

User Guide

MEGALITE

01FDL34



IMPORTANT:

Any safety provisions as directed by the appropriate governing agencies must be observed when using our products.

The pictures in this brochure are snapshots of situations at different stages of assembly, and therefore are not complete images. For the purpose of safety, they shall not be deemed as definite.

All instructions regarding assembly and basic procedures contained in this document, and the data on stress and loads must be respected. ULMA's Technical Department must be consulted any time that field changes alter our equipment installation drawings.

The loads featured in this document, related to the basic parts of the product, are approximate.

Our equipment is designed to work with accessories and parts produced by our company only. Combining such equipment with other brands is not only dangerous without having made all corresponding verifications, it also voids any and all our warranties.

The company reserves the right to introduce any modifications deemed necessary for the technical development of the product.



Safety note



Control note



Warning note



Information note

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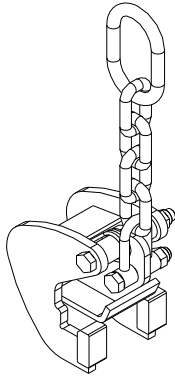
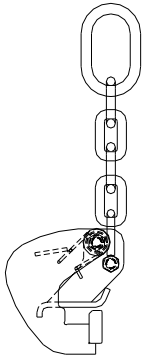
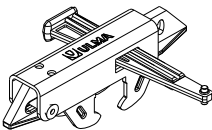
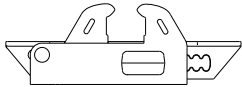
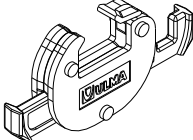

1. INTRODUCTION

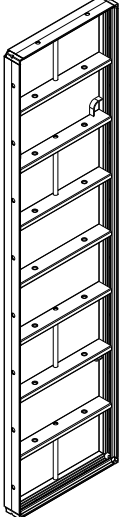
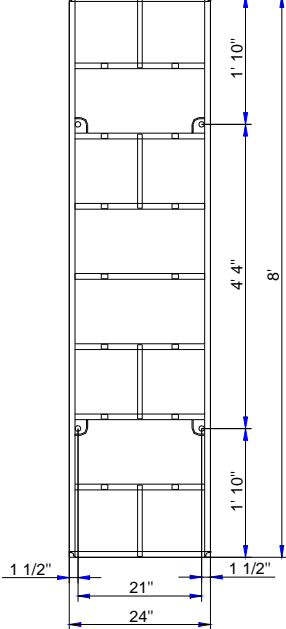
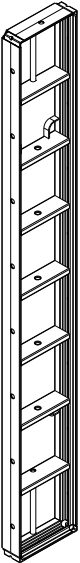
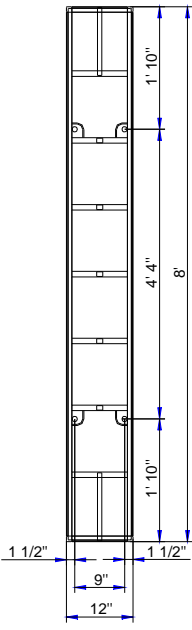
The *MEGALITE* product was created as a vertical formwork system for handset and gang forming applications, utilizing quick connecting clamps to join panels together.

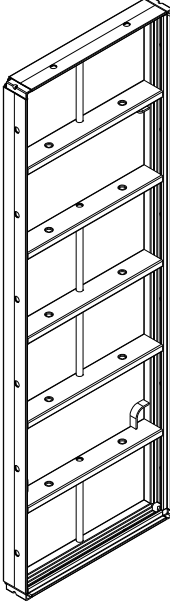
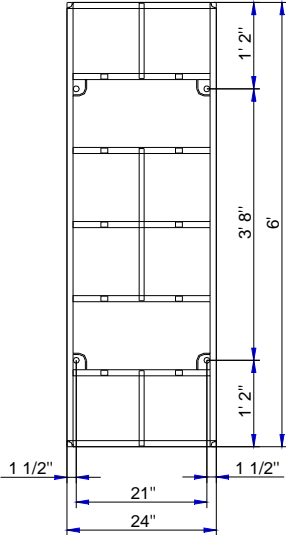
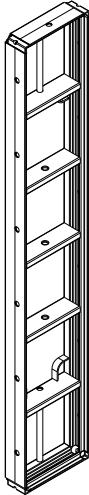
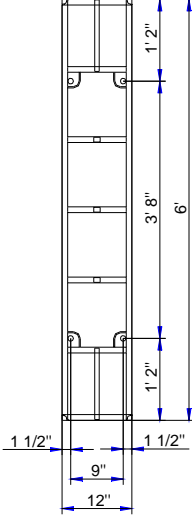
Basic properties:

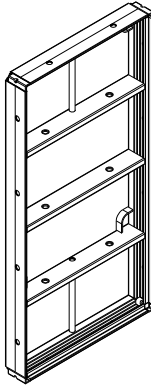
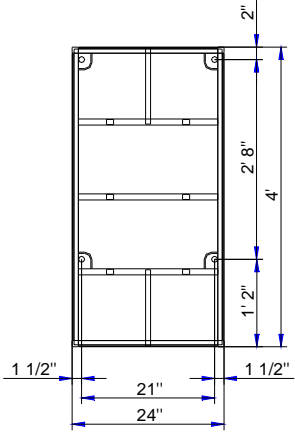
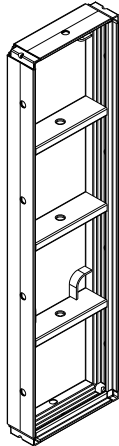
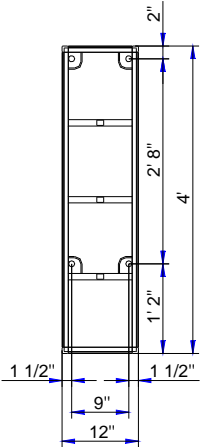
- Panel design:
 - Maximum allowable concrete pressure: 1250 PSF
- Weight of the largest panels:
 - Standard panel 8'x24": 108 pounds
 - Universal panel 8'x30": 146.3 pounds
- Panel height: 8', 6' and 4'.
- Panel width: 30"(universal), 24", 18", 12", 6", 4" and 2"
- All the panels have several holes in the external profiles for connecting hardware and also can be used for joining to "Steel-Ply" panels using wedge bolts.
- The form face is 15 mm birch plywood riveted to the steel frame. The corners of the steel frame are manufactured with special casting elements, to provide a more durable panel and increase service life

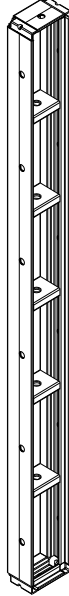
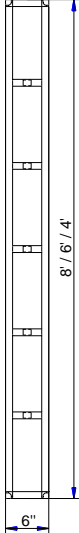
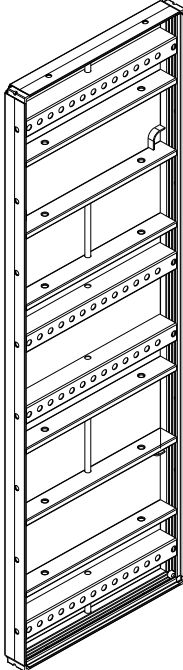
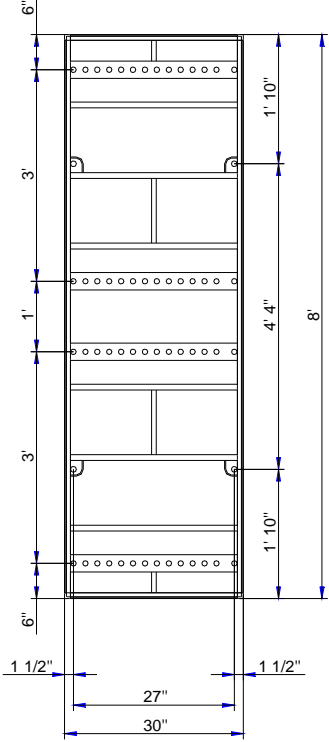
2. COMPONENTS OF THE SYSTEM

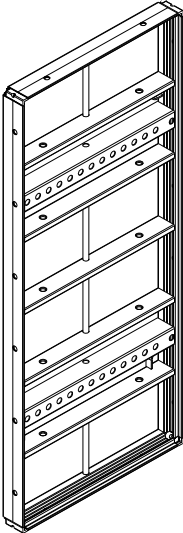
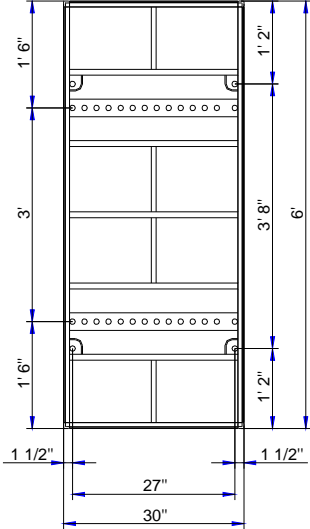
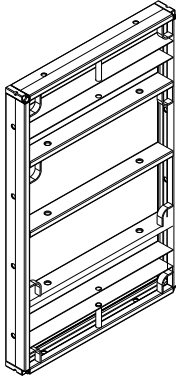
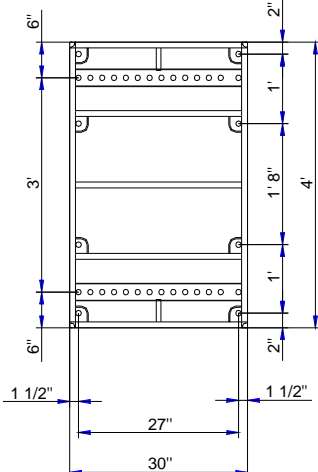
CODE	NAME	WEIGHT (lbs)	SKETCH	
1920835	LIFTING HOOK	17.6	 <p data-bbox="932 972 1023 992">GALVANIZED</p>	
1920851	ADJUSTABLE CLAMP	6.6	 <p data-bbox="932 1384 1023 1404">GALVANIZED</p>	
1920818	FIXED CLAMP	2.8	 <p data-bbox="932 1868 1023 1888">ZINC PLATED</p>	

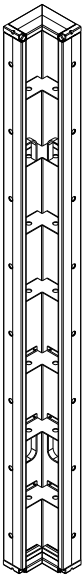
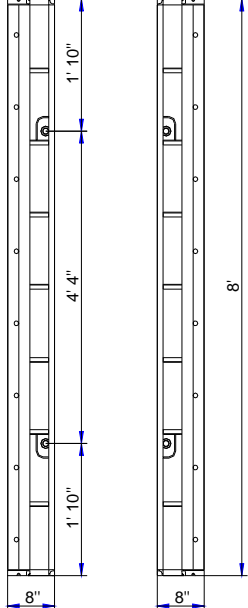
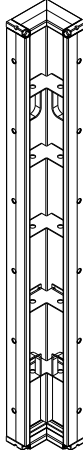
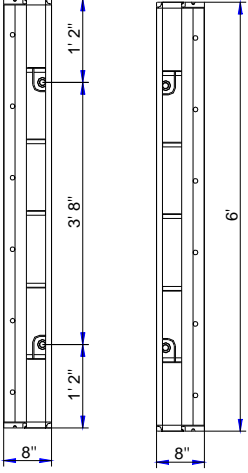
CODE	NAME	WEIGHT (lbs)	SKETCH	
1920455	PANEL 8'x24''	108	 <p data-bbox="917 1057 1045 1079">PAINTED YELLOW</p>	
1920473	PANEL 8'x18''	90.3		
1920474	PANEL 8'x12''	72.7	 <p data-bbox="917 1787 1045 1809">PAINTED YELLOW</p>	


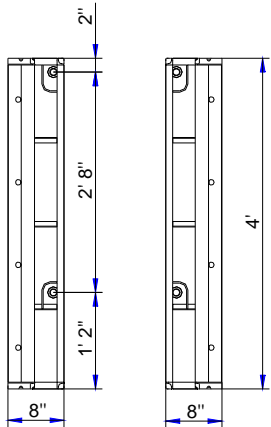
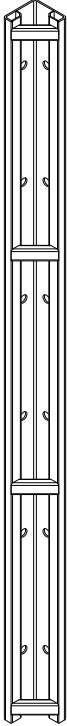
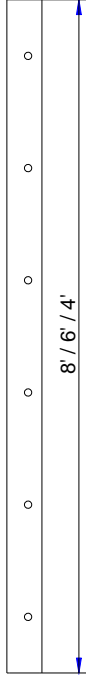
CODE	NAME	WEIGHT (lbs)	SKETCH	
1920456	PANEL 6'x24"	83.5	 <p data-bbox="916 1115 1038 1137">PAINTED YELLOW</p>	
1920458	PANEL 6'x18"	70.3		
1920460	PANEL 6'x12"	55.7	 <p data-bbox="916 1816 1038 1839">PAINTED YELLOW</p>	


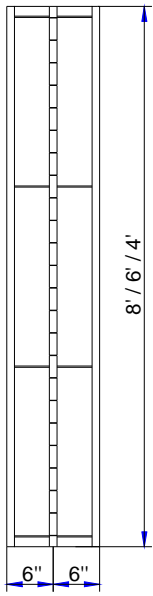

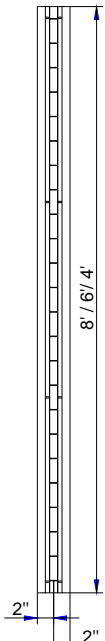
CODE	NAME	WEIGHT (lbs)	SKETCH	
1920457	PANEL 4'x24"	57.3	 <p data-bbox="916 952 1038 972">PAINTED YELLOW</p>	
1920459	PANEL 4'x18"	48.5		
1920461	PANEL 4'x12"	37.4	 <p data-bbox="916 1760 1038 1780">PAINTED YELLOW</p>	

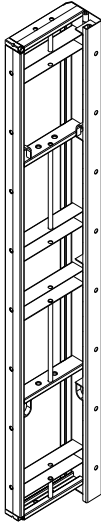
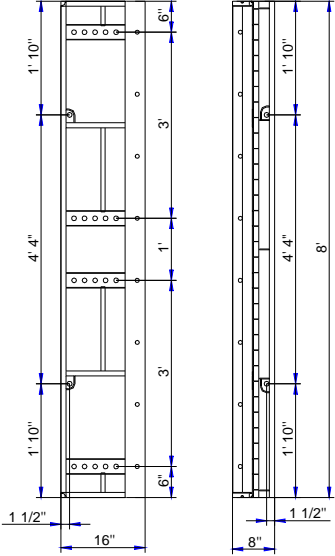
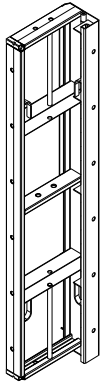
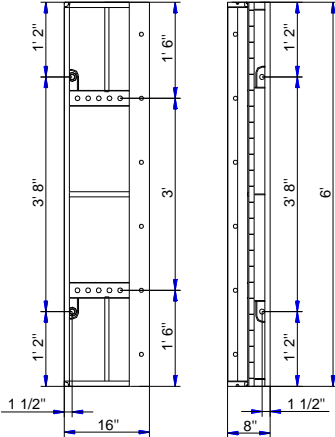
CODE	NAME	WEIGHT (lbs)	SKETCH	
1920475	PANEL 8'x6"	53.7	 <p data-bbox="916 1005 1038 1025">PAINTED YELLOW</p>	
1920462	PANEL 6'x6"	40.7		
1920463	PANEL 4'x6"	27.7		
1920480	UNIVERSAL PANEL 8'x30"	146.3	 <p data-bbox="916 1839 1038 1859">PAINTED YELLOW</p>	

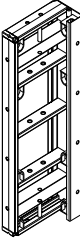
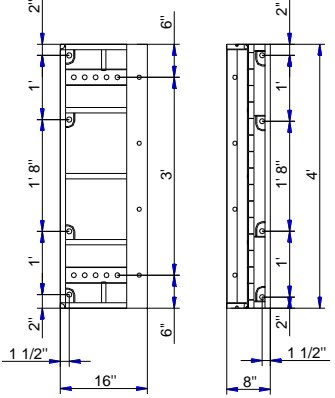
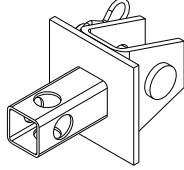
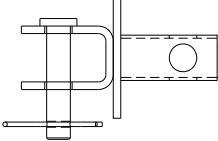
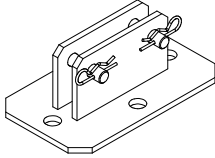
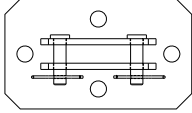
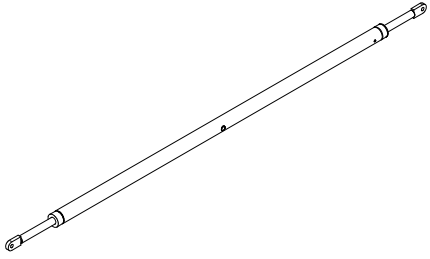
CODE	NAME	WEIGHT (lbs)	SKETCH	
1920490	UNIVERSAL PANEL 6'x30''	109.5	 <p data-bbox="916 965 1038 987">PAINTED YELLOW</p>	
1920500	UNIVERSAL PANEL 4'x30''	80.1	 <p data-bbox="916 1682 1038 1704">PAINTED YELLOW</p>	

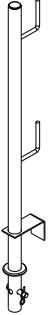
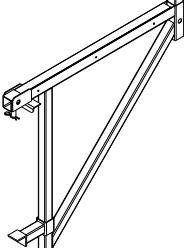
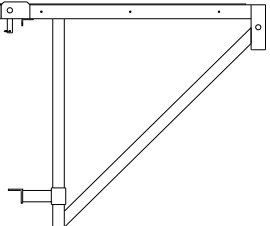
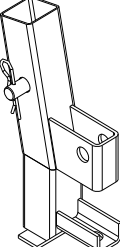
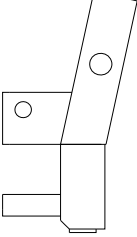
CODE	NAME	WEIGHT (lbs)	SKETCH	
1920242	INSIDE CORNER 8''x8'' 8'	83.8	 <p data-bbox="916 981 1040 1003">PAINTED YELLOW</p>	
1920246	INSIDE CORNER 8''x8'' x6'	64.1	 <p data-bbox="916 1594 1040 1617">PAINTED YELLOW</p>	

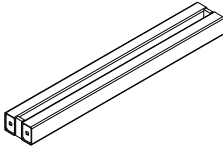
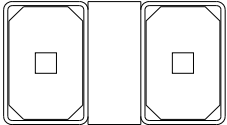
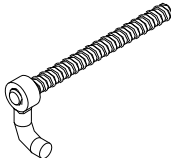

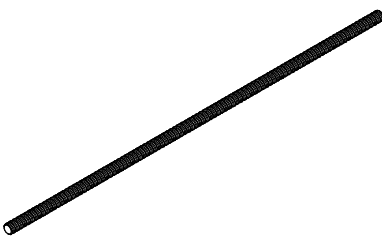
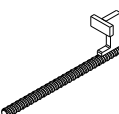

CODE	NAME	WEIGHT (lbs)	SKETCH	
1920250	INSIDE CORNER 8''x8'' x4'	44.4	 <p>PAINTED YELLOW</p>	
1920082	OUTSIDE CORNER 8'	48.5	 <p>PAINTED YELLOW</p>	
1920080	OUTSIDE CORNER 6'	36.3		
1920075	OUTSIDE CORNER 4'	24.2		

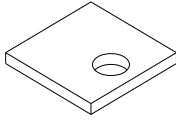
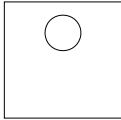
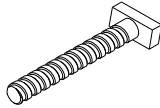

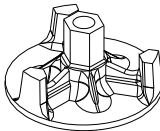
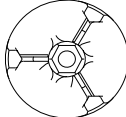
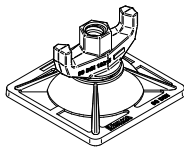
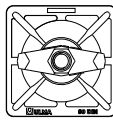
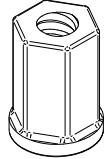
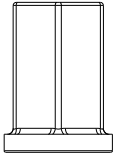
CODE	NAME	WEIGHT (lbs)	SKETCH	
1920130	HINGED INSIDE CORNER 8'	120.3	 <p data-bbox="917 992 1042 1010">PAINTED YELLOW</p>	
1920146	HINGED INSIDE CORNER 6'	90.3		
1920158	HINGED INSIDE CORNER 4'	60.4		
1920128	HINGED OUTSIDE CORNER 8'	79.8	 <p data-bbox="917 1825 1042 1843">PAINTED YELLOW</p>	
1920140	HINGED OUTSIDE CORNER 6'	60		
1920152	HINGED OUTSIDE CORNER 4'	39.9		


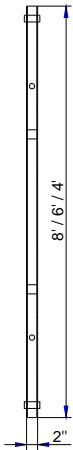

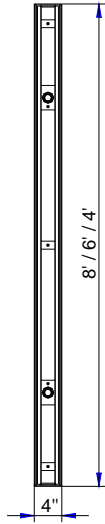
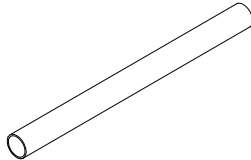
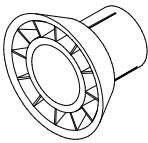
CODE	NAME	WEIGHT (lbs)	SKETCH	
1920098	UNIVERSAL HINGED CORNER 8'	142.4	 <p>PAINTED YELLOW</p>	
1920100	UNIVERSAL HINGED CORNER 6'	105	 <p>PAINTED YELLOW</p>	

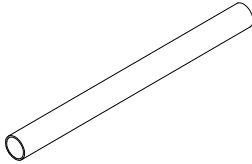
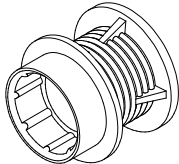
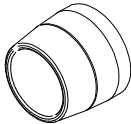
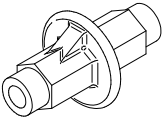
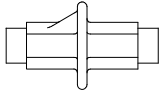
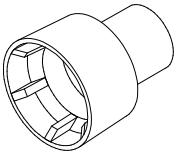
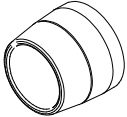
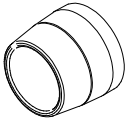
CODE	NAME	WEIGHT (lbs)	SKETCH	
1920110	UNIVERSAL HINGED CORNER 4'	80.1	 <p data-bbox="914 719 1038 741">PAINTED YELLOW</p>	
1920804	PIPE BRACE HEAD	1.83	 <p data-bbox="930 1149 1023 1171">GALVANIZED</p>	
1900144	PIPE BRACE SHOE	9.4	 <p data-bbox="922 1417 1035 1440">PAINTED BLACK</p>	
1900134	PIPE BRACE 1.1-1.7 (3' 7"-5' 7")	16.9	 <p data-bbox="1110 1895 1233 1917">PAINTED YELLOW</p>	
1900123	PIPE BRACE 2.4-3.5 (7' 10"-11' 6")	53.5		
1908168	PIPE BRACE 3.6-4.8 (11' 9"-15' 9")	95.4		
1900147	PIPE BRACE 5-6 (16' 4"-19' 8")	113.1		

CODE	NAME	WEIGHT (lbs)	SKETCH	
1904311	MEGAFORM HANDRAIL POST	7.5	 <p data-bbox="1109 772 1236 795">PAINTED YELLOW</p>	
1920041	WALKWAY BRACKET	19.1	 <p data-bbox="933 1198 1029 1220">GALVANIZED</p>	
1920854	POST BRACKET	3	 <p data-bbox="933 1758 1029 1780">GALVANIZED</p>	

CODE	NAME	WEIGHT (lbs)	SKETCH	
1850162	WALER 0.75 (2' 6")	10.5	 PAINTED BLACK	
1850159	WALER 1.6 (5' 3")	22		
1850433	WALER 3 (9' 10")	40.1		
1850164	WALER HOOK	1.1	 GALVANIZED	
0230100	TIE ROD 15/1 (3' 3 1/2")	3.1		
0230120	TIE ROD 15/1.2 (4')	3.8		
0230150	TIE ROD 15/1.5 (5')	4.7		
0230200	TIE ROD 15/2 (6' 7")	6.3		
0230600	TIE ROD 15/6 (19' 8")	19		
1920000	BULKHEAD HOOK	1.3	 ZINC PLATED	

CODE	NAME	WEIGHT (lbs)	SKETCH	
1920894	ECCENTRIC WASHER	0.7	 ZINC PLATED	
1920259	PANEL BOLT 5"	0.6	 ZINC PLATED	
1861122	PANEL BOLT 8"	0.8		
7238000	FIXED PLATE NUT 15	1.5	 BICROMATE TREATED	
1900256	PLATE WASHER NUT 15	3	 BICROMATED	
7238001	HEXAGONAL NUT 15	0.8	 ZINC PLATED	

CODE	NAME	WEIGHT (lbs)	SKETCH	
1920050	COMPENSATION 2''x8'	39.4	 PAINTED YELLOW	
1920052	COMPENSATION 2''x6'	29.7		
1920054	COMPENSATION 2''x4'	19.8		
1920067	COMPENSATION 4''x8'	46.3	 PAINTED YELLOW	
1920072	COMPENSATION 4''x6'	35.2		
1920059	COMPENSATION 4''x4'	24.2		
7230455	SPACER TUBE 22/25	0.66		
7230264	CONE 22	0.013		

CODE	NAME	WEIGHT (lbs)	SKETCH	
7238047	SPACER TUBE 22/26	0.88		
7238049	WATER STOP CAP 26	0.02		
7238050	PLUG 26	0.009		
0230004	WATER STOP DW15	1.34		
9371966	WATER STOP ADAPTER DW15	0.02		
1861799	PLUG 20	0.007		
1900159	PLUG 22	0.007		

2.1. MAIN PANELS

The MEGALITE system range of panels is furnished as follows:

- Heights: 8', 6' and 4'.
- Widths: 24", 18", 12" and 6".

The panel 8'x24" is the largest of the system covering a 16 sf surface area.

These panels have an external frame formed by steel profiles and rectangular tubes. The panel face is birch plywood riveted to the frame.

The corners of the frame are reinforced with special casting elements (welded to the external profiles).

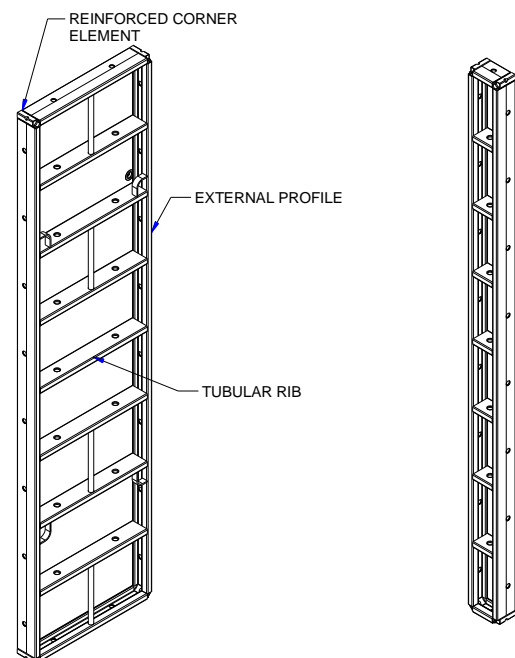
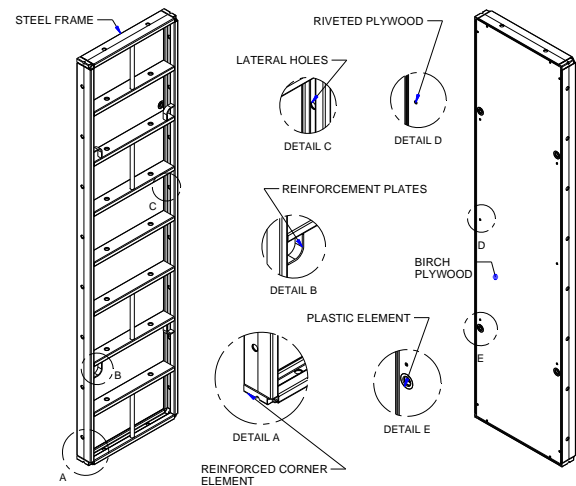
The frame also has four tie reinforcement plates to support the washer nuts (for 15 mm diameter tie rods). The plywood face has tie holes that are protected with plastic elements to prevent plywood from damaging.

All panel ribs have holes for easy attachment of the different accessories.

The external profiles have lateral holes, which will be useful for connections, bulkheads and job built fillers.

The surface in contact with the concrete is a 15 mm birch plywood, that is recessed in the steel frame. The plywood edge is protected by the external profile.

The gap between them is filled with silicone.

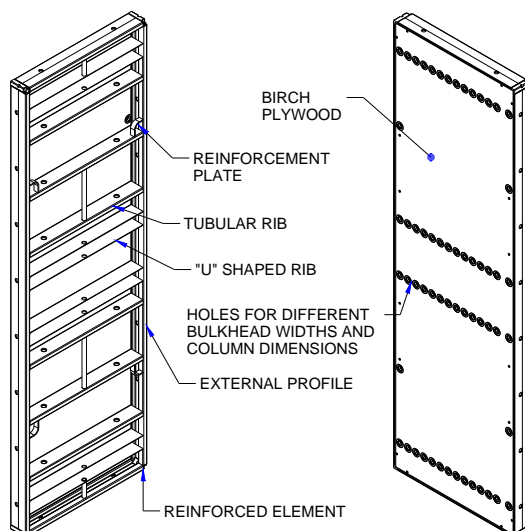


2.2. UNIVERSAL PANEL

- Heights: 8', 6' and 4'.
- Width: 30".

The universal panels apart from being used for column forming, can be used as standard panels for corners and bulkheads.

These panels are similar in design to the main panels, formed by steel profiles and rectangular tubes. They also have the special casting elements in the corners. In addition to these components, they have "U" shaped ribs multipunched for different bulkhead widths and column dimensions.



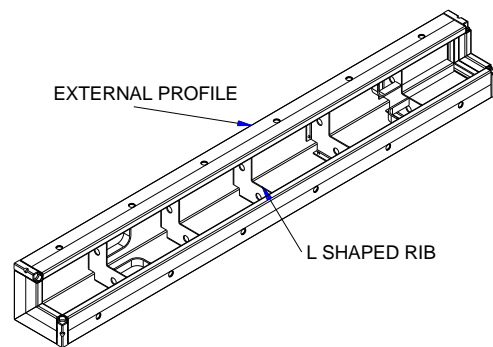
2.3. INSIDE CORNER

- Heights: 8', 6' and 4'
- Width: 8"x8"

These elements are used to provide a solution for the internal face of 90° corners. They are 8"x8" components formed by a steel frame and a 16 mm thick composite board (riveted over the structure).

The steel frame has external profiles (with lateral holes), "L" shaped ribs and special casting elements in the corners (welded to the external profiles).

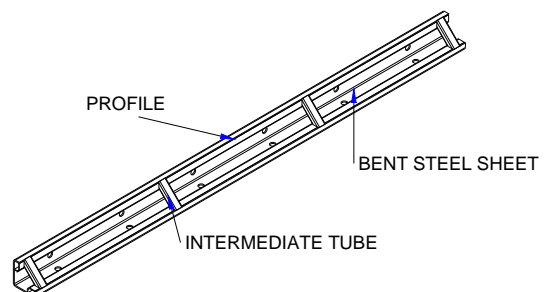
The corner has two tie holes and reinforcement plates in both sides.



2.4. OUTSIDE CORNER

- Heights: 8', 6' and 4'

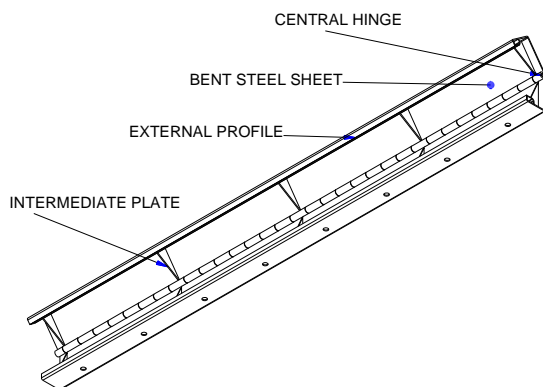
These elements are used on the external face of 90° corners. They are formed by a bent steel sheet with a welded external profile. These profiles allow the use of clamps to join the corners with adjacent panels (there are also lateral holes to make this connection with bolts and hexagonal nuts). Intermediate tubes reinforce the final element.



2.5. HINGED INSIDE CORNER

- Heights: 8', 6' and 4'
- Width: 6"x6"

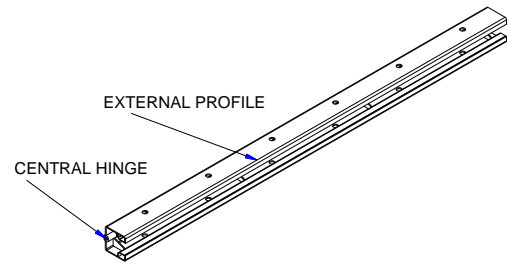
These elements are used to provide a solution for the internal face of hinged corners. They are formed by two symmetrical parts, which pivot around a central hinge. These parts are formed by a bent steel sheet with a welded external profile. These profiles allow the use of clamps to join the hinged corners with adjacent panels (there are also lateral holes to make this connection with bolts and hexagonal nuts). This element is reinforced with intermediate plates and does not have tie holes.



2.6. HINGED OUTSIDE CORNER

- Heights: 8', 6' and 4'
- Width: 2"x2"

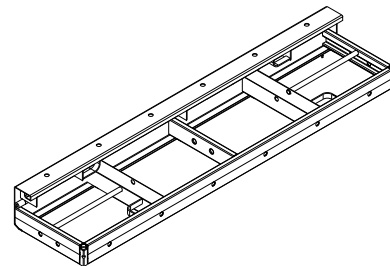
These elements are used on the external face of hinged corners. They are formed by two symmetrical parts, which pivot around a central hinge. These parts are formed by a bent steel sheet with a welded external profile. These profiles allow the use of clamps to join the hinged corners with adjacent panels (there are also lateral holes to make this connection with bolts and hexagonal nuts). This element is reinforced with intermediate plates and does not have tie holes.



2.7. UNIVERSAL HINGED CORNER

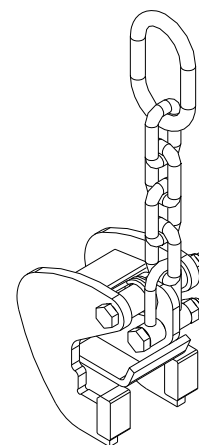
- Heights: 8', 6' and 4'
- Width: 8"x16"

These elements are used to provide a solution for pilasters (in the middle of the walls and in corners) and wall thickness changes. They are two different parts that pivot around a hinge. One of these parts is similar to a universal panel. The other is similar to one of the symmetrical parts of the outside hinged corner.



2.8. LIFTING HOOK

The MEGALITE lifting hook is an auxiliary component for lifting gangs using a crane.



The lifting hook is designed for a maximum safe working load of 3,300 lbs.

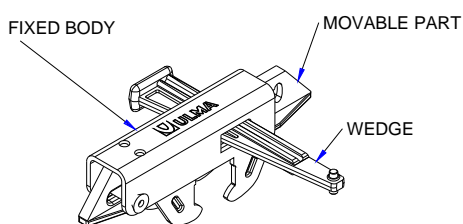
A minimum of two hooks must be used for gang lifting.

2.9. ADJUSTABLE CLAMP

The adjustable clamp is a one piece assembly used to join together different panels or accessories. This joint can be made horizontally or vertically.

This component can also join wooden or metal compensations up to 2" placed between two consecutive panels.

The movable part slides on the fixed body until reaching the desired opening. In this position, the wedge is driven (with hammer) until the clamp joins two external profiles together.



2.10. FIXED CLAMP

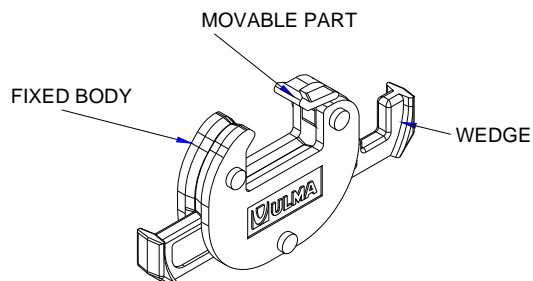
The fixed clamp is also a one piece assembly and is the main MEGALITE component used to join different panels or accessories.

This joint can be made horizontally or vertically.

This component can be only used to join panels without any compensation between them.

The fixed clamp is formed by three parts: fixed body (formed by two elements riveted together), movable part and wedge.

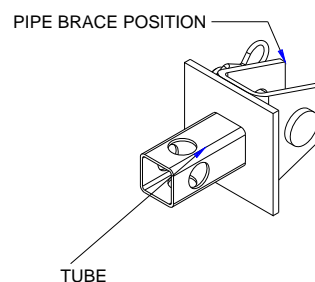
When driving the wedge (with hammer), the movable part rotates to engage and join two external profiles together.



2.11. PIPE BRACE HEAD

The pipe brace head is a component used to connect pipe braces to the panels. These pipe braces are used to stabilize the panels (in a vertical position).

This pipe brace head can be placed on any hole of the tubular ribs, vertically or horizontally. The pipe brace head is secured to the panel by bolting it ("PANEL BOLT 5" ") through a rib.

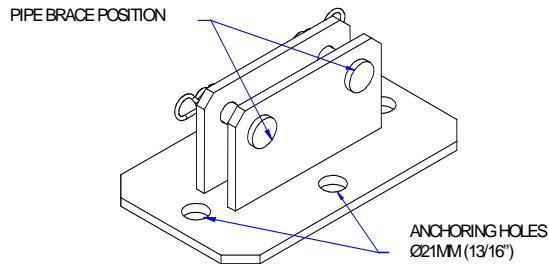


2.12. PIPE BRACE SHOE

The "pipe brace shoe" is the component used to anchor pipe braces to the ground.

They have two holes for allowing the pipe braces to be secured using pins.

The base must be fixed on the ground or deadman using the $\varnothing 21\text{mm}$ (13/16") holes which allow the insertion of suitable anchors.



2.13. PIPE BRACES

The "Pipe braces" are components used to stabilize the panels against wind loading, and plumb the assembled gang or panels. They can work with tensile and compressive stress.

These pieces are formed by a tubular body with two adjustable screws located at each end in order to control the final length of the pipe brace.

Depending on the formwork height, adequate pipe brace and spacing will be used.

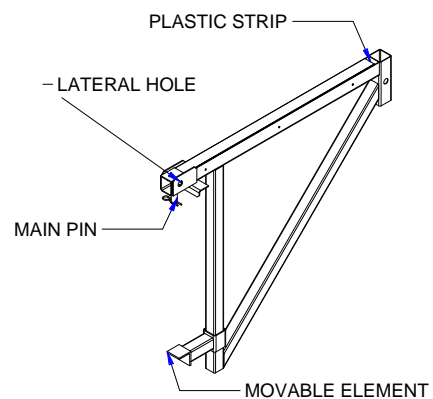
CODE	NAME	WEIGHT	
1900134	Pipe brace 1.1-1.7 (3' 7" – 5' 7")	17	↗
1900123	Pipe brace 2.4-3.5 (7' 10" – 11' 6")	53	
1908168	Pipe brace 3.6-4.8 (11' 9" – 15' 9")	95	
1900147	Pipe brace 5-6 (16' 4" – 19' 8")	113	

The pipe braces will be secured on one side to the pipe brace head (this head will be fixed to the panel) and the other side to the "Pipe brace shoe" (anchored as required by contractor).

2.14. WALKWAY BRACKET

The "Walkway Bracket" is a component used to provide support for a walkway, utilizing scaffold grade wood planks (supplied by contractor) nailed to a plastic strip located on the top element of the bracket.

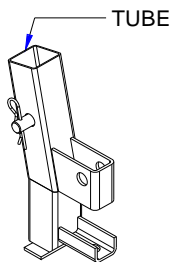
The bracket is installed by inserting the main pin in one of the holes of the horizontal ribs, securing it with the hitch pin and resting the movable element on lower ribs in order to give enough stability to the component. The assembly to vertical ribs is also possible through the lateral hole (the fastening in this case will be done using "PANEL BOLT 5" " and one hexagonal nut 15).



2.15. POST BRACKET

The "Post Bracket" is a component where the "Handrail Post" is inserted in order to have a protection (handrail) on the opposite side of the walkway area.

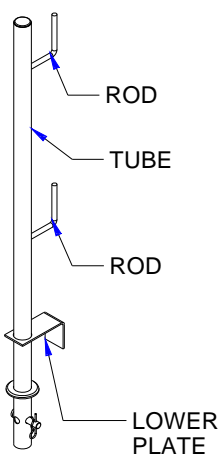
This bracket can be secured in any hole of the tubular ribs (not only when they are horizontally, but also vertically). The installation process is similar to the walkway bracket. Secure using "PANEL BOLT 5" " and one hexagonal nut 15.



2.16. MEGAFORM HANDRAIL POST

The "Megaform handrail post" is a component manufactured with a vertical tube and welded rods necessary to support the wood planks designed and supplied by contractor to be used as handrails. The main tube also has a plate on the lower part for fastening toe boards. This is also designed and supplied by contractor.

The "Handrail post" is installed on the "Walkway bracket" or in the "Post bracket" by inserting the bottom part of the tube in the square pocket and fastening with pins.

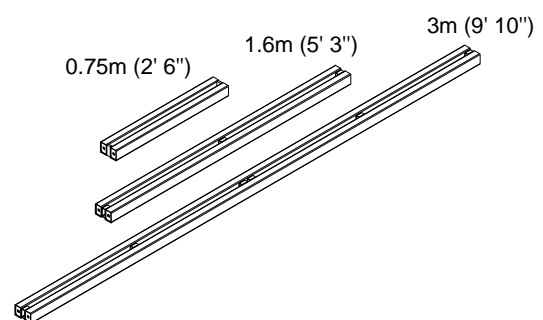


2.17. WALER

These components are available in three different lengths: 0.75 m (2' 6"), 1.6 m (5' 3") and 3 m (9' 10"). Their main function is to increase gang stiffness.

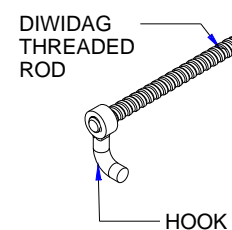
These components are manufactured with two rectangular tubes, assembled together with a gap between them to allow for a waler hook connection (these waler hooks are necessary to join walers to panels). The final tightening is made using plate nuts. Depending on the gang sizes, the adequate waler will be used. As a general rule, the 3 m (9' 10") waler will be installed using 4 waler hooks and plate nuts. For the 1.6 m (5' 3") and 0.75 m (2' 6") only two hooks will be used.

Walers will also be used for bulkheads and to reinforce areas with job built fillers bigger than 2".



2.18. WALER HOOK

These components are used to secure the walers to the panels. The elements are formed with a hook joined to 200 mm (8") diwidag thread rod. The final tightening is achieved using plate nuts.



2.19. TIE ROD


This component in conjunction with plate nuts is used to support panels joints (one opposite of the other), due to concrete pressures while pouring.

They are inserted through the panel's tie holes.

Spacer tubes cut to size as required by contractor and cones are used to sleeve the tie rods to allow their removal after pouring. The final tightening is made using plate nuts.

TIE ROD 15
SAFE WORKING LOAD: 20.2 Kips

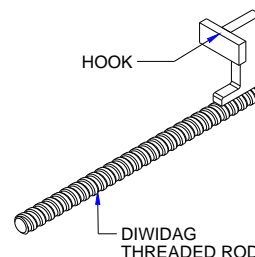
Tie rods are available in the following lengths in order to cover different wall thicknesses.

CODE	NAME	WEIGHT (lbs)	
0230100	TIE ROD 15/1 (3' 3 1/2")	3.17	
0230120	TIE ROD 15/1.2 (4')	3.80	
0230150	TIE ROD 15/1.5 (5')	4.75	
0230200	TIE ROD 15/2 (6' 7")	6.33	
0230600	TIE ROD 15/6 (19' 8")	19	

2.20. BULKHEAD HOOK

The bulkhead hook can be used through the lateral holes of the panels, and also hooked externally to the MEGALITE main profile. This element has the possibility of being used in different positions, and for several functions:

- Column forming: to make 90° connections between universal panels (with plate nuts 15).
- Bulkheads: it is used to secure walers to panels (with plate nuts 15). It is also used in cases where universal panels are used for bulkheads.
- Lateral joints: using the panel's lateral holes together with eccentric washers and hexagonal nuts 15, the bulkhead hook can also be used to achieve a 3" offset in lateral joints.

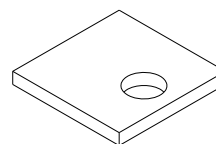


2.21. ECCENTRIC WASHER

The eccentric washer is a 75x75x8mm (3"x3"x5/16") plate with one Ø23mm (7/8") hole.

It is always used with bulkhead hooks (or panel bolts) and hexagonal nuts 15 to make lateral connections.

When panels are in a horizontal position this element can be used with a hexagonal nut 15 to secure the bottom row of ties.



2.22. PANEL BOLT

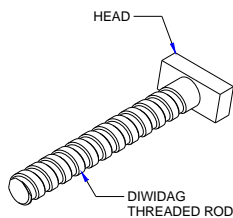
There are two different bolts: 8" and 5" length.

These components have many functions:

- They can be used to connect pipe brace heads and post brackets through holes in the

panel ribs. The 5" bolt is the suitable for this case.

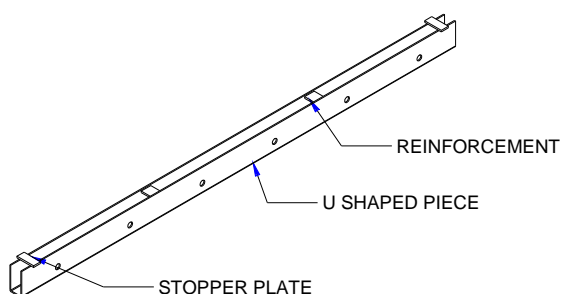
- They are used to connect the "Walkway bracket" through holes in the ribs when the panel is in a horizontal position (ribs in vertical). The 5" bolt is the suitable for this case.
- They can also be used to make lateral panels connections through the holes of the external profile (together with the eccentric washer and hexagonal nut 15). It is necessary to use the 8" bolt when there are compensations between panels.



2.23. FILLER 2"

This element is formed by a 2" wide "U" shaped piece. This "U" has two welded stopper plates at each end which facilitates the placement of the component against the adjacent panel.

These components can also be joined laterally to the panels with panel bolts 8" and hexagonal nuts 15.

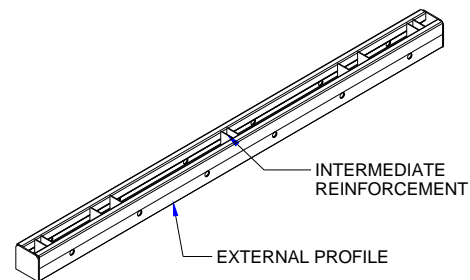


2.24. FILLER 4"

These components are formed by a steel frame with plywood face riveted over it.

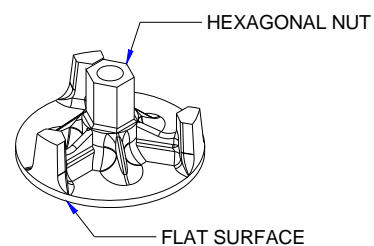
The frame is formed by external profiles with lateral holes, and intermediate and edge reinforcements.

The plywood has tie holes.



2.25. PLATE NUT 15

The plate nut is a one piece fixed hexagonal shaped nut with a 4 5/16" diameter reinforced plate which allows the use of a hammer to turn the nut. This element has a Ø 15 mm (5/8") threaded hole to use with a diwidag tie rod. These two elements make up the panel's tying system.

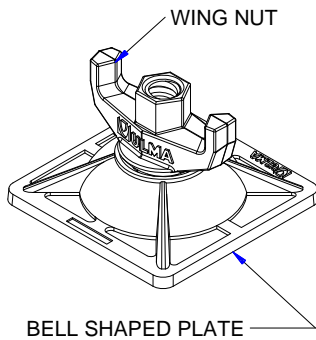


SAFE WORKING LOAD
PLATE NUT 15: 20.2 Kips

2.26. PLATE WASHER NUT 15

This element is formed by a 120x100 mm (4 3/4" x 4") "bell shaped" plate with a movable wing nut which allows the use of Ø 15 mm (5/8") diwidag tie rods.

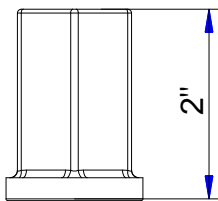
This design allows the wing nut to pivot and have adequate bearing for sloped panels (up to 15°).



SAFE WORKING LOAD
PLATE WASHER NUT 15: 20.2 Kips

2.27. HEXAGONAL NUT 15

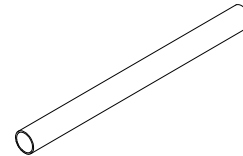
This fastening component, 50 mm (2") in length, is used with any Ø 15 mm (5/8") diwidag tie rods.



SAFE WORKING LOAD
HEXAGONAL NUT 15: 20.2 Kips

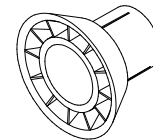
2.28. SPACER TUBE 22/25

This element is a plastic tube used to sleeve tie rods to allow their removal after pouring. It remains in the concrete.



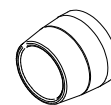
2.29. CONE 22

This element is a plastic cone. It is placed on both sides of the "SPACER TUBE 22/25" and it will cover the panel tie hole. Together with the spacer tube, these two elements will form a wall spreader. This cone is a reusable element.



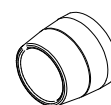
2.30. PLUG 20

After stripping the panels, this plastic element is used to plug the holes in the "CONES 22" if is not removed.



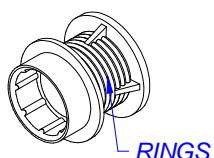
2.31. PLUG 22

After stripping the panels and removing the "CONES 22", this plastic element is used to plug the holes in the "SPACER TUBES 22/25".



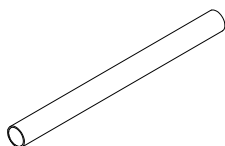
2.32. WATER STOP CAP 26

This plastic piece is manufactured with cylindrical rings, to prevent liquids from leaking through the wall. This element together with "PLASTIC PLUG 26" and "SPACER TUBE 22/26" solve the "water stop" condition in wall forming.



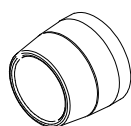
2.33. SPACER TUBE 22/26

This element is similar to the "SPACER TUBE 22/25". It is used together with "WATER STOP CAP 26".



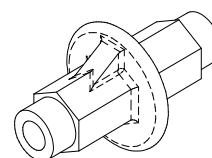
2.34. PLASTIC PLUG 26

This plastic element is used to plug the "WATER STOP CAP 26" to solve the "water stop" condition in wall forming.



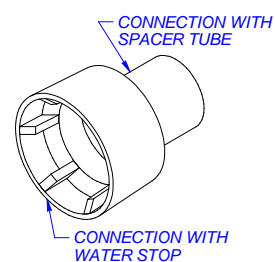
2.35. WATER STOP DW15

This element is placed in the centre of the wall and connected on both sides with TIE RODS. Its function is to work as a barrier to prevent liquid leakage through the wall.



2.36. WATER STOP ADAPTER DW15

This plastic piece is used together with the "WATER STOP DW15" and allows the connection between this element and the standard SPACER TUBE 22/25.



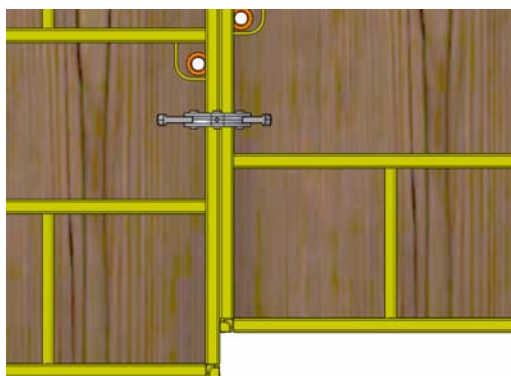
3. SOLUTIONS

Gang solutions, as well as different working cases are analyzed in next pages. These cases are the following:

- Panel assemblies-Gangs
 - Vertical joint
 - Horizontal joint
- Job built fillers
 - Job built filler $0 < x < 2''$
 - Job built filler $2''$
 - Job built filler $2'' < x < 4''$
 - Job built filler $4''$
- 90° corners
 - Inside side: inside corner
 - Outside side
 - Outside corner
 - Universal panel
- Hinged corners
 - 65-85° corners
 - 85-180° corners
- Intersections
- Pilasters
 - In the middle of the wall
 - In corners
- Bulkheads
 - With waler
 - With Universal Panel
- Column forming
- Other solutions
 - Wall thickness change
 - "Z" shape wall
 - Compatibility with other systems (Symons)
- Adjoining wall forming
 - Against an intersecting wall
 - Lapping over a previous pour
- Battered walls
- Foundations
 - Open air foundations
 - Panels placed on the ground
 - Panels placed on wood planks
 - Foundations in dig
- Water stop
 - Water stop 26 system
 - Water stop system DW15

3.1. PANEL ASEMBLIES-GANGS

Panel forming using clamps saves time because it is possible to set up and to strip them very easily and efficiently. The only tool required for both operations is a hammer. Another important quality of this type of connection is that it allows the panels to be at different elevations, as the clamps can be placed anywhere along the external profiles.



3.1.1 Vertical joint

Although vertical joints can be made with both clamps ("FIXED CLAMP" and "ADJUSTABLE CLAMP"), the general rule is to give priority to the use of "FIXED CLAMPS". Two "FIXED CLAMPS" will be used to join two adjacent panels (heights 8', 6' and 4'):

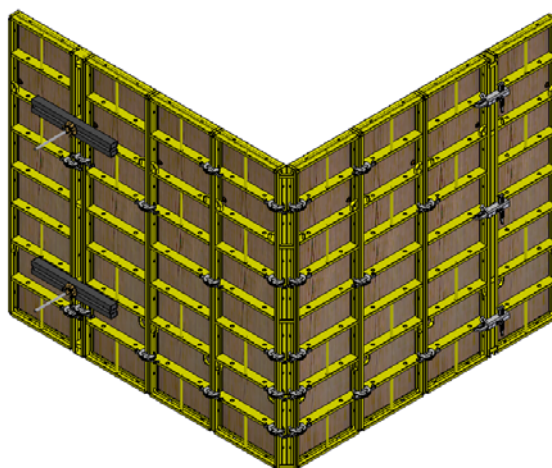
- Panel height 8': 2 clamps in each joint
- Panel height 6': 2 clamps in each joint
- Panel height 4': 2 clamps in each joint

Exceptions to this rule are as follows:

- Joints with job built fillers $0 < X \leq 2$ ". In these cases, "ADJUSTABLE CLAMPS" will be used.
 - Panel height 8': 3 clamps in each joint
 - Panel height 6': 2 clamps in each joint
 - Panel height 4': 2 clamps in each joint
- Joints with 4" compensations:

- Panel height 8': 2 clamps in each joint and 2 walers.
- Panel height 6': 2 clamps in each joint and 2 walers.
- Panel height 4': 2 clamps in each joint and 1 waler.
- Internal hinged corners (with "HINGED INSIDE CORNER"):
 - Panel height 8': 3 clamps in each joint
 - Panel height 6': 2 clamps in each joint
 - Panel height 4': 2 clamps in each joint
- External joints in 90° corners (with OUTSIDE CORNER), external joints in hinged corners (with "HINGED OUTSIDE CORNER"), and pilasters solved with "UHC" (in the side of the hinge):
 - Panel height 8': 5 clamps in each joint
 - Panel height 6': 4 clamps in each joint
 - Panel height 4': 3 clamps in each joint

Any adjacent joint to these corner joints will be reinforced with another clamp (three "FIXED CLAMPS" per joint).

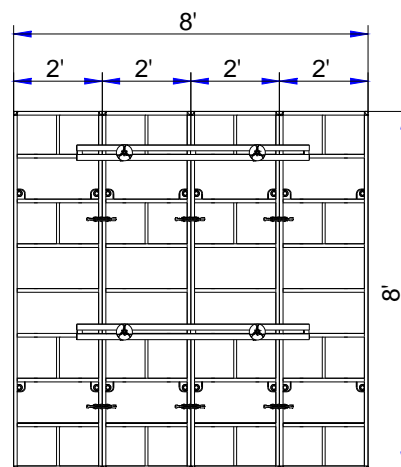
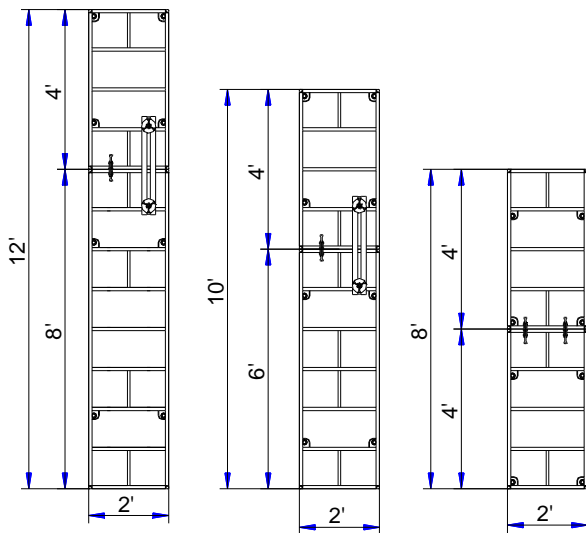
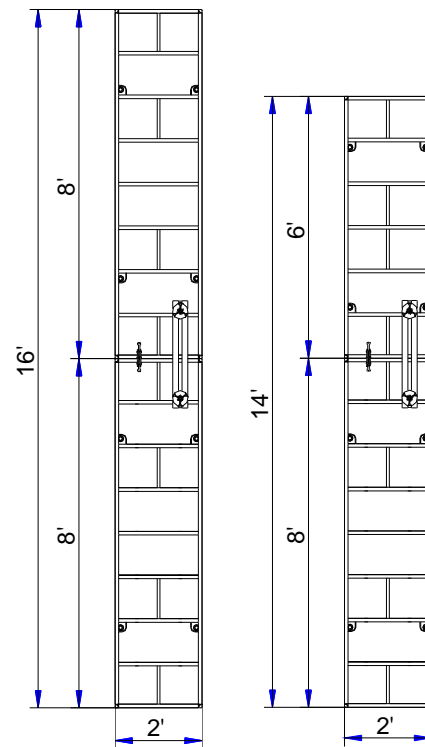


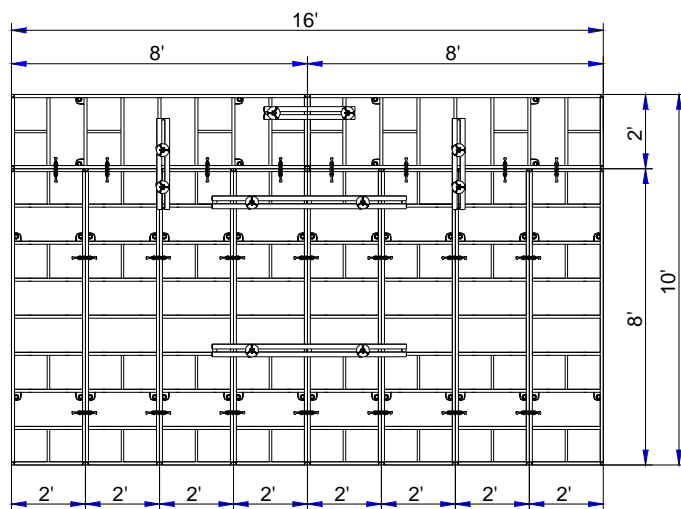
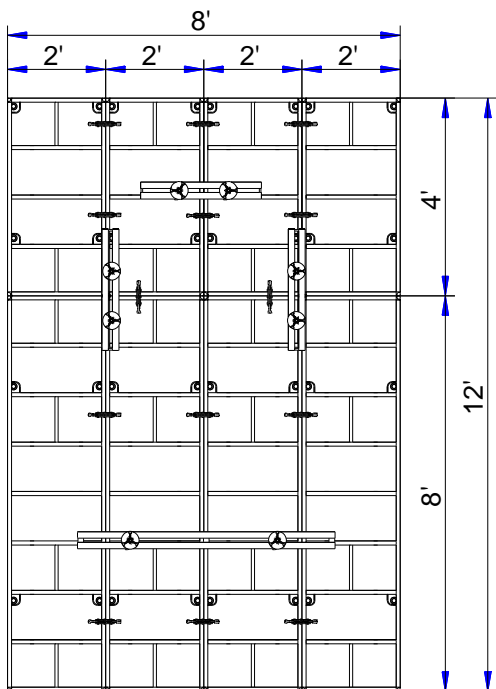
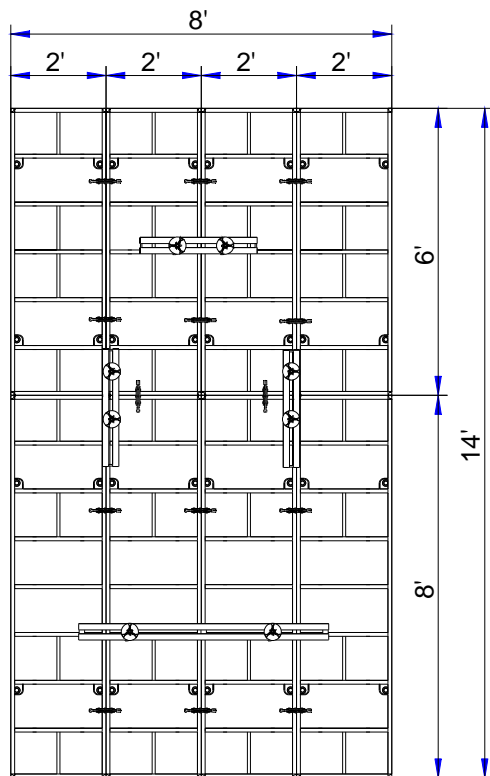
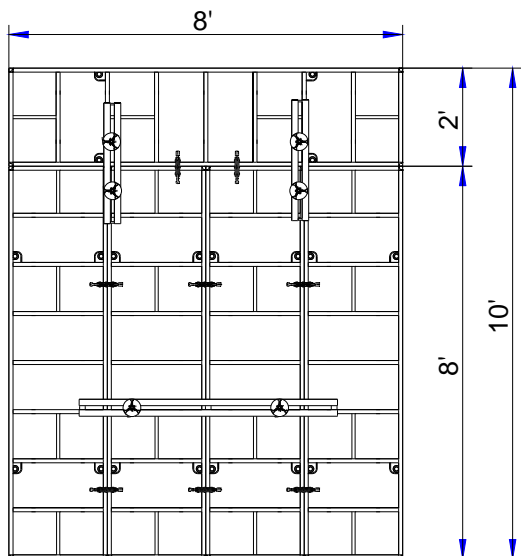
3.1.2 Horizontal joint

Depending on the panel sizes, only clamps or the combination of clamps and walers is used. Although it is possible to use both clamps ("FIXED CLAMP" and "ADJUSTABLE CLAMP"), the general rule is to give priority to the use of "FIXED CLAMPS".

Referring to "WALERS", it is important to mention that 0.75 m (2' 6") and 1.6 m (5' 3") elements are tied to the panels with two "WALER HOOKS" and "PLATE NUTS 15". In the 3 m (9' 10") elements, four joints are required instead of two.

Following are some examples of different panel heights and gang elevations:





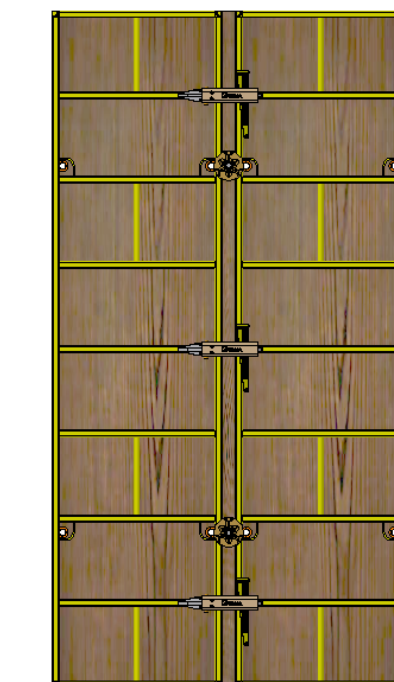
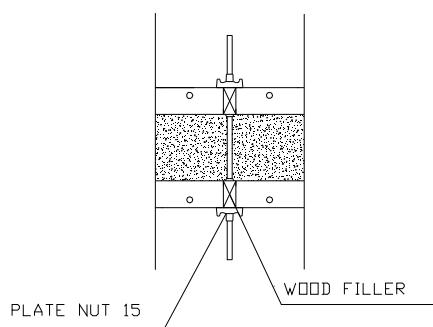
3.2. FILLERS

Often it is necessary to use compensations or wood fillers in order to achieve the required wall dimensions. Depending on the filler size, the MEGALITE system has different solutions:

3.2.1 Job built filler 0<x<2"

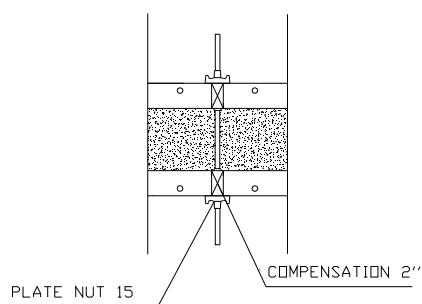
Job built filler up to 2" will be solved with wood fillers (supplied by contractor). In these cases, joints are fastened using "ADJUSTABLE CLAMPS" (regulation 0-2"). The tie rods will be passed through the wood filler and "PLATE NUTS 15" will be used. The number of "ADJUSTABLE CLAMPS" required is as follows:

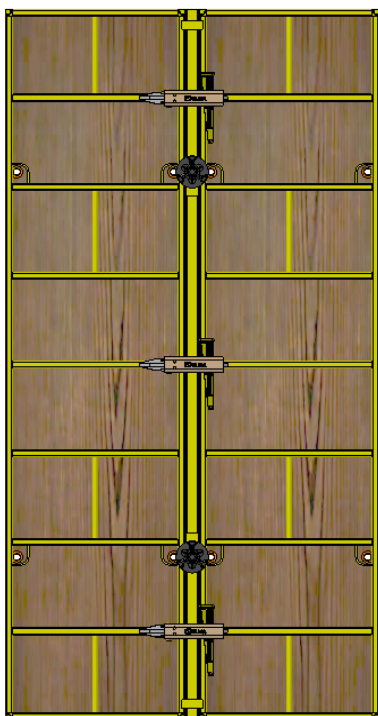
PANEL	NUMBER OF ADJUSTABLE CLAMPS
PANEL HEIGHT 8'	3
PANEL HEIGHT 6'	2
PANEL HEIGHT 4'	2



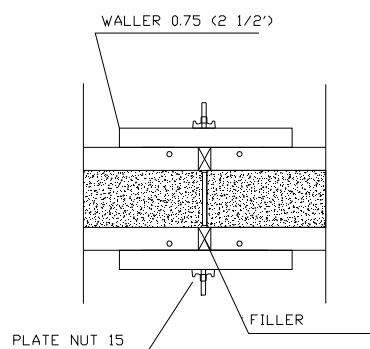
3.2.2 Filler 2"

These cases will be solved using the "COMPENSATION 2" element. Joints will be fastened using "ADJUSTABLE CLAMPS" (regulation 0-2"). The tie rods will be passed through the "COMPENSATION 2" " and "PLATE NUTS 15" will be used. The number of "ADJUSTABLE CLAMPS" is the same used with job built filler up to 2".





PANEL	NUMBER OF CONNECTIONS	WALERS 0.75 m (2' 6")
PANEL HEIGHT 8'	3	2
PANEL HEIGHT 6'	2	2
PANEL HEIGHT 4'	2	1



3.2.3 Job built filler 2" < x < 4"

Job built fillers between 2" and 4" can be solved in 2 different ways:

- With wood fillers (supplied by contractor).
- With "COMPENSATION 2" " and wood fillers.

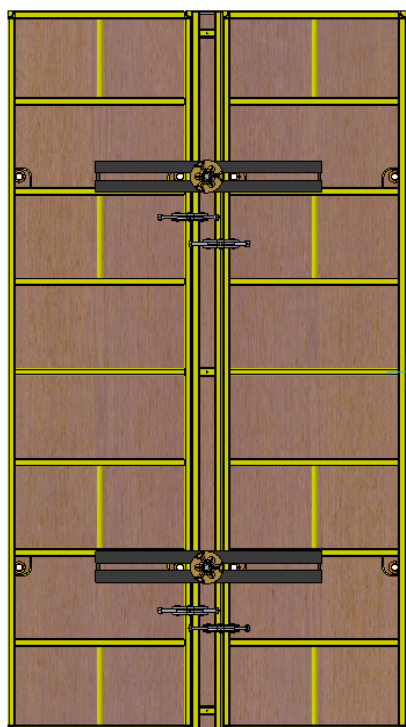
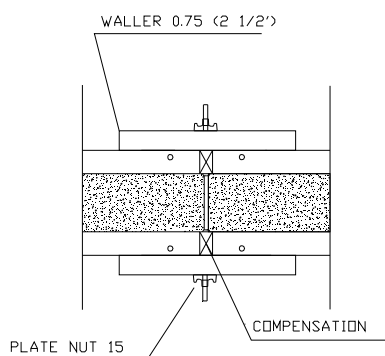
In both cases the joints will be fastened using "BULKHEAD HOOKS" ("PANEL BOLT 8" could also be used), "ECCENTRIC WASHERS" and "HEXAGONAL NUTS 15".

The tie rods will be passed through the filler (wood filler or "COMPENSATION 2") and "PLATE NUTS 15" will be also used. The joints will be finally reinforced with "WALERS 0.75 m (2' 6")" (one on each tie rod for 8' an 6' heights). The number of connections varies based on panel heights:

3.2.4 Filler 4"

These cases will be solved using the "COMPENSATION 4" element. The joints will be fastened using "FIXED CLAMPS" on each joint. The tie rods will be passed through the "COMPENSATION 4" " and "PLATE NUTS 15" will be also used. The joints will be finally reinforced with "WALERS 0.75 m (2' 6")" (one on each tie rod for 8' an 6' heights). The number of "FIXED CLAMPS" varies based on panel height:

PANEL	FIXED CLAMPS	WALERS 0.75 m (2' 6")
PANEL HEIGHT 8'	2	2
PANEL HEIGHT 6'	2	2
PANEL HEIGHT 4'	2	1



3.3. 90° corners

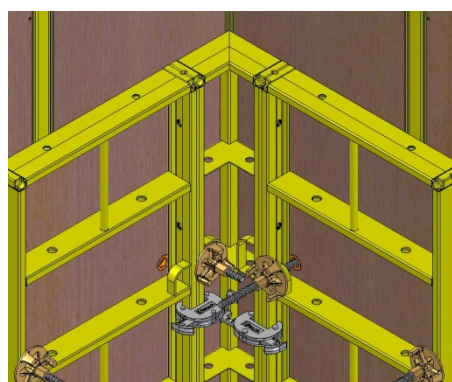
3.3.1 Inside corner

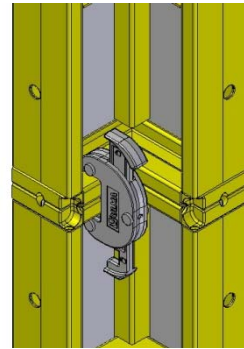
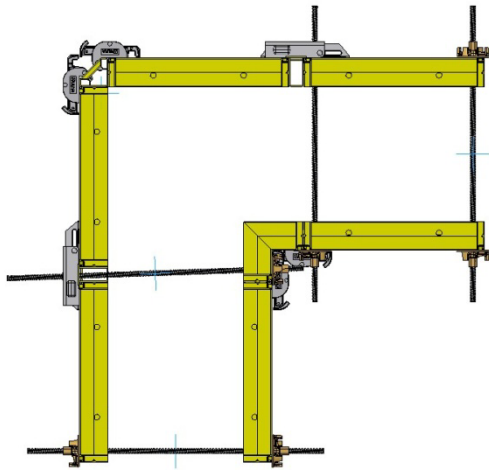
The internal sides of 90° CORNERS are solved by placing the "INSIDE CORNER 8"x8", although it is also possible to place the "INSIDE HINGED CORNER". The joint between the "INSIDE CORNER 8"x8" " and the rest of the components can be made with both clamps, "FIXED CLAMP" and "ADJUSTABLE CLAMP". The general rule is to give priority to the use of "FIXED CLAMPS", although in this case the stripping process may be easier using the "ADJUSTABLE CLAMP".

Two clamps (fixed or adjustable) will be used for connections:

PANEL	NUMBER OF CLAMPS
PANEL HEIGHT 8'	2
PANEL HEIGHT 6'	2
PANEL HEIGHT 4'	2

- Connections using "FIXED CLAMPS"

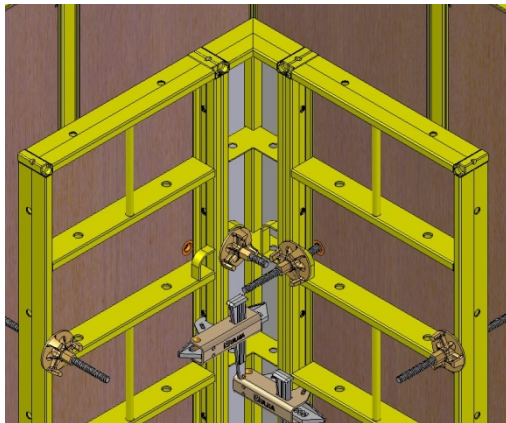




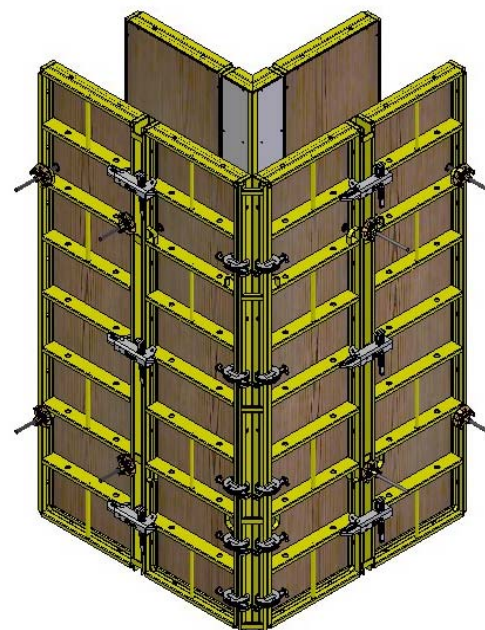
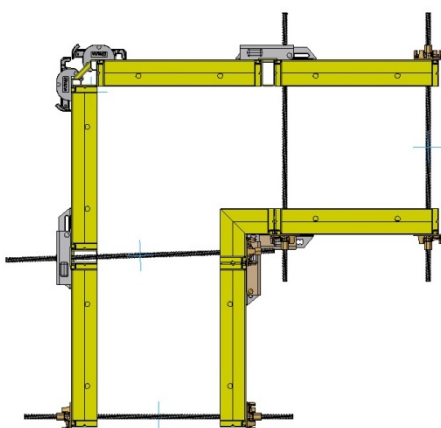
3.3.2 Outside corner

- Connections using "ADJUSTABLE CLAMPS"

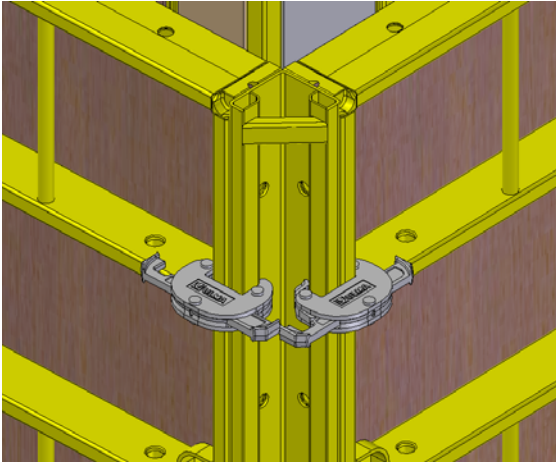
The external sides of the 90° CORNERS can be solved using the "OUTSIDE CORNER". The fastening will be made using "FIXED CLAMPS" on each joint. The number of clamps varies based on panel's height:



PANEL	NUMBER OF CLAMPS
PANEL HEIGHT 8'	5
PANEL HEIGHT 6'	4
PANEL HEIGHT 4'	3

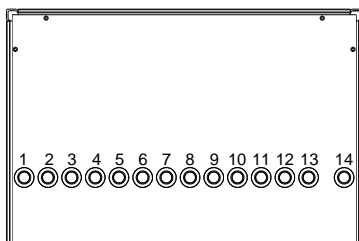


The horizontal joint of these elements will be always made using "FIXED CLAMPS" on one of the 8" sides:



3.3.3 Universal panel

The external sides of the 90° CORNERS can also be solved using "UNIVERSAL PANELS". It must be taken into consideration that the universal panels have some "U" shaped ribs with 13 holes in 2" increments and one hole at 3" from the last one ("BULKHEAD HOOKS" can pass through any one of these holes). Depending on the chosen hole, the wall thickness will be different. Due to location of the holes, it is possible to adjust the wall thicknesses in 1" increments by rotating the panel 180°. A holes diagram can be seen below:

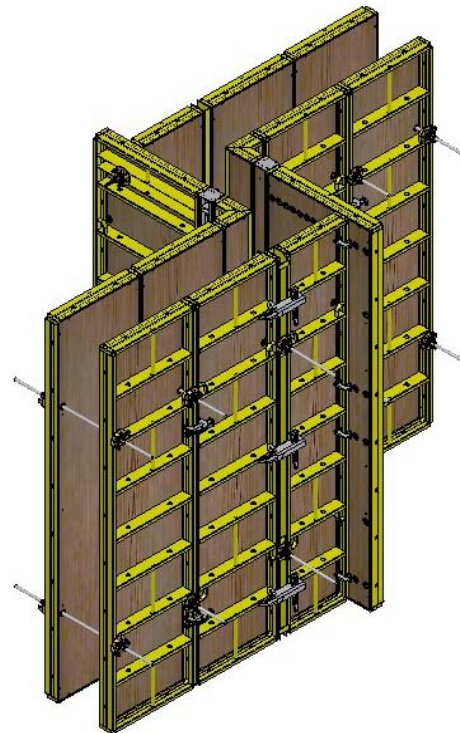


Depending on panel height, the number of "U" shaped ribs is different:

PANEL	NUMBER OF RIBS WITH HOLES
UNIV PANEL 8'	4
UNIV PANEL 6'	2
UNIV PANEL 4'	2

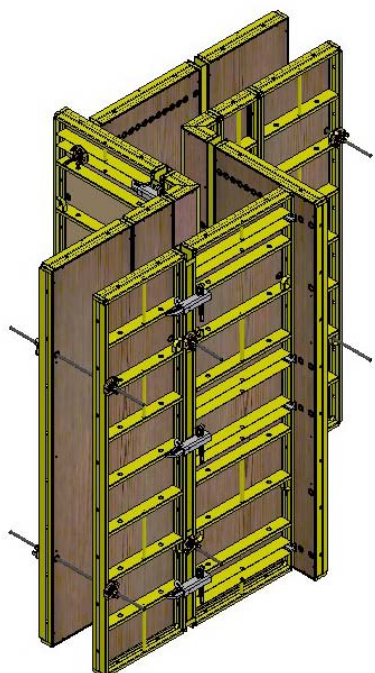
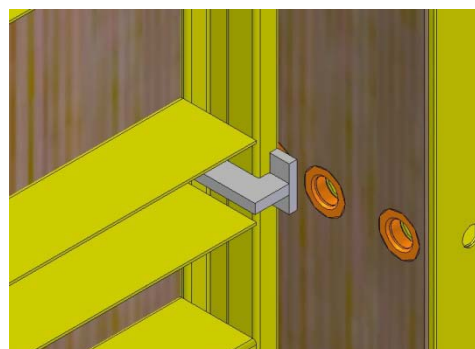
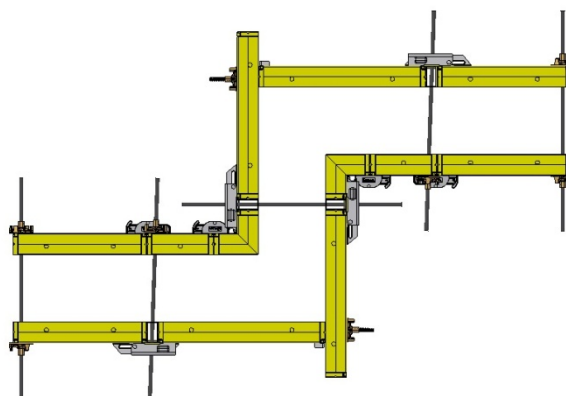
There are 2 possible configurations:

- The corner can be solved using a universal panel together with a standard one. The joint is fastened using the holes of the "U" shaped ribs of the universal panels, and the lateral holes on the standard ones. The elements used are "BULKHEAD HOOK" and the "PLATE NUT 15".
 - Wall thicknesses (even dimension): hole N° 14 in the EXTERNAL side of the wall.
 - Wall thicknesses (odd dimension): hole N° 14 in the INTERNAL side of the wall.



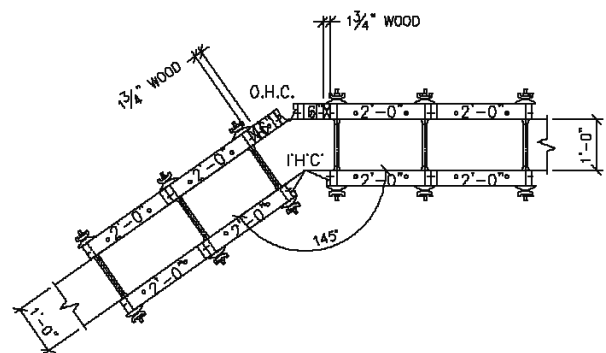
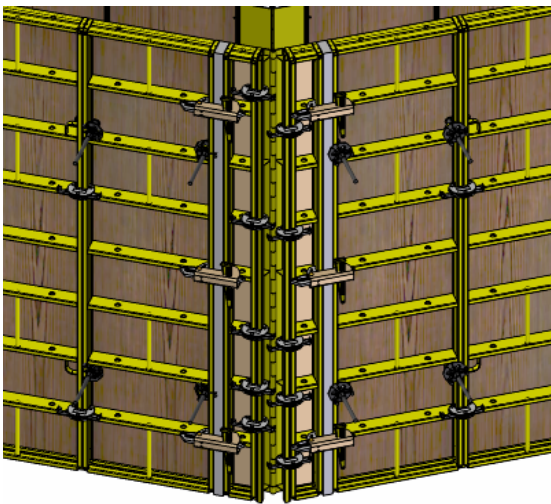
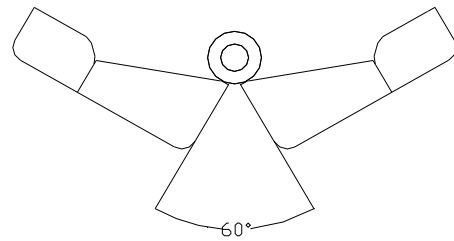
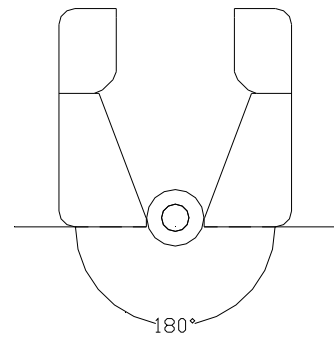
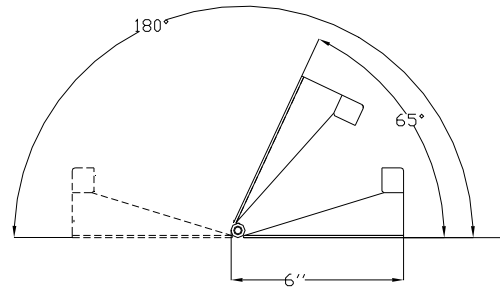


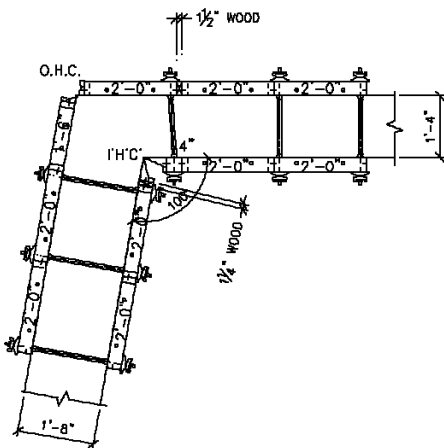
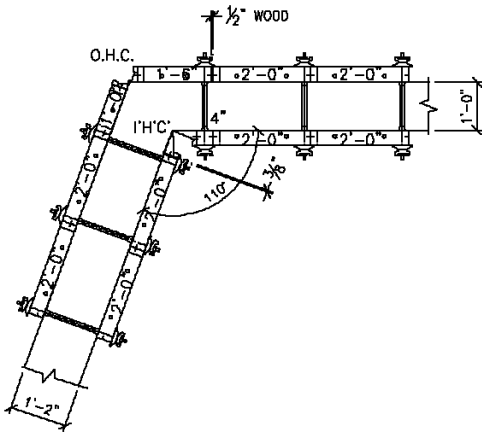
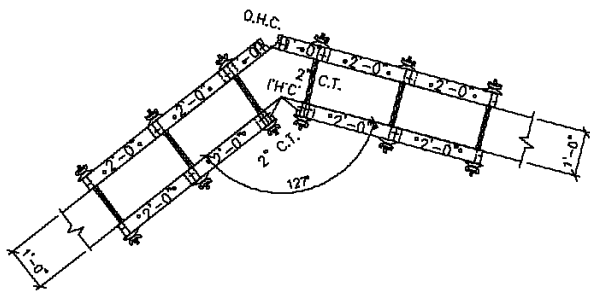
- The corner can be also solved using two universal panels. The joint is fastened using the holes of the “U” shaped ribs and the lateral holes of the universal panels. The elements used are the “BULKHEAD HOOK” and “PLATE NUT 15”.
- Wall thicknesses (even dimension): hole N° 14 in the EXTERNAL side of the wall.
- Wall thicknesses (odd dimension): hole N° 14 in the INTERNAL side of the wall.



3.4. Hinged corners

The solution for hinged corners (with acute or obtuse angles) will be made by combining the HINGED INSIDE CORNER and HINGED OUTSIDE CORNER.





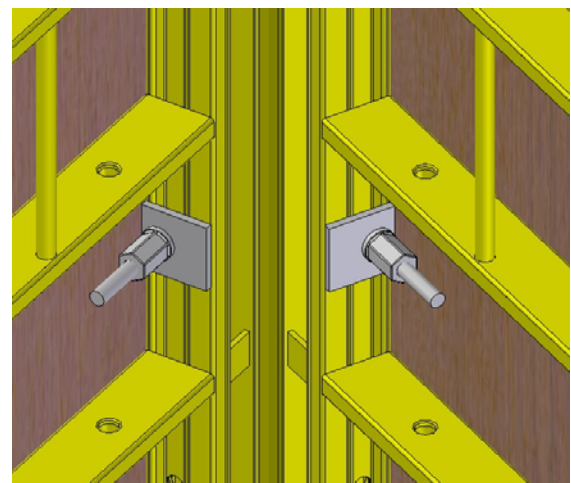
To solve these cases it is necessary to use two "COMPENSATION 2" in the internal angle of the wall. These "COMPENSATION 2" are used to avoid interferences between the "PLATE NUTS 15" located in the tie rods. It must be also taken into account that probably some "COMPENSATION 2" or wood fillers will be necessary on the outside in order to align panel joints for tie installation.

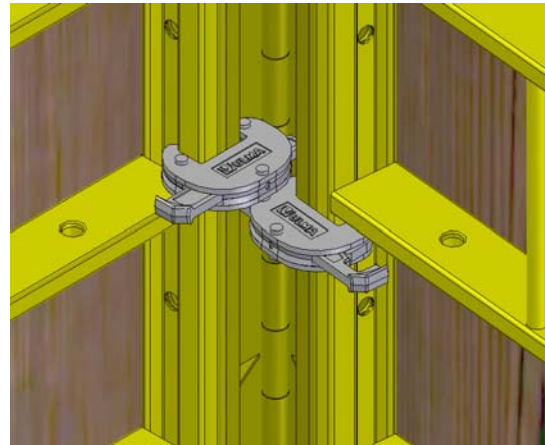
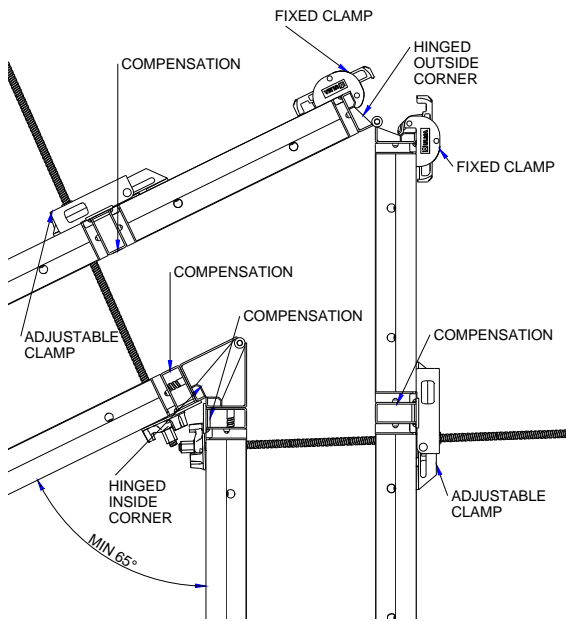
The number of connections varies based on the component's height:

HEIGHT	INSIDE NUMBER OF CONNECTIONS	OUTSIDE NUMBER OF FIXED CLAMPS
8'	3	5
6'	2	4
4'	2	3

3.4.1 65° - 85° corners

These cases are solved by combining both corners. The "HINGED INSIDE CORNER" is placed on the inside (fastened with "PANEL BOLT 8" ", "ECCENTRIC WASHER" and "HEXAGONAL NUT 15") and the "HINGED OUTSIDE CORNER" is placed on the outside (fastened with "FIXED CLAMPS").



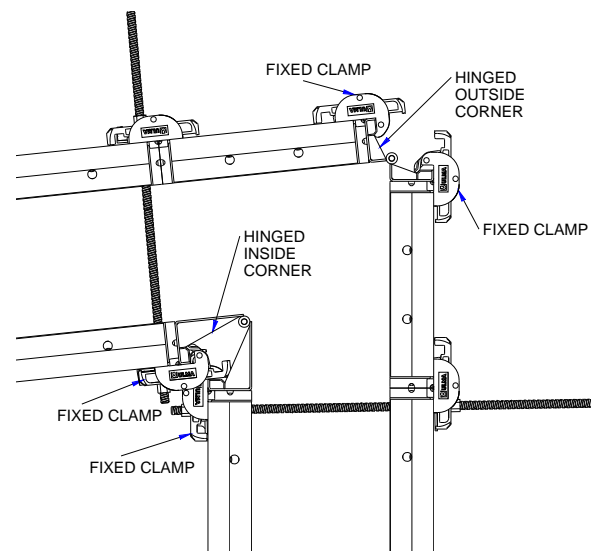


3.4.2 85° - 180° corners

These cases are solved by combining both corners. The "HINGED INSIDE CORNER" is placed on the inside part and the "HINGED OUTSIDE CORNER" is placed on the outside part. Both sides are fastened with "FIXED CLAMPS".

The number of connections varies based on the components height:

HEIGHT	INSIDE NUMBER OF FIXED CLAMPS	OUTSIDE NUMBER OF FIXED CLAMPS
8'	3	5
6'	2	4
4'	2	3

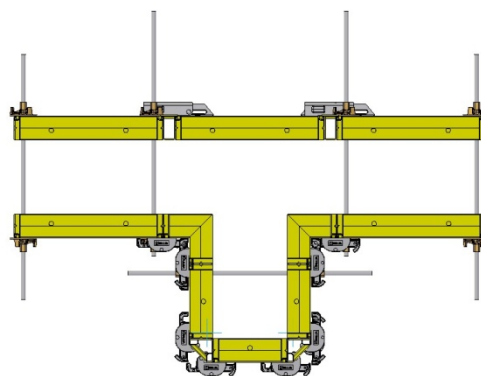
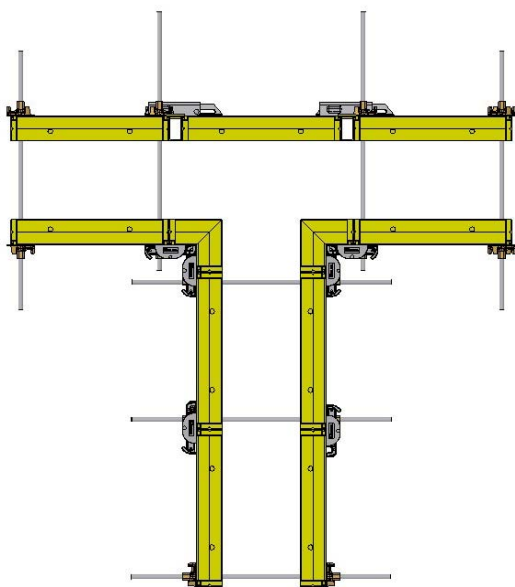
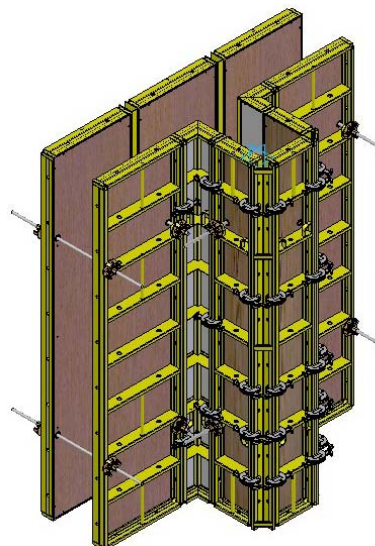
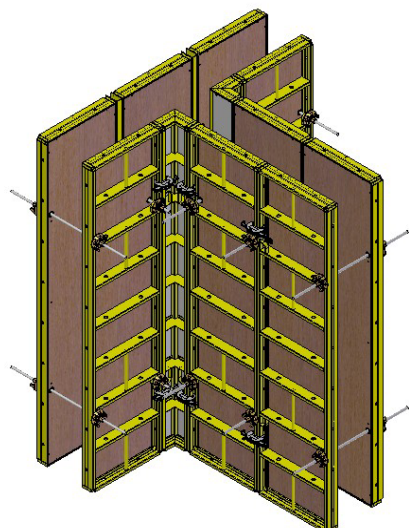


3.5. WALL INTERSECTIONS

Using "INSIDE CORNER 8"x8" with the standard panels.

3.6.1 *In the middle of the wall*

- Use of the "INSIDE CORNER 8"x8" together with the "OUTSIDE CORNER". The joints will be fastened with "FIXED CLAMPS"

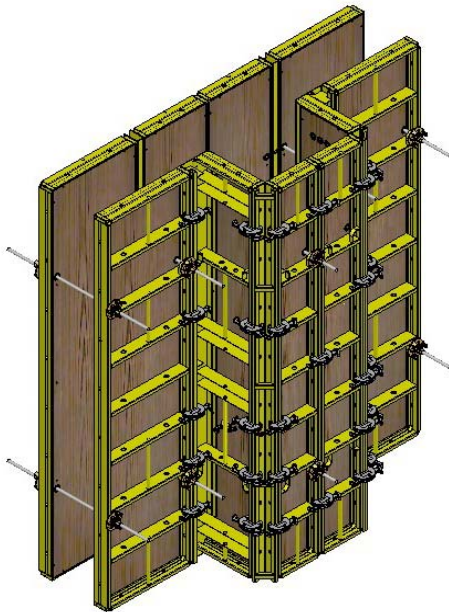
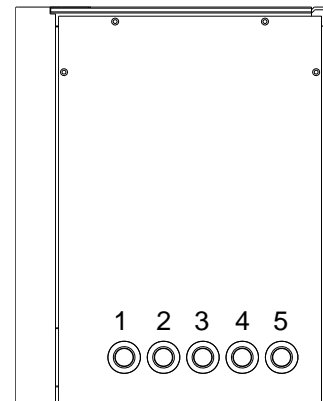


3.6. *PILASTERS*

Pilasters can be located in the middle of the wall as well as in wall corners. Some examples are shown hereafter.

- Use of the U.H.C. (UNIVERSAL HINGED CORNER) together with the "OUTSIDE CORNER". The joints will be fastened using "FIXED CLAMPS" on both joints (the number of connections varies based on component height):

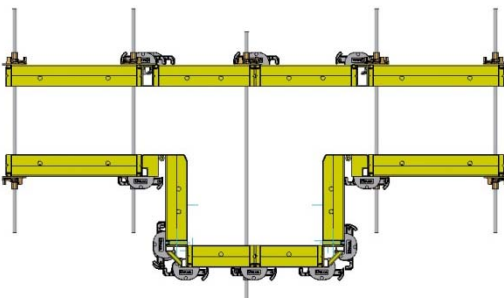
HEIGHT	NUMBER OF FIXED CLAMPS IN EACH SIDE OF THE UHC
8'	5
6'	4
4'	3



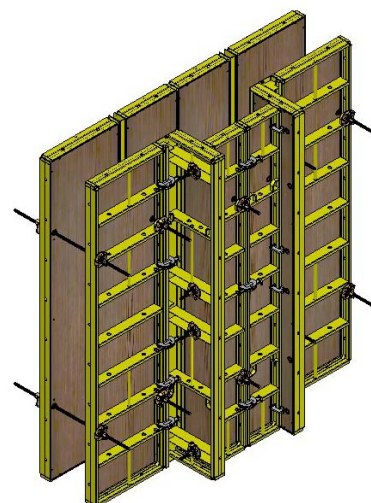
PANEL	NUMBER OF RIBS WITH HOLES
UNIV PANEL 8'	4
UNIV PANEL 6'	2
UNIV PANEL 4'	2

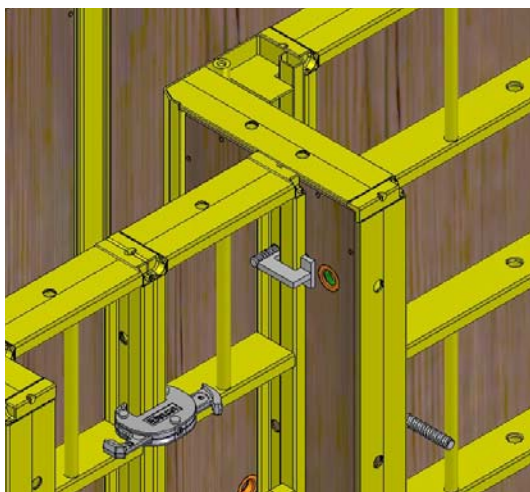
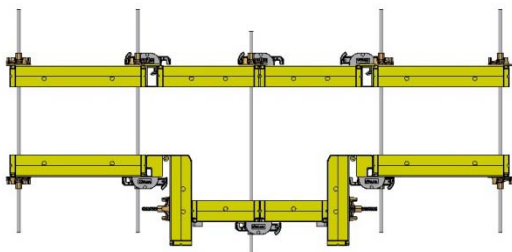
Different pilaster projections (without taking into account the wall thickness) are reached as follows:

- o EVEN dimension: this is achieved by inserting the "BULKHEAD HOOK" through the lateral holes of the standard panels.

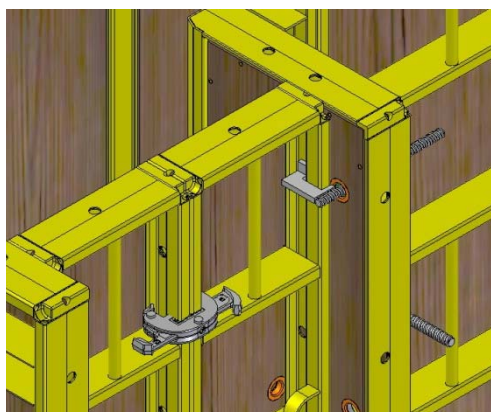


Use of the U.H.C. (UNIVERSAL HINGED CORNER) together with standard panels. In the U.H.C. hinged side, the joints will be fastened using "FIXED CLAMPS", while "BULKHEAD HOOKS", "ECCENTRIC WASHERS" and "HEXAGONAL NUTS" will be used for the multi-punched side. The holes of the U.H.C.'s "U" shaped ribs will be used (each rib has 5 holes in 2" increments). The holes diagram is shown below:





- ODD dimension: this is achieved by inserting the "BULKHEAD HOOK" with the threaded rod passing on the out side of the panel profile.

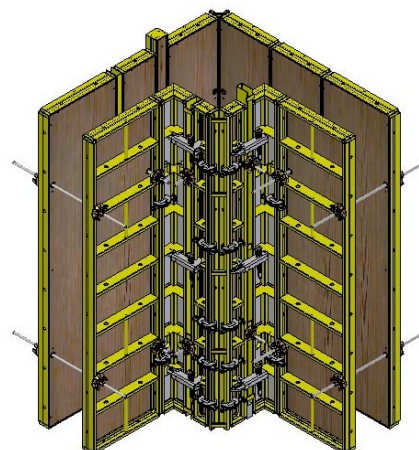


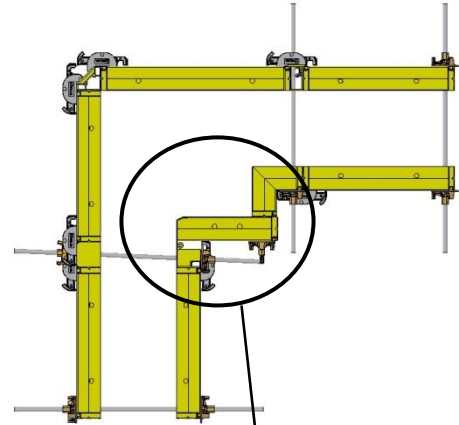
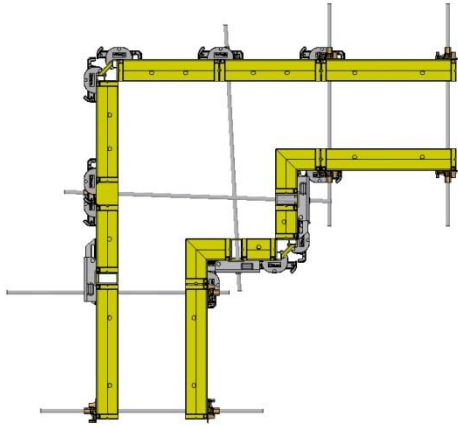
The chart below shows the hole required for each pilaster dimension including the orientation of the "BULKHEAD HOOK":

DIMENSION	HOLE NUMBER	"BULKHEAD HOOK" Placement
1"	1	Outside placement
3"	2	Outside placement
4"	1	Through lateral hole
5"	3	Outside placement
6"	2	Through lateral hole
7"	4	Outside placement
8"	3	Through lateral hole
9"	5	Outside placement
10"	4	Through lateral hole
12"	5	Through lateral hole

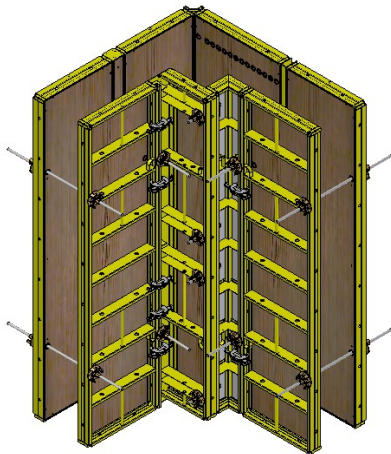
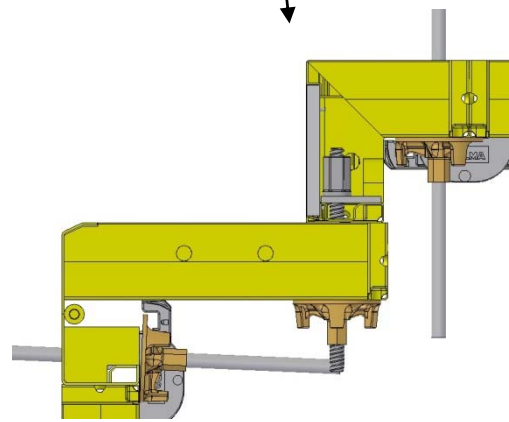
3.6.2 *In corners*

- Use the "INSIDE CORNER 8"x8" together with the "OUTSIDE CORNER". The joints will be fastened with "FIXED CLAMPS" In this case, to avoid interferences between tie rods, 2 compensation fillers opposite each other will be raised on a wood sill.

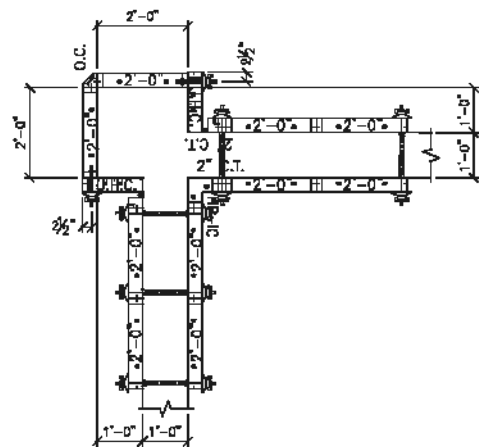




- Use of the U.H.C. (UNIVERSAL HINGED CORNER) together with the "INSIDE CORNER 8"x8" for the inside. The outside will be formed using "UNIVERSAL PANEL" and the "OUTSIDE CORNER". The different pilaster dimensions will be reached by bolting the "INSIDE CORNER 8"x8" in one of the holes of the U.H.C. with threaded rod 15, "ECCENTRIC WASHER", "HEXAGONAL NUT" and "PLATE NUT 15".



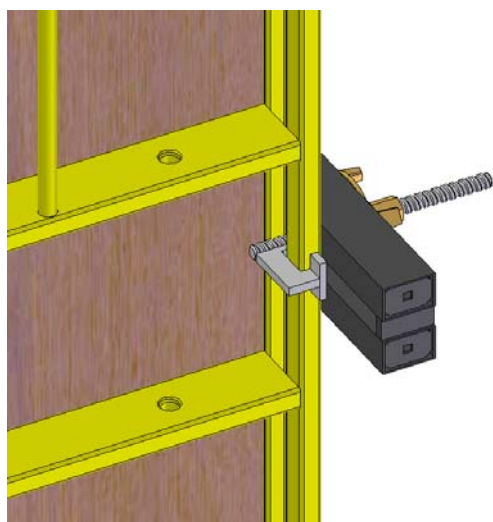
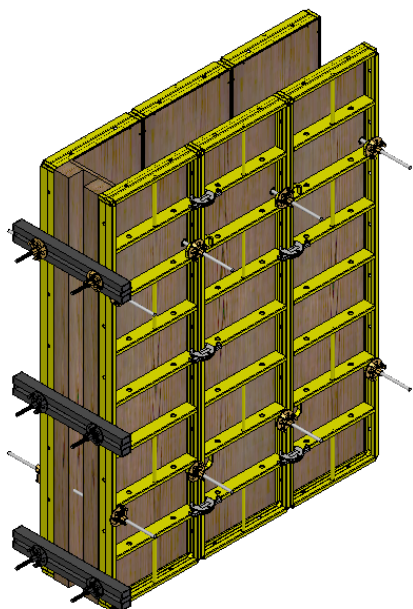
- Use of the U.H.C. (UNIVERSAL HINGED CORNER) together with standard panels. The joints will be fastened as explained previously for pilasters in the middle of the wall.



3.7. BULKHEADS

3.7.1 With waler

To form bulkheads, the WALERS are used together with the "BULKHEAD HOOKS" and "PLATE NUT 15". In these cases, the "BULKHEAD HOOKS" pass through the panel's side holes (as an alternative, it is possible to use also the "BULKHEAD HOOK" with the threaded rod passing it through the out side of the panel profile).



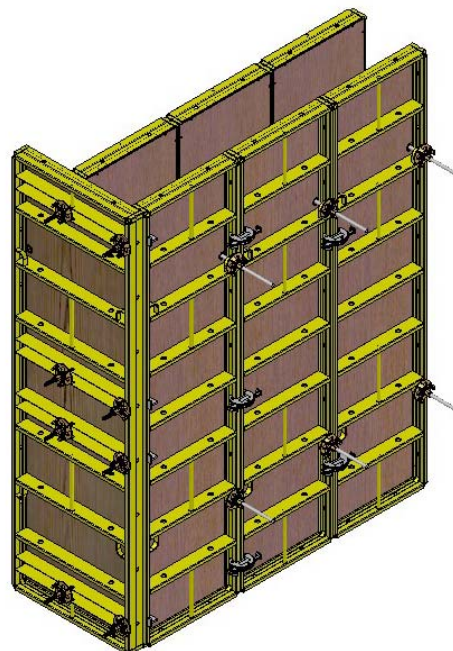
PANEL	NUMBER OF WALERS
PANEL HEIGHT 8'	3
PANEL HEIGHT 6'	3
PANEL HEIGHT 4'	2

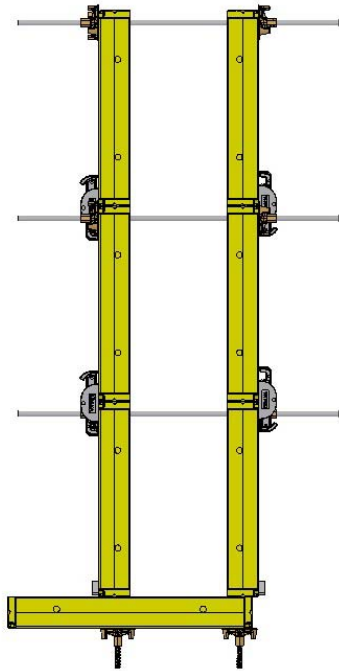
The adjacent panel joint will be reinforced with an extra clamp.

It is also possible to use the "PANEL BOLT" (5" or 8") instead of the "BULKHEAD HOOK" for these cases.

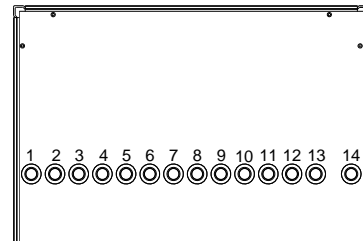
3.7.2 With Universal Panel

In these cases, the "UNIVERSAL PANEL" is fixed to the standard components with the "BULKHEAD HOOK" and the "PLATE NUT 15". The joint is fastened using the holes in the "U" shaped ribs on the universal panels, and the lateral holes of the standard ones.





Column forming is solved using "UNIVERSAL PANELS". These panels are connected using "BULKHEAD HOOKS" and "PLATE NUTS 15". As previously explained in the "90° Corners", the universal panels have some "U" shaped ribs with 13 holes in 2" increments and one hole at 3" from the last one ("BULKHEAD HOOKS" can pass through any one of these holes). Depending on the chosen hole, the wall thickness will be different. Due to location of the holes, it is possible to adjust the wall thicknesses in 1" increments by rotating the panel 180°. The holes diagram can be seen below (same picture previously shown in "90° Corners" section):



3.8. COLUMN FORMING

Based on panel's height, the number of "U" shaped ribs is different:

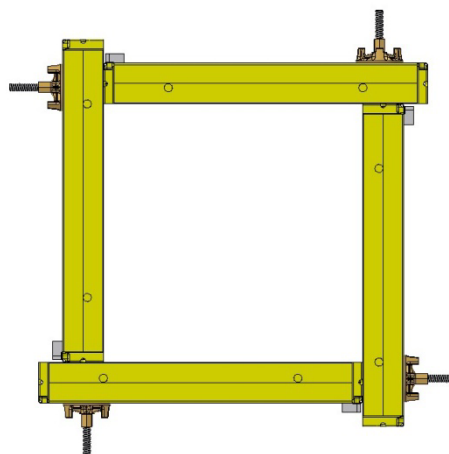
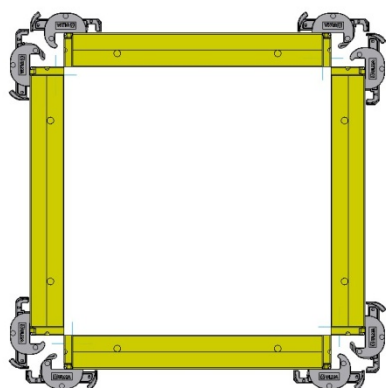
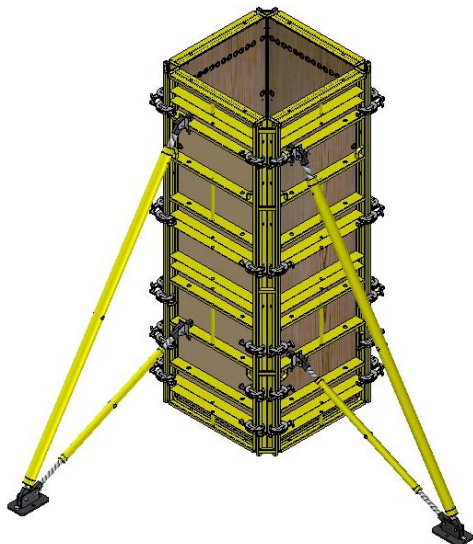


PANEL	NUMBER OF RIBS WITH HOLES
UNIV PANEL 8'	4
UNIV PANEL 6'	2
UNIV PANEL 4'	2

The joint is fastened using the holes of the "U" shaped ribs and the lateral holes of the universal panels. The elements used are the "BULKHEAD HOOK" and "PLATE NUT 15".

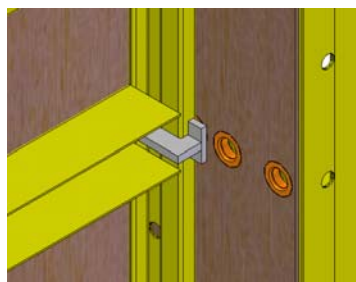
Different column sizes are achieved as follows:

- Maximum column of 30"x30": in this case, "UNIVERSAL PANELS", "OUTSIDE CORNERS" and "FIXED CLAMPS" will be used together.



The "BULKHEAD HOOK" placement and the position of hole N° 14 are shown below:

- **Even dimension:**
 - Hole N° 14 in the EXTERNAL side of the column
 - Maximum column of 24"x24"



➤ Odd dimension:

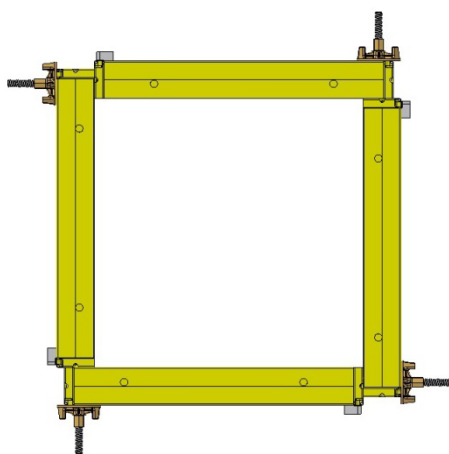
- Hole N° 14 in the INTERNAL side of the column
- Maximum column of 27"x27"



COLUMN DIMENSION	HOLE NUMBER (hook entrance)	"Hole 14" position
27"	1/14	Hook in hole 14
25"	2	Internal side
24"	13	External side
23"	3	Internal side
22"	12	External side
21"	4	Internal side
20"	11	External side
19"	5	Internal side
18"	10	External side
17"	6	Internal side
16"	9	External side
15"	7	Internal side
14"	8	External side
13"	8	Internal side
12"	7	External side
11"	9	Internal side
10"	6	External side
9"	10	Internal side
8"	5	External side
7"	11	Internal side
6"	4	External side

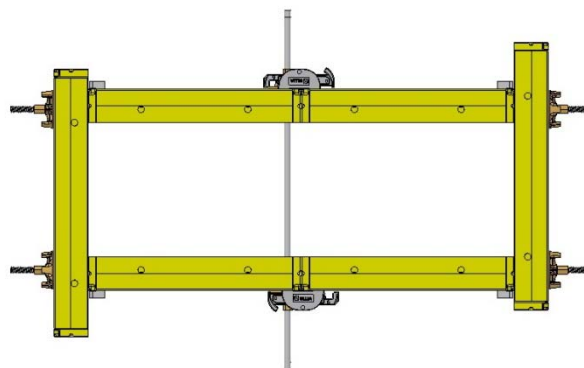
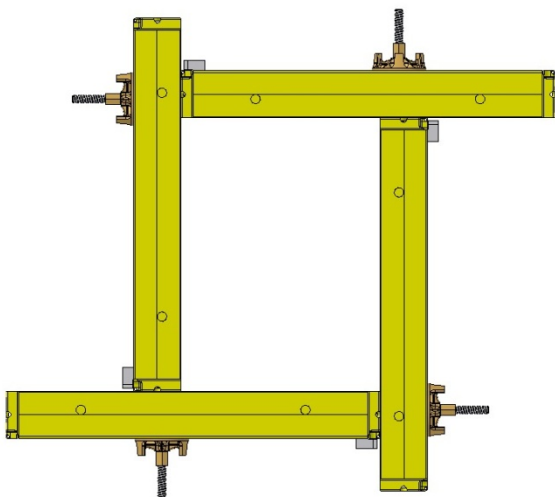
- It is possible to combine different holes to obtain rectangular columns.

- Simple rectangular column:



The chart below shows the required hole for each column dimension including the position of hole N° 14:

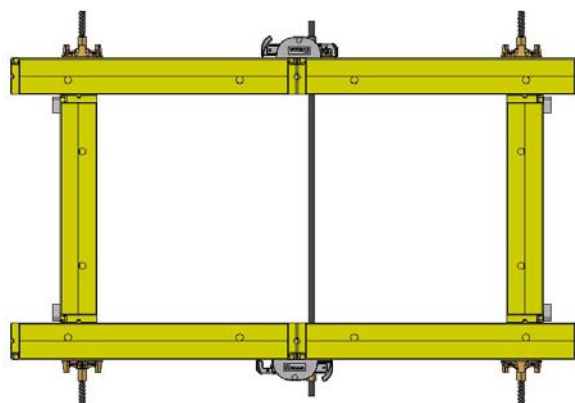




o Multiple rectangular column:

- Lateral connection of standard panels closing the column with universal panels. In these cases, it is necessary to use tie rods.

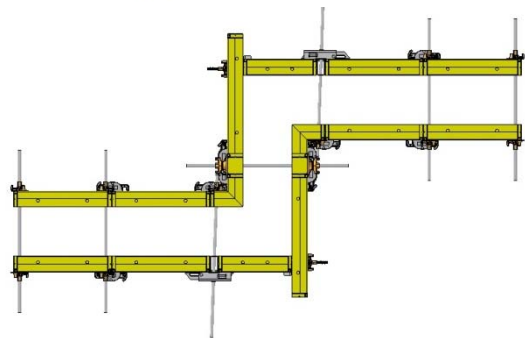
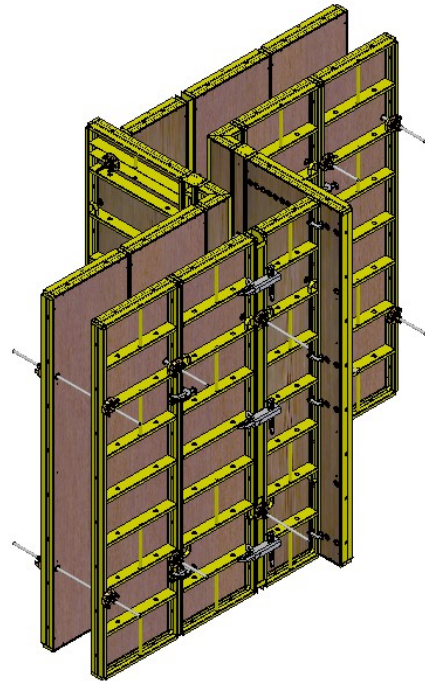
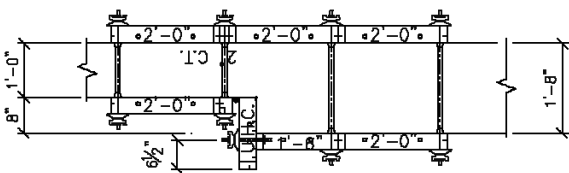
- Lateral connection of universal panels closing the wall with standard panels. In these cases it is necessary to use tie rods.



3.9. OTHER SOLUTIONS

3.9.1 Wall thickness change

- These cases are solved using the U.H.C. corners (UNIVERSAL HINGED CORNER) together with standard panels. The joints will be fastened using "FIXED CLAMPS" on the short side; while "BULKHEAD HOOKS", "ECCENTRIC WASHERS" and "HEXAGONAL NUTS" will be used for the perpendicular joint (the holes of U.H.C. ribs will be used for these connections). The solutions for these cases are similar to the ones for pilasters in the middle of the wall.

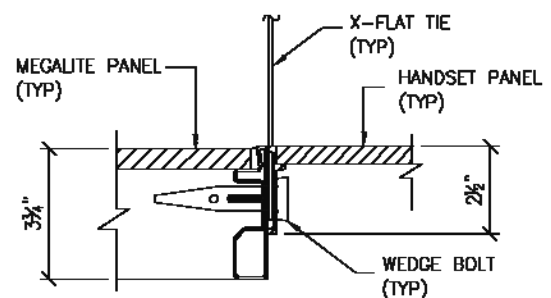


3.9.2 "Z" shape wall

- It is solved using "INSIDE CORNERS 8"x8" together with universal and standard panels.

3.9.3 Compatibility with other systems (STEEL-PLY)

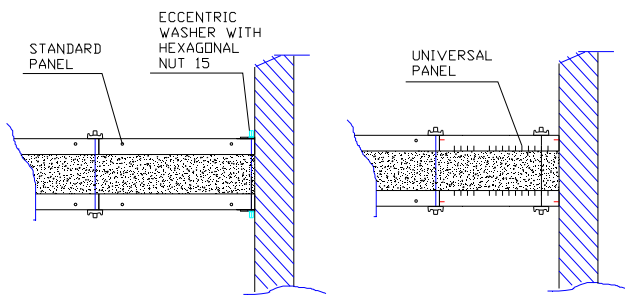
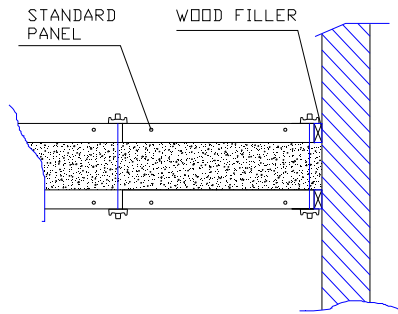
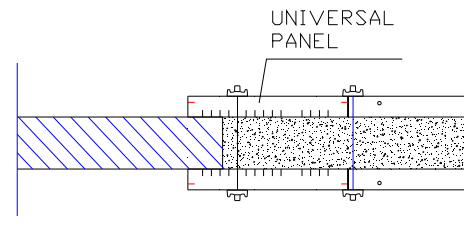
The MEGALITE system has lateral holes 1' 0" on center in all panels and fillers, making it possible to use it together with STEEL-PLY panels and accessories. Joints between both systems are made with STEEL-PLY wedges (see the following sketch):



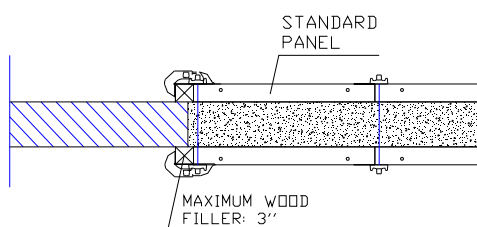
3.10. ADJOINING WALL FORMING

A few solutions are shown below:

3.10.1 Against an intersecting wall



3.10.2 Lapping over a previous pour



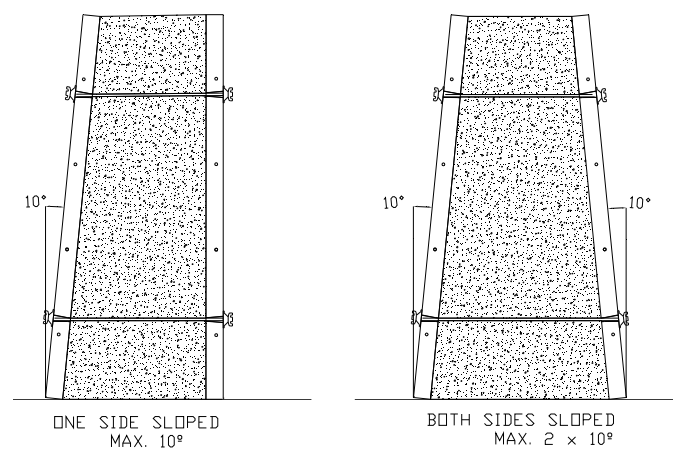
3.11. BATTERED WALLS

In these cases the general assembly is similar to that for straight panels, but it is necessary to take into account some considerations with regard to the sloped side.

The values considered refer to the use of panels with Ø15mm (5/8") TIE RODS, which are used in the 8' high vertical position.

It must be also considered that, when pouring, there are vertical forces on formwork panels, thus it is necessary to adequately anchor these panels to the ground to resist such forces. MEGALITE panels used in these conditions allow 18% slopes (10° approximately).

The sloping limitation is due to the diameter of the tie holes.

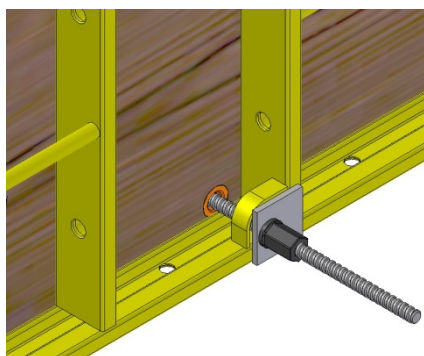
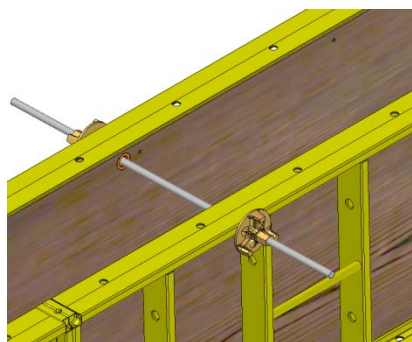
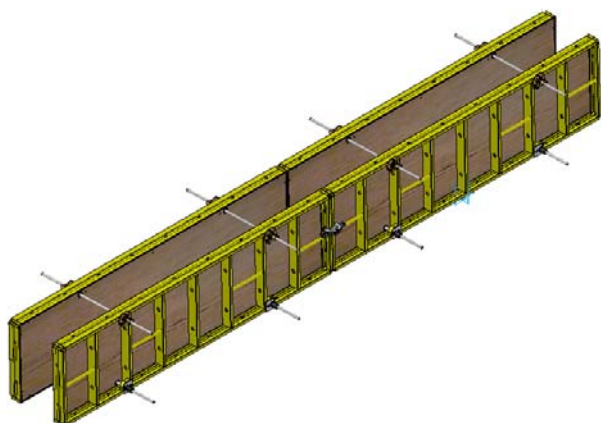


3.12. GRADE BEAM FOUNDATIONS

A few solutions are shown below:

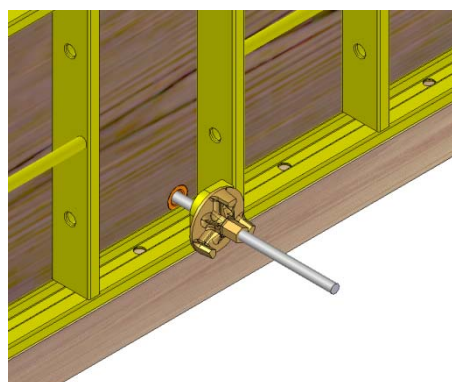
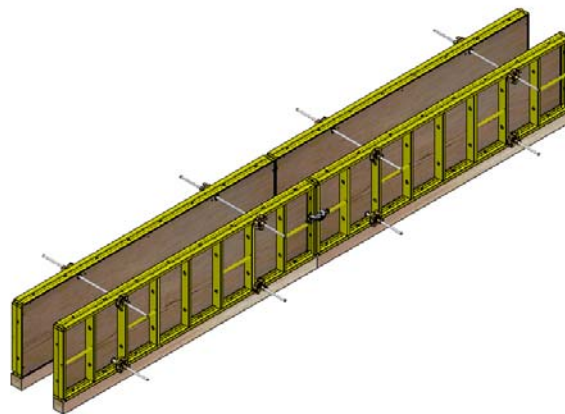
3.12.1 Panels placed on grade

With panels in direct contact with the ground, it is necessary to use "HEXAGONAL NUTS 15" and "ECCENTRIC WASHERS" to fasten lower tie rods. Upper "TIE RODS" can use standard plate nuts 15.



3.12.2 Panels placed on wood sills

In these cases and due to the wood sills, it is possible to use "PLATE NUTS 15" to fasten lower tie rods.



3.12.3 Foundations in trenches

Foundations in trenches are solved by bracing the panels, with lumber provided by the contractor, to the trench walls. Ties are not required.

3.13. WATER STOP


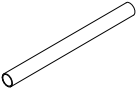

There are two basic systems to solve the "water stop" condition:

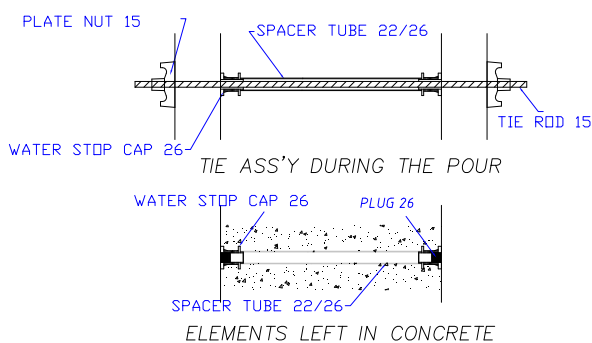
3.13.1 Water stop system 26

When properly installed, this system will withstand a hydrostatic pressure equal to approximately a 10 m (33' 0") head of water.

The "WATER STOP CAP 26" is installed at each end of the spacer tube (as shown in the picture).

In structures where the hydrostatic pressure is only on one face of the wall, the "WATER STOP CAP 26" can be installed just on that side, keeping cone 22 on the other.

CODE	NAME	
7238049	Water stop cap 26	
7238047	Spacer tube 22/26	
7238050	Plastic plug 26	

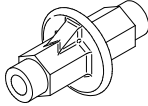
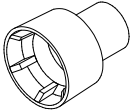


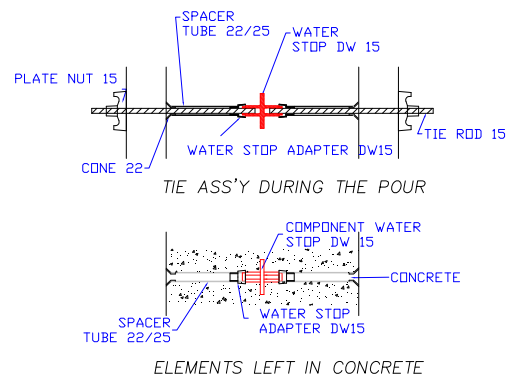
3.13.2 Water stop system DW15

When properly installed, this system will withstand a hydrostatic pressure equal to approximately a 70 m (230' 0") head of water.

The "WATER STOP DW15" is installed in the middle of the wall together with the "WATER STOP ADAPTER DW15". TIE ROD 15 is installed on both sides covered with spacer tubes.

All components, except tie rods, will remain in the concrete.

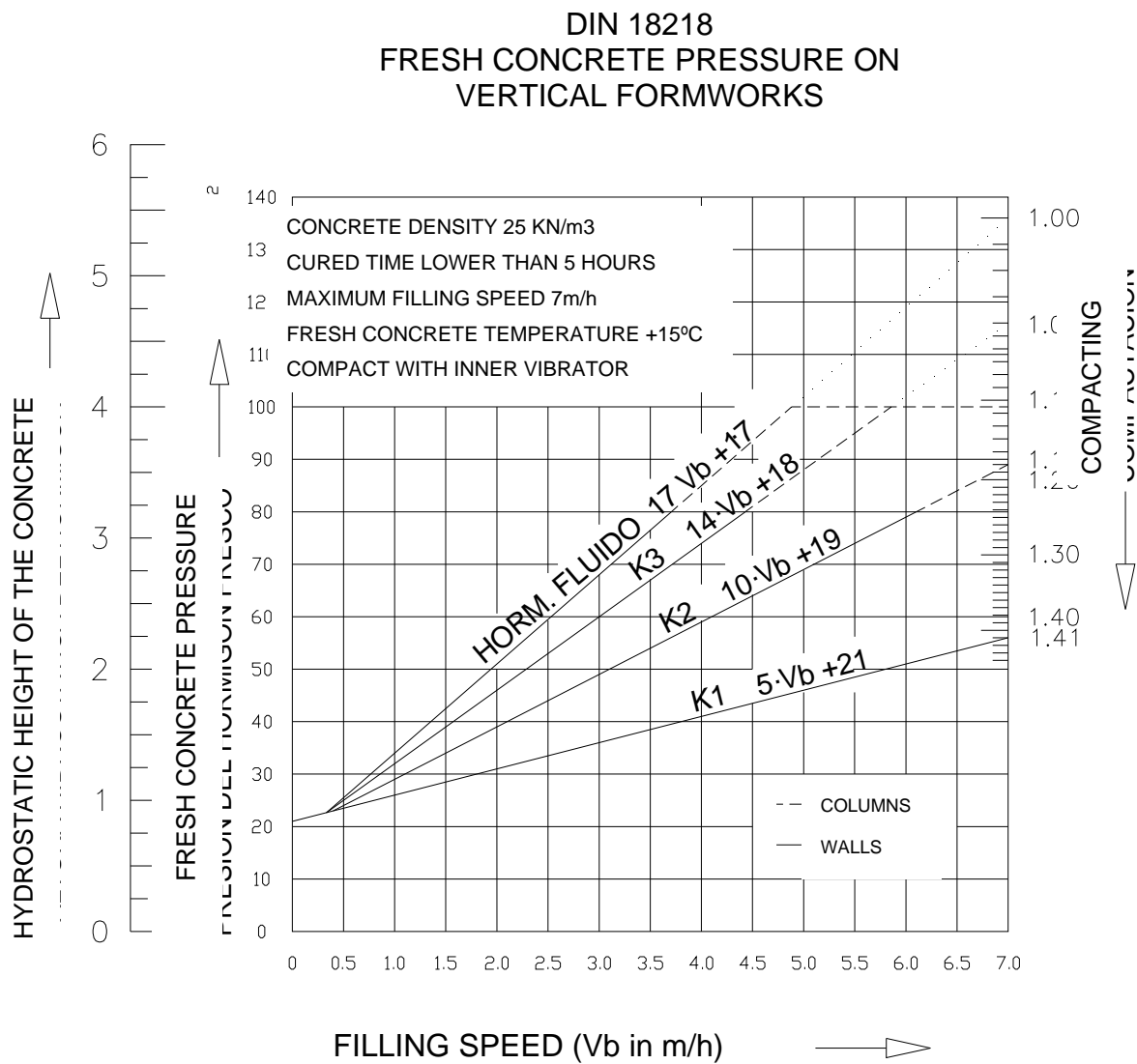
CODE	NAME	
0230004	Water stop DW15	
9371966	Water stop adapter DW15	



4. SYSTEM FEATURES

4.1. CONCRETE PRESSURE

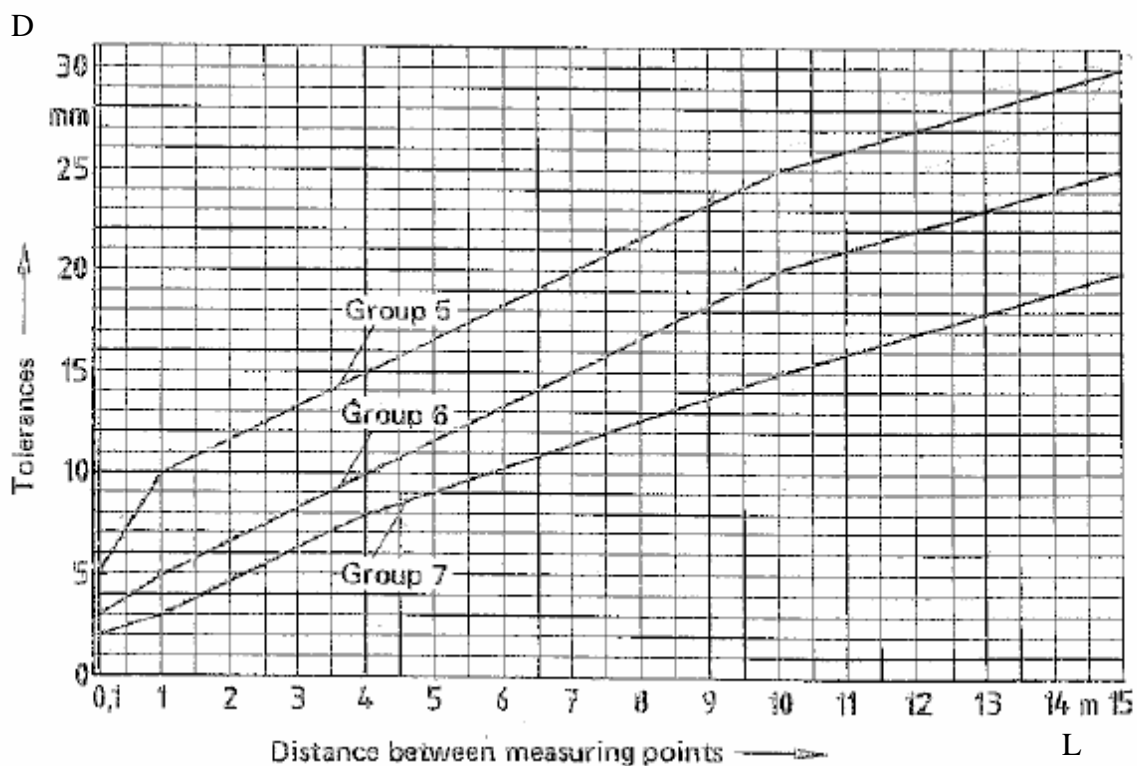
The calculation of the concrete pressure on formwork panels is based on the German standard DIN 18218:

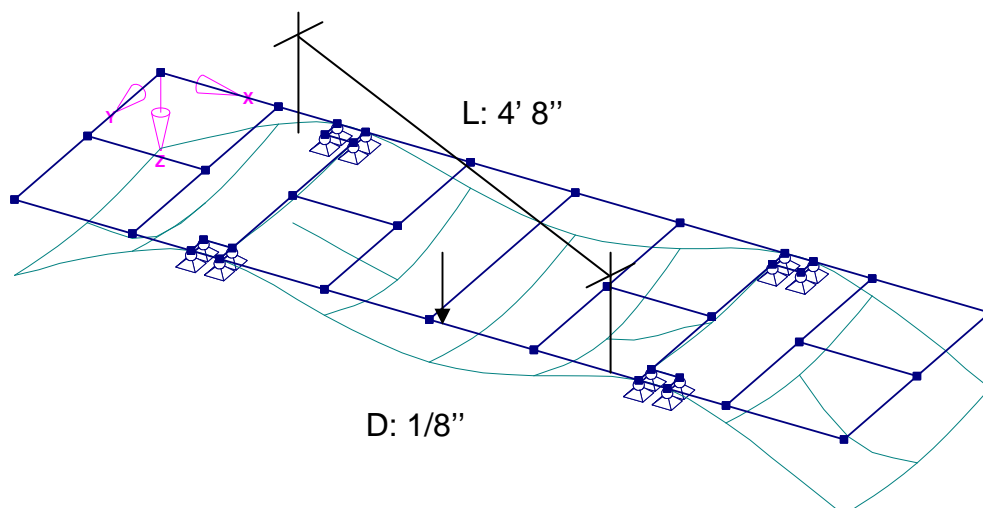


4.2. PANELS WORKING LOADS

PANELS WORKING LOADS							
			Maximum concrete pressure according to standard DIN 18202 ⁽¹⁾			Maximum tie load	Ties per SF
Panel	SF	Kind of load	Group 5	Group 6	Group 7	pounds	
8'x30''	20	Hydrostatic load (PSF)	1,250	1,250	1,250	12,460	0.1
		Constant load (PSF)	1,250	1,250	1,250	12,460	0.1
8'x24''	16	Hydrostatic load (PSF)	1,250	1,250	1,250	9,830	0.125
		Constant load (PSF)	1,250	1,250	1,250	9,830	0.125


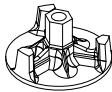
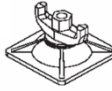
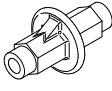
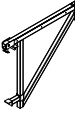
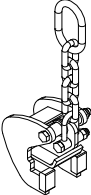
(1) DIN 18202 (Deflection tolerances): The different quality levels of finishing surfaces are defined in the following chart.





4.3. COMPONENTS SAFE WORKING LOADS

(Safe Working Load provides a factor of safety of approximately 2 to 1)

Code	Name	Picture	Safe Working Load
7238001	Hexagonal nut 15		20,200 Lbs
7238000	Plate nut 15		20,200 Lbs
1900256	Plate washer nut 15		20,200 Lbs
0230004	Water stop DW15		20,200 Lbs
1920041	Bracket		25 PSF
1920835	Lifting hook		3,300 Lbs

PIPE BRACE WORKING LOADS (TENSILE AND COMPRESSIVE)			
PIPE BRACE 1.1-1.7 (3' 7" – 5' 7")		PIPE BRACE 2.4-3.5 (7' 10" – 11' 6")	
LENGTH	WORKING LOAD (lbf)	LENGTH	WORKING LOAD (lbf)
1.1 m (3' 7")	8,200	2.4 m (7' 10")	10,800
1.3 m (4' 3")	6,700	2.8 m (9' 2")	7,200
1.5 m (5' 0")	4,500	3.2 m (10' 6")	4,350
1.7 m (5' 7")	2,450	3.5 m (11' 6")	3,050
PIPE BRACE 3.6-4.8 (11' 10" – 15' 9")		PIPE BRACE 5-6 (16' 5" – 19' 8")	
LENGTH	WORKING LOAD (lbf)	LENGTH	WORKING LOAD (lbf)
3.6 m (11' 10")	7,400	5 m (16' 5")	3,700
4 m (13' 1")	6,050	5.25 m (17' 3")	3,250
4.4 m (14' 5")	4,900	5.5 m (18' 0")	2,900
4.8 m (15' 9")	3,700	5.75 m (18' 10")	2,700
		6 m (19' 8")	2,450

"TIE ROD 15"

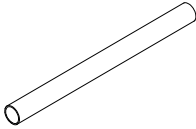


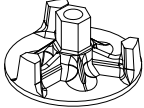


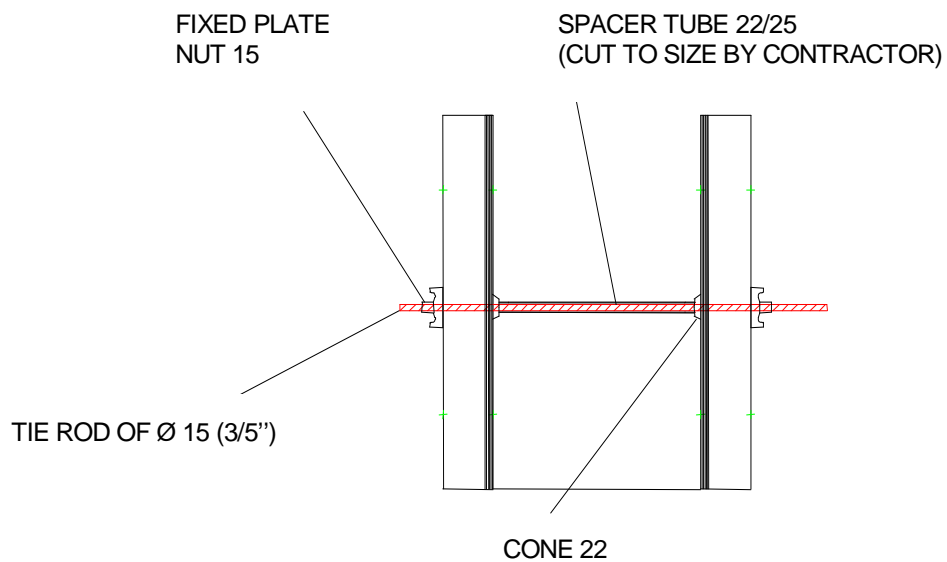
Tie rod	Ø 15mm (5/8")
Safe Working Load According to DIN 18216	20,200 Lbs

* Do not weld or heat tie rods.

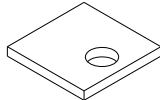
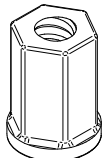
4.4. TYING SYSTEM

The main tie system components are shown below:

CODE	NAME	
7230455	Spacer tube 22/25	
7230264	Cone 22	
Depending on the length	Tie rod 15 (5/8")	
7238000	Plate nut 15	



The "PLATE NUT 15" can be replaced with the combination of "ECCENTRIC WASHER" + "HEXAGONAL NUT 15".

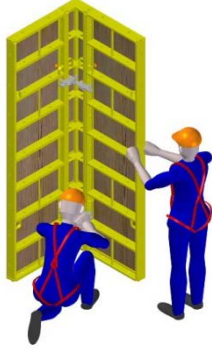
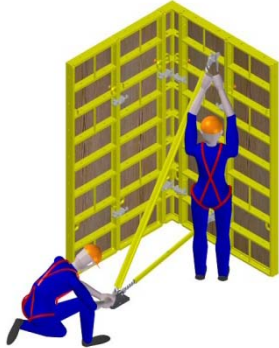
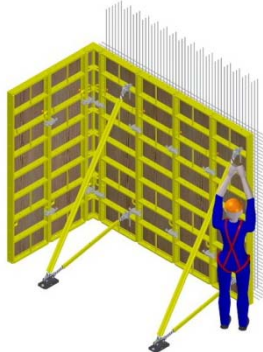
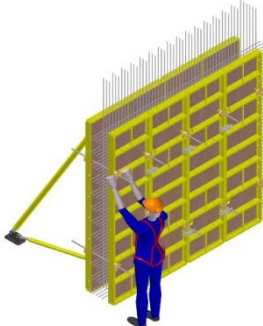
CODE	NAME	
1920894	Eccentric washer	
7238001	Hexagonal nut 15	




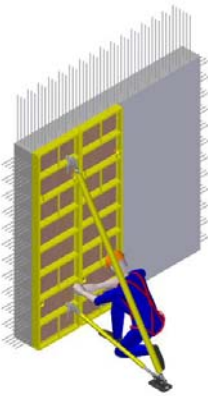
Holes from "TIE RODS" (after stripping the panels), can be filled as follows:

- Place "PLUG 20" (Cod: 1861799) in "CONE 22".
- Remove "CONE 22" and place "PLUG 22" (Cod: 1900159) in "SPACER TUBE 22/25"

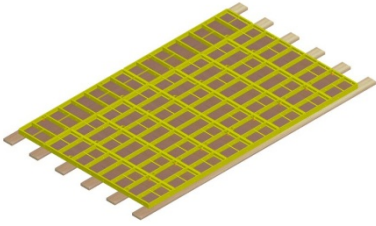
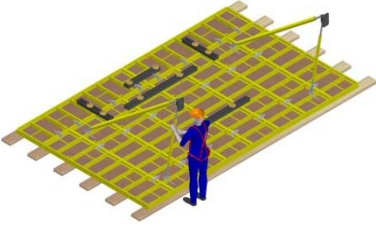
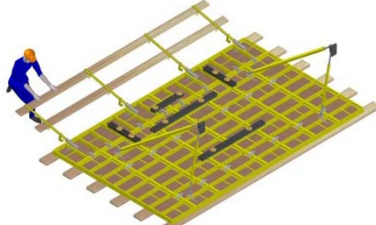
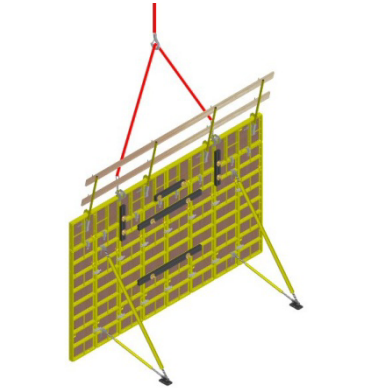
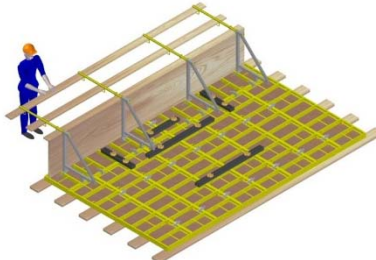
5. ASSEMBLY, USE AND DISASSEMBLY



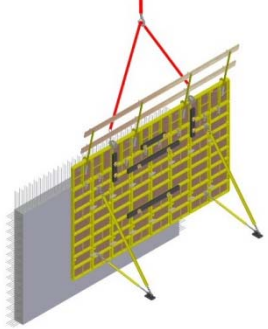
HAND SET ASSEMBLY PROCEDURE

STEP	DESCRIPTION	SKETCH
1	Start at a corner (inside or outside) and set the required form. Then, set the corner, and set the other form against the other side of the corner.	
2	Add two more forms in both directions so the form assembly will be self supporting. Heads, pipe braces and pipe brace shoes are installed to plumb, brace and secure as necessary (Section 5.1.). The pipe brace shoes will be anchored to the ground with Hilti HSA M20x125 anchors.	
3	Continue to set panels in line and brace as required. Place reinforcing steel box-outs, inserts, etc. Note: prior to setting the reinforcing steel. Spray the form face with the release agent (always clean and apply release agent between pours).	
4	Insert tie rods, sleeves and plate nuts in the leading form. Start to close wall forms with the same width form as on the opposite side to permit proper tying.	

5	<p>Using appropriate auxiliary equipment, place “post brackets” and “Megaform handrail posts” (at the top of the assembly). Upper and lower handrails as well as toe boards will be supplied and installed by contractor.</p>	
6	<p>Place “Walkway brackets” and “handrail posts” on the other side of the formwork. Also, place the corner handrails. Adequate planks, upper and lower handrails as well as toe boards, should be supplied and installed by contractor.</p>	
7	<p>Use appropriate auxiliary equipment to reach the walkway platform, and begin pouring concrete.</p>	
8	<p>Once the concrete has cured completely, begin stripping (usually at an outside corner). The walkway brackets, posts, lumber and corner handrails can be disassembled on both sides of the formwork (using appropriate auxiliary equipment). The panels on the side without pipe braces should be disassembled, removing clamps and walers and releasing plate nuts. Then, strip the panels on the opposite side with pipe braces. Panel’s maintenance and cleaning should be performed.</p>	

GANG ASSEMBLY PROCEDURE

STEP	DESCRIPTION	SKETCH
1	<p>Prepare a clean and flat staging area. Planks should be relatively level and spread out to support panel joints. Position the panels on the planks according to the assembly drawing and connect with fixed clamps.</p>	
2	<p>Assemble the heads, the pipe braces and the pipe brace shoes on the panels. Install walers with waler hooks and plate nuts.</p>	
3	<p>Connect post brackets at the top of the gang. Once they are positioned, the safety handrails posts can be installed. Wood planks as upper and lower protections can be supplied and installed by contractor.</p>	
4	<p>Fasten the MEGALITE lifting hooks on the gang. Use a minimum of two hooks for lifting gangs. Crane lift the gang and place it in position and anchor the pipe brace shoes to the ground with Hilti HSA M20x125 anchors. Spray the form face with release agent (always clean and apply release agent between pours). Place reinforcing steel.</p>	
5	<p>Repeat step 1 with new panels. Walkway brackets, posts and adequate planks, upper and lower handrails as well as toe boards, will be supplied and installed by contractor.</p>	

6	<p>Crane lift the gang with a minimum of two hooks, sprayed with form release agent and placed in front of the previously positioned gang. Place tie rods and plate nuts to join the gangs. Remove the lifting hooks. These operations require the use of appropriate auxiliary equipment.</p>	
7	<p>Using appropriate auxiliary equipment to reach the walkway platform, install corner handrails and begin pouring concrete.</p>	
8	<p>Once the concrete has cured completely, begin stripping. Remove plate nuts and tie rods, always leaving one until the gang form is secured to the crane. Break the bond between the concrete and form using wood wedges to prevent damage to the face of the forms. Using MEGALITE lifting hooks, strip gangs and move them to the next pour location. Clean and spray with release agent. After the last pour, the gangs can be moved to the staging area and disassembled.</p>	

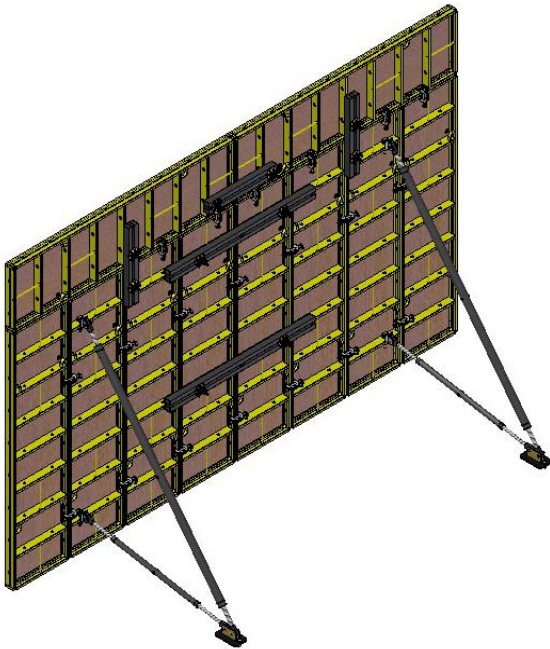
It is advised to follow the technical instructions to assemble and disassemble the MEGALITE system panels:

- TECHNICAL INSTRUCTIONS FOR ASSEMBLY "EM01-00" "HAND SET FORMING OF MEGALITE WALL"
- TECHNICAL INSTRUCTIONS FOR DISASSEMBLY "EM02-00" "HAND SET STRIPPING OF MEGALITE WALL"
- TECHNICAL INSTRUCTIONS FOR ASSEMBLY "EM03-00" "HAND SET FORMING OF MEGALITE COLUMN"
- TECHNICAL INSTRUCTIONS FOR DISASSEMBLY "EM04-00" "HAND SET STRIPPING OF MEGALITE COLUMN"
- TECHNICAL INSTRUCTIONS FOR ASSEMBLY "EM05-00" "FORMING MEGALITE WALL WITH CRANE"
- TECHNICAL INSTRUCTIONS FOR DISASSEMBLY "EM06-00" "STRIPPING MEGALITE WALL WITH CRANE"
- TECHNICAL INSTRUCTIONS FOR ASSEMBLY "EM07-00" "FORMING MEGALITE COLUMN WITH CRANE"
- TECHNICAL INSTRUCTIONS FOR DISASSEMBLY "EM08-00" "STRIPPING MEGALITE COLUMN WITH CRANE"
- TECHNICAL INSTRUCTIONS FOR ASSEMBLY "EM09-00" "HAND SET FORMING OF MEGALITE WALL WITH CORNER"

5.1. PIPE BRACES

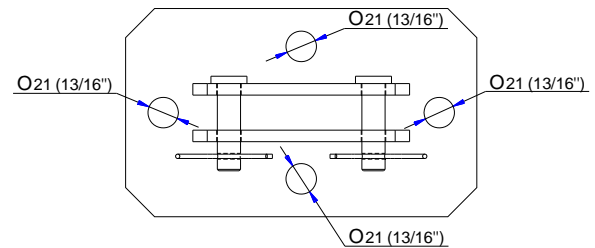
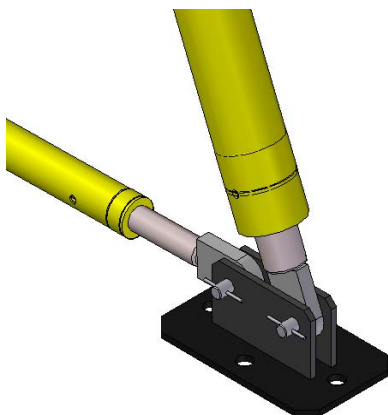
The "PIPE BRACES" are used for the initial gang or panel bracing and plumbing.

They are used to support temporary loads during the assembly process, as well as wind loads.

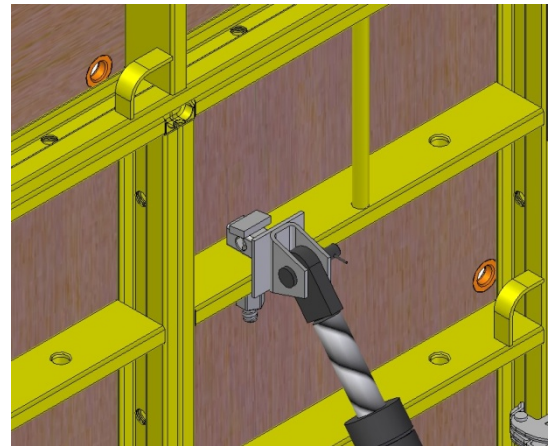


The "PIPE BRACES" are anchored to the ground or deadman with "PIPE BRACE SHOES".

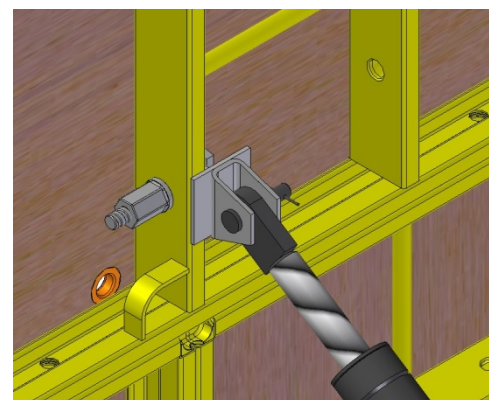
It is recommended to use Hilti HSA M20X125 anchors (tensile load=23.8kN). The contractor must follow the manufacturer's installation instructions.



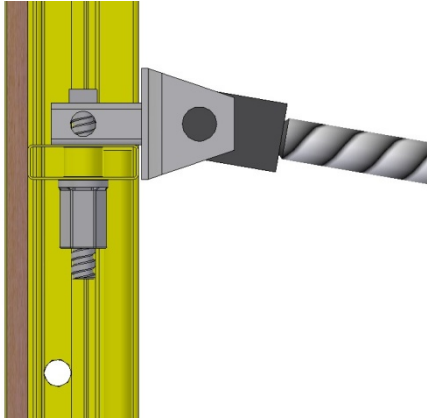
"PIPE BRACES" are attached to the forms using the "PIPE BRACE HEAD", which is bolted through the holes in the ribs.



HORIZONTAL RIB

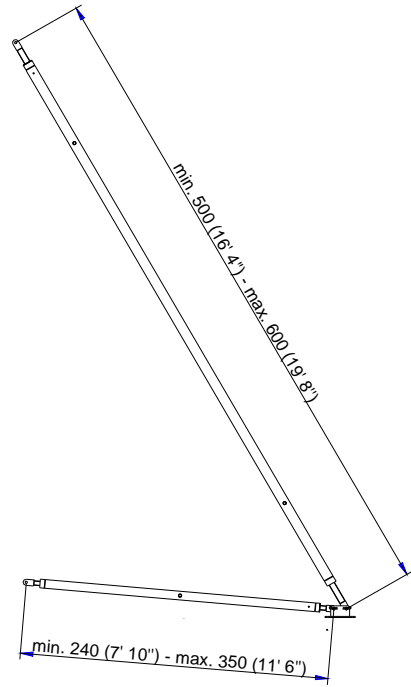


VERTICAL RIB



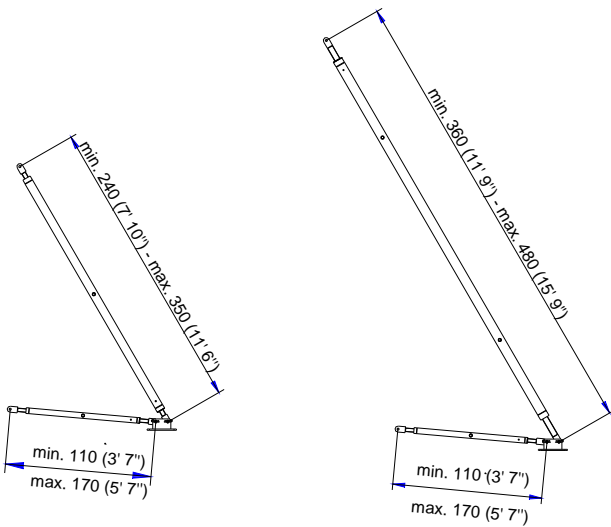
CONNECTION DETAIL

There are four different "PIPE BRACES" sizes. Depending on the formwork height, the adequate pipe brace and spacing will be used.



1900123 Pipe brace 2.4-3.5 (7' 10" – 11' 6")

1900147 Pipe brace 5-6 (16' 4" – 19' 8")



1900134 Pipe brace 1.1-1.7
(3' 7" – 5' 7")

1900134 Pipe brace 1.1-1.7
(3' 7" – 5' 7")

1900123 Pipe brace 2.4-3.5
(7' 10" – 11' 6")

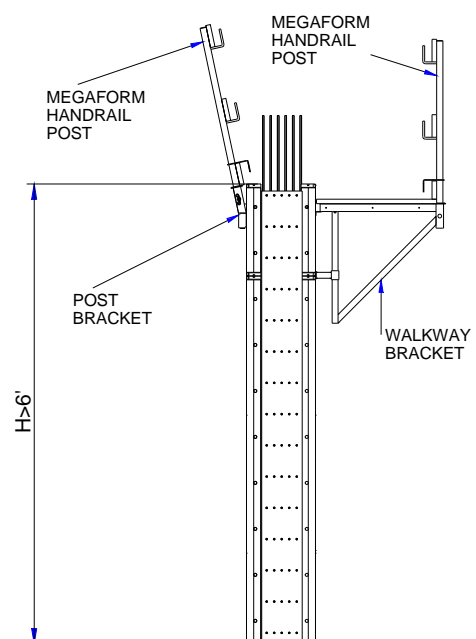
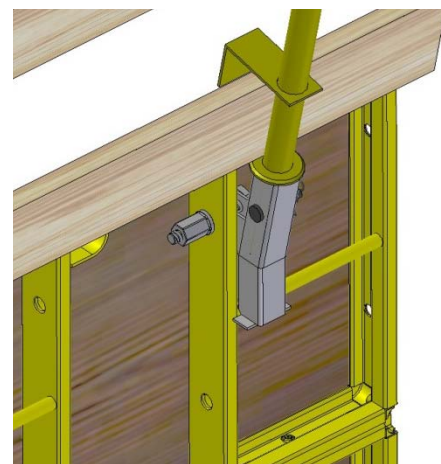
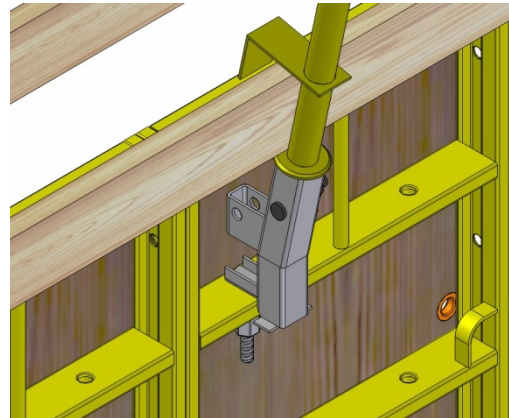
1908168 Pipe brace 3.6-4.8
(11' 9" – 15' 9")

5.2. POST BRACKET

This bracket can be placed on in any hole in the tubular ribs, vertically or horizontally inserting the bolt in the holes of these ribs, and fastening it with the hexagonal nut.

This bracket is used as a support element where the "MEGAFORM HANDRAIL POST" is installed as a protection (handrail) on the opposite side of the "WALKWAY BRACKETS".

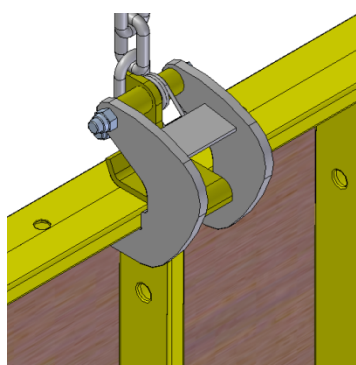
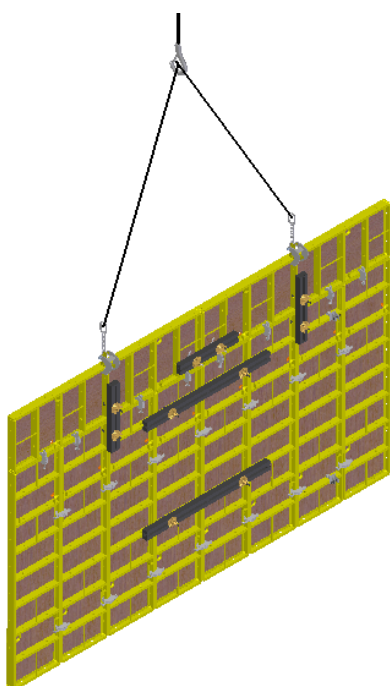
Adequate lumber supplied by contractor is used for upper and lower protection handrails. The maximum distance between two "POST BRACKETS" should be 2m (6' 6").



5.3. LIFTING HOOK

This element is an auxiliary component for lifting gangs by a crane. Each hook has a maximum safe working load of **3,300 lbs**, with a recommended angle of 60° between the slings.

A minimum of two hooks must be used for gang lifting.

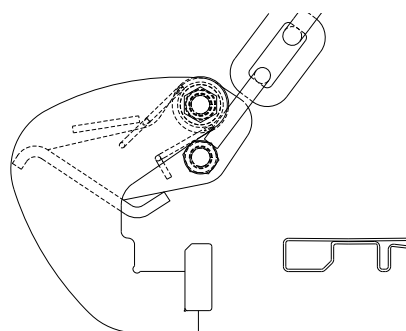


5.3.1 Basic assembly

The basic installation can be divided into three phases:

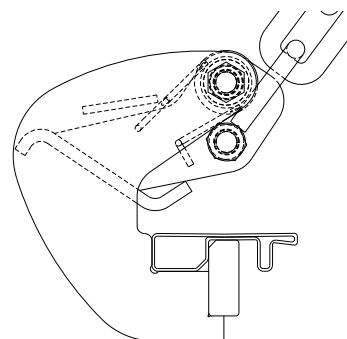
5.3.1.1 Hook opening

The fixed part of the hook is held with one hand, while the movable element is raised with the other hand.



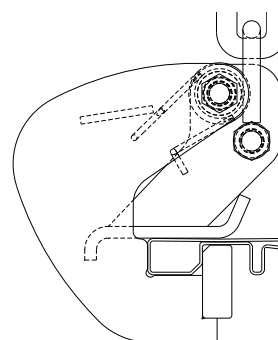
5.3.1.2 Hook placement

The hook is positioned with the claws inside the profile groove.

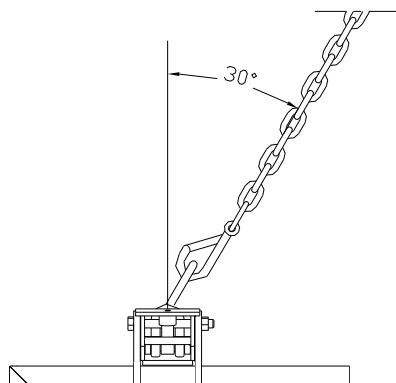


5.3.1.3 Hook fastening

To properly secure the hook, the movable element is lowered to lock the bracket in place.



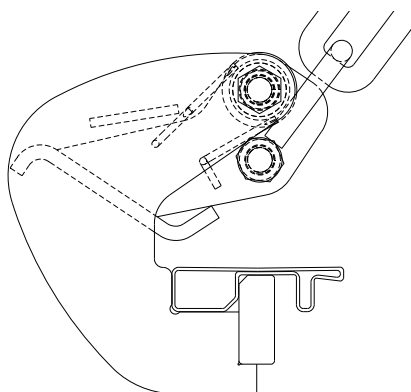
It is recommended to place the hook on a rib in order to avoid lateral movements when lifting. The sling will be fastened in the hook link, taking into account a 30° maximum angle from the vertical.



5.3.2 Basic disassembly

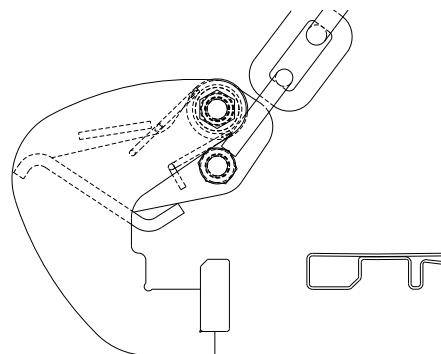
5.3.2.1 Hook opening

The fixed part of the hook is held with one hand, while the movable element is raised with the other hand.



5.3.2.2 Hook releasing

The hook is disengaged from the external profile.



For additional information see ULMA's safety guidelines.

5.4. WALKWAY BRACKET

The "Walkway Bracket" is a component used to provide support for a walkway utilizing scaffold grade wood planks (supplied by contractor) nailed to a plastic strip located on the top element of the bracket.

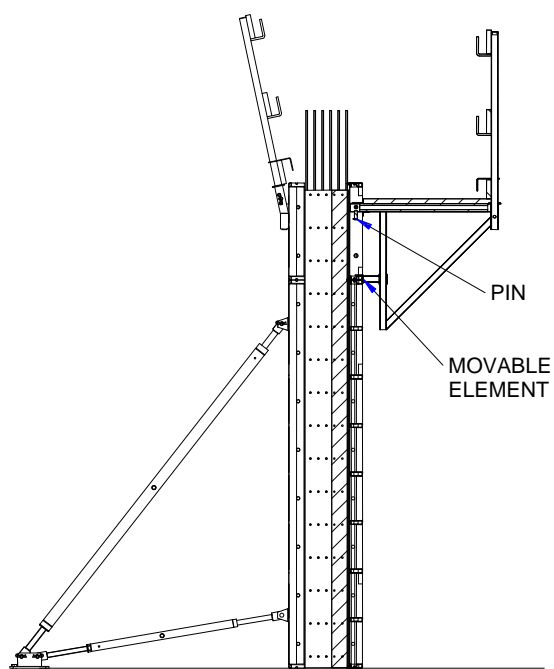
- The brackets are placed a maximum distance of 2,44 m (8') apart.

Bracket load capacity: 25 PSF.

The brackets can be fastened to a vertical or horizontal rib.

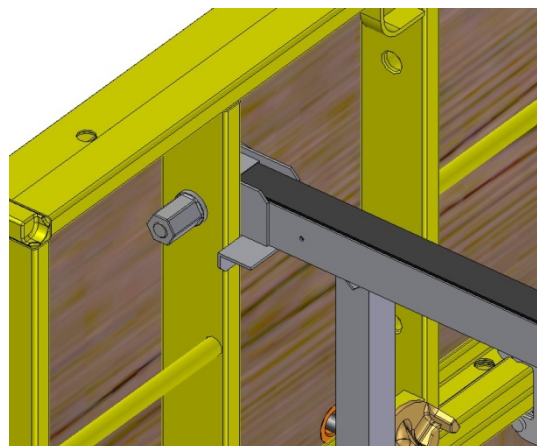
5.4.1 Horizontal ribs

The "WALKWAY BRACKET" is installed inserting its pin in one of the holes of the tubular ribs and secured with a hitch pin. The movable element is seated on the lower ribs for stability.

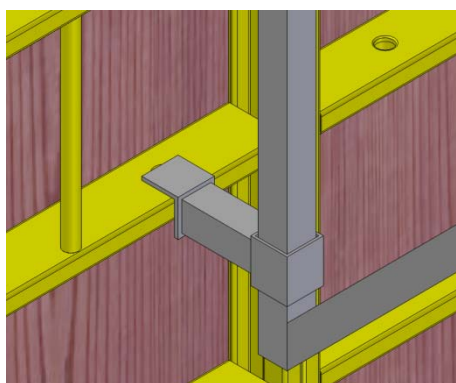
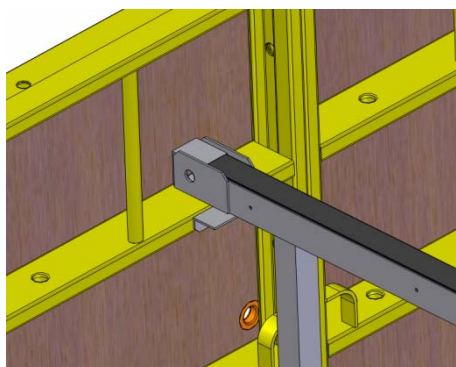


5.4.2 Vertical ribs

The "WALKWAY BRACKET" is laterally bolted on one of the holes in the tubular ribs by inserting "PANEL BOLT 5" " through the hole in the bracket. It is then secured with a hexagonal nut 15.



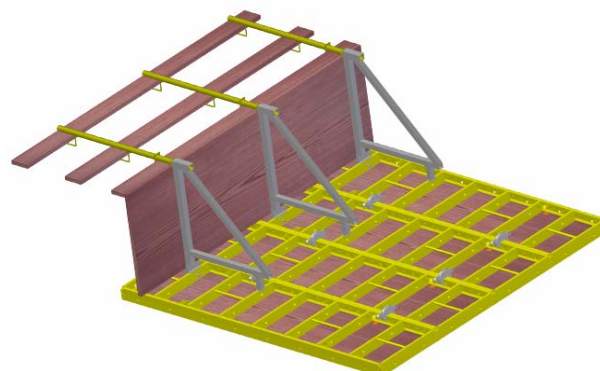
Rib connection with PANEL BOLTS 5" + HEXAGONAL NUT 15



5.4.3 Basic assembly

Adequate wood planks supplied and installed by contractor are placed to make the walking surface. Each plank is nailed in two places in order to avoid movement.

Upper and intermediate wood handrails also supplied and installed by contractor are secured to the "MEGAFORM HANDRAIL POST". The toe board wood plank (supplied by contractor) has to rest on the walking surface wood planks.



6. USE, HANDLING AND MAINTENANCE CONDITIONS

6.1. BASIC PROCEDURES

MEGALITE Important notice:

ULMA is strictly a supplier of concrete formwork equipment. The contractor and their properly trained personnel perform and are responsible for all labor and the safe use of the equipment. Contractor must always observe and work in accordance to the safety regulations, codes, and safety guidelines that apply in the erection, use and handling of Ulma's concrete forming equipment (such as but not limited to: OSHA, Contractor's Safety Programs, ACI, and any others as applicable).

Some of the illustrations depicted may indicate or describe situations while under assembly and may not be shown with correct safety precautions in place. Contractors must exercise and apply safety precautions at all phases of the work.

This suggestive compilation is intended to be a general guideline for assembling and using Ulma's MEGALITE System. Contractor is responsible to have adequately trained and experienced personnel in the use of concrete forming equipment and knowledgeable in concrete construction. Upon request, should the contractor require it, Ulma can provide personnel to review the assembly of Ulma's concrete forming equipment on site or at their offices.

Ulma's equipment should never be used with another manufacturer's as it could create a dangerous and unsafe situation. Should there be a question or concern by the contractor, contact Ulma's Technical department immediately.

"SAFETY IS EVERYONE'S PRIMARY CONCERN"

Revised 1-06

6.1.1 Formwork

Select and prepare a clean and flat staging area where there is a good view of the crane operator. Presort, identify and count equipment in anticipation of assembly. Area should be close to where the forms should be erected.

The form assembly area does not have to be sophisticated but should be relatively level. Planks should be spread out on the ground where form panel joints meet so that they line up correctly. Contractor should have Key Personnel that are knowledgeable in the use of concrete formwork and can lead the workers in the safe and correct use of concrete forming equipment.

UPON REQUEST BY THE CONTRACTOR, ULMA HAS PERSONNEL AVAILABLE TO THE FIELD FORCES AND/OR CONTRACTOR'S OFFICES THAT CAN REVIEW THE BASIC PROCEDURES FOR ASSEMBLY OF ULMA'S CONCRETE FORMING EQUIPMENT.

Starting at a corner, set panels and align with adjacent panels. Locate clamps as per the erection drawing and tighten by hammering the wedge until tight.

If walers are required as per erection drawing, tighten with waler hooks and plate nuts.

Continue to set panels in line until appropriate layout is complete. Install additional components (walkway brackets, pipe braces, etc.) as per the erection drawing.

Spray the form face with the release agent (always clean and apply release agent between pours).

The basic tools required for assembly and working of the form include but are not limited to carpenter hammers, adjustable wrenches, pry bars, masonry drill, expansion anchors and form release agents.

Break the bond between the concrete and forms using wood wedges to prevent damage to the face of the form.

Under no circumstances should any form rail or rib be hit directly with a hammer or sharp object. If necessary to strike the form for any reason PLEASE use a woodblock at point of impact.

Safely use the fixed and adjustable clamps as you would any other connecting device. In excessive gaps between panels in the process of assembly, do not beat on one clamp to pull the forms together but walk it over instead. Work the clamps sequentially; let them do the work for you.

Once the forms are assembled as a gang or being cycled, always be aware of using the proper quantity of Lifting Hooks in conjunction with the proper rigging (slings, lifting beams, taglines, etc.) and always keep a safe distance from any pick based on your firm's safety procedures and any other governing regulations.

Although our engineered drawings indicate the location of the walkway brackets, in the field the contractor must determine their preferred location prior to installing these other accessories (clamps, horizontal stiffeners, pipe braces, etc.) to avoid interferences. This can save time in unnecessary removal of the accessories.

6.1.2 Some basic safety suggestions

Inspect all equipment before using. Never use equipment that appears damaged. If damage develops in any equipment, discontinue use immediately and contact Ulma Form Works, Inc. to have it repaired or replaced.

All joints, which are not held by ties, must be waled and braced.

Before placing concrete, the contractor should have assigned personnel checking both sides of the wall to make sure that all ties and bolted connections are properly secured and in place. Assure that all clamps and walers are maintained tight and secure and in proper positions. Protective devices such as hard hats, goggles, gloves, steel-toed shoes and safety harness must be worn when working with forming systems.

The contractor must provide safe access to the walkways and other areas of the forms. Forms are not designed to be climbed. It is the contractor's responsibility to supply adequate planking, guardrail systems and/or fall protection devices as required complying with their own safety programs and any other governing regulations.

If tie-off to the Formwork is required by the contractor, MEGALITE panel bars meet OSHA requirements for fall protection when used in conjunction with self-retracting life lines, lanyards and positioning device systems limiting free fall distance to 2 feet.

Standard practice for placing concrete and standard vibrating procedures must be followed. Concrete should not be dropped without the use of an elephant trunk. Vibration should be limited to 4 feet below top of concrete surface, and vibrators should not be used for moving concrete laterally (see ACI 347).

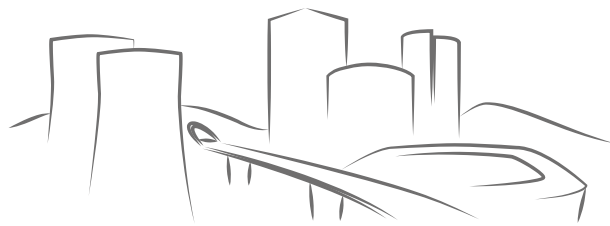
Serious injury may result if the contractor fails to use safe practice in the erection, dismantling or use of the forming equipment. The contractor must be familiar with and follow correct laws and regulations at all times.

This user's guide only covers general situations. It does not attempt to be all-inclusive, nor to supersede or replace other additional safety and precautionary measures that may be necessary to cover the many usual and unusual

conditions that may be encountered during the installation, use and removal of the products described. Safe and proper use of this equipment is the responsibility of the user.

7. LEGAL REFERENCES AND STANDARDS ON HEALTH AND SAFETY IN THE WORKPLACE AND ENVIRONMENTAL HAZARDS

- Directive 89/391/EEC on the application of better health and safety measures to promote health and safety in the workplace.
- Directive 89/654/EEC on the minimum health and safety requirements in the workplace.
- Directive 92/57/EEC on the minimum health and safety requirements at temporary or mobile construction sites.
- Directive 92/58/EEC on the minimum health and safety requirements in regards to signposting.
- Directive 89/655/EEC on the minimum health and safety requirements when using work equipment in the workplace.
- Directive 89/656/EEC on the minimum health and safety requirements for the use of personal protective equipment by personnel in the workplace.
- Directive 90/269/ECC on the minimum health and safety requirements for manually handling loads where there is a risk, particularly of back injury to workers.
- Directive 2002/44/EC of the European Parliament and of the Council on the minimum health and safety requirements regarding worker exposure to the risks arising from physical agents (vibration).
- Directive 2003/10/EC of the European Parliament and of the Council on the minimum health and safety requirements regarding worker exposure to the risks arising from physical agents (noise).
- UNE-EN 13374. Temporary Peripheral Protection Systems. Product Specifications, Test Method.
- Occupational Health and Safety Act of 1970.
- CFR PART 1926 Health and Safety Regulations for Construction.
- NIOSH lifting equation.



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