1. Insert group into the round area of the highest keyhole in the trapezoid girder.
2. Screw on and tighten nuts from outside.

Double channel waler 60x800mm:

3. Slide waler over the pins in the tie rod guides.
4. Use to the linchpin as a lock.

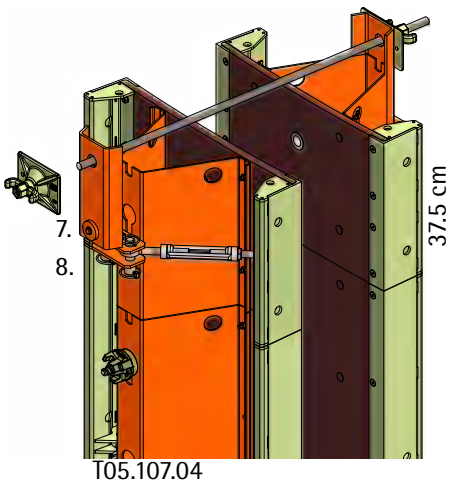
Tie rod guide segment 37.5 cm TR/TK
Art.No.: 182.000.0263
Weight: 2.40 kg



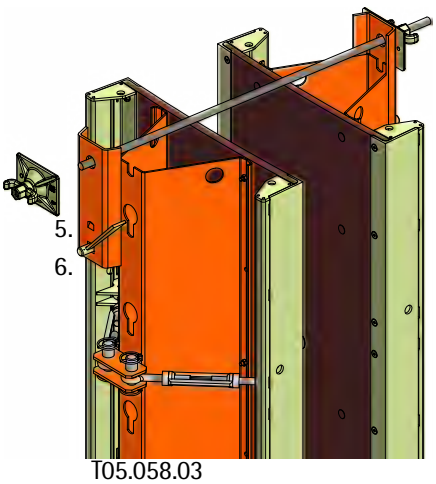
Tie rod guide with wedge T
Art.No.: 182.000.0089
Weight: 2.56 kg

Tie rod guide with wedge:

5. Insert screw into the slot of the highest keyhole in the trapezoid girder.
6. Hammer wedge tight.



T05.107.04



T05.058.03

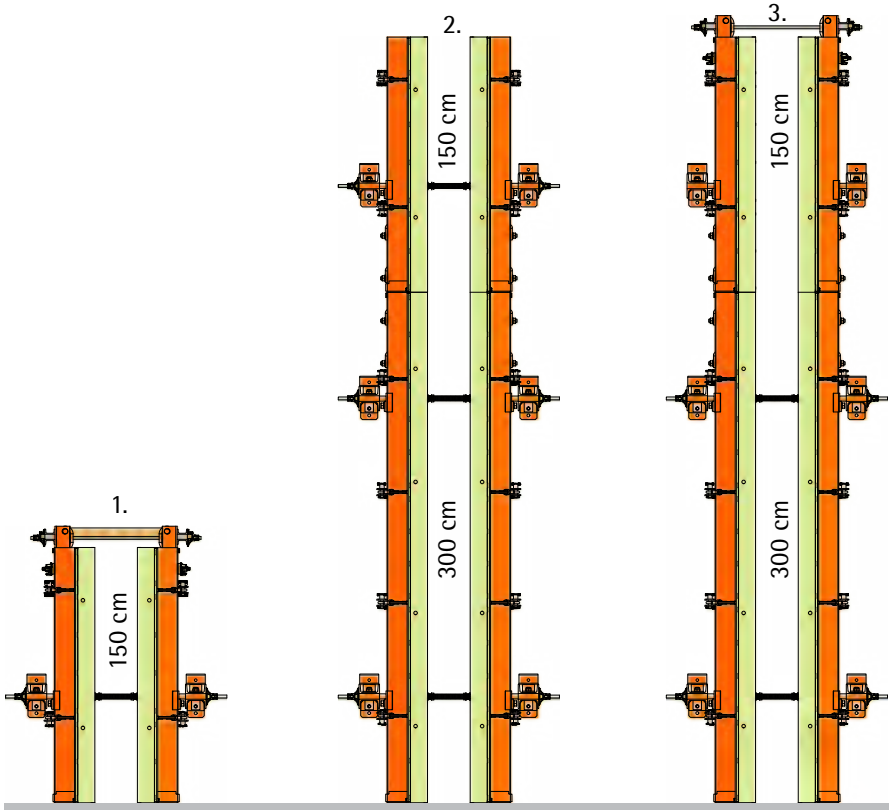
Tie rod guide segment height 37.5 cm:

7. Insert group from the outside into the round area of the highest keyhole in the trapezoid girder.
8. Screw on and tighten nuts from inside.

Tie point arrangement

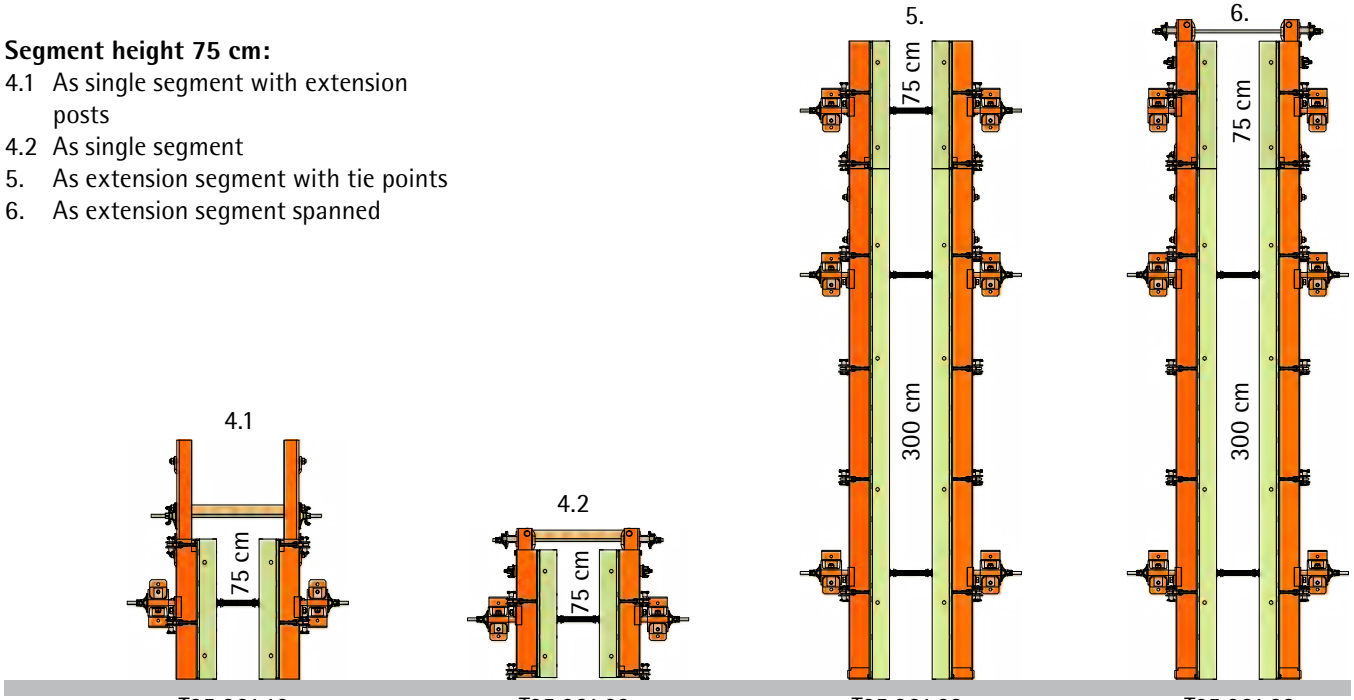
Segment height 150 cm:
1. As single segment
2. As extension segment with tie points
3. As extension segment spanned

Note:
Side views 1, 4.1, 4.2, 9 and 10 are required for the upper tie points cladding tubes or pressure struts. Otherwise the formwork folds inwards from the top when pouring concrete.



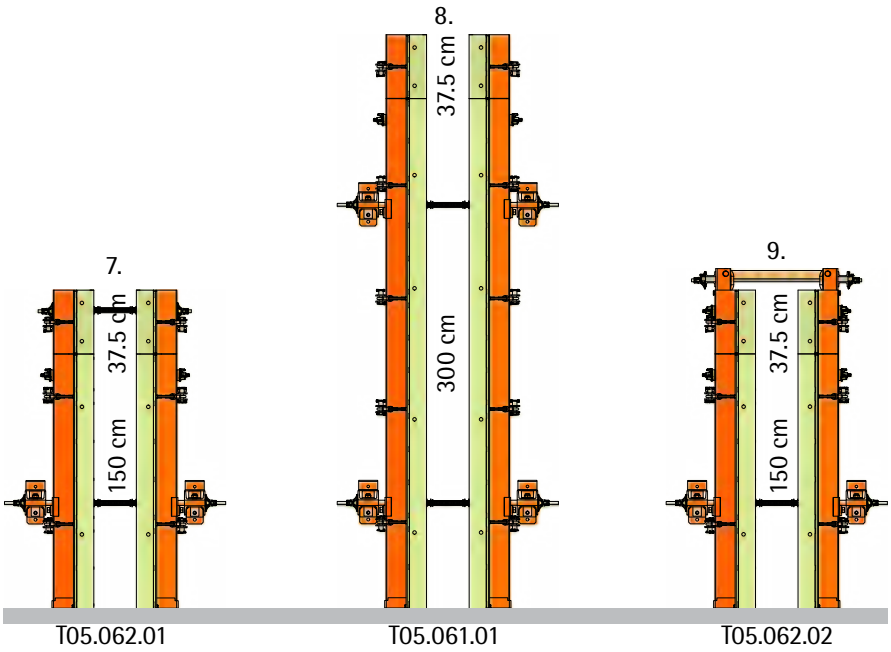
T05.061.08 T05.061.04 T05.061.05

Segment height 75 cm:
4.1 As single segment with extension posts
4.2 As single segment
5. As extension segment with tie points
6. As extension segment spanned



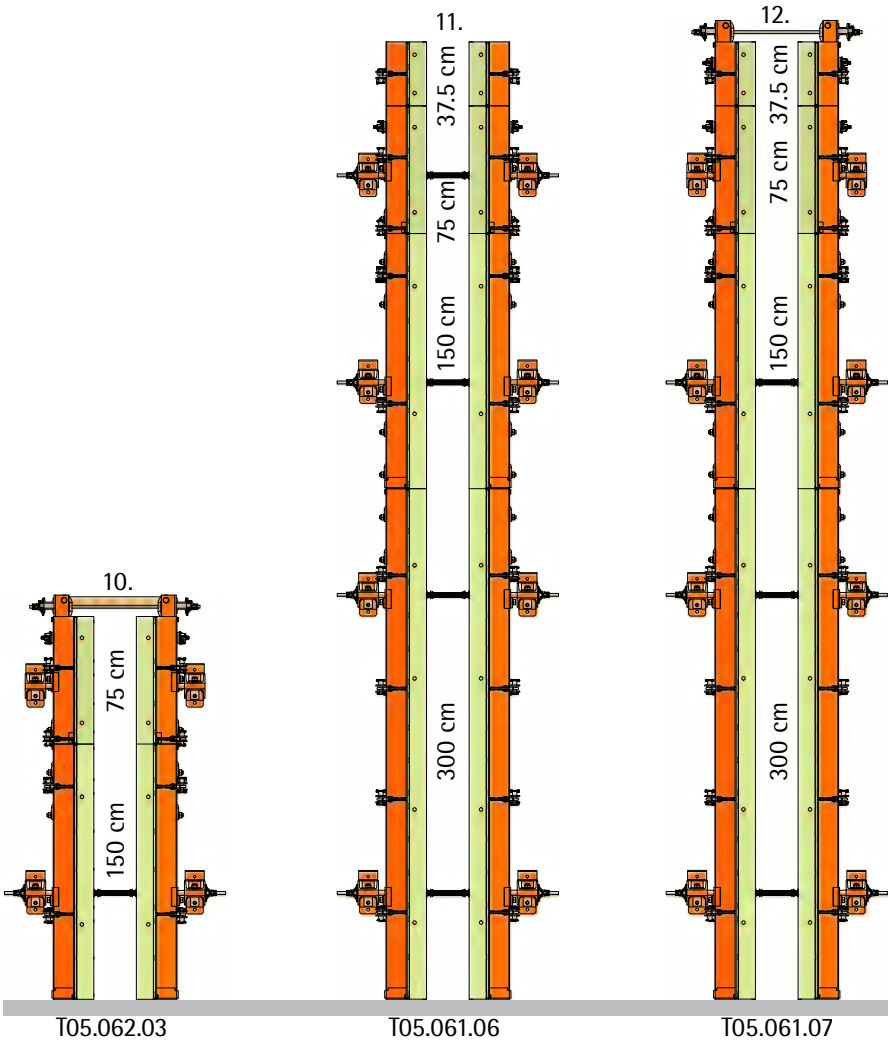
T05.061.10 T05.061.09 T05.061.02 T05.061.03

Tie point arrangement



Segment height 37.5 cm:

7. As extension segment with tie points
8. As extension segment without tie point
9. As extension segment spanned



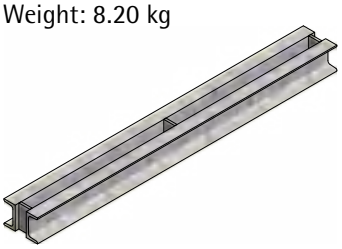
Other examples:

10. Heights 150 cm and 75 cm with a tie point at the bottom and the 75cm segment spanned.
11. Heights 300 cm, 150 cm, 75 cm and 37.5 cm with four tie points.
12. Heights 300 cm, 150 cm, 75 cm and 37.5 cm with three tie points and the 37.5-segment spanned.

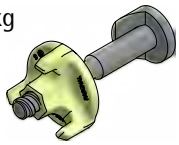
If the plan includes segment combinations, which are not described in this technical information, lease contact the manufacturer's application engineering department.

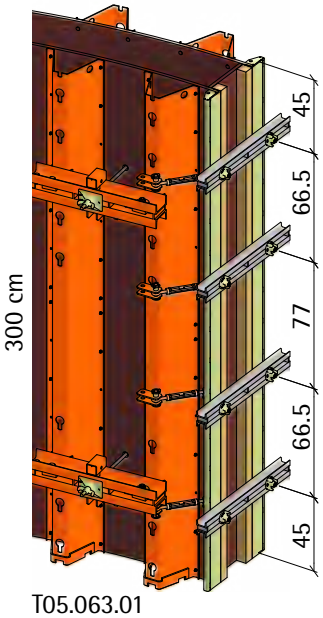
End stop

Double channel waler 60x800 mm
Art.No.: 189.001.0118
Weight: 8.20 kg

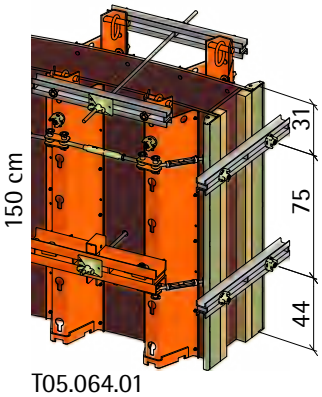


TTK screw for end stop cpl.
Art.No.: 182.008.0002
Weight: 0.83 kg





T05.063.01



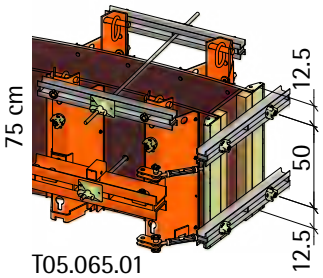
T05.064.01

There are several system solutions for the end stop or end formwork.
For work joints with full reinforcement or joint panels, the formwork is erected on site. The pressure occurring from the fresh-concrete pressure are deflected via the double channel walers or Multigurts in the segment.

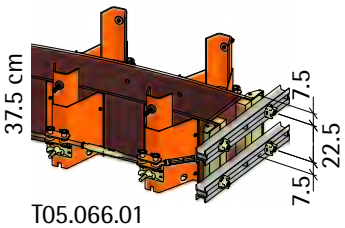
1) Dismantling with the double channel waler 60 x 800 mm:

The number and arrangement of the required double channel walers depend on the respective segment height.
Each double channel waler must with screwed with a TTK screw for end stop to both formwork sides.
Stepless wall thickness of up to 50 cm are possible.

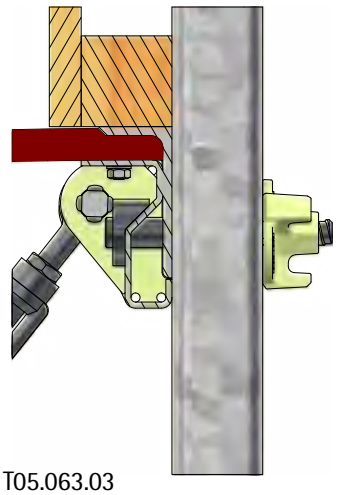
Note:
For height extensions with the 37.5 cm segment, one rail is enough.



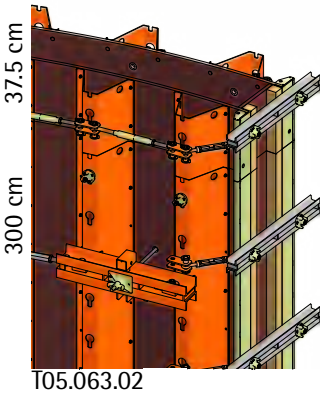
T05.065.01



T05.066.01

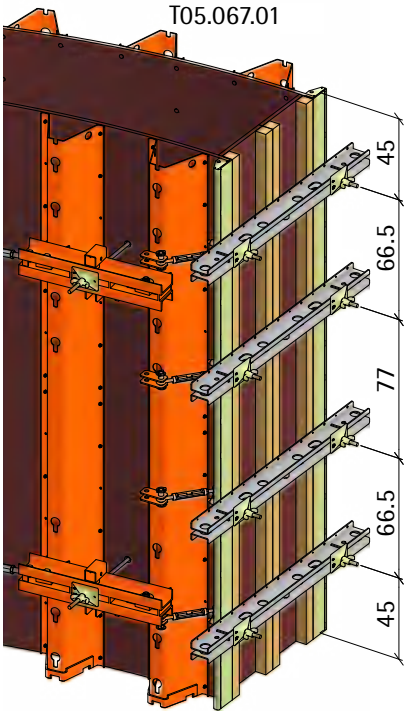

T05.063.03

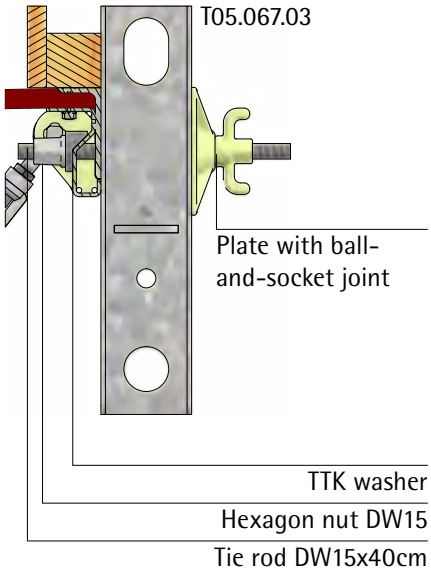
Height 37.5 cm as extension segment with only one rail.



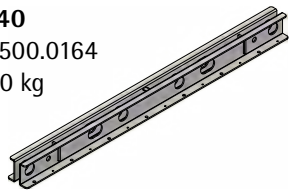
T05.063.02

End stop



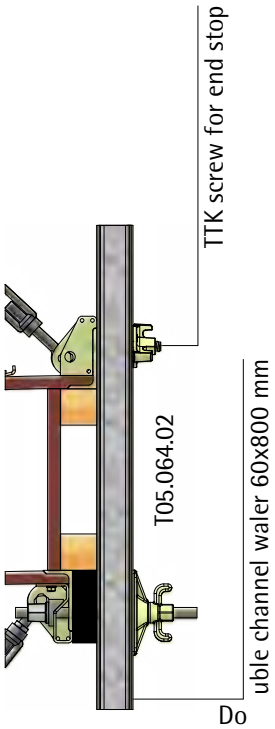


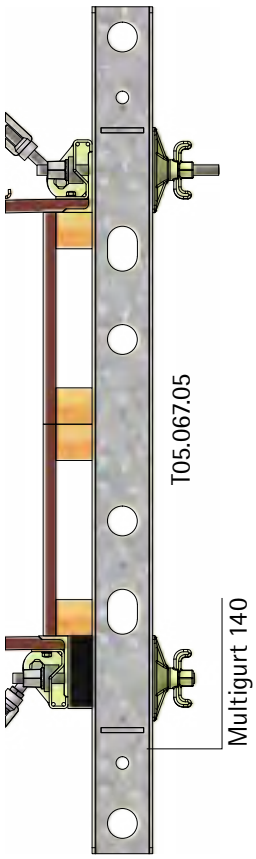
Multigurt 140
Art.No.: 187.500.0164
Weight: 16.50 kg



2) Dismantling with Multigurt:
Multigurts are used for wall thicknesses > 50 cm. The position and number of Multigurts for the different segment heights correspond to the arrangement of the double channel walers 60 x 800 mm.
The screw connection is made with tie rods DW15 and plate with ball-and-socket joints in the segment frame.

Note:
Depending on the wall thickness, the otherwise approved fresh-concrete pressure has to be reduced (see table).





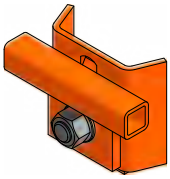
Relevant only for end stops with Multigurt

Fresh-concrete pressure [kN/m²]	max. wall thickness w [cm]
60	50
50	60
40	75
30	100
25	120

If, with regard to the end stop, the inside formwork is widely offset from the outside formwork, a plastic filler piece can be fitted on the withdrawn side so that the waler or Multigurt can be flush to the segment frame.

End stop

Stop end guide fitted T
Art.No.: 182.000.0032
Weight: 2.90 kg



3) Dismantling with stop end guide:

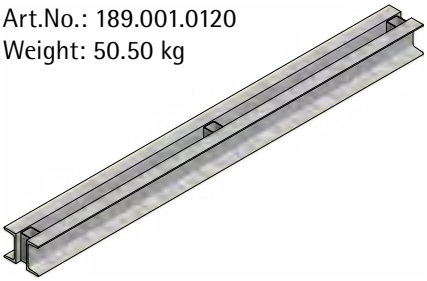
Multigurts 140 or double channel walers 120 in the first trapezoid girder can be back-anchored with the stop end guide and tie rods DW15.
Because of the construction height of the formwork, the length of the respective waler must be at least 60 cm larger than the wall thickness being erected.

Note:
Depending on the wall thickness, the otherwise approved fresh-concrete pressure has to be reduced (see tables.)

Relevant only for end stops with Multigurt

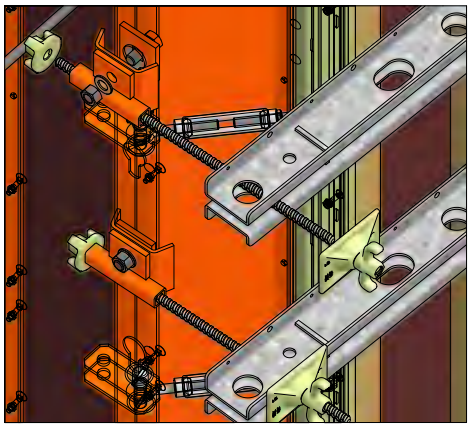
Fresh-concrete pressure [kN/m²]	max. wall thickness w [cm]
60	<= 70
50	80

Double channel waler 120x1800
Art.No.: 189.001.0120
Weight: 50.50 kg

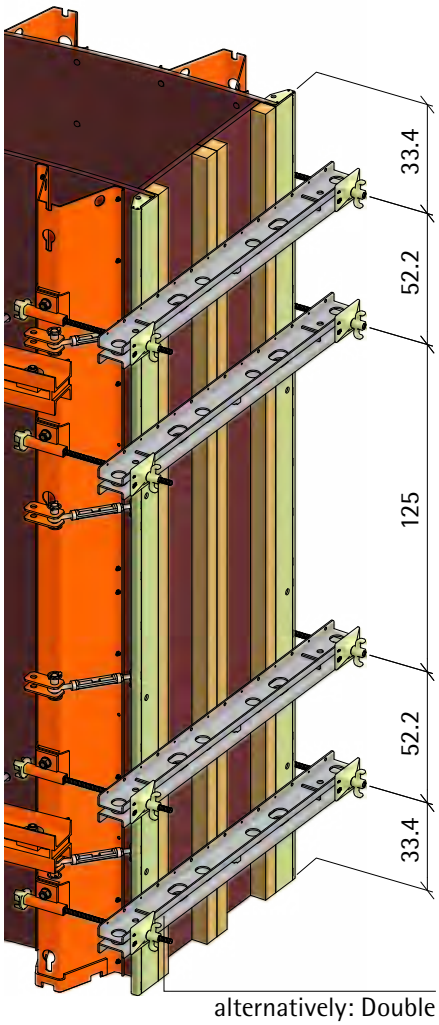


Relevant only for end stops with double channel 120

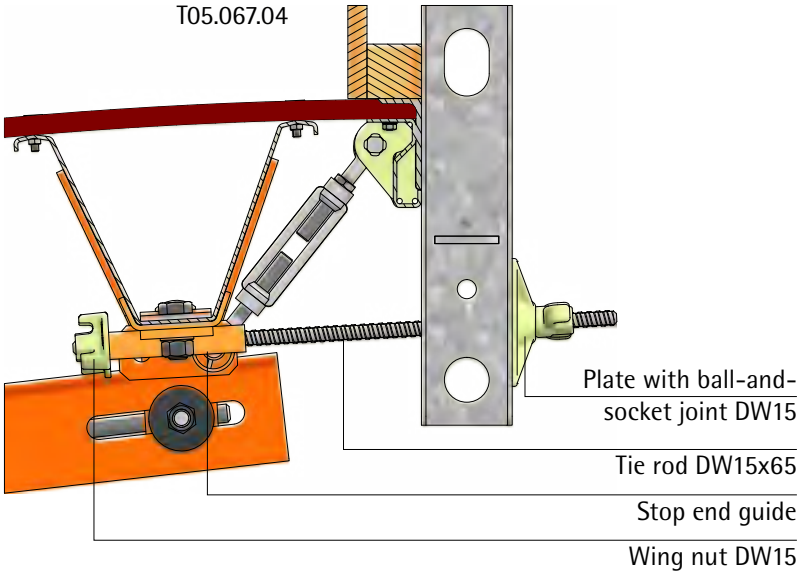
Fresh-concrete pressure [kN/m²]	max. wall thickness w [cm]
60	<= 120



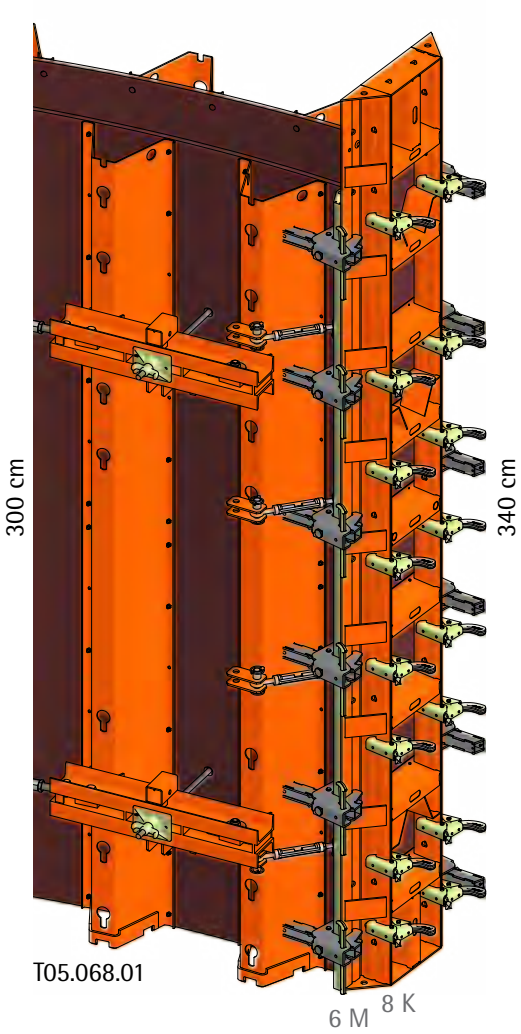
T05.067.02



T05.067.04

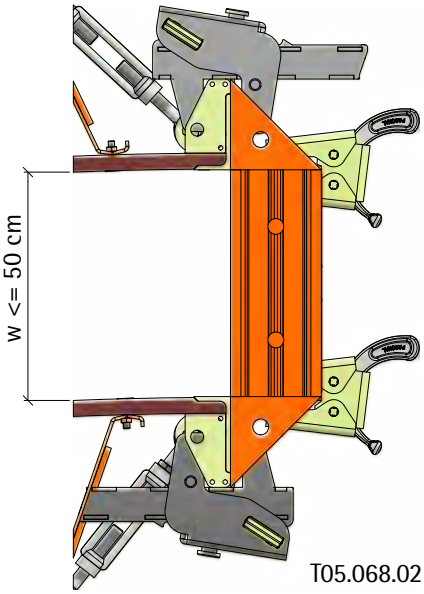


End stop



4) Dismantling with LOGO fitting part:

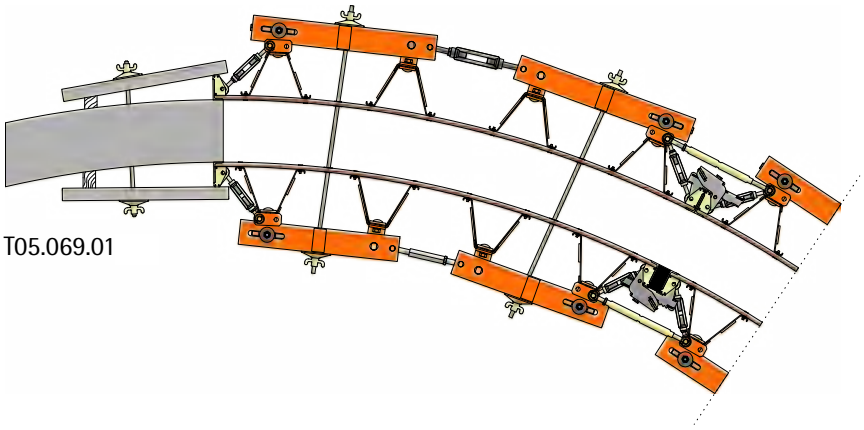
If work joints with full reinforcement do not have to be taken into account, an adjustment element can be fitted to the end of the LOGO formwork with LOGO outside corner posts.
The connection of the LOGO outside corner post to the adjustment element is made with the wedge clamp with curved wedge. The outside corner post is connected to the trapezoid girder circular formwork with the TTK multi-clamp 0-10 cm.



Connection to existing walls

For an appendage, the existing wall is overlapped with the formwork segments.

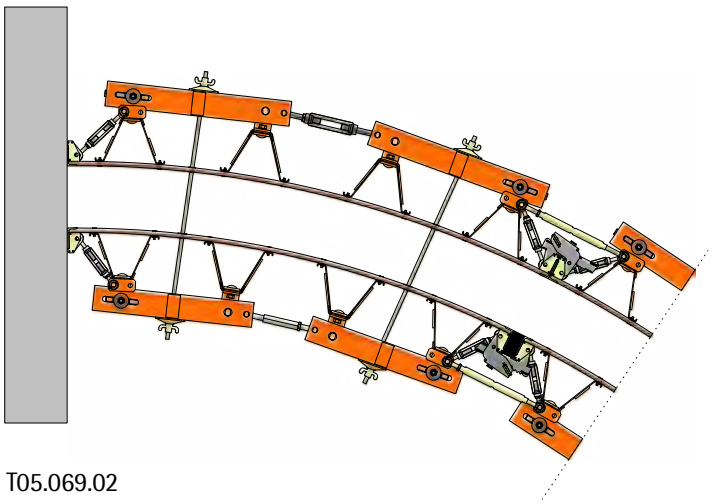
All segment widths have internal holes for ties and they can overlap provided the first tie rod in the segment passes the existing wall.



T05.069.01

Note:
In order to guarantee a sealed connection of the segments to the existing set, tightening in recommended with a waler on both sides.

If there is a right-angled connection to existing walls, both the inside and outside formwork is placed directly against the existing wall.



T05.069.02

Note:
On the same side that needs the fillers, a wider filler may be required at the first joint after the connection.

Girder cover

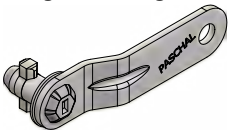
T05.098.01

Girder cover T
Art.No.: 182.000.0283
Weight: 0.18 kg

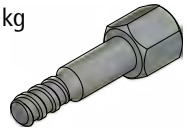
The top of the trapezoid girder can be closed with the girder cover T.
For example, this prevents concrete entering the beam during concrete-pouring. This would result in the trapezoid girder have to be loosened from the plywood for cleaning purposes.

Compatibility

Connecting bolts
Art.No.: 189.001.0100
Weight: 0.19 kg

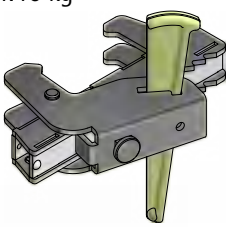


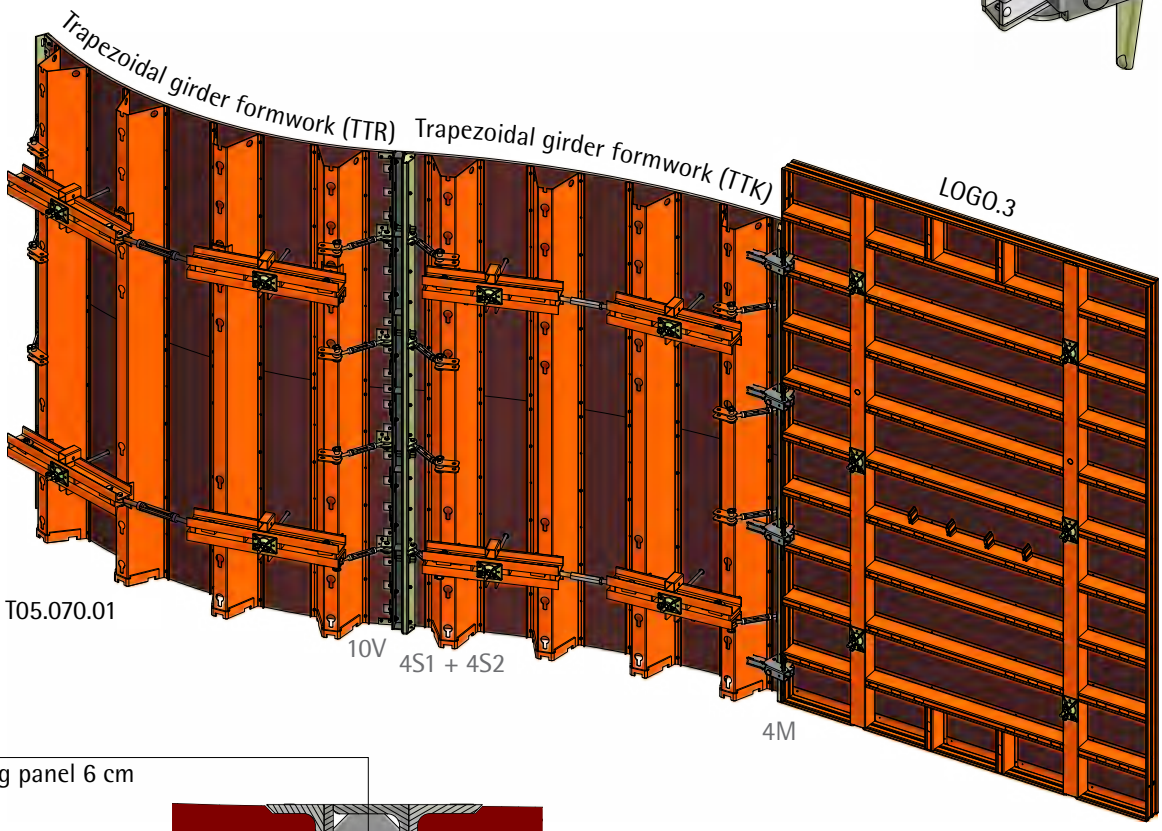
TTK screw Connecting panel and filler piece
Art.No.: 182.008.0004
Weight: 0.32 kg

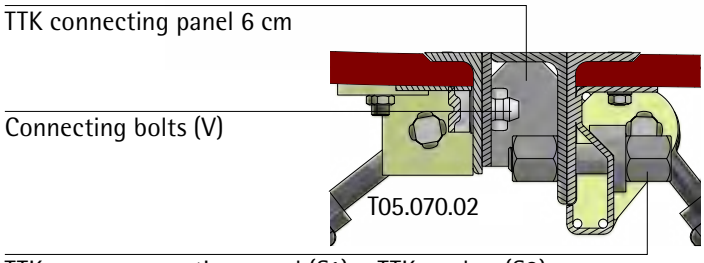


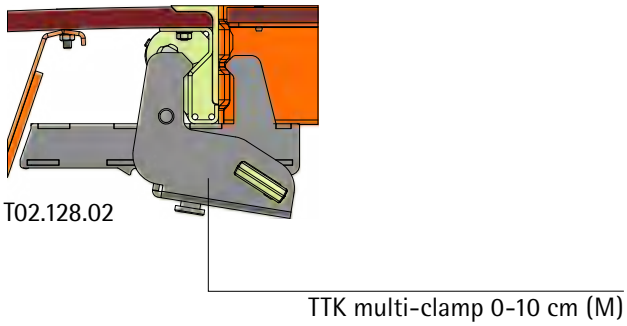
TTK washer
Art.No.: 182.008.0006
Weight: 0.12 kg

TTK multi-clamp 0-10 cm
Art.No.: 182.008.0001
Weight: 4.40 kg



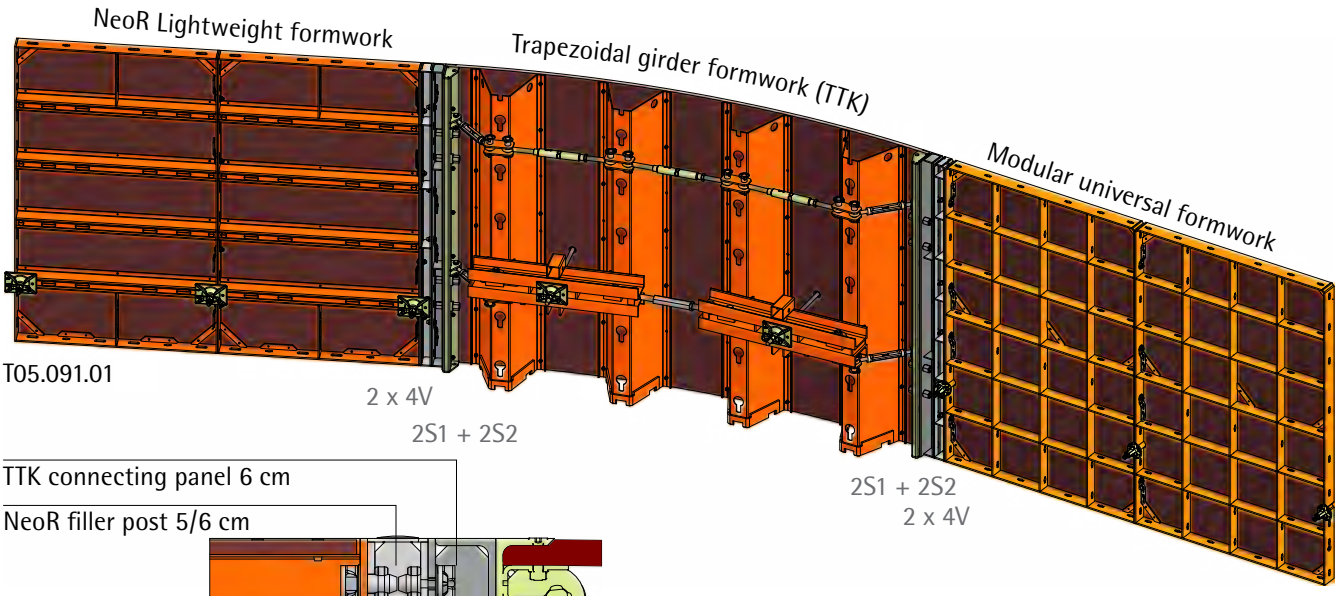




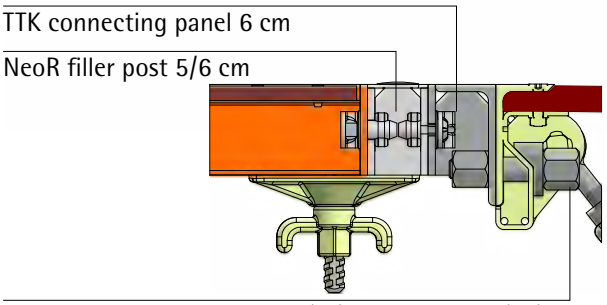


The segments of the trapezoidal girder circular formwork TTK can be connected with all other PASCHAL systems if required, whether in straight or precurved form. The element joints are made either directly or with a connecting panel, where the TTK multi-clamps 0-10 cm, the connecting bolts or TTK screw connecting panels are sufficient as connecting pieces.

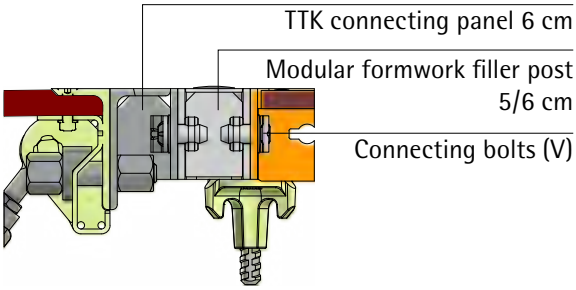
Compatibility

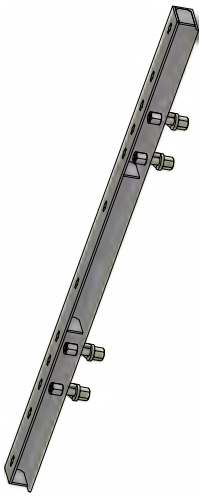


T05.091.01



T05.091.02



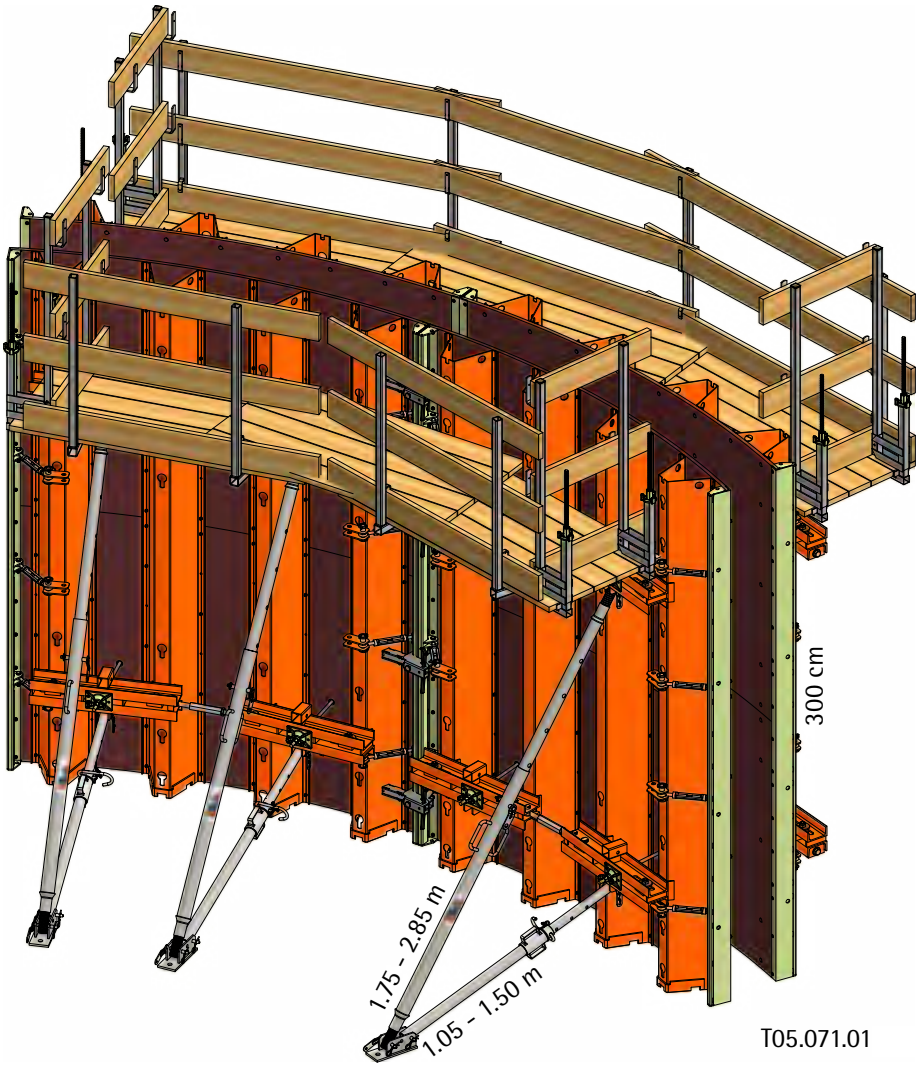


TTK connecting panels
with TTK screws connecting panel and TTK washers

At the transfer from the trapezoidal girder formwork TTK to NeoR Lightweight formwork or the modular universal formwork, initially a TTK connecting panel has to be included in the plan at the joint. In addition, a filler post NeoR or modular formwork is required alongside so that all connecting bolts as connecting pieces fit and the required tie points can be set.

Occupational safety, platforms, supports

Platform bracket cpl. 90 cm pluggable cpl. T
Art.No.: 182.000.0053
Weight: 11.10 kg



T05.071.01

For the occupational safety requirements when working with formwork systems, there is a large number of provisions and guidelines from lawmakers, professional organisations and liability insurance organisations. The latest versions of these provisions must always be complied with. Important points here are:

- Workplaces at the formwork
- Fall protection
- Absorption and deflection of wind loads

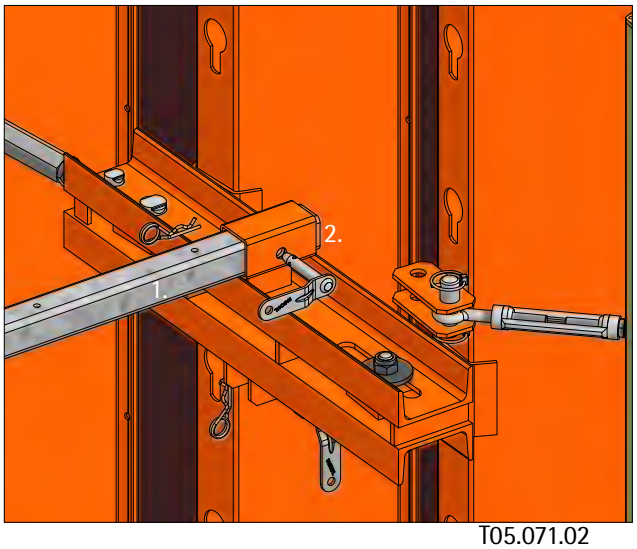
For the erection of workplaces at and on the formwork, platform brackets cpl. are fastened to the segments, which are then completed with an on site board and a railing post (lateral protection).

- The provisions of DIN EN 12811-1 apply.
- The area-related weighting weight is 2.0 kN/m² (scaffolding group 3).
- Depending on the board level, a platform bracket cpl. has to be fitted to each waler.

Alternative:

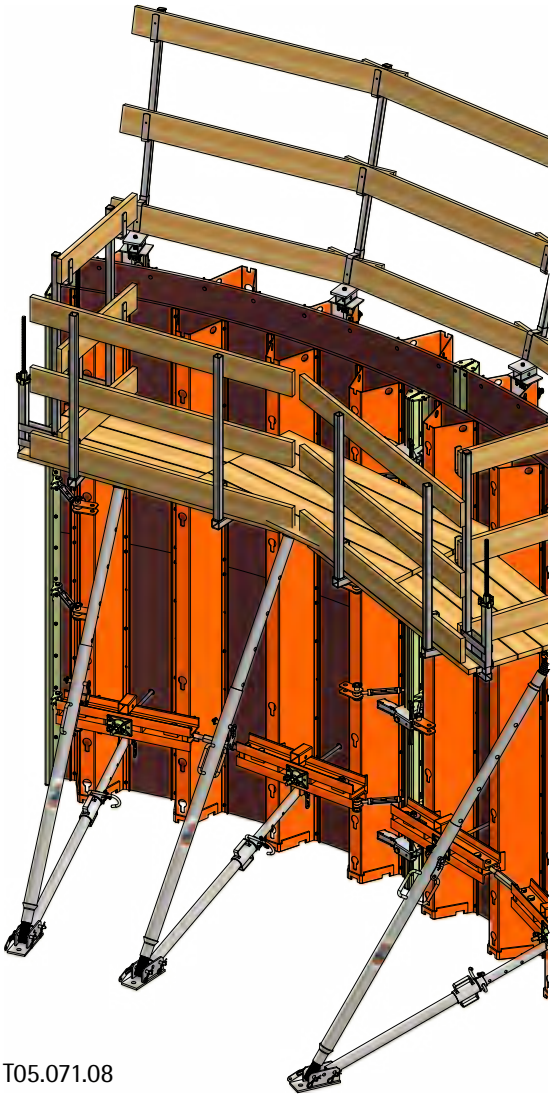
- Multip platform see 62 et seq.

1. Insert platform bracket cpl. in the tube profile of the waler.
2. Securing the platform bracket cpl. with security bolts and clip connectors.



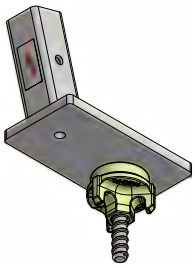
T05.071.02

Occupational safety, platforms

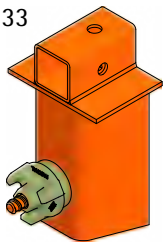


T05.071.08

LOGO support cpl. Secuset
Art.No.: 189.000.0001
Weight: 3.10 kg

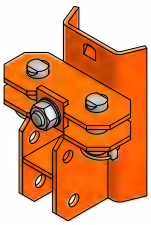


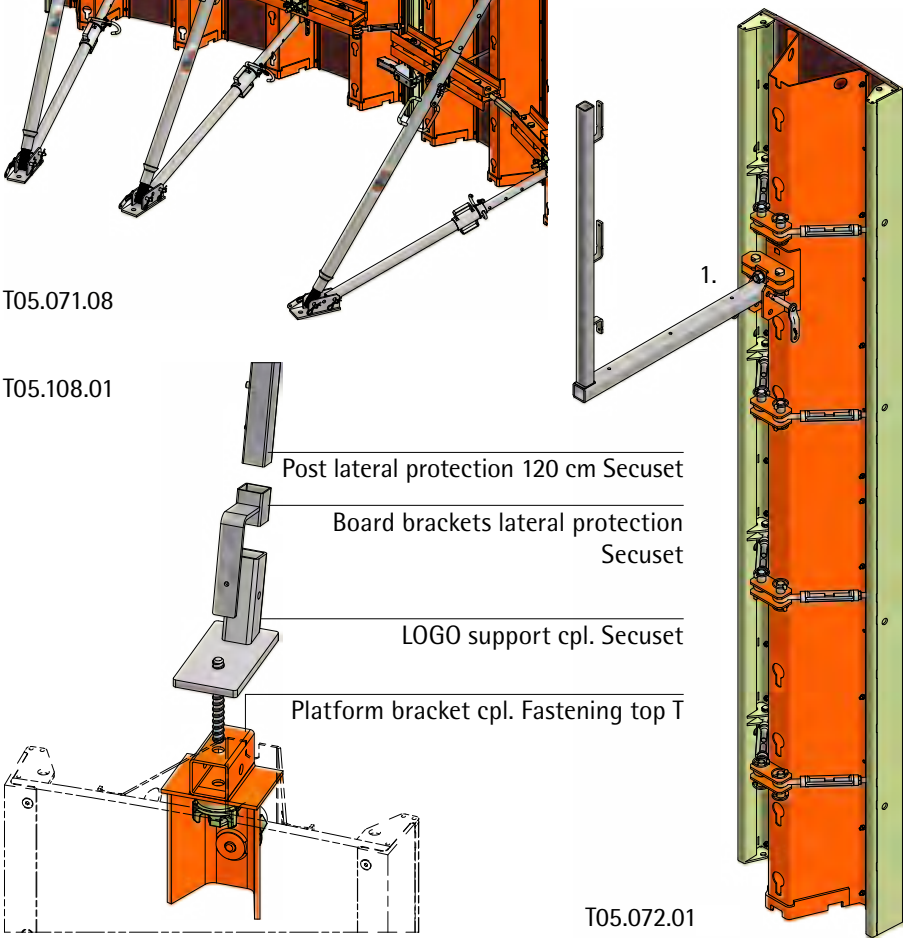
Platform bracket cpl. Fastening top T
Art.No.: 182.000.0133
Weight: 5.50 kg



When using supporting jacks with single-sided formworks, the platform bracket cpl. cannot be installed as described on page 58 because the die supporting jacks have to be arranged on the same axes.
With the platform bracket cpl. at the top it is possible to secure all platform brackets cpl. To the trapezoid girders. In narrow spaces, fall protection can be fitted on the opposing side above the platform bracket cpl. Fastening, as an alternative to the platform brackets cpl. In addition, a LOGO support Secuset can be screwed on, the lateral protection posts inserted with board holders and three boards of size 3x15 cm.

2-hole turnbuckle coupling fitted T
Art.No.: 182.000.0055
Weight: 5.40 kg





T05.108.01

T05.072.01

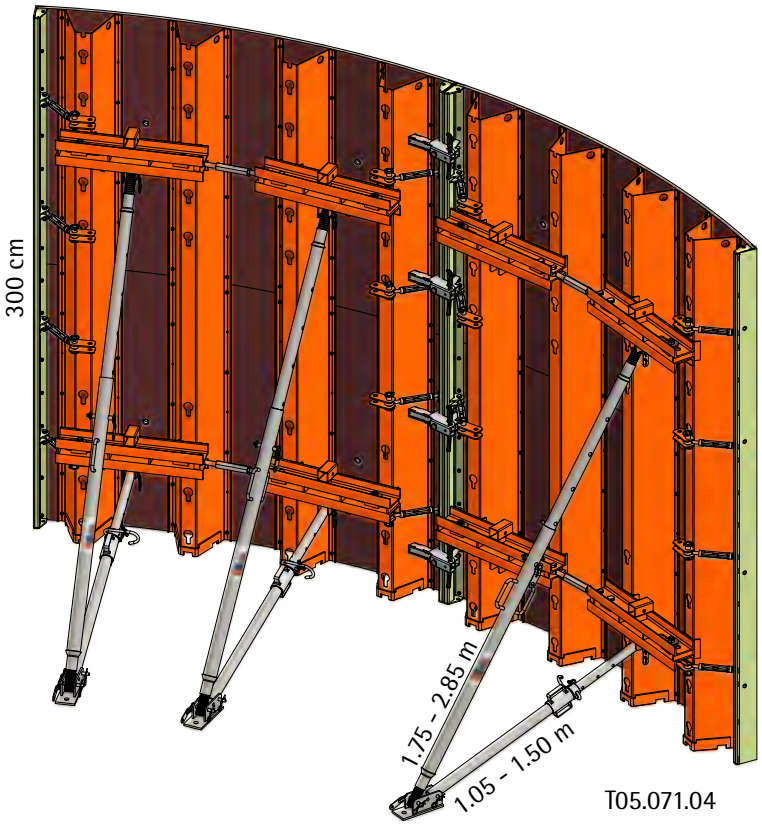
The single girder segments do not have walers. To fasten the platform bracket cpl., the 2-hole turnbuckle coupling is needed here, to which an adjustable prop can also be mounted.

1. Fit the 2-hole turnbuckle coupling with the integrated pan head screw in the keyhole in the trapezoid girder.
2. Insert platform bracket cpl. into the opening and secure with the security bolt.

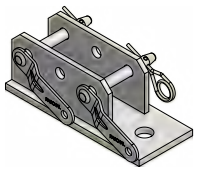
Occupational safety, supports

Adjustable props are used for the vertical alignment of the formwork and the defection of wind forces into the installation base of the formwork.
These have to be selected in four different lengths depending on the formwork height.
The two numbers in the article description specify the basic length and the maximum extension size.
For the rough setting, internal and external tubes are pushed into the modular formwork to 20 cm and then secured with a security bolt.
The precise setting is then performed by turning the outer tube using the integrated handles.

The connection to the formwork is with security bolts directly at the integrated walers.
On the installation surface, base plates with 3-holes or a
panel end joint is screws with the assembly screw 16x130 in the outer area and connected to the adjustable props.

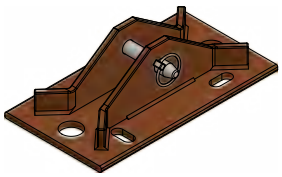


Base plate 3-hole cpl.
Art. No.: 189.005.0023
Weight: 4.20 kg



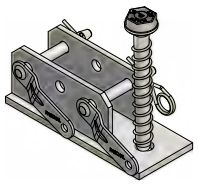
For adjustable props with extension length of up to 620 cm, the 3-hole base plate is used, which can hold two adjustable props. It must be noted that the outside tube of the adjustable prop always connects to the base plate, not the formwork.

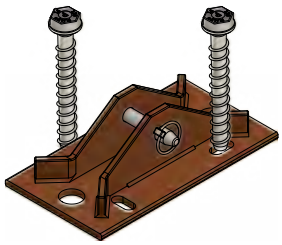
Panel end joint BKS fitted
Art. No.: 189.005.0033
Weight: 7.20 kg



For the adjustable prop 620 - 1000 cm, both inner tubes must be extended equally. The end with the right thread (black) is secured in the panel end joint on the installation surface, the end with the left thread (galvanized) with the suspending piece for props on the formwork.

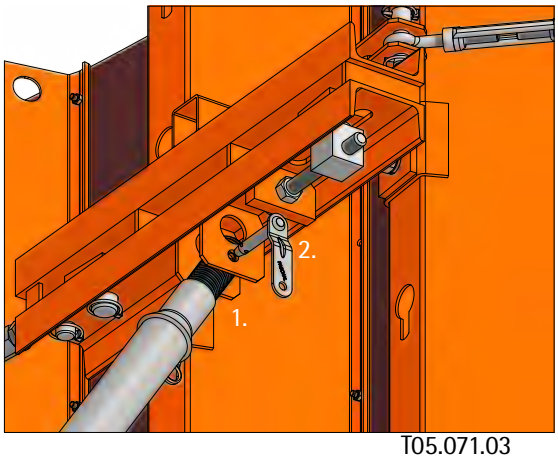
Assembly screw 16x130-10 pcs
Art.No.: 935.000.0016
Weight: 2.10 kg



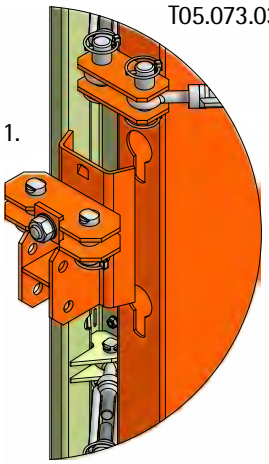


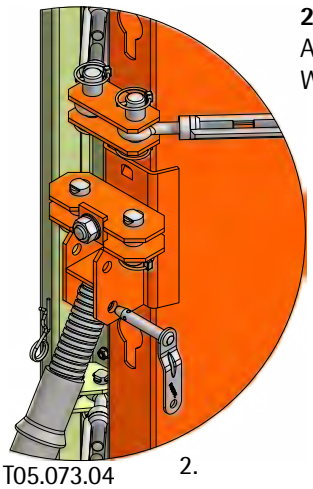
1. Place adjustable prop between the steel lashes of the waler.

2. Securing the adjustable prop with security bolts and clip connectors.

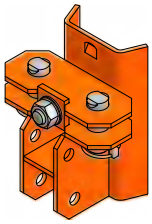


Occupational safety, supports

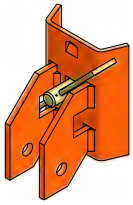


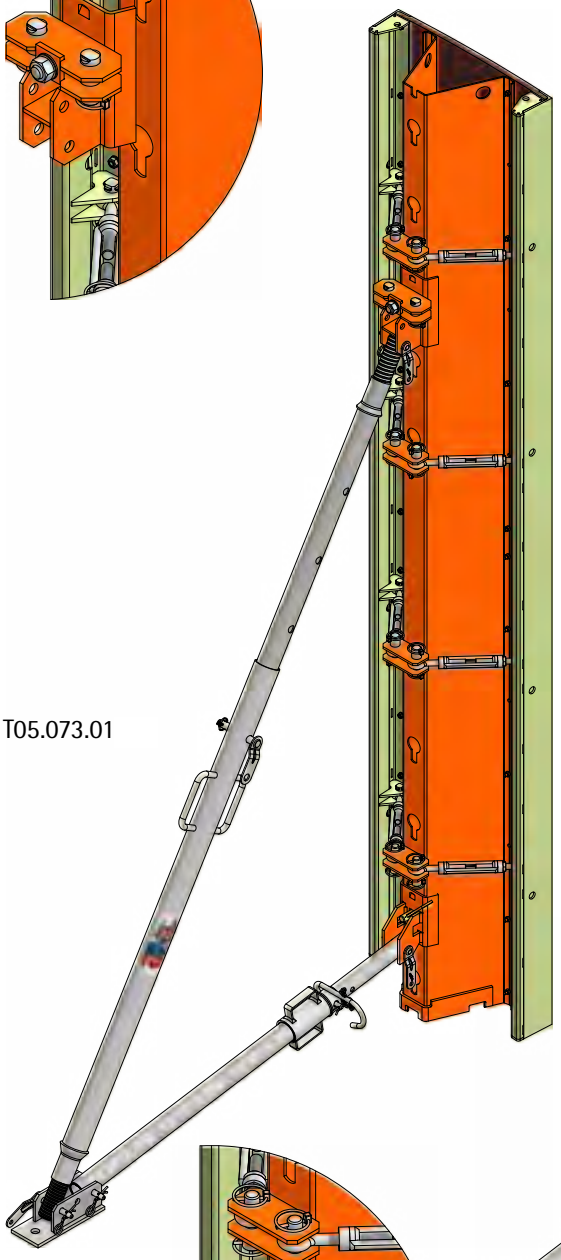


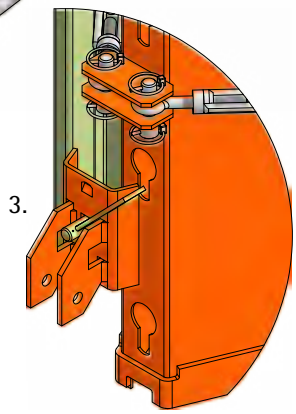
2-hole turnbuckle coupling fitted T
Art.No.: 182.000.0055
Weight: 5.40 kg

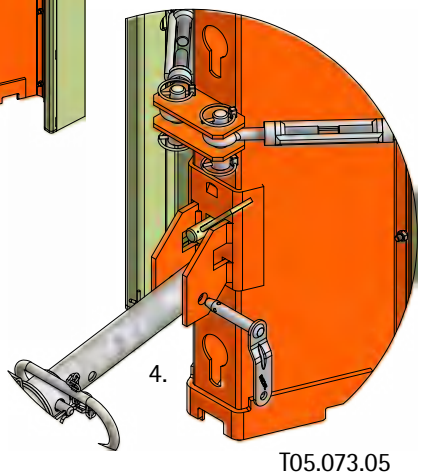


Suspending piece for props T
Art.No.: 182.000.0096
Weight: 3.00 kg









The single girder segments do not have walers. To fasten the adjustable props, the 2-hole turnbuckle coupling or the suspending piece for props T is needed here.

In addition, a platform bracket cpl. Can be fastened to the 2-hole turnbuckle coupling.

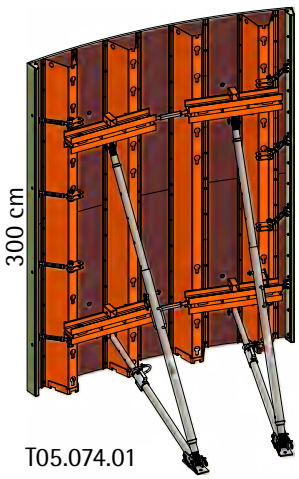
1. Fit the 2-hole turnbuckle coupling with the integrated pan head screw in the keyhole in the trapezoid girder.

2. Insert adjustable prop into the opening and secure with the security bolt.

3. Fit suspending piece for props T with the integrated pan head screw + wedge in the keyhole in the trapezoid girder.

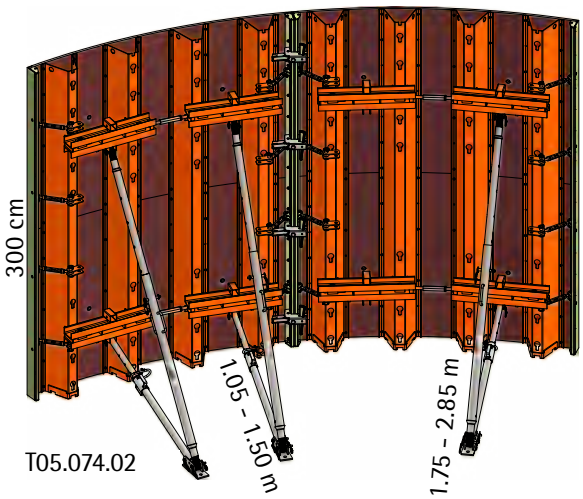
4. Insert adjustable prop into the opening and secure with the security bolt.

Occupational safety, supports

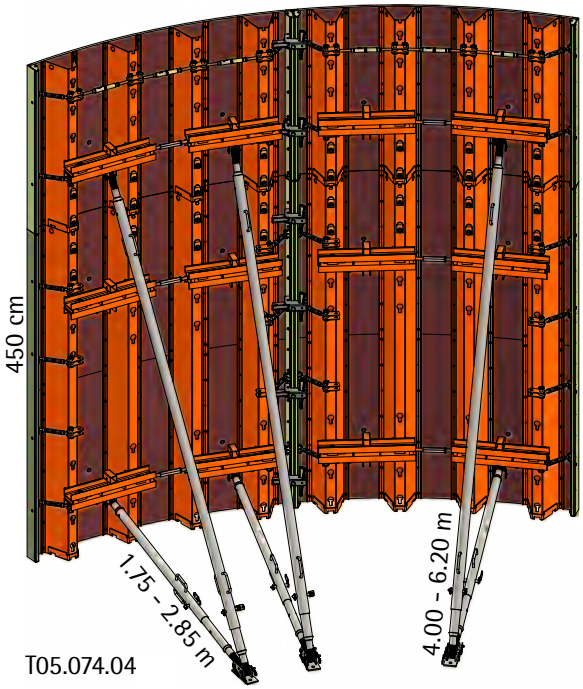


T05.074.01

1. Position the first segment and support with an adjustable prop on the left and right edge.
2. Fit the second segment to the standing part using the required connecting pieces.
3. Fit another adjustable prop outside on the second segment.
4. Repeat this process for each additional segment.

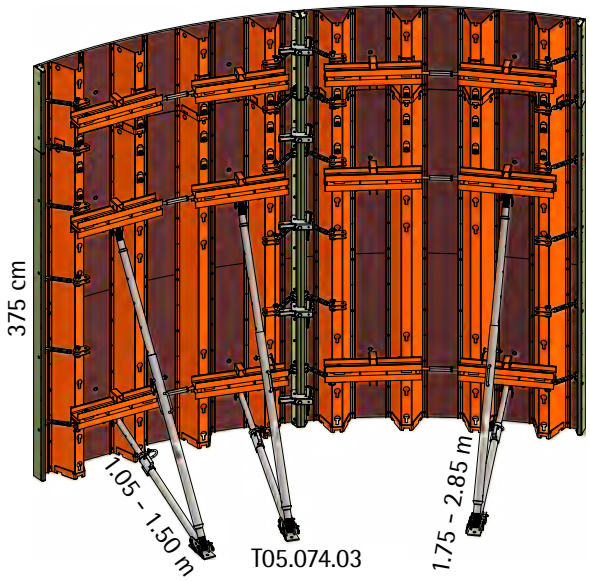


T05.074.02



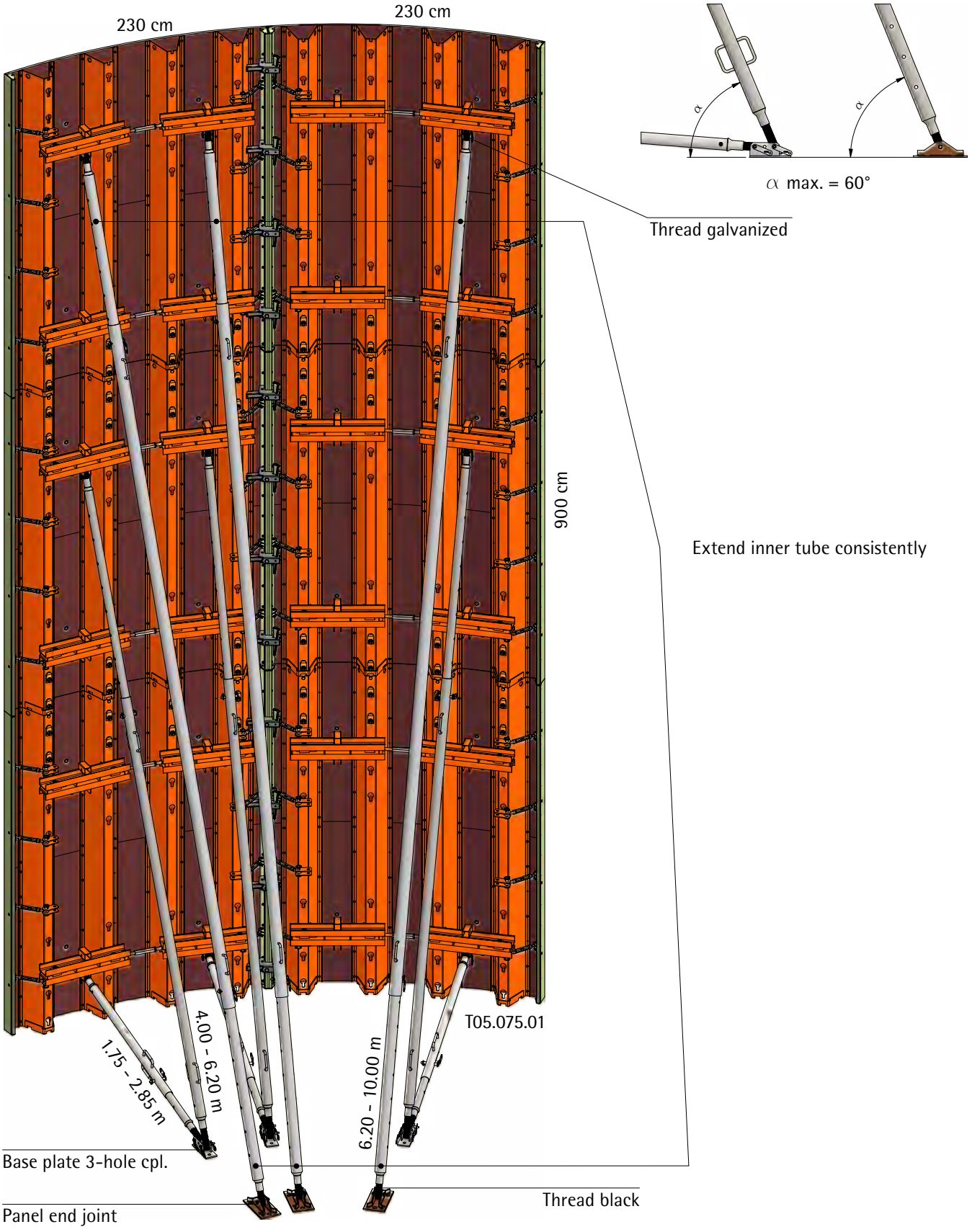
T05.074.04

	Extension length L [m]	Approved compressive force D [kN]	Approved tensile force Z [kN]
Adjustable prop	L	D	kN
175-285 cm (18.2 kg)	1.75	36.00	36.00
	2.00	36.00	
	2.60	36.00	
	2.85	27.50	
255-405 cm (33.5 kg)	2.55	40.00	40.00
	2.90	35.80	
	3.30	27.10	
	3.70	20.50	
	4.05	16.50	
400-620 cm (54.5 kg)	4.00	36.90	
	4.50	29.30	
	5.00	22.90	
	5.50	17.80	
	6.00	13.80	
	6.20	12.60	
620 -1000 cm (110.0 kg)	6.20	30.00	
	6.50	27.60	
	7.00	24.00	
	7.50	20.80	
	8.00	18.10	
	8.50	15.90	
	9.00	14.10	
	9.50	12.80	
	10.00	12.00	



T05.074.03

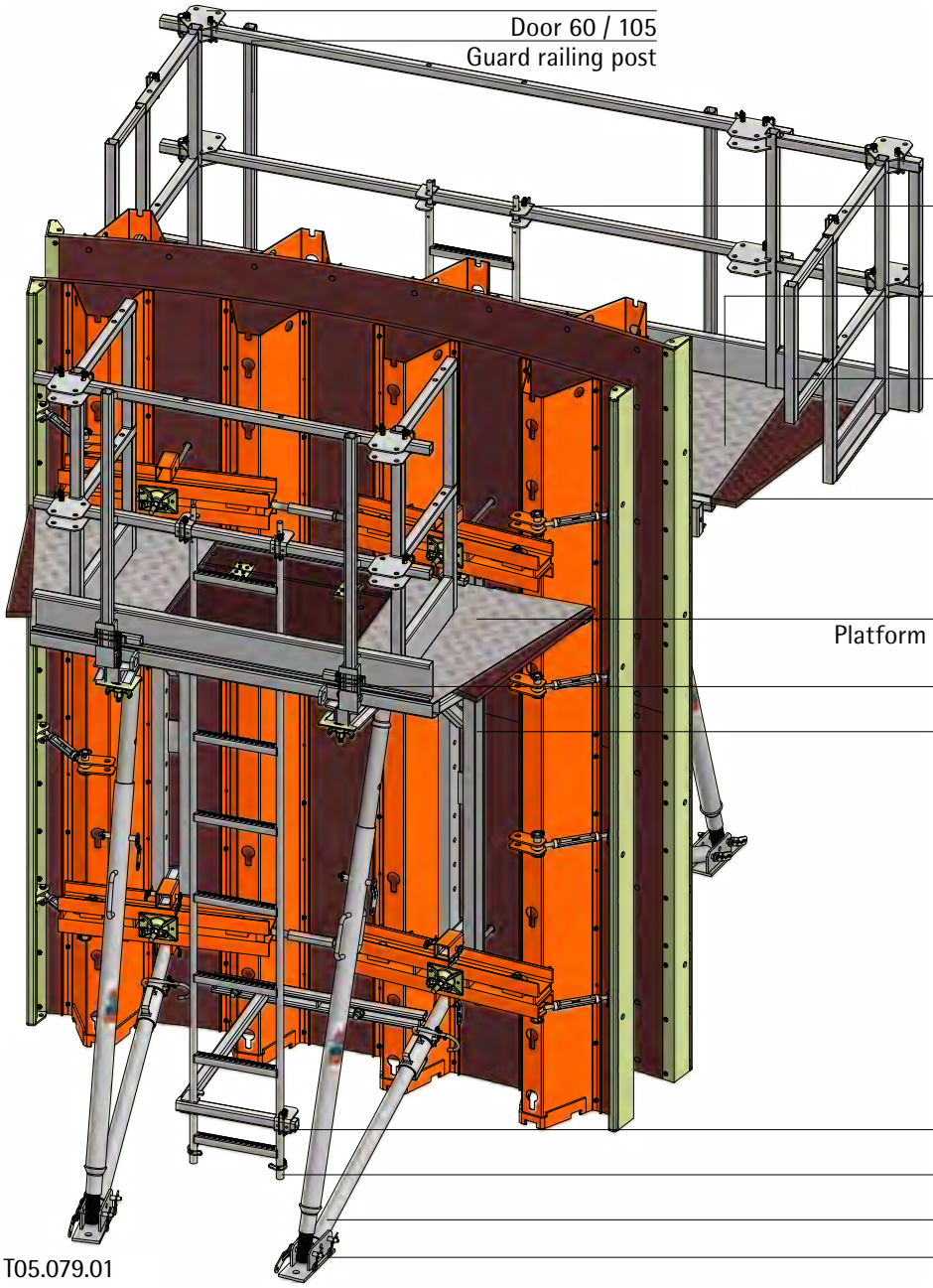
Occupational safety, supports



Multip Multi-functional working platform

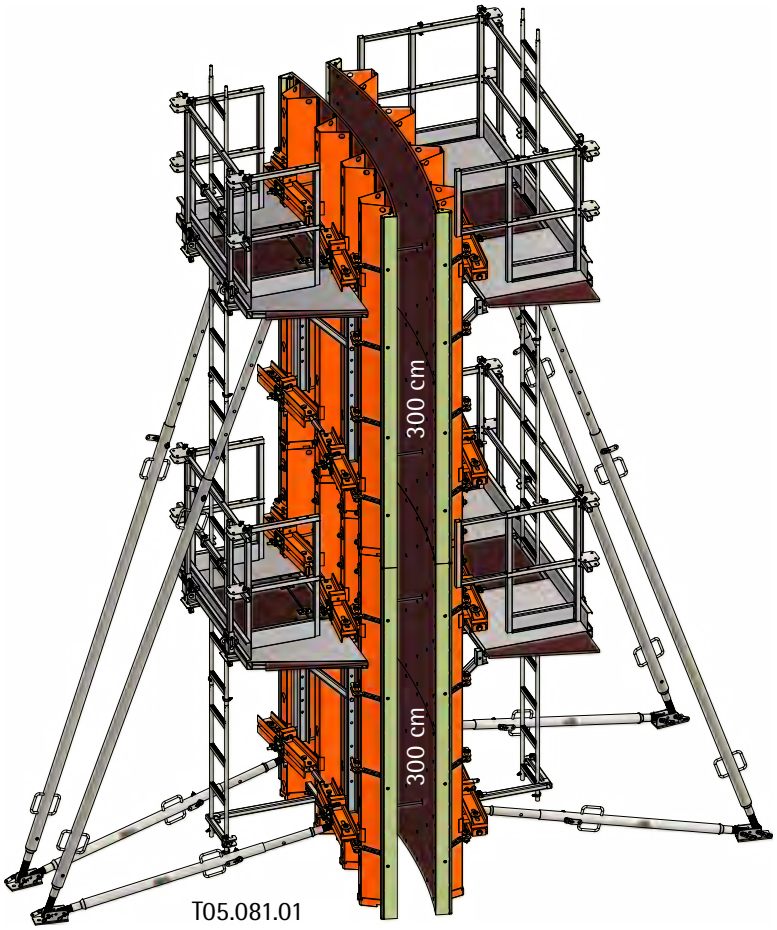
With regard to occupational safety when working with formwork systems, there must be safe workplaces. This is also the case, inter alia, for operating the accessories when erecting and dismantling the formwork as well as when pouring and compressing the concrete. Safe access to the individual working levels must also be ensured.
The multi-functional working platform Multip for the systems TTR/TTK/TTS, which like the formwork systems used can also be adjusted to different diameters, fulfils these requirements.

- Boards and lateral protection made from steel, one floorboard each for the inside and outside formwork.
- Extendable boards for adjusting to different lengths with difference diameters.
- Integrated doors on the ends.
- Ladder ascent through traps in the platform levels.
- For storage and transport, the load-deflecting connecting pieces can remained folded to the segments.



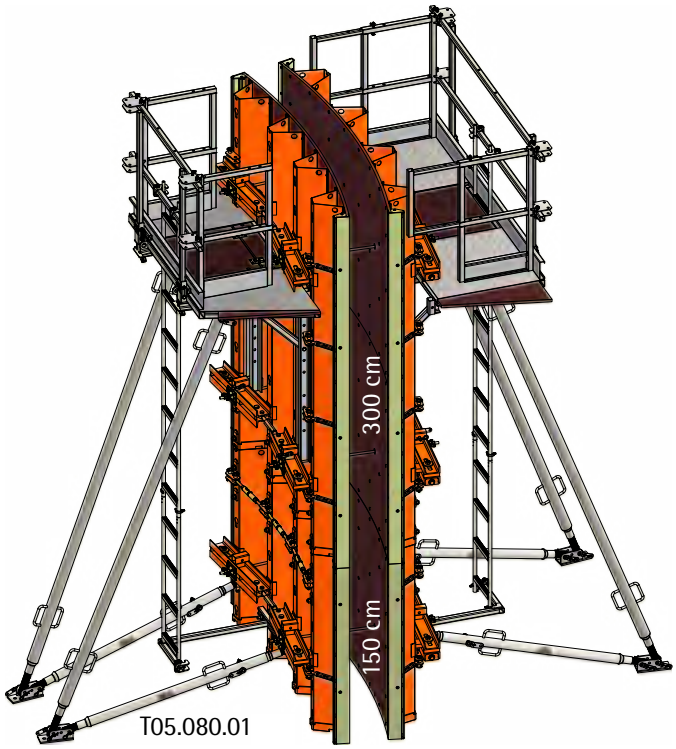
T05.079.01

Multip Multi-functional working platform



T05.081.01

For large formwork heights, the individual levels are extended and supported together with the TTK segments.
The formwork with platforms and the required adjustable props can be completely pre-mounted for this.



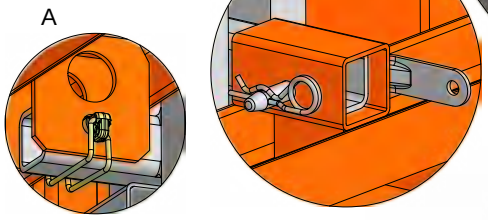
T05.080.01

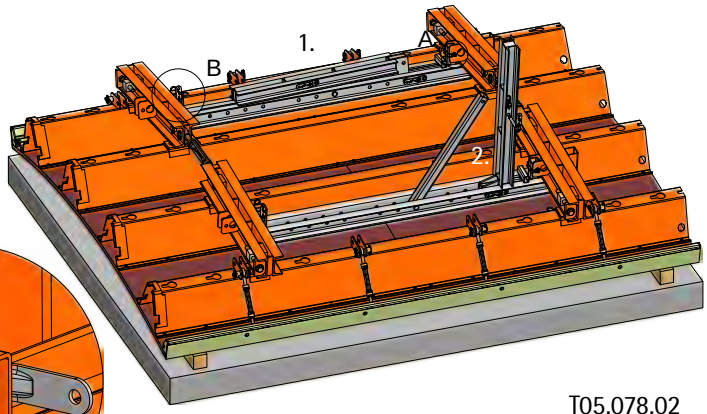
If the segment heights 150 cm, 75 cm or 37.5 cm are needed for certain formwork heights, these are usually used as lower layer segments, as the connecting pieces only fit heights to 300 cm.

Multip Multi-functional working platform

Basic assembly outside segment:

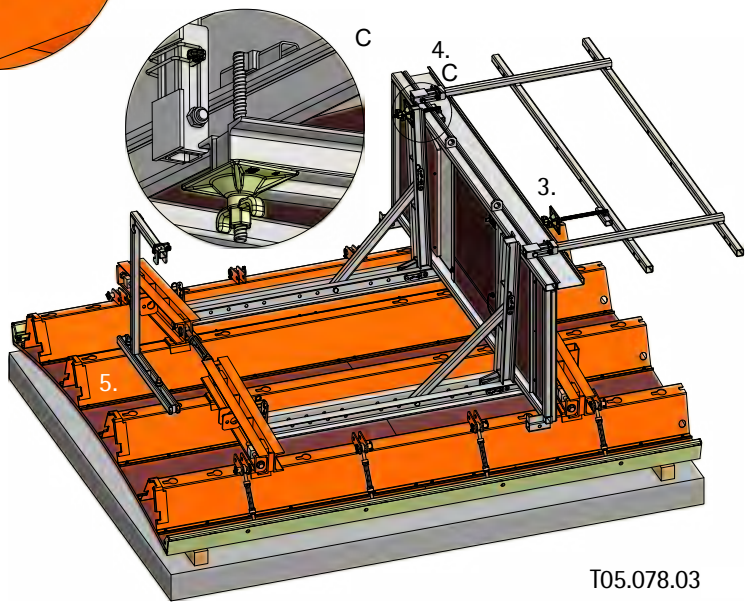
1. Fit connecting pieces in the upper waler in the double axis for the adjustable prop, in the lower waler in the square tube for the platform bracket cpl.
2. Fold up connecting piece and secure with the diagonals and security bolts.





T05.078.02

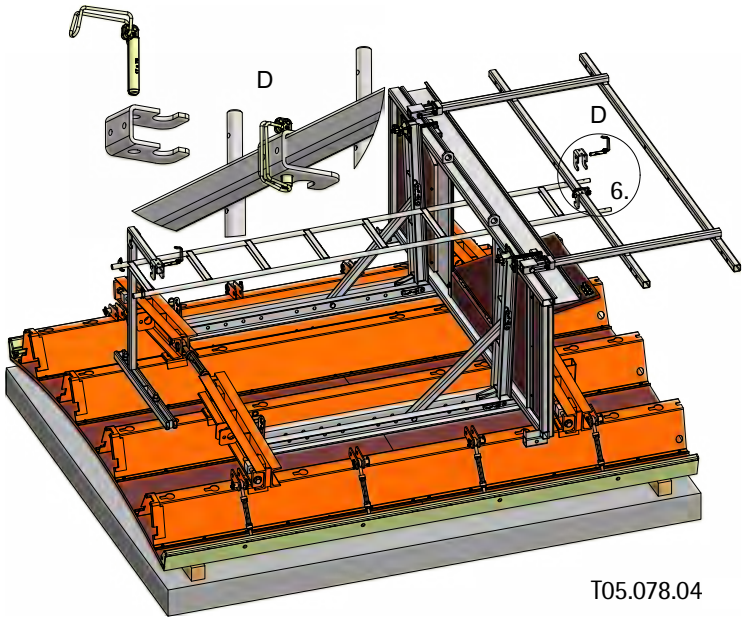
3. Fit platform level for outside formwork.
4. Platform level with fastening Clamp platform level to both connecting pieces.
5. Fix ladder fastening in the second keyhole from below.



T05.078.03

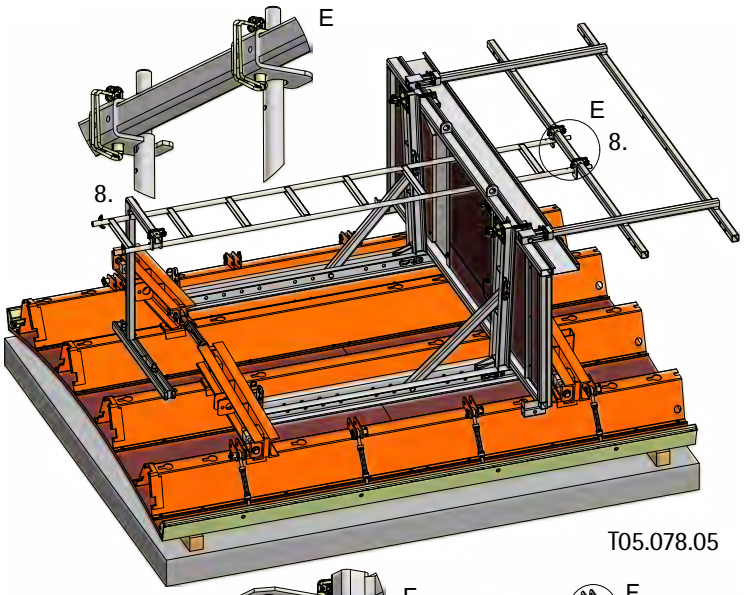
Platform level 85 x 238 cm outside
Art. No.: 182.000.0271
Weight: 133.00 kg

6. Fit ladder fastening guard railing post.



T05.078.04

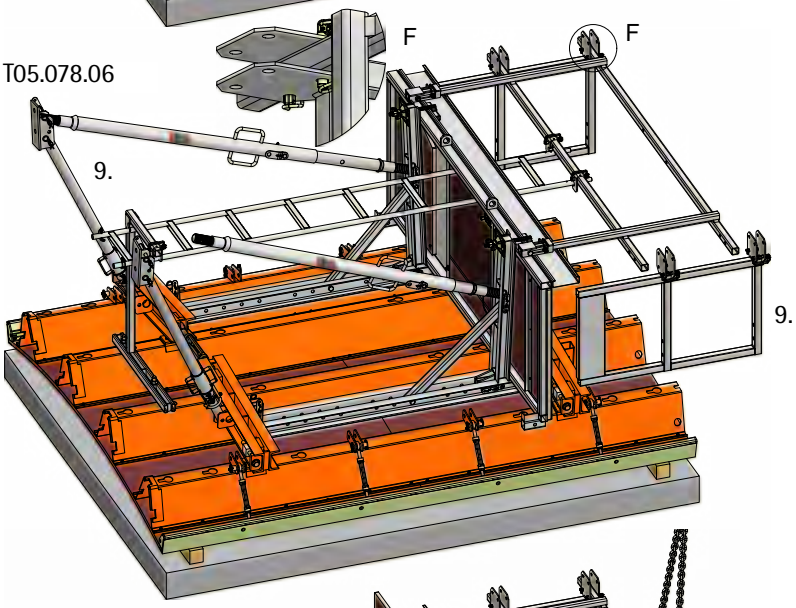
Multip Multi-functional working platform



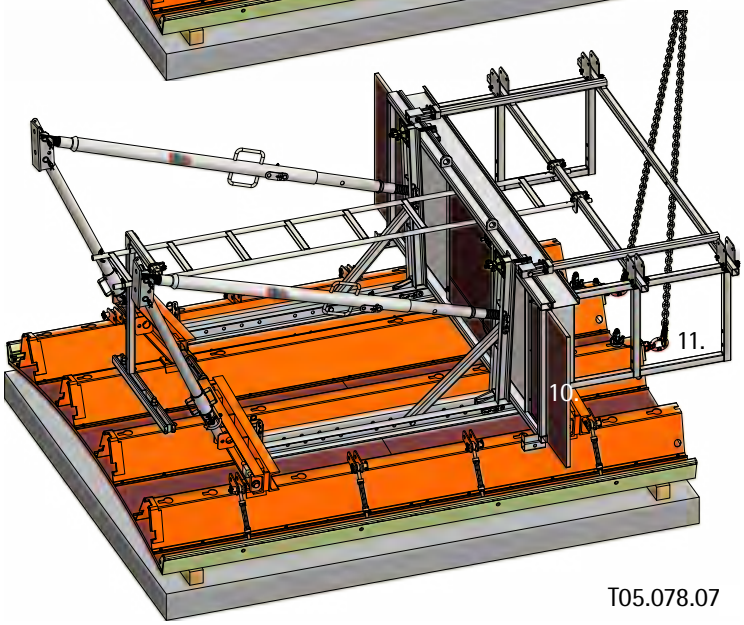
T05.078.05

7. Suspend ladder from board.
8. Fasten the ladder at the top to the ladder fastening guard railing post and at the bottom to the ladder fastening.

T05.078.06



9. Fit doors and adjustable props on both sides.



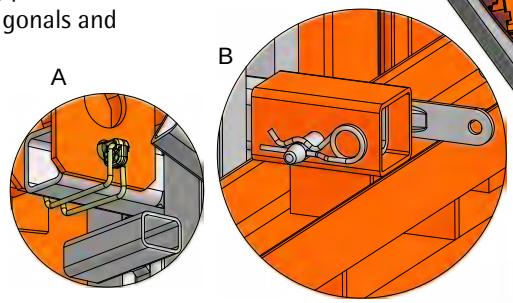
T05.078.07

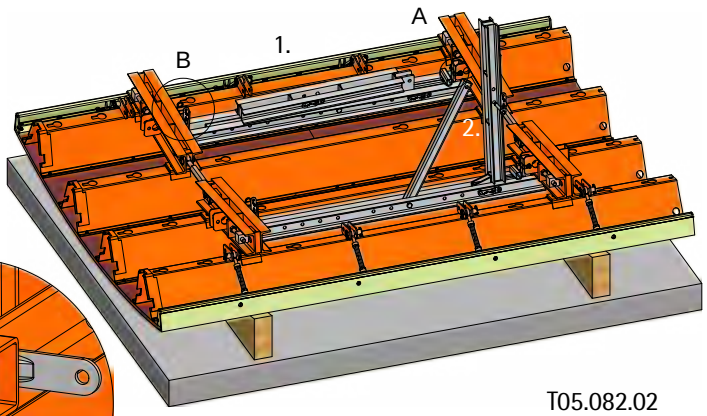
10. Pull integrated plywood panels and thereby adjust the board to the respective diameter.
11. Attach crane lifting eye KBT for offsetting the formwork.

Multip Multi-functional working platform

Basic assembly inside segment:

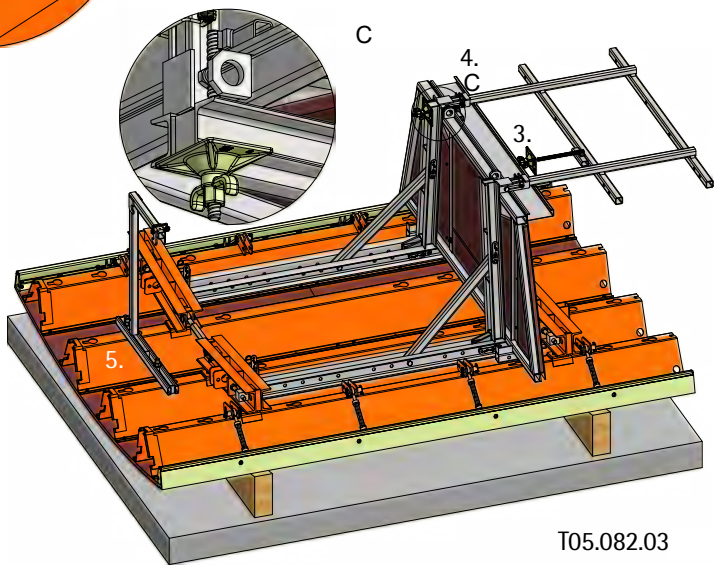
1. Fit connecting pieces in the upper waler in the double axis for the adjustable prop, in the lower waler in the square tube for the platform bracket cpl.
2. Fold up connecting piece and secure with the diagonals and security bolts.





T05.082.02

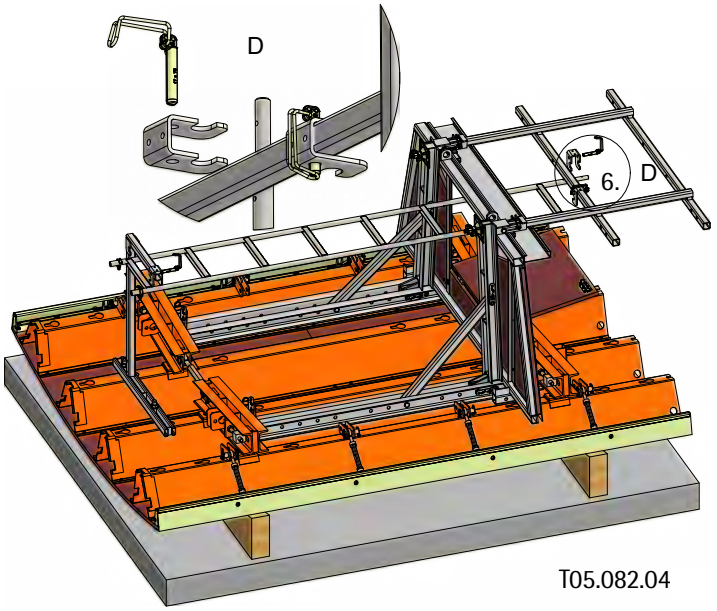
3. Fit platform level for outside formwork.
4. Platform level with fastening Clamp platform level to both connecting pieces.
5. Fix ladder fastening in the second keyhole from below.



T05.082.03

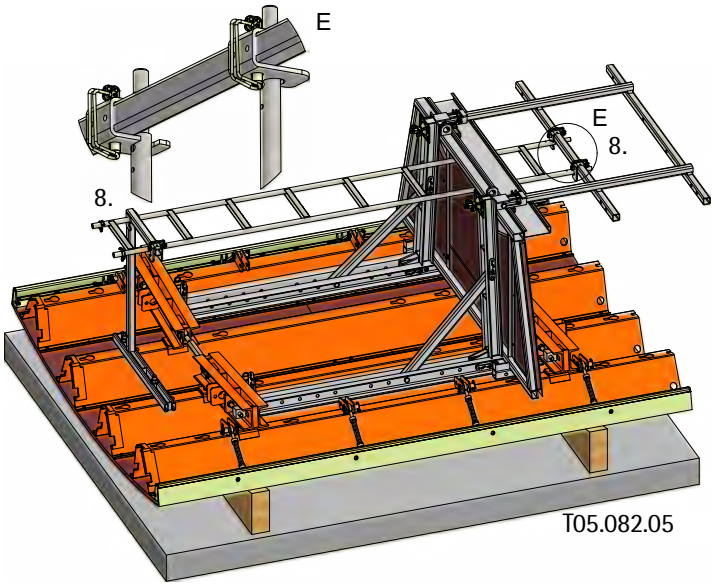
Floorboard 85 x 210 cm inside
Art. No.: 182.000.0272
Weight: 129.00 kg

6. Fit ladder fastening guard railing post.



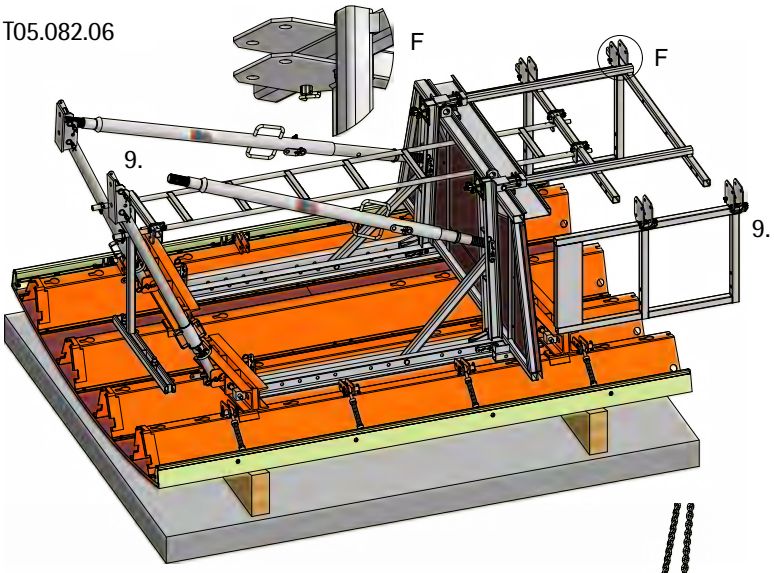
T05.082.04

Multip Multi-functional working platform

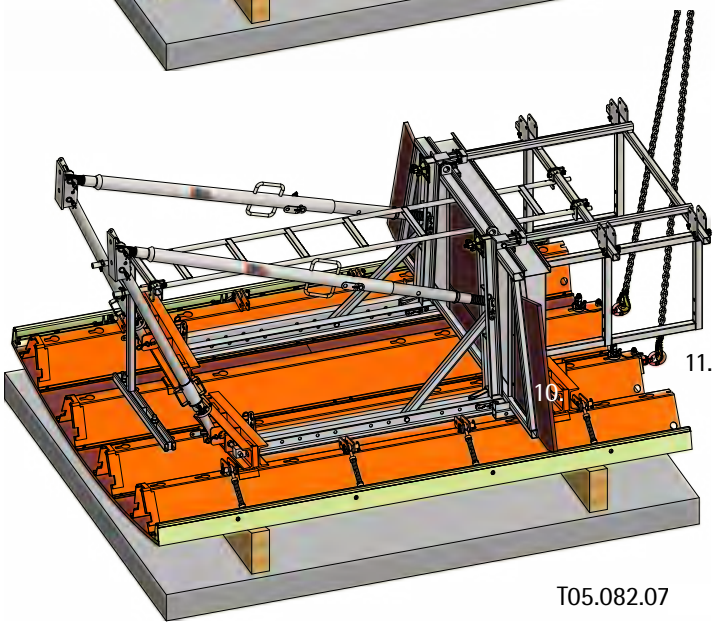


7. Suspend ladder from board.
8. Fasten the ladder at the top to the ladder fastening guard railing post and at the bottom to the ladder fastening.

T05.082.06



9. Fit doors and adjustable props on both sides.

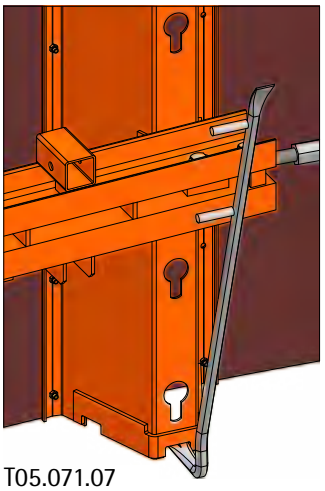


10. Pull integrated plywood panels and thereby adjust the board to the respective diameter.
11. Attach crane lifting eye KBT for offsetting the formwork.

Horizontal alignment

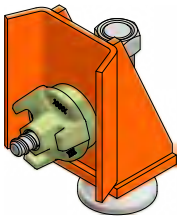
Assembly and dismantling lever L/A
Art.No.: 183.500.0014
Weight: 3.10 kg

So that the segments can be aligned when positioning with standard assembly tools, all trapezoid girders are fitted with reinforced lifting edges on the bottom.

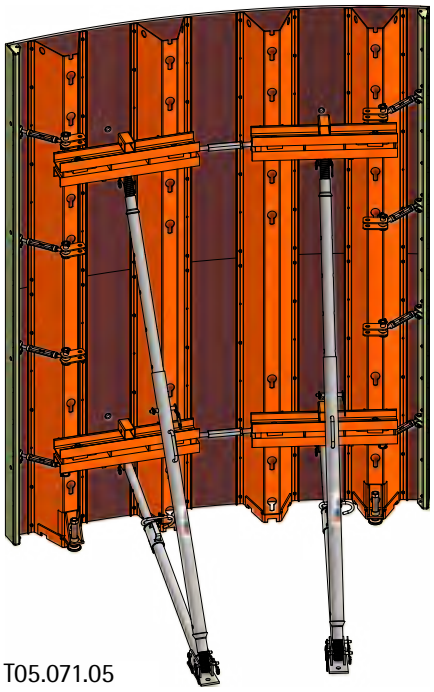


T05.071.07

Height adjustable spindle fitted T
Art.No.: 182.000.0219
Weight: 2.90 kg



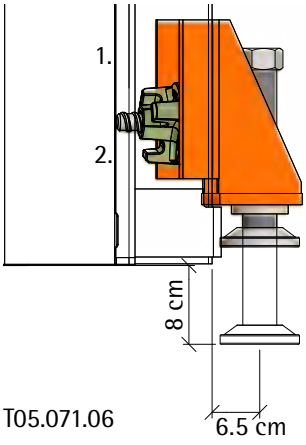
Admissible capacity: 1500 kg



T05.071.05

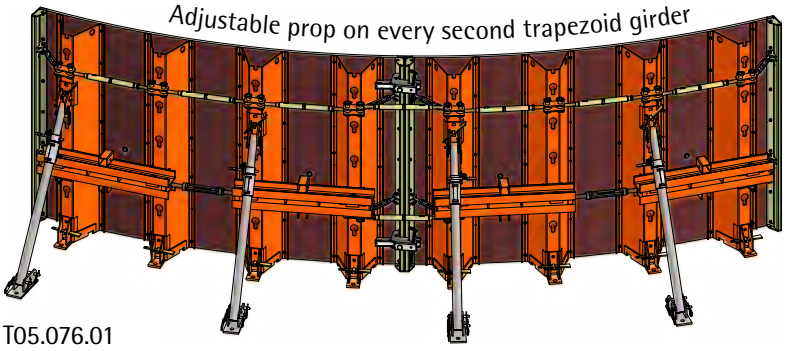
With the height-adjustable spindle as a system part, individual segments can be aligned horizontally, e.g. on uneven installation surfaces. To this end, a height-adjustable spindle is fitted on the left and right trapezoid girder. Turning the spindle raises or lowers the segment.

1. Place height-adjustable spindle from outside onto the horizontal segment.
2. Screw on the collar nut from inside and securely tighten.



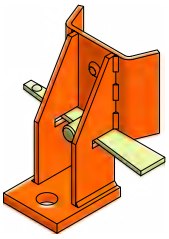
T05.071.06

Segment holder

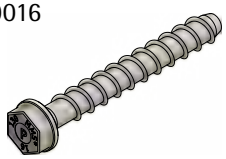


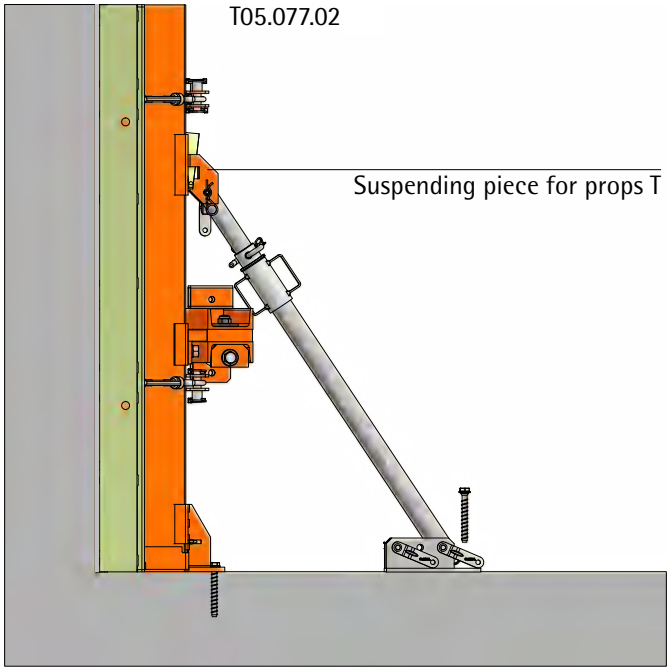
T05.076.01

Segment holder with wedge fitted T
Art.No.: 182.000.0284
Weight: 2.50 kg



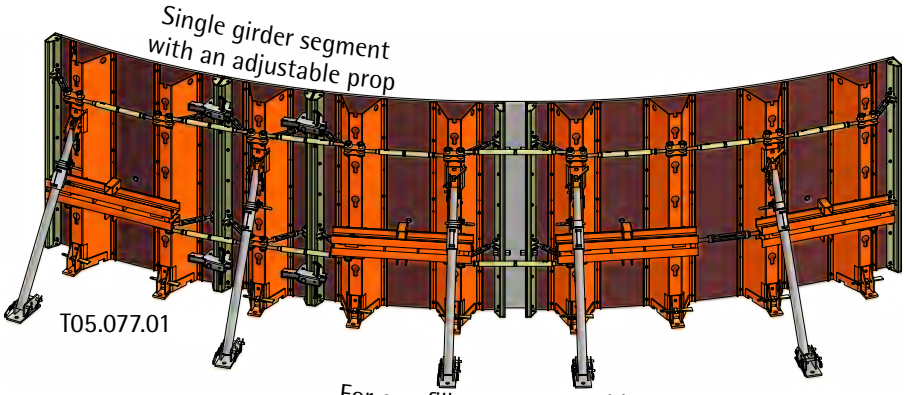
Assembly screw 16x130-10 pcs
Art.No.: 935.000.0016
Weight: 2.10 kg





T05.077.02

For small concrete heights and single-part formwork (outside or inside), formwork heights up to 1.50 m, some supporting jacks can be omitted.
The existing fresh-concrete pressure is transferred through the formwork into the segment holders.
These in turn are connected to all trapezoid girders and are screwed into the part of the building below with assembly screws 16x130. At the top, the segments are supported with adjustable props.
If necessary, please contact the manufacturer's application engineering department.
The segment holder also serves to secure the position of segments if adjustable props are not used or if there is no space for them.



T05.077.01

For one filler, one adjustable prop
on the right and left of the joint

Supporting jacks, single-sided forms

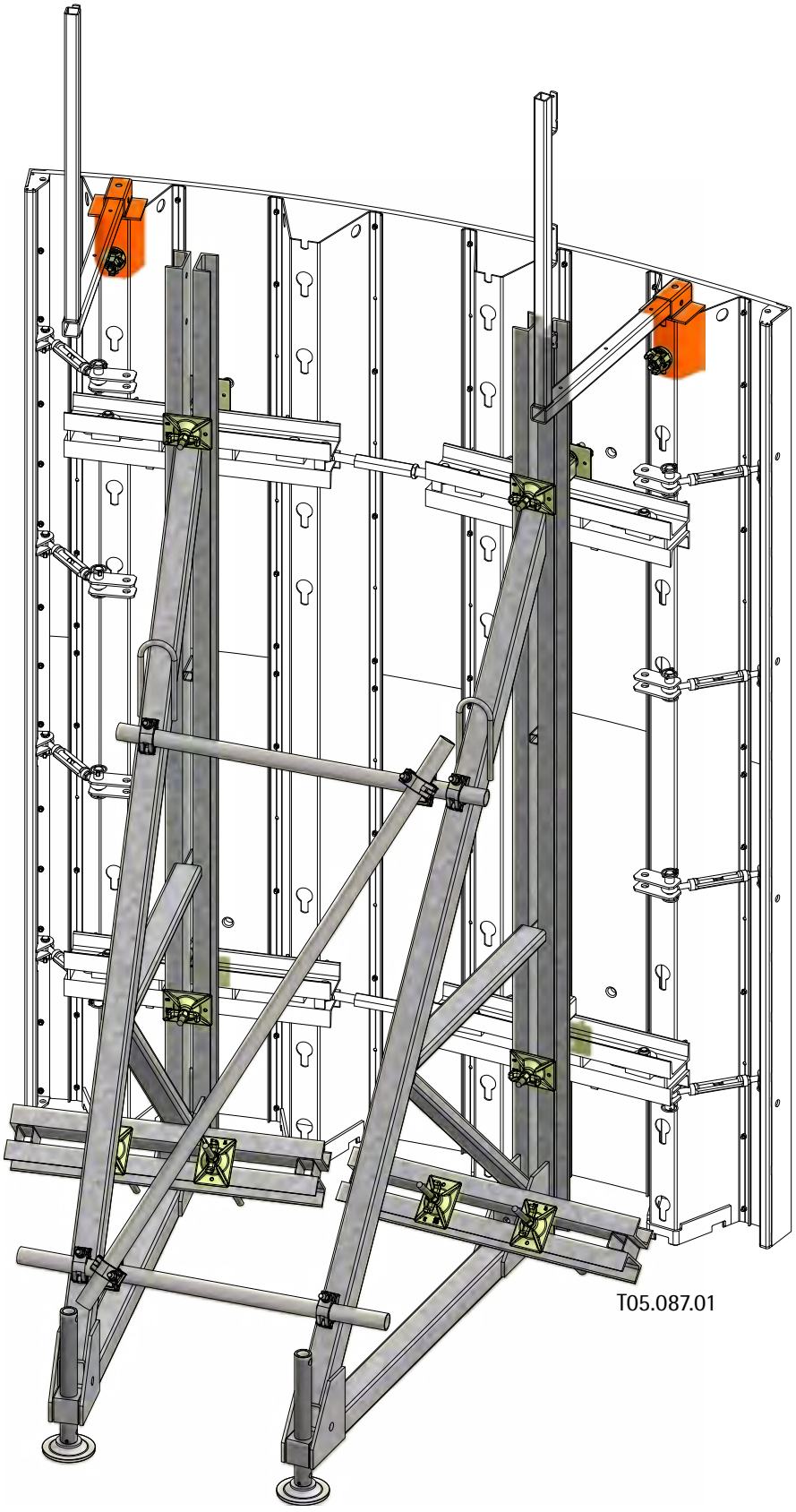
The TTK segments can be used together with supporting jacks as single-sided formwork.
If it is not possible to back-anchor the single-sided formwork into an existing part of the building or structure, supporting jacks are positioned in front of the formwork elements. These transfer the forces from the fresh-concrete pressure through anchors into the existing part of the building.

Note:
To transfer the forces, anchors already have to be concreted into the base plate (foundation + base plate).

Note:
To hold the platform bracket cpl. For this use, the platform bracket fastening is required at the time, as the supporting jack blocks the usual fastening of the waler.

Attention:
As this is a construction status, the responsible structural engineer has to be asked about the required connection depths of the anchors and about any additional reinforcement for deflecting forces.

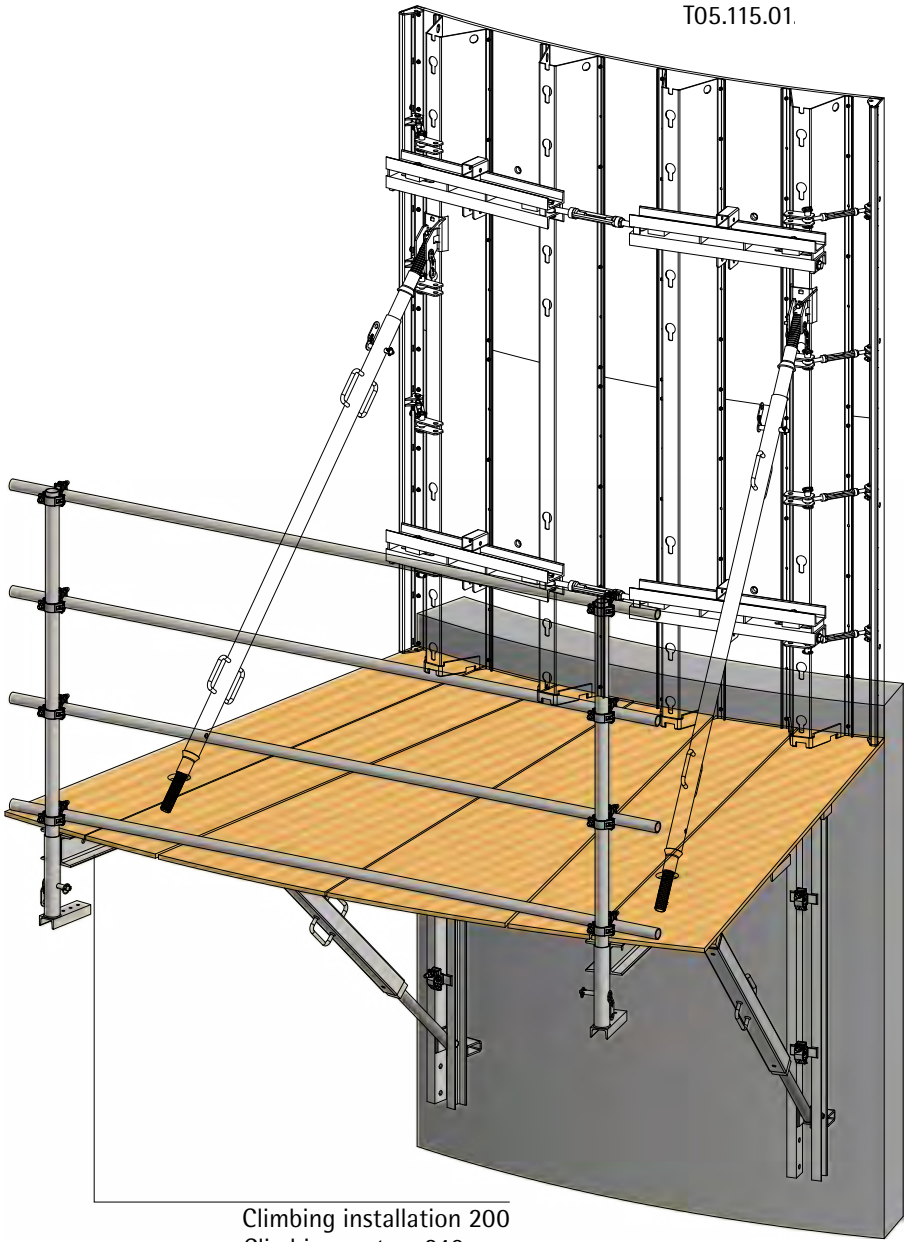
The size of the supporting jacks is based on the formwork height and the distances between the supporting jacks according to the width of the TTK segments used.
For this specific application case, the provisions of the separate Technical Information “Single-sided walls” apply.



T05.087.01

Working and protective scaffolding

T05.115.01



Climbing installation 200
Climbing system 240
Heavy-duty brackets SPK 270

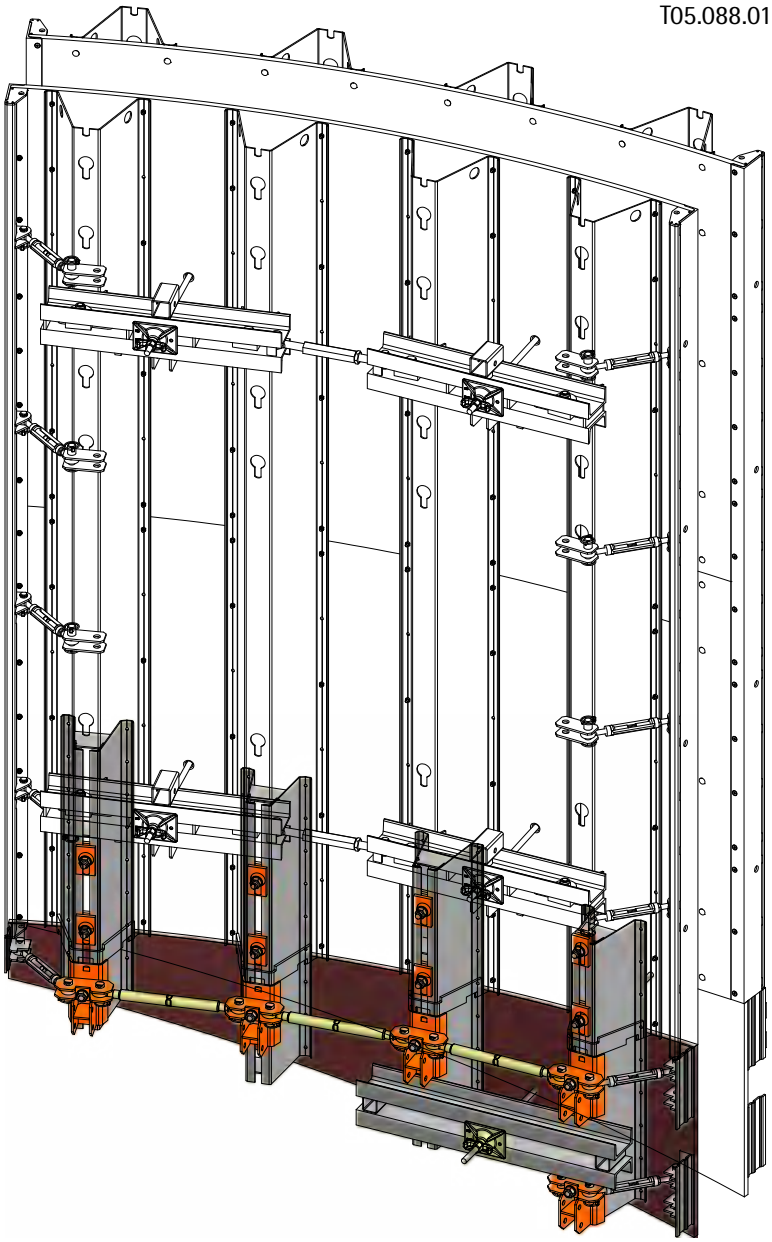
Lateral protection is required at free ceiling edges in order to fulfil the occupational safety requirements. If a platform is needed for this, for example in order to erect a formwork, the area being formed is fitted with consoles, on which a board is mounted, in order for the segments of the TTK to be placed on it. Three different types of console are available for this.

Note:
With this application, additional load assumptions often have to be made and the anchoring of the consoles through standard anchors in the concrete has to be verified specifically for the object. It is therefore necessary to contact the manufacturer's application engineering department.

Forms on slopes

For formwork on a slope, the individual trapezoid girders of the segments are extended with extendable telescopic girders (56.5 cm and 100 cm) onto the sloping installation surface.
A 21 mm-thick plywood is cut corresponding to the inclination and screwed to the telescopic girders.

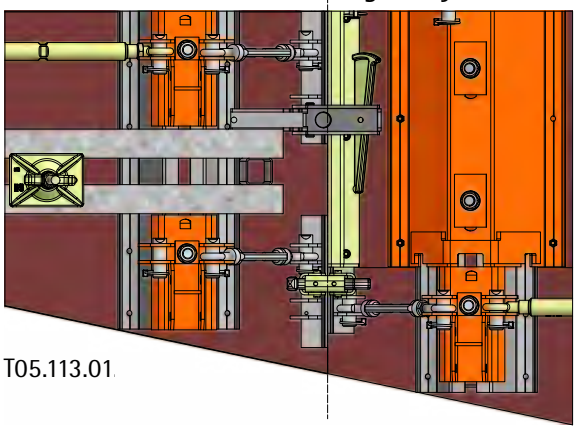
T05.088.01



Note:
Depending on the extension lengths of the telescopic girders, the following parts have to be included in the base extension area.

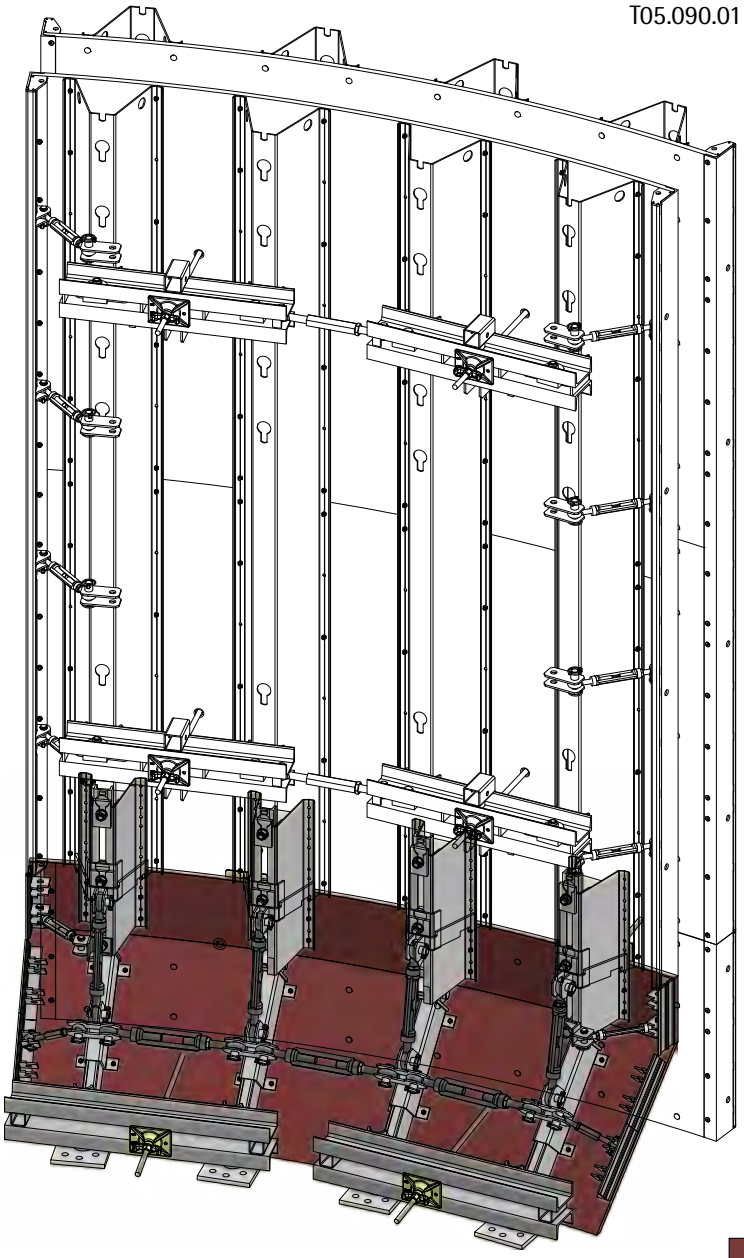
1. Tie points directly in the telescopic girders of via walers in order to absorb the fresh-concrete pressure.
2. Turnbuckle couplings with the turnbuckles for precise radius setting.
3. Side parts, connection bracket to the segment connection.

Segment joint:



T05.113.01

Concrete haunch



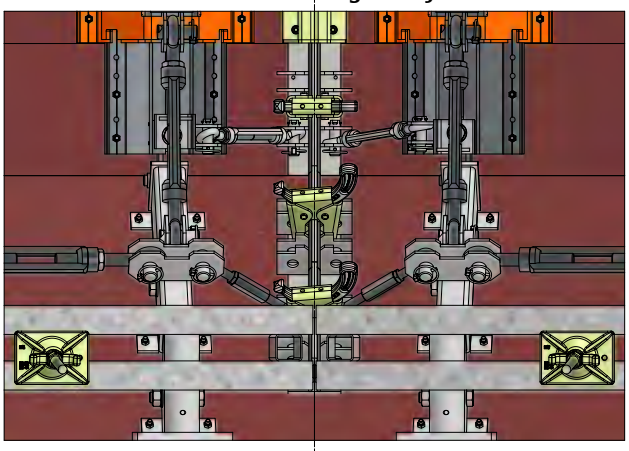
T05.090.01

For forms on concrete haunches, two different-sized concrete haunch girders are available.
These are connected via the telescopic girder to the trapezoid girders of the segments. It is possible to adjust the various concrete haunch widths and heights via an integrated joint and a sliding part.
A 21mm-thick plywood panel is screwed to the concrete haunch girders, which has to be cut to the respective haunch size.

Attention:

1. To absorb the fresh-concrete pressure, additional tie points are required in the concrete haunch.
2. For precise radius setting, horizontal turnbuckles are fitted on the haunch girders.
3. Turnbuckles are also mounted vertically from the trapezoid girder to the haunch girder in order to be able to set the haunch angle and in order to keep the entire formwork rigid.
4. The formwork side with the concrete haunch has to be secured to each haunch girder against uplift.

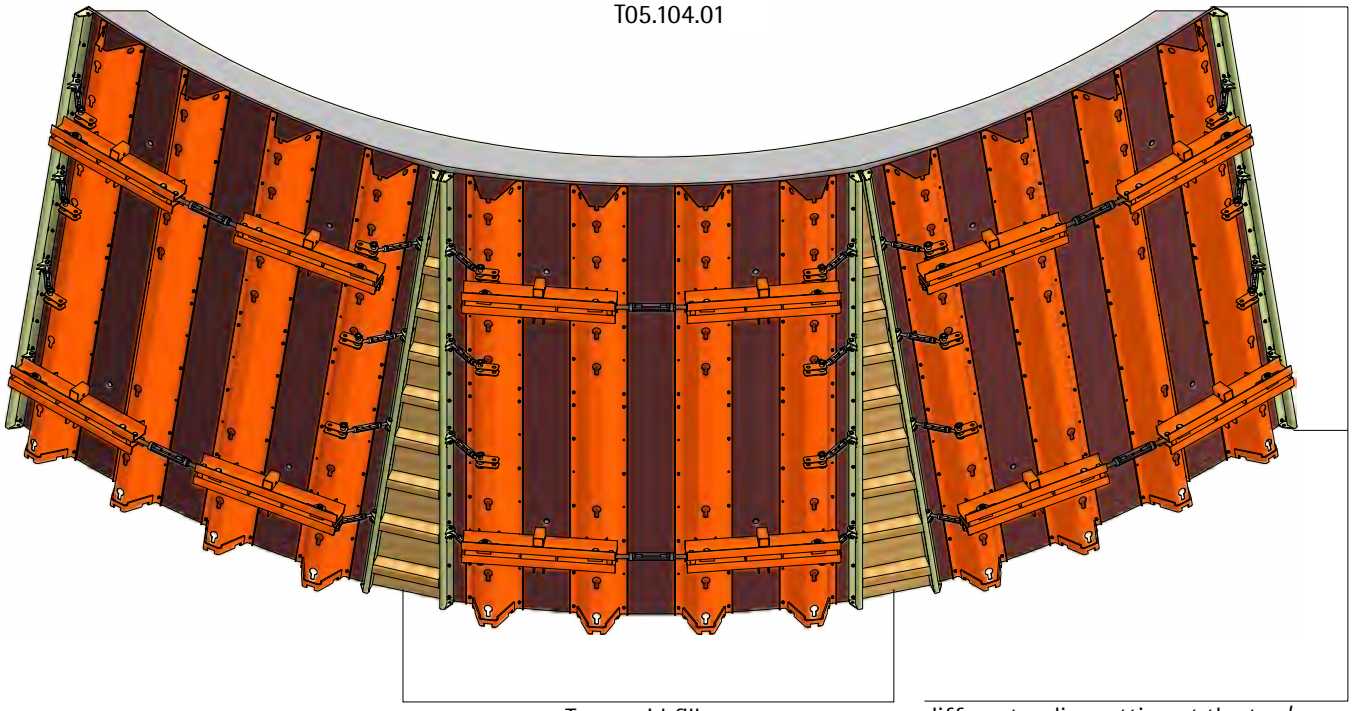
Segment joint:



T05.114.01

Angled parts of the building, conical walls

T05.104.01



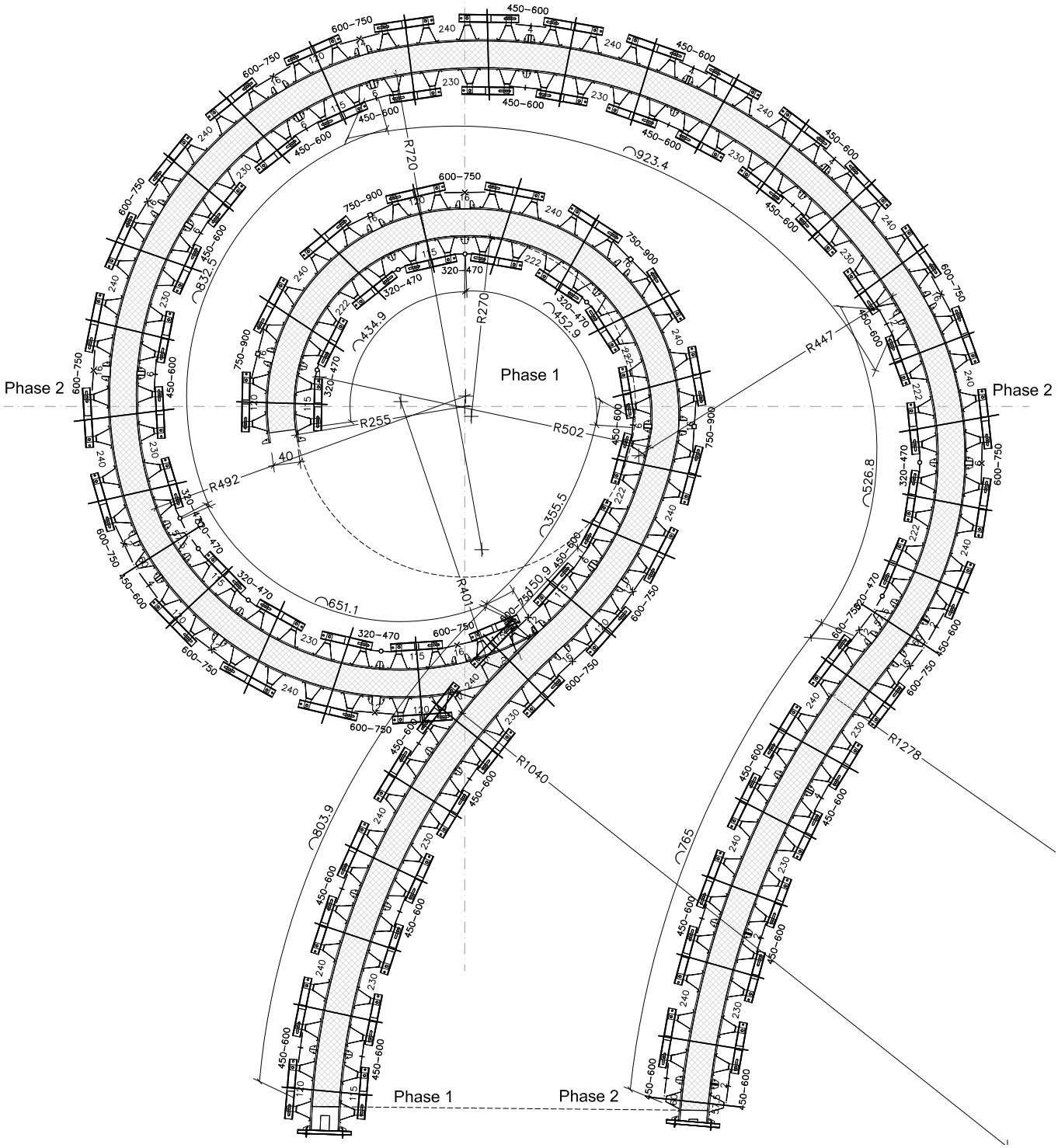
Trapezoid fillers

different radius setting at the top/ bottom possible.

Angled or conical precurved walls can be formed with the trapezoidal girder formwork TTK in the system.
The different diameters at the top/bottom can be set in the segment or in extended segment units. To do this, more or less rotation is applied from top to bottom in the individual horizontal layers, where the turnbuckles are located for radius adjustment. Radius adjustment, see page 26 et seq.
Trapezoid fillers remain at the joints, which can have different designs.

- For smaller differences, a wedge-shaped solid wood cross-section can be fitted at the bottom/top. The TTK multi-clamp (up to 10 cm compensation width) is available as a connecting piece, for larger widths a standard screw with washer and nut.
- Otherwise, a trapezoid wood element is fitted, which typically needs an additional tie point.

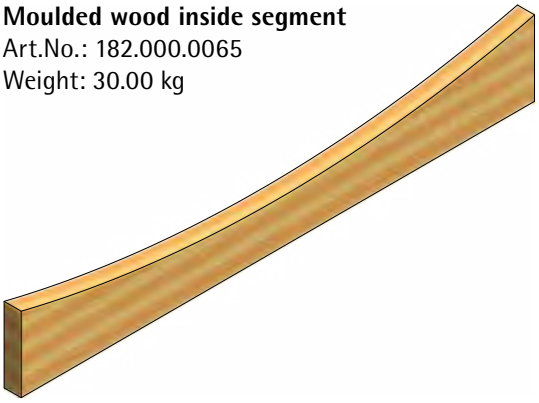
Spirals, ovals, ellipses



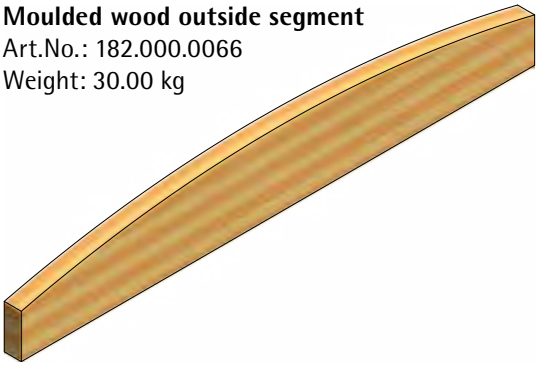
All non-circular shapes such as ellipses, ovals or spirals can also be set in the specified diameter range of 5.00 m up to straight wall.
The different diameters on the left/right can be set in the segment or in extended segment units. To do this, more or less rotation is applied from left to right in the individual vertical layers, where the turnbuckles are located for radius adjustment.
Radius adjustment, see page 26 et seq.
Any required fillers are specified in the tables on page 40 et seq.

Storage, segment height 300 cm

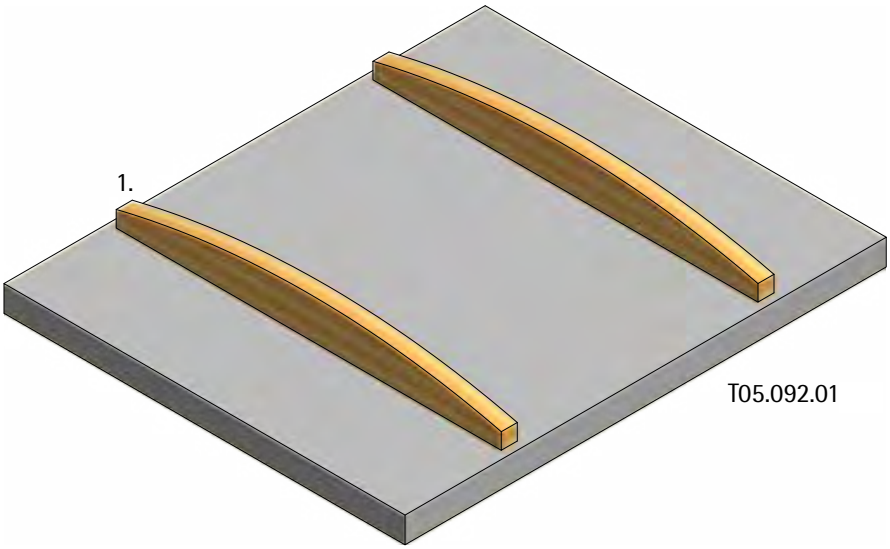
Moulded wood inside segment
Art.No.: 182.000.0065
Weight: 30.00 kg



Moulded wood outside segment
Art.No.: 182.000.0066
Weight: 30.00 kg

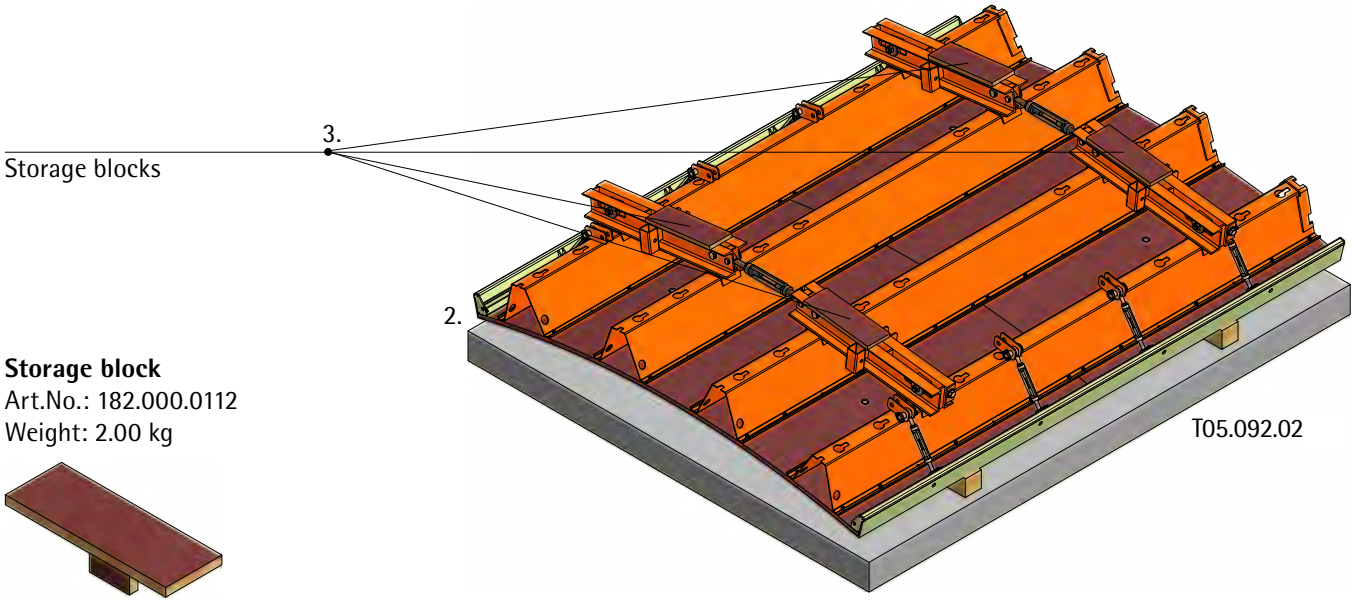


So that the segments of the TTK formwork can be stacked safely, moulded wood must be placed under the stacks. Storage blocks also have to be inserted between the segments in order to prevent damage to the plywood.



T05.092.01

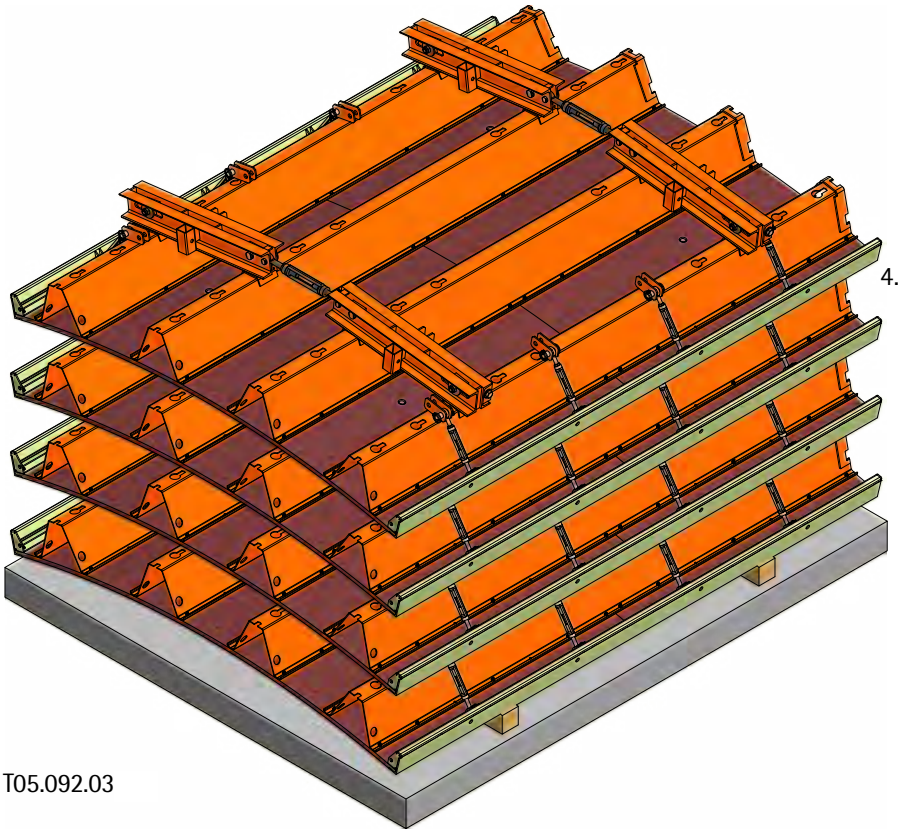
1. Distribute moulded wood. The moulded wood is positioned wherever there are steel walers in the segments placed on them.
2. Position the first segment
3. Distribute storage blocks



T05.092.02

Storage block
Art.No.: 182.000.0112
Weight: 2.00 kg

Storage, segment groups

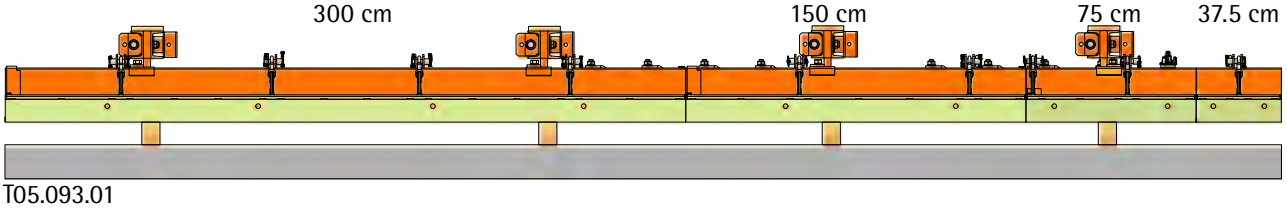


T05.092.03

4.

4. Place additional segment with storage blocks.
5. Secure segments.

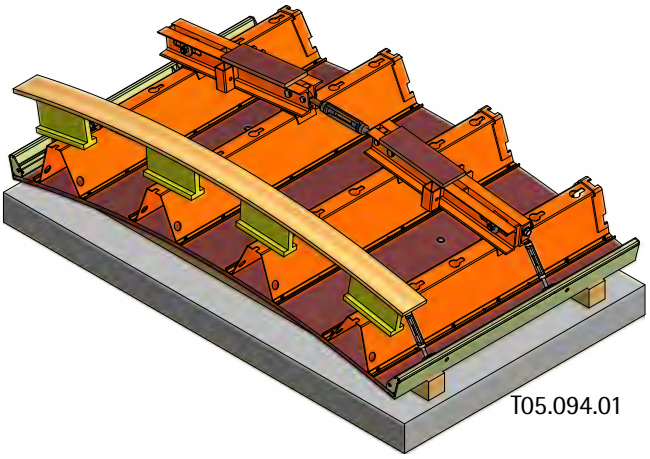
For extended formwork, moulded wood is always used as a base wherever there are walers in the segments. This is irrespective of the segment combination.



T05.093.01

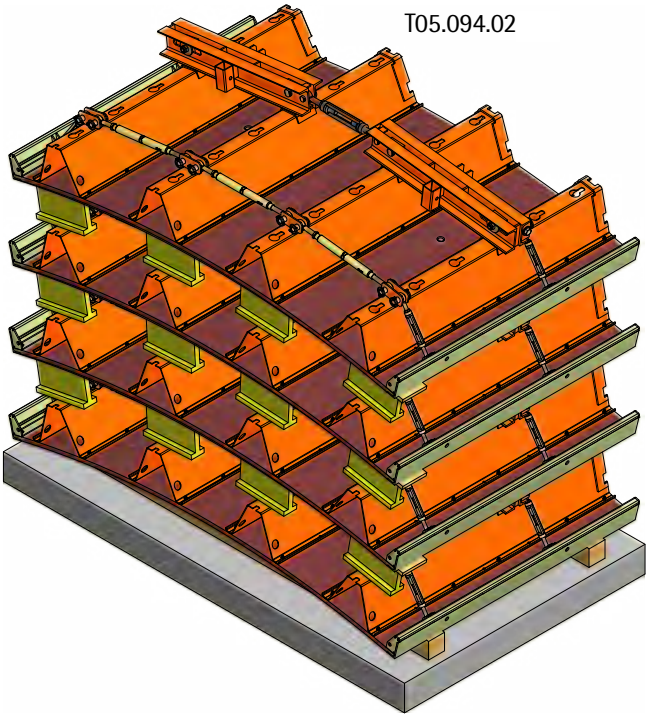
Storage, segment height 150 cm

For segment height 150 cm, there is only one row with walers. The loading tool 222-240 has to be positioned opposite so that the nearest installed segment is horizontal.



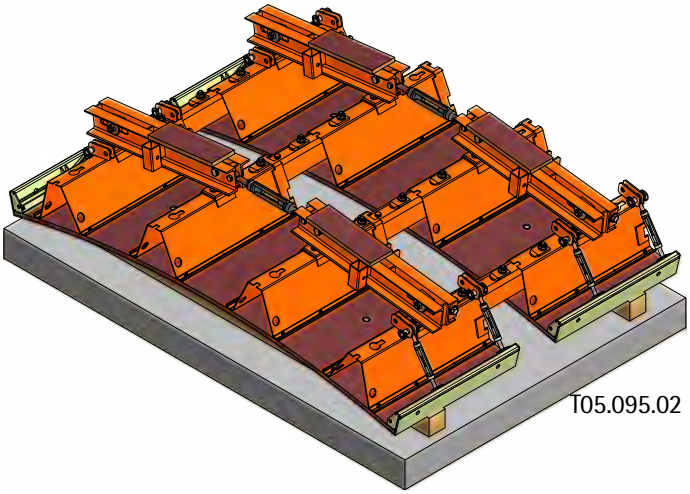
T05.094.01

Secure segments.



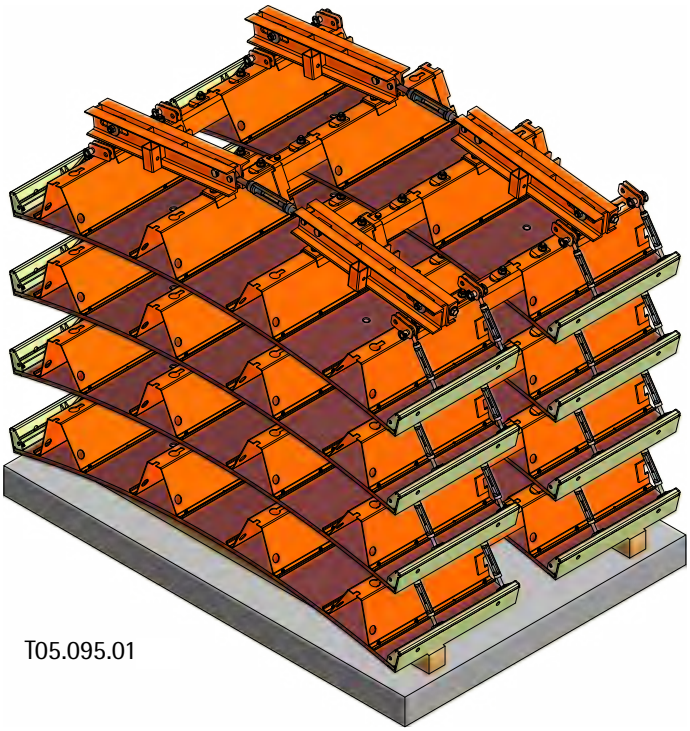
T05.094.02

Storage, segment heights 75 cm and 37.5 cm

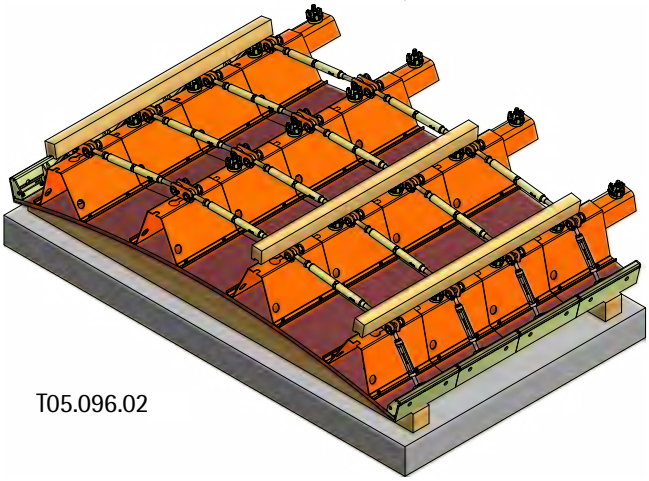


T05.095.02

To store 75 cm high segments as a single segment, they are coupled in pairs via the extension post. The connection is made using a pan head screw in the outer hole of the trapezoid girder.



T05.095.01

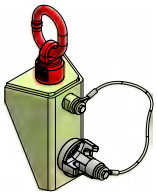


T05.096.02

The segments of height 37.5 cm can be connected next to each other multiple times using the integrated extension post. Squared timber is required between the individual segment layers.

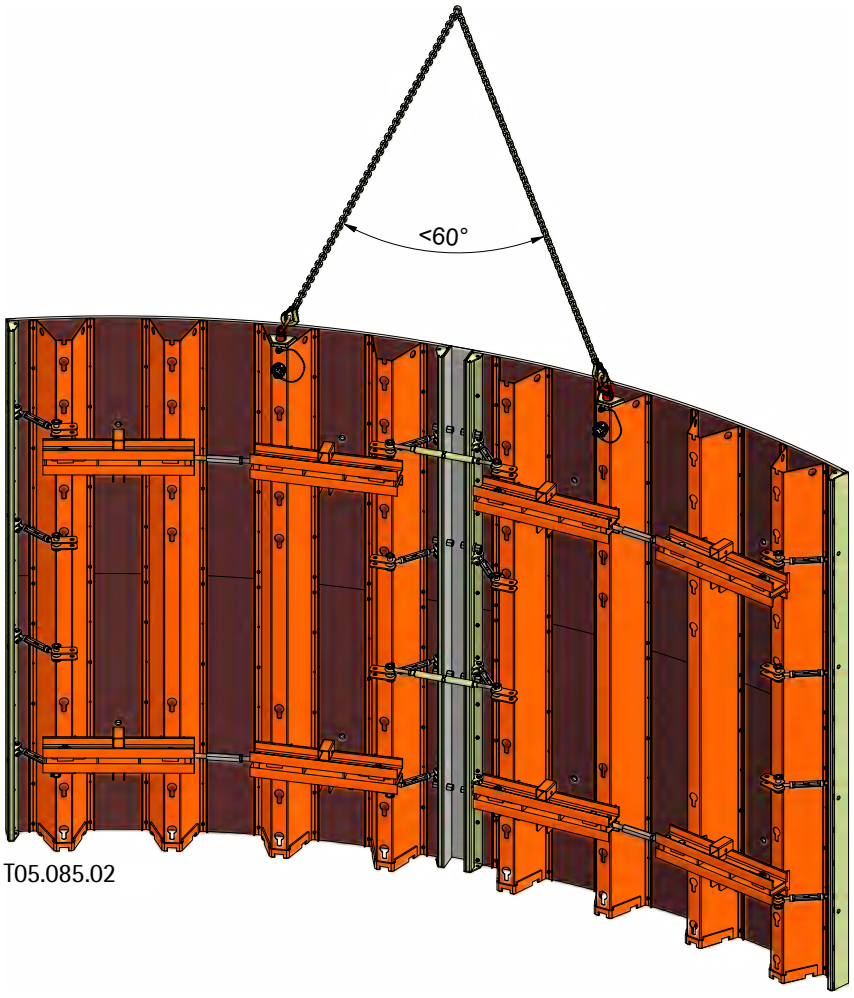
Crane suspension

Crane lifting eye KBT
Art.No.: 182.000.0069
Weight: 5.77 kg



The crane lifting eye KBT is used to move individual segments or prefitted segment units of the TTK formwork.

Admissible capacity: 1700 kg

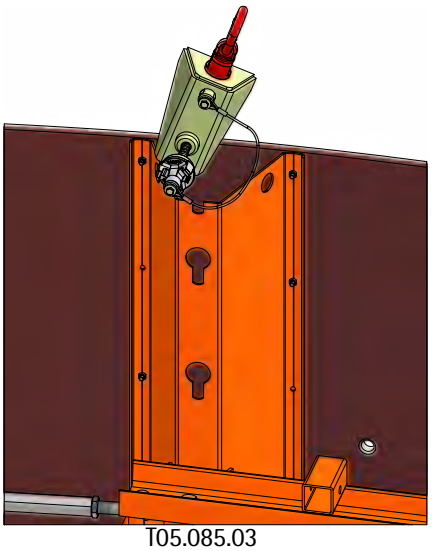


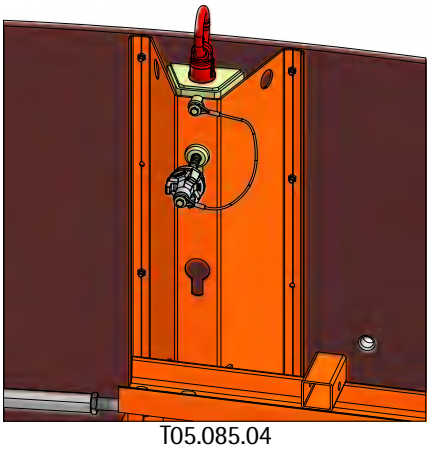
T05.085.02

In this respect, see the original operating instructions regarding the items:

- Structure
- Intended use
- Admissible capacity
- Attachment points
- Assembly
- Tests, safety
- Commissioning

QR page 24


T05.085.03


T05.085.04

Box and transportation boxes

B15.000.01

Pallet box PASCHAL
1200 x 810 x 930 mm
Art. No.: 940.009.0017
Weight: 65.00 kg (without lid)

Transportation box
Art. No.: 189.002.0003
Weight: 82.00 kg (without lid)

Pallet box small PASCHAL
1200 x 810 x 460 mm
Art. No.: 940.009.0018
Weight: 50.00 kg (without lid)

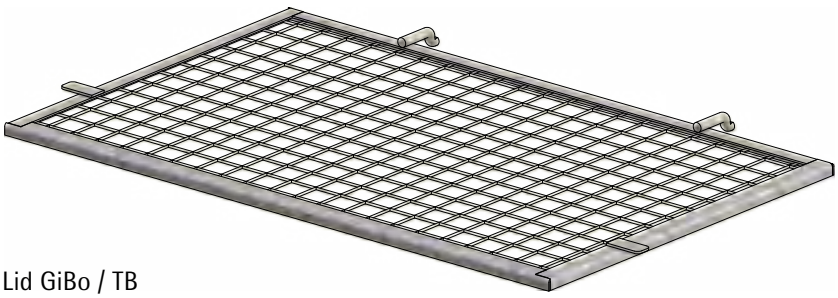
To store or transport small parts, three different steel (pallet) boxes are available, each of which can be covered with a lid.
The two pallet boxes are not subdivided, the transportation box is divided into one large and three smaller compartments.

In this respect, see the original operating instructions regarding the items:

- Structure
- Use
- Admissible capacity
- Stackable, storage
- Implementation
- Tests, safety
- Commissioning

This document can be downloaded via the QR code on the type plate.

QR code page 24



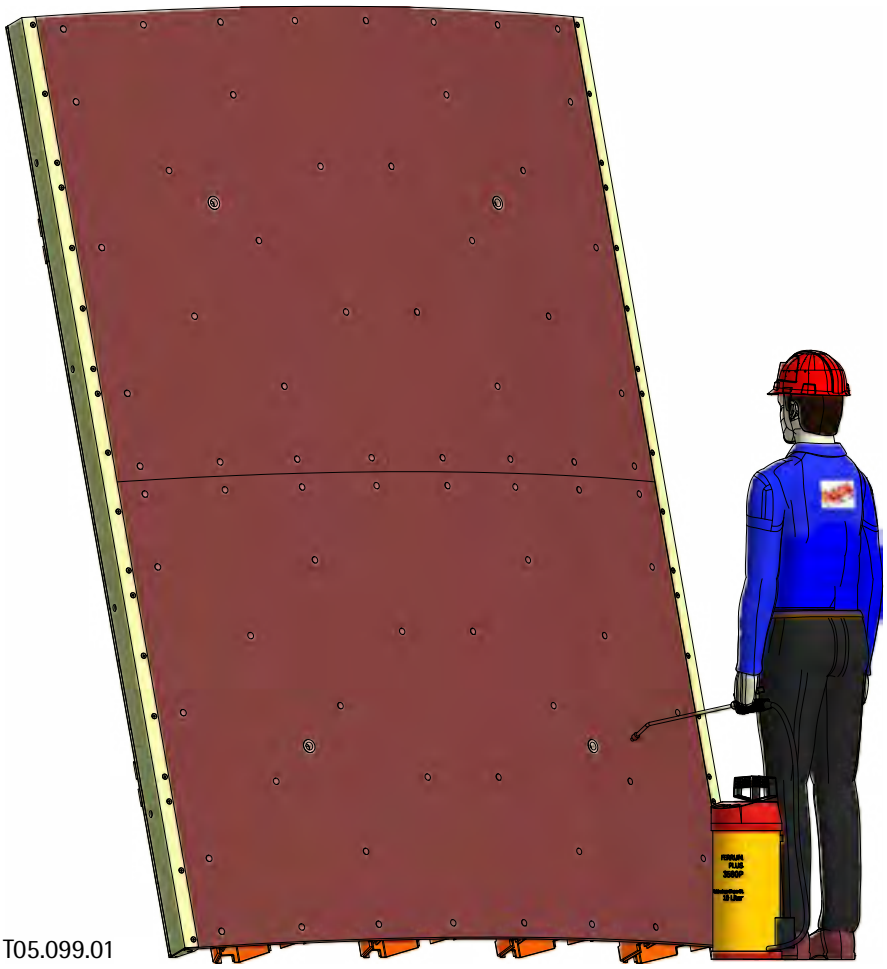
Lid GiBo / TB
Art. No.: 940.009.0019
Weight: 6.70 kg

Concrete - parting compound

Parting compound pistol

Canister /barrel

See page 25



T05.099.01

- The parting compounds from PASCHAL guarantee a simple loosening of the formwork from the concrete.
- The parting compounds delivered ready for use and can be used weatherproof for all absorbent and non-absorbent surfaces.
- All concrete surfaces, not only exposed concrete, can be dismantled cleanly and without imperfections.
- If the application provisions are complied with, the plaster and paint adhesion is not affected.
- The use of parting compounds is also required at sensitive locations such as cut-outs, edges or indentations.
- The regular application of parting compounds not only extends the lift of the plywood but also that of the entire formwork through corrosion protection.
- A well looked-after formwork treated with parting compounds lasts longer and guarantees the quality requirements of the concrete parts and surfaces being made.
- Apply the parting compounds thinly and consistently on the clean, dry formwork using a po and work with a rubber lip.
- Spray the formwork all over with parting compound when first used.
- If the back of the formwork is dirty after concreting, immediately clean with a water jet.
- After dismantling, temporarily clean the plywood and sides of the formwork, then spray with a thin layer of parting compound.
- For specific application cases, always carry out tests.

More information about the product features is available in the Technical Information “Concrete - parting compound”

Notes

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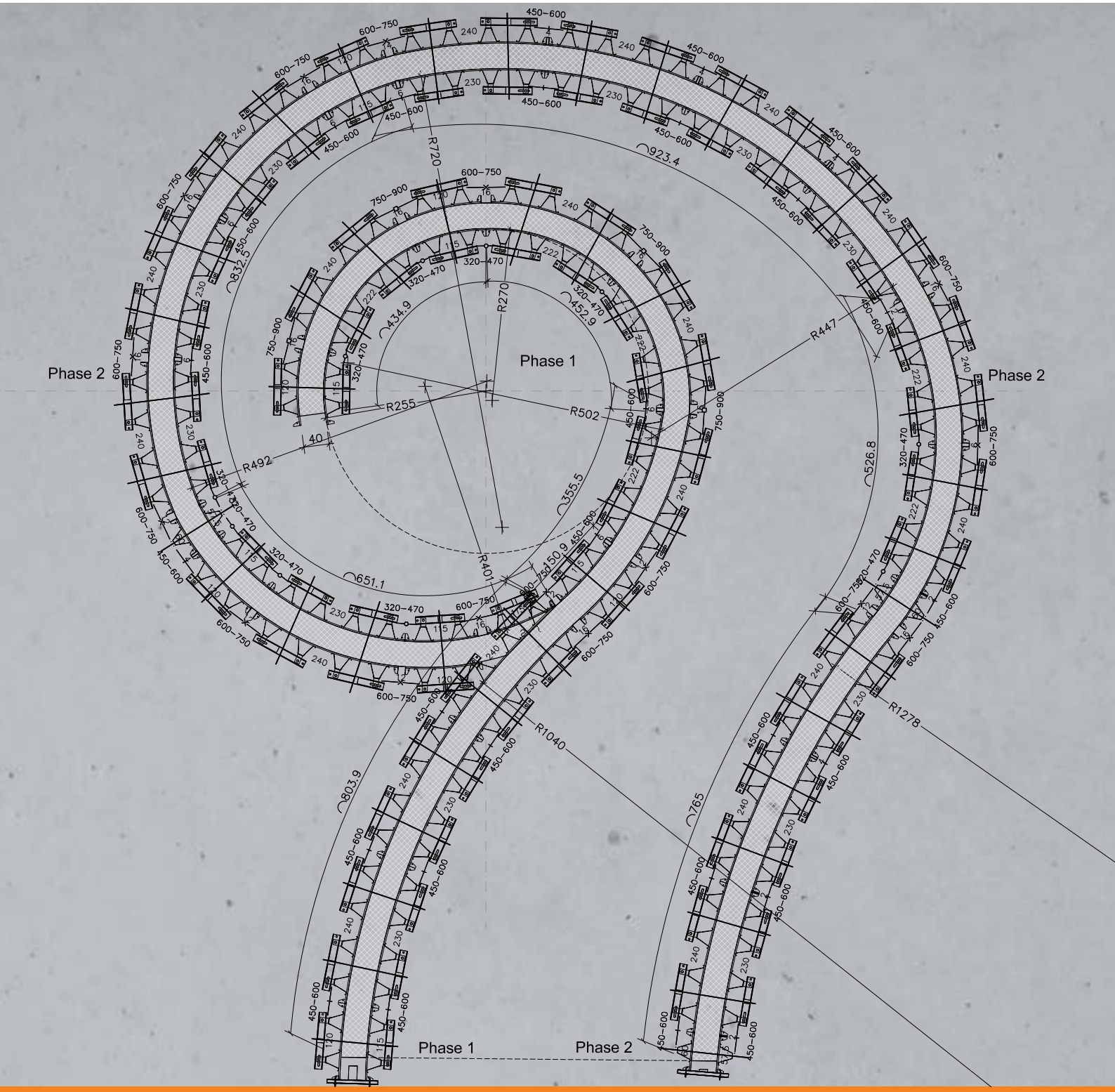

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