Assembly- and Usage Instructions **Master PRO**

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RINGER
SCAFFOLDING + FORMWORK

LET'S BUILD

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Content

1 General
Information

REFERENCE
Refers to other documents
with more detailed information

TECHNICAL INFORMATION
Refers to important product
features.

TIP
Refers to useful practical tips.

CAUTION / WARNING / DANGER
NON-OBSERVANCE CAN LEAD TO
DAMAGE ON INJURY

qualityaustria
SYSTEMZERTIFIZIERT
ISO 9001:2015 NR.00720/0

Safety information

FOREWORD
In order to ensure that the products are applied and used safely, the country-specific laws, standards and any other applicable regulations must be observed. They form part of the occupational safety obligations of employers and employees. They result, for example, in the employer's obligation to ensure that formwork constructions are structurally stable during all stages of construction. They also include basic assembly, dismantling and transportation of these constructions and their parts. The overall construction must be inspected during and after assembly.

ASSEMBLY AND USAGE INSTRUCTIONS
Formwork is technical work equipment intended solely for commercial use. It may only be applied as intended by technically suitable and qualified personnel. These assembly and usage instructions are an integral part of the formwork construction. They contain safety information, information about the standard design and intended use as well as a system description. They also include drawings and explanatory illustrations.

AVAILABILITY OF THE ASSEMBLY AND USAGE INSTRUCTIONS
The user must ensure that the assembly and usage instructions provided by RINGER are available at the point of use and that employees know of them and can access them.

INSTRUCTIONS
The functional instructions (standard design) in the assembly and usage instructions must be observed closely. Deviations require a separate verification from the user in compliance with the relevant laws, standards and safety regulations.

ILLUSTRATIONS
Some of the illustrations in the assembly and usage instructions are states of assembly and therefore not always complete in terms of safety technology. Nevertheless, the users must always utilise safety equipment, even if it is not shown in these illustrations.
Sicherheitseinrichtungen sind vom Anwender dennoch in jedem Fall zu verwenden.

STORAGE AND TRANSPORT
The special requirements of formwork structures must be observed for transport processes and storage.

MATERIAL CONTROL
The formwork material must be checked when it arrives at the construction site, as well as before each additional use, to ensure that it is fault-free and functional. Changes and alterations are not permissible. All connections must be checked for fit and function. This is particularly necessary after extraordinary events (e.g. storm/severe weather).

SPARE PARTS AND REPAIRS
Only original components may be used as spare parts. Repairs may only be performed by RINGER or authorised facilities.

USE OF OTHER PRODUCTS
Combining RINGER systems with parts from other manufacturers harbours risks that may result in injuries or material damage.

RISK ASSESSMENT
The user is responsible for compiling, documenting, implementing and reviewing a risk assessment for each construction site. Their employees are obliged to implement the resulting measures in line with relevant legislation. The assembly and usage instructions form one of the bases for preparing a risk assessment.

INSTALLATION INSTRUCTIONS
The user is responsible for preparing written installation instructions. The assembly and usage instructions form one of the bases for preparing these installation instructions.

CHANGES
The author reserves the right to make changes during the course of technical development.

Master PRO
Wall formwork

2 Product Description

Master PRO offers a tie rod system operated from one side.
It is eligible for high fresh concrete pressure. Two tie rod types allow to cast walls with thicknesses 20 - 50cm.

Adjusting of wall thickness is done without any tools in 1 cm increments. Thus continuous adjustment of any wall thickness is possible.

Tie rod holes are placed only in midspan. There are no unused holes that have to be closed. Distance of anchor sleeve to at least one panel edge is always 60cm, so that hole pattern is always neat aligned even when combining upright and horizontal panels.
Therefore the system suits perfectly for creating exposed concrete.

Benefits of Master PRO::

- Considerable saving of working time by anchoring
- Maximum fresh concrete pressure 80 kN/m² to DIN 18218, where the surface planeness tolerances to DIN 18202 Table 3 Line 6 are observed.
- Maximumload capacity per tie rod: 150kN
- At panel height of 3m only 2 tie rods are required: up to 1,8m² formwork surface per tie rod
- Wall thickness with one grip adjustable
- Innovative sealing system: sealing effect rises with increase of concrete pressure --> perfect concrete surface (exposed concrete) possible without additional procedures
- Compatibel with Alu- and Steel-Master
- Hot-dip galvanized frames
- High admissible angle deviation of tie rod by inclined or mismatched panels
- Perfectly coordinated panel formats with only 18 sizes plus 2 Uni panels
- All tie rod holes (except in corner are and T-connection) are used. There are not „blind" holes in frames and no hole should be closed therefore.

Structure of the panel

Master PRO - frame is constructed from dimensionally stable profile made from fine-grained steel and central bearing profile that carries fresh concrete pressure force over cross-section and functional profile and transmits it to Master-PRO tie rod.

Functional profiles are used for fixing concreting platforms, brackets, walers and push-pull props to panels.

Master PRO ties are inserted in tie rod sleeves that are welded in central bearing profile.

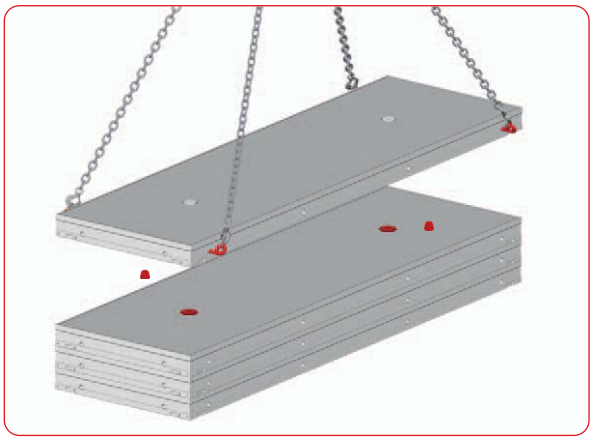
After the production of the welded structure, the entire frame is hot-dip galvanized.

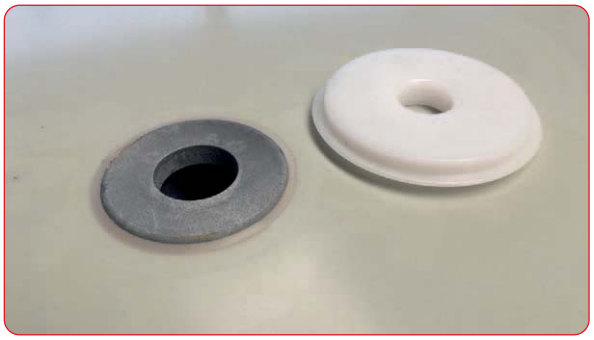
Plywood

Plywood is attached with screws from the behind and sealed with silicone into frame profile. Master PRO panels can be delivered with the following plywood types:

- **Phenolic coated plywood**
  Birch plywood, bonded 13 times, film-coated on both sides
- **Plastic coated plywood**
  Birch plywood, bonded 13 times, coated on both sides with 1.8mm of plastic
- **Alkus**
  All-over plastic sheet with extremely long durability

Transport





Master PRO panels are transported horizontally in a stack by crane or forklift.

Master transportation device with 4 chains 3m

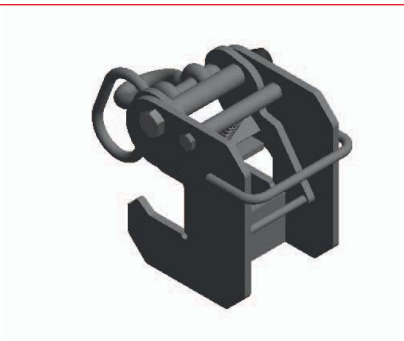
- For stacking and repositioning of Master panels
- Insert transportation bolts in the designated cross holes
- The bolt is self securing through the load

Carrying capacity up to 1.600 kg

The panels can slip against each other very easily.
It is therefore absolutely necessary to insert a stacking cone in each tie hole when stacking two or more elements on top of each other.
Exception: for the 300x240 panel, two stacking cones in diagonally opposite tie holes are sufficient.

Stacking cones must also be used when panels are returned to the factory.

Positioning by crane



The max. transport weight with Master crane hook Art. Nr. 708V5 must not exceed 1.800 kg

The max. weight of a transport with Master crane hook Nr. 708V4 must not exceed 1.200 kg

Differentiation according to type plate, see page 10

Please observe the assembly and usage instruction of Master crane hooks!

The crane hook must not be hooked into the Master panel width 25cm - danger of falling!
Manipulation only possible in gangform.

Crane hook

The Master crane hook allows gangforms to be repositioned safely. The crane hook is attached to the profile of the formwork panel in the area of the inter panel joint or along the reinforced profile. This is done by raising the handle (locking lever) by hand and pushing the crane hook onto the profile. Afterwords the handle is closed.

When lifting horizontal panels, the load direction must be observed. Before lifting the formwork panels with the lifting mechanism, it must be checked whether the formwork profile is fully in the crane hook recess and the lower edge of the clamping bracket touches the formwork profile. Otherwise the crane hook is at risk of coming loose.

Usage

The crane hook may only be used by qualified personnel (crane operator, slinger).
Press the handle of the clamping part upwards against the spring. The central center of gravity makes this easy to achieve.
- Release the handle and shake it gently to check whether the crane hook is securely attached to the edge profile

Select the position on the edge profile in such a way that the panel or the gangform is vertically suspended when lifted.
- Hook the tower crane/ construction crane into the suspension link and lift the load. The crane should be moved in such a way that the load direction of the hook is always upwards (if possible, vertical crane rope by following the movement curve of the panel/gangform).

Mounting

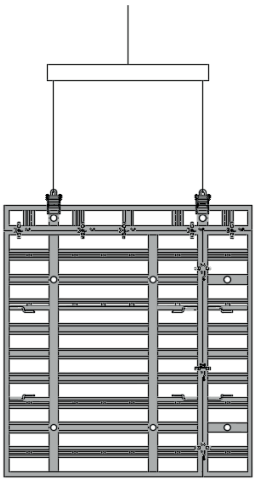
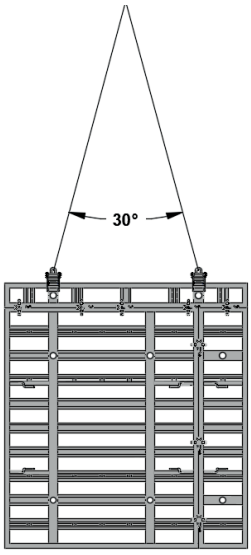
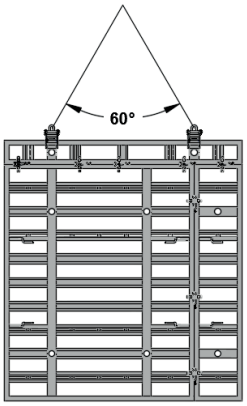
Always attach the Master crane hook over the inter panel joints or the reinforced profiles to prevent the hook sliding from side to side. Hook the gangform symmetrically (center of gravitiy position). The spread angle must not exceed 60°. Pre-assembled gangforms must be suppported with walers to prevent the formwork from buckling when lifted.

Positioning by crane

Using multiple crane hooks

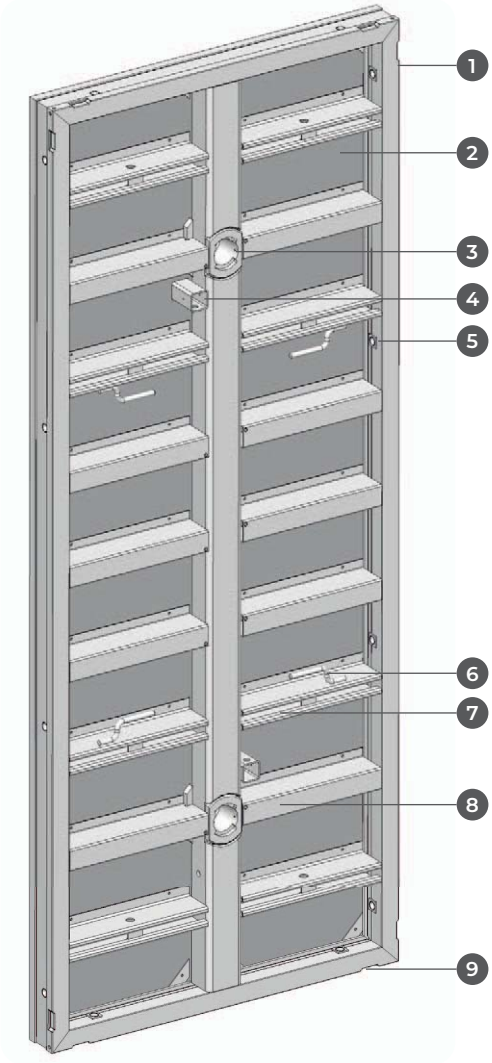
Single panels and especially gangforms may be moved with 2 crane hooks at the same time. Make sure that the spread angle of the chains does not exceed 60° (see sketch below). Therefore the chain length should at least be as long as the distance between the crane hooks. Make sure that the crane hooks fit thightly to the panel joint so that they can not slip inside, to the molded tubes or to the hat and function profile. (When panels are placed horizontally)

If a crane end carriage is used, the maximum load capacity of 1.800kg may be applied to each of the two hooks, provided that the hooks are loaded vertically or with a maximum deviation of 7.5°. When using 2 chain hangers on one hook of the tower crane/construction crane, the maximum permissible load is reduced depending on the angle between the chains.

Ankle between 2 chain hangers	**0°**	**30°**	**60°**
			
Master crane hook Art.No. 708V5 manufatured from 2022 on 	**3.600kg**	**3.480kg**	**3.120kg**
Master crane hook Art.No. 708V4 manufatured until end of 2021 	**2.400kg**	**2.320kg**	**2.080kg**

3 Master PRO
Product overview

Master PRO
Panel details



Master PRO-Panel in detail

Master PRO - frame is constructed from dimensionally stable profile made from fine-grained steel. The profiles are compatible with the profiles used for the Ringer Master series, so that the components of both systems can be combined, if required.

Function and omega profiles are welded into the frame to stiffen the frame. These also form the supporting surface for the plywood. It isre screwed in from the back to make sure that nearly no imprints are left in the concrete.

The panels are fully symmetrical: there is no „top“ or „bottom“ side. This makes the system easier to handle on the construction site.

For this reason, even with the larger panels with a width of 60 cm and wider, the lifting loops are attached to all four sides of the frame. This allows a clean and damage-free stripping with every installation position:

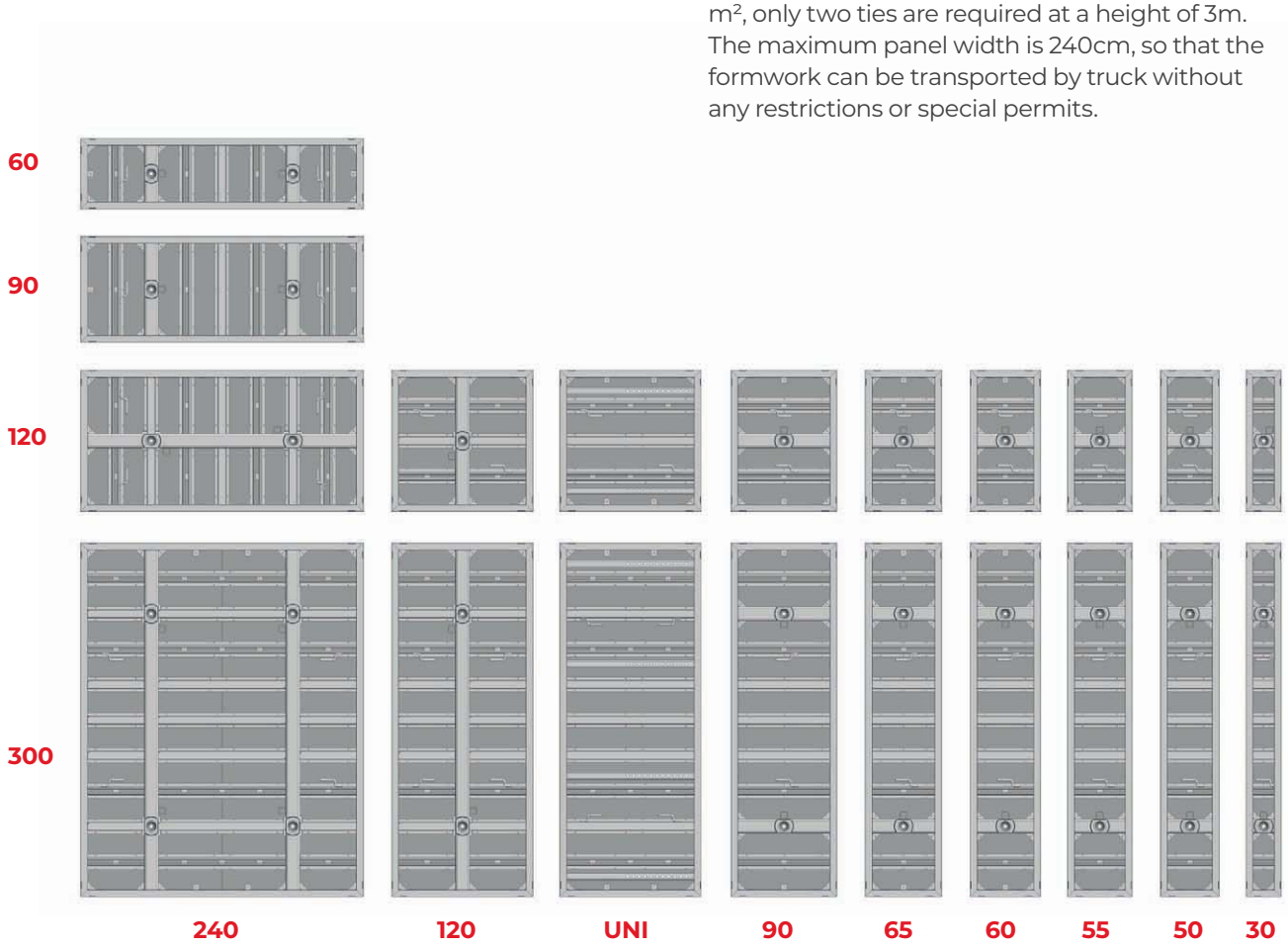
1 **Frame Profile**
2 **Plywood**
3 **Tie sleeve**
4 **Tie rod storage**
5 **Cross bore hole**
6 **Handles**
7 **Function profile**
8 **Hut profile**
9 **Notch for stripping**

Panel pattern and width

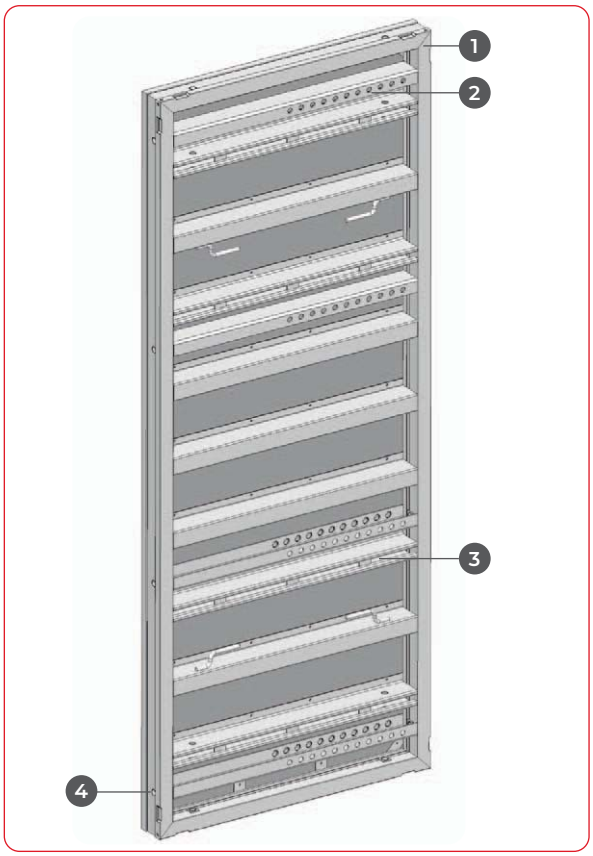
The panel pattern has been newly developed for the Master PRO.

A large percentage of current construction projects can be formed in the standard storey area with 3m formwork without stacking.

The panels are statically designed so that even with a fresh concrete pressures of up to 80kN/m², only two ties are required at a height of 3m. The maximum panel width is 240cm, so that the formwork can be transported by truck without any restrictions or special permits.



System parts



Uni panel

An adjusting rail hole pattern of 5cm throughout enables variable wall thicknesses of 20cm to 100cm. The Master PRO Uni Panel is perfect for:

- Columns
- Corners
- Stop-End formwork
- Wall junctions

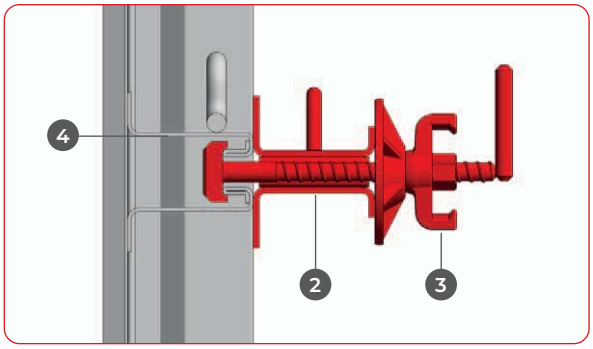
The neighboring panel is connected with a Master Uni Fixing Bolt and a Ringer Combi Plate. Unused holes must be plugged with brown plugs for Uni panels. Due to their function, Master PRO Uni panels do not have the common Master PRO anchor sleeves.

1 Master uni panel
Panel width 120 cm
Panel heights 300/120cm
2 Adjusting rail
3 Function profile
4 Cross- borehole

Waler

For vertical stacked configurations with panels of 90cm and larger, the Waler 150 must be attached to stiffen the gangform.
At compensations or transitions, the Waler 100 can be used.

1 Waler 100
2 Waler 150
3 RS-Clamp
4 Function profile

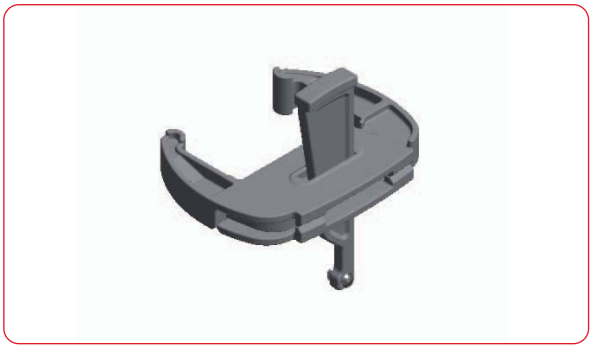


Installation

Walers are fixed to the function profiles using RS-clamps. In addition, the waler can also be anchored.

The waler ensures optimum load transfer in the gangforms. The frame panels are thereby aligned in line with each other.

System parts



Uni clamp

Master panels can be connected using Uni clamps. The Uni clamp is self-locking, so it can be fastened with one hand. Just one hammer blow creates tension-proof joints.

Panels longside vertical
Panel height 120cm 2 clamps
Panel height 240cm 2 clamps
Panel height 300cm 3 clamps

Panels londside horizontal
Panel height 30 bis 50cm 1 clamp
Panel height 60 bis 120cm 2 clamps

Number of Uni Clamps needed in corner areas, stated in the corner formation section

Master aligning clamp galvanized

For closures of up to 10cm and panel joints, the Master Aligning Clamp can be used.
Advantage: Its design aligns the formwork at the same time.

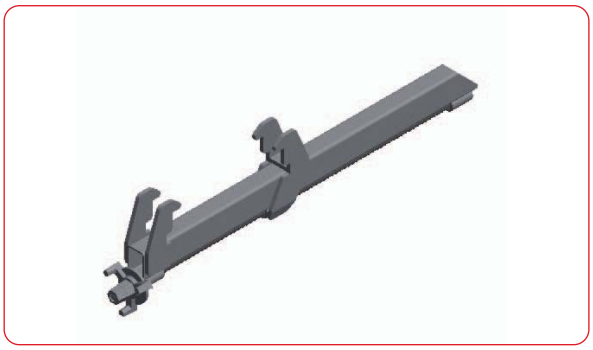
Panel height 240cm
2 aligning clamps
Panel height 300cm
3 aligning clamps

Master adjustable clamp galvanized

Closures of up to 20cm and connections to existing walls are possible using the Master Adjustable Clamp.

Panel height up to 240cm
2 Clamps
Panel height 300cm
3 Claps

System parts



Stop-End coupler

This option lets you form stop-ends steplessly without tie holes for a wall thickness up to 40cm.

Vertical Allignement
Panel height 120cm 2 Clamps
Panel height 240cm 2 Clamps
Panel height 300cm 3 Clamps

Distance keeper 15-20cm

To secure the distance at the upper edge of the panel with a single horizontal tie rod row only (e.g. single-row use of horizontal panels)

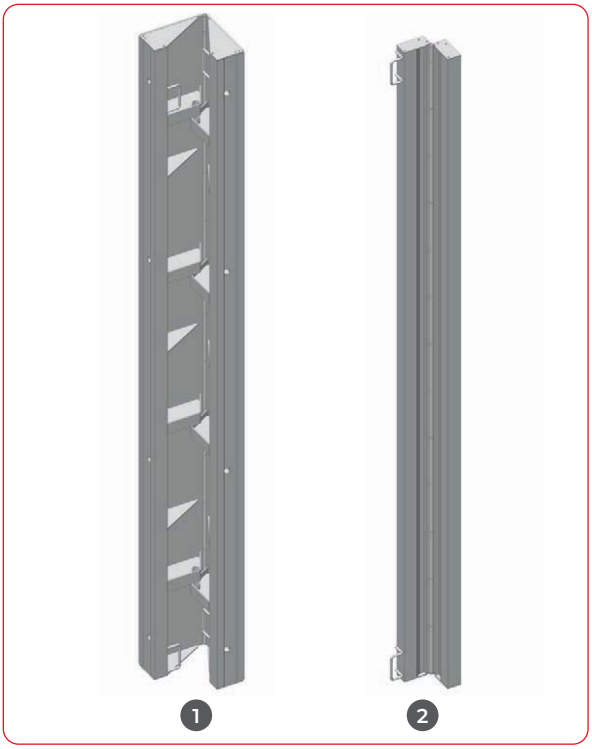
For further connecting parts, see charpter individual parts.

System parts

Master - Corners

Corner formations can be efficiently formed with the respective corner panels. In contrast to the inside corners of the Master series, the Master PRO inside corners do not have any insertion holes for tie rods and are symmetrically designed (no „top“ or „bottom“).

1 Master PRO Inside Corner
Height 300/120cm
Width 30cm
2 Master Outside Corner
Height 300/120cm



Master-Hinged Inside Corner

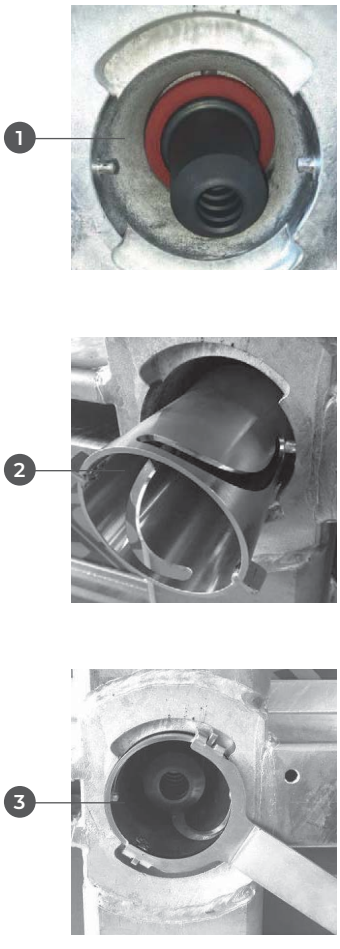
For acute and obtuse corners from 65° - 180°, the master hinged corners can be used.
Angles from 65° to 155° can be formed with one inner corner and one outer corner.
Angles > 155° are formed with two Master hinged inside corners.

1 Master PRO Hinged Inside Corner
Height 300/120cm
Side length 30cm
2 Master Hinged Outside Corner
Height 300/135cm
Side lenght 6cm

Tie Rod System

Tie rod with thread

The tie rod system for single-sided operation has been completely redeveloped for the Master PRO system. This comprises a conical rod made of high-strength heat-treated steel, which is screwed into the holding formwork without the use of spacers from the side of the opposing formwork. For this purpose, a coarse thread is located at the tip of the tie rod, which fits into the corresponding nut in the holding formwork.



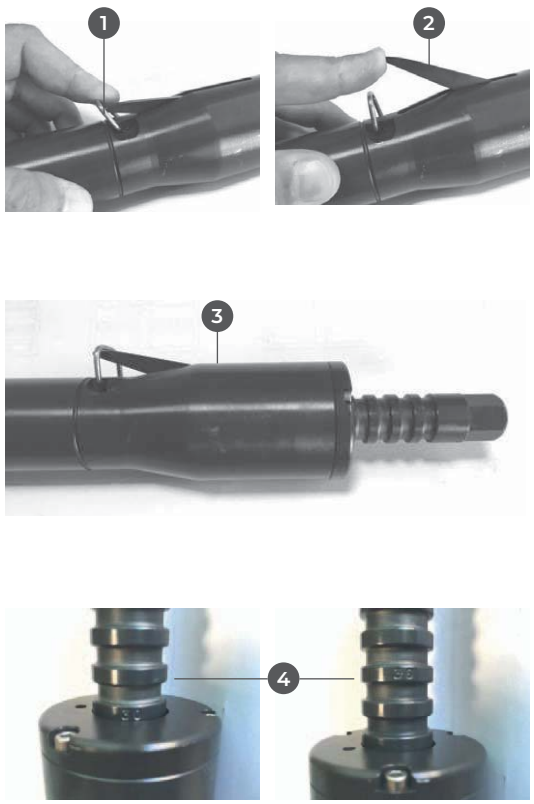
Preparatory work:

The tie rod nut is inserted into the tie rod sleeves before erecting the holding formwork and fixed with the lock.

1. **Slot in tie rod sleeve**
2. **Insert the lock and turn in clockwise direction to tighten**
3. **Tigthen the locking key up to the stop**

Insertion of the nut
When inserting the nut, make sure that the bolts on the sealing end of the tie rod nut engage into the corresponding slots in the tie rod sleeve. Otherwhise it cannot be locked.

Wall thickness adjustment



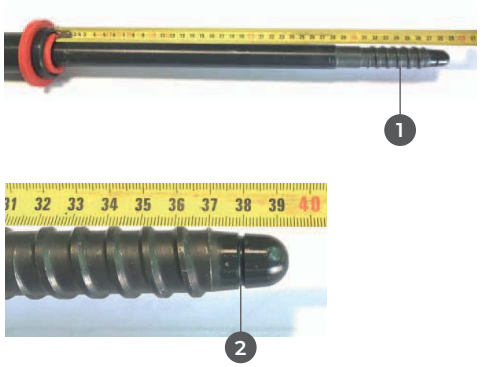
By forgoing the commonly used spacer tubes, the wall thickness is defined by the effective length of the tie rod. Therefore, the wall thickness at the tie rod must be pre-set:

1 Locking spring lever
2 Adjustment lever
3 Sleeve
4 Wallthickness examples
30cm und 28cm

- Press the locking spring away from the adjusting lever and pull the adjusting lever upwards:
- Push the sleeve with the red seal first over the tie rod from the back and engage at the desired wall thickness by releasing the adjusting lever. Afterwards, gently move the sleeve back and forth to allow the adjustment lever to engage fully.

After setting the wall thickness, the lever should be located below the retaining spring again, to prevent inadvertently adjusting the wall thickness later on.
Engraved numbers are attached to the tie rod in increments of 5 cm to guide orientation. All other thicknesses can be adjusted accordingly using the 1 cm grid between these engravings.

Checking the set wall thickness
There is another easy way to check the set wall thickness: a groove is located at the top of the tie rod. The distance between this groove and the first red seal is the wall thickness +10 cm.



1 Example for wall thickness 28cm
(Groove bei 28+10=38cm)
2 Groove

If a very large number of tie rods have to be set to the same wall thickness, it is recommended to produce a simple template made of timber and cut to the correct length.

Tie rod system

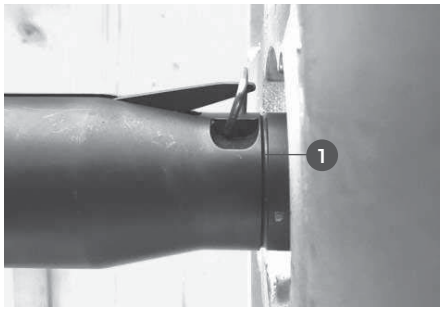
Preparatory work:

The holding formwork is erected using the pre-assembled tie rod nuts and adjusted by using panel struts. Afterwards it is then reinforced in the usual manner and the reinforcement is cut out at the tie rod points. The cuts are made using bolt cutters or angle grinders. The opposing formwork is then set next to it.

Screwing in the tie rod

The pre-set tie rods are screwed into the tie rod nuts through the reinforcement, until firm resistance can be noticed. Under no circumstances should the tie rod be screwed in too tightly: when tightened too tightly, the tie rods do not produce an improved sealing effect, but rather make it more difficult to remove the tie rod afterwords.

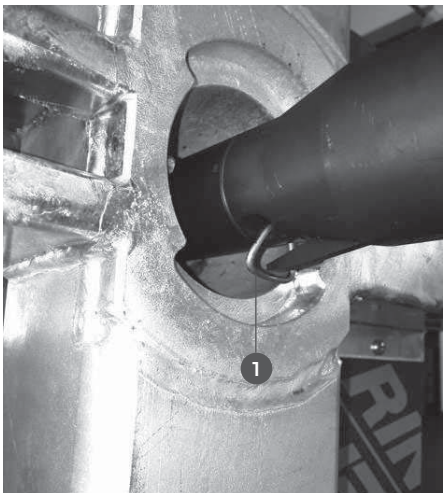
When using an impact wrench, you should thus set the torque low enough during anchoring to ensure that the tie rod is completely screwed in, but not tightened in too far. When using a hand tool, a commercially available SW19 ratchet or corresponding wrench are fully adequate. If necessary, remove any concrete residues from the tie rod sleeve before screwing in the tie rod.

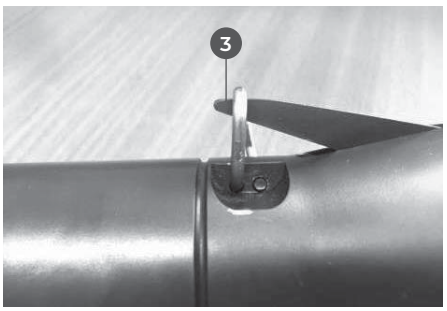


There is an easy way to check whether the tie rod has been screwed into the nut completely:
A groove is located on the outside of the sleeve. The groove lies on the same level of the backside of the frame if the tie rod system is correctly mounted:

1 Groove

Recommended procedure when inserting the tie rod.





The sleeve can easily twist at the tie rod. It is thus recommended to align and hold the sleeve when twisting in the final threads to ensure that the adjusting lever points downwards. This way, fresh concrete cannot get into the adjustment mechanics if it drops.

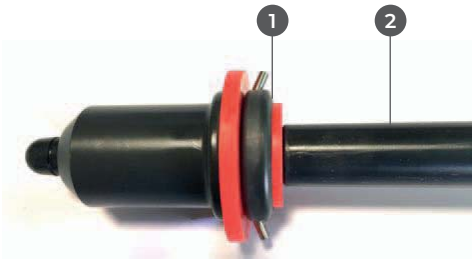
1 Adjusting lever facing downwards
2 Dirty rear adjustment grooves
3 Adjustment lever

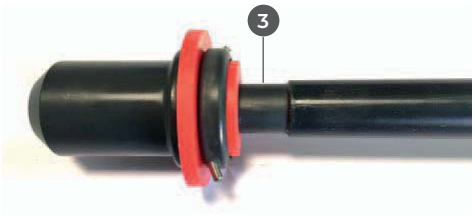
The rear adjustment grooves of the tie rod must be cleaned if they are soiled (see picture below). Usually, a few strokes with a formwork hammer already cause the concrete to flake off.

Before each use of the tie rod, it must be ensured that the adjusting mechanism is fully engaged!

The tie rod lock is only fully functional if the adjustment lever is again situated below the safety spring after setting the wall thickness (see picture). If this is not the case, the sleeve must be removed from the tie rod again and the tie rod needs to be cleaned.

Installation components for recesses





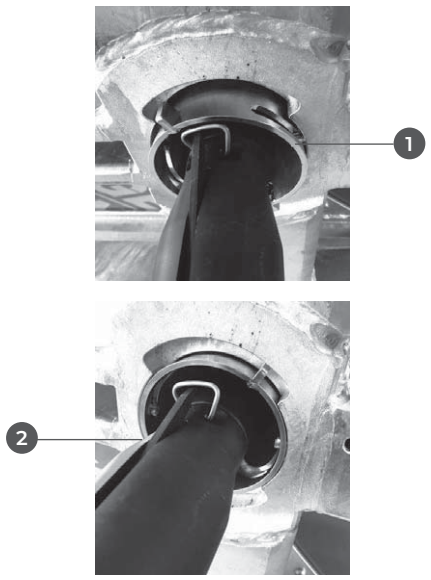
When forming recesses for windows or doors, the installation components might not exactly match the planned wall thickness.
In many cases, these parts are a bit narrower, which might lead to fresh concrete entering the gap between the formwork skin and installation component during pouring. It will then no longer be possible to achieve the quality requirements placed on exposed concrete.

The Master PRO tie rod systems comes with the advantage of ensuring that the full sealing effect is also guaranteed if the tie rod has not yet been fully screwed into the tie rod nut. This makes it possible to set the tie rod thickness 1 cm thinner (for example, 24 cm for a wall of 25 cm) and to only screw in the tie rod far enough to ensure that the installation components are firmly and tightly clamped between the plywood.

The system tolerance is very high here: in extreme cases, it would even be possible to leave 1.5 cm of air between the tie rod and the tie rod nut seal without negatively influencing the sealing effect.

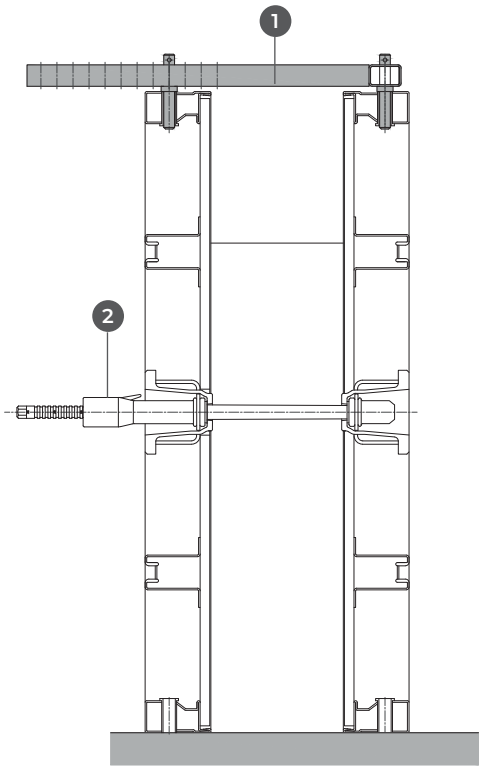
1 **Tie rod nut seal**
2 **Tie rod completely screwed-in**
3 **Max. 1,5cm distance possible with full sealing effect**

Pressure Bracing



Due to the absence of spacer tubes the formwork panels could theoretically move in relation to each other. In practice, this is usually prevented by the reinforcement, but for safety reasons an interlock must also be installed on the operator side in the top tie layer. In practice, this is usually prevented by the reinforcement, but for safety reasons an lock must also be installed on the operator side in the top tie layer.
If the tie rod is strongly inclined, it may be necessary to twist the sleeve in the tie rod slightly so that the setting lever and the locking spring are not in the way when inserting the lock.

1 Insert lock
2 Close the lock



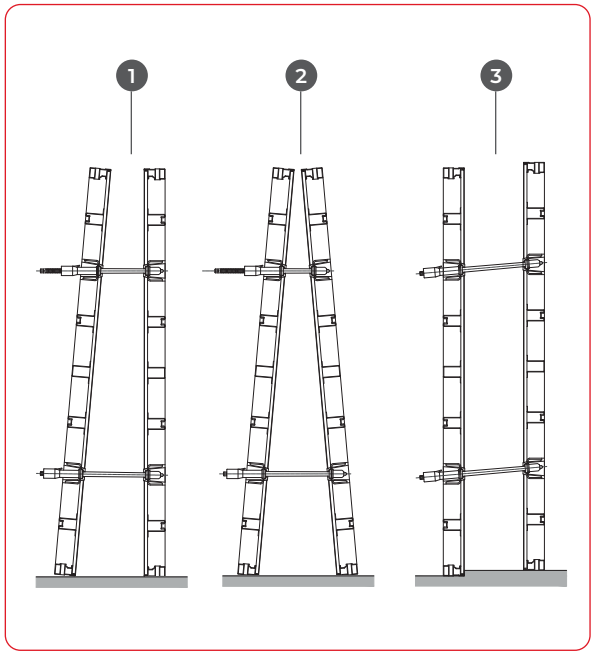
Pressure bracing with only one tie

With Master PRO the ties are always in the centre of the panel, which results in only one horizontal tie positions when the panels are arranged horizontally without any extensions (with the exception of the 300x240 panel). The installation of the Ringer distance keeper 15-50cm on top of the formwork prevents the panels from being pushed apart when pouring. The absence of the lower tie point in the edge profile simplifies the forming of foundations, parapets, edgings and floor beams. Set the desired wall thickness (in 1cm increments from 15 - 50cm) and then insert the distance keeper from the top into the connecting tubes (approx. 2 pcs. per 3 meters of formwork length)

1 Distance keeper 15-50cm
2 Master PRO tie rod

Do not apply the distance keeper from the side and never use it for stop ends!

Inclination and mismatch between panels



The system is designed to allow for a vertical inclination of one panel or both panels by max. 5°.

A deviation of 5° or a mismatch of approx. 1 cm per 12 cm of wall thickness is allowed in all directions with parallel panels.

Example wall thickness 30cm: max. lateral or vertical closure 2.5 cm

1 Conical on one side
1 x 5°
2 Conical on both sides
2 x 5°
3 Mismatch between panels
max. 1 cm per
12 cm wall thickness in all directions

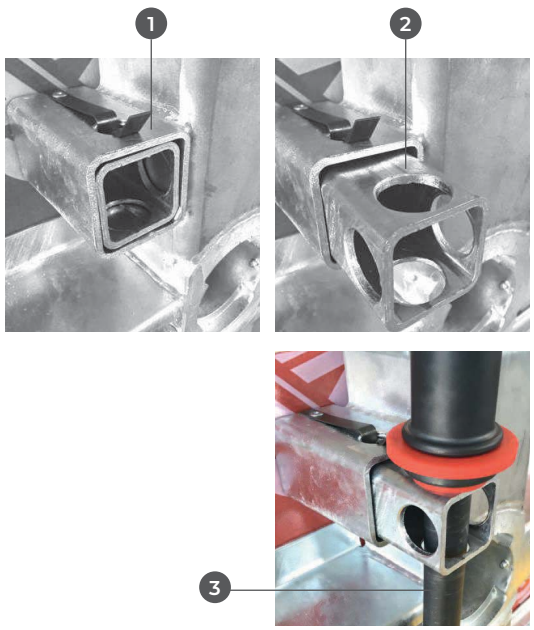
Loosening the tie rods

The tie rods can be removed after the minimum concrete strength has been achieved

It is important that the operator-side latches in the upper tie rod position are removed before the tie rod is released, otherwise the entire panel will be pushed away from the concrete (when the tie rod is released).
The tie rods can be loosed using an impact wrench or manual ratchet.

It helps to spray on a thin layer of release agent onto the conical part of the tie rod before loosening; however, this is not always necessary. To save time, the tie rod can stay in the tie rod storge point several times during the manipulation of the formwork, without intermediate lubrication.

Use of the tie rod storage point



1 Briefly lift the locking spring
2 Pull out the inner tube until the locking spring engages again
3 Insert the tie rod into the mounting space

Application for exposed concrete

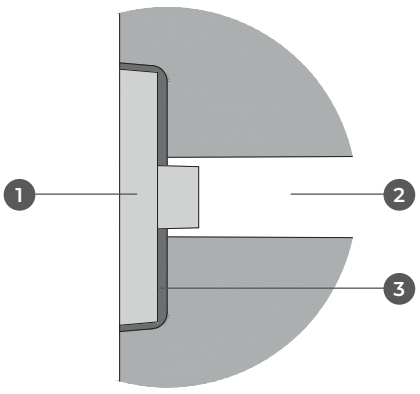
Thanks to the tie rod points situated on the inside, the Master PRO system is perfectly suited for applications with exposed concrete.
The purpose built sealing system prevents the penetration of cement slurry or concrete components into the tie rod sleeve, leaving a clean concrete surface near the tie rods as well.

Therefore, the tie rod holes are sealed after forming (with sealing plugs 24 mm or 38 mm – see next page) in normal applications, and consequently remain visible.

For special applications, it might be desirable to fit a plate for exposed concrete to close the tie rod hole. This creates an even finish with the surface of the concrete, using the same material.

1 Plate for exposed concrete 81mm

Application for exposed concrete



To create space for the plate, the plug for exposed concrete is attached to the inside of the panels during forming. It is held in place magnetically and placed onto the tie rod sleeve of the Master PRO panel before inserting the tie rod.

During formwork stripping, make sure that the Master PRO panel is removed slightly from the wall on the lower side before crane lifting, to avoid damaging the fresh exposed concrete finish.

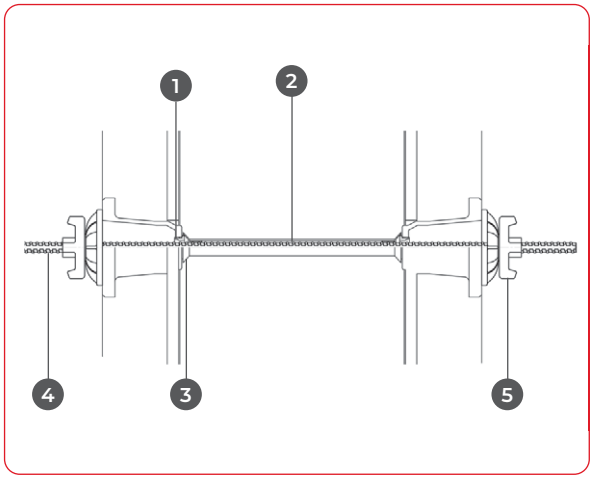
The plug for exposed concrete remains in the concrete during removal of the Master PRO panel, before unscrewing it from the concrete using an SW19 cone wrench. For this purpose, the cone wrench is inserted into the hex opening of the locking key and secured using the linch pin.
The exposed concrete cone can be reused after cleaning.

- Removing the plug for exposed concrete from the concrete: Place the cone wrench onto the cone and carefully unscrew it.

- Glue in the plate for exposed concrete to the surface using a construction adhesive.

1 Plate for exposed concrete
2 Tie rod hole
3 Construction adhesive

Use of Master PRO with tie rods



The Master PRO panels can also be anchored using DW15 or DW20 tie rod. To neatly centre the combi plate over the tie rod sleeve, DW 15 or DW 20 adapter plugs are placed in the tie rod hole:

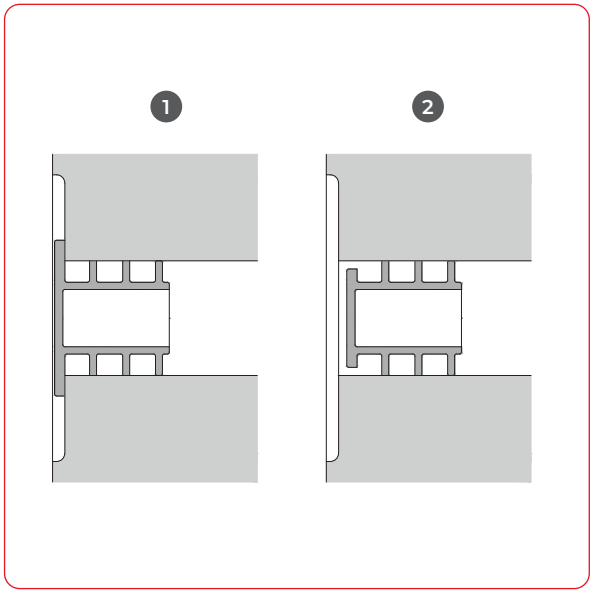
1 Adapter plugs DW 15 or DW 20
2 Spacer tube
3 Pressure cone
4 Tie rod DW 15 or DW 20
5 Combi plate

Cutting length spacer tubes:
= intended wall thickness - 34 mm.

The Adapter plugs are inserted into the tie rod hole of the Master PRO panels; they can easily be removed using a screwdriver.

At a fresh concrete pressure exceeding 60 kN/m² a DW 20 tie rod must be used

Closing tie rod holes



The tie rod holes are closed using either a plug for exposed concrete (see previous page) or by pressing a sealing plug into the tie rod hole (from a single side or from both sides, as required):

The **closing plug 38mm** remains visible. Before pressing it in, the concrete burr around the tie rod hole must be removed to ensure a flush fit of the plug with the concrete surface.
The **closing plug 24mm** is pushed all the way into the tie rod hole and can either remain visible or be covered by filling over the tie rod sleeve impression.

1 Closing plug 38mm
2 Closing plug 24mm

Sealing tie rod holes

If higher demands are placed on waterproofness, fire protection, or acoustics, the tie rod holes can be sealed using the following methods:

A) RiveStop

RiveStop is an elastic rivet. It is inserted into the tie rod hole and then processed using common construction tools (rivet tongs or a pneumatic or electric rivet gun).

Benefits:

- extremely fast processing (up to 500 pcs per hour possible)
- can be used during any kind of weather condition
- pressure-tight up to a water column of 50 m = 5 bar
- only one type required for all applications with the Master PRO

Application:

- Clean the inside of the tie rod hole (blow out, brush). The surface of the tie rod hole must be closed (no concrete cavities near the RiveStop rivets)
- Place the RiveStop rivet into the setting tool and insert the rivet and setting tool completely into the tie rod hole Bore diameter of the mouthpiece 3.2 to 3.7 mm
- Press the setting tool until you hear the mandrel tear, completely separating from the rivet.

A D24x50 SS inner seal is used for Master PRO. The stainless-steel back cover fits completely into the tie rod hole. This type can be used on both the thinner and thicker side of the tie rod hole, regardless of wall thickness. As a general rule, the RiveStop should be slid in from the side from where the water pressure is exerted later on in the process.

Sealing tie rod holes

B) Fibre concrete plug + epoxy resin

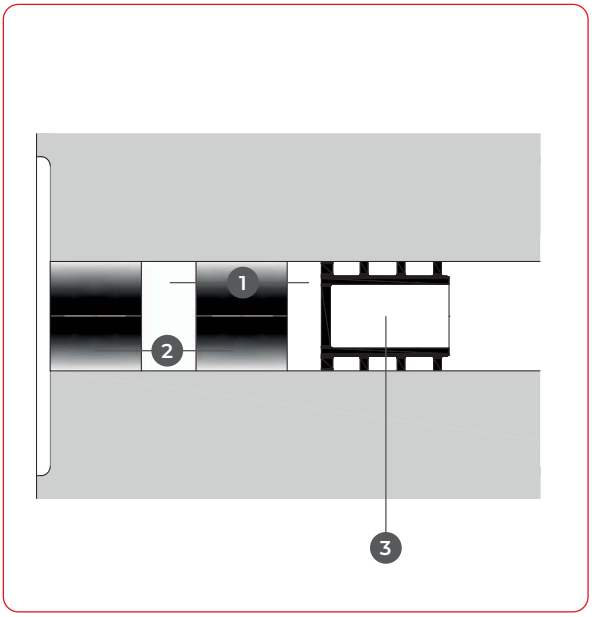
This method is normally used at the side of the tie rod hole with the larger diameter, but can also be used on the smaller diameter..

Procedure:

- Clean the inside of the tie rod hole (blow out, brush)
- Press the 24mm closing plug into the tie rod hole to a depth of approx. 6cm
- Apply the epoxy resin adhesive to form a com pressed layer with an approx. thickness of 2 cm
- Press the first DM 24 x 20 mm fibre concrete plug into the fresh adhesive
- Fill the tie rod hole with epoxy resin up to approx. 1mm underneath the concrete surface
- Press the second fibre concrete plug into the layer of adhesive, remove any excess adhesive on top

The following epoxy resin adhesive are recommended:

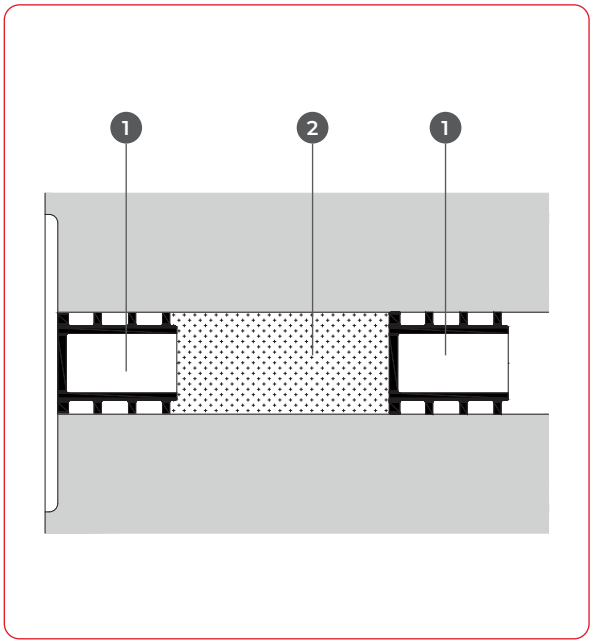
- Sika Anchorfix - 3001
- Two-component - epoxy resin
- Tie rod adhesive



1 Epoxy resin tie rod adhesiv
2 2 pcs. fibre concrete plug DM 24x20mm
3 Closing plug 24mm

Attention! Comply with the resin manufacturer‘s processing guidelines!

Sealing tie rod holes



B) Moulding mortar

This method is also suitable for both ends of the tie rod holes.

Procedure:
- Clean the inside of the tie rod hole (blow out, brush)
- Press the closing plug 24mm into the tie rod hole, to a depth of approx. 6 cm
- Fill the tie rod hole with expansive grout up to approx. 5 mm below the concrete surface
- Press the second closing plug 24mm into the tie rod hole
- Remove any leaking grout with a spatula

The following expansive grout can be used:
- Sika FastFix-121
- SikaGrout-312

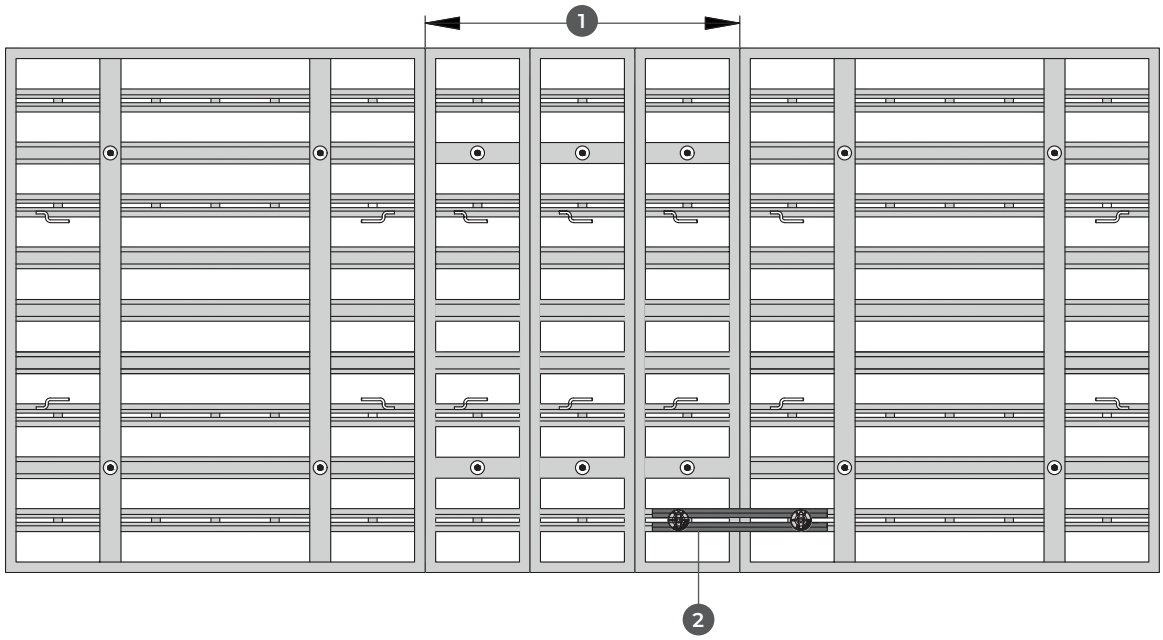
1 Closing plug 24mm
2 Moulding mortar

Sealing in a manner suitable for drinking water
For drinking water-proof sealing, the sealed tie rod point is filled with a two-component adhesive after hardening of the epoxy adhesive or after fixing with moulding mortar.
It must be ensured that the outer sealing plug or the outer fibre concrete plug (depending on the method) stays at least 3 mm below the concrete surface, to ensure that enough layer thickness remains for the filling.

The following material may be used:
- SikaDur-31 DW

Attention! Comply with the manufacturer‘s processing guidelines!

4 Use of Master PRO
Gangforms

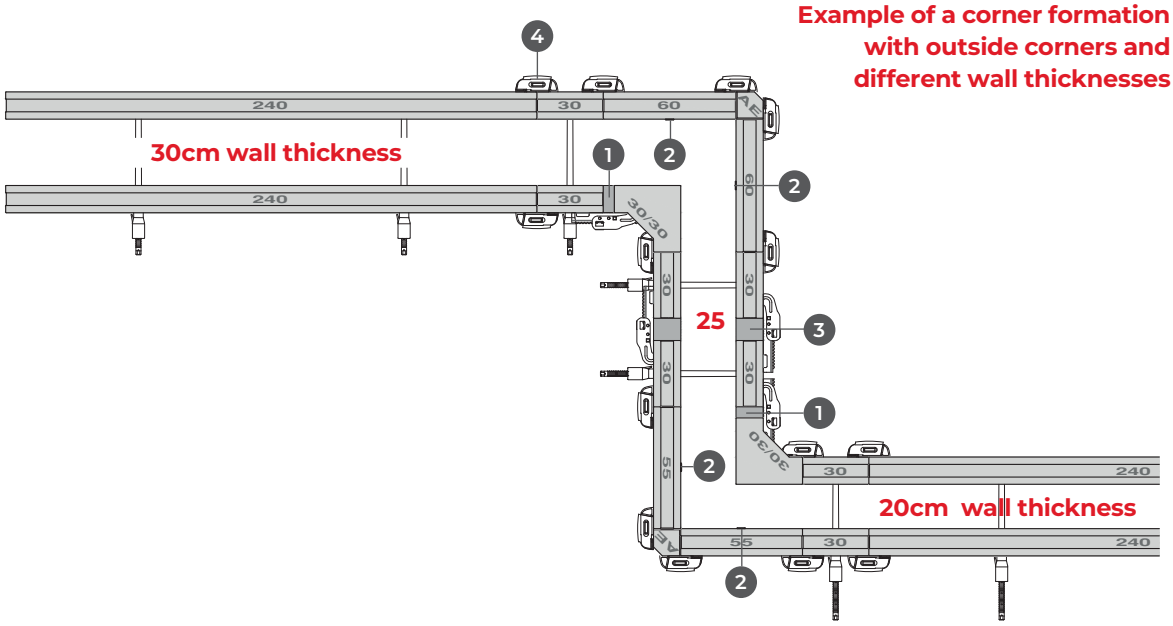


1 Single form tie panel
Waler + 2 x RS-Clamps+ 2x Combi Plates

With Master PRO, the tie rods of all panels are located in the centre. Therefore, all panels only have one tie rod level in plain view with the exception of the 300 x 240 large panel. These so-called „single form-tie panels“ (all widths from 30 cm to 120 cm) can be readily used side by side; however, if a larger number of these panels are used next to each other, additional reinforcing might be necessary.

No special precautions are required up to a max. number of 2 panel side-by-side. If more than two single form tie panels are used next to each other bracing with a waler will be required (100 cm or 150 cm) and two RS clamps at the level of the lowest reinforced profile:

Corner structure



90° Corners

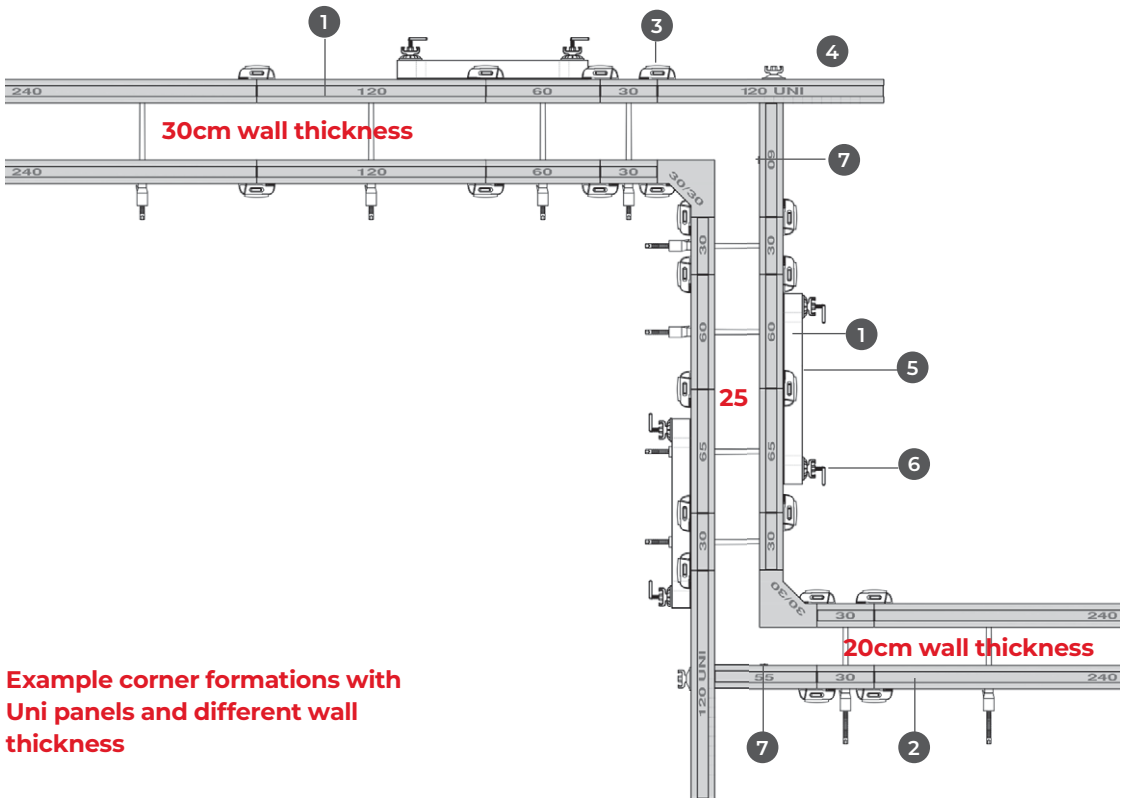
As a general rule, the construction of 90° angles is realised using Master PRO inside corners (300/30/30 or 120/30/30).
On the outside, Master PRO outside corners or universal panels 300/120 or 120/120 can be used.
The Master PRO inside corners do not have a tie rod point for the Master PRO tie rod, nor any sleeves for conventional tie rod.
Therefore, anchoring is only possible for the panel next to it. To ensure that the tie rod still rests as close to the corner as possible, the width of panels next to the inside corner should not exceed 60 cm. If possible, only panels with a width of 30 cm should be used here (refer to the sketch above).
Seal of any unneeded tie rod sleeves with Master PRO Filler plugs.

Corner formation with outside corners and different wall thicknesses

Panels situated next to the Inside corner 30/30 should be followed by the panel that is as narrow as possible in in both directions, to ensure that the tie rod is close to the corner. It is recommended to use 30 cm panels here. If this is not possible, the panel width should not exceed 60 cm. The unused tie holes in the corner area are to be sealed with Filler plugs.

1 Compensation 5cm
2 Filler plugs
3 Master Aligning clamp for compenastions of max. 10cm
4 Uni-Clamp

Corner formations with Uni panels and different wall thickness



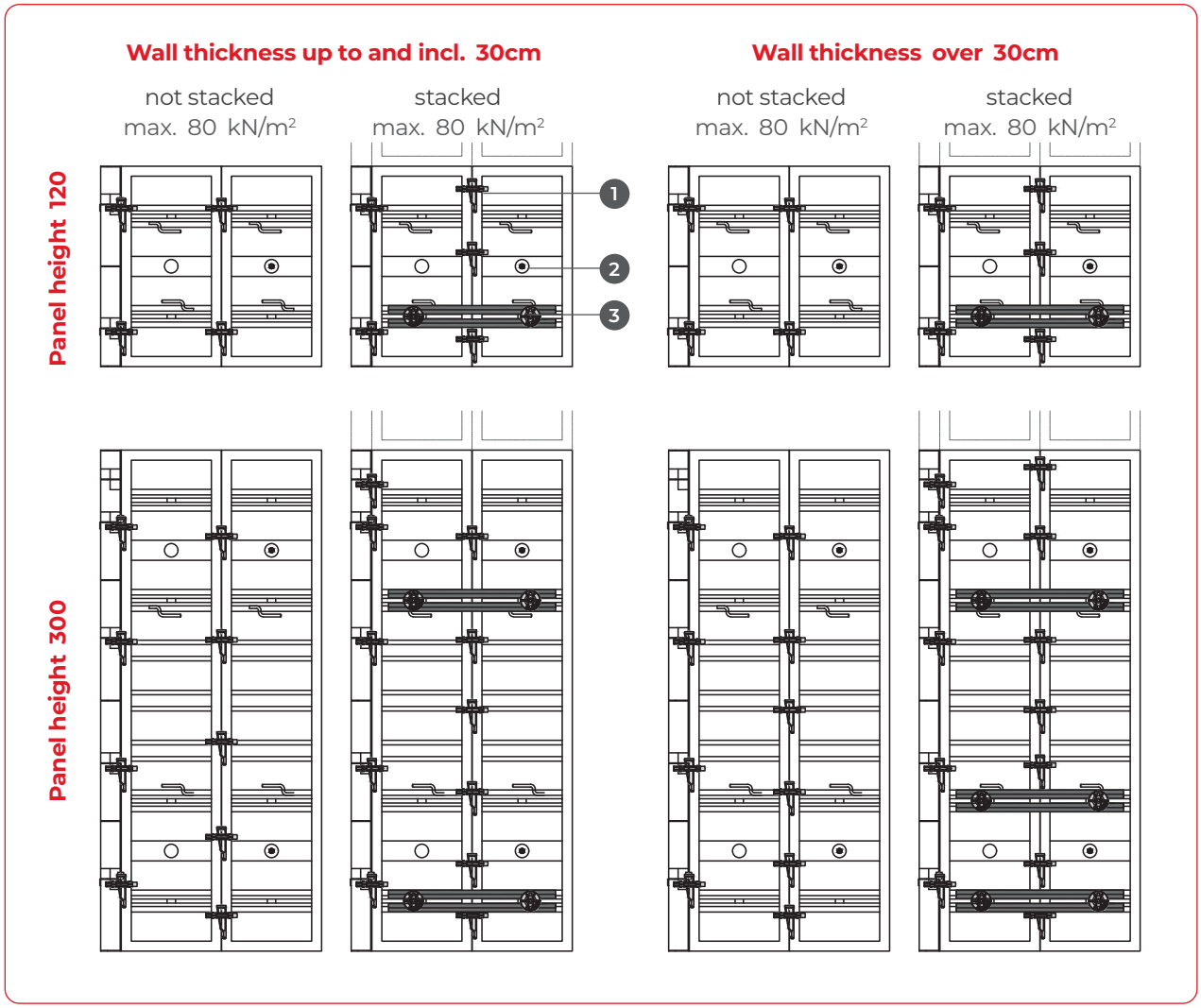
Example corner formations with Uni panels and different wall thickness

1 **Single-tie panel on this side: Waler required**
2 **Two-tie panel on this side: No waler required**
3 **Uni-clamp**
4 **Master- Unversal fixing bolt + Combi plate**
5 **Waler**
6 **RS-Clamp**
7 **Fillerplug**

If universal panels are used in the corner area, the next panel should have a width of 30 cm. If this is not possible, the panel width should not exceed 60 cm. No additional precautions have to be taken if the second panel after the inside corner has a width of 240 cm. If a further single tie panel is following, a waler must be installed (see sketch).

Attention: The holes in the uni panel are only located on one side to reduce the number of plug impressions in the concrete. It is therefore recommended to pay attention to the correct panel position (top/bottom) when attaching the panel with the Master crane hook. If necessary, turn the panel by 180°.
A universal fixing bolt and a combi plate must be installed at the height of each row of holes.

Panel connection at 90° - Corners (outside view)

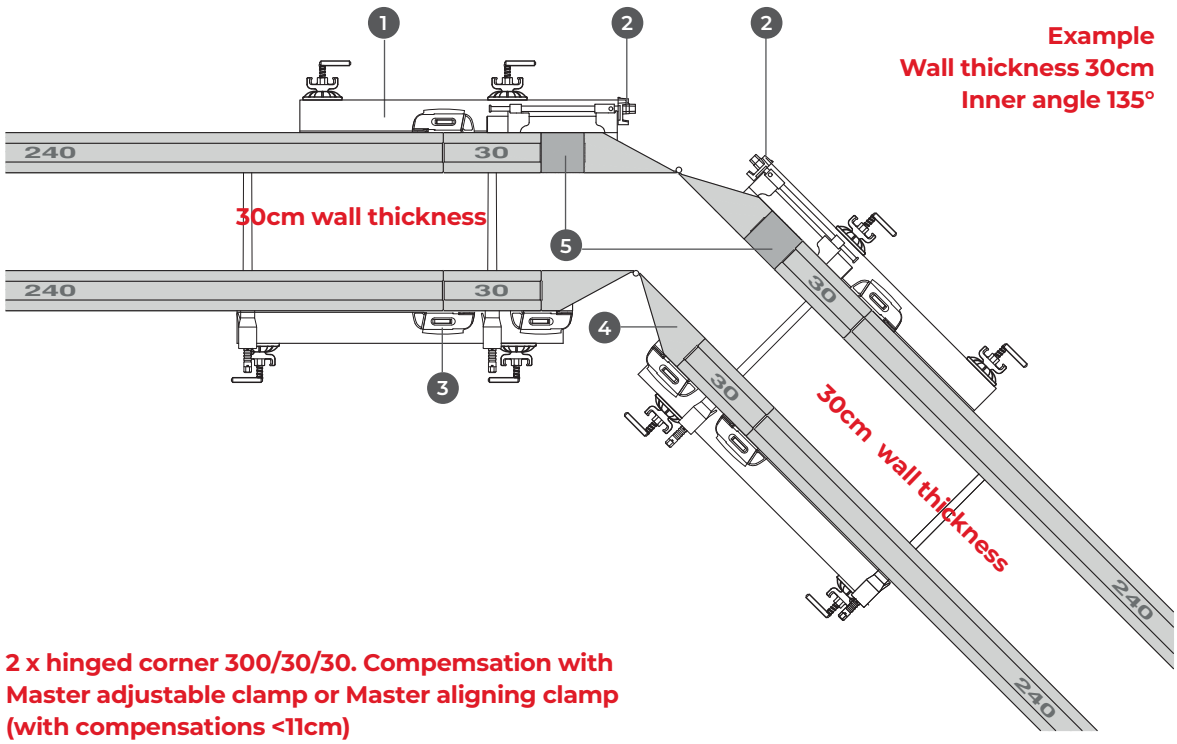


1 Uni clamp
2 Master Pro tie rod
3 Waler + RS-clamp + Combi plate

The required number of connecting devices (Uni clamp, aligning clamp or waler) depends on the wall thickness and the pouring height (stacked/ not stacked). In the sketches above, the Master PRO panel next to the outside corner has a max. width of 60 cm. If possible, however, a 30 cm panel should be used to increase the stability of the corner formation.

The sketches also apply when using universal panels for corner formations. Hereby, one Master universal connecting bolt and a combi plate must be installed for each row of tie holes.

Obtuse-angled corners

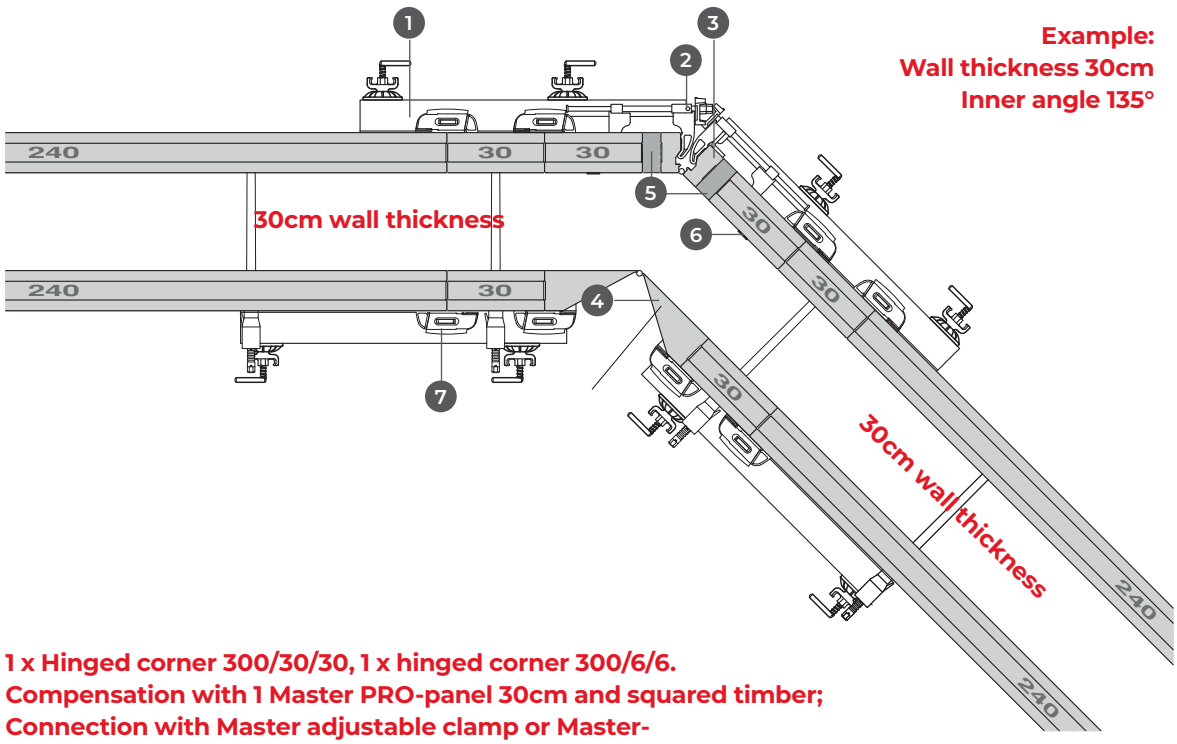


2 x hinged corner 300/30/30. Compemsation with Master adjustable clamp or Master aligning clamp (with compensations <11cm)

1 **Waler + 2x RS-clamps**
2 **Master adjustable clamp**
3 **Master hinged corner 300/30/30**
4 **Master hinged corner 300/30/30**
5 **Compensation**

Hinges corners are used to form obtuse-angled corners. For application examples, see the sketches above. Similar to 90° corners and T-wall connections, the Master PRO panel next the inside corner should also be as narrow as possible. It is recommended to use a 30cm panel. In exceptional cases, panels with a maximum width of 60cm are possible.

Obtuse-angled corners

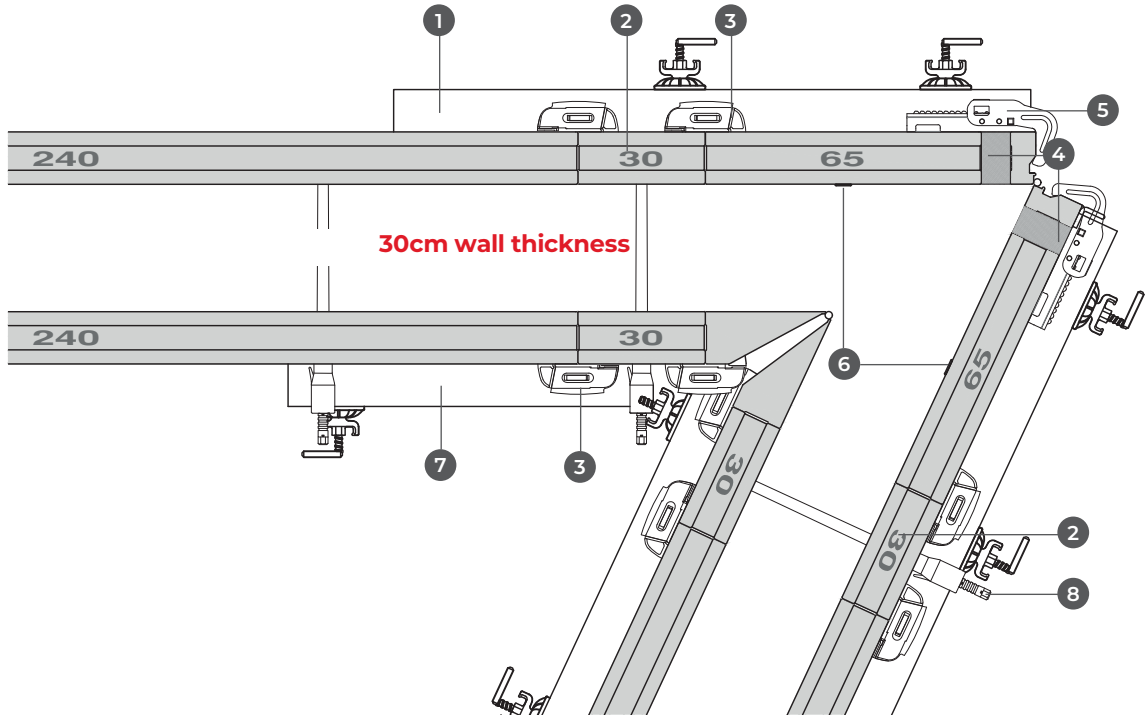


1 x Hinged corner 300/30/30, 1 x hinged corner 300/6/6.
Compensation with 1 Master PRO-panel 30cm and squared timber;
Connection with Master adjustable clamp or Master-aligning clamp (for compensations <11cm)

1 Waler + 2x RS-clamps
2 Master adjustable clamp or Master aligning clamp
3 Master hinged corner 300/6/6
4 Master hinged corner 300/30/30
5 Compensation
6 Filler plug
7 Uni clamp

Acute-angled corners

Example: wall thickness 30cm
Inner angle 65° (= Minimum)



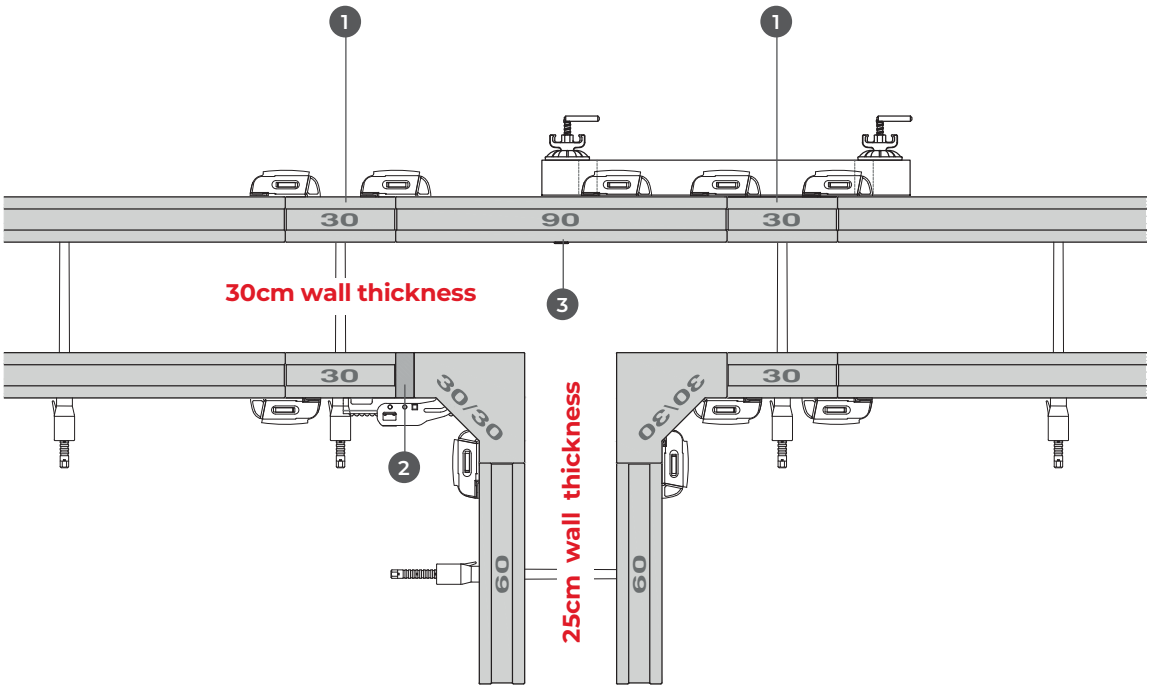
2 x Hinged corner 300/30/30. Compenation with squared timber and with Master adjustable clamp or Master aligning clamp (for compensations <11cm)

1 **Waler 150 + 2 x RS-clamp**
2 **Master PRO panel 30cm**
3 **Uni Clamp**
4 **Compensation**
5 **Master adjustable clamp or Master aligning clamp**
6 **Filler plug**
7 **Waler 100 + 2 x RS- clamp**
8 **Install the tie rod from the opposite side of the sharp angle otherwhise it will strike**

Hinged corners are also used to form sharp-angled corners. For application examples, see the sketches above. Due to the large radius – especially with large wall thicknesses and very sharp angles – a 30 cm Master PRO panel must be installed directly next to the inside hinged corner.

1 x hinged corner 300/30/30, 1 x hinged corner 300/6/6. Alternatively a 300/30/30 hinged corner can also be used on the outside.
The compensation is realised with a squared timber and Master adjustable clamp or Master aligning clamp (for compensations <11 cm).
Reinforcement with Waler 150cm (outside) or Waler 100cm (inside). The vertical number of walers, clamps and aligning clamps is the same as with 90° corners.(depending on wall thickness and stacked or not stacked formwork).

T-wall connections

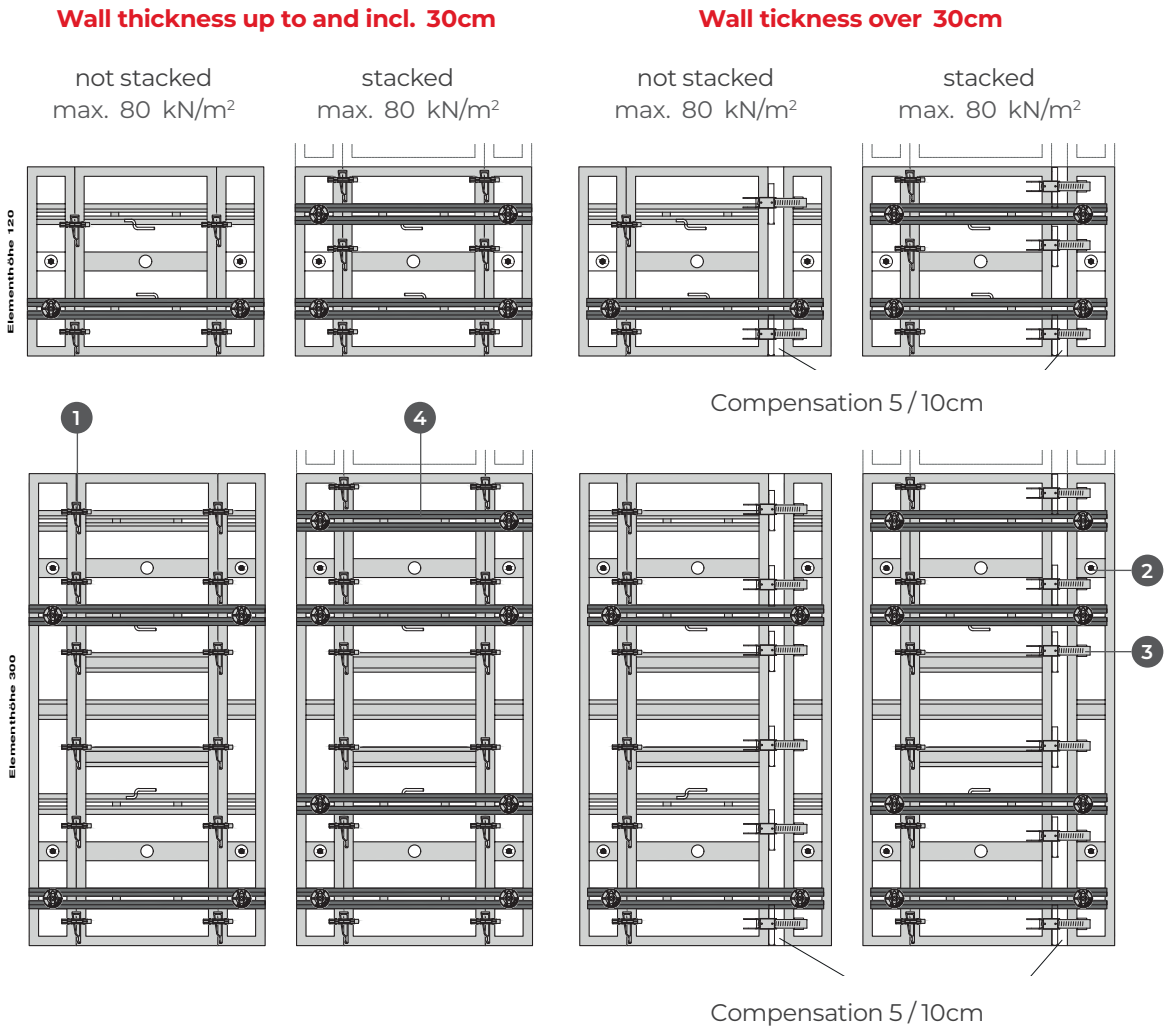


1 **Wall thickness up to and incl. 30cm:**
30 / 55 / 60cm - panel
Wall thickness over 30cm:
30cm - panel
2 **Compensation 5cm**
3 **Filler plugs**

Similar rules apply to T-connections as for corners: The direct connection to the inner corner should be made using a Master PRO panel with a width of 30 cm (see sketch above).With a wall thickness up to and incl. 30 cm, panels with a width of 55 cm and 60 cm also are possible. 30 cm panels must be used with wall thicknesses more than 30 cm. Unused tie rod holes **have to** be closed with a filler plugs.

For wall thicknesses over 30 cm, the fresh concrete pressure must be limited to 60 kN/m² (observe the max. permissible pouring speed)!

T-wall connections

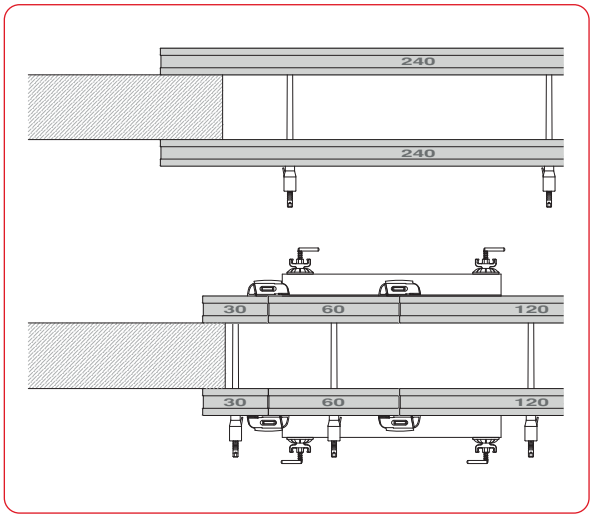


1 Uni clamp
2 Master PRO - tie rod
3 Master - Aligning clamp
4 Waler 150
+ RS-Clamp
+ Combi plate

The required number of connecting devices (Uni clamp, aligning clamp, or alignment rail) depends on the wall thickness and pouring height.

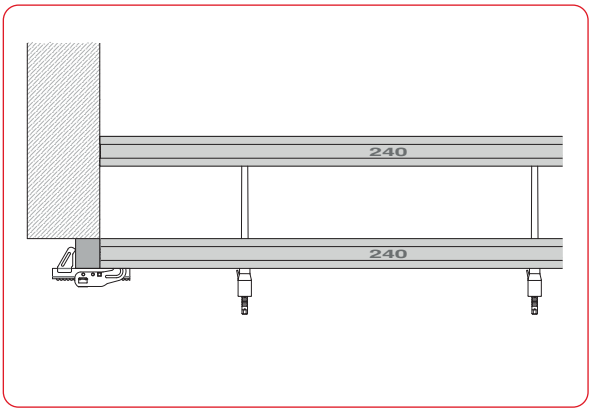
The sketches above illustrate the arrangement, depending on the wall thickness and stacked/not stacked formwork, for panel heights 120cm and 300cm.

In-line connections and wall offsets



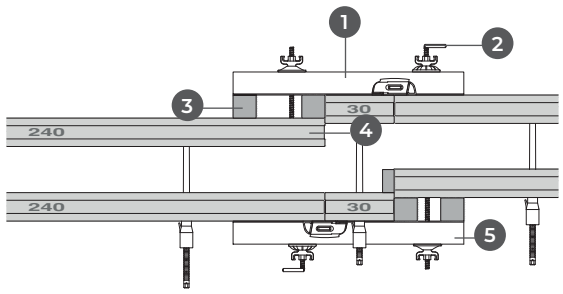
Connections to an existing wall

In-line connections
In-line connections can be created by using Master PRO-Panels. When using 240 panels, no further precautions are necessary. If more than two successive single tie panels are used, walers must be installed on both sides (at the height of the bottom function profile).
If the existing wall is thinner than the theoretical thickness, the Master PRO tie rod system can also be made thinner by 1 cm. Only screw in the tie rod until the panels snug against the existing wall on both sides.



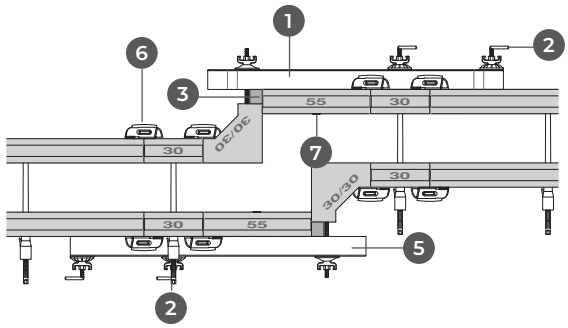
Corner connections with squared timber and Master aligning clamp.
If more than two successive single tie panels are used, a waler must be installed on both sides. The existing wall must be secured against the concrete pressure if needed (possibly support on the outside using push-pull props).

In-line connections and wall offsets



Wall offsets 0 - 12cm

A wall offset up to max. 12cm can be produced with this method. The side holes of the panels open to the offset must be closed with suitable plugs or a narrow strip of wood.
The number of Walers and Uni clamps is the same as with 90° corners (depending on the wall thickness and stacked/not stacked formwork).

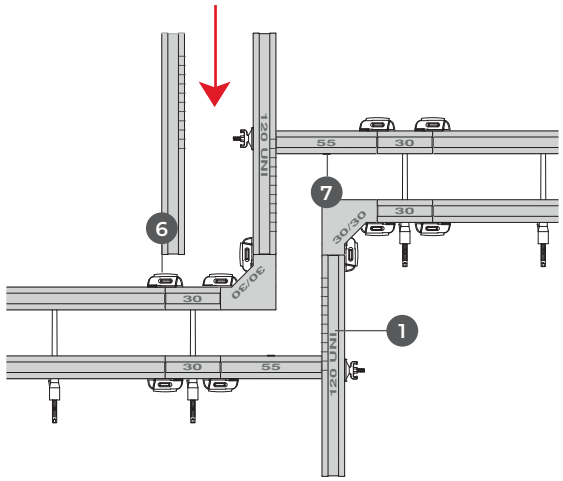


20 / 25 / 30 / 35cm Wall thickness

Wall offsets 18 - 30cm

This method uses Inside corners. The size of the wall offsets depends on the thicknes of the enclosed squared timber (0 to 12cm). The number of Walers and Uni clamps is the same as with 90° corners (depending on the wall thickness and stacked/not stacked formwork).

with offsets >85cm Uni panels have to be rotated by 180° (Top side down)

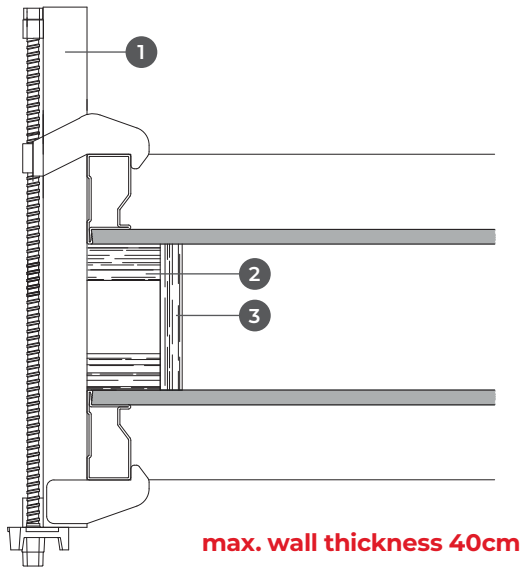


20 / 25 / 30 / 35cm Wall thickness

Wall offsets 35 - 130cm

1. **Master-Universal connecting bolts + Combi plates**
2. **RS-Clamp**
3. **Squared timber**
4. **Close side holes or insert narrow wooden strip**
5. **Waler**
6. **Uni clamp**
7. **Filler plugs**

Stop-end formwork

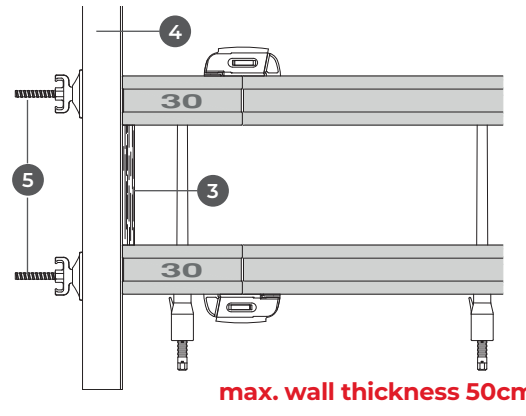


max. wall thickness 40cm

There are following options to form stop-ends:

Formworksheet with **Stop-end coupler**

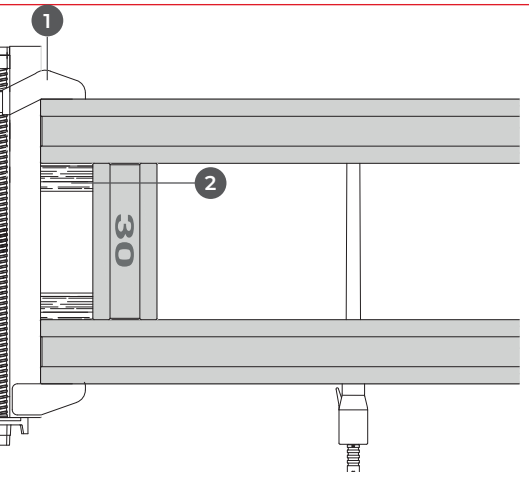
Number of couplers:
up to 0,60m: 1 coupler
up to 1,20m: 2 coupler
up to 3,00m: 3 coupler



max. wall thickness 50cm

Formworksheet with **Waler**

Formwork panels with waler; securing either with universal connecting bolts or Master stop end anchor (each with a combi plate):
Number of Walers:
up to 0,60m: 1 Waler
up to 1,20m: 2 Waler
up to 3,00m: 3 Waler



Master PRO - Panel with **Stop-end coupler**

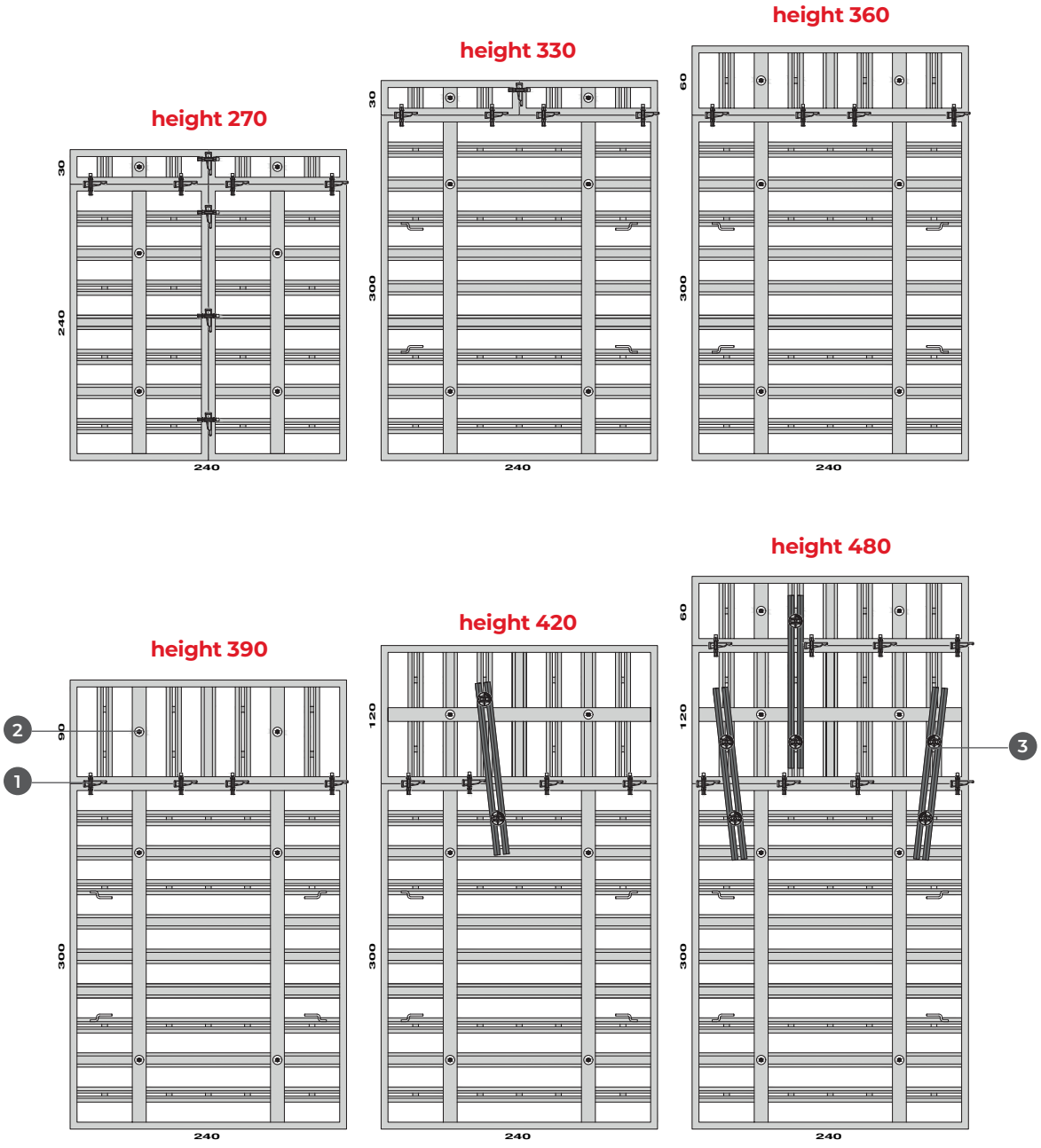
if necessary, the distance can be changed with square timbers

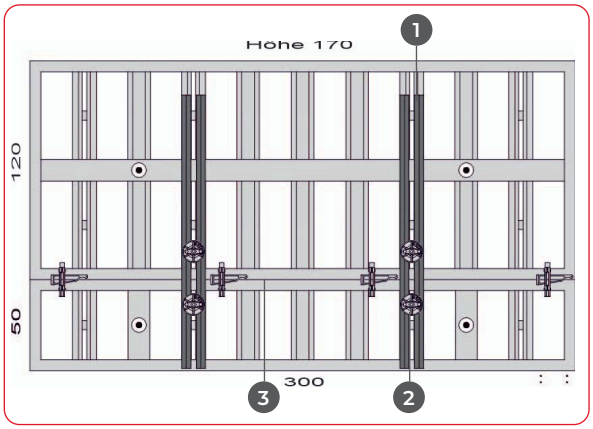
1 **Stop-end coupler**
2 **Squared timber**
3 **Formworksheet**
4 **Waler 100**
5 **Master Stop-end anchor+ Combi plate or Master Uni Fixing Bolt + Combi plate**

Rules for vertical stacking

1 **UNI-Klemme**
2 **Master PRO - Tie rod**
3 **Waler + RS-Clamp + Combi plate**

Panels are connected using Uni clamps and Walers 150 in line with the following sketches. For increases from 600 cm upwards, three 150 Walers must be installed for each horizontal panel joint.





Support

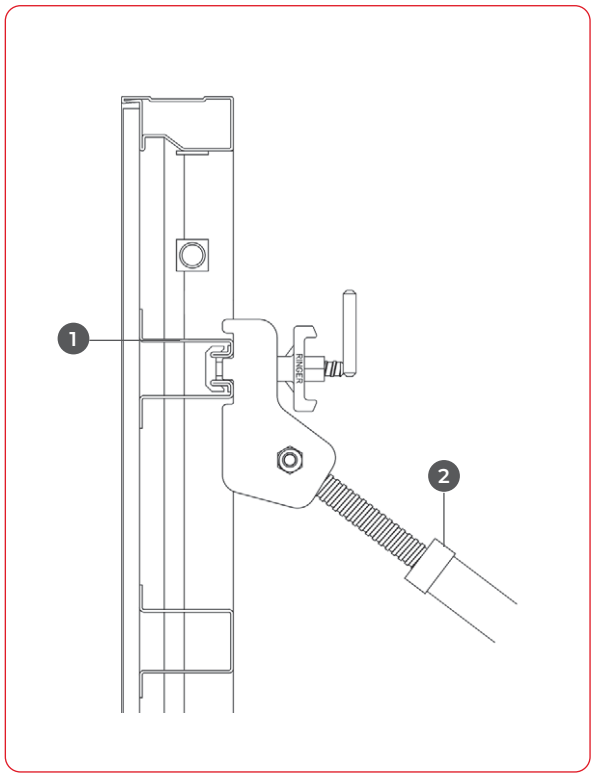
Observe the following when supporting horizontal single form-tie panels:

- The narrower panel must be at the bottom
- At least 2 verical Walers 1.0 m or 1.5 m must be used for each panel length (2.4 m or 3.0 m).
- At least one RS clamp must be arranged as close as possible to the panel joint.

Number of horizontal Uni-clamps:
3 pcs for 2,40m panels
4 pcs for 3,00m panels
If more than 2 single tie panels are used on top of each other, additional 2.0 m or 3.0 m vertical Walers are required. They should span all three panels, if possible.
Using 4 single tie panels on top of each other should be avoided.

1 **Waler**
2 **RS-Clamp**
3 **Panel joint**

Storage and Set-up Aides



Master push-pull props are used to set up and fix the Master PRO panels. The push-pull props are attached to the panels using the function profile:

1 Function profile
2 Master push-pull prop

The push-pull prop must be anchored into the ground in a manner that is resistant to tensile and compressive forces. The steadfastness and wind-resistance must be guaranteed during every construction phase!

There are 3 types of push-pull props and extensions available:

„Size 1“	Adjustment range 2,15 - 3,60m
„Size 2“	Adjustment range 3,10 - 5,50m
„Size G”	Adjustment range 3,50 - 5,90m
„Size G” with extensions	Adjustment range 6,50-10,00m

Number and type of push-pull props for panel joints with 2,40m width:

Formwork height [m]	Size 1	Size 2	Size G	Size G with Extension
3,60	1			
5,40		1		
6,60			1	
7,20	1			1
9,00		1		1

Note: The horizontal push-pull prop distance can be increased to 3.6 m up to a formwork height of 3.6 m.

Size	max. compressive load	max. tensile load
Gr.1	12kN	18kN
Gr.2	20kN	30kN
Gr.G	30kN	40kN
Extension for size G	20kN	40kN

Pouring platforms, Climbing formwork, Brace frames

The profiles of the Master PRO panels are identical to those of the Ringer Master profiles. This also applies to the function and reinforced profiles.

All Ringer Master formwork accessories can therefore also be used and are compatible with Master PRO.

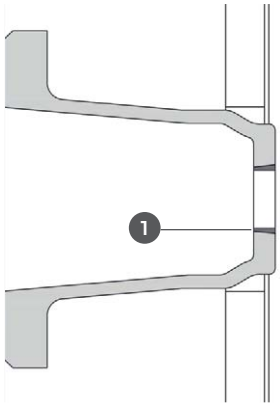
Therefore, reference is made to following assembly and usage instructions**:**
- Ringer 3S - Platform
- Ringer Climbing Platform
- Ringer Brace Frame

Solutions for Special Applications

Reference is made to other Ringer formwork systems for the following applications or items:

- Circular formwork with circular foming plate assembly and usage instructions**:** Ringer Master
- Master compensation panel with withs of 2 / 3 / 5 / 10cm and heights of 90 / 135 / 270 / 330cm
- Master stripping panel with a width of 10cm an a height of 90 / 135 / 270cm
- Master stripping corner 135/30/30, 270/30/30, 300/30/30, 330/30/30
- Shaftformwork with Master stripping corner

Cleaning and Maintenance



1 Concreting Ring

before pouring:
- Apply a thin coat of Ringer release agent or Ringer release agent for exposed concrete onto the formwork skin
- Spray the conical parts of the tie rod with a thin layer of release agent before the first use and every 5th use.

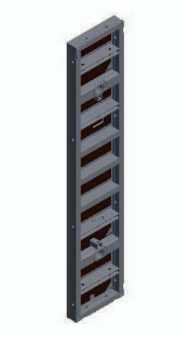
after pouring:
- Spray the conical parts of the tie rod with a thin layer of release agent before the first use and every 5th use

after stripping:
- Clean the plywood with a scraper or, if necessary, a high-pressure cleaner. Never use wire brushes, rotating grinding discs, or similar tools!
- If necessary, remove any remaining concrete ring from the hole of the tie rod sleeve, this protects the seals during next use

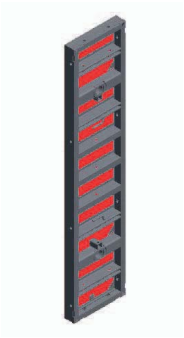
5 Overview of individual parts

Single-sided tie technology Master PRO

Art. No.		Item	Weight [kg]	Unit
Master PRO 300 Phenolic Coated Plywood				
F808V240	*	Master PRO Panel 300/240 galvanized with Phenolic-ply	531.00	pc.
F808V120	*	Master PRO Panel 300/120 galvanized with Phenolic-ply	288.00	pc.
F808V090	*	Master PRO Panel 300/90 galvanized with Phenolic-ply	203.00	pc.
F808V065	*	Master PRO Panel 300/65 galvanized with Phenolic-ply	160.00	pc.
F808V060	*	Master PRO Panel 300/60 galvanized with Phenolic-ply	152.00	pc.
F808V055	*	Master PRO Panel 300/55 galvanized with Phenolic-ply	143.00	pc.
F808V050	*	Master PRO Panel 300/50 galvanized with Phenolic-ply	134.00	pc.
F808V030	*	Master PRO Panel 300/30 galvanized with Phenolic-ply	97.00	pc.
Master PRO 240 Phenolic Coated Plywood				
F807V120	*	Master PRO Panel 240/120 galvanized with Phenolic-ply	238.00	pc.
F807V090	*	Master PRO Panel 240/90 galvanized with Phenolic-ply	173.00	pc.
F807V060	*	Master PRO Panel 240/60 galvanized with Phenolic-ply	129.00	pc.
Master PRO 120 Phenolic Coated Plywood				
F806V120	*	Master PRO Panel 120/120 galvanized with Phenolic-ply	121.00	pc.
F806V090	*	Master PRO Panel 120/90 galvanized with Phenolic-ply	92.00	pc.
F806V065	*	Master PRO Panel 120/65 galvanized with Phenolic-ply	73.00	pc.
F806V060	*	Master PRO Panel 120/60 galvanized with Phenolic-ply	69.00	pc.
F806V055	*	Master PRO Panel 120/55 galvanized with Phenolic-ply	65.00	pc.
F806V050	*	Master PRO Panel 120/50 galvanized with Phenolic-ply	61.00	pc.
F806V030	*	Master PRO Panel 120/30 galvanized with Phenolic-ply	44.00	pc.
Master PRO Uni Panels Phenolic Coated Plywood				
F808VU120	*	Master PRO Uni Panel 300/120 galvanized with Phenolic-ply	239.00	pc.
F806VU120	*	Master PRO Uni Panel 120/120 galvanized with Phenolic-ply	108.00	pc.



Art. No.	Item	Weight [kg]	Unit
Master PRO 300 Plastic Coated Plywood			
E808V240	Master PRO Panel 300/240 galvanized with Plastic-ply	529.00	pc.
E808V120	Master PRO Panel 300/120 galvanized with Plastic-ply	287.00	pc.
E808V090	Master PRO Panel 300/90 galvanized with Plastic-ply	202.00	pc.
E808V065	Master PRO Panel 300/65 galvanized with Plastic-ply	159.00	pc.
E808V060	Master PRO Panel 300/60 galvanized with Plastic-ply	151.00	pc.
E808V055	Master PRO Panel 300/55 galvanized with Plastic-ply	142.00	pc.
E808V050	Master PRO Panel 300/50 galvanized with Plastic-ply	133.00	pc.
E808V030	Master PRO Panel 300/30 galvanized with Plastic-ply	96.00	pc.
Master PRO 240 Plastic Coated Plywood			
E807V120	Master PRO Panel 240/120 galvanized with Plastic-ply	229.00	pc.
E807V090	Master PRO Panel 240/90 galvanized with Plastic-ply	172.00	pc.
E807V060	Master PRO Panel 240/60 galvanized with Plastic-ply	128.00	pc.
Master PRO 120 Plastic Coated Plywood			
E806V120	Master PRO Panel 120/120 galvanized with Plastic-ply	120.00	pc.
E806V090	Master PRO Panel 120/90 galvanized with Plastic-ply	92.00	pc.
E806V065	Master PRO Panel 120/65 galvanized with Plastic-ply	72.00	pc.
E806V060	Master PRO Panel 120/60 galvanized with Plastic-ply	68.00	pc.
E806V055	Master PRO Panel 120/55 galvanized with Plastic-ply	64.00	pc.
E806V050	Master PRO Panel 120/50 galvanized with Plastic-ply	60.00	pc.
E806V030	Master PRO Panel 120/30 galvanized with Plastic-ply	44.00	pc.
Master PRO Uni Panels Plastic Coated Plywood			
E808VU120	Master PRO Uni Panel 300/120 galvanized with Plastic-ply	237.00	pc.
E806VU120	Master PRO Uni Panel 120/120 galvanized with Plastic-ply	107.00	pc.



* Items for sale only, not available for renting

Art. No.	Item	Weight [kg]	Unit
Alu Master 300 Alkus (all-over plastic)			
V808V240	Master PRO Panel 300/240 galvanized with Alkus	539.00	pc.
V808V120	Master PRO Panel 300/120 galvanized with Alkus	292.00	pc.
V808V090	Master PRO Panel 300/90 galvanized with Alkus	206.00	pc.
V808V065	Master PRO Panel 300/65 galvanized with Alkus	162.00	pc.
V808V060	Master PRO Panel 300/60 galvanized with Alkus	154.00	pc.
V808V055	Master PRO Panel 300/55 galvanized with Alkus	145.00	pc.
V808V050	Master PRO Panel 300/50 galvanized with Alkus	136.00	pc.
V808V030	Master PRO Panel 300/30 galvanized with Alkus	98.00	pc.
Alu Master 240 Alkus (all-over plastic)			
V807V120	Master PRO Panel 240/120 galvanized with Alkus	241.00	pc.
V807V090	Master PRO Panel 240/90 galvanized with Alkus	176.00	pc.
V807V060	Master PRO Panel 240/60 galvanized with Alkus	131.00	pc.
Alu Master 120 Alkus (all-over plastic)			
V806V120	Master PRO Panel 120/120 galvanized with Alkus	123.00	pc.
V806V090	Master PRO Panel 120/90 galvanized with Alkus	94.00	pc.
V806V065	Master PRO Panel 120/65 galvanized with Alkus	74.00	pc.
V806V060	Master PRO Panel 120/60 galvanized with Alkus	70.00	pc.
V806V055	Master PRO Panel 120/55 galvanized with Alkus	66.00	pc.
V806V050	Master PRO Panel 120/50 galvanized with Alkus	62.00	pc.
V806V030	Master PRO Panel 120/30 galvanized with Alkus	45.00	pc.
Master PRO Uni Panels Alkus (all-over plastic)			
V808VU120	Master PRO Uni Panel 300/120 galvanized with Alkus	243.00	pc.
V806VU120	Master PRO Uni Panel 120/120 galvanized with Alkus	109.00	pc.

Accessories

Art. No.	Item	Weight [kg]	Unit
Master PRO Inside Corners			
F808V3030 *	Master PRO Inside Corner 300/30/30 galvanized with Phenolic-ply	117.00	pc.
F806V3030 *	Master PRO Inside Corner 120/30/30 galvanized with Phenolic-ply	51.00	pc.
E808V3030	Master PRO Inside Corner 300/30/30 galvanized with Plastic-ply	115.00	pc.
E806V3030	Master PRO Inside Corner 120/30/30 galvanized with Plastic-ply	50.00	pc.
V808V3030	Master PRO Inside Corner 300/30/30 galvanized with Alkus	120.00	pc.
V806V3030	Master PRO Inside Corner 120/30/30 galvanized with Alkus	52.00	pc.
Master Outside Corners			
703V133	Master Outside Corner 300 galvanized	43.50	pc.
703V137	Master Outside Corner 120 galvanized	18.00	pc.
703V16	Master Outside Corner 90 galvanized	13.90	pc.
Master Scharnierecken Innen			
703V34	Master Hinged Inside Corner I 300/30/30 galvanized	143.50	pc.
803V24	Master Hinged Inside Corner I 135/30/30 galvanized	68.00	pc.
Master Hinged Outside Corners			
703V341	Master Hinged Outside Corner 300/6/6 galvanized	65.50	pc.
803V241	Master Hinged Outside Corner 135/6/6 galvanized	26.00	pc.
Tie Rod System Master PRO			
407E007	Tie Rod 15-30cm single side operated	2.30	pc.
407E008	Tie Rod 20-35cm single side operated	2.54	pc.
407E009	Tie Rod 35-50cm single side operated	3.27	pc.
407E054	Anchor Sleeve Master PRO (incl. sealing)	1.95	pc.
407E010	Form Tie Nut set for Master PRO incl. Sealing Disk	0.76	pc.
407E225	Ratchet 3/4 for Master PRO Anchor spanner gap 19mm lenght 80cm	4.00	pc.
407E016	Lock for Master PRO galvanized	0.47	pc.











* Items for sale only, not available for renting

Art. No.		Item	Weight [kg]	Unit
407E030	*	Sealing Disk Standing Formwork Master PRO ready cast	0.07	pc.
407E035	*	Sealing Disk Opposing Formwork Master PRO ready cast	0.09	pc.
407E040	*	Holding Ring Master PRO	0.01	pc.
407E131		Wrench for Master PRO galvanized	0.45	pc.
407E135		Distance Keeper 15-50cm for Master PRO Panels	3.40	pc.




Additional Accessories Master PRO

407E100	*	Plug for Exposed Concrete Master PRO	0.05	pc.
407E175	*	Plate for Exposed Concrete Master PRO	0.13	pc.
407E102		Cone Wrench for Master PRO galvanized	0.19	pc.
407E085	*	Filler Plug for Master PRO	1.00	100 pc.
407E095	*	Closing Plug 38mm Master PRO	1.00	100 pc.
407E090	*	Closing Plug 24mm Master PRO	0.01	100 pc.
407E110	*	Stacking Cone Master PRO	1.00	500 pc.
407E120	*	Adapter Plug DW20 Master PRO	1.00	100 pc.
407E115	*	Adapter Plug DW15 Master PRO	1.00	100 pc.








407E172	*	Rivestop 24x50 SS Interior with stainless steel disk for inner seal	0.03	pc.
EB008		Hand Riveter for Rivestop	6.00	pc.

Master Stripping Corners

709V5	Master Stripping Corner 300/30/30 galvanized	225.00	pc.
706V1	Master Stripping Corner 135/30/30 galvanized	107.00	pc.
706V4	Adjustment Lever for Master Stripping Corner	4.00	pc.

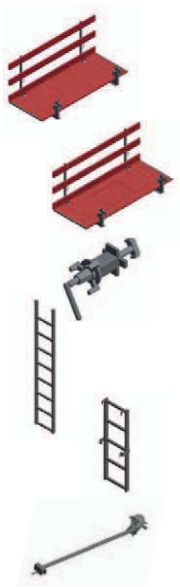
Art. No.		Item	Weight [kg]	Unit
254 21	*	Coil for Coil Anchor galvanized	1.50	100 pc.
254 2	*	Coil Anchor 16 x 90mm galvanized	0.15	pc.

Concreting Brackets

708V11	Bracket without Railing galvanized	6.30	pc.
408V12	Railing for Concreting Bracket galvanized	3.90	pc.
704V53	Master Railing Holder galvanized	4.40	pc.

Concreting Platforms

708V20	Concreting Platform "L" 2,70m preassembled unit	66.00	pc.
708V21	Concreting Platform "L" 2,70m with Access Hatch	66.00	pc.
708V206	Assembly Adapter for Concreting Platform "L"	2.00	pc.
708V211	Ladder for Concreting Platform "L" 2,7m galvanized	15.00	pc.
708V212	Extension 3,3m for Ladder for Concreting Platform "L" galvanized	12.00	pc.
708V222	Distance Bracket for Ladder for Concreting Platform "L"	6.00	pc.



3S-Concreting Platform 3,0m including:

254V2	3S-Platform 3,0m size 2
255V1	3S-Concreting Bracket galvanized

Gesamtgewicht [kg] 187.00

Transportation Devices

708V5		Crane Hook Master galvanized capacity 1800 kg serial number ...../....	11.00	pc.
708 412	*	Transport Bolt with chain link for Master Formwork	1.20	pc.

* Items for sale only, not available for renting

Art. No.		Item	Weight [kg]	Unit
708 41		Master Transportation Device with 4 chains 3m (complete set)	15.00	pc.
704 4		Assembly Bar for H20 Beams and Master Crane Hook (made of aluminium)	3.20	pc.

Transportation and Storage

260V0006		Accessory Box galvanized	160.00	pc.
260V10		UNI Container with flap galvanized	72.00	pc.
260V11		UNI Container without flap galvanized	70.00	pc.
260V12	*	RINGER Multi-Trip Transport Box galvanized	66.00	pc.

Release Agent and Spraying Device

450 1	*	Release Agent (canister 25 litre)	22.50	CSTR
450 11	*	Release Agent (barrel 200 litre) incl. spigot set	180.00	Bbl
450 3	*	Special Release Agent for exposed concrete (25 liter canister)	22.50	CSTR
408 8	*	Spraying Device with flat jet nozzle set (5 Liter content)	5.00	pc.

Additional Accessories

B561	*	Concrete Deflector galvanized	2.70	pc.
230V3	*	Ground Anchor galvanized	4.00	pc.
408 5	*	Carbide Scraper with reversing plate width 10cm arm length 1,3m	1.40	pc.
408 51	*	Carbid Scraper with reversing plate width 10cm arm lenght 0,8 m	1.20	pc.

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