OPTIMO

FORMWORKS | USER MANUAL

CONDOR

WELCOME THE CHALLENGES

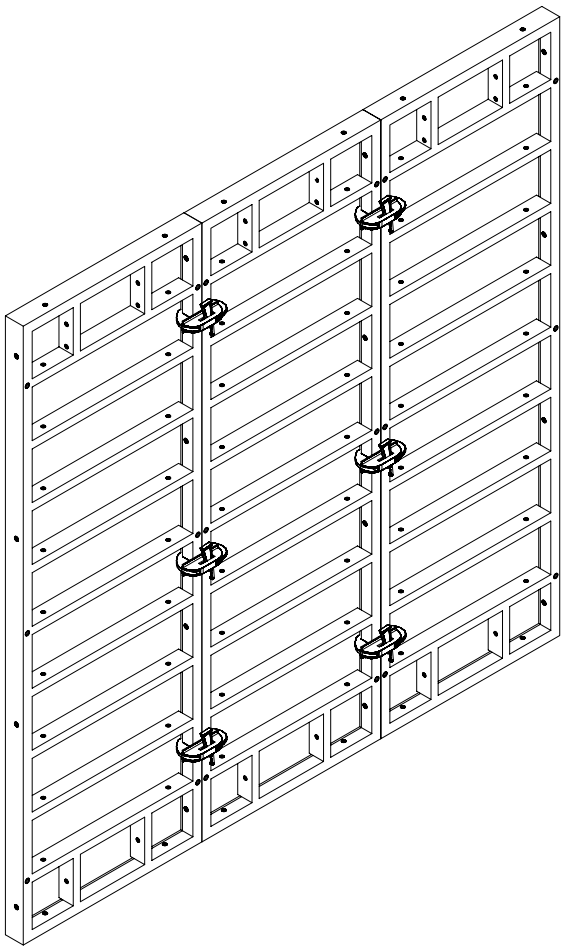
Index

System Characteristics

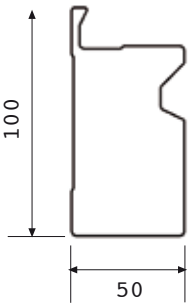
Outer frame with Optimo profile and "CU" cross-beams welded every 30 cm, on which a single plywood panel is fixed with self-drilling screws.The panel is 18 mm-thick birch plywood with phenolic coating, 220/220 g/m2.

CAUTION!
Do not use cross beams as stairs.

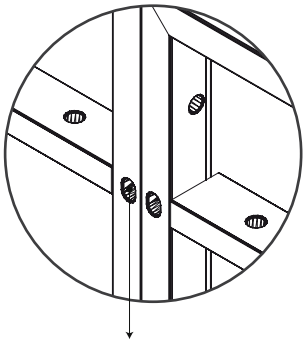
PRESSURES:
60 kN/m2: pressure of fresh concrete according to DIN 18218, respecting the flatness tolerance as per DIN 18202 (chart 3 line 7).



18 mm-thick single-panel Finnish plywood with 220/220 g/m2 phenolic film.

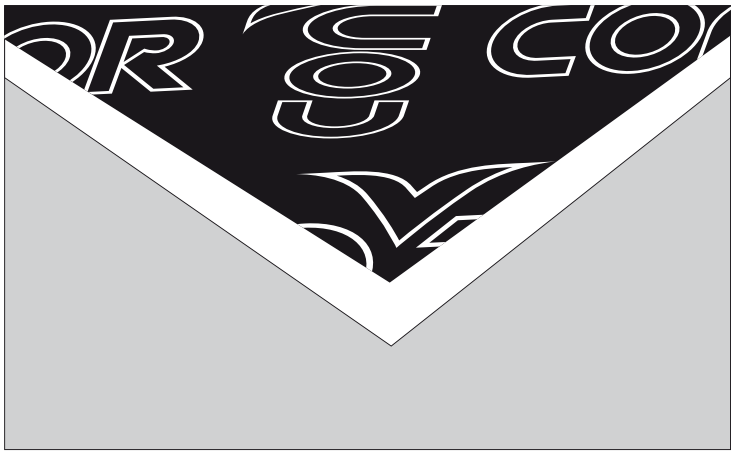


OPTIMO PROFILE
weight = 4,52 kg/m
material EN 10025B/S23B JR



the holes in the panel permit the insertion of DW15 tie rods, inclined at most 4,5°.

PLYWOOD CHARACTERISTICS
Birch plywood, thikness 18 mm, phenolic film on both sides
- easier cleaning
- clean concrete surfaces
- durable



CARACTERISTICS OF THE PLYWOOD

	PLYWOOD
THICKNESS	18 mm
WEIGHT	12,6 kg/mq
EXTERNAL PROTECTION	PHENOLIC FILM 220/220
INTERNAL COMPOSITION	13 LAYERS (BIRCH)
SIDES (H = 2973-2980)	PROTECTED BY PAINT
ABSORPTION OF HUMIDITY OF PROTECTED PANEL	NULL
ABSORPTION OF HUMIDITY OF CUT PANEL UNI 4872/61	ELEVATED
NUMBER OF RE-USES	100-150 PER SIDE
RELEASES	NECESSARY
REPAIRS	WITH FILLERS (PUTTY)
THERMAL CONDUCTIVITY IEN 139	0,17 W/m°K

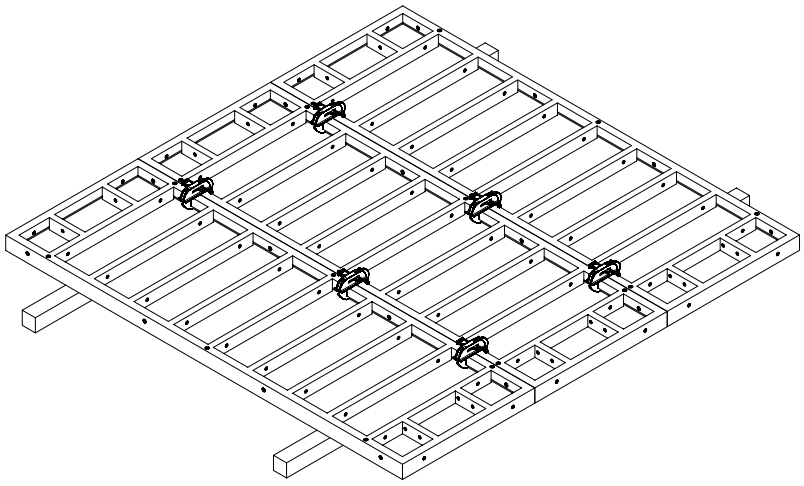
Assembling & Stripping of Walls

a. Walls

Assembly of a straight wall.

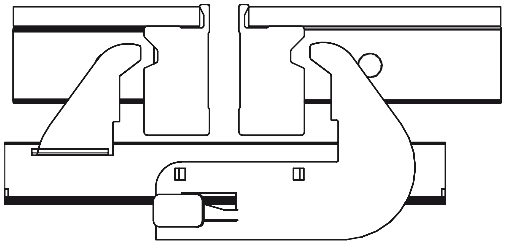
WALL 1

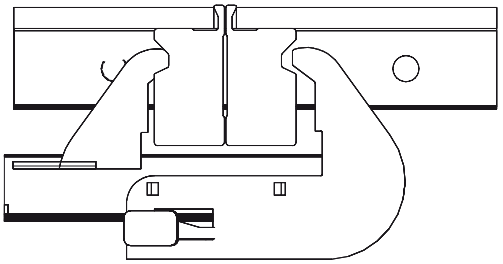
Pre-assembly
- Pre-assemble the Optimo panels in horizontal position on a support surface. Use wood beams to keep the support surface level.
- Assemble the panels with adjustable clamp or fixed clamp.

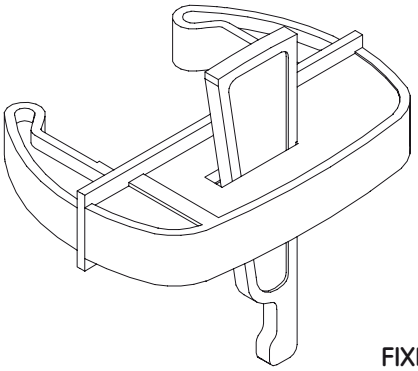


wooden beams to level the work surface

ADJUSTABLE CLAMP







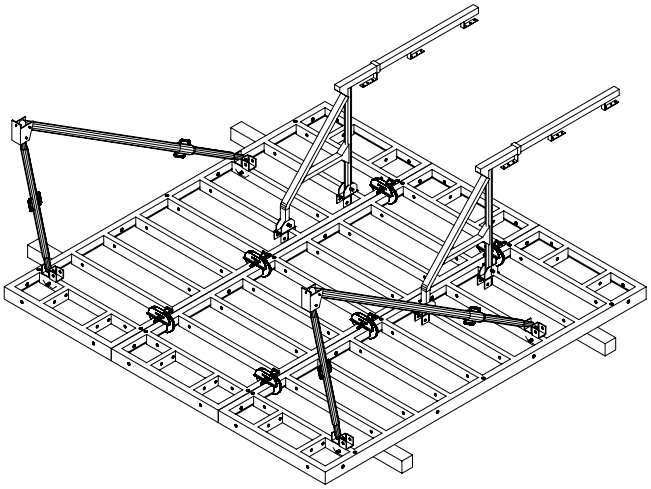
FIXED CLAMP

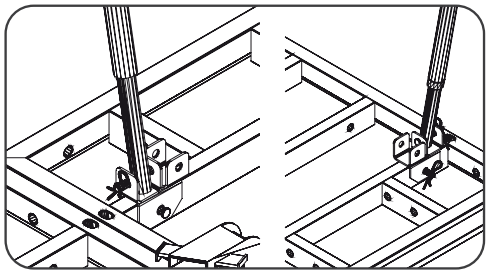
-Mount the props on the formworks in the horizontal position.
-Mount the service brackets on the formworks in the horizontal position.
-Mount Optimo lifting hooks.
-Connect the crane hooks to the Optimo lifting hooks.

Carefully check the coupling between the lifting hook and the frame profile!The handle must be closed!The maximum load of the lifting hook is 1.5 t with a maximum angle of 30° to the vertical of the ropes of the sling gear.

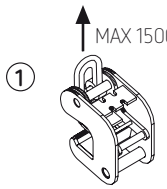
STABILIZATION PROPS
Important note:
Mount all the formwork elements in a stable manner in each phase of the work! Comply with all current security and safety regulations!

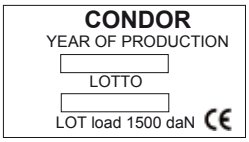
Note:
Prop up with at least two (2) props, placed at variable centre distances according to the stabilization props chart.
SERVICE BRACKET
Dead load permitted: 1,5 kN/m2 (150 kg/m2;
Load category 2 as per EN 12811 -1:2003

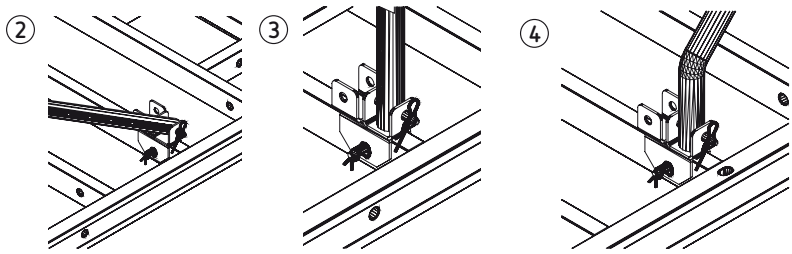




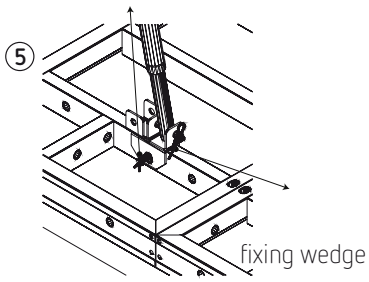
detail OMEGA PT connector







D20 pin + split pin

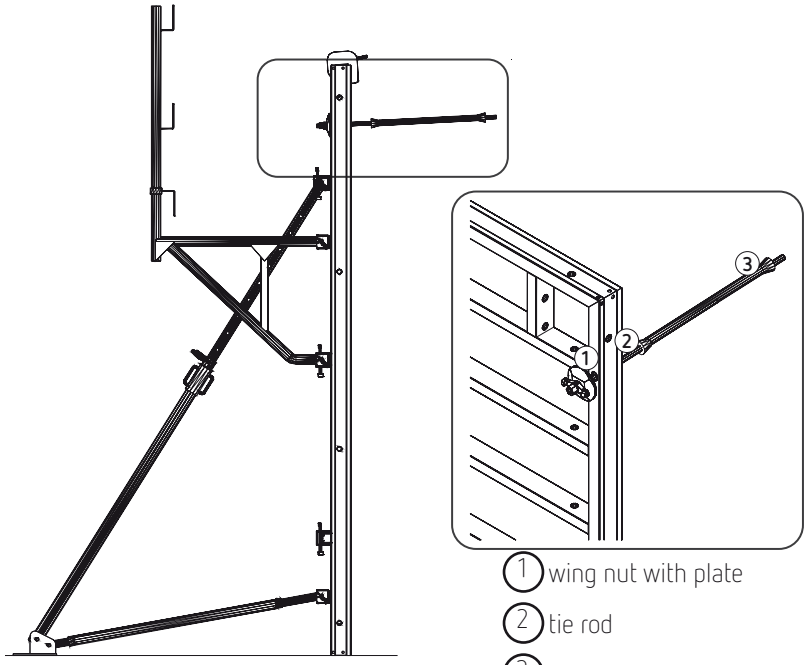


POSITIONING WALL 1

CAUTON!
Do not use hammer to adjust the components because this would damage the profiles of the formworks. Only use the special accessories provided to assemble and adjust the components.
- Lift with a crane.
- Spray the release agent on the panel.

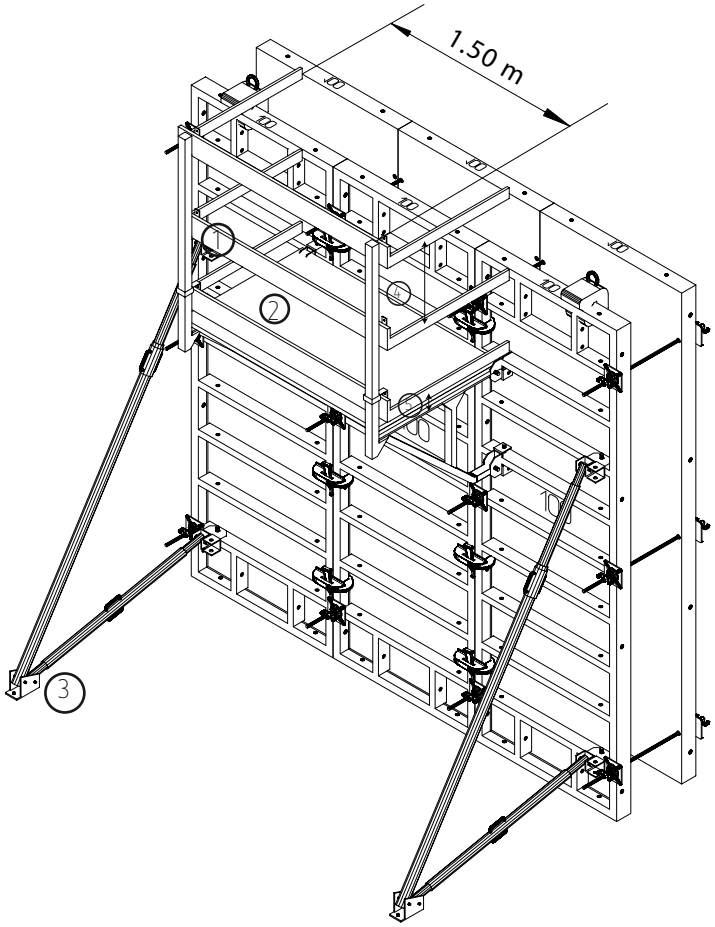
-Bring the assembled system to the place of installation.
-Fix the stabilization props to the floor to guarantee stability.
-Insert the tie rods with plate and wing nut and the PVC spacers which ensure parallelism and distance between the formworks
-Complete the service brackets with walking decks and wood parapet (H min. 1,00 m)
-Unhook the lifting hooks.

Proceed in the same manner to assemble the other walls, one next to the other.



1 wing nut with plate
2 tie rod
3 spacer

CAUTION !
Risk of death from falling. Always use individual fall protection equipment or assemble the parapet in the pre-mounting phase.



1 Universal service bracket
2 wood and deck and parapet to be provided by the customer

3 Optimo adjustment prop with plate and universal coupling

4 max 25 / min 200

5 min 50

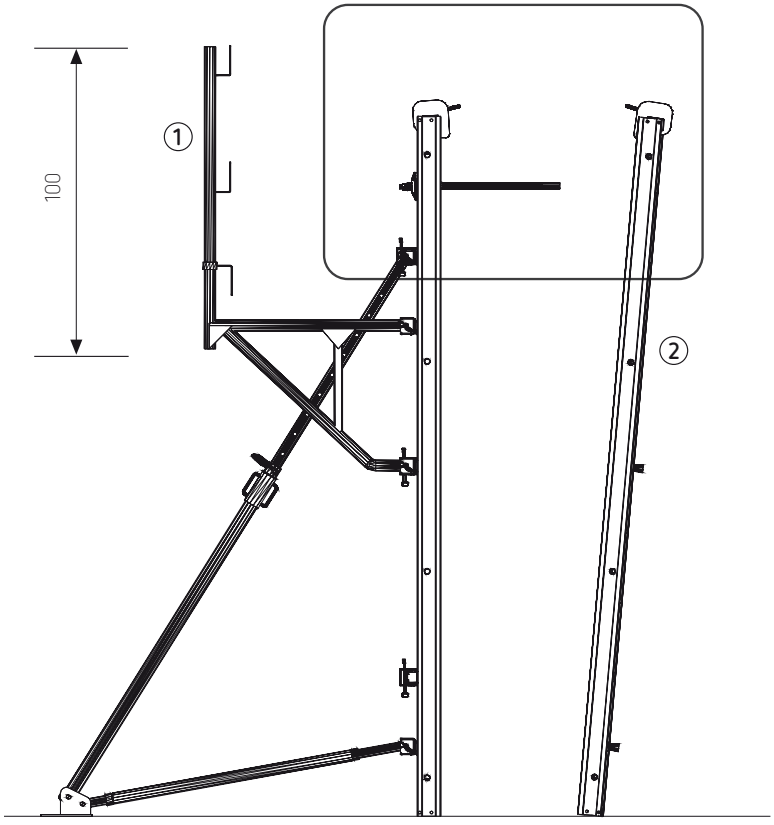
WALL2

Mount tie rods for the wall and proceed to assembly the formworks for the opposite side, repeating the same steps, which were carried out for wall 1. When the formworks are all in position, tighten the tie rods using the wing nuts.

Only use certified tie rods. Do not weld or heat the tie rods.
To turn and tighten the tie rods, use the wrench for 15/20 tie rods.

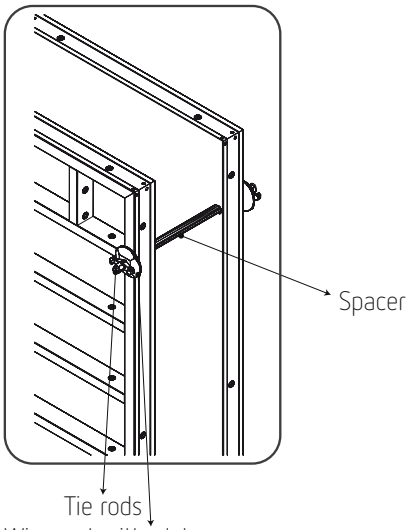
POSITIONING WALL 2

1. Universal service bracket
2. Optimo adjustable prop



For mounted formworks, which are less than 3 m high, a shelf must be provided below

TIGHTENING OF TIE RODS

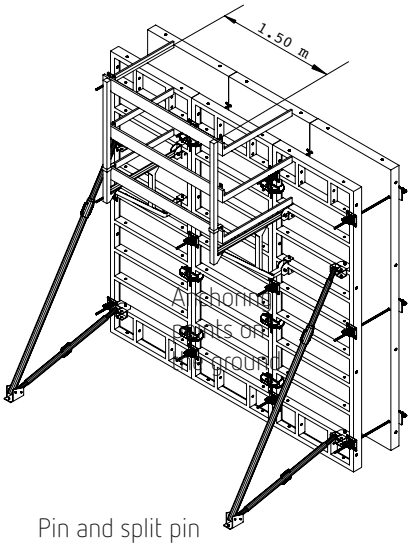


- Pour the concrete.

Before unhooking from the crane, check that there are sufficient anchoring points to ensure stability against overturning.

- Max permissible pressure of fresh concrete: 60 kN/m2
- Comply with the degree of concrete vibration of the concrete indicated in DIN 4235 part 2
- Use the concrete vibration in the correct manner according to the indicated times and locations.

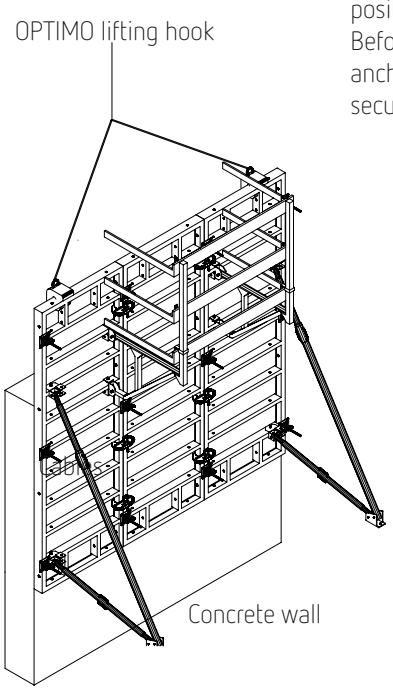
POURING THE CONCRETE



Pin and split pin
SC arm/BTS prop connection plate with pin and split pin

STRIPPING PHASE
- Detach the anchoring elements
- Connect the Optimo lifting hook to the formworks
- Hook the crane cables on the Optimo lifting hooks.
- Lift the formworks, which are still aligned together. Deposit them on the ground in the horizontal position.
- Clean the residual concrete from the panel.

AFTER STRIPPING, LIFTING THE FORMWORKS WITH THE CRANE



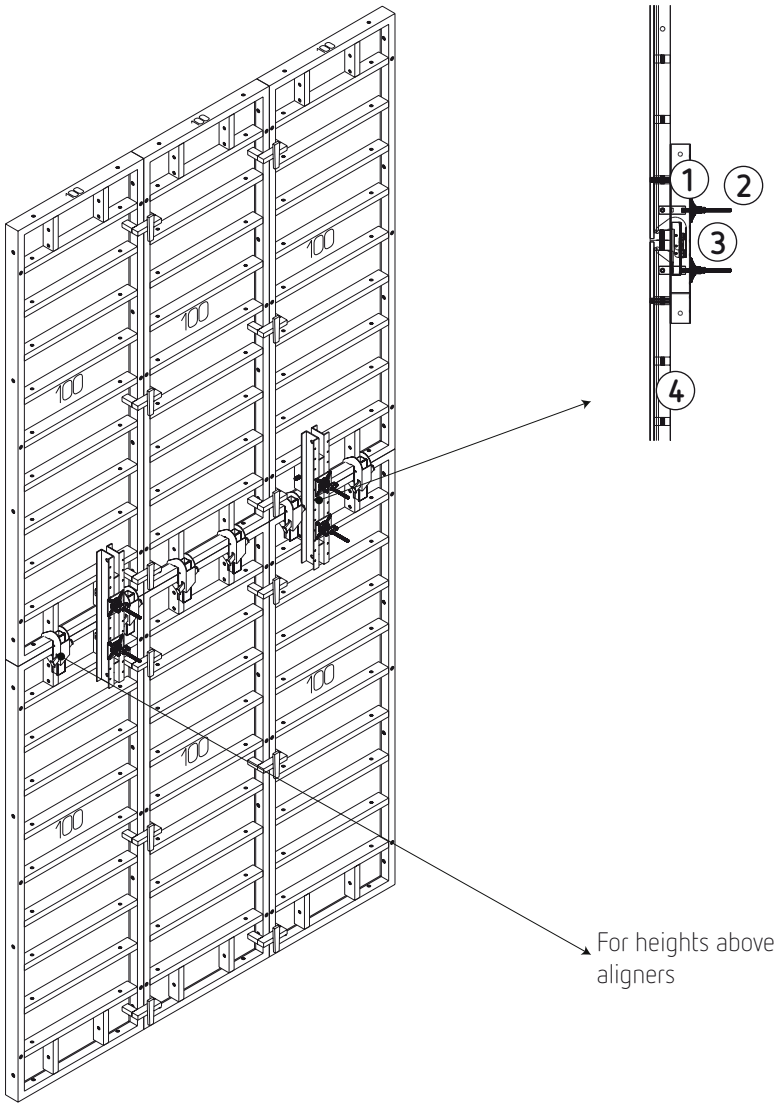
Comply with stripping schedules.

CAUTION!
While stripping, there must be a sufficient number of anchoring elements so that the system does not topple over.
CAUTION!
While stripping , the formwork must not be detached using the crane; rather, use the equipment provided. There is a risk of overloading the crane.
The maximum load of the lifting hook is 1.5 tons, with a maximum angle of 30° from the vertical position.
If, while are still assembled, the formworks are temporarily placed on the ground in the vertical position, always check that they are stable. If there is only one prop, place the formworks on the ground in the horizontal position.
Before detaching the props from their ground anchoring points, the formworks must be securely hooked to the crane.

b. High walls

For walls higher than three meters, adjustable clamps and aligners must be used. The aligners perform the following functions: align the panels and transmit the anchoring forces to the panels: reinforce the components, unload the loads of the service brackets. The use of aligners makes it safer to move the formwork with cranes.

Assembly of panels for heights above 3 m



SIDE VIEW

1. Tie rod with wing nut & plate
2. Tie rod with omega coupling
3. Aligner
4. Panel

For heights above 3 m connect the panels with clamps and aligners

Positioning of connecting elements, anchoring elements and accessories for:

1. Lifting and positioning
2. Handling using the crane
3. Loads on the walking platform
4. Pouring the concrete

FIXED CLAMP
Tensile force allowed: 15.0 kN Transverse strength allowed:6.0 kN Momentum allowed: 0.5 kNm

ADJUSTABLE CLAMP
Tensile force allowed: 15.0 kN
Transverse strength allowed: 9.0 kN Momentum allowed: 0.9 kNm
These values apply only in the case of a support on the profile.

ALIGNER
Momentum allowed (for added storey): 5.0 kNm

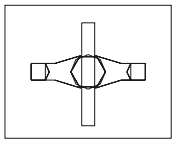
Ⓐ Tie rod and plate with wing nut

Ⓑ Adjustable clamp

Ⓒ Fixed clamp

Ⓓ Aligner

Ⓐ



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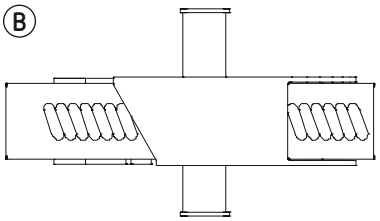

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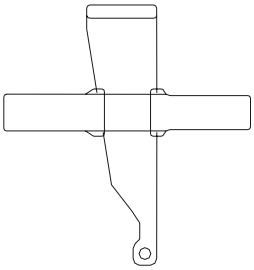

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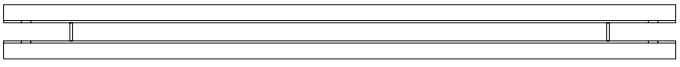
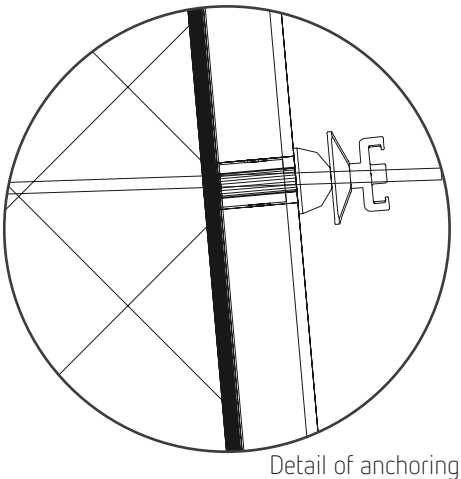


c. Sloping Walls

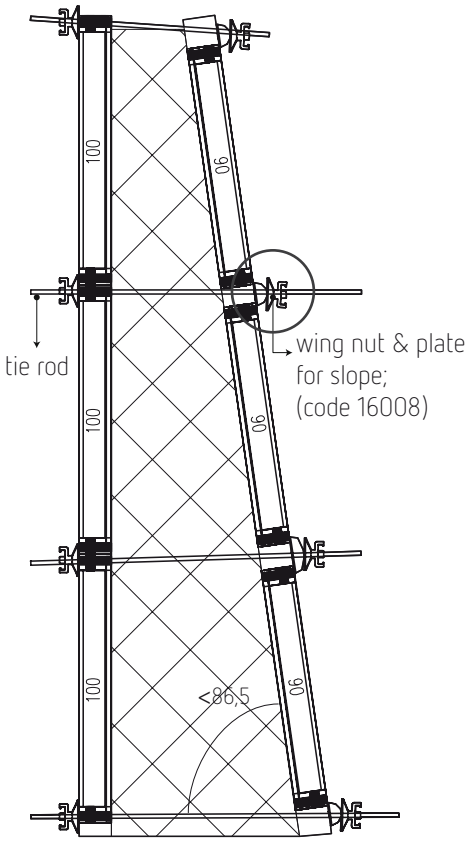
The panels can be mounted in a sloping manner on one or both sides, as well as offset in height. The plate is also easily adaptable.

Solutions for sloping walls, h = 3m



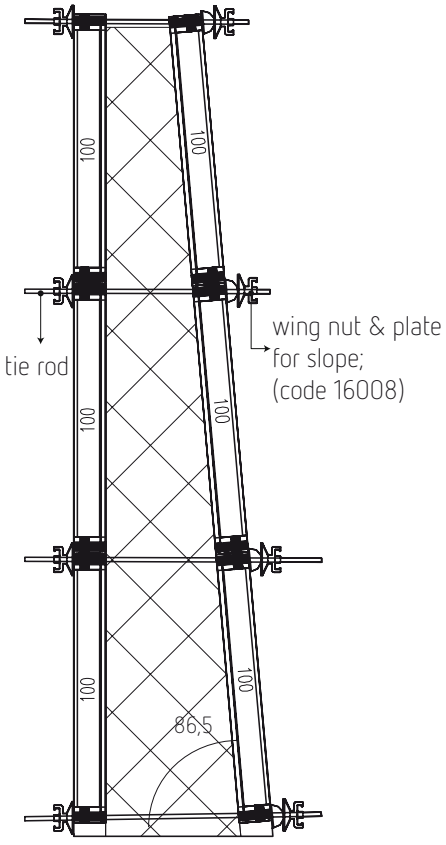
Detail of anchoring

Panel placed horizontally and compensation scantling



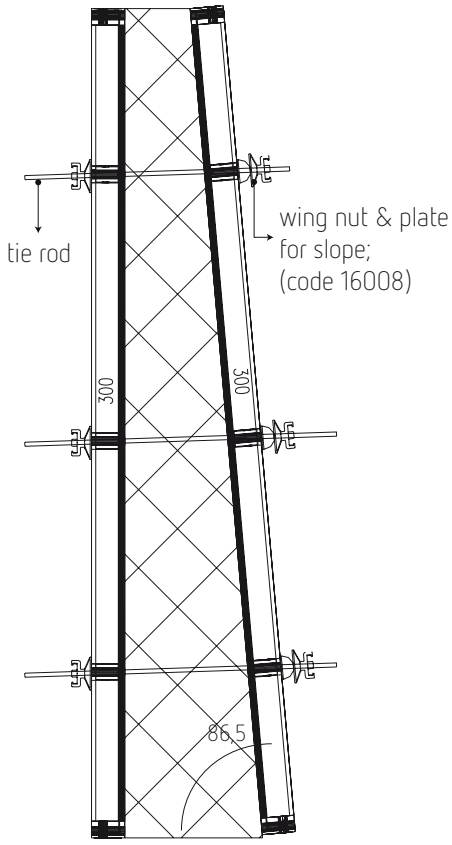
for slope < 86,5°

Panel placed horizontally



maximum slope 86,5°

Panel placed vertically

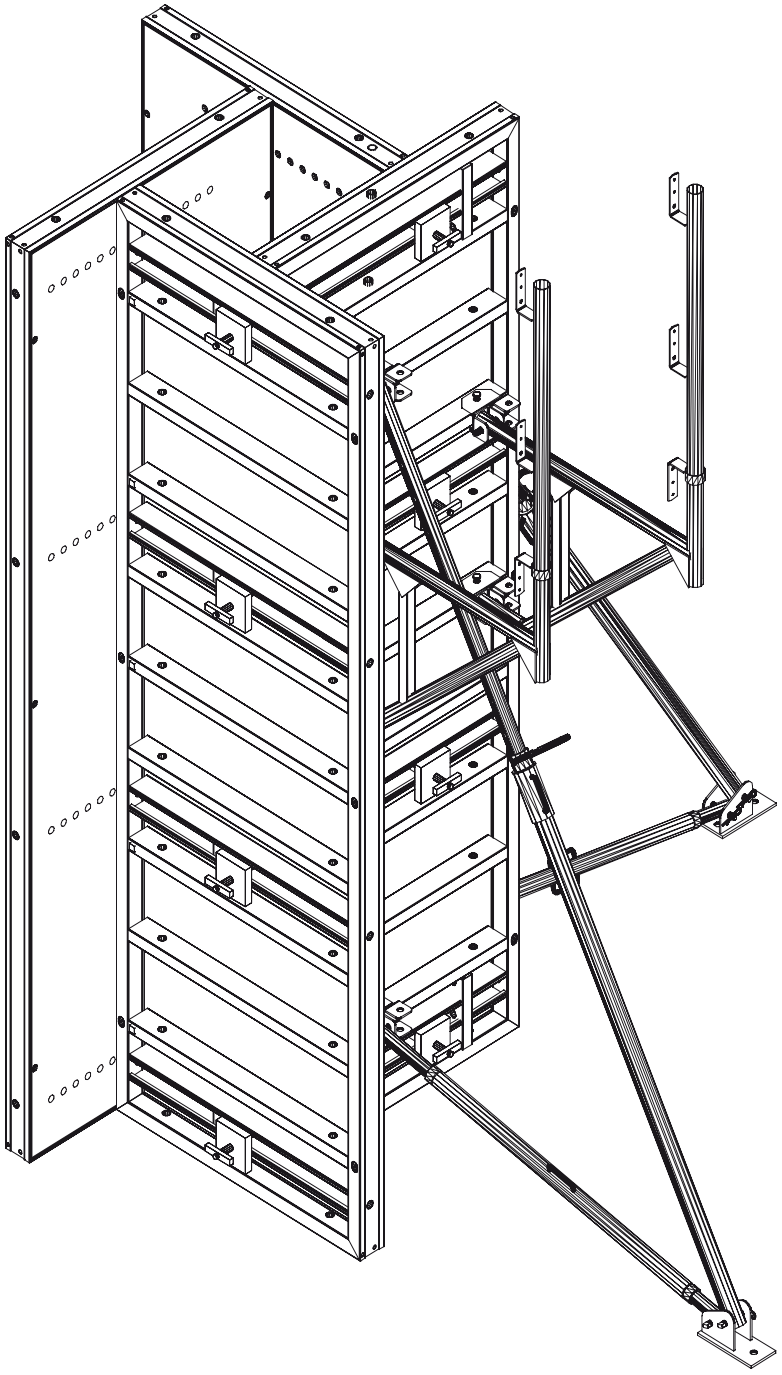


maximum slope 86,5°

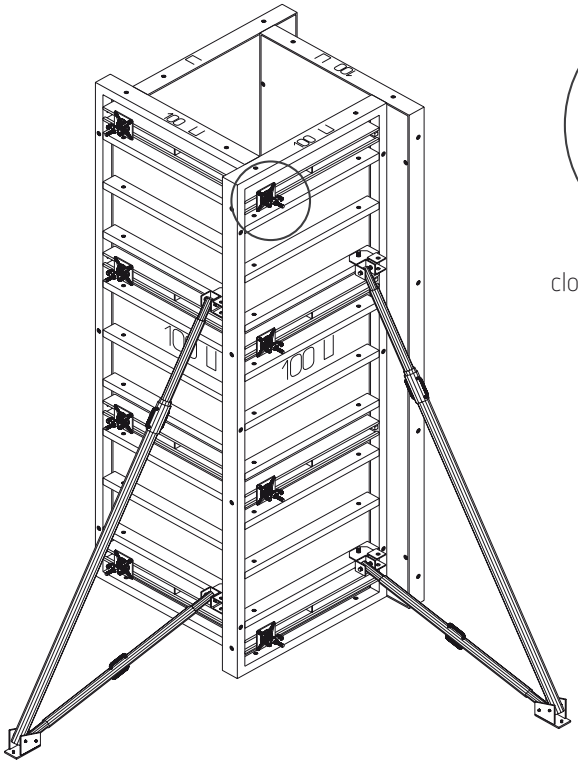
Assembling and Stripping of Columns

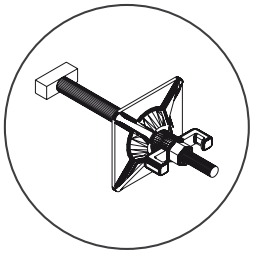
The Optimo panels for columns, H= 300/150 permit the realization of columns up to 80 cm, in span of 5 cm, thanks to the practical modular holes.

Pressure of fresh concrete allowed: 90 kN/m2



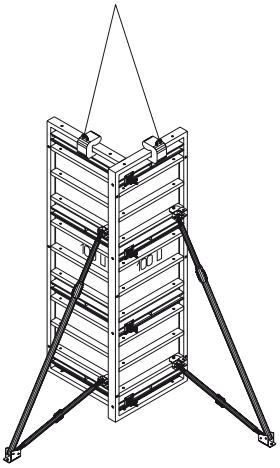
ASSEMBLY
To form a column: on the ground, mount the first half of the formwork, prop it up with the supporting props and then detach from the crane. Join the other part of the formwork with the first and then detach from the crane.
STRIPPING
Hook half of the formwork, without props, to the crane and detach from the other half of the formwork; lift and place on the ground. Then hook the other part of the formwork, with props, to the crane; detach the supporting props from the ground and transport the formwork.



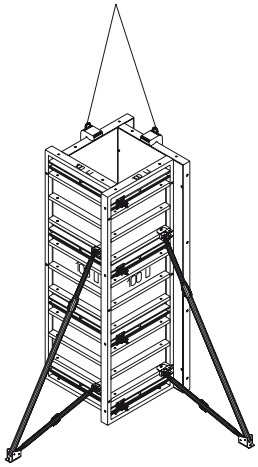


closing pin for column

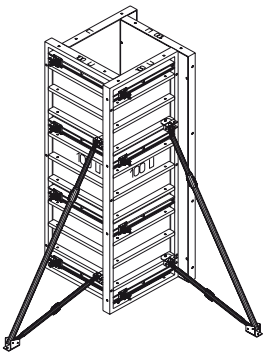
SEQUENCE OF STEPS TO ASSEMBLE A COLUMN



Mount first half of formwork with props

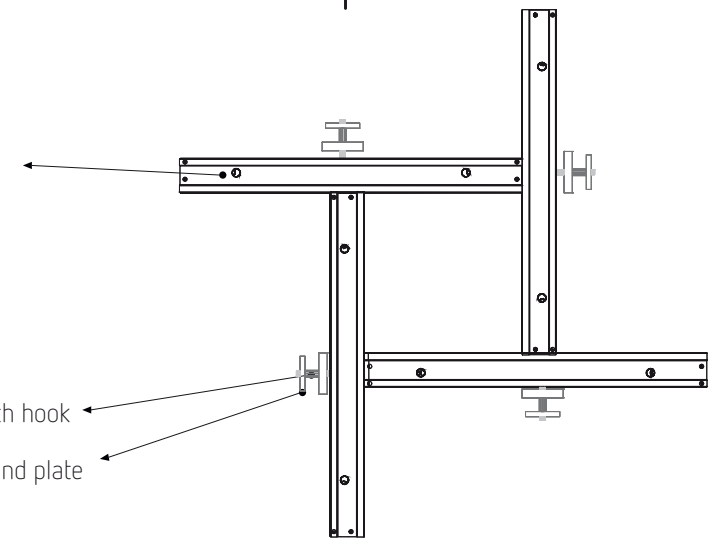


Mount second half of the formwork



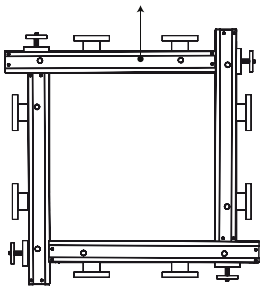
Formwork column ready for concrete pouring

a. Solution with universal panels

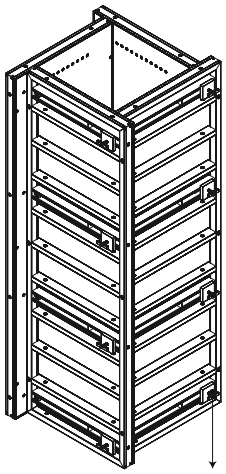


1. Panels for column 100
maximum dimension 80x80
minimum dimension 20x20
span 5 cm

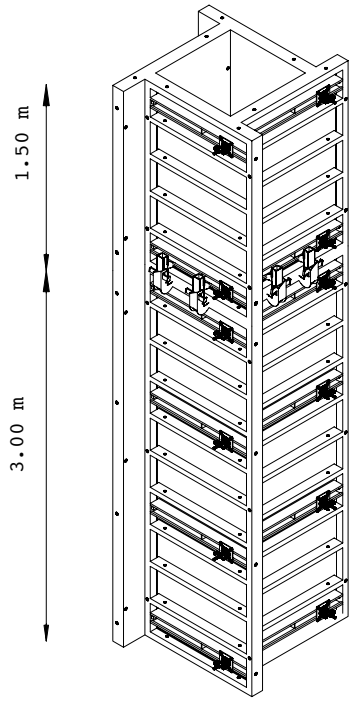
2. Panels for column 75
maximum dimension 55x55
minimum dimension 20x20
span 5 cm



Universal adjustable clamp



Closure with hook tie rods



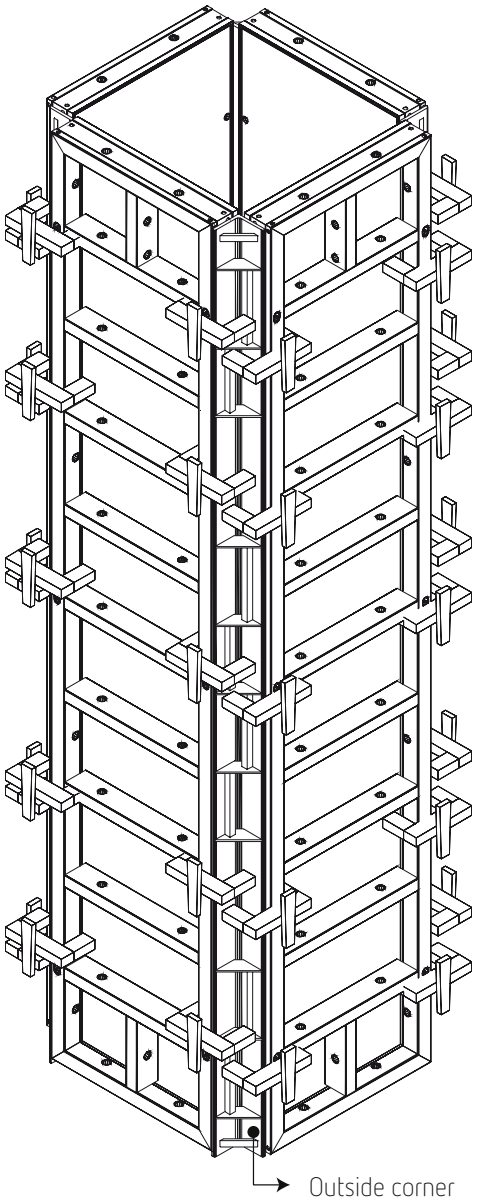
Assembly of column for H = 4500 e H = 6000

To seal the holes that are not used,
insert the PVC plugs

b. Solution with External Corners

Columns may also be made using normal frame panels and outside corners.

Pressure of fresh concrete allowed:60 kN/m2



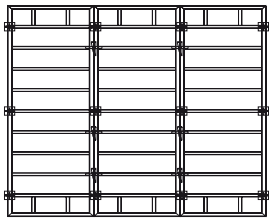
Panel Assembly scheme

Walls and Columns

	Aligner 900	19055
	DW15 swivelling wing nut	6006
	Clamp	9330

HEIGHT STANDARD CONNECTION

3,00



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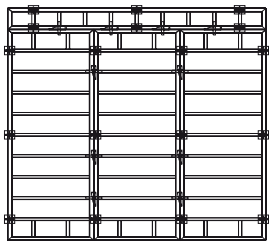

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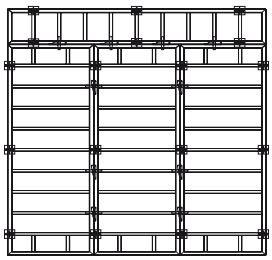
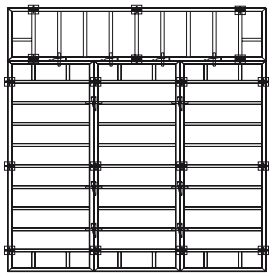
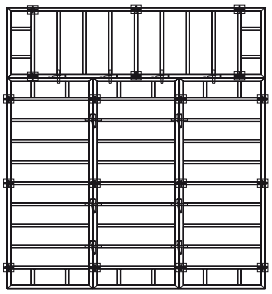


3,75

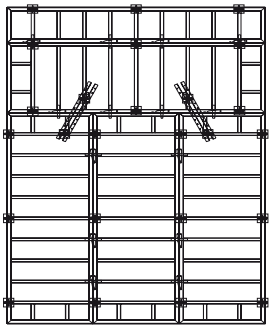


HEIGHT STANDARD CONNECTION

4,00



4,50



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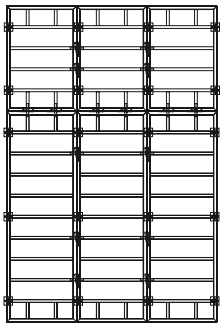
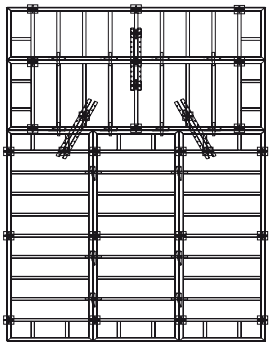
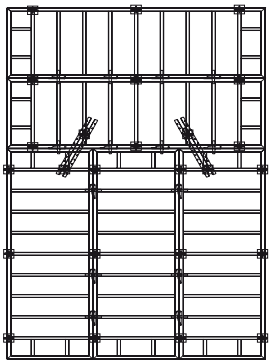


HEIGHT STANDARD CONNECTION

4,75



5,00



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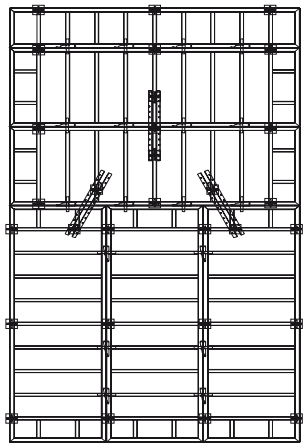
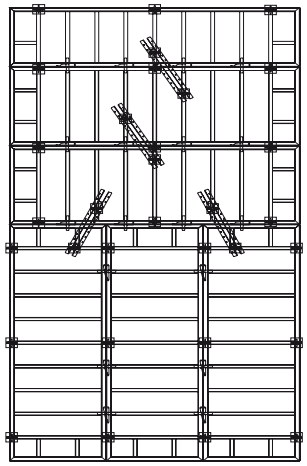
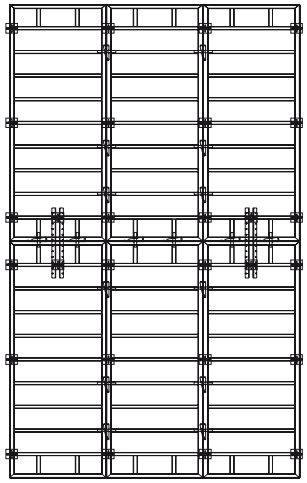
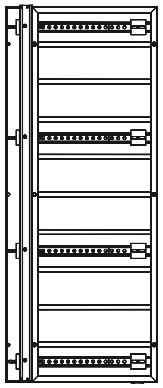
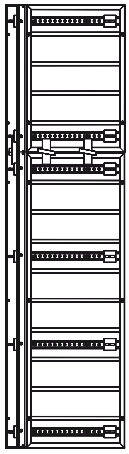
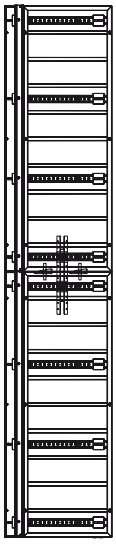
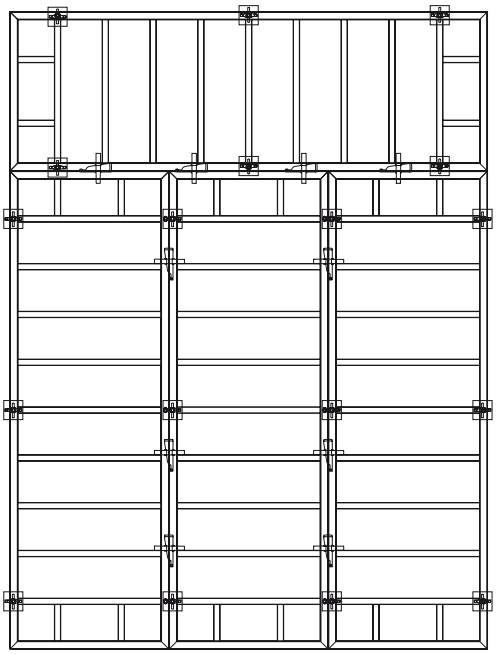
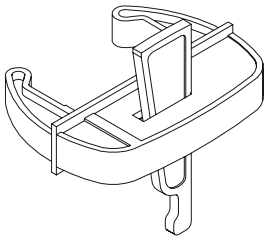
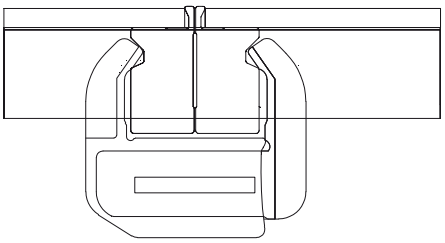
5,50	
5,75	
6,00	

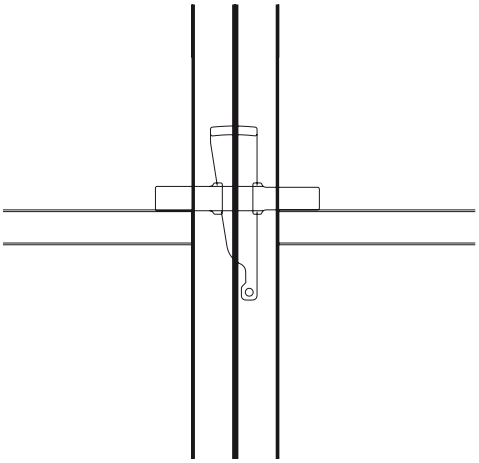
HEIGHT	STANDARD CONNECTION
3,00	
4,50	
6,00	

Connecting the Panels





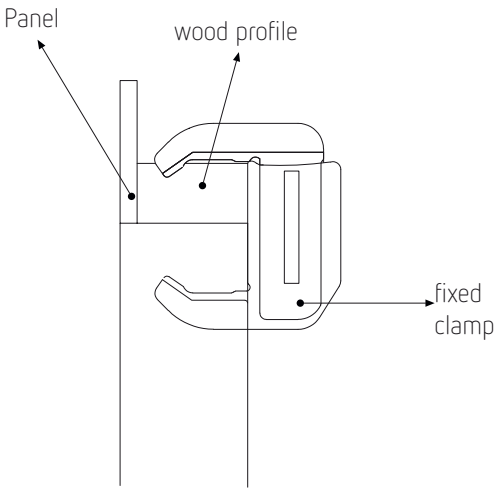




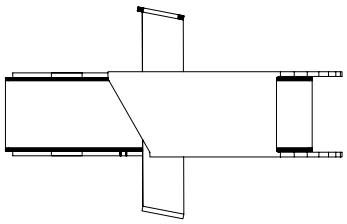
The fixed clamp and the adjustable clamp align the panels, rapidly creating connections which are resistant to traction; these must be attached only by using the hammer provided (max. 800g)

FIXED VICE
- if used with Optimo Panels:
tensile force allowed: 15.0 kN
transverse strength allowed: 6.0 kN
momentum allowed: 0.5 kNm

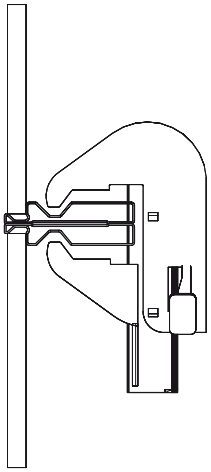
With this type of profile the panels can be connected at any point.



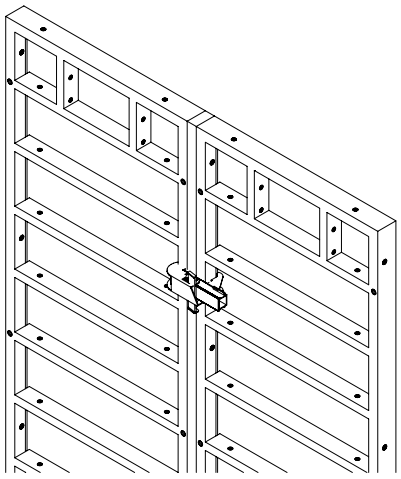
UNIVERSAL ADJUSTABLE CLAMP
- if used with Optimo panels: Tensile force allowed: 15.0 kN Transverse strength allowed: 9.0 kN Momentum allowed: 0.9 kNm
These values apply only in the case of a support on the profile.

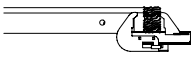


This clamp is also used in assembling panels in elevation.



It can also be used with offsets, since it is adjustable, and with squared timbers.



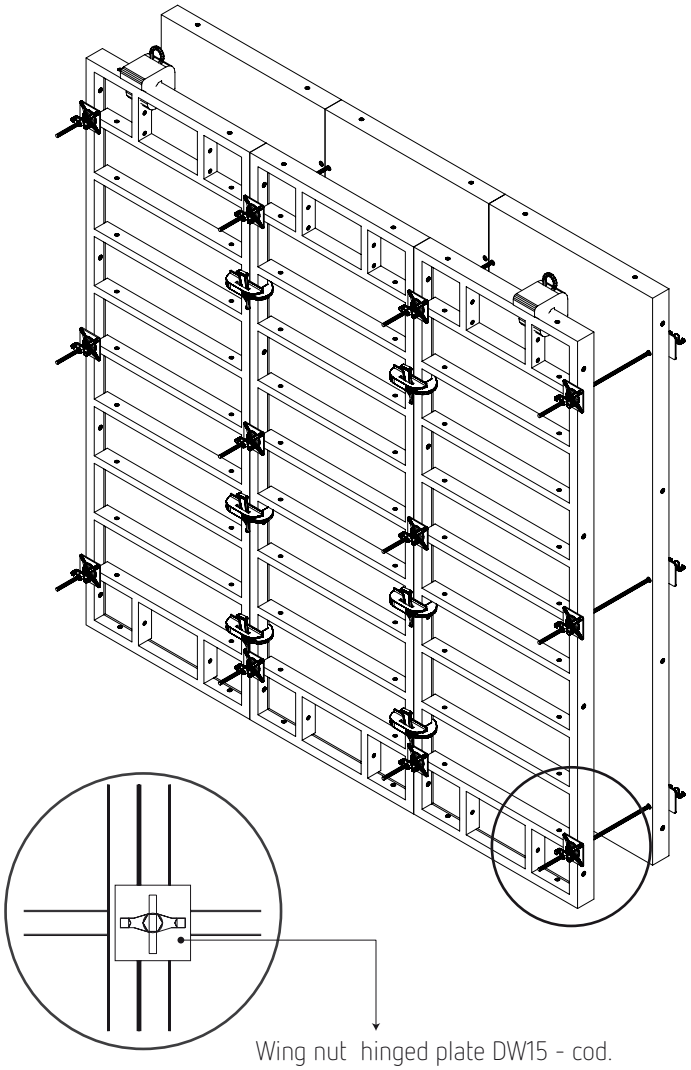


Anchoring Systems

Use only certified tie rods.
Do not weld or heat tie rods.

15.0 mm tie rod wrench
To turn and fix the tie rods.

Tie rod DW15:
Allowed capacity with 1.6 safety factor against ultimate tensile strength: 120 kN
Allowed capacity as per DIN 18216: 90 kN.



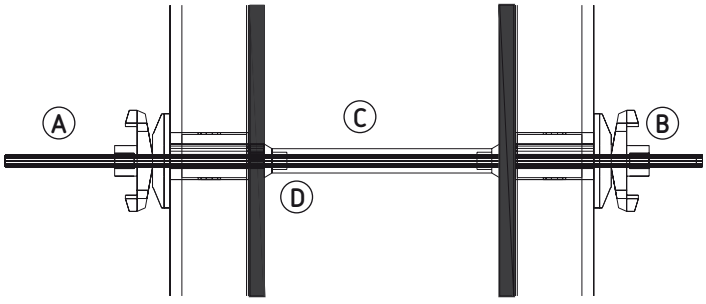
To sheath the tie rods, either plastic tubes with cones may be used, or else spacers, which are plastic tubes with incorporated cones.

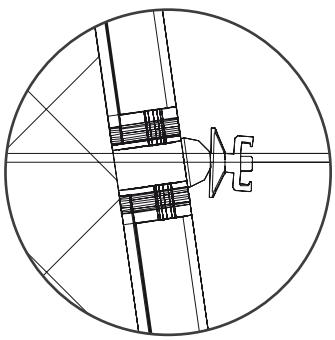
The plastic tubes which remain in the concrete may be closed with plastic covers of the same diameter.

Thanks to the feature of the hole along the profile, the tie rods can also be mounted at an angle. In this case, use the angled mounting plate.

Wing nut hinged plate DW15 - cod. 16006

Ⓐ 15/20mm tie rod
Ⓑ Wing nut & plate
Ⓒ Corrugated tube
Ⓓ Cone-shaped head

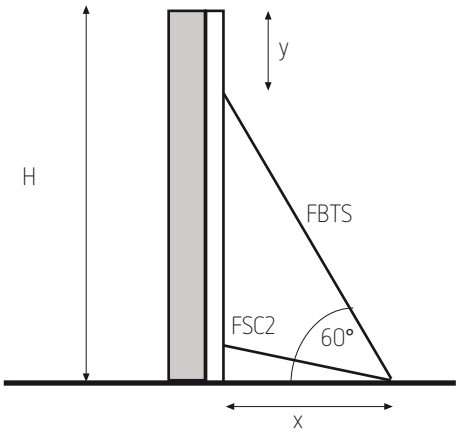




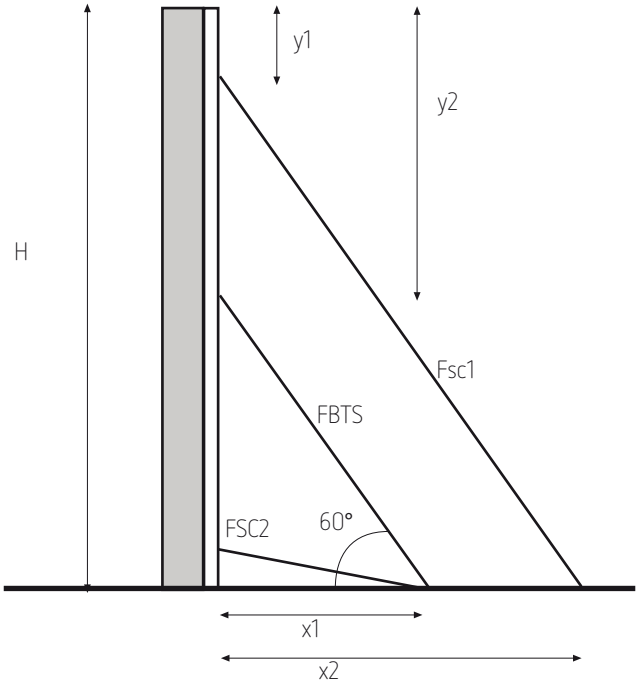
Anchoring detail

Stabilization Props

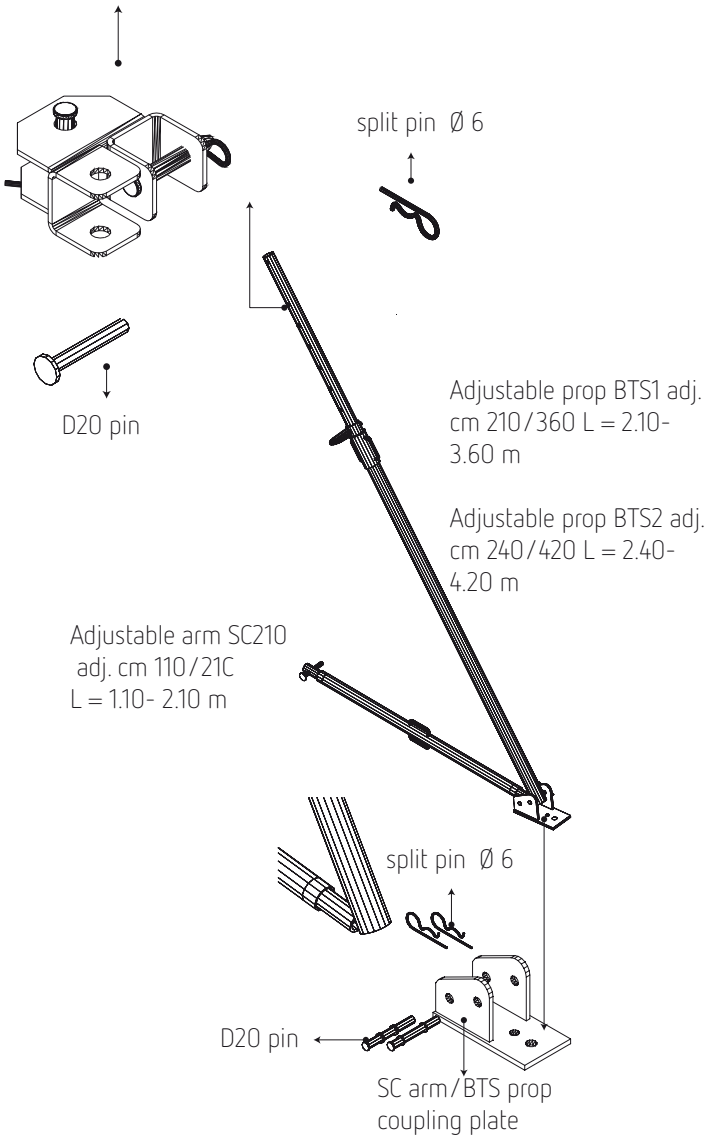
picture A



picture B



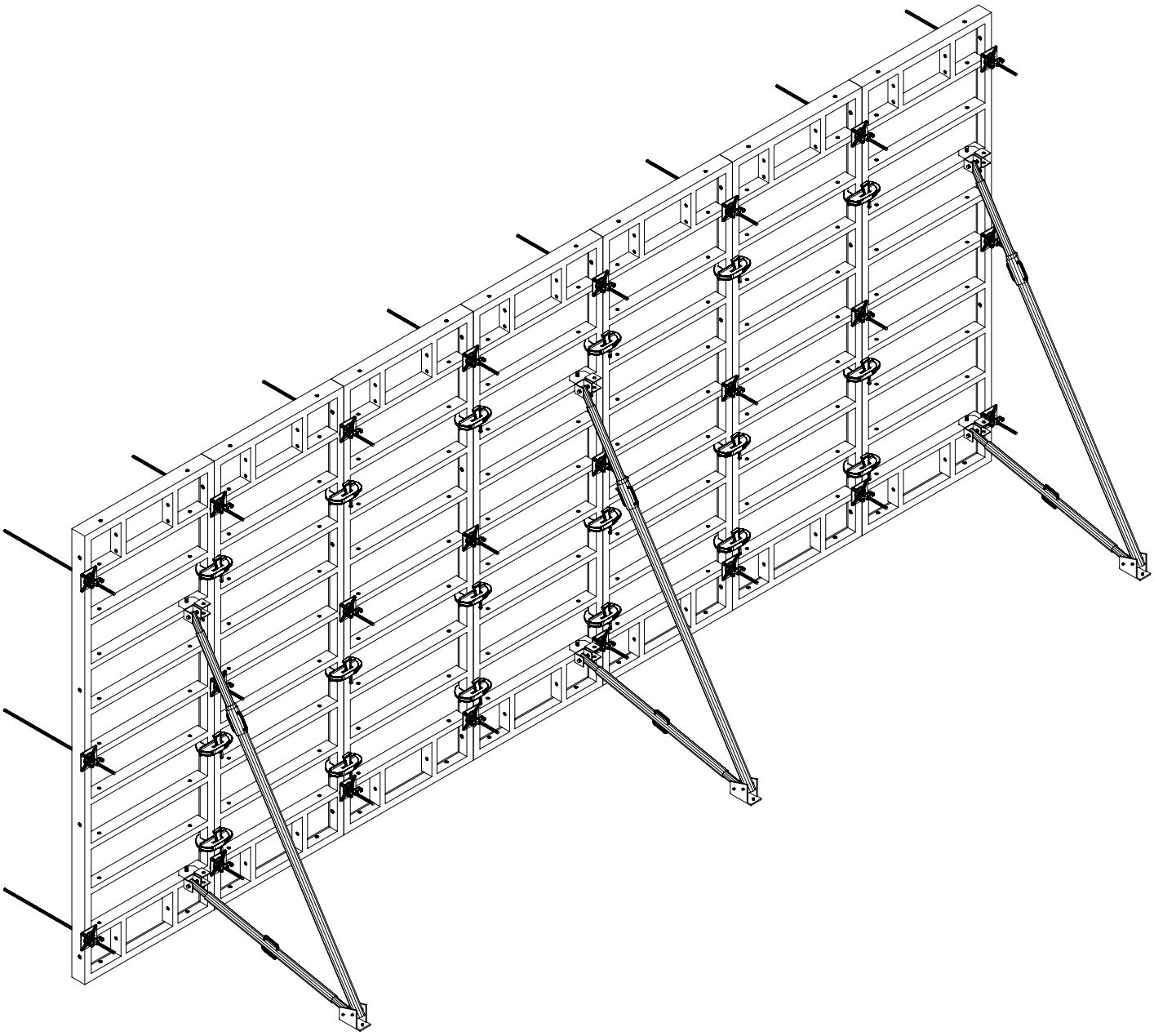
Universal support for props and service bracket on vertical and horizontal profiles



CONDITION WHEN NOT OPERATING wind load = 0.8 kN/m2 (80 kg/m2)

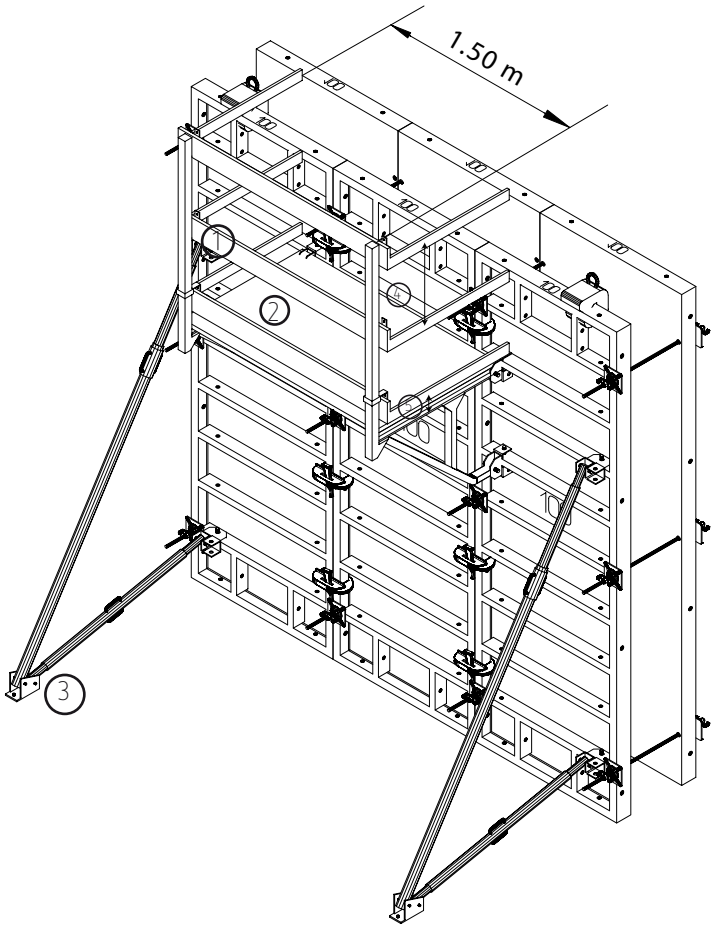
	picture A			picture B		
Formwork height H [m]	3,00	3,75	4,50		6,00	9,00
Distance of maximum influence between props [m]	4,00	2,73	1,55		2,96	1,96
Normal stress FBTS max [kN]	12,52	9,15	5,62	FBTS FSC2	7,07 4,85	7,06 11,70
Normal stress FSC2 max [kN]	1,58	1,69	1,89		3,96	2,69
x = distance between the support plate and the front edge of the formwork	1,30	1,59	2,02	x1 x2	2,17 3,32	2,17 3,75
y = distance between the prop connection point and the top edge of the formwork	0,75	1,00	1,00	y1 y2	0,25 2,25	2,50 5,25

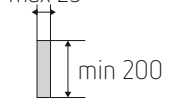
The stabilization props must be properly anchored using anchor sleeves etc.
The panels must be properly anchored so that they cannot be lifted up or moved in any way.



Service brackets

SERVICE BRACKETS
Accidental load allowed:
1.5 kN/m2 (150 kg/m2;
Load category 2 as per EN 12811 -1:2003.



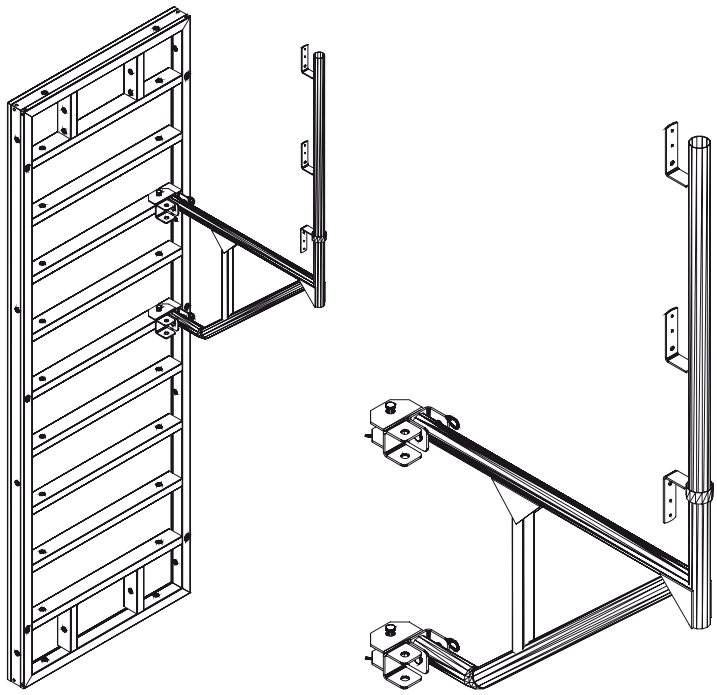
1. Universal service bracket
2. walking wood deck and parapet to be provided by the customer
3. OPTIMO adjustable prop with plate and universal couplings
4. 

5. 

The service bracket is intended for job site workers. Do not place building materials on the service bracket.
The parapets must be installed in the job site, in compliance with current regulations.

Mounting the service bracket on the panels

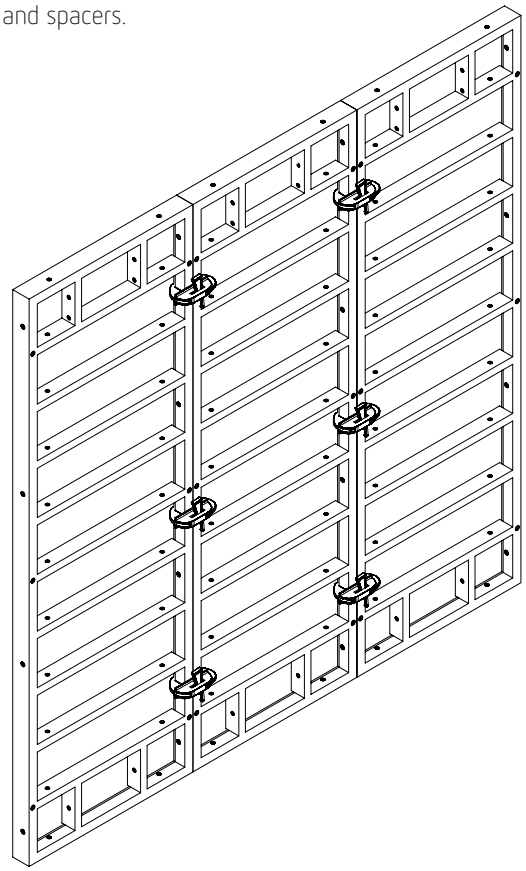
distance between two bracket (wooden planks)	1,50 m
permitted load	1,50 kN/m2
minimum distance between deck and the upper edge of the handrail	1,00 m

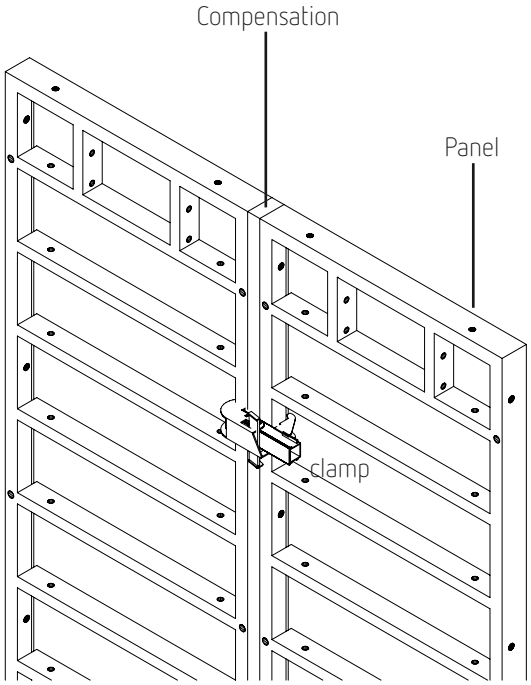


Compensations

Compensations with OPTIMO steel profiles (max 13 cm)

Compensations permit the completion of a formwork surface with small openings. In special cases, these are made on the worksite with adequately thick wood. The adjustable clamp can be used on compensations of up to 9 cm. The screw-on clamp can be used on compensations of up to 22 cm. Assembly of compensation components should always be performed with tie rods with plates and wing nuts and spacers.

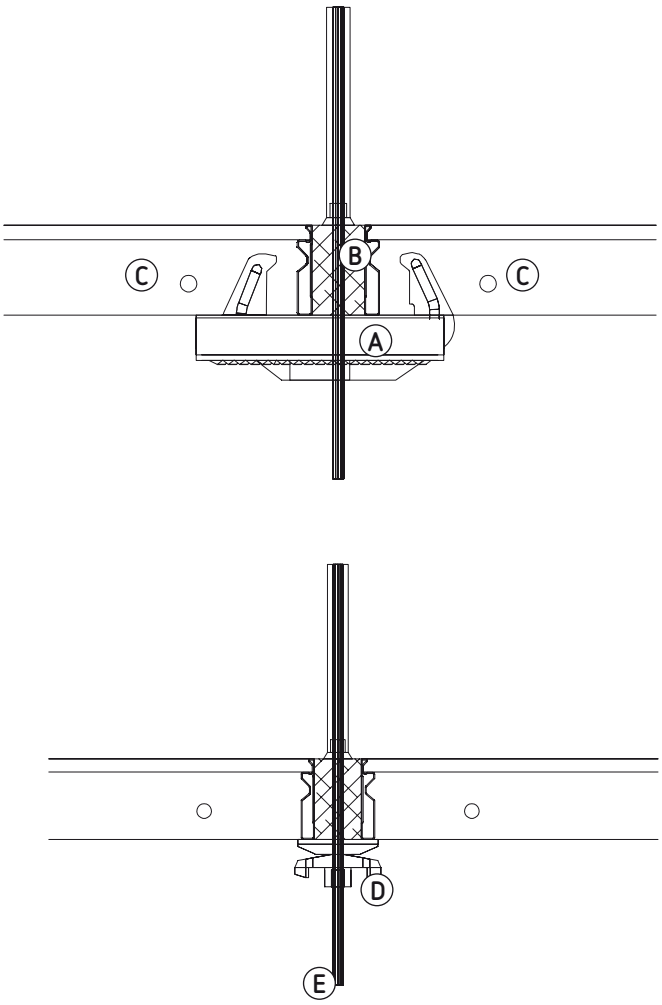




Compensation from 0 to 9 cm with compensation plank and adjustable clamp.

- (A) Adjustable clamp
- (B) Compensation plank
- (C) Optimo panel
- (D) Wing nut and plate
- (E) Tie rod

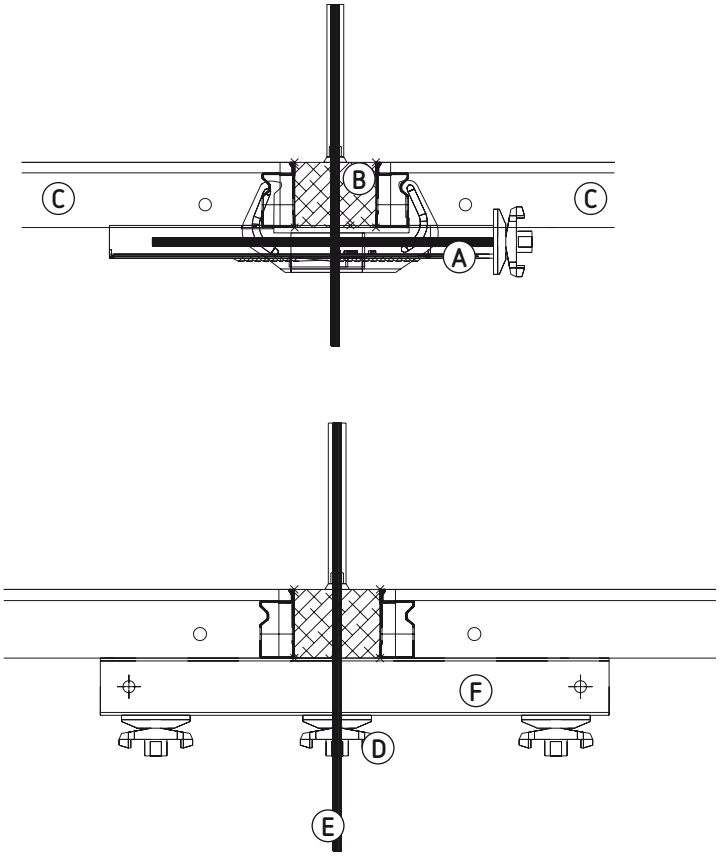
Compensation 0 - 9 cm



Compensation from 0 to 22 cm with compensation plank and screw-on clamp.

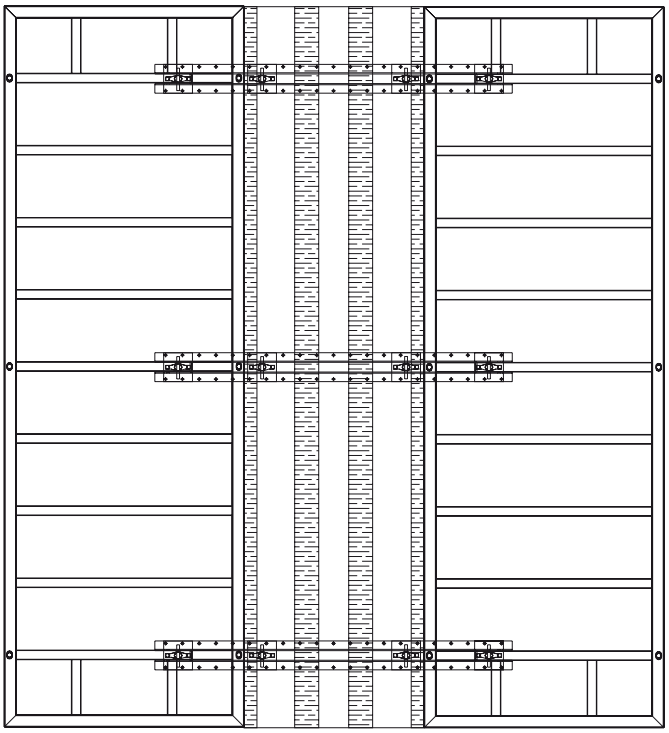
- (A) Screw-on clamp
- (B) Compensation plank
- (C) Optimo panel
- (D) Wing nut and plate
- (E) Tie rod
- (F) Aligner

Compensation 0 - 22 cm

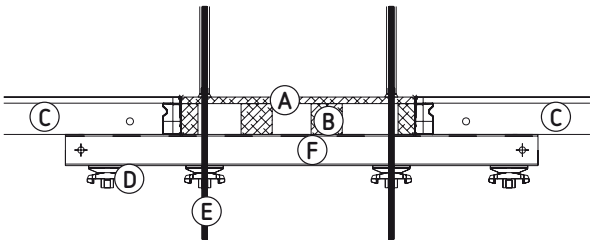


Compensation from 20 to 75 cm with wood profiles and aligners.

Compensation 20 - 75 cm

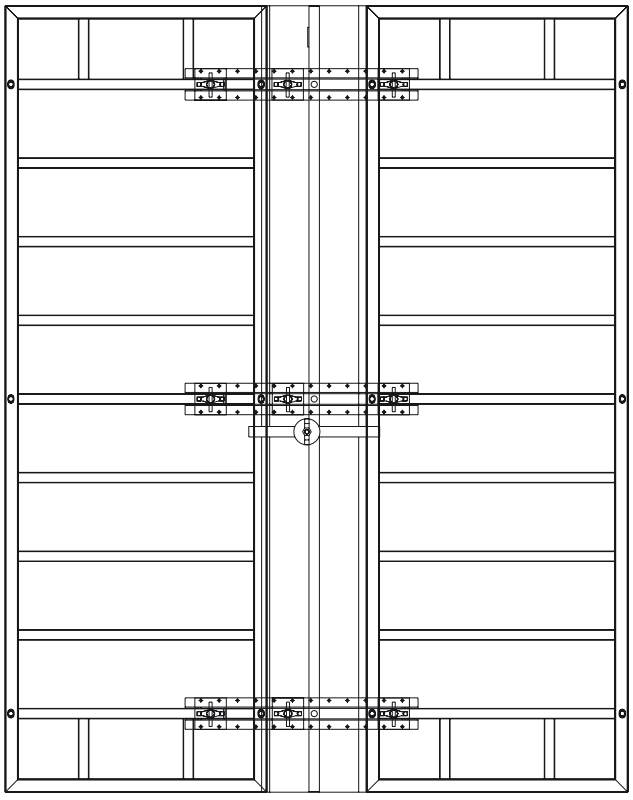


- (A) Wood panel
- (B) Square wood
- (C) Panel
- (D) Wing nut and plate
- (E) Tie rod
- (F) Aligner

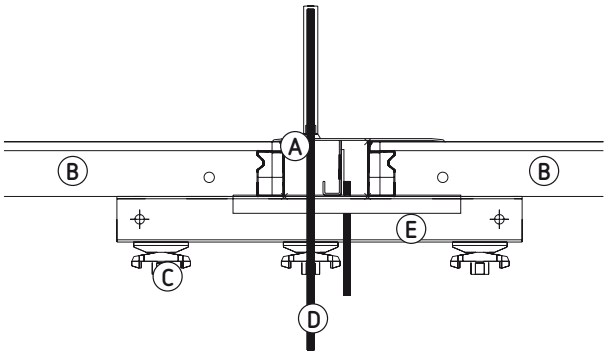


Compensation from 4 to 30 cm with metal sheet 6 - 30 cm

Compensation with metal sheet 4 - 30 cm



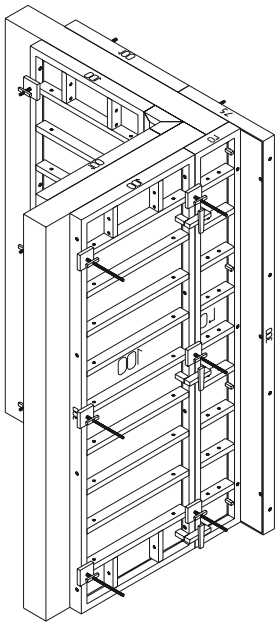
- (A) Compensation metal sheet
- (B) Panel
- (C) Wing nut and plate
- (D) Tie rod
- (E) Aligner



Closing Casting and Continuation joint

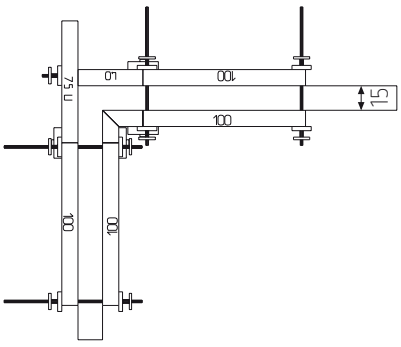
a. Corner Closures

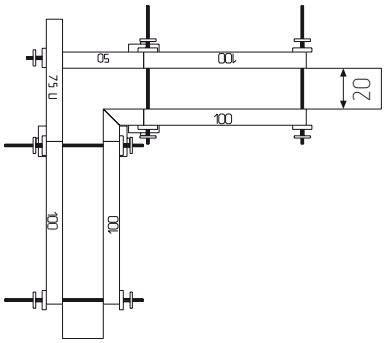
Corner closures can be performed in the following
ways:
1 corners with universal / column panels
2 closing corners with outside corners
For walls of up to 50 cm thick, in the corners with universal panels, compensations are not necessary.
The external closure is performed with 5 hook tie rods.

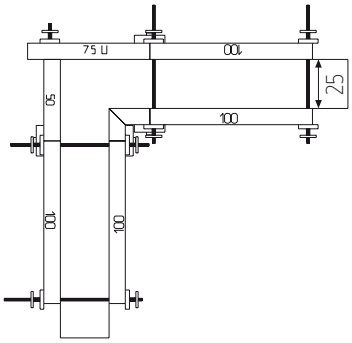


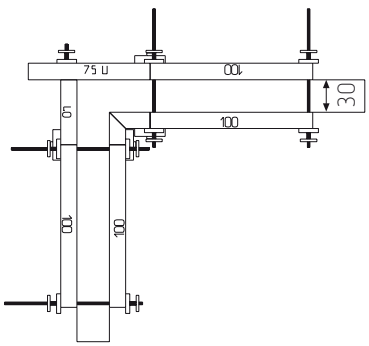
Continuing corners: 5 hook tie rods

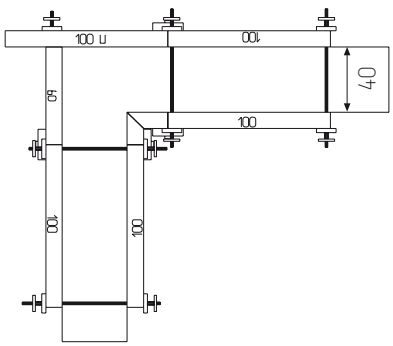
a. SOLUTION WITH UNIVERSAL PANELS

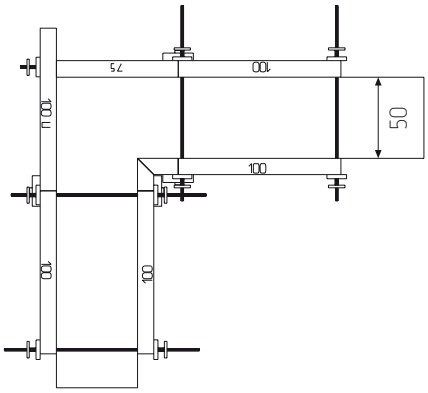






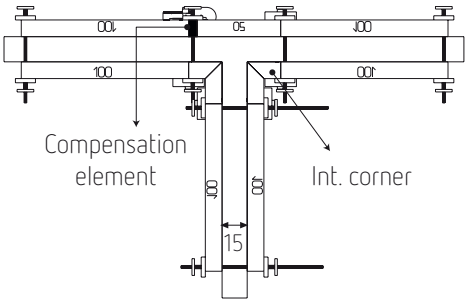


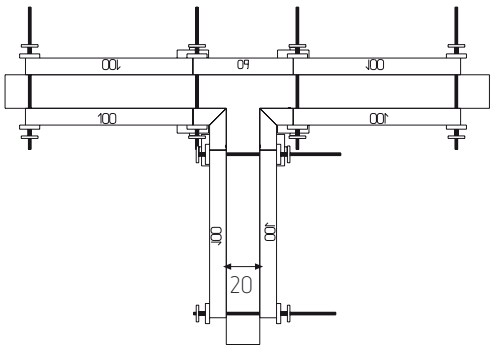


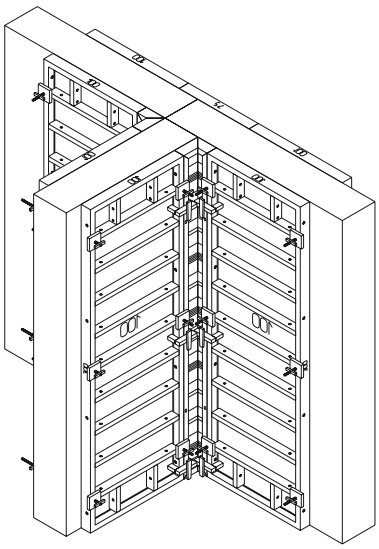


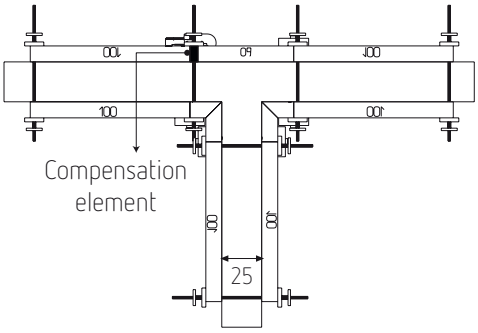
b. "T" Closures

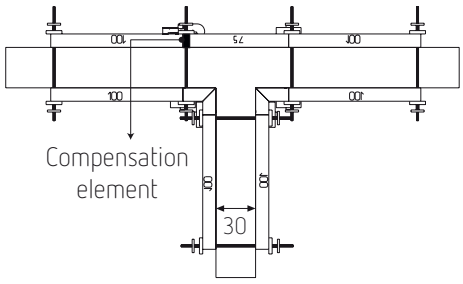
"T" walls are carried out simply using the internal corner 20x20 with 3 clamps per side. .

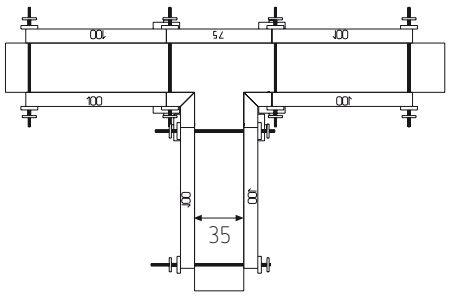


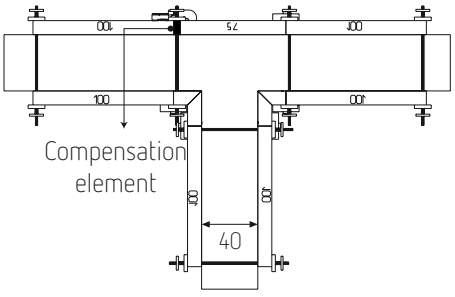


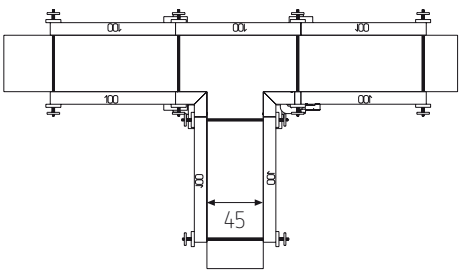


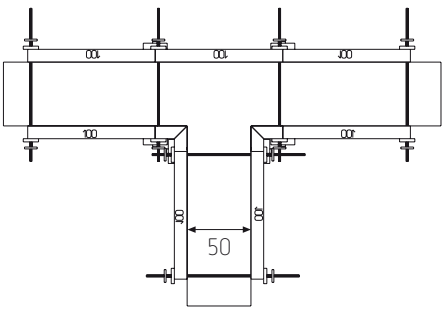




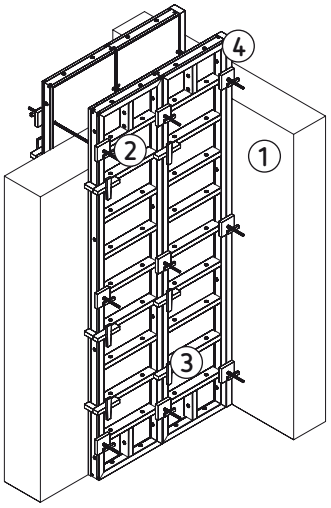




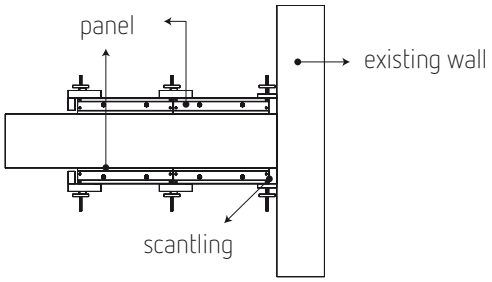


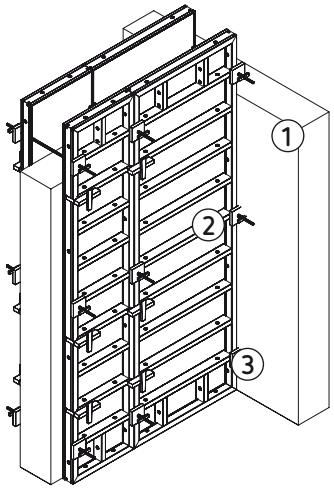


c. Continuing with Existing Walls

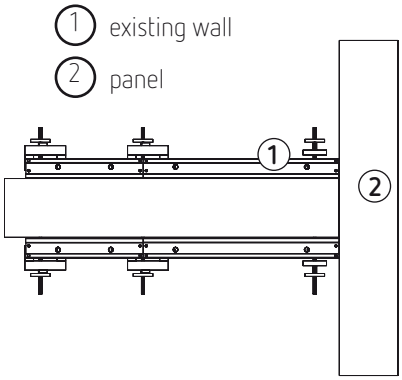


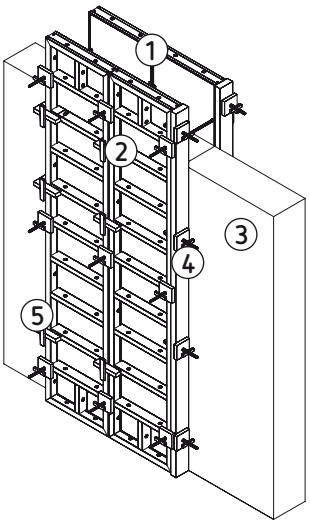
1. existing wall
2. panel
3. plate wing nut
4. scantling



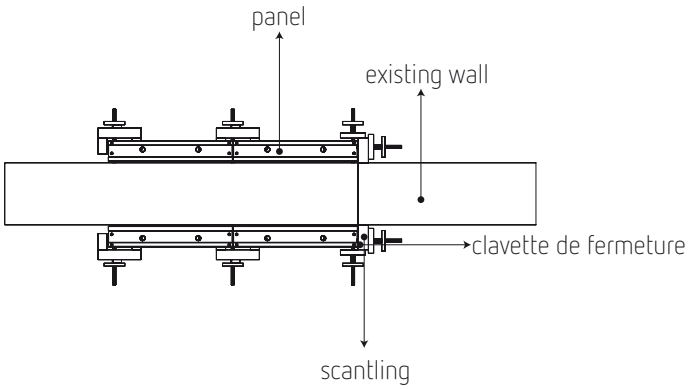


1. existing wall
2. panel
3. plate wing nut





1. panel
2. plate wing nut
3. existing wall
4. scantling
5. clavette de fermeture

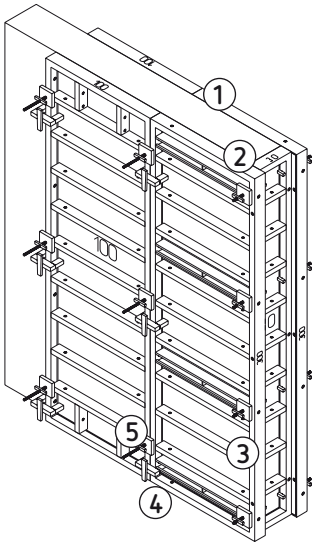


d. Closing Casting

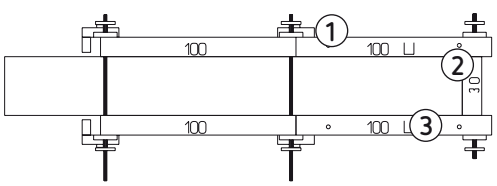
Closing casting can be realized in two ways:
A with a standard panel and two columns panels.
B with aligner, wood beams and plywood

A

1. Universal / Column panel
2. Standard panel
3. Hooked tie rod
4. Clamp
5. Tie rod with wing nut & plate

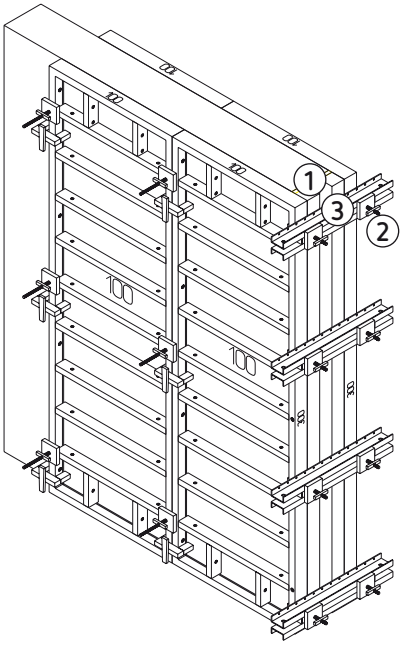


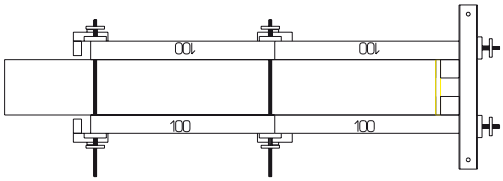
1. Column panel
2. Hooked tie rod
3. Standard panel



B

1. Wooden panel
2. Aligner with hook tie rod
3. Wooden beam



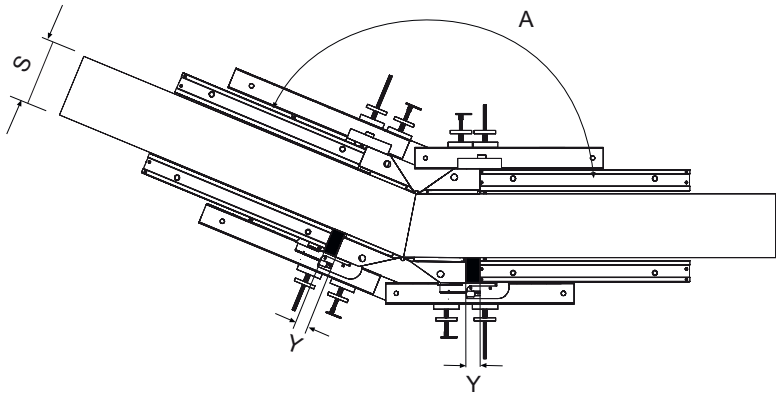


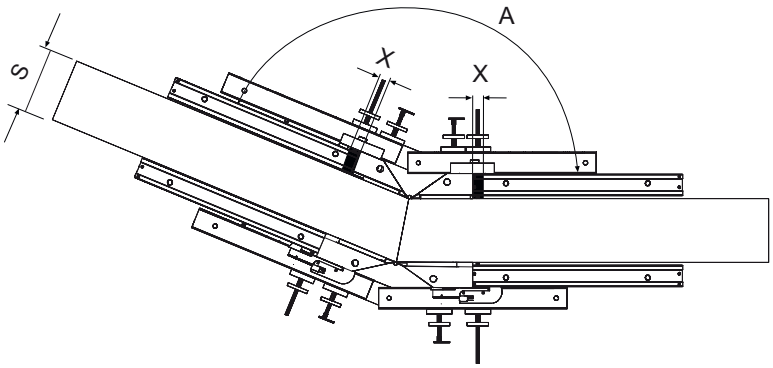
Variable Corners

For corners which are not 90°, but variable from 65° to 180° use:
1 hinged aligner
2 compensations
3 standard panels
For 3.00 meter panels:
- Internal hinged corners: 4 adjustable clamps and 3 aligners
- External hinged corners: 4 clamp and 3 aligners

X

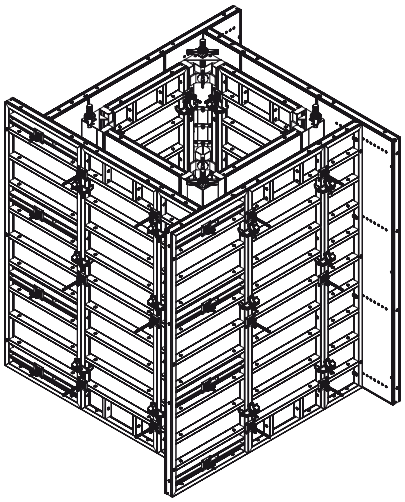
S \ A	60°	75°	90°	120°	135°	150°
100	139	87	50	0	21	39
150	226	152	100	28	0	26
200	312	217	150	56	20	12
250	399	282	200	85	41	0
300	485	347	250	114	62	15
350	572	413	300	143	82	28
400	659	478	350	172	103	41
450	745	543	400	201	124	55
500	832	608	450	230	145	68

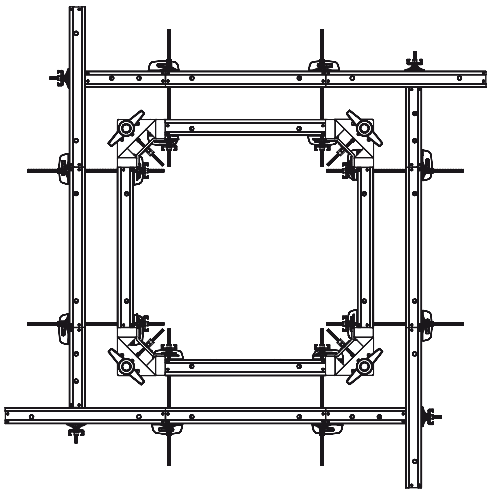




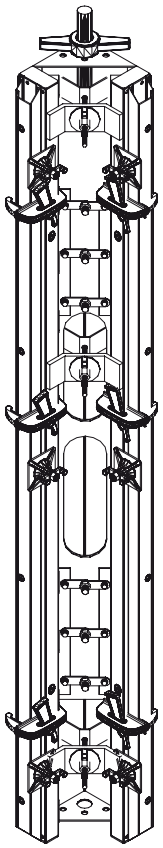
Elevator shaft-forming and stripping

For closed compartments such as lift shafts and staircases, the system has set-up and stripping corners.
When the concrete is completely set:
a) loosen the 3 wing nuts at each corner;
b) release the lockring on the large screw;
c) insert a metal bar into the hole on the large screw and turn the stripping mechanism which rigidly slides the panels, loosening them from the concrete;
d) hook the lift shaft system in four points and with a single lift of the crane bring the formworks to the next level.

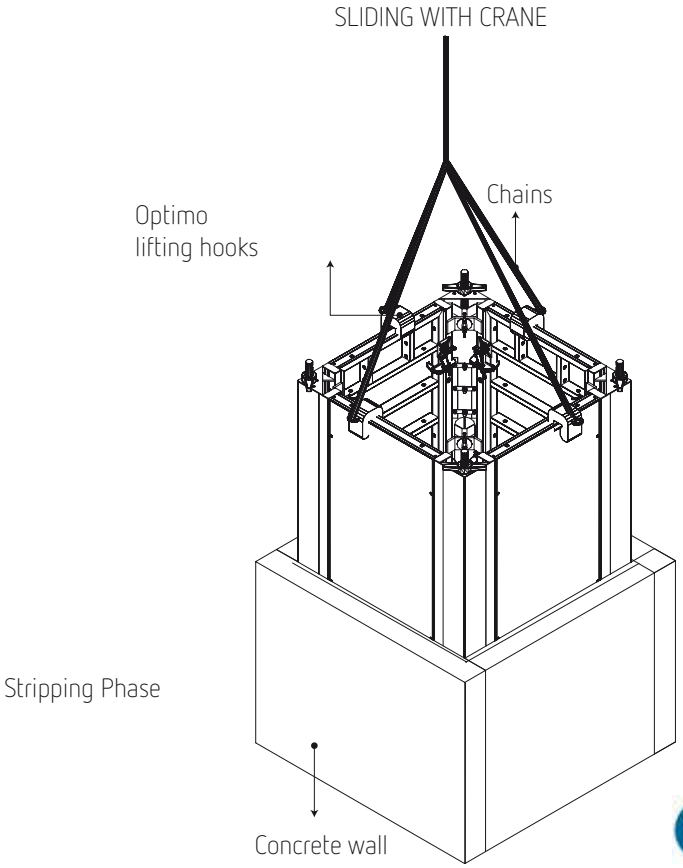




Allowable weight of the formwork for closed areas: 4000 kg with 4 lifting hooks.

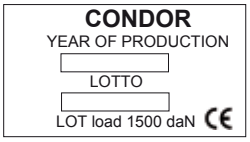


PHASE D'ARMEMEN

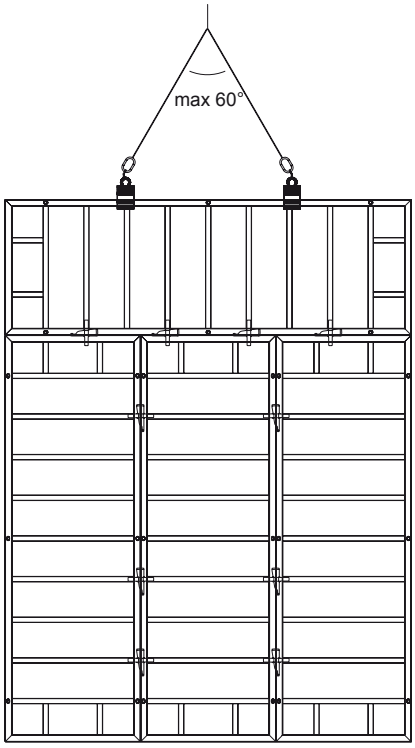


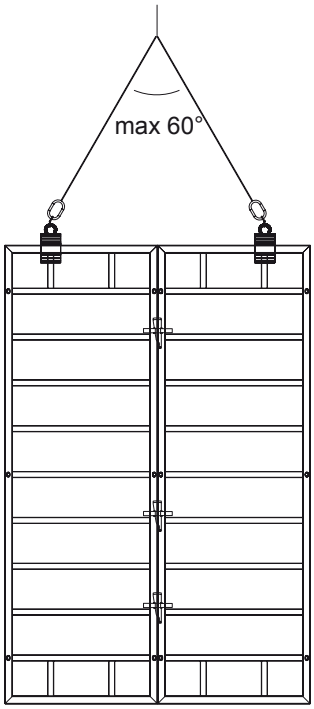
Handling with Crane

To move optimo panels using a crane: the optimo lifting hooks connect to the panels. The hook will automatically lock after being attached. Attach the lifting chain of the crane to the lifting hook and raise the panels, which must already be mounted. The lifting hook must be placed in the joint between 2 panels in order to prevent sliding of the hook. When the panels are mounted horizontally, the hook must be attached to a cross beam profile.



Always use 2 lifting hooks, placed symmetrically to the centre of gravity of the load. Maximum capacity 1500 kg. The maximum angle between the two lifting chains must not exceed 60°. For more safety information, see the ADATTO lifting hook user's manual.



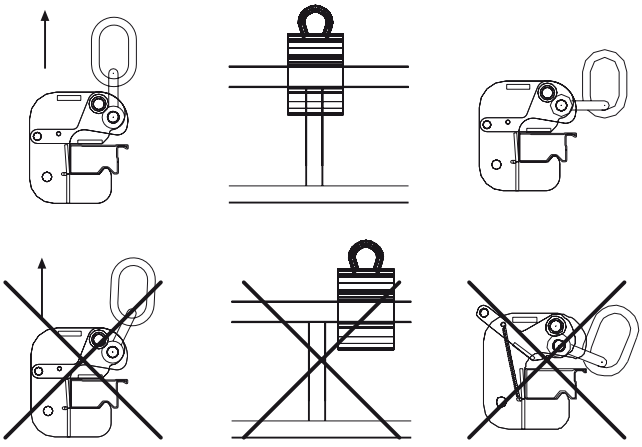


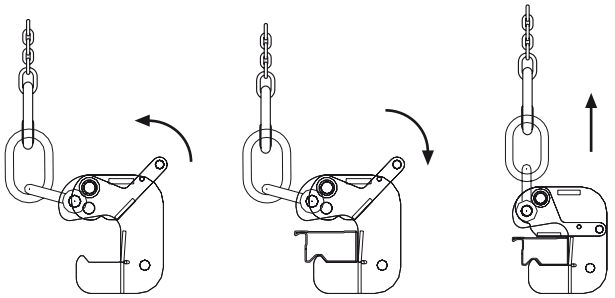
Optimo Lifting hook

1. Lift the opening handle until it stops.
2. Place the ADATTO lifting hook on the profile of the frame until it stops and close the handle.
3. During the lifting with the crane, a blocking mechanism is activated, based on the load.

Visually check the closure of the hook on the profile of the frame.

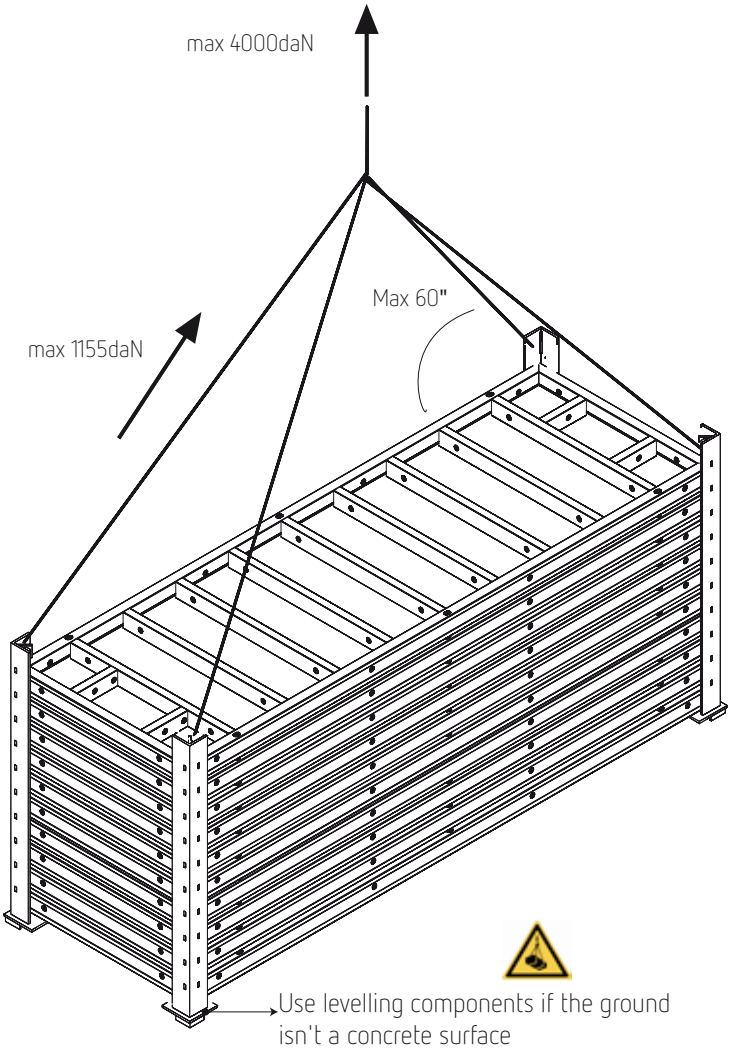
CAUTION!
Danger of crane overload!
Never detach the formwork from the concrete using the crane!



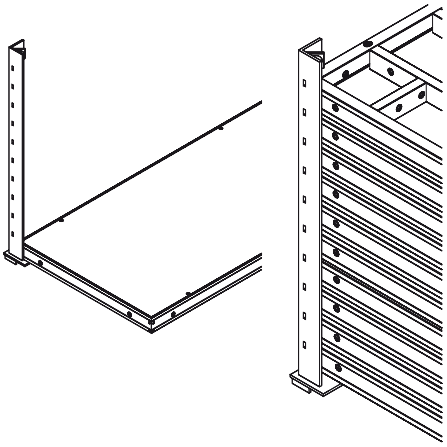


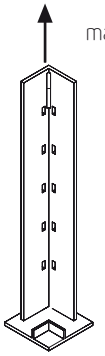
Transport & Storage

The panel storage component is designed for the transport of horizontal panels using a crane. Four panel storage components must always be used at the same time. A minimum of 2 panels must be transported, using panel storage components. The angle between each lifting chain and the vertical must not exceed 30°.

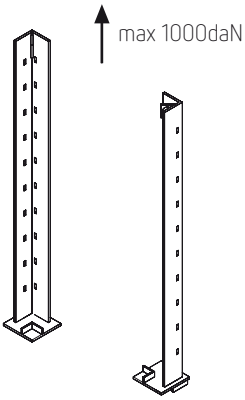


Place the first panel with the plywood side up. Place all other panels, including the top panel, with plywood side down.





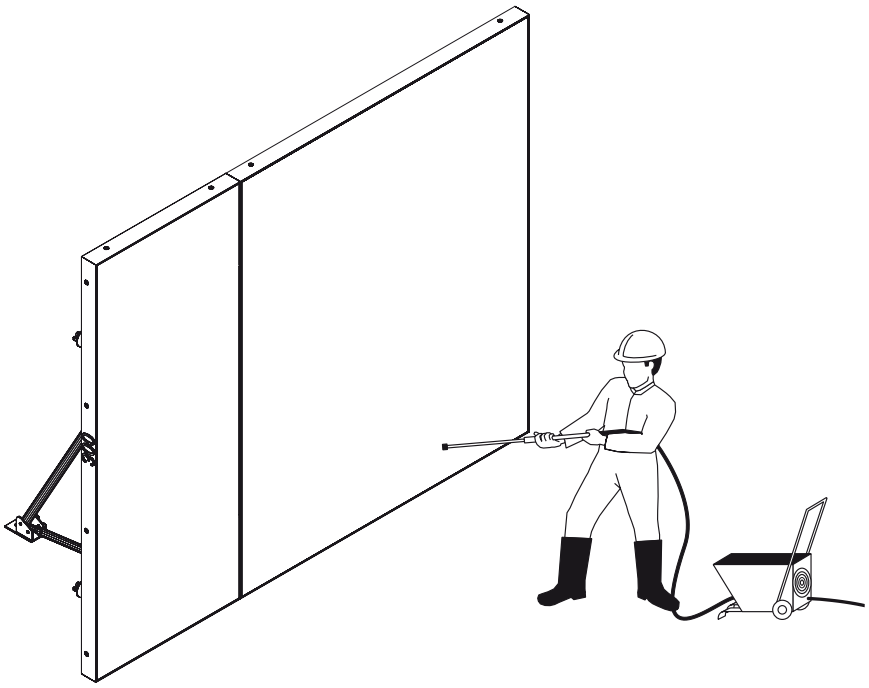
5 PIECE PANEL STORAGE COMPONENT
To stack and transport at most 5 elements, permitting lifting with a crane.
See instructions for the use of barrows. Maximum load 500 kg.
CE Mark at lifting hook points.

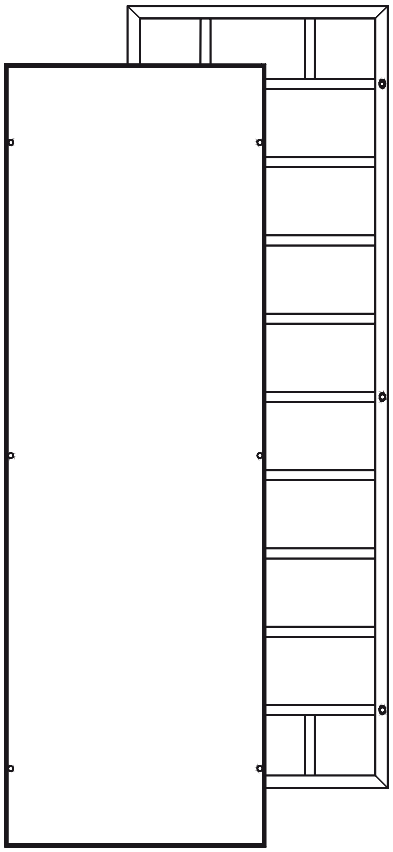


10 PIECE PANEL STORAGE COMPONENT To stack and transport at most 10 elements, permitting lifting with a crane.
See instructions for the use of barrows. Maximum load 1000 kg.
CE Mark at lifting hook points.
Stacking 2 storage component is valid only for formworks which are 1.20m width.

Cleaning & Maintenance

For ordinary maintenance of the formworks, the panels MUST be cleaned and checked before each use.
After use, it is necessary to remove concrete residue with a cleaning machine or scraping knife and check the frames. Before the next pouring, it is necessary to apply a layer of release agent oil on the surface of the plywood.
In the case of deformations, dents, or detached welds on the frame or other components, it is necessary to perform the required repairs using metal framing methods; if the damage to the components is substantial, it is recommended the replacement.
All the lifting accessories MUST be replaced if they are damaged, even if only minor damage is present.

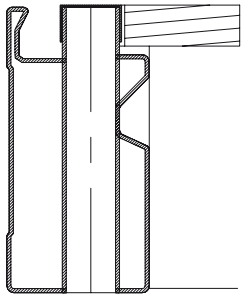


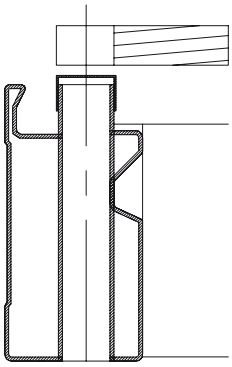


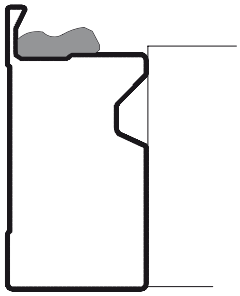
	PLYWOOD
THICKNESS	18 mm
WEIGHT	12,6 kg/mq
EXTERNAL PROTECTION	PHENOLIC FILM 220/220
INTERNAL COMPOSITION	13 LAYERS (BIRCH)
SIDES (H = 2973-2980)	PROTECTED BY PAINT
ABSORPTION OF HUMIDITY OF PROTECTED PANEL	NULL
ABSORPTION OF HUMIDITY OF CUT PANEL UNI 4872/61	ELEVATED
NUMBER OF RE-USES	100-150 PER SIDE
RELEASES	NECESSARY
REPAIRS	WITH FILLERS (PUTTY)
THERMAL CONDUCTIVITY IEN 139	0,17 W/m°K

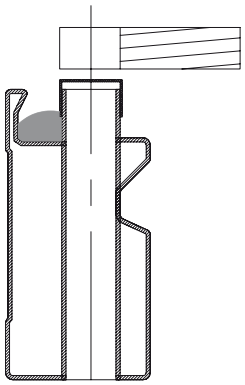
MAINTENANCE INSTRUCTIONS

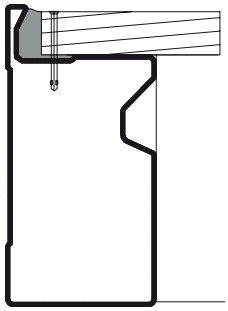
Regarding the plywood, if it requires repair, there are repair kits available which permit the application of disks of the same material on the damaged parts, which eliminates the defect. If the plywood must be completely replaced, follow the procedure illustrated below.

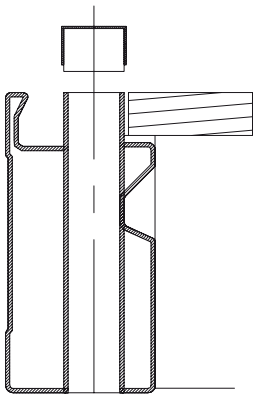




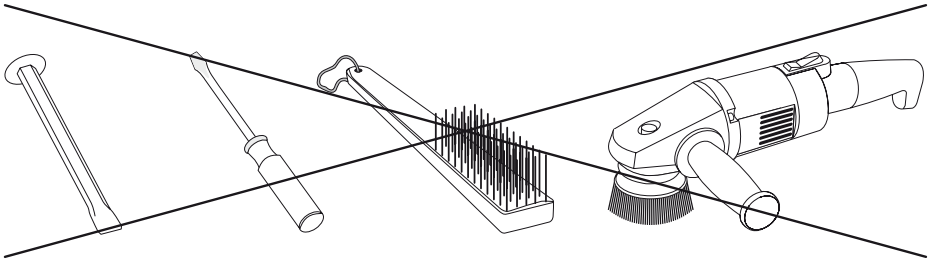




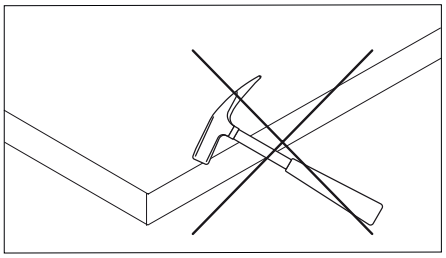


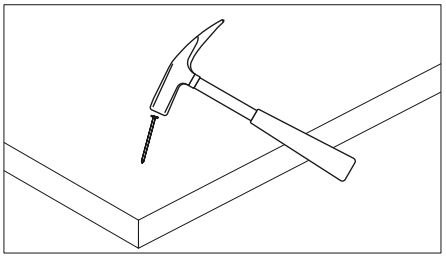


Do not use pointed or sharp objects, metal brushes, abrasive disks or surfaces, etc.

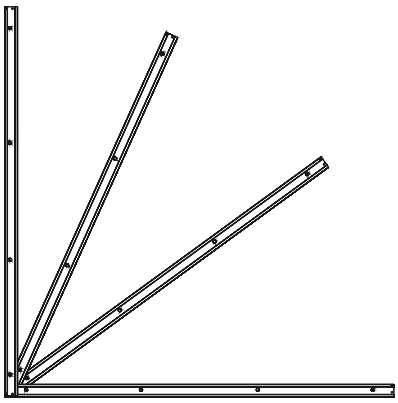


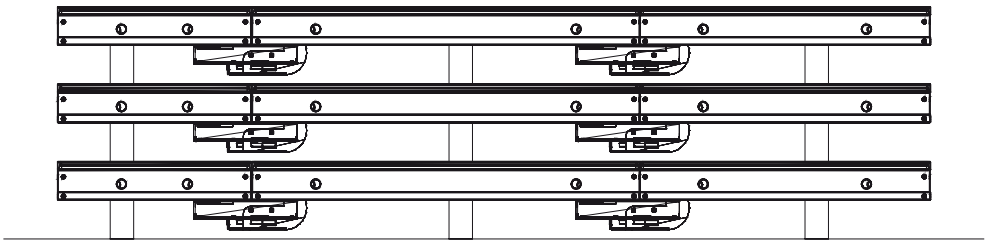
Do not use the hammer on the profiles of the frames. Do not use nails, which are longer than 60 mm on the formwork.





Do not tip over the elements or permit them to fall. Use wood supports when stacking the panels to avoid damaging the connecting accessories.





Safety Advisories

This manual contains information for the correct assembly and safe use of the vertical formworks. The system must be used exclusively according to the following instructions; therefore, for any variation or differing method of use, it is necessary to contact Condor, which will perform specific checks and produce additional instructions for that specific assembly and use. Condor is excluded from any and all responsibility for damage caused by unauthorized repairs or modifications. The person in charge of the construction site must take care to ensure that the formworks are assembled in compliance with the illustrations for correct operation, and respecting the safely regulations and the working illustrations and instructions for assembly and use. Any use which does not follow the functional diagrams signifies that the contractor assumes direct responsibility of the operations related to the use of the provisional equipment insofar as regards the suitability and regularity of the provisional equipment as a whole. Before proceeding to assembly and use, all the components, must be checked and damaged components must be eliminated and substituted. The entire system must be assembled in such a way that the actions, to which the formworks and the shoring are subjected, are correctly performed in complete safety. The personnel who perform the assembly and disassembly must carefully read the manual and be instructed with information and training regarding the operations of preparation, assembly and disassembly of the formworks. The stripping phase must be performed in conformity with the phases required by the structural project, only when the setting of the concrete is sufficient for the performance of the successive phase of the construction cycle. During lifting and transport, the frame formwork components must be previously stacked in the specific barrows in such a way as to ensure safe work conditions.

WARNING
If it is not possible to know the weather conditions regarding the wind during use, the pressure must not be assumed less than 200N/mg for the working conditions. If winds stronger than 64km/h are forecast, it is necessary to use iron reinforcement rods immediately after the assembly of the formworks.

Directives, regulations & charts

REGULATORY REFERENCES:
Law Decree April 9, 2008 , no. 81 implementatio¬n of art. 1 of the law of August 3, 2007, no. 123, regarding employee health and safety in the workplace (g.u. no. 101 of April 30, 2008) updated by Law Decree August 3, 2009, no. 106
Dlgs. August 14, 1996 no. 494 Implementation of Directive for worksites 9257 CE
L. March 19, 1990 no. 55 "Plan of measures for physical safety of workers" D.M. November 28, 1987 no. 592, Implementation of Directive 84532 CEE
D.RR. January 7, 1956 no. 164 Injury prevention on construction worksites
D.RR. July 24, 1996 no. 459 Received European Directive "machines"
Law Decree. September 19,1994 no. 626 IMplemented CE Directive on worker safety and health, D.RR. April 27, 1955 no. 547 Regulation for prevention of work injuries
CNR UN110027/85 Steel structures for provisional constructions
CNR UNI 10011/85 and foll. UNI 50.00.206.0/01/99 Formworks and general requirements for the design, construction & use Ministry Labour Circular Letter 80/86 Technical Attachment 07/07/1986
Ministry Labour Circular Letter 15/80 (Substituted circular 80/86)
Ministry Labour Circular Letter 18/81 (Substituted circular 80/86)
Ministry Labour Circular Letter 13/82 Systems and means against falls
UNI EN 1065 Steel Props, Technical datasheet ISPESL Steel props
CEN TC53 WG12 PR EN Vertical formworks
EN 12813 Scaffolding with prefabricated elements EN13374 Protective parapets
EN1263/1/2 Safety nets
EN13377 Wooden prefabricated beams
Law Decree. July 8, 2003 no. 235 Implementation CE – Work equipment
D.RR. July 3, 2003 no. 222 Regulations regarding minimum contents of Safety and Coordination Plans
Letter of Labour Ministry prot. 22793/OM-04 of May 14, 1998
Letter of Labour Ministry prot. 22383/PRI of May 14, 1998

DIN 1052 - Wooden structures
DIN 1055 - Allowed loads for buildings
DIN 4420 - Work and safety scaffolding
DIN 4421 - Shoring structure
DIN 4424 - Steel props and extractions
DIN 18.202 - Tolerances in building construction
DIN 18.215 - Wooden panels for concrete and constructions in reinforced concrete standard measures 0.50 m x 1.50 m, width 21 mm
DIN 18.216 - Anchoring formworks for concrete
DIN 18.217 - Concrete surfaces and panels
DIN 18.218 - Pressure of fresh concrete on vertical formworks
DIN 18.800 - Steel constructions
DIN 68791 - Panels for large concrete surfaces and reinforced concrete, in plywood laths and scantlings

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