FORMTECH
A WHITE CAP COMPANY®

Field Guide

1500

CLAMP SYSTEM

Harris 1500™ General Safety

Safety is the number one priority at White Cap. As a result, all of our concrete formwork and shoring is designed to first be safe, and second to be productive. In order to ensure the safe use of White Cap equipment, all of the personnel on the construction site should be familiar with the contents of this application guide. This guide is not meant to cover all potential applications, but a core group of common situations. Should any application arise that is not specifically described in this guide, please contact a White Cap representative.

Job site safety is your responsibility, and therefore you should schedule regular safety meetings specific to the formwork setting, concrete placement, formwork stripping and formwork cycling operations. All job site personnel should be familiar with and in compliance with all applicable government regulations and codes, including, but not limited to industry safety standards developed and set forth by:

- American Concrete Institute
- American National Standards Institute
- The Occupational Safety and Health Administration
- The Scaffolding, Shoring and Forming Institute

Technical Guide Illustrations

The drawings and/or photographs contained in this Technical Guide are for illustrative purposes only and often show the formwork during the erection procedure. Please refer to your erection drawings for specific application design. All local and federal requirements must be followed when erecting formwork, placing concrete and dismantling formwork. If you have questions regarding your erection drawings, please contact a White Cap representative.

Jobsite Safety

Job site safety is the responsibility of the contractor. Safe use of White Cap supplied equipment is critical to the success of your project. As an invested partner, White Cap recommends that the following practices be enforced:

1. Make all job site personnel familiar with this technical guide.
2. Make all job site personnel familiar and compliant with local and federal codes.
3. Make all job site personnel familiar and compliant with industry standards.
4. Unload formwork deliveries in a flat and stable area.
5. Inspect all formwork components and accessories prior to use.
6. Remove any damages or unsuitable formwork components and/or accessories from the job site inventory. Call White Cap immediately for replacement of the damaged equipment.
7. Assemble formwork in a safe environment that has easy access for emergency vehicles.
8. Assemble formwork with trained professionals who are well versed in the erection and dismantling of concrete formwork and/or shoring.
9. Ensure that hard hats, safety glasses, safety vests, steel toe shoes, gloves and hearing protection are used at all times.
10. Regularly check and maintain all component connections, specifically any bolted and/or clamped connections.

Harris 1500™ General Safety

Concrete Placement Safety

The Harris 1500 Clamp System is designed to withstand up to 1500 pounds per square foot as defined by ACI- 347. There are a number of factors that contribute to concrete pressure, none of which are under the control of White Cap. Concrete pressure is impacted by temperature, rate of placement, vibration methods, re-vibration, density, cement slump and admixtures.

Exceeding formwork designed pressures will result in damage to rental equipment and potential formwork failures. Formwork failures can result in injury, loss of life, loss of time and loss of money. Immediately following concrete placement, an effort should be made to clean concrete spillage from the formwork before it sets. This will greatly increase crew productivity and reduce cleaning charges.

Stripping and Dismantling Formwork

Concrete formwork and/or shoring should not be stripped until the concrete has reached the proper design strength as specified by the contract documents or until the fresh concrete can sustain itself. Never attempt to break the bond between the concrete and the formwork with a crane. Attempts to break the bond with a crane may result in serious injury. The bond between the concrete and formwork should be broken by use of pry bars and wedges.

When dismantling formwork do not drop components or accessories from above. Place all panels, fillers, hardware and accessories in logical groups for easy transportation to the next location. Make sure careful attention is paid to how the dismantling operation impacts adjacent formwork. Unsecured formwork can fall and cause serious injury.

Climbing Rods

Climbing rods are standard on all 30” and 24” wide panels. The climbing rods provide not only a great source for climbing the formwork, but they also exceed the required OSHA standard for fall protection. Prior to climbing the formwork, job site personnel must ensure that the formwork has been properly erected and secured. The formwork must be braced to resist any and all loads associated with wind and live load produced by job site conditions.

Transportation and Handling

The Harris 1500 System will be shipped to your job site in panel stacks of (10), which are banded together with nylon strapping. Careful consideration should be given prior to removing the banding, as uneven job site conditions will result in form movement once the banding has been removed. Panel stacks can safely and easily be moved by use of choker straps. These straps must have a safe working load of 1,500 lbs and an ultimate capacity of 7,500 lbs.

Note on Staging Returns:

Equipment should be cleaned & treated with formwork release prior to staging. Panels and fillers should be staged in stacks of (10) & banded together with nylon strapping. Accessories and hardware should be segregated and returned as they were shipped to the project. Steel banding is not permitted and will severely damage the formwork panels.

Harris 1500™ Panel Frame

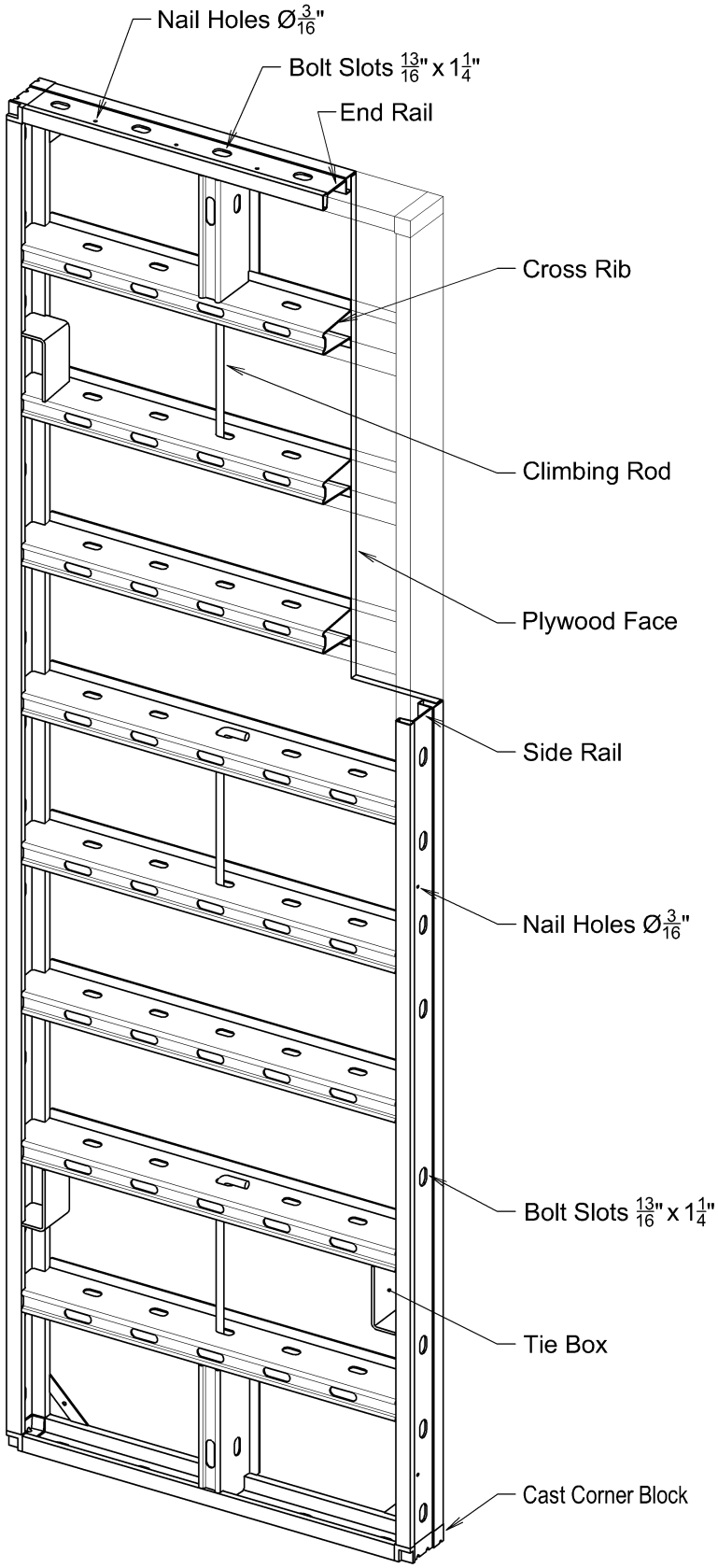
- Manufactured from 50 ksi steel
- Rugged cast steel corner blocks
- Hot-dip galvanized for durability
- Bolt slots and nail holes on all four sides for versatility
- Climbing rods for tie-off on all 30” wide, 24” wide and giant panels

Harris 1500™ Panel Face

- ½” birch veneer plywood for strength and durability
- ½” thick, 9 ply, cross-banded construction
- Solid birch veneers for exceptionally smooth finish
- Phenolic resin adhesive for maximum moisture resistance and durability
- Extra-thick 220 phenolic resin film thermally fused to both faces for additional smoothness and durability
- Sealed plywood edges to minimize moisture penetration
- Caulked joint between frame and plywood for long service life

Allowable Placement Pressure

- 1500 pounds per square foot
  Standard panels – 36” and narrower
- 1350 pounds per square foot
  Giant panels – 8’ wide



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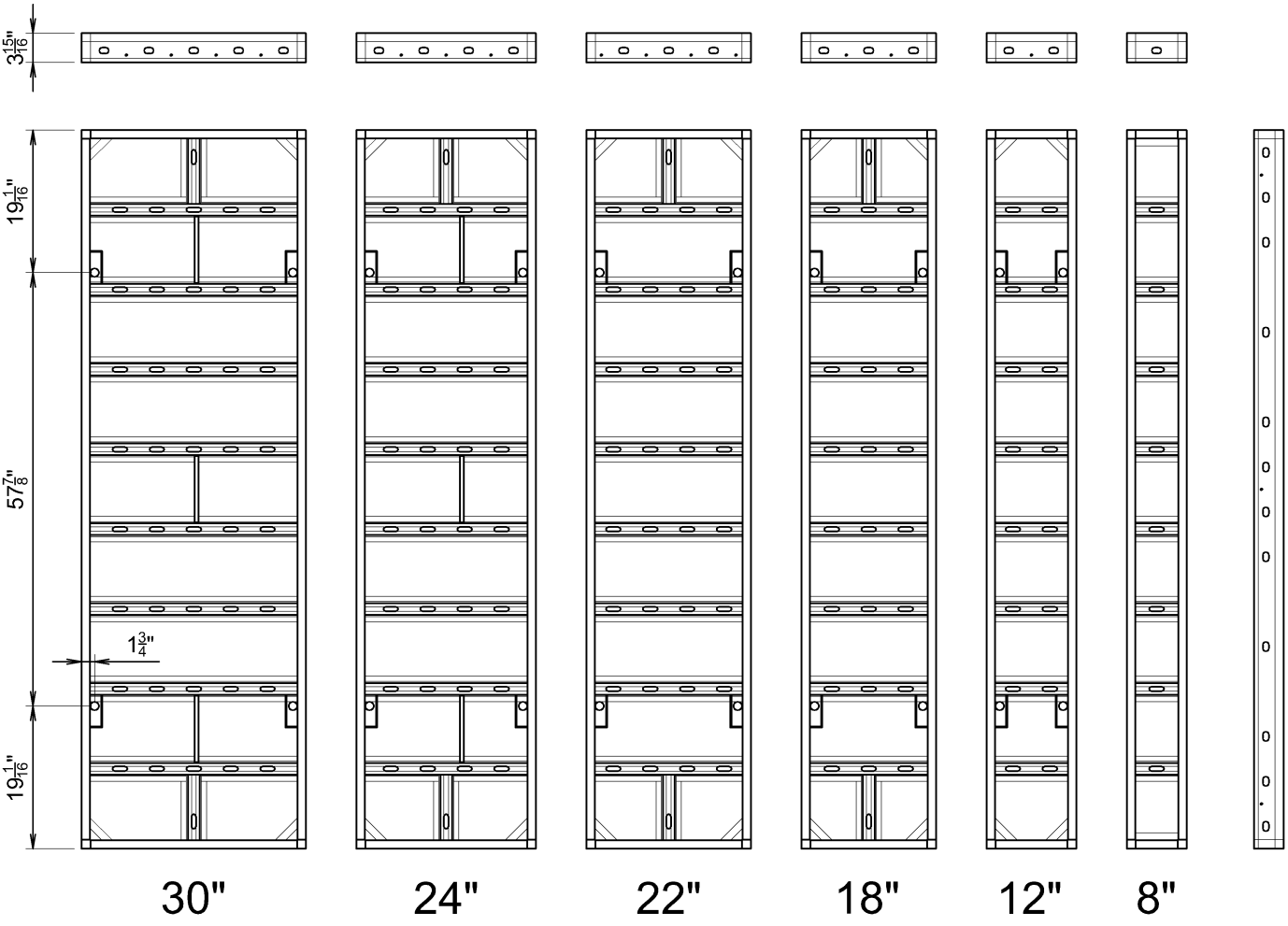
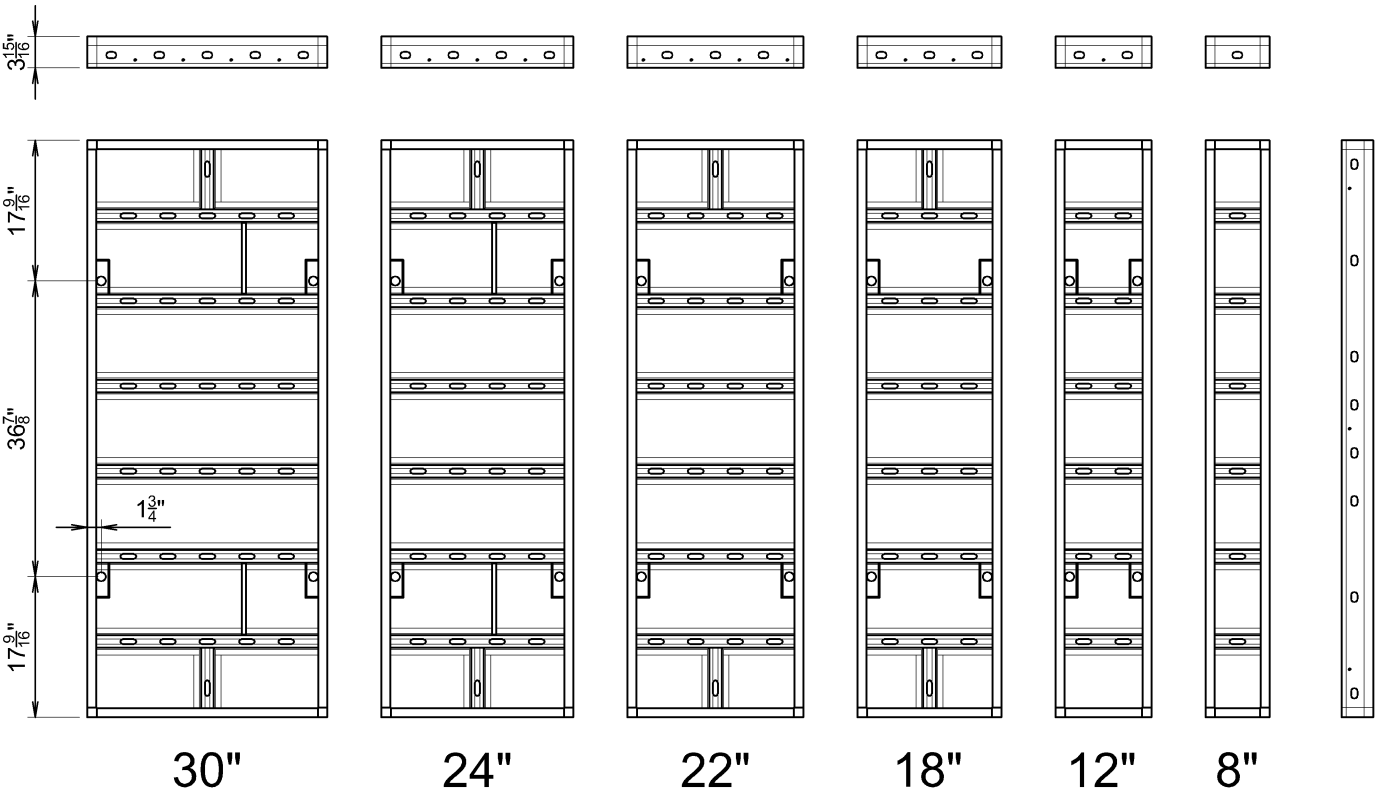
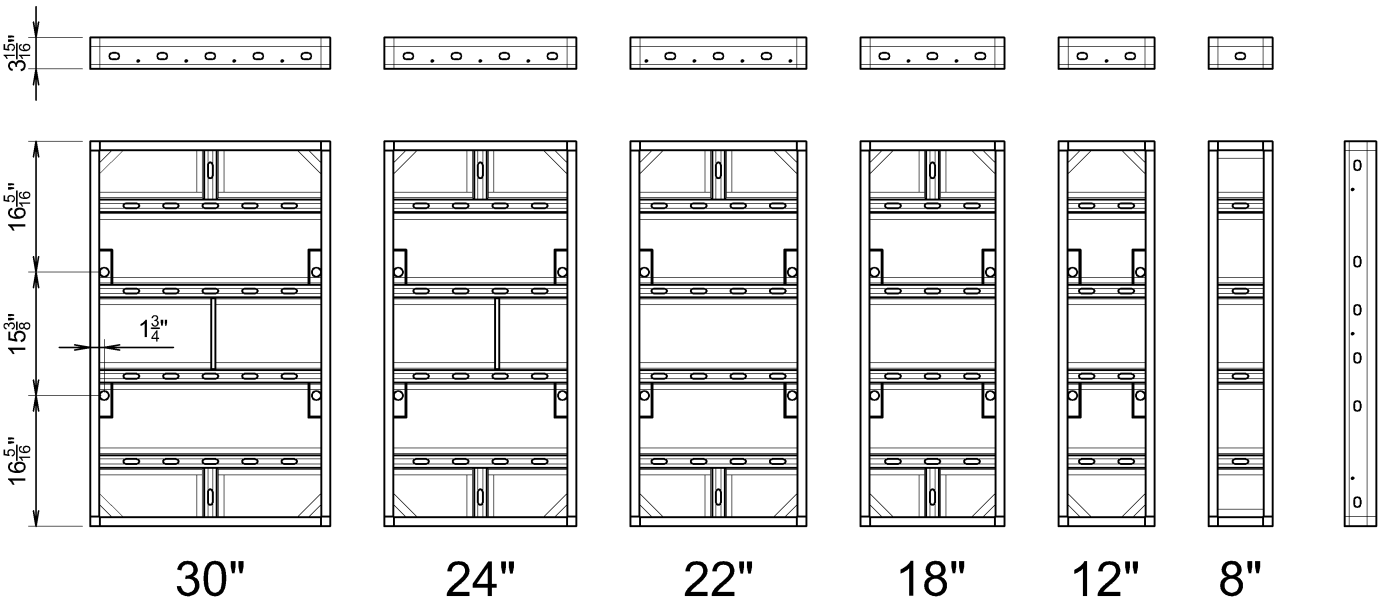


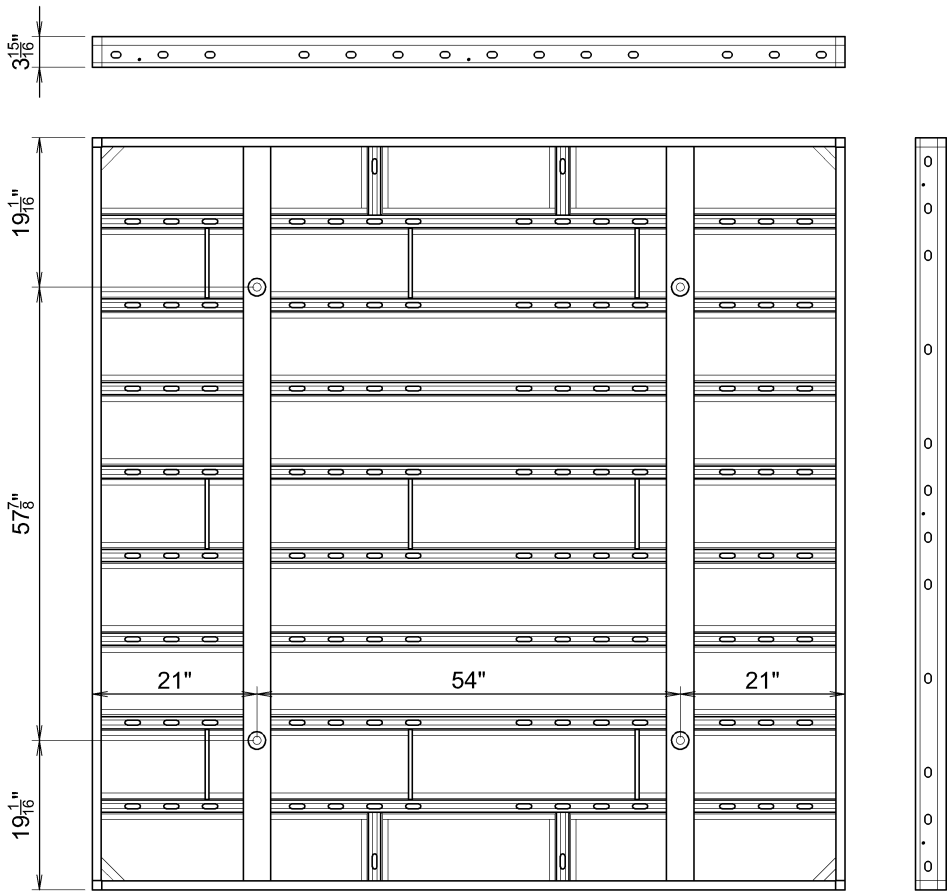
Harris 1500™ 8' Standard Panels			
Size	**Part No.**	**Area**	**Weight**
30" x 8'	1500830	20.0 sq ft	165.2 lb
24" x 8'	1500824	16.0 sq ft	143.7 lb
22" x 8'	1500822	14.7 sq ft	133.3 lb
18" x 8'	1500818	12.0 sq ft	117.2 lb
12" x 8'	1500812	8.0 sq ft	90.0 lb
8" x 8'	1500808	5.3 sq ft	72.0 lb



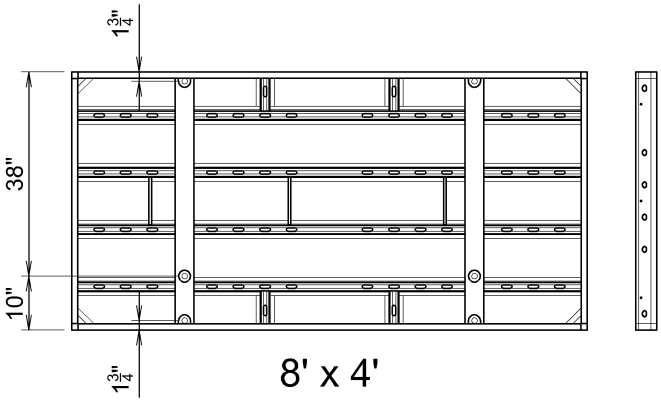
Harris 1500™ 6' Standard Panels			
Size	**Part No.**	**Area**	**Weight**
30" x 6'	1500630	15.0 sq ft	127.9 lb
24" x 6'	1500624	12.0 sq ft	111.8 lb
22" x 6'	1500622	11.0 sq ft	106.4 lb
18" x 6'	1500618	9.0 sq ft	93.9 lb
12" x 6'	1500612	6.0 sq ft	71.2 lb
8" x 6'	1500608	4.0 sq ft	55.7 lb



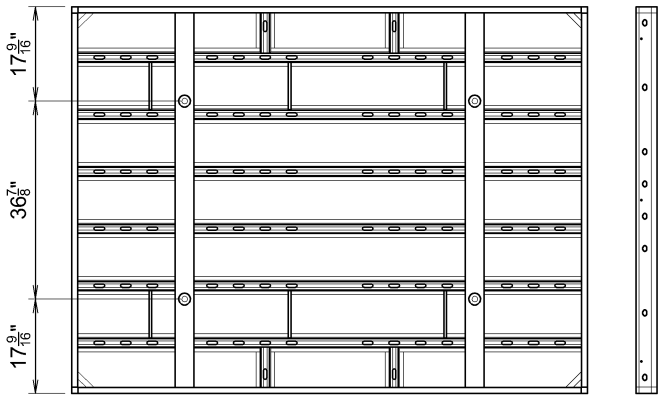
Harris 1500™ 4' Standard Panels			
Size	**Part No.**	**Area**	**Weight**
30" x 4'	1500430	10.0 sq ft	94.1 lb
24" x 4'	1500424	8.0 sq ft	81.0 lb
22" x 4'	1500422	7.3 sq ft	77.1 lb
18" x 4'	1500418	6.0 sq ft	68.6 lb
12" x 4'	1500412	4.0 sq ft	52.3 lb
8" x 4'	1500408	2.7 sq ft	39.4 lb



8' x 8'



8' x 4'



8' x 6'

Harris 1500™ Giant Panels			
Size	**Part No.**	**Area**	**Weight**
8' x 8'	1500896	64.0 sq ft	558 lb
8' x 4'	1500496	32.0 sq ft	439 lb
8' x 6'	1500696	48.0 sq ft	320 lb

Note: 8’ x 6’ Giant panels are available for purchase only and are manufactured to order. Minimum lead time is 2 months.

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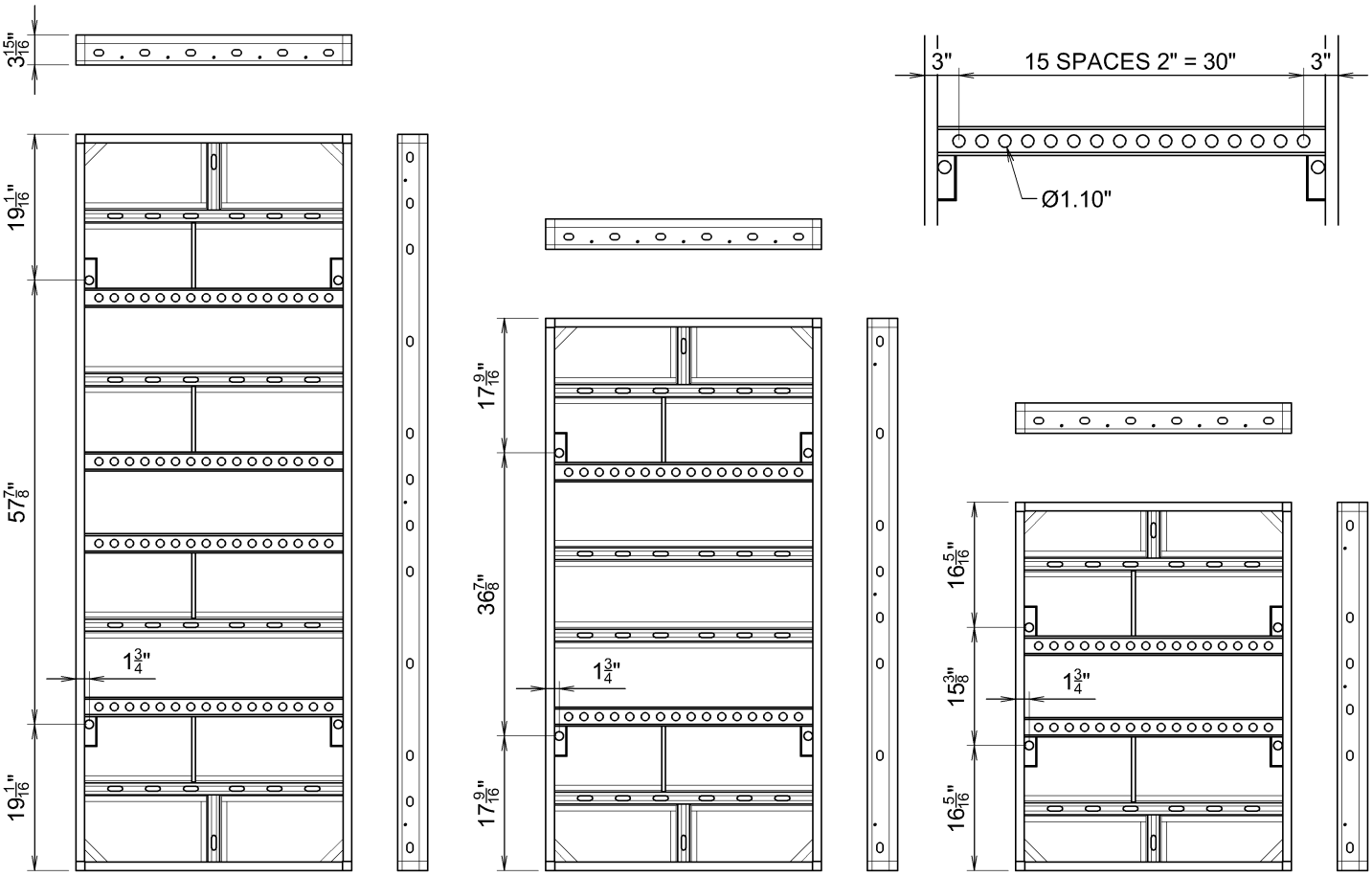

36" x 8' MP

36" x 6' MP

36" x 4' MP

Harris 1500™ 36" Multi-Purpose Panels			
Size	**Part No.**	**Area**	**Weight**
36" x 8' MP	1500837	24.0 sq ft	200 lb
36" x 6' MP	1500637	18.0 sq ft	152 lb
36" x 4' MP	1500437	12.0 sq ft	110 lb

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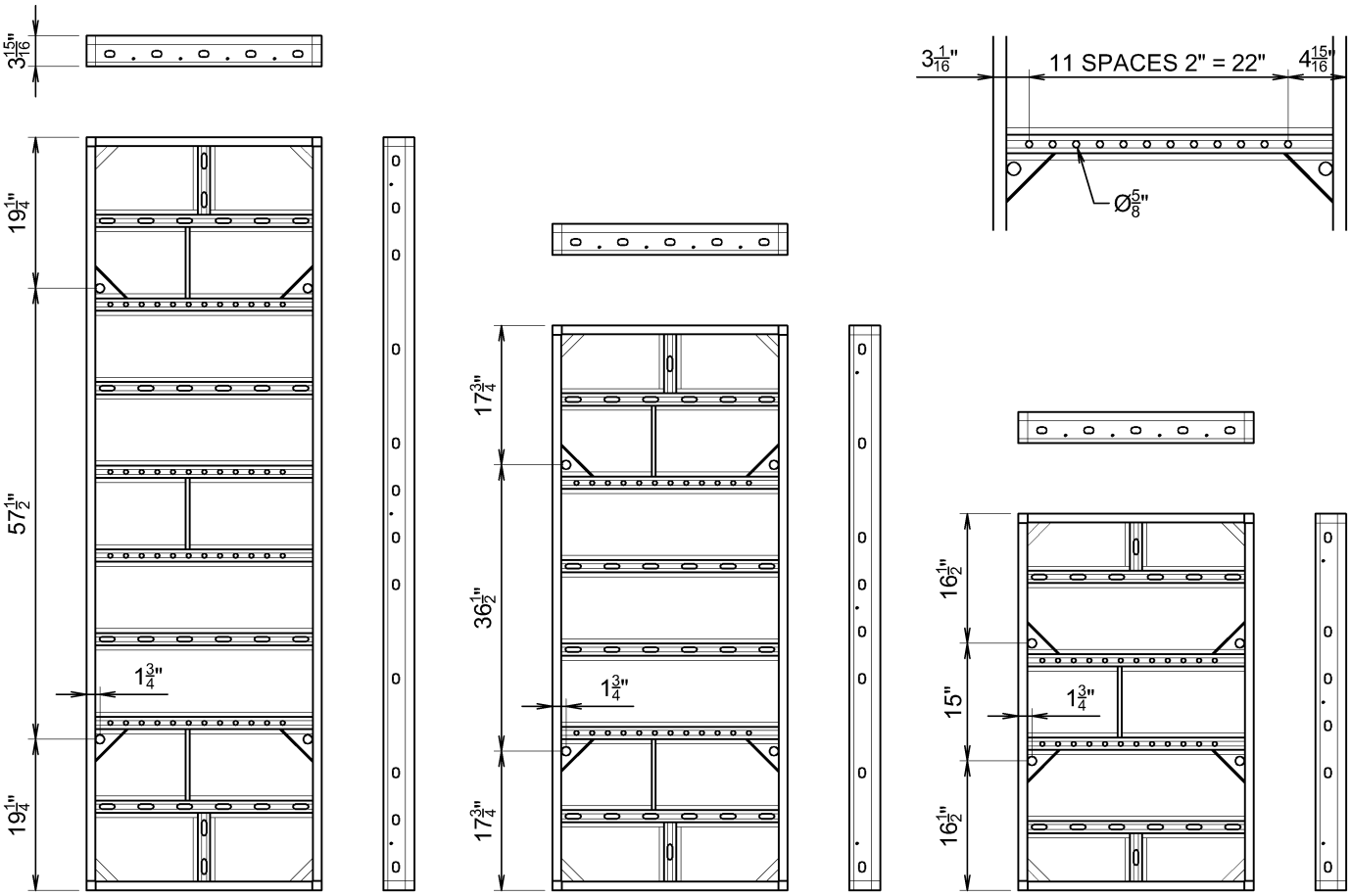


Harris 1500™ 30" Multi-Purpose Panels			
Size	**Part No.**	**Area**	**Weight**
30" x 8' MP	15003008	20.0 sq ft	130.0 lb
30" x 6' MP	15003006	15.0 sq ft	98.0 lb
30" x 4' MP	15003004	10.0 sq ft	71.0 lb

Climbing rods are included on all Harris 1500 panels 24” and wider including multi-purpose panels and 8’x8’, 8’x4’ and 8’x6’ giant panels.

Climbing rods are to be used ONLY as handholds when climbing the formwork or as anchorages for fall protection.

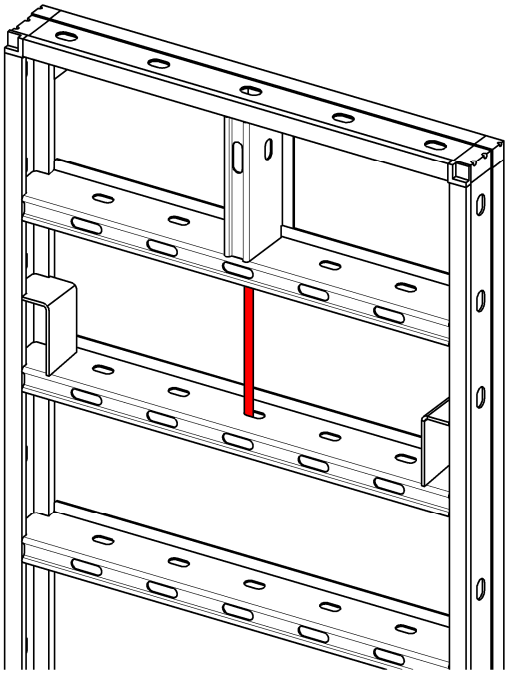
Climbing rods are capable of supporting 5,000 pounds as required by OSHA regulation – 29 CFR 1926.502(d)(15).

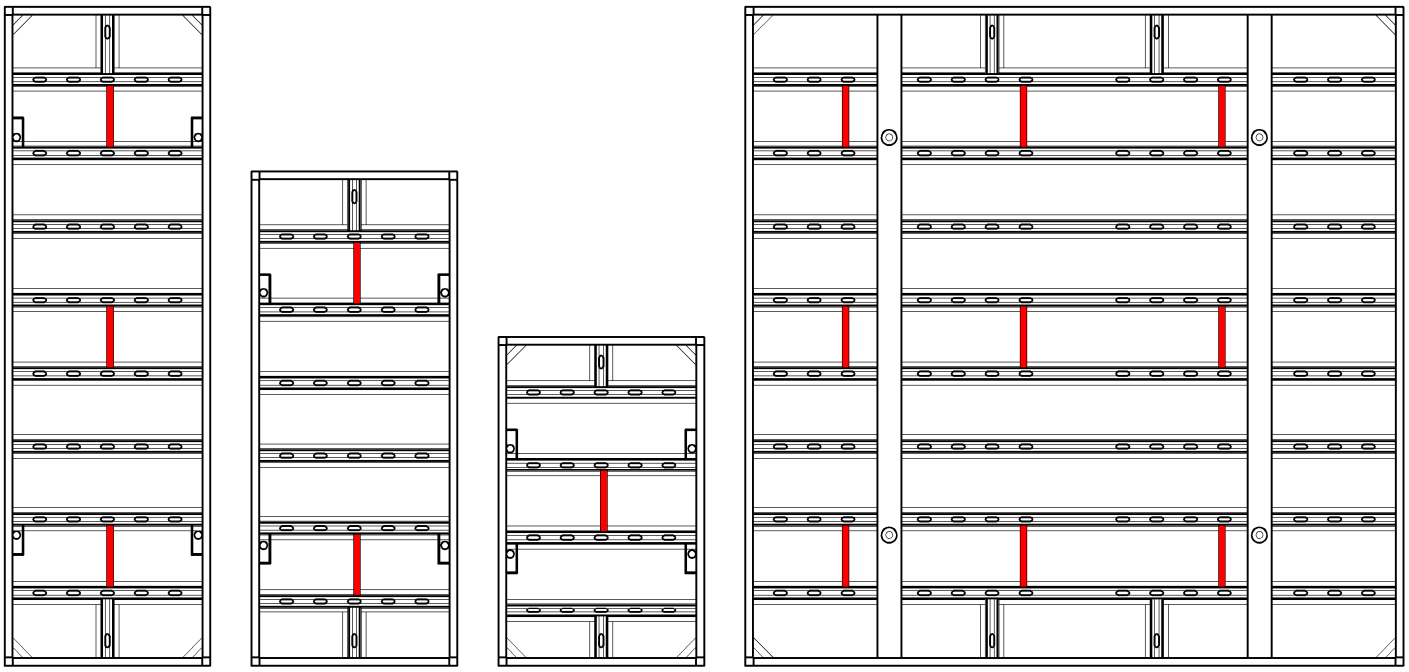
Only one person may be attached to any single climbing rod.

Formwork must be properly erected, secured and braced before any workers begin climbing. The formwork must be braced to resist any and all loads associated with wind and live load produced by job site conditions.

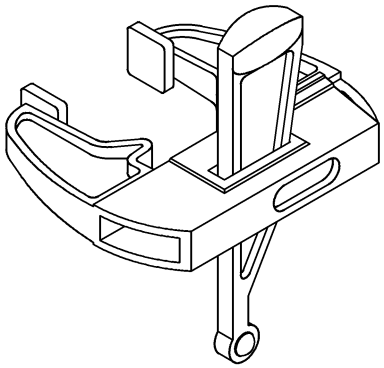
White Cap assumes no liability whatsoever for the selection, attachment, proper use or suitability of any fall protection device or equipment attached to the climbing rods.

NEVER use climbing rods for crane lifting of formwork gangs.

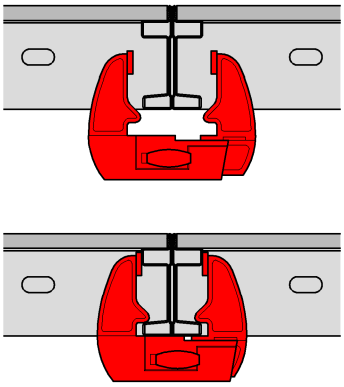


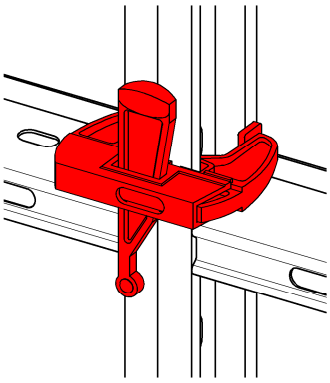


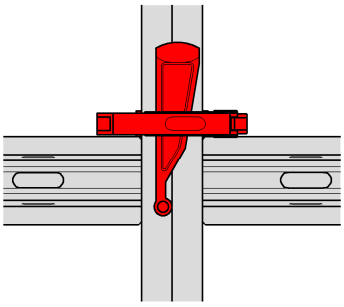
30" x 8' 30" x 6' 30" x 4' 8' x 8'

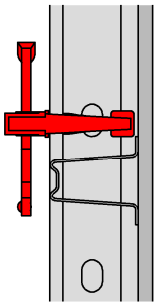


Harris 1500™ Wedge Clamp	
Part Number	**Weight**
1500024	3 lb



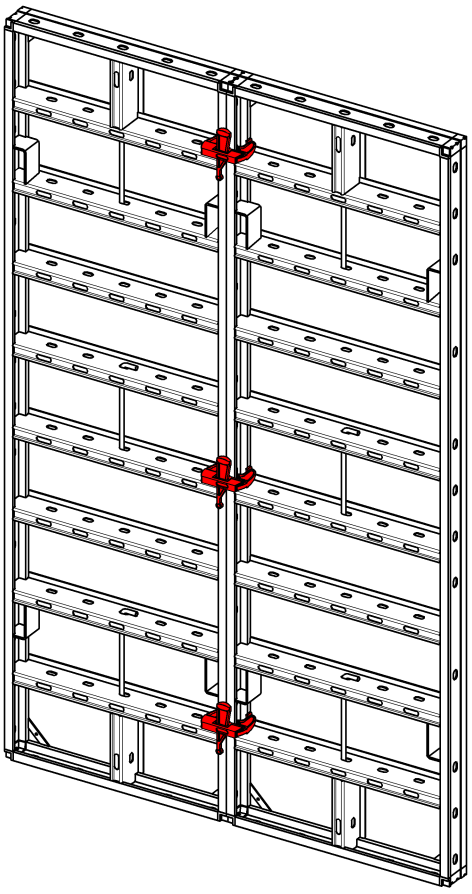






Harris 1500™ panels are connected using the Wedge Clamp. The clamp jaws and rail profile are designed to work together to ensure a tight connection and proper alignment across the joint. Clamps can be positioned anywhere along the side or end rail allowing adjacent panels to be staggered when necessary.

A standard framing hammer, 28 oz. max., should be used to tighten the clamp. Only a few blows on the wedge are required to properly tighten the clamp. Excessive blows or use of an oversized hammer can cause damage to the clamp and frame rail and will over-stress the clamp leading to fatigue and reduced service life.



Standard Clamp Requirements	
Rail Length	**Clamp Quantity**
8'	3
6'	2
4'	2
36" - 24"	2
18" - 8"	1

Safety Note

Extra clamps are required at outside corners and at panel joints near outside corners and bulkheads due to increased tension.

Refer to the details in each section for additional clamp requirements.

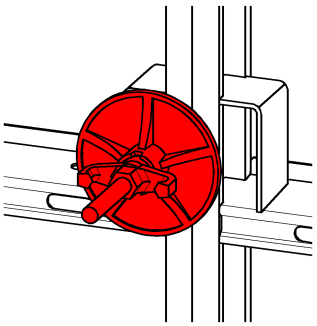
Harris 1500™ forms are tied using Ø5/8" (15mm) euro-thread tie hardware.

Ties are required at all vertical form joints except between two 8' wide giant panels. For 8' wide giant panels, ties are placed through holes in the internal box-tube members.

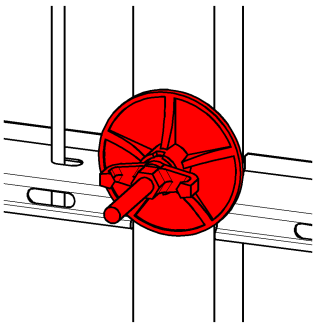
Ties can be located on either side of the form joint as needed to avoid conflict with reinforcing bars. Ties should be placed in the wider panel whenever possible. The swivel tie plate overlaps the joint to support the adjoining form.

Plugs must be installed in all unused tie holes. Panels are shipped with plugs in all tie holes.

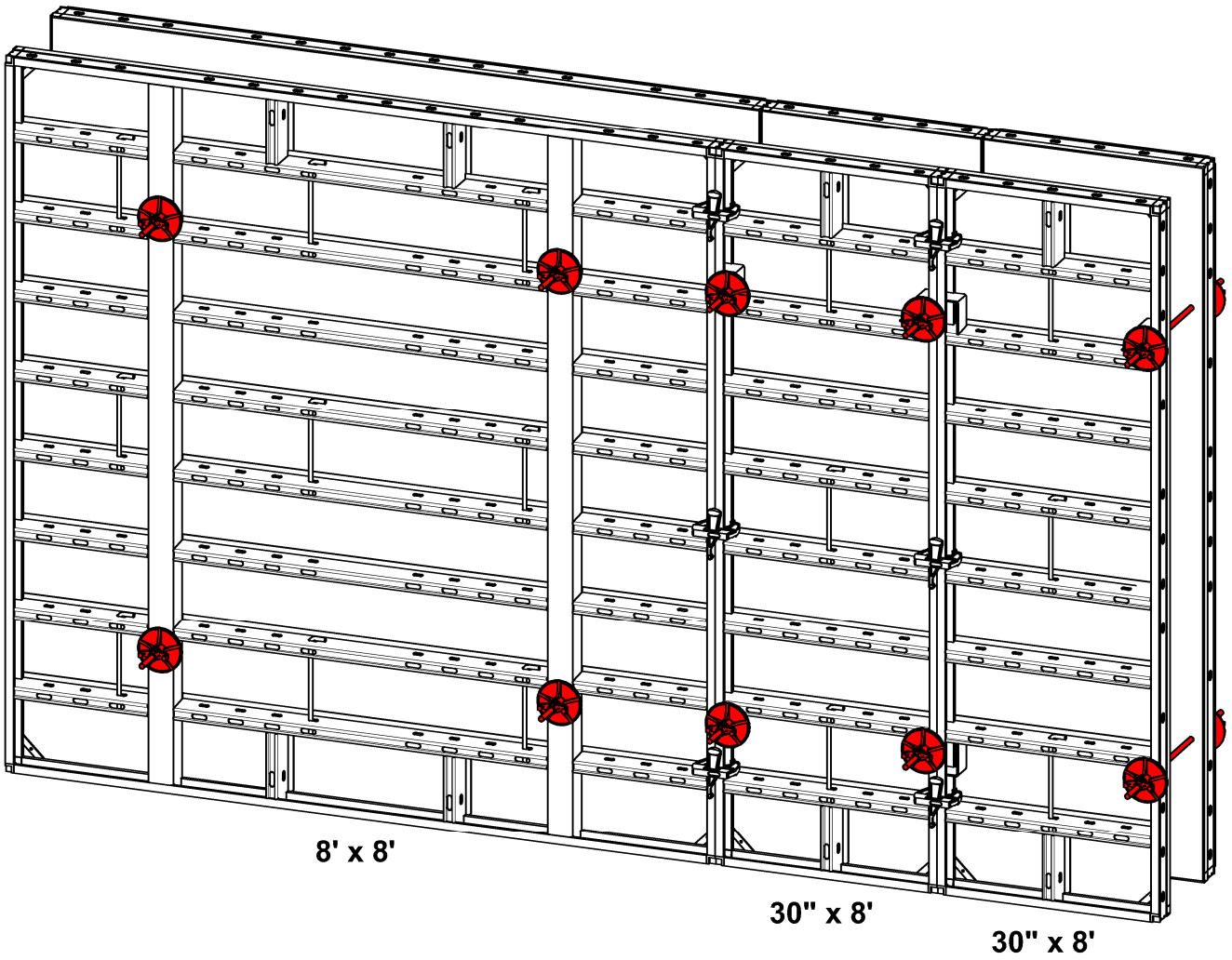
The safe working load for all Harris 1500™ tie systems is 21,900 pounds. If tie hardware with a lower safe working load rating is used, the allowable placement pressure must be reduced to prevent overloading of the ties.



Standard Panel Tie Box

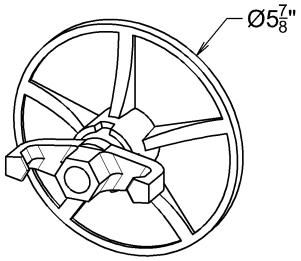


Giant Panel Box-Tube



General Tie Requirements		
Height	**Width**	**Ties**
8' 6'	36" or less	2 ties at each vertical joint
8' 6'	8' Giant	4 ties at internal locations
4'	8' Giant	Horizontal Orientation 4 ties at internal locations
4'	8' Giant	Vertical Orientation 2 ties at each vertical joint
4'	36" or less	When used alone or below top of stack 2 ties at each vertical joint
4'	36" or less	When used at top of stack 1 tie at each vertical joint

For exceptions and additional information see Typical Elevations and Sections later in this guide.

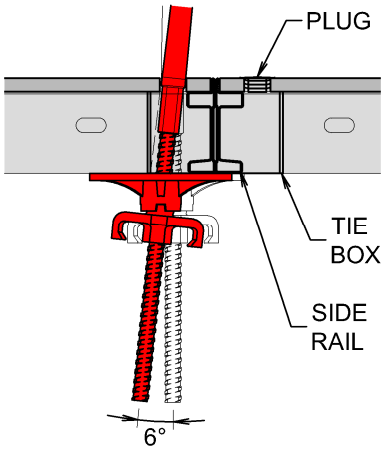


Swivel Tie Plate

The Harris 1500™ Swivel Tie Plate allows ties to be angled up to 10° from square. In some cases, the allowable angle is limited by the frame. See details at right.

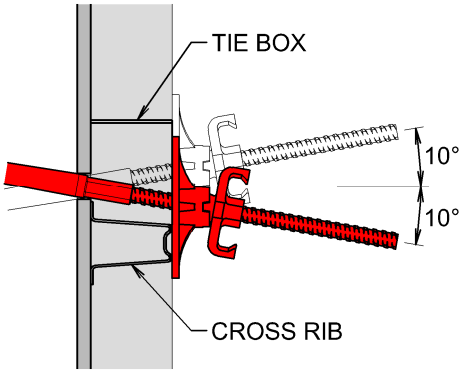
See Battered Wall Forming later in this guide for more information.

Allowable Tie Angle



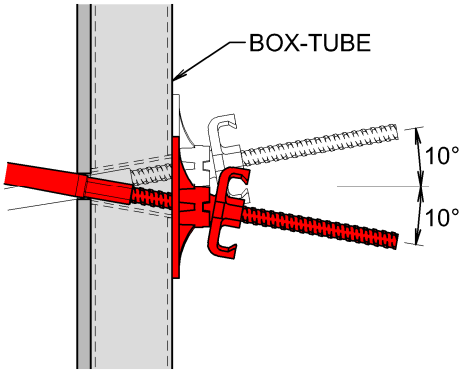
Standard Panels – Horizontal

6° ≈ 1:10



Standard Panels – Vertical

10° ≈ 2:12



Giant Panels – Vertical or Horizontal

10° ≈ 2:12

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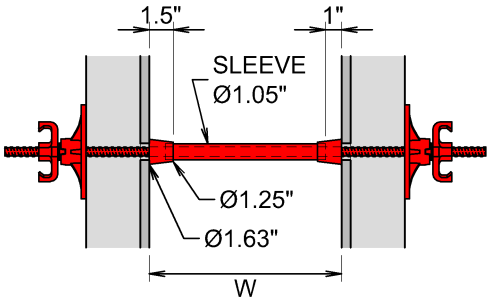
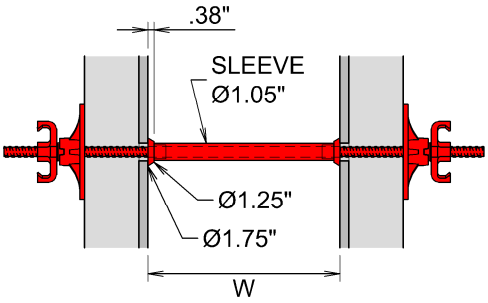
Thru-Tie – External Spacer Cone



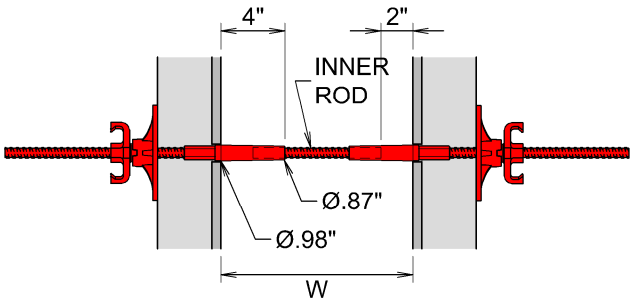
Sleeve Length = W–2”
Minimum Rod Length = W+16”

Thru-Tie – Internal Spacer Cone



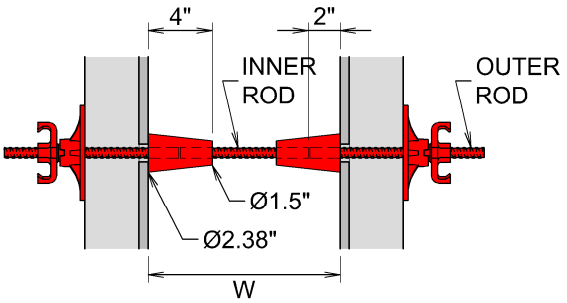
Sleeve Length = W–3/4”
Minimum Rod Length = W+16”

Pass-Through She-Bolt



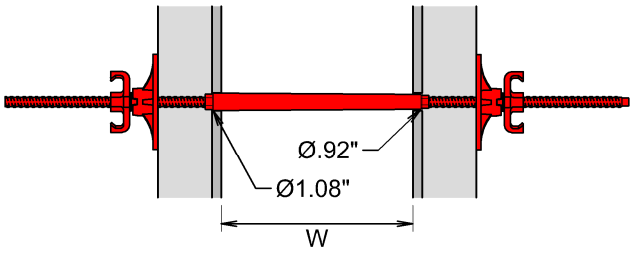
Inner Rod Length = W–4”

She-Bolt Cone



Inner Rod Length = W–4”

Taper Tie



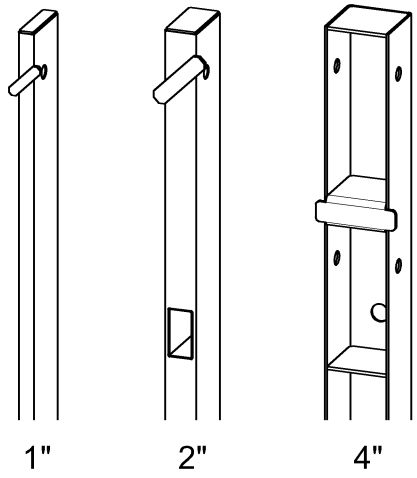
Safe Working Load – 21,900 lbs – For all tie systems

Consumable Tie Materials	
Description	**Part Number**
Plastic Plug for Unused Tie Holes	1500700
Tie Rod Ø5/8" (15 mm) L=19'	189.006.5800
Plastic Spacer Cone -- External	4910-00
Plastic Spacer Cone -- Internal	4009-01
PVC Sleeve Ø3/4" L=20'	PVC PIPE 3/4-20

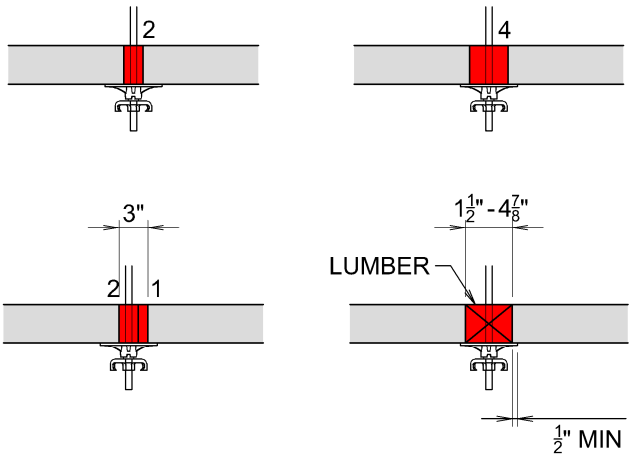
Tie Hardware	
Description	**Part Number**
Swivel Tie Nut Ø6" (150 mm)	1500105
Pass-Through She-Bolt L=19"	103.015.0000
She-Bolt Cone	102.015.0030
Outer Rod for SB Cone L=10"-14"	722012

Thru-Tie Rods		
Length	**Wall Thickness**	**Part Number**
33" (85 cm)	17" Max	722085
39" (100 cm)	23" Max	722100
53" (135 cm)	37" Max	722135
71" (180 cm)	55" Max	722180
83" 210 cm)	67" Max	722210

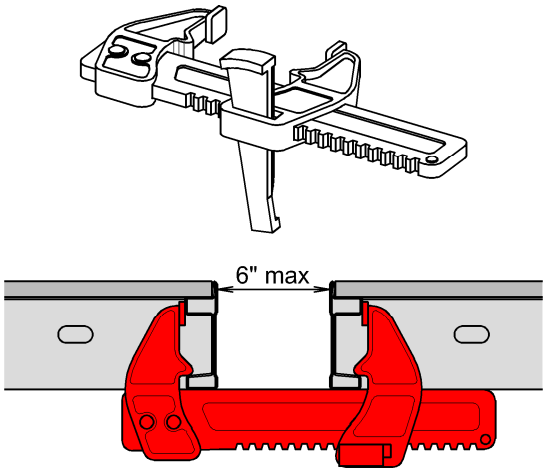
Taper Ties			
Length	**Taper**	**Wall Thickness**	**Part Number**
39"	13"	6" to 12"	103.015.0005
45"	19"	12" to 18"	103.015.0004
51"	25"	18" to 24"	103.015.0002
57"	31"	24" to 30"	103.015.0003



Steel Fillers		
Size	Part No.	Weight
1" x 8'	1500801	20.4 lb
1" x 6'	1500601	15.3 lb
1" x 4'	1500401	10.3 lb
2" x 8'	1500802	27.0 lb
2" x 6'	1500602	20.0 lb
2" x 4'	1500402	14.0 lb
4" x 8'	1500804	49.0 lb
4" x 6'	1500604	37.0 lb
4" x 4'	1500404	25.0 lb

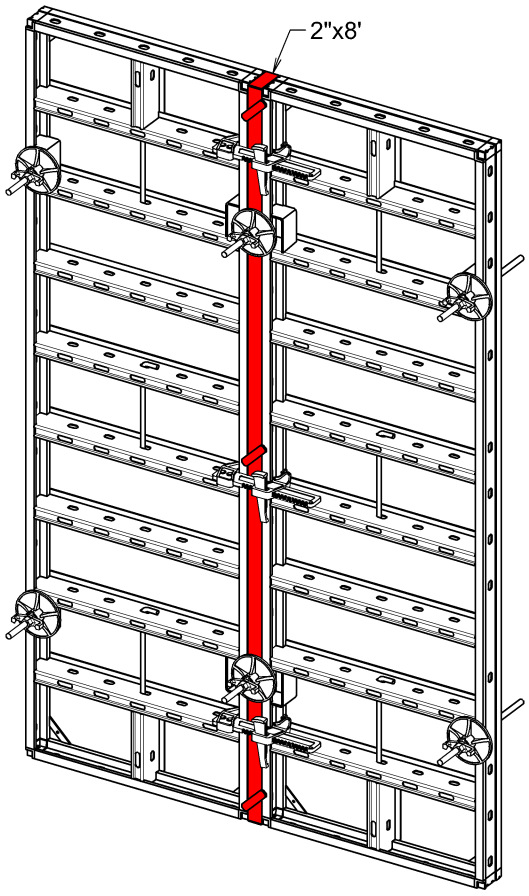


Note: For fillers up to 2” wide located between two 8’-wide giant panels, ties are not required.



Adjustable Wedge Clamp	
Part Number	Weight
1500071	9.2 lb

Adjustable clamp requirements are the same as for standard clamps including extra clamps at locations with increased tension.



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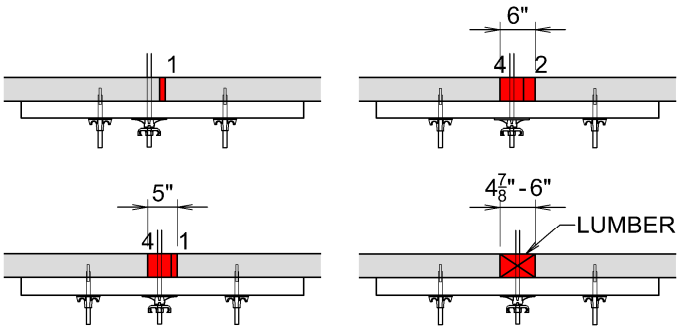
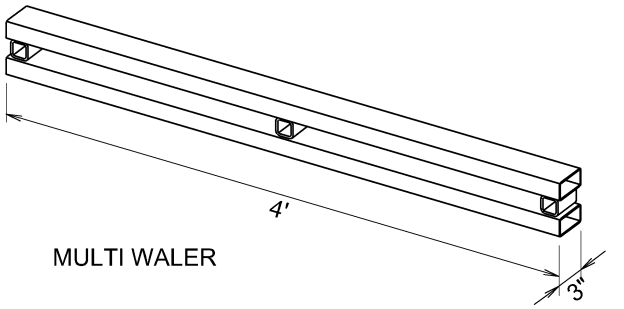
In order to provide proper tie support, the Swivel Tie Plate must overlap the adjacent panel by 1/2" minimum unless the adjacent panel is an 8’ wide giant panel with the cross ribs horizontal.

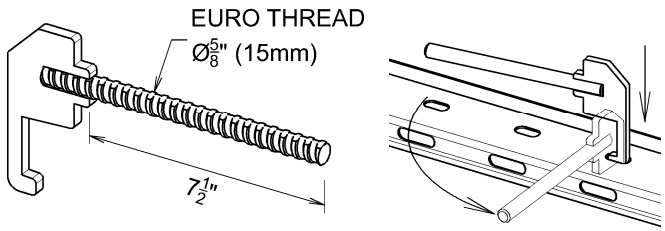
The Multi Waler is used to provide additional support when the overlap is less than 1/2" and for wider fillers. Waler Attachment Hooks are used when ties must pass through the Multi Waler. Otherwise, Multi Walers are secured with Hammerhead Bolts. Fixed Tie Nuts Ø4” are used with all waler attachment hardware.

Maximum allowable bending moment on the Multi Waler is 4.11 ft-k.

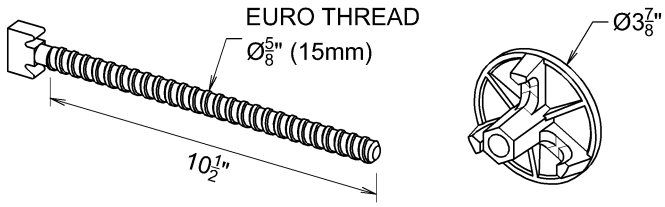




MULTI WALER

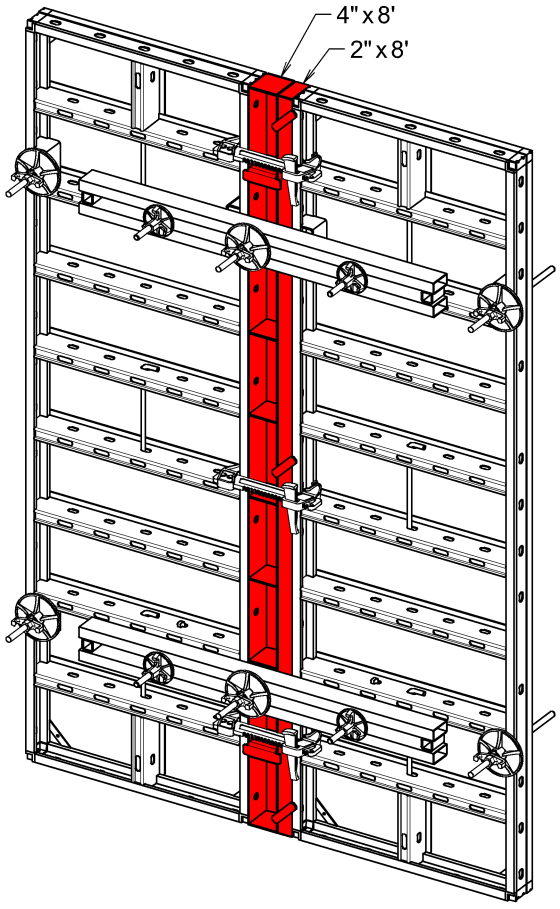


WALER ATTACHMENT HOOK



HAMMERHEAD BOLT

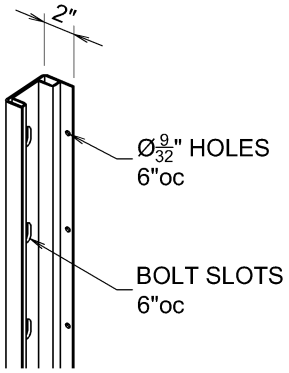
FIXED TIE NUT Ø4"



Description	Part No.	Weight
Multi Waler	1500039	32 lb
Waler Attachment Hook	1500260	1.1 lb
Hammerhead Bolt	1500251	1.0 lb
Fixed Tie Nut Ø4"	1500106	1.9 lb

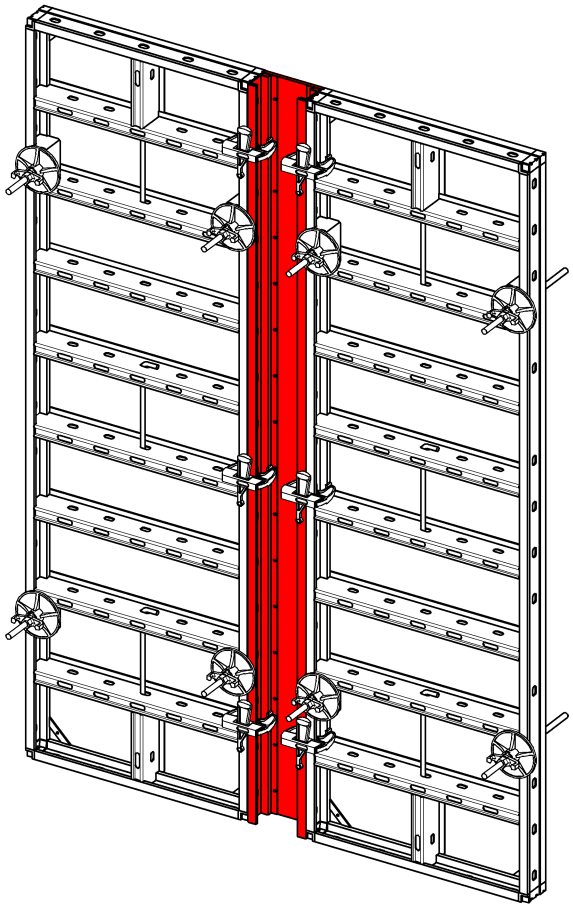
Note: A plate washer may be used in place of the Multi Waler to provide the required overlap with adjacent panels.

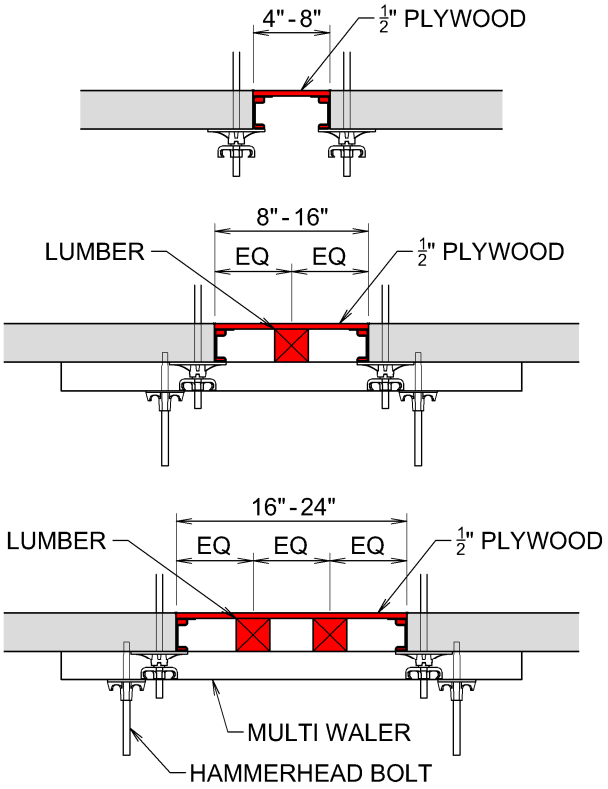
Minimum plate thickness: 3/8”
Minimum hole diameter: 3/4"
Minimum overlap: 1/2"

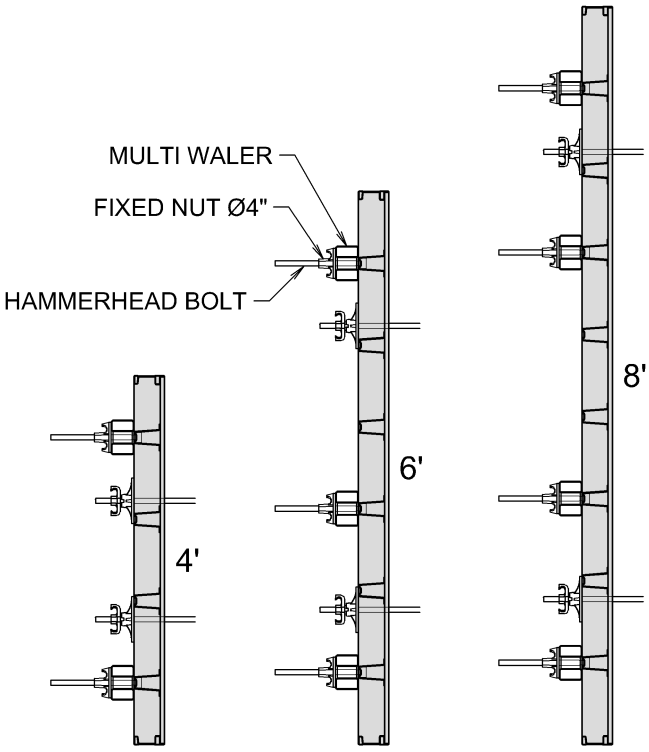


Galvanized for long service life

Filler Rail		
Size	**Part No.**	**Weight**
8'	1500856	32 lb
6'	1500656	25 lb
4'	1500456	18 lb







Note: In some cases, one or both ties may be omitted for 4' forms. See Typical Elevations and Sections for more info.

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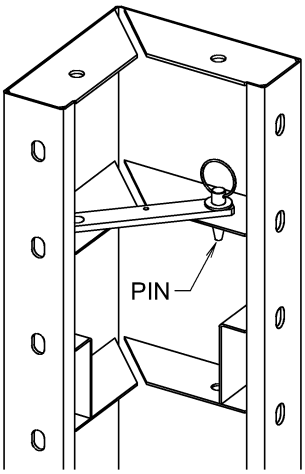
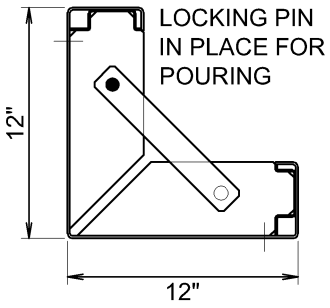
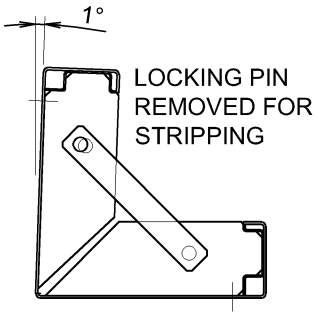
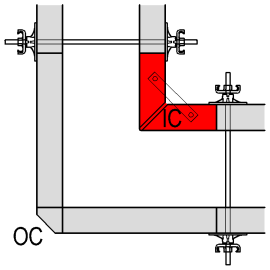
Inside Corner

- All-steel construction
- Powder-coated Harris orange
- Tie holes at same locations as panels
- Removable locking pin keeps the corner square while placing concrete
- Removing the pin allows the corner to flex approximately 1°, providing relief for easier stripping
- Locking pin MUST be in place while placing concrete





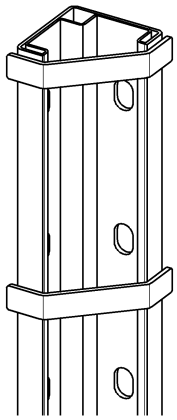


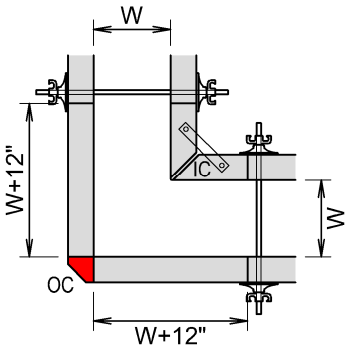


Inside Corners		
Size	Part No.	Weight
8'	1500850	189.6 lb
6'	1500650	140.6 lb
4'	1500450	92.7 lb

Outside Corner

- All-steel construction
- Galvanized for long service life



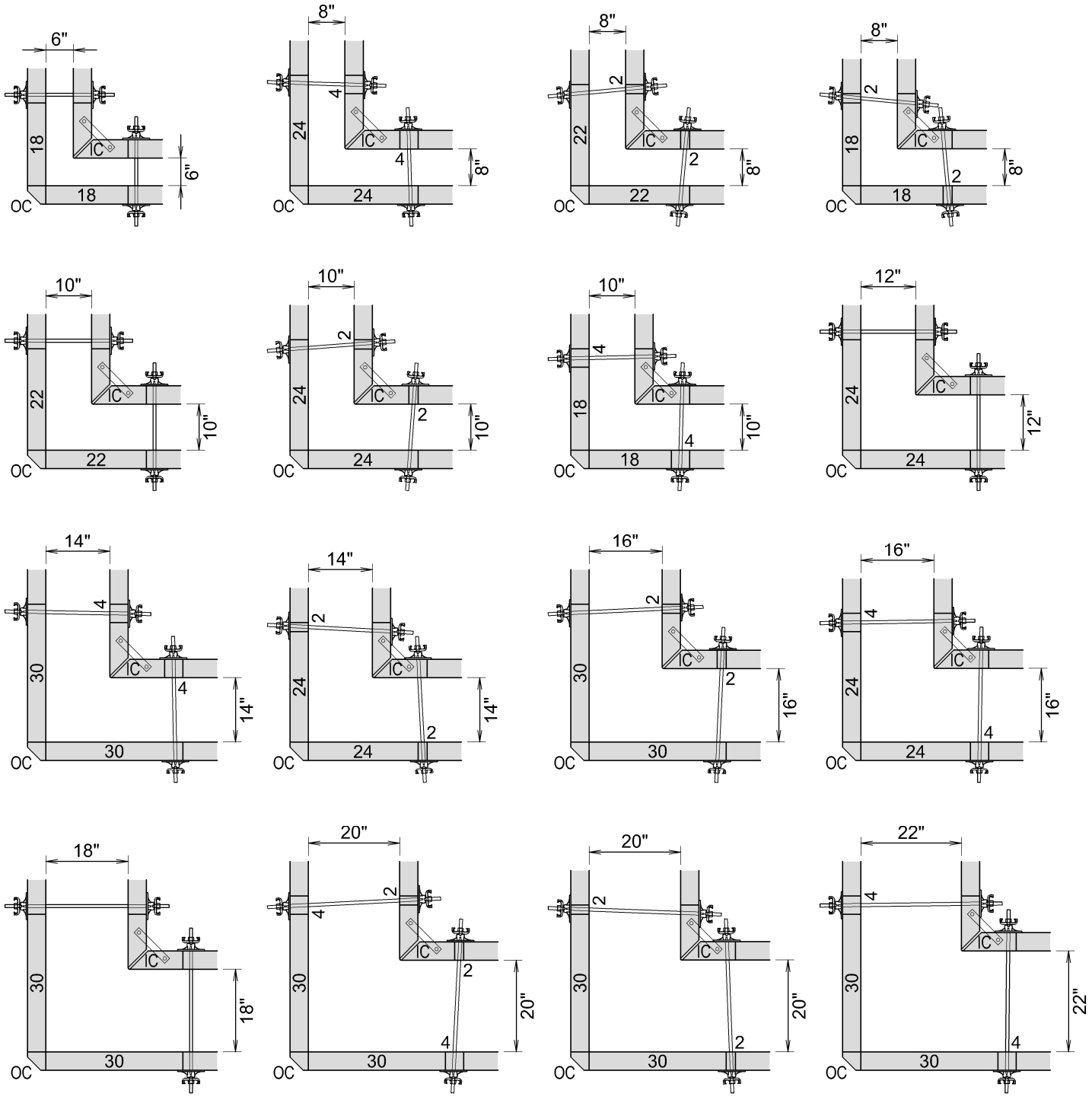


Outside Corners		
Size	Part No.	Weight
8'	1520852	54.0 lb
6'	1520652	51.0 lb
4'	1520452	34.0 lb

Safety Note

Extra clamps are required at outside corners and panel joints near outside corners due to increased tension. Refer to the details at the end of this section for additional clamp requirements.

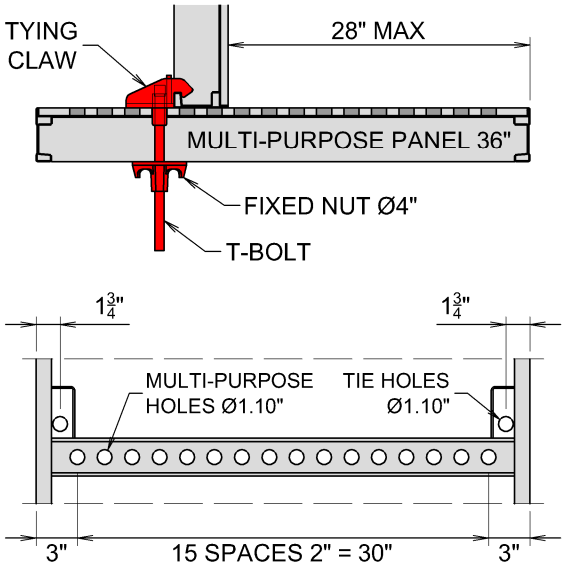
Examples

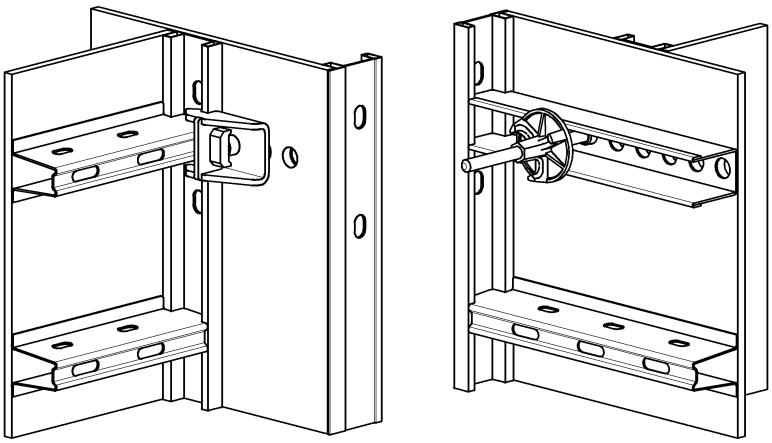


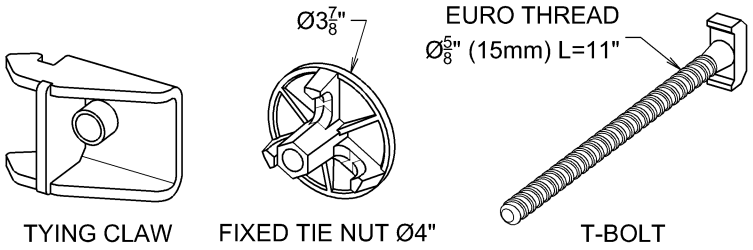
Safety Note

Extra clamps are required at outside corners and panel joints near outside corners due to increased tension. Refer to the details at the end of this section for additional clamp requirements.

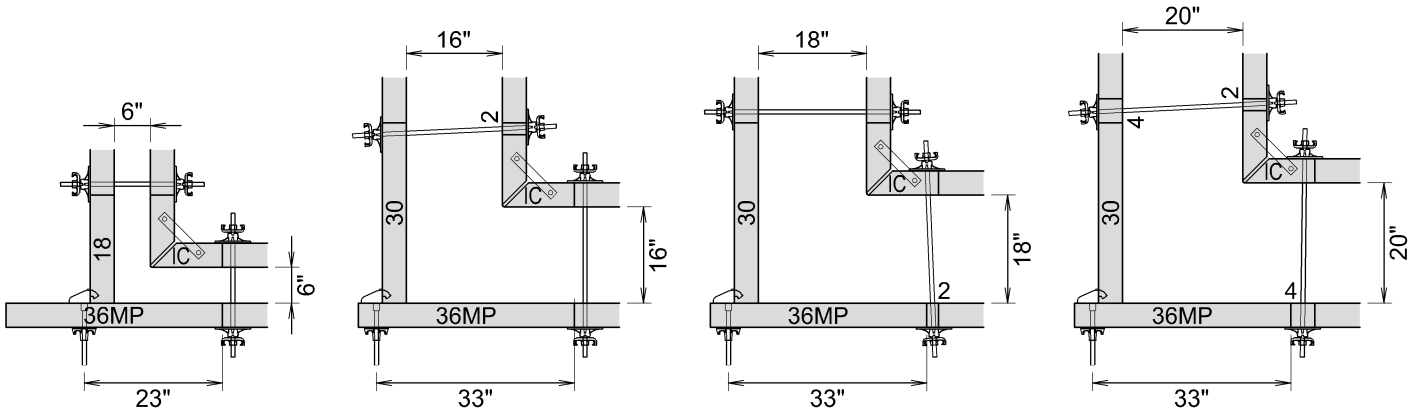
With Multi-Purpose Panel 36”







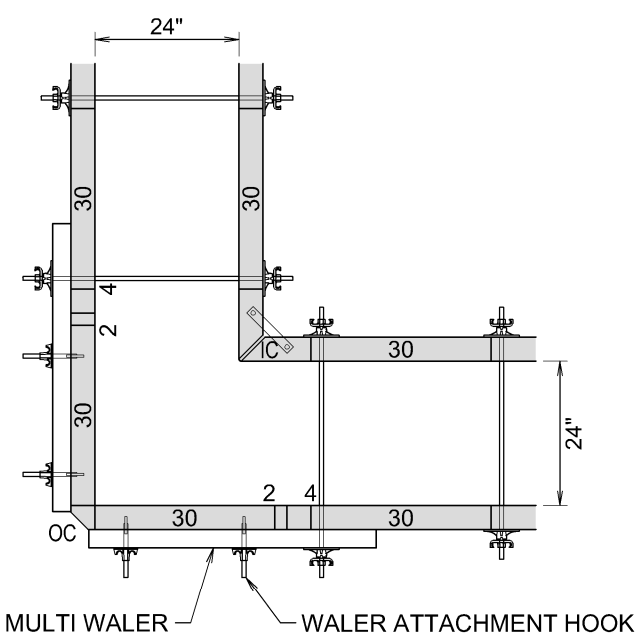
Description	Part No.	Weight
Tying Claw	1500010	2.7 lb
Fixed Tie Nut Ø4"	1500106	1.9 lb
T-Bolt	1500081	1.1 lb

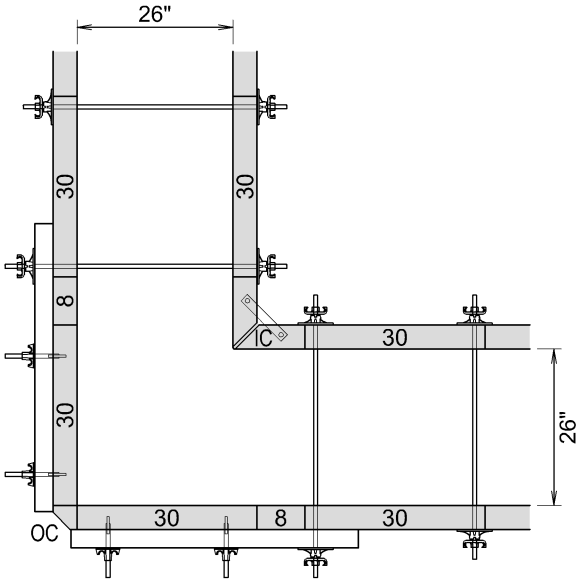


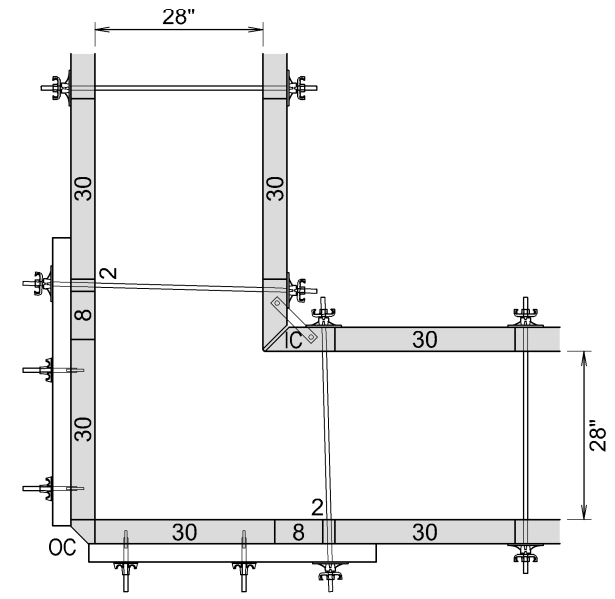
Safety Note

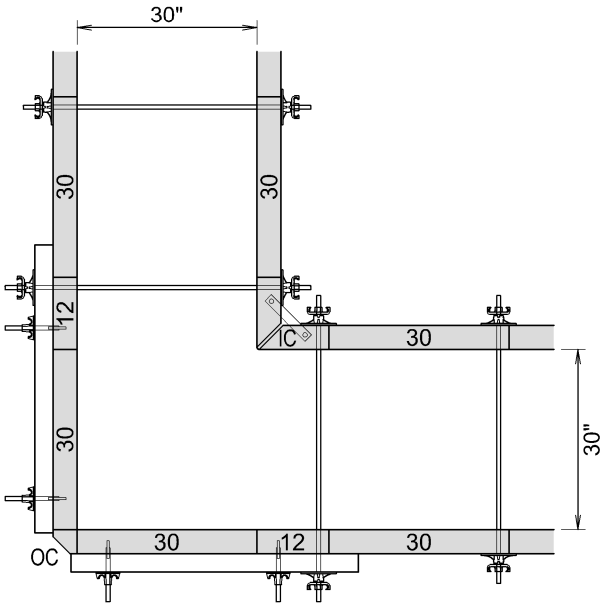
Extra clamps are required at panel joints near outside corners due to increased tension.
Refer to the details at the end of this section for additional clamp requirements.

Examples – Thick Walls with Walers









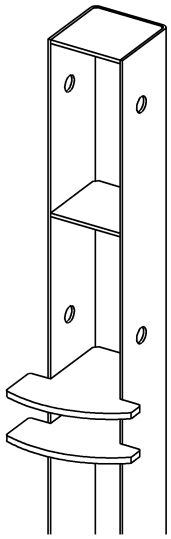
Safety Note

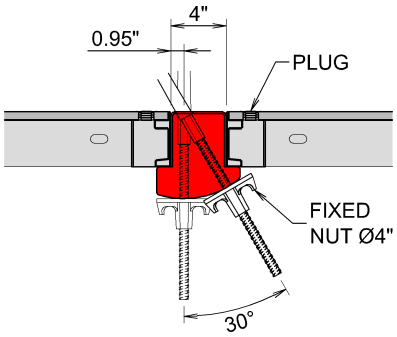
Extra clamps are required at outside corners and panel joints near outside corners due to increased tension. Refer to the details at the end of this section for additional clamp requirements.

With Angle Tie Filler

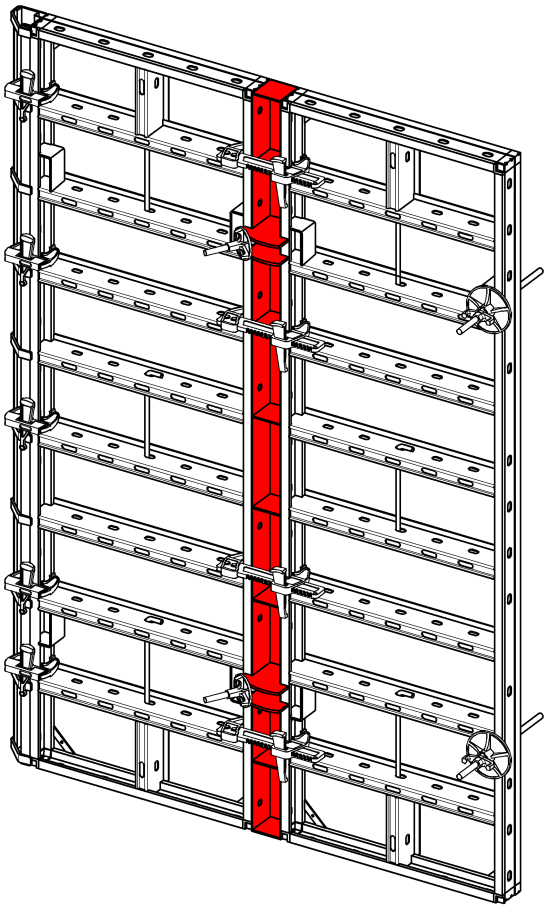
The Harris 1500™ Angle Tie Filler allows ties to be angled horizontally up to 30° from square eliminating the need for walers to support untied form joints at thick wall corners.

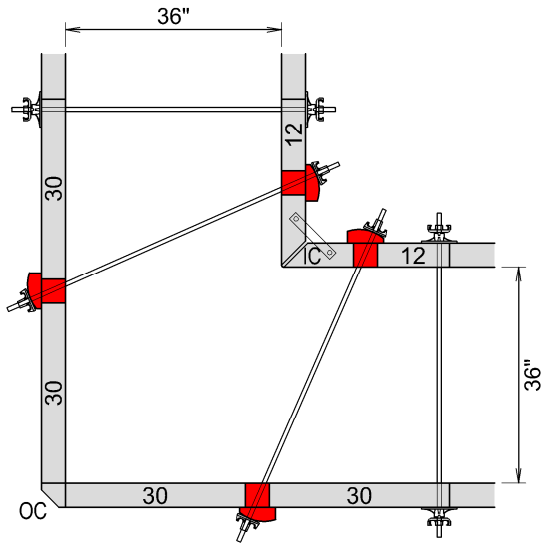
- All-steel construction
- Powder-coated Harris orange
- 4” Wide
- Secured between two standard panels or corners using the Adjustable Wedge Clamp
- Integral radius bearing plates eliminate the need for separate batter washers
- Use with Fixed Tie Nut Ø4”





Angle Tie Filler		
Size	**Part No.**	**Weight**
8'	1500850	48 lb
6'	1500650	37 lb
4'	1500450	27 lb

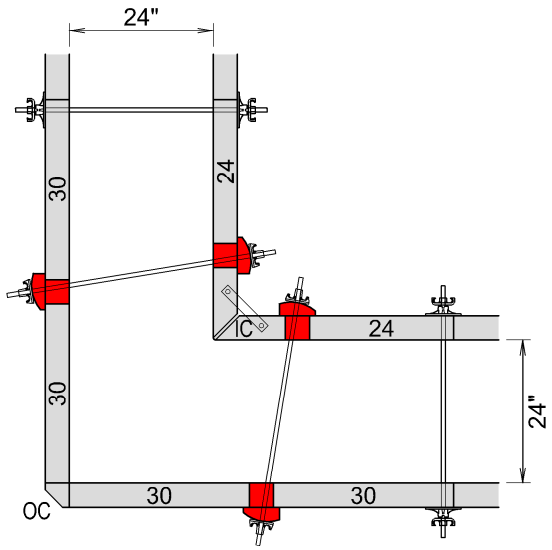


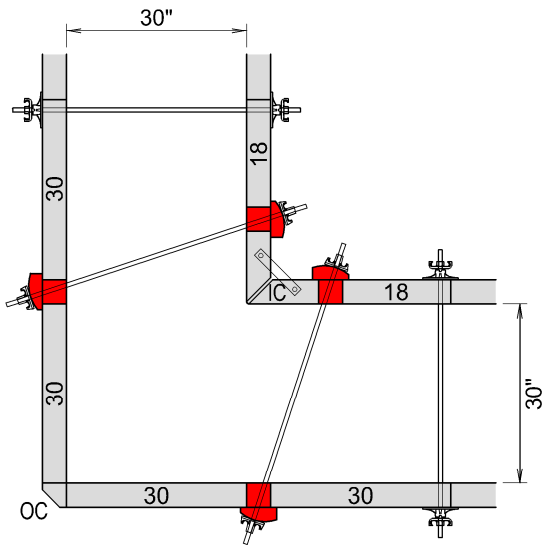


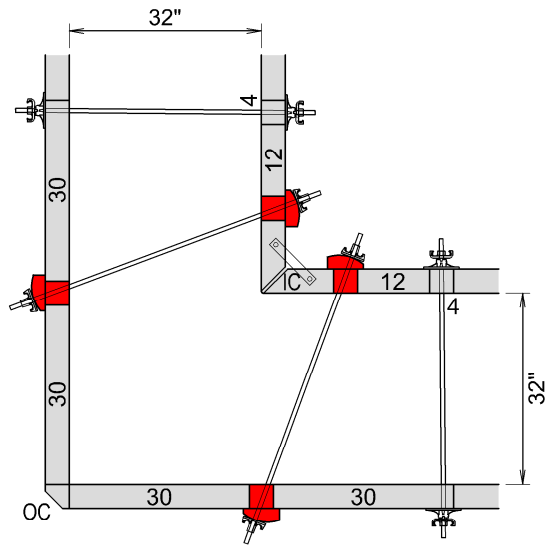
Safety Note

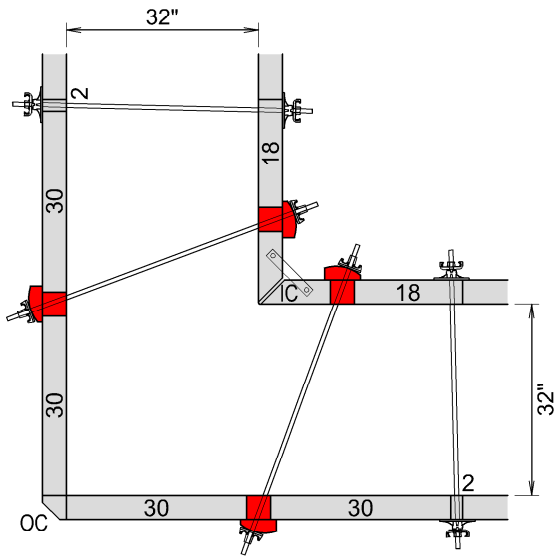
Extra clamps are required at outside corners and panel joints near outside corners due to increased tension. Refer to the details at the end of this section for additional clamp requirements.

Examples With Angle Tie Filler









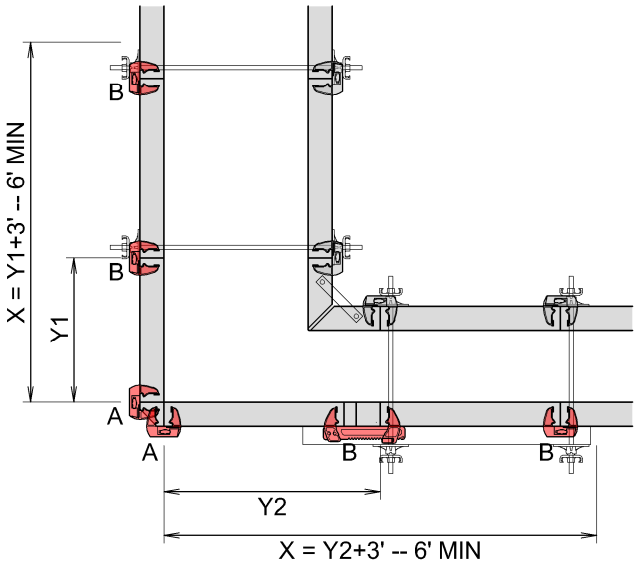
Safety Note

Extra clamps are required at outside corners and panel joints near outside corners due to increased tension. Refer to the details at the end of this section for additional clamp requirements.

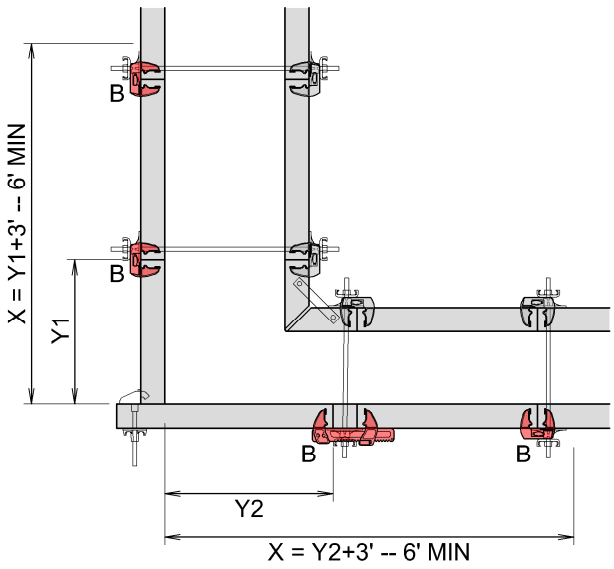
Additional Clamp Requirements

Clamp Requirements At Outside Corners					
	Distance to First Tied Joint	Y	30"	36"	42"
8'	Number of Clamps at Outside Corner Joint	A	5	6	8
	Number of Clamps at Joints In Zone X	B	4	5	6
6'	Number of Clamps at Outside Corner Joint	A	4	5	6
	Number of Clamps at Joints In Zone X	B	3	4	5
4'	Number of Clamps at Outside Corner Joint	A	3	4	4
	Number of Clamps at Joints In Zone X	B	2	3	3

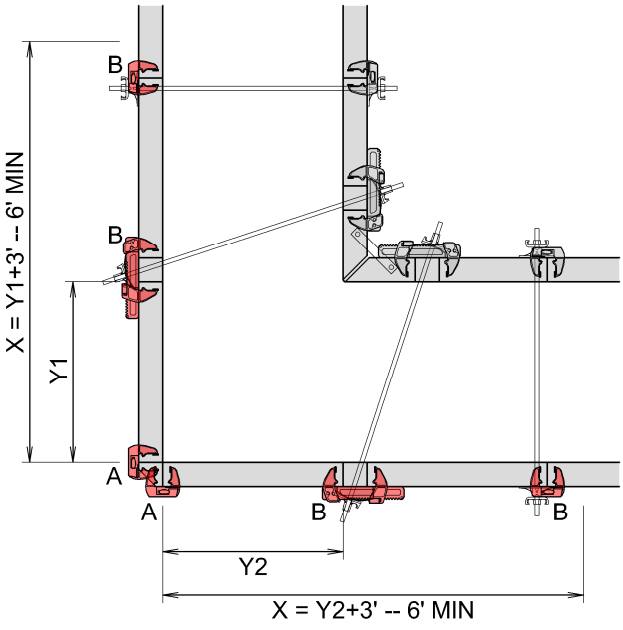
NOTE: Clamp requirements are determined by the larger of Y1 and Y2.



OUTSIDE CORNER



MULTI-PURPOSE PANEL

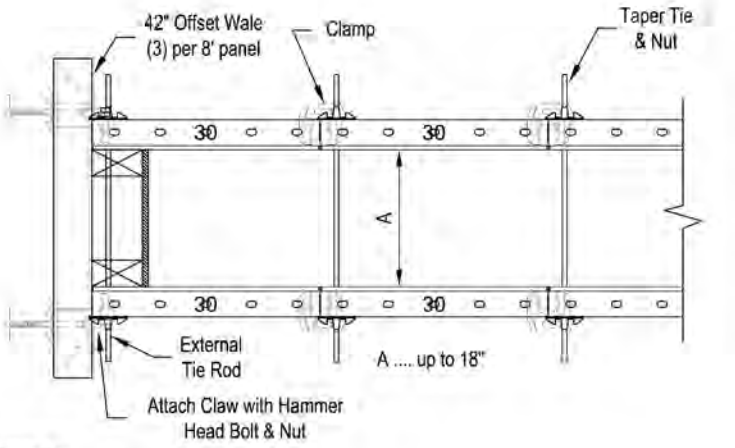


ANGLE TIE FILLER

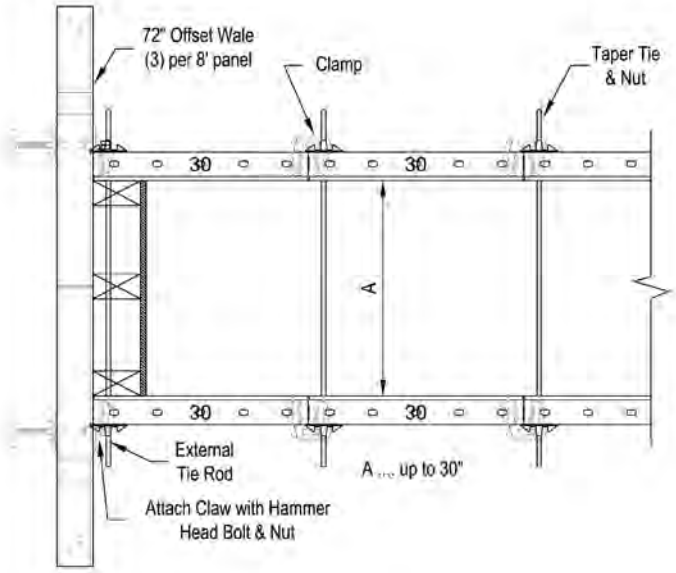
Harris 1500™ Areas of Increased Formwork Pressure

Careful consideration should be given to areas that have increased tension on panel joints, such as outside corners, panel joints immediately adjacent to outside corners & panel joints immediately adjacent to formwork bulkheads.

Vertical	
Form Height	Number of Clamps
9’ - 0”	5
8’ - 0”	4
6’ - 0”	3
5’ - 0”	2
4’ - 0”	2
3’ - 0”	2



Bulk Head



Careful consideration should be given to areas that have increased tension on panel joints, such as outside corners, panel joints immediately adjacent to outside corners & panel joints immediately adjacent to formwork bulkheads.

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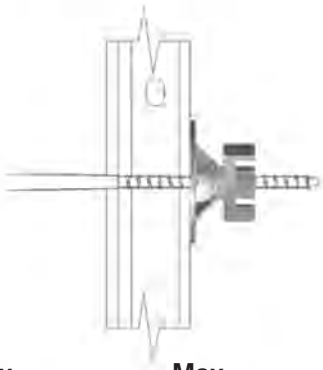
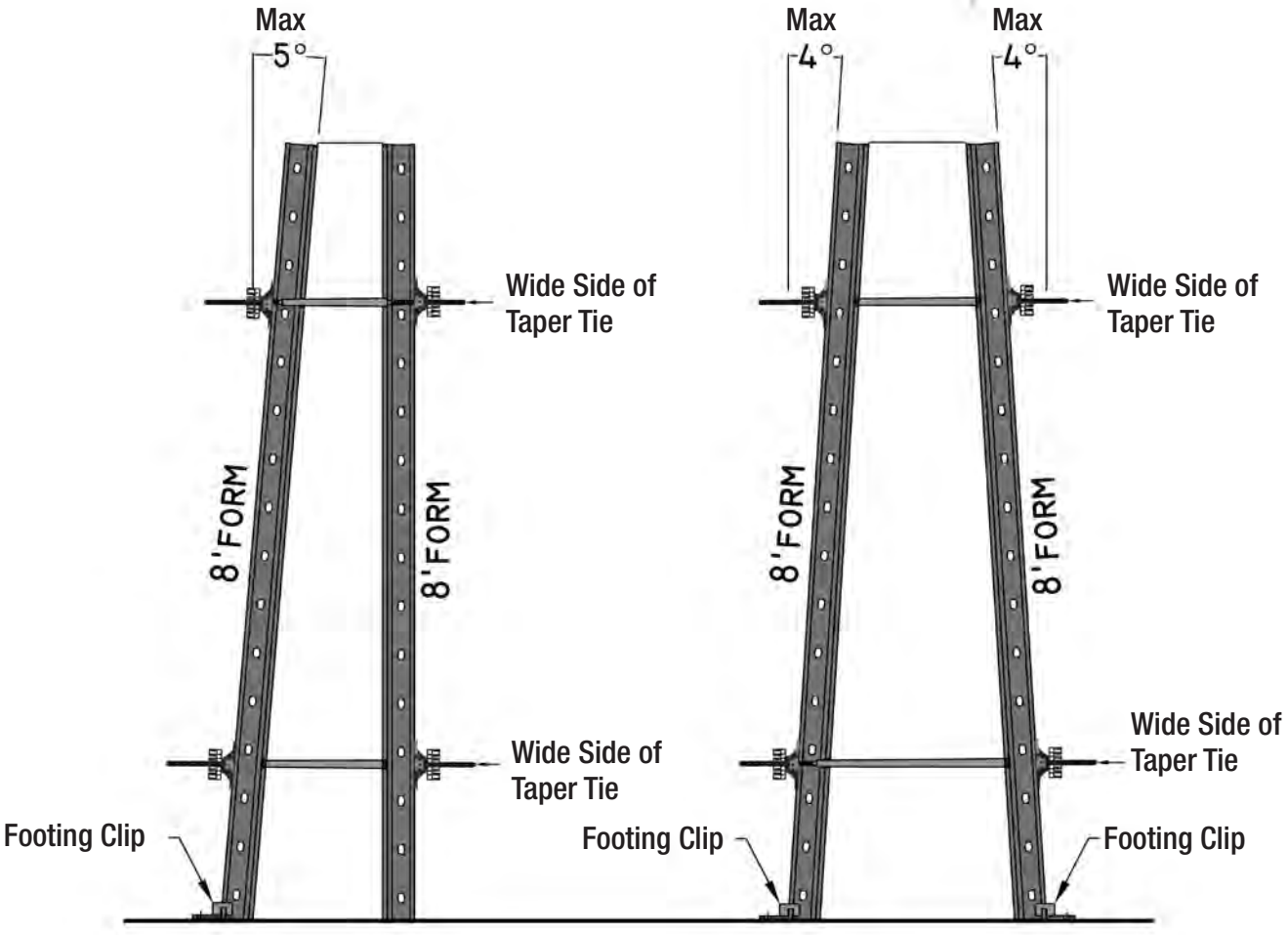
Harris 1500™ Battered Wall Forming

By utilizing the swivel tie plate, batter wall applications can be accomplished. Walls that batter up to 5 degrees on one side can be achieved with standard she bolts and swivel tie nuts. Walls that batter up to 4 degrees on each side can be achieved with standard she bolts and swivel tie nuts.

Offset Formwork Elevations

Often the concrete footer or slab is slightly offset in elevation from one side of a wall to another. Applications of this nature are easily accomplished using the swivel tie plate assembly. Please consult your White Cap representative regarding your specific application.



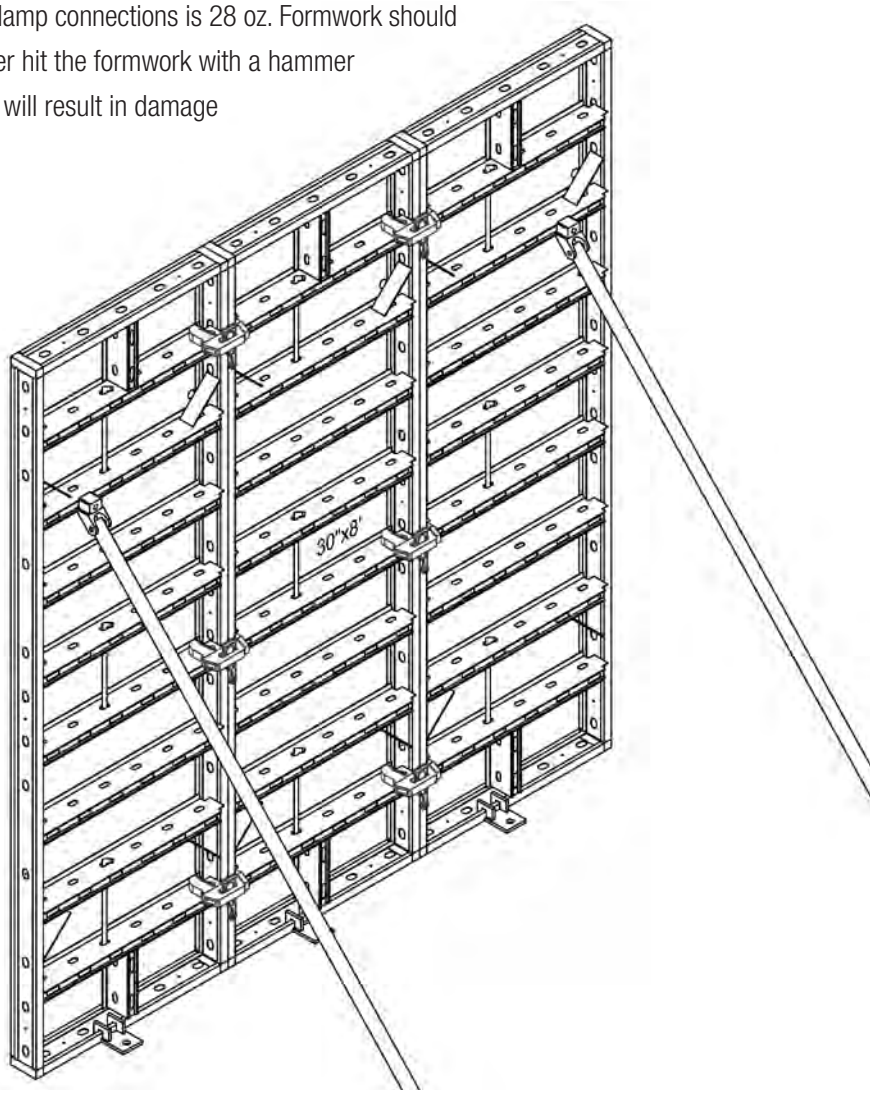


Harris 1500™ Formwork Erection

Prior to formwork erection, the job site personnel should treat the formwork with release agent. Failure to use form release will result in excessive concrete build up and subsequent cleaning costs.

1. Plan and locate a logical starting point for your formwork erection. Typically the best place to begin is in a corner. Fix the first panel to the footer by using the footing clip or by nailing the formwork to a sill plate thru the manufactured nail holes. Immediately brace the first panel back to the footer or contractor supplied concrete blocks. Bracing the formwork is an absolute requirement, failure to adequately brace formwork will result in injury.

2. Continue erecting formwork as depicted in the erection drawings and outlined in detail on pages 35 - 60 of the Application Guide. Pay careful attention to use appropriate tools when engaging clamps and aligning formwork. Damage will result if the frame profile is struck with a hammer or if a clamp is repeatedly struck with a hammer. The maximum size hammer allowed for clamp connections is 28 oz. Formwork should be moved in final position by use of a pry bar. Never hit the formwork with a hammer in order to position the form, misuse of this nature will result in damage to the formwork.



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Harris 1500™ Formwork Erection - Closing the Wall

Now that you have set the first face of your wall, it is time to tie your rebar and set any required imbeds, sleeves and/or box outs.

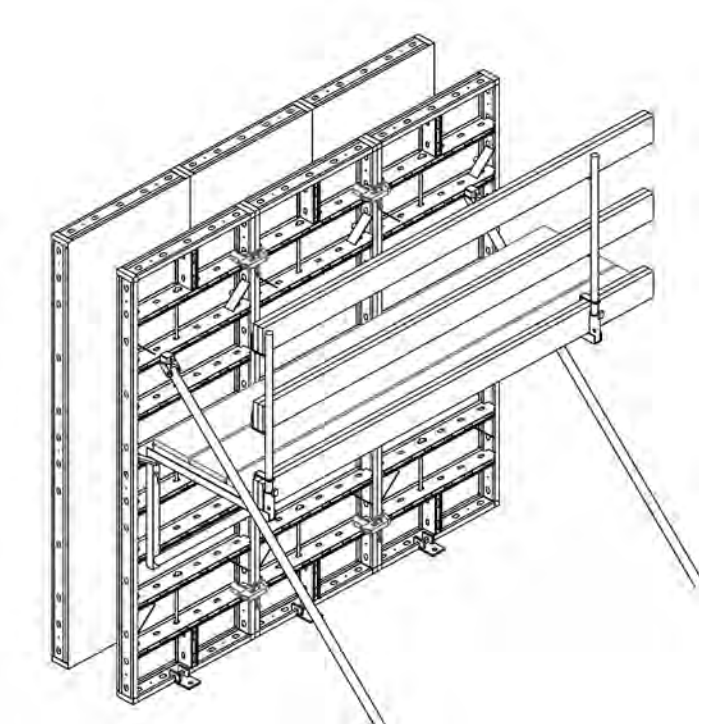
1. Plan and locate a logical starting point for continuing your formwork erection. Typically the best place to start the formwork operation is in a corner. Place the first panel in the proper location and secure the panel by placing ties thru the tie holes, be sure to affix tie nuts to the ties on both sides of the wall. Next, secure the base of the panel to the footer.

2. Take the time to plumb the first panel. Locate the second panel and secure the panel joints with the proper amount of wedge clamps. The wedge clamp should first be 'seated' on the panel joint and then driven tight with a hammer. The maximum size hammer allowed for clamp connections is 28 oz.

3. Continue erecting the formwork in this manner until your form work operation is complete. Careful attention should be given to installing the proper amount of formwork ties. Failure to install the proper number of ties will result in formwork failure.

4. Careful consideration should be given to areas that have increased pressures on panel joints, such as outside corners, panel joints immediately adjacent to outside corners and panel joints immediately adjacent to formwork bulkheads. Follow the instructions on pages 14 to 16 for safely addressing these areas of concern.

5. Once the formwork is erected and properly secured you may install your walkway brackets, scaffold planks and guard rail posts. The walkway brackets have a safe working load of 500 lbs each.



Concrete Placement

The Harris 1500 Clamp System is design to withstand 1500 pounds per square foot of concrete pressure as defined by ACI-347. Exceeding 1500 pounds per square foot of concrete pressure will result in damage and potential form failure. Form failure can result in injury and costly repair.

Careful attention should be paid to mix design, weather conditions and vibration.

Controlling concrete pressure is the responsibility of the contractor.

Immediately following concrete placement, every effort to remove concrete spillage from the formwork is required. Failure to properly clean excess concrete from the formwork will result in increased cleaning costs.

Harris 1500™ Stripping and Dismantling Formwork

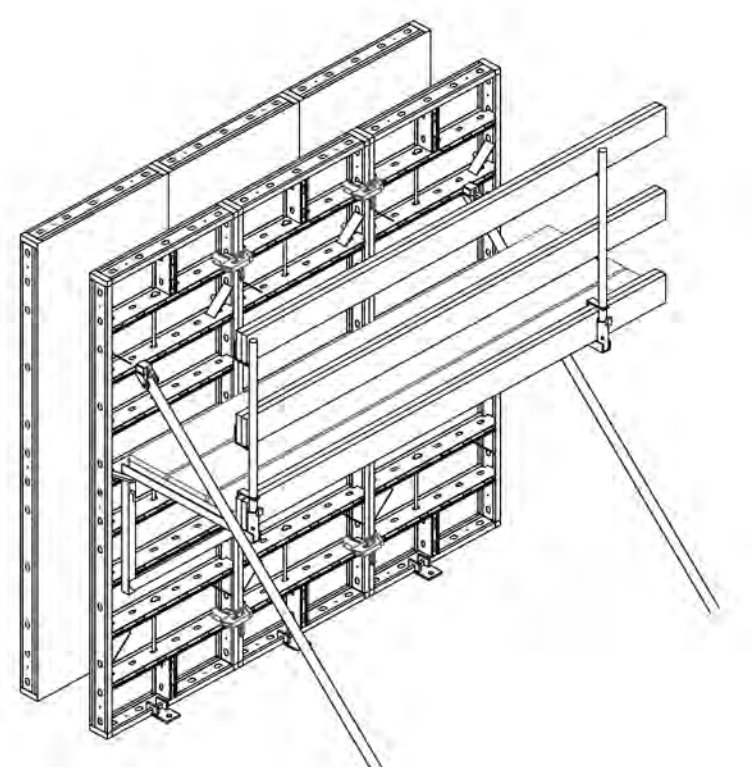
Concrete formwork and/or shoring should not be stripped until the concrete has reached the proper design strength as specified by the contract documents or until the fresh concrete can support itself.

1. Plan and locate a logical starting point for your formwork stripping operation. Careful consideration should be given to the impact of formwork removal on adjacent formwork and adjacent job site operations.

2. Begin stripping the formwork by dismantling the walkway bracket system.

3. Continue the operation by working on the unbraced side of the wall. Remove all formwork ties. Careful consideration should be given to removing formwork ties and the impact it may have on unbraced sections of wall. Refrain from hammering formwork ties from the concrete. Hammering the ends of formwork ties will cause damage and reduce productivity.

4. Begin removing clamps from panels in a repetitious manner. Remove clamps from the panel joint, while maintaining support of the unbraced / unclamped panel. Place loose hardware in logical transportation bins and stack formwork panels and fillers in like groups of ten.



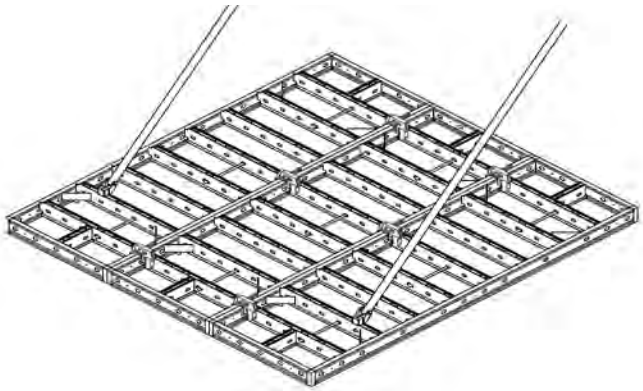
Harris 1500™ Crane Handling Formwork Gang Assemblies

Productivity can greatly be increase by assembling the formwork on the ground and crane shifting the equipment into final position. Careful consideration must be given to this practice, as crane time is typically at a premium rate on the job site.

1. Plan and locate a stable and level area for your assembly operation. This area should be within reach of the crane. It is recommended that assembly take place on a flat area such as a concrete slab or an area fitted with 2" x 6" lumber sleepers. Level sleepers should be located at all horizontal panel joints to provide a level surface to clamp adjacent panels together.

2. Place panels face down closely aligning panel joints. Connect panels together with the proper number of clamps at each panel joint. Information on clamp requirements can be found on pages 14 to 16.

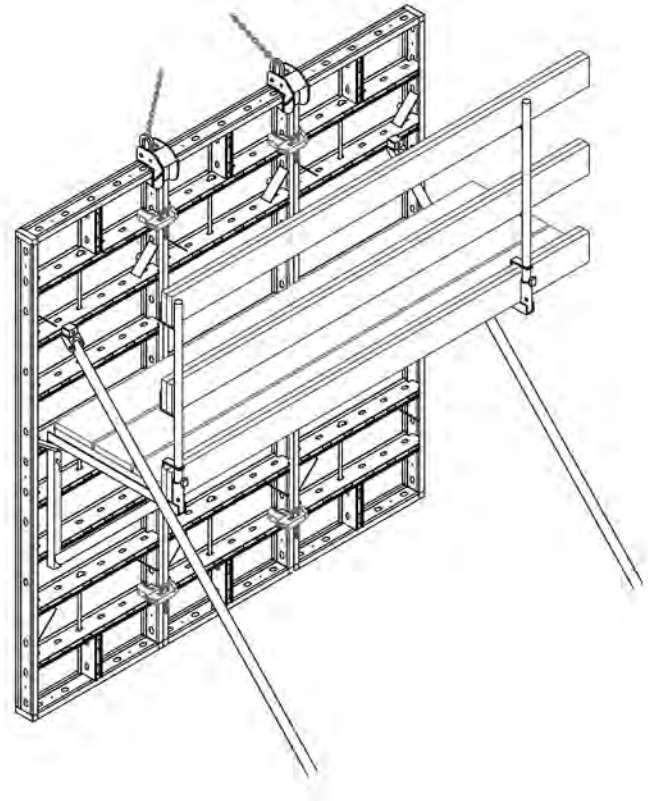
3. Once your panels are clamped together, continue the operation by installing your walkway brackets, guardrail posts, lumber planks and lumber rails.



4. Continue the operation by attaching your bracing components. The Harris brace is telescopic and therefore can easily be moved as part of the formwork assembly.
   Pipe Brace I (7'-6" to 14'-0")
   Pipe Brace II (14'-0" to 21'-0")
   Pipe Brace III (22'-0" to 39'-0")

5. Prior to moving the formwork, tag lines should be installed on the formwork assembly. Tag lines are required to keep the job site personnel safe and productive.

6. In order to lift the formwork assembly, crane hooks must be used. The Harris 1500 Crane Hook has a safe working load of 1600 lb. Crane Lifting devices should only be installed at a common panel joints, picking off of the frame profile alone will result in damage and potential injury.



7. Formwork assemblies should be shifted into position and secured to the footer by affixing the formwork brace and formwork panel to the footer. The formwork assembly should be plumbed prior to setting the next section of formwork.

Closing the Wall

Now that you have set the first face of your wall, it is time to tie your rebar and set any required imbeds, sleeves and/or box outs.

8. Plan and locate a logical starting point for continuing your formwork erection. Typically the best place to start the formwork operation is in a corner. Place the first formwork assembly in the proper location and secure the assembly by placing ties thru the tie holes, be sure to affix tie nuts to the ties on both sides of the wall. Next, secure the base of the formwork assembly to the footer.

9. Take the time to plumb the first gang. Locate the second gang and secure the panel joints with the proper amount of wedge clamps. The wedge clamp should first be 'seated' on the panel joint and then driven tight with a hammer. The maximum size hammer allowed for clamp connections is 28 oz.

10. Continue erecting the formwork in this manner until your formwork operation is complete. Careful attention should be given to installing the proper amount of formwork ties. Failure to install the proper number of ties will result in formwork failure.

11. Careful consideration should be given to areas that have increased pressures on panel joints, such as outside corners, panel joints immediately adjacent to outside corners and panel joints immediately adjacent to formwork bulkheads. Follow the instructions on pages 14 to 16 for safely addressing these areas of concern.

Concrete Placement

The Harris 1500 Clamp System is design to withstand 1500 pounds per square foot of concrete pressure as defined by ACI-347. Exceeding 1500 pounds per square foot of concrete pressure will result in damage and potential form failure. Form failure can result in injury and costly repair.

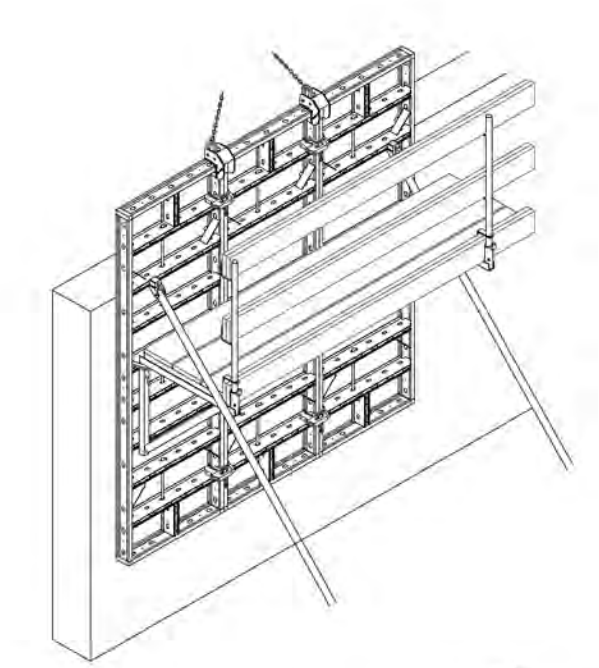
Careful attention should be paid to mix design, weather conditions and vibration.
Controlling concrete pressure is the responsibility of the contractor.

Immediately following concrete placement, every effort to remove concrete spillage from the formwork is required. Failure to properly clean excess concrete from the formwork will result in increased cleaning costs.

Stripping and Dismantling

Concrete formwork and/or shoring should not be stripped until the concrete has reached the proper design strength as specified by the contract documents or until the fresh concrete can support itself.

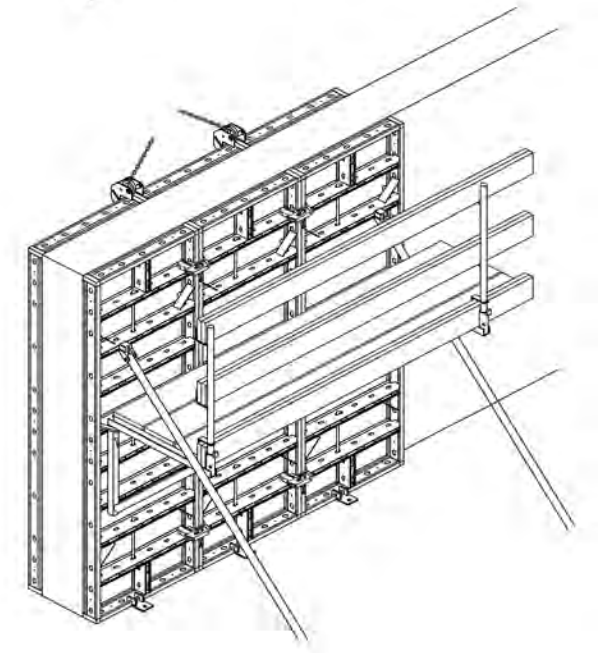
1. Plan and locate a logical starting point for your formwork stripping operation. Careful consideration should be given to the impact of formwork removal on adjacent formwork and adjacent jobsite operations. Secure the crane to the formwork assembly you will strip first. Be sure to use the proper crane lifting device. Specific instructions on the proper use of the crane handling device is outlined in the next section of this application guide.



2. Begin the stripping operation by working on the unbraced side of the wall. Remove all formwork ties. Careful consideration should be given to removing formwork ties and the impact it may have on unbraced sections of wall. Refrain from hammering formwork ties from the concrete. Hammering the ends of formwork ties will cause damage and reduce productivity.

3. Begin removing clamps at the formwork assembly joints. Remove clamps from the panel joint, while maintaining support of the unbraced / unclamped panel. Place loose hardware in logical transportation bins and stack formwork panels and fillers in like groups of ten.

4. Break the bond between the concrete and the formwork by use of wedges and pry bars. Never attempt to break the bond between the concrete and the formwork with a crane. Attempts to break the bond with a crane may result in serious injury.



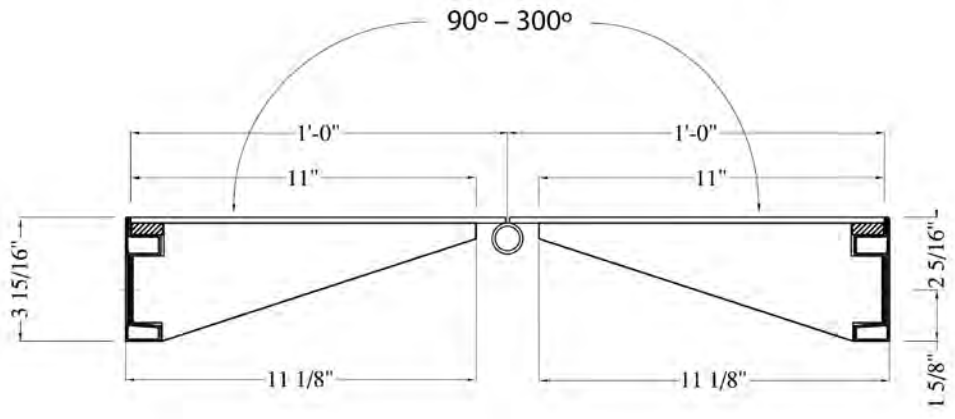
5. Continue to repeat this pattern until all of your formwork has been cycled to the next location.

Harris 1500™ Inside Hinge Corners

Harris 1500 12” x 12” Inside Hinge Corners have the ability to rotate from 90° to 300°. The inside hinge corners are both boltable and clampable.

Note: Clamps can be offset side to side to allow for tighter closure.

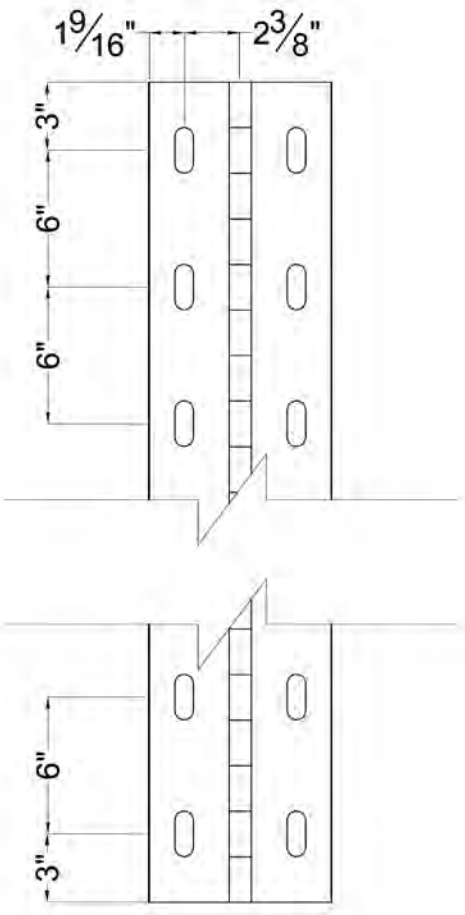
Inside Hinge Corners		
Part No.	Description	Weight Ea.
1500851	8’ Inside Hinge Corner	240.0 lb
1500651	6’ Inside Hinge Corner	180.0 lb
1500551	5’ Inside Hinge Corner	150.0 lb
1500451	4’ Inside Hinge Corner	120.0 lb
1500351	3’ Inside Hinge Corner	90.0 lb



Harris 1500™ Outside Hinge Corners

Harris 1500 Outside Hinge Corners have the ability to rotate from 90° to 300°.
The outside hinge corners are boltable.
Note: Bolt locations from side to side can be offset to allow for tighter closure.

Outside Hinge Corners		
Part No.	Description	Weight Ea.
1500853	8' Outside Hinge Corner	54.0 lb
1500653	6' Outside Hinge Corner	48.0 lb
1500553	5' Outside Hinge Corner	34.0 lb
1500453	4' Outside Hinge Corner	27.0 lb
1500353	3' Outside Hinge Corner	20.0 lb



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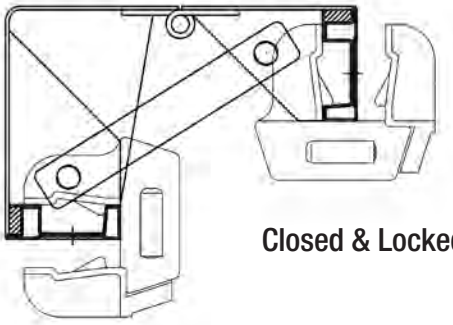
Harris 1500™ Pilaster Form Corner

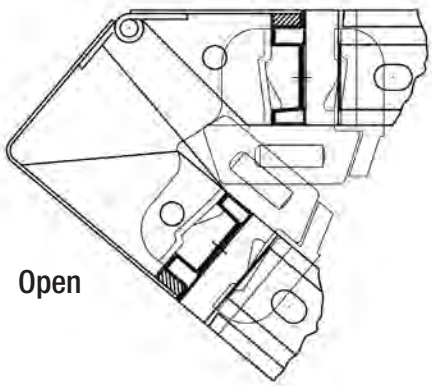
Harris 1500 Pilaster Forms are 8” x 12”. They are designed to pivot and retract approximately 3/4” allowing the form to be stripped after pouring. It comes with pilaster corner locking bars that lock the corner assembly into the 90° position. Removing the pilaster locking bar allows the corner to hinge.

Pilaster Form Corner		
Part No.	Description	Weight Ea.
1500855	8’ Pilaster Form Corner	196.0 lb
1500655	6’ Pilaster Form Corner	156.0 lb
1500455	4’ Pilaster Form Corner	100.0 lb

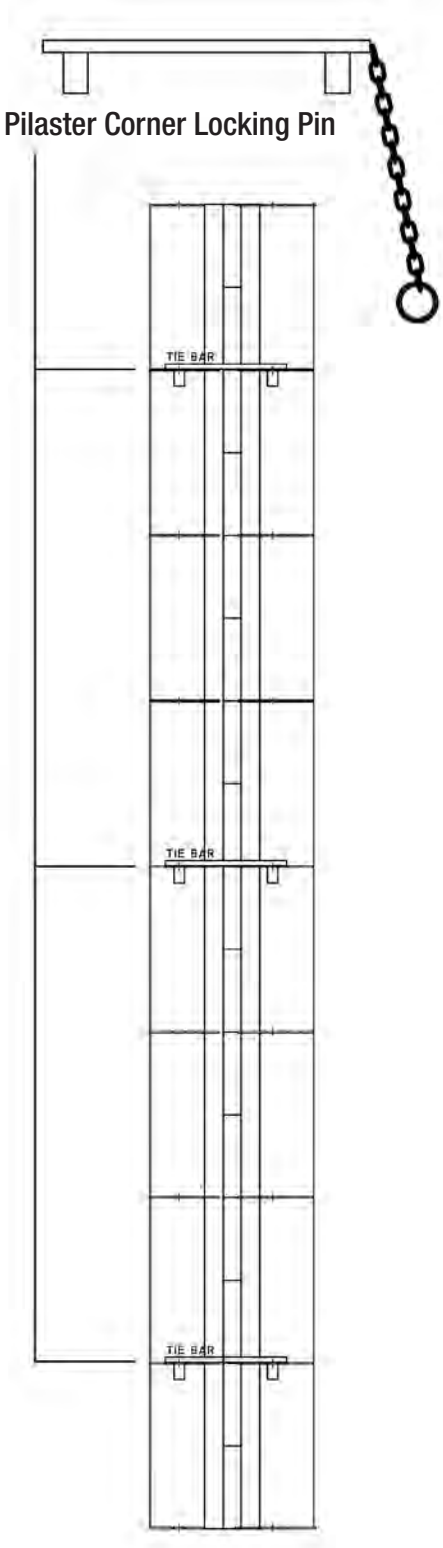
Note: Stagger horizontal clamp locations to allow more degree of pivot swing



Closed & Locked



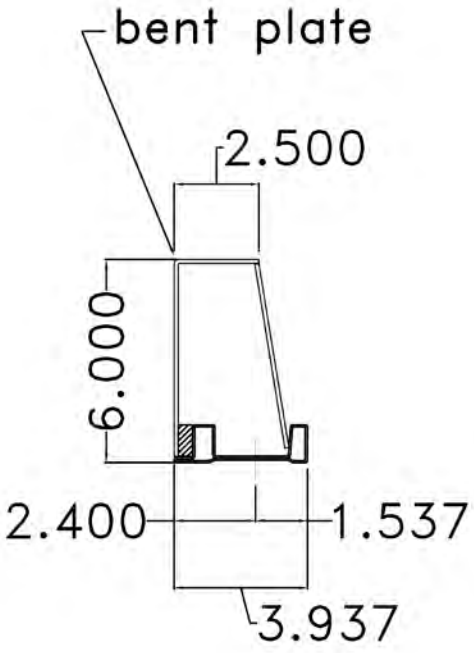
Open



Harris 1500™ Transition Adapter

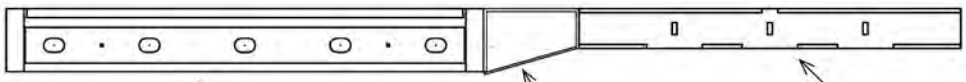
Easy transition from Harris 1500 to Harris-Ply system.

Transition Adapter		
Part No.	Description	Weight Ea.
1500854	8’ Transition Adapter	64.0 lb
1500654	6’ Transition Adapter	48.0 lb
1500554	5’ Transition Adapter	40.0 lb
1500454	4’ Transition Adapter	32.0 lb
1500354	3’ Transition Adapter	24.0 lb



Wedge Bolts to Harris-Ply

Clampable & Boltable to Harris 1500



Harris 1500 Panel

Adapter Panel

Harris-Ply Panel

Harris 1500™ System Components

Harris 1500 Hardware		
Part No.	Description	Weight Ea.
1500020	Walkway Bracket	26.0 lb
1500040	Guard Rail Post	8.0 lb
1500100	Top Guard Rail Bracket	16.0 lb
1500010	Tying Claw	5.0 lb
1500000	Top Tie Bracket	1.8 lb
1500050	Crane Hook	10.0 lb
1500080	Connecting Screw 15mm x 12”	2.0 lb
1500090	Footing Clip	1.8 lb
1500060	Wedge Clamp	5.0 lb
1500070	Adjustable Clamp	9.2 lb

Tying Claw

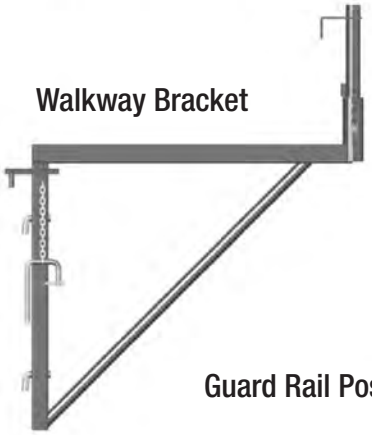
Wedge Clamp

Crane Hook

Top Guard Rail Bracket

Footing Clip

Walkway Bracket



Connecting Screw

Top Tie Bracket

Guard Rail Post

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Harris 1500™ System Components

Harris 1500 Hardware		
Part No.	Description	Weight Ea.
22000713	Pipe Brace 7'6" - 13'0"	64.0 lb
22001423	Pipe Brace 14'0" - 23'6"	130.0 lb
22002239	Pipe Brace 22'6" - 39'0"	200.0 lb
1500107	Pipe Brace Bracket	40.5 lb
1500030	Mini Waler 3' - 6"	40.5 lb
2200606	Mini Waler 6' - 6"	74.0 lb
1500700	Plastic Tie Hole Plug	-
15.0001	Taper Tie 15mm x 16" (3/4" - 1")	4.0 lb
15.0002	Taper Tie 15mm x 24" (3/4" - 1")	4.9 lb
15.0003	Taper Tie 15mm x 32" (3/4" - 1")	5.6 lb
1500099	She Bolt 15mm x 16" for 15mm Inner Rod	2.5 lb
1500105	15mm Swivel Tie Nut	2.1 lb
1500108	15mm 6" Fixed Tie Nut	2.1 lb
1500106	15mm 4" Fixed Tie Nut	1.7 lb
1500109	15mm Wing Nut	0.6 lb

Max. adjustment
4.75"

Adjustable Clamp

Wing Nut

Plastic Plug

Swivel Nut

Euro She Bolt

Euro Taper Tie

Fixed Nut

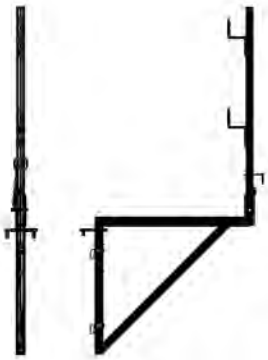
Harris 1500™ Typical Elevations & Sections - Legend

Clamp

Tie Assembly

Footing Clip

Walkway Bracket



Pipe Brace Adapter

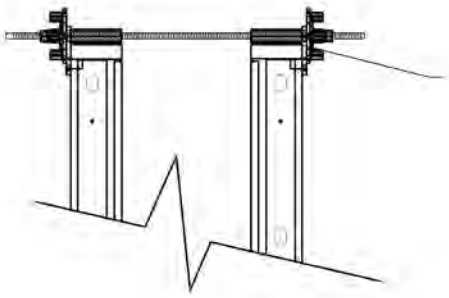
Pipe Brace

3' Waler Assembly

Top Tie Assembly

Optional Top Tie Detail

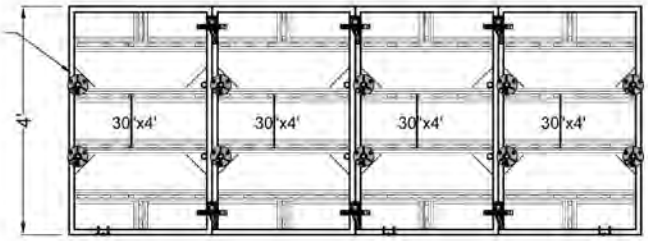
See Note on Following Drawings

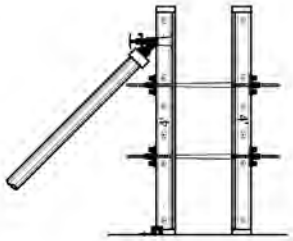


Remove Top Row of Ties & Use Top Tie Brackets

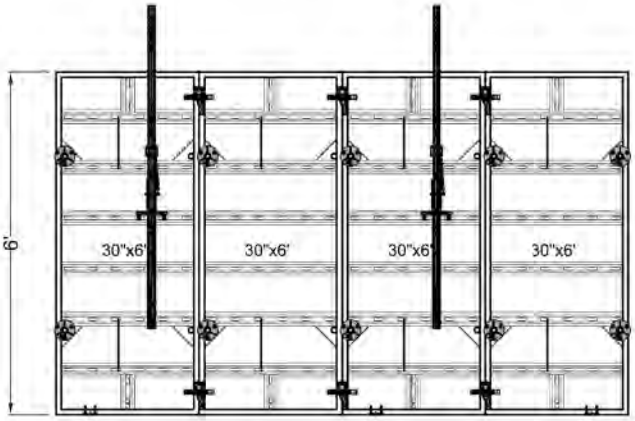
Harris 1500™ Typical Elevations & Sections - 4', 6', & 8'

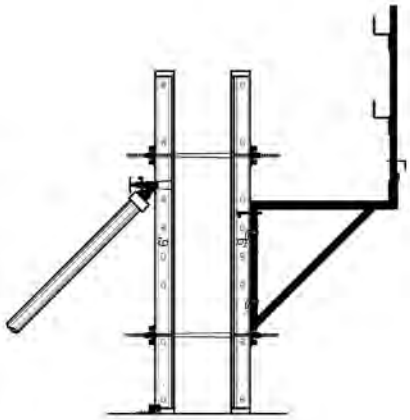
Note: See Top Tie Detail
Remove Top Row of
She Bolts & Use Top
Tie Assembly



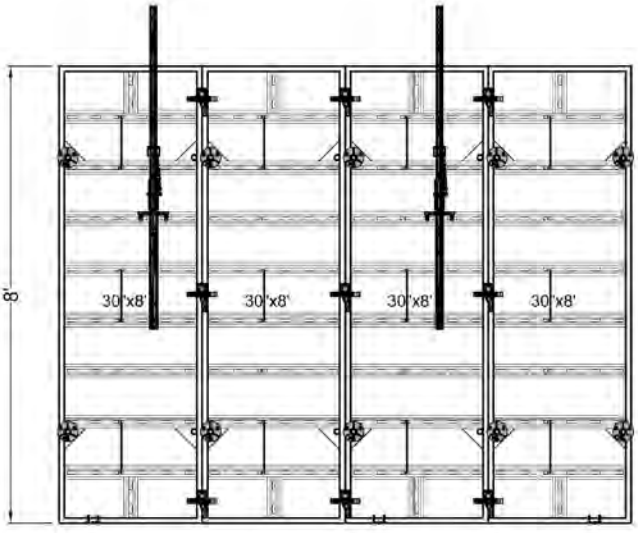


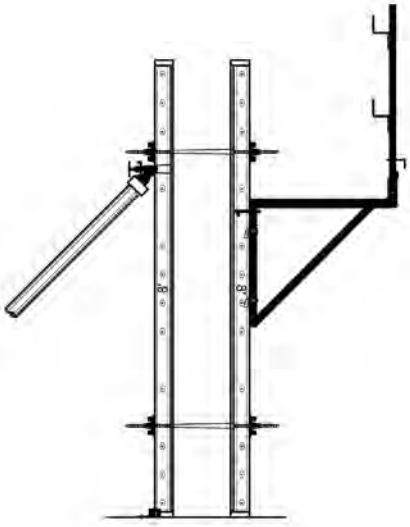
4' Gang





6' Gang





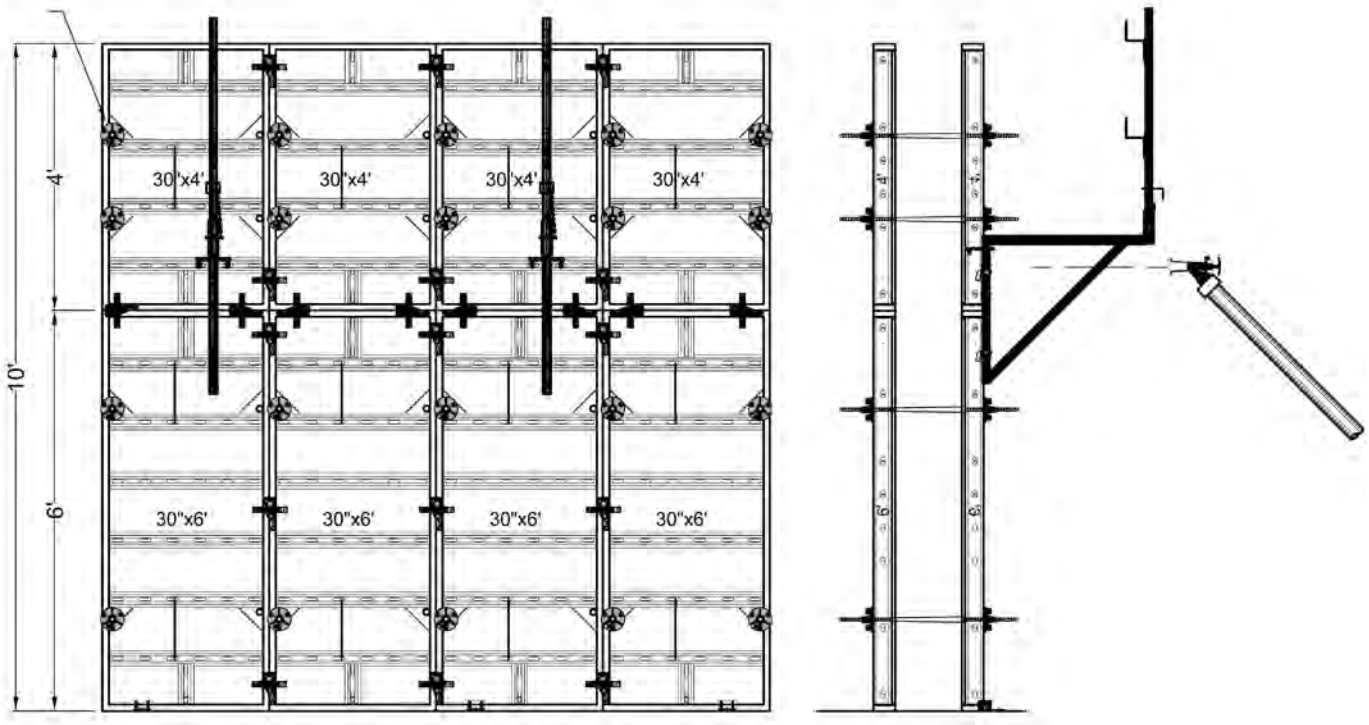
8' Gang

Harris 1500™ Typical Elevations & Sections - 10’

Note: See Top Tie Detail

Remove Top Row of She Bolts & Use Top Tie Assembly

10’ Gang



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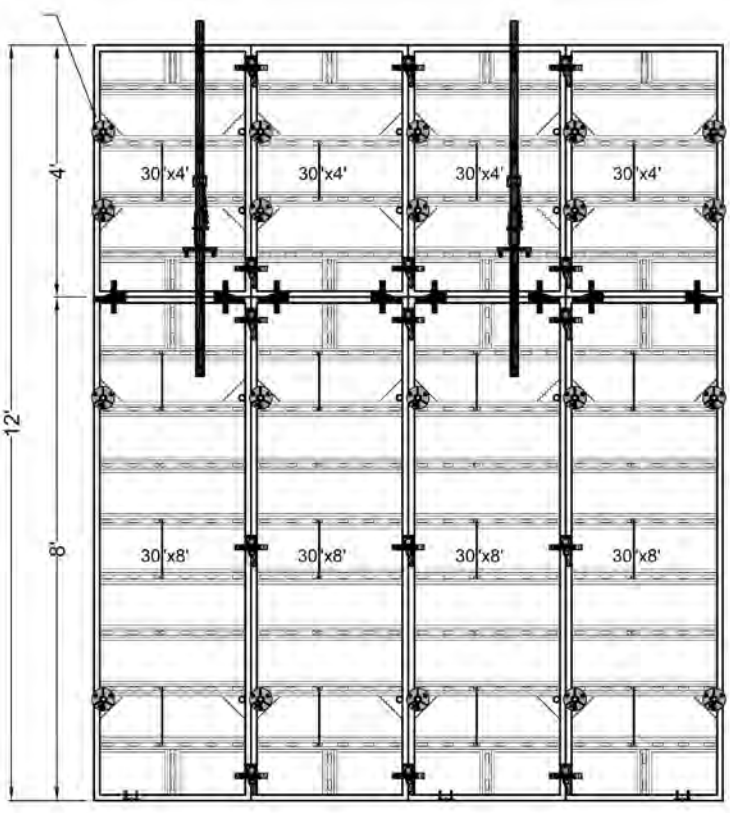
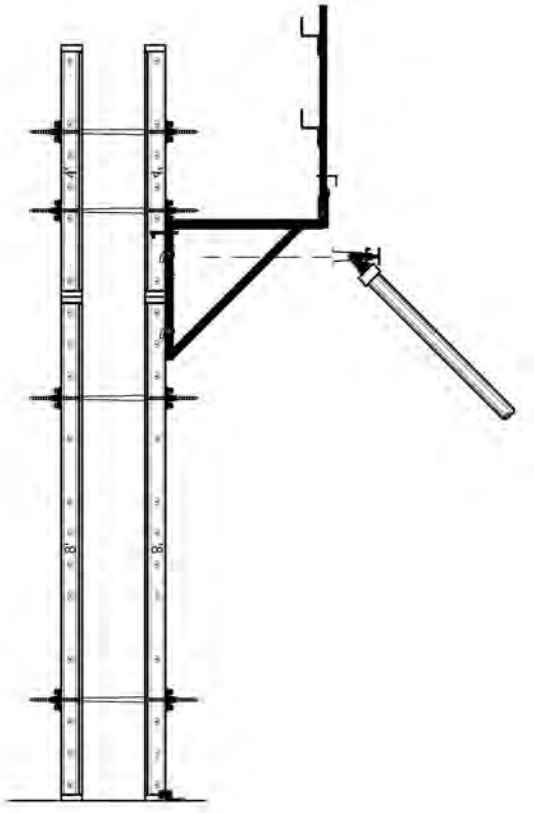
Harris 1500™ Typical Elevations & Sections - 12’

Note: See Top Tie Detail

Remove Top Row of She Bolts & Use Top Tie Assembly

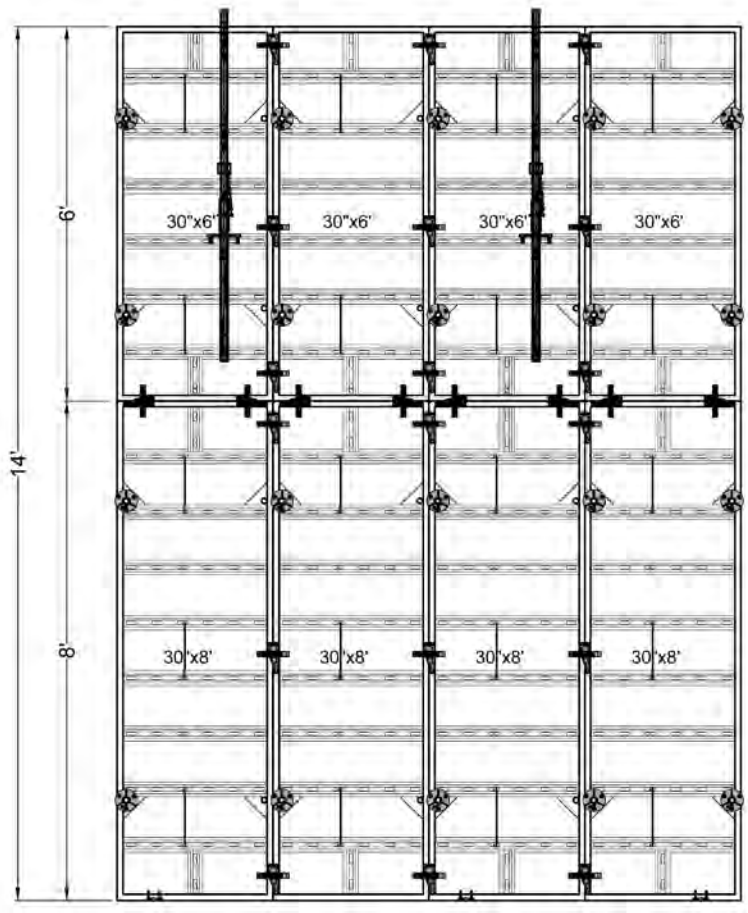
12’ Gang

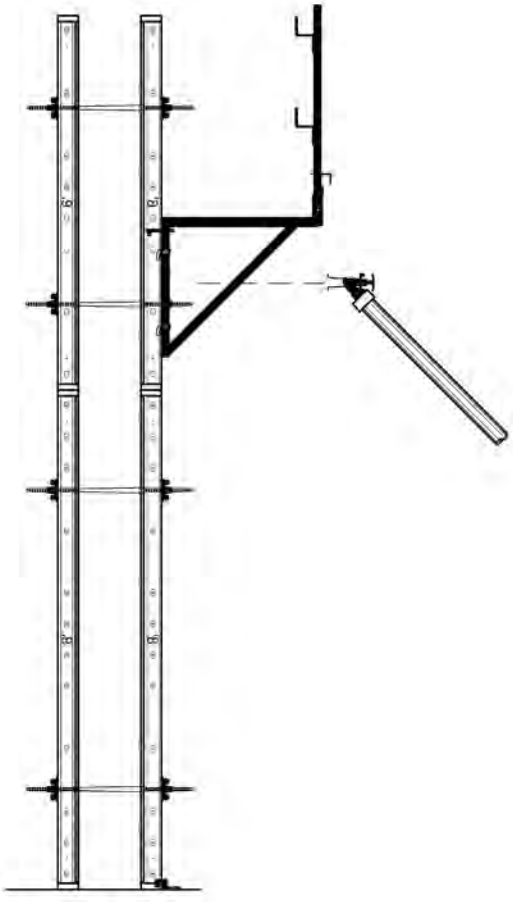




Harris 1500™ Typical Elevations & Sections - 14’

14’ Gang





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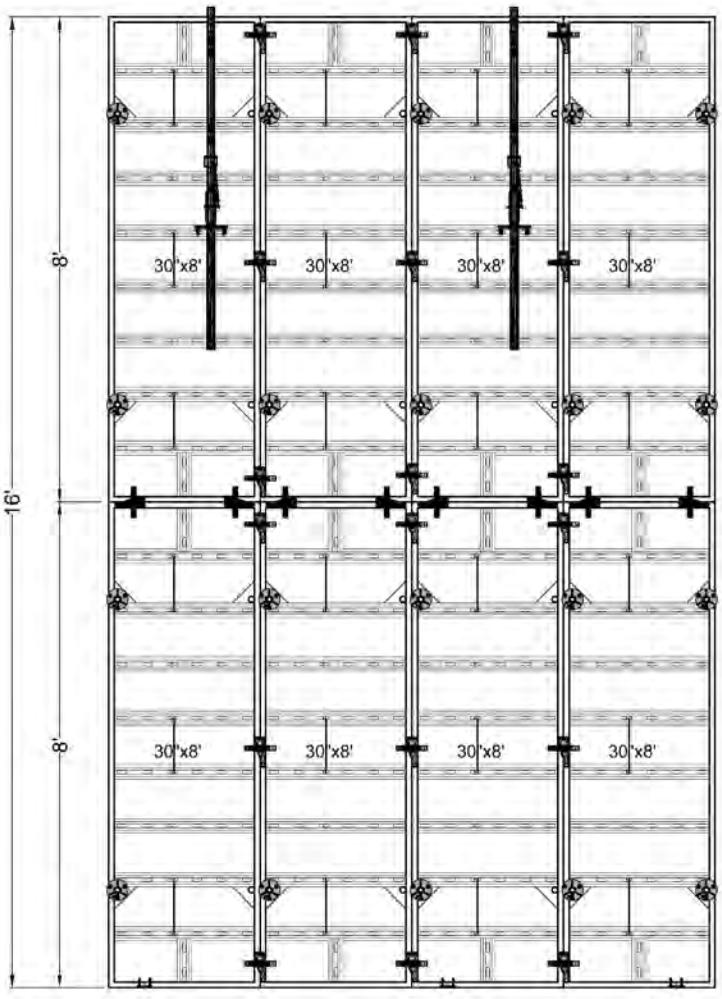
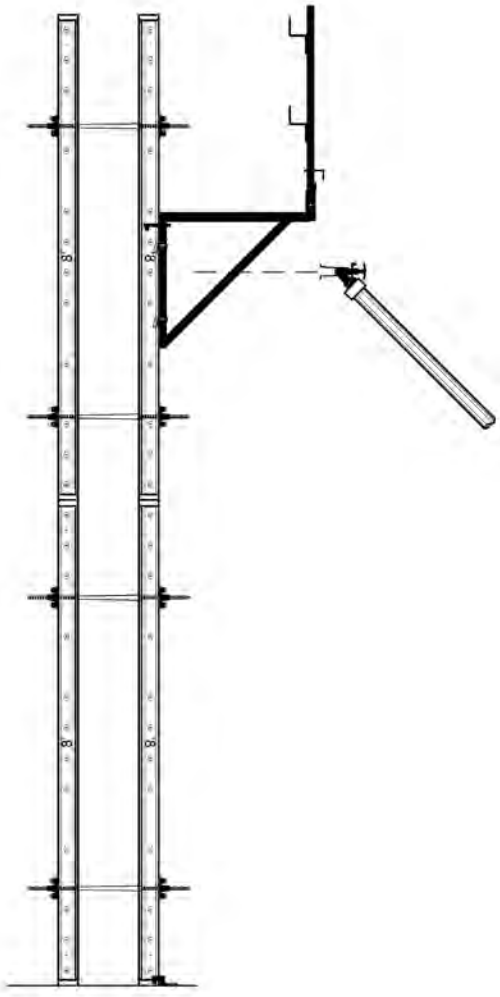
Harris 1500™ Typical Elevations & Sections - 16’

Note: See Top Tie Detail

Remove Top Row of She Bolts & Use Top Tie Assembly

16’ Gang



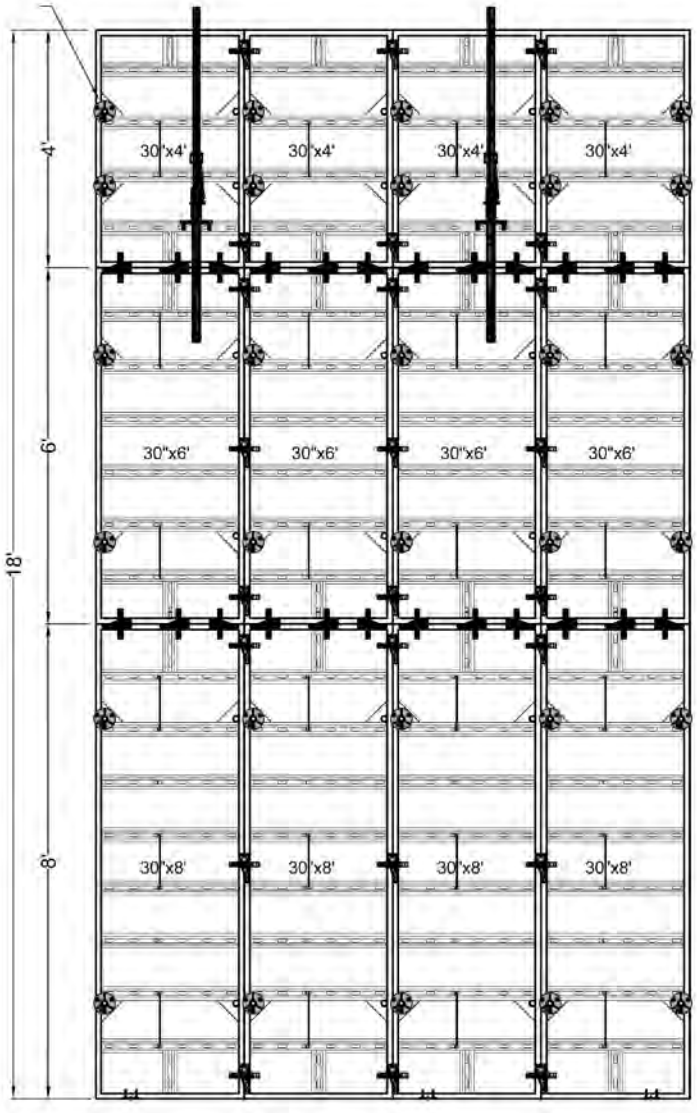


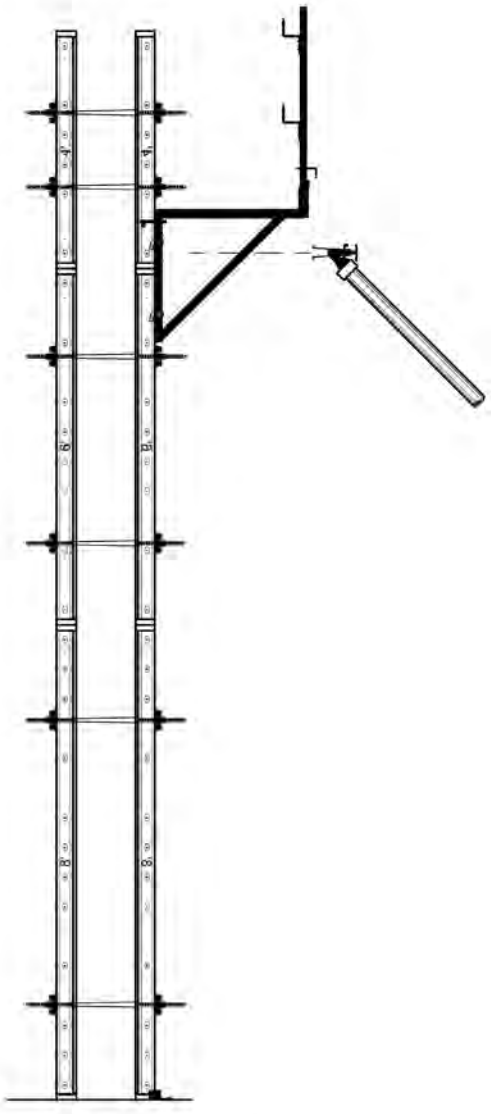
Harris 1500™ Typical Elevations & Sections - 18’

Note: See Top Tie Detail

Remove Top Row of She Bolts & Use Top Tie Assembly

18’ Gang





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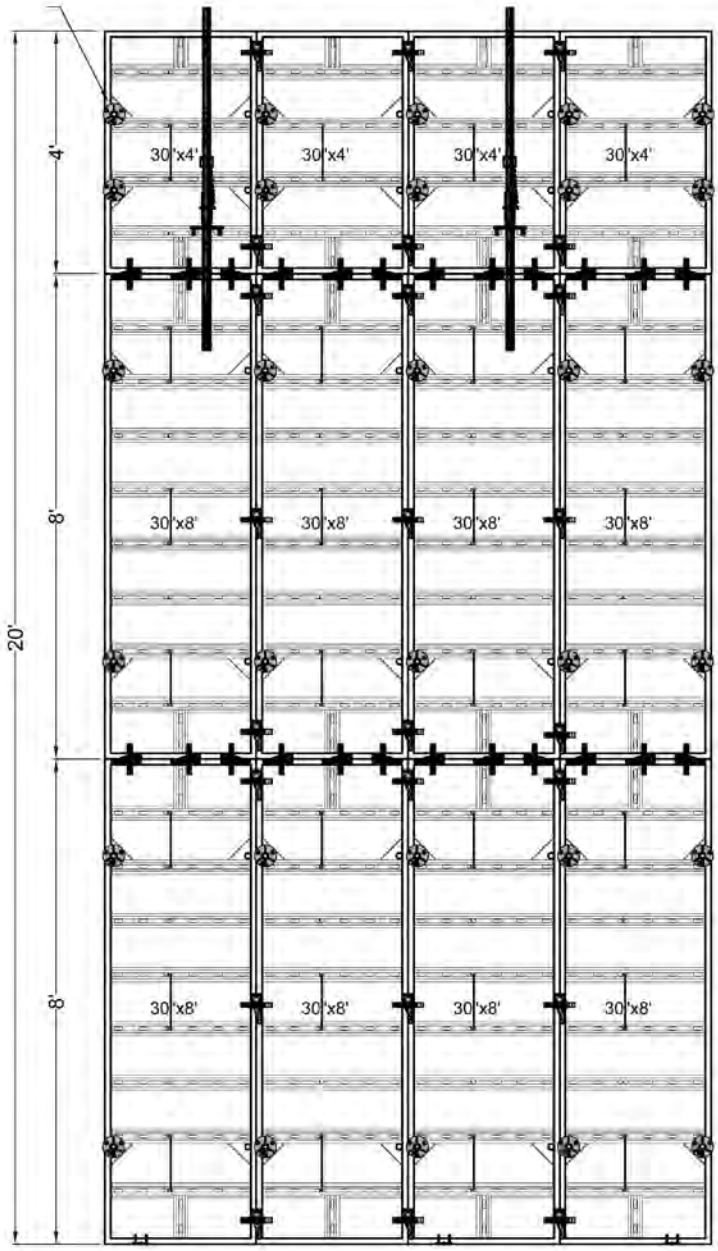
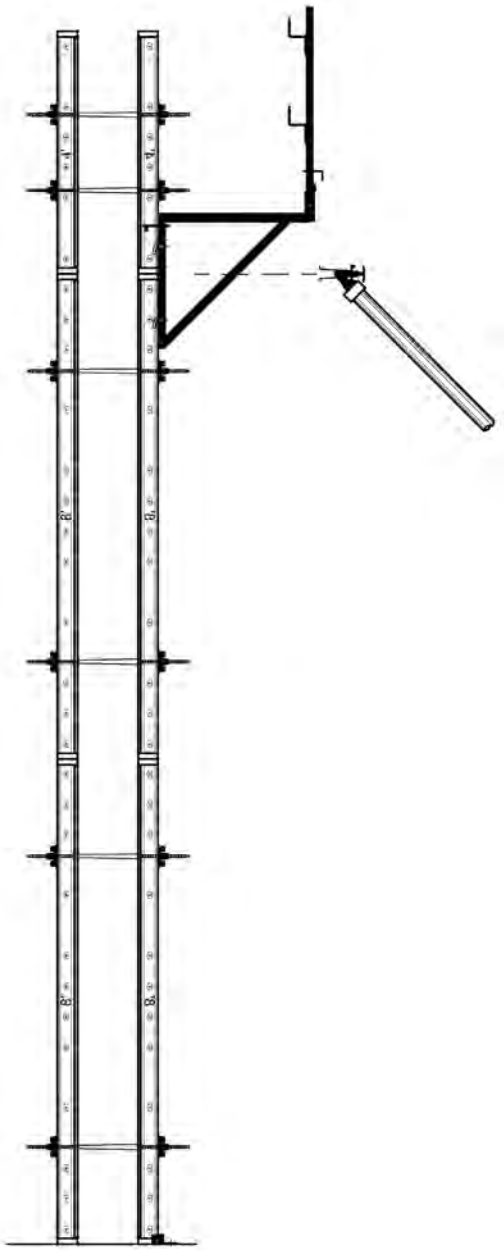
Harris 1500™ Typical Elevations & Sections - 20’

Note: See Top Tie Detail

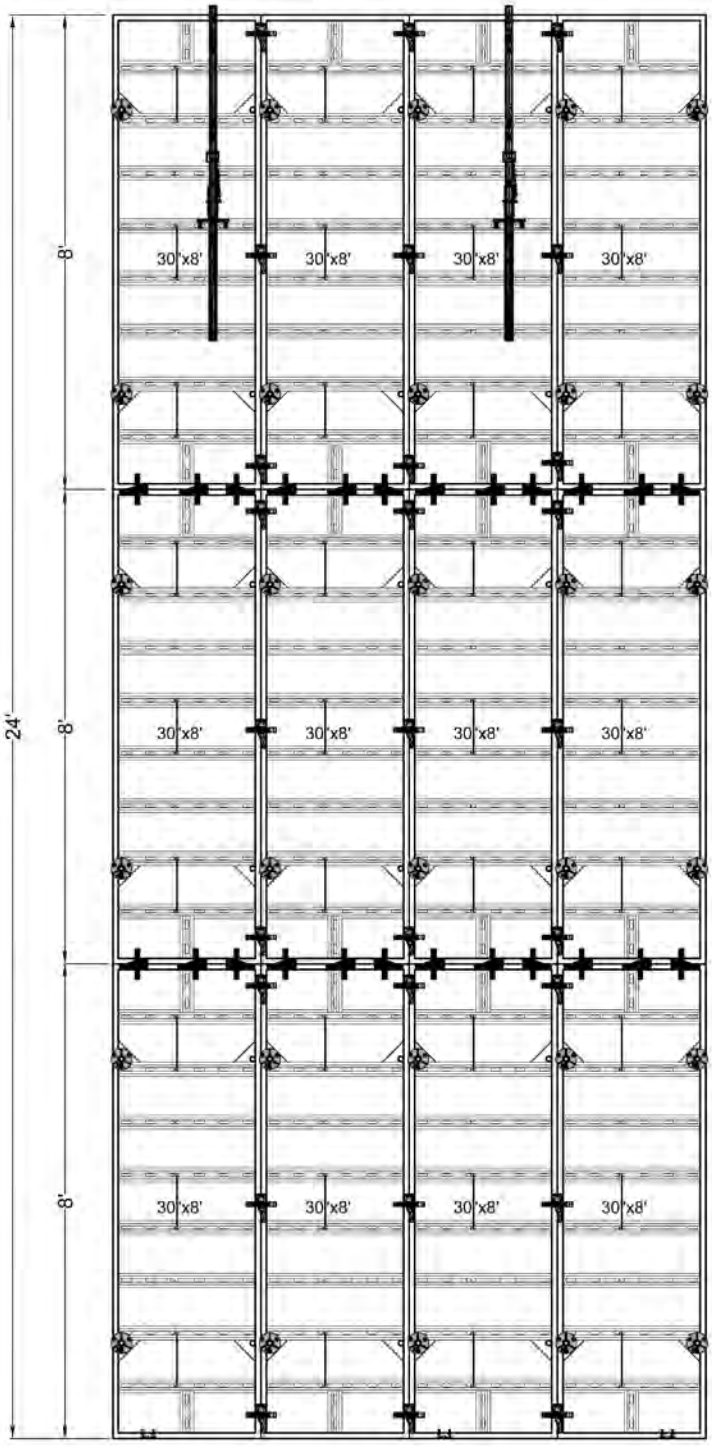
Remove Top Row of She Bolts & Use Top Tie Assembly

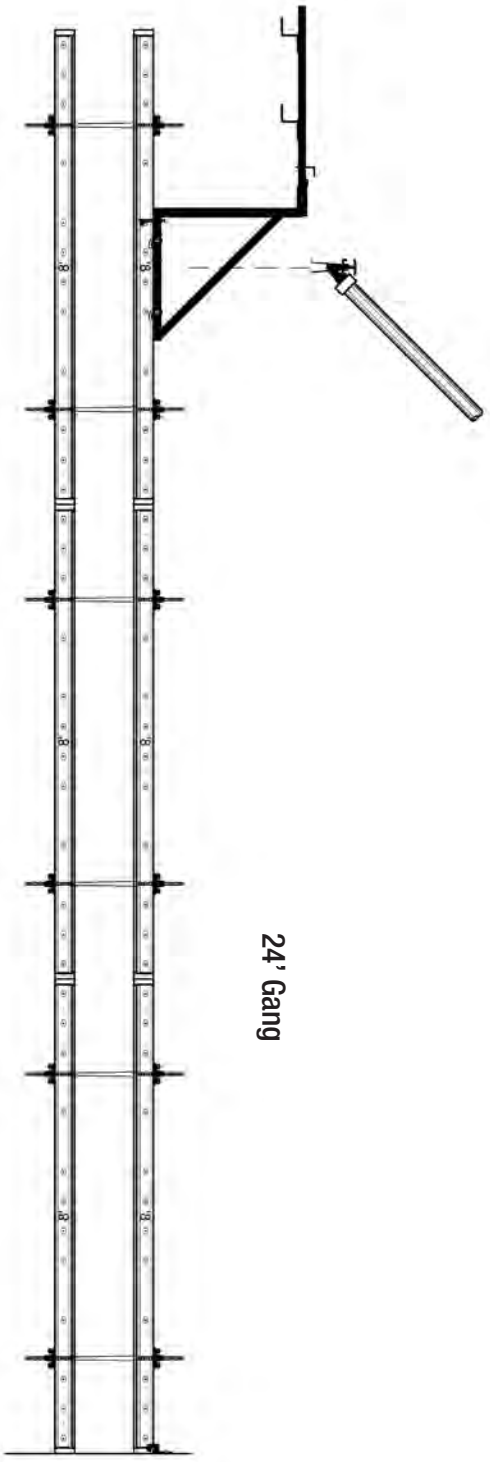
20’ Gang





Harris 1500™ Typical Elevations & Sections - 24’





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Harris 1500™ Hinged Corner Application

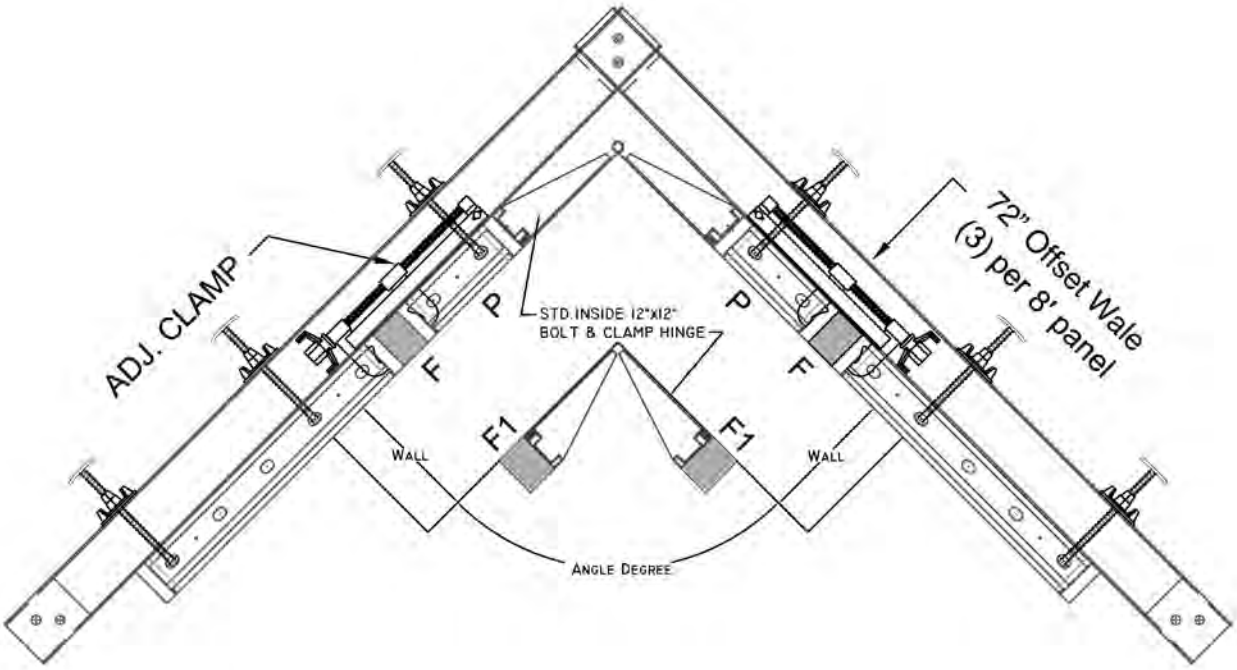


Table No. 1 - with 12" Hinge Inside and Outside

Wall / Angle	8"			10"			12"			14"			16"			24"		
Panel/Filler	F	P	F1	F	P	F1	F	P	F1	F	P	F1	F	P	F1	F	P	F1
120°	4-5/8"	–	–	5-3/4"	–	–	–	12"	5"	–	12"	4"	–	12"	2-3/4"	1-7/8"	12"	–
135°	3-5/16"	–	–	4-1/8"	–	–	5"	–	–	5-13/16"	–	–	–	8"	1-3/8"	–	10"	–
150°	2-1/8"	–	–	2-11/16"	–	–	3-3/16"	–	–	3-3/4"	–	–	4-5/8"	–	–	6-7/16"	–	–

Wall - Wall Width P - Panel Width F - Filler Outside F1 - Filler Inside

Harris 1500™ Hinged Corner Application

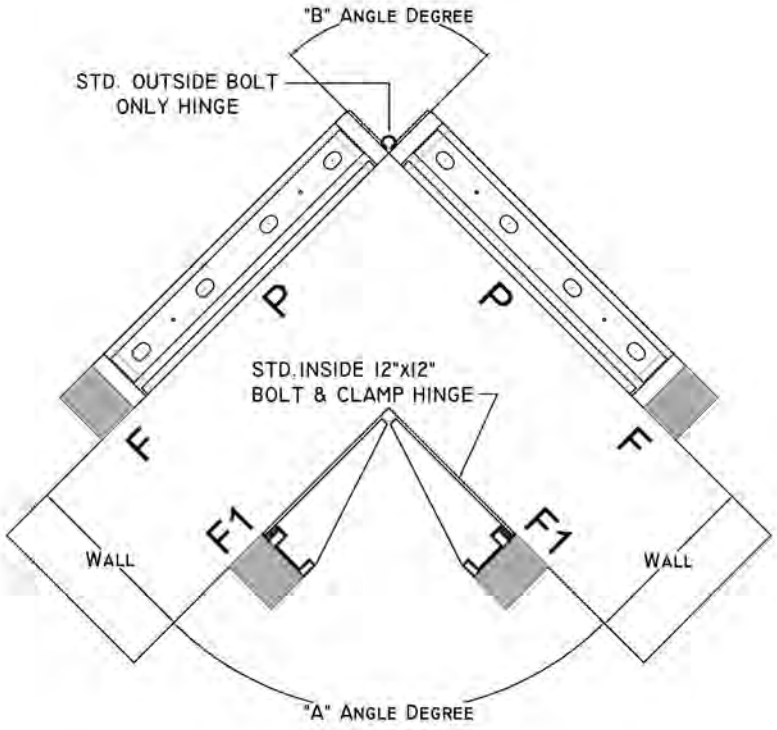


Table No. 2 - with 12" Hinge Inside and Standard Hinge Outside

Wall / Angle		8"			10"			12"			14"			16"			24"		
A	B	F	P	F1	F	P	F1	F	P	F1	F	P	F1	F	P	F1	F	P	F1
120°	60°	4-5/8"	12"	–	–	18"	1/4"	–	24"	5"	–	24"	4"	–	24"	2-3/4"	1-7/8"	24"	–
135°	45°	–	18"	2-11/16"	–	18"	1-7/8"	–	18"	1"	–	18"	3/16"	5/8"	18"	–	–	22"	–
150°	30°	2-1/8"	12"	–	2-11/16"	12"	–	3-3/16"	12"	–	3-3/4"	12"	–	4-5/16"	12"	–	7/16"	18"	–

Wall - Wall Width P - Panel Width F - Filler Outside F1 - Filler Inside A - Angle Degree Inside B - Angle Degree Outside

Harris 1500™ Acute & Obtuse Corner

Acute Angles

On outside hinge corner wales should be positioned to add strength to the corner.

Forms 9'0" - 8'0" 4 Wales

Forms 6'0" - 3'0" 2 Wales

Notes:

A wood block might be required to fix hinge position.

See pages 19-20 about additional clamp requirement.

Obtuse Angles

On both the outside and inside hinge wales should be positioned to add strength to the corner.

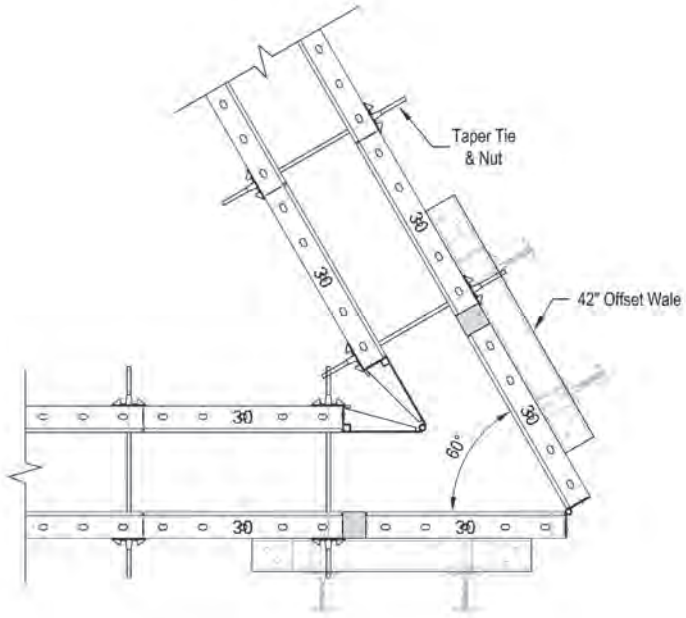
Forms 9'0" - 8'0" 4 Wales

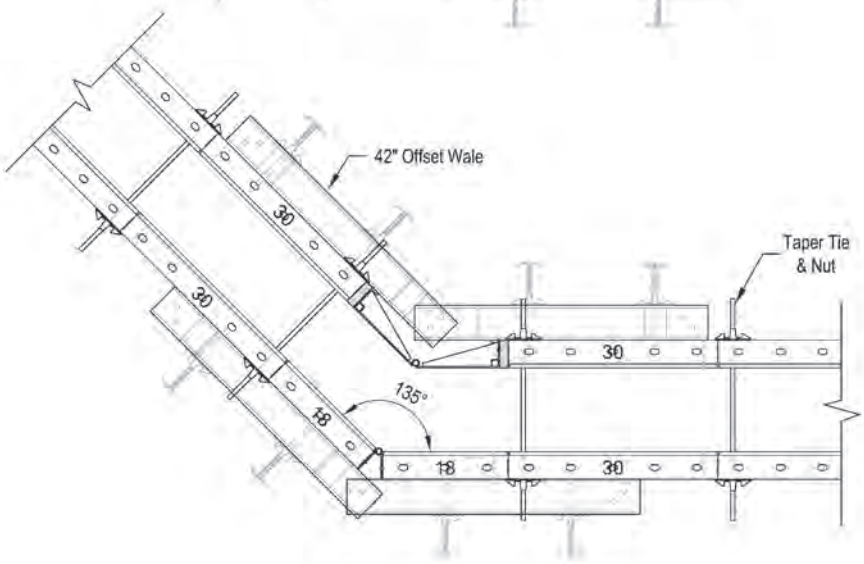
Forms 6'0" - 3'0" 2 Wales

Notes: A wood block might be required to fix hinge position.

See pages 19-20 about additional clamp requirement.

All specific applications should be evaluated by the Harris technical group.





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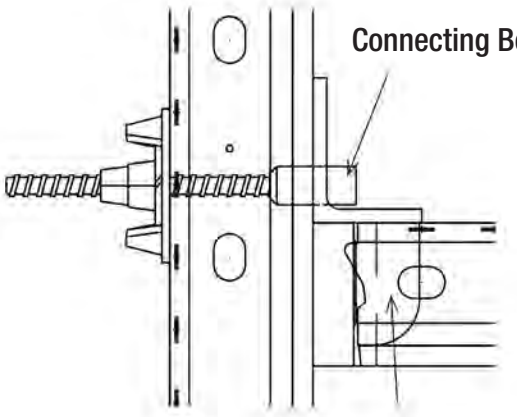
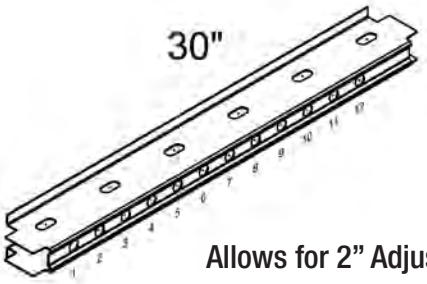
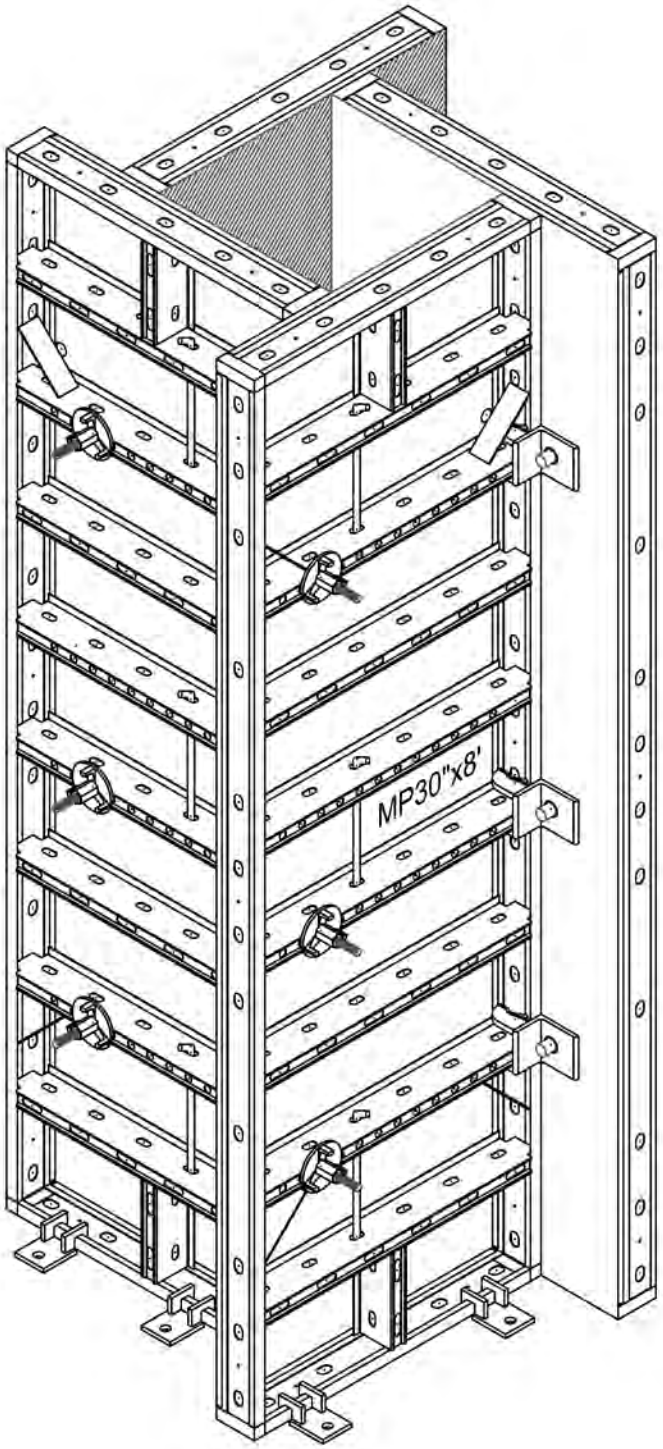
Harris 1500™ Column Forming With 30” Multi-purpose Panels

Panel Connection		
Panel Height	# of Tying Claws	All Cross Members Adjustable for Positioning
8’ - 0”	3	
6’ - 0”	2	
5’ - 0”	2	
4’ - 0”	2	
3’ - 0”	2	

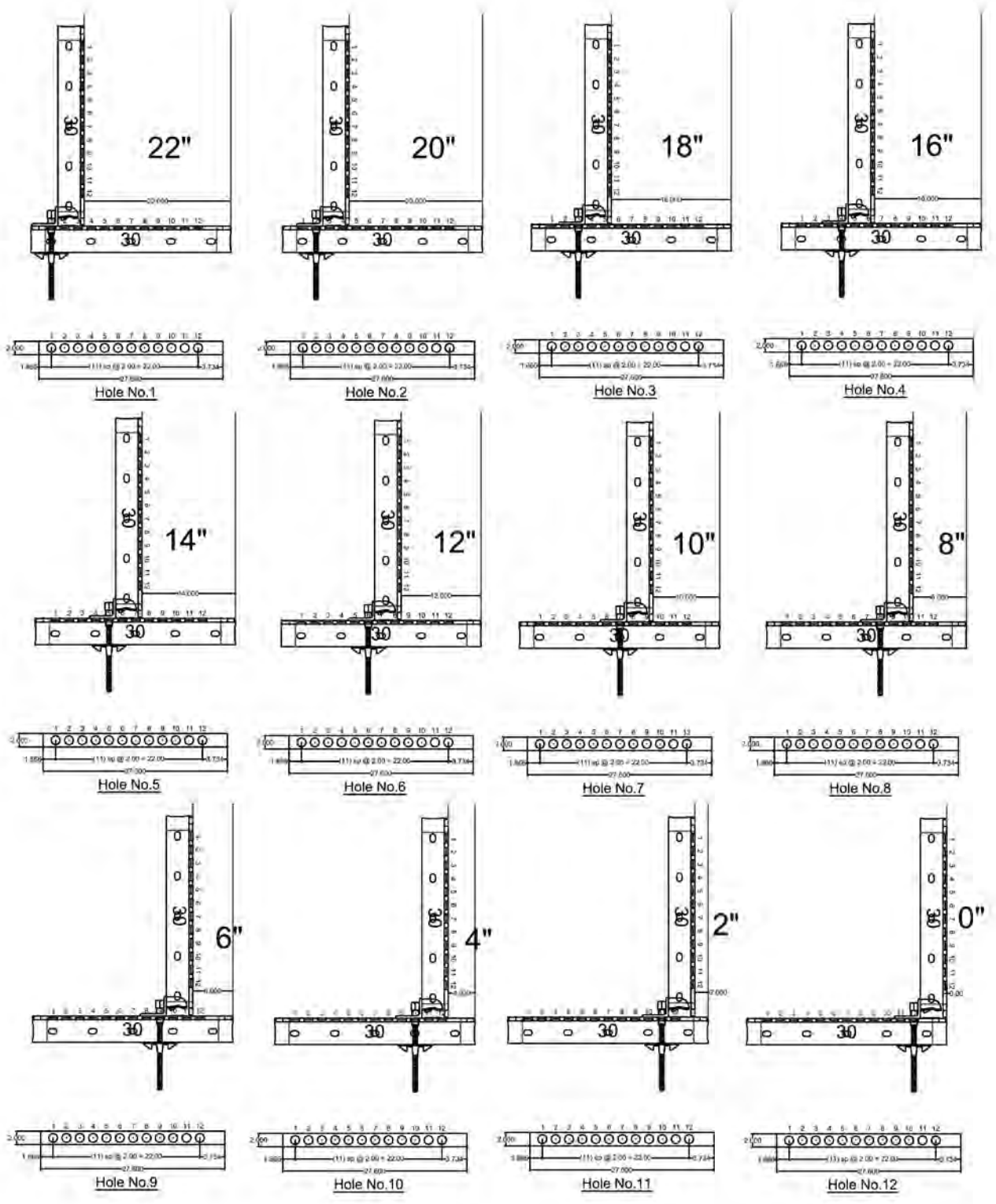




Allows for 2” Adjustment



Harris 1500™ Typical Hole Locations for Corner Assembly



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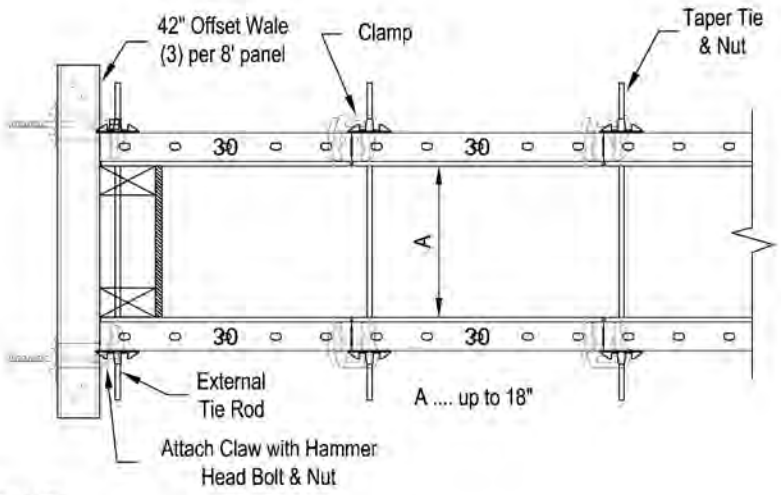
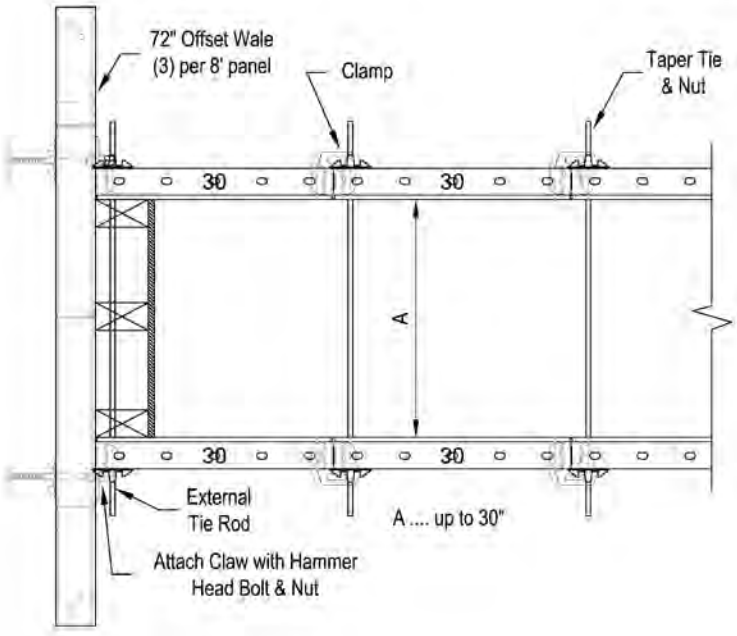
Harris 1500™ Bulkhead Forming Walls

Bulkheads can be built in a number of ways.
Here are a few of the standard approaches:

1. Utilizing an outside corner on each side of the wall and clamping in the appropriate filler size for the bulkhead.
2. Utilize job site material and build your own bulkhead from plywood and lumber. Please note that you will require a tie in the tie hole directly adjacent to the bulkhead to resist lateral forces.
3. Utilizing the Harris 1500 Multi-Purpose panel, you can accommodate various wall thickness. Please see pages 50 to 51 for proper use of the Multi-Purpose panel.

Bulk Head





Harris 1500™ Bulkhead Channel Walls

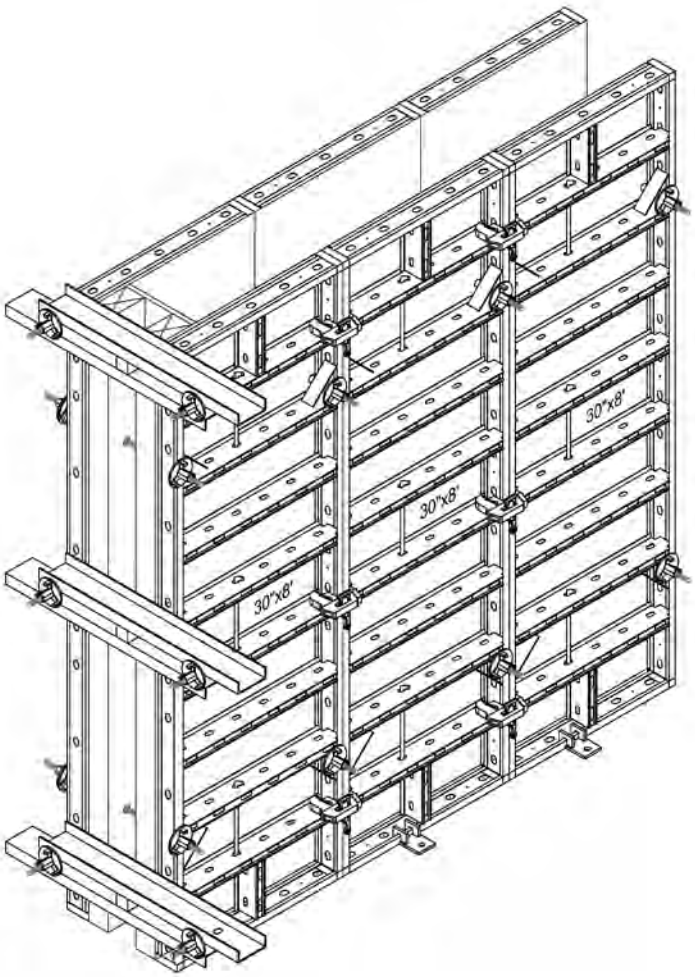
Bulkhead wale channels are placed across the end of the forms to hold wooden bulkhead system. There are two sizes of channels: 42" offset wale and 72" offset double wales. When used with tying claw, connecting bolt, and fixed nut 15mm and attached to side rails of the form a rigid wale end is made.

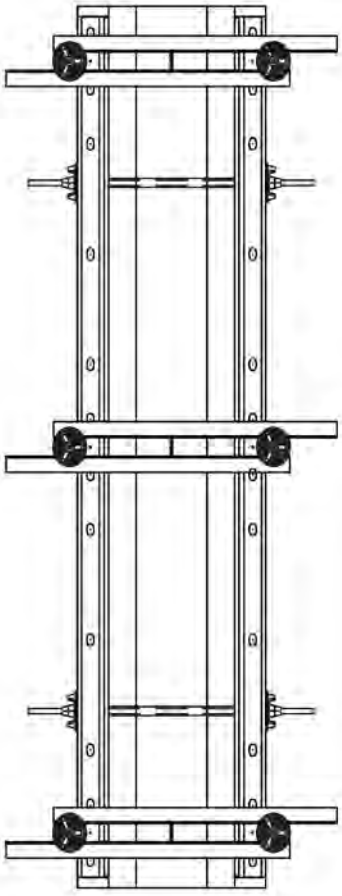
For walls:

8' tall 16" wide 3 wales required

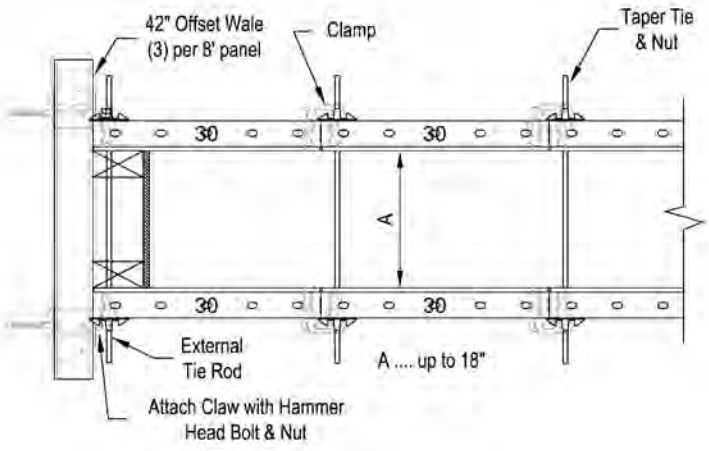
8' tall 16"-24" wide 4 wales required

8' tall 24"-30" wide 5 wales required





End View



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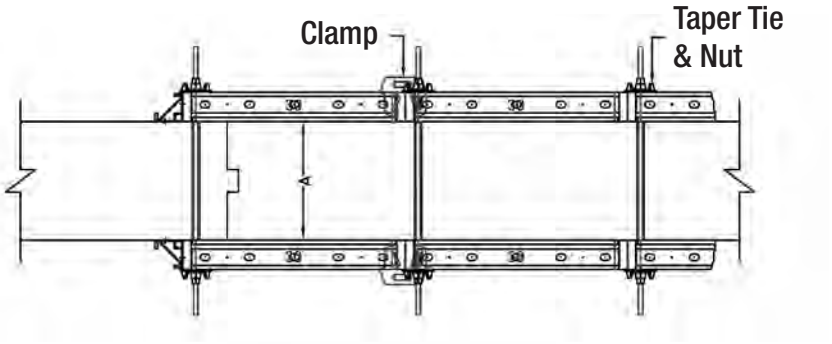
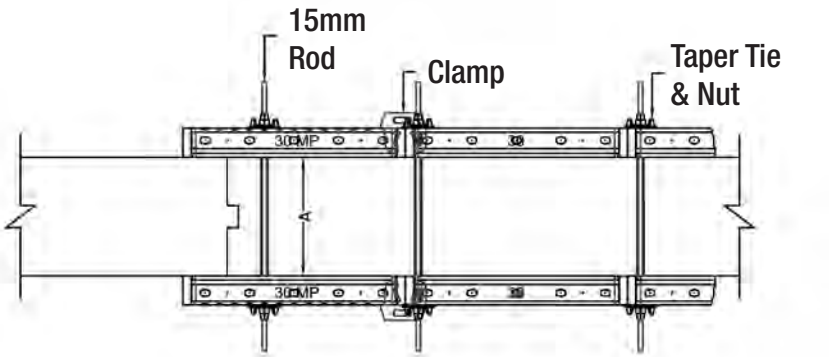
Harris 1500™ Connecting to Existing or Previous Pour

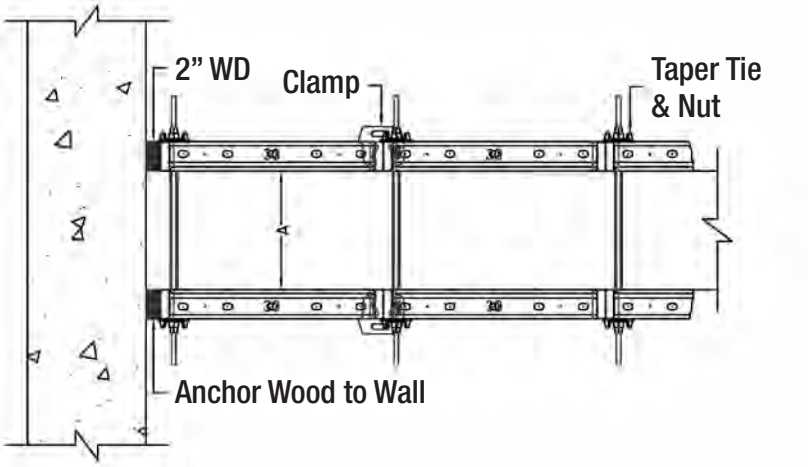
Fasten through existing tie hole locations.



Overlap the previous pour and tie through the Harris 1500 multi-purpose panel.



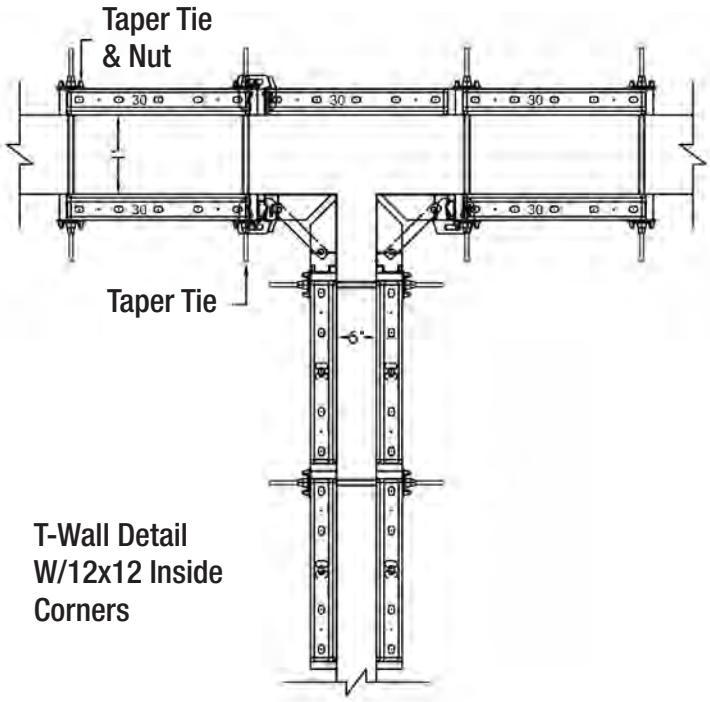
Anchor Harris 1500 panel to existing concrete wall.



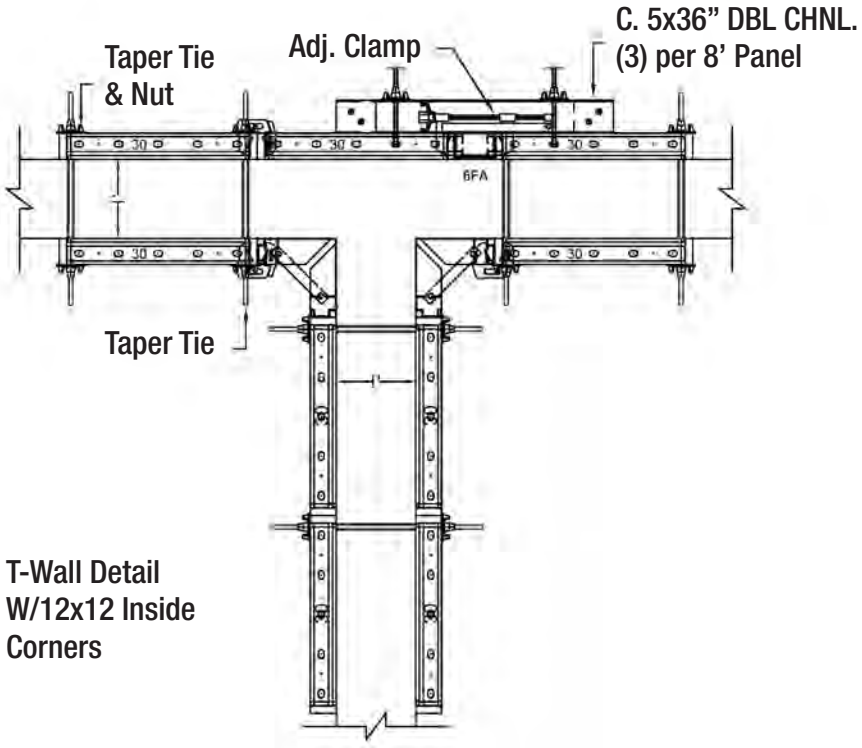
Harris 1500™ Typical T-Wall Intersection Details

Typical T-Wall intersections can be formed using the 12” x 12” Inside Corner and the appropriate opposing panel and ties. If a filler panel or wood filler is required to make up the dimension, then it is necessary to wale the joint. In each application of this nature, please refer questions to your White Cap technical representative.

Note: Inside Corners have a locking bar to lock the corner at 90 degrees. This bar can be removed after the concrete placement, which instantly converts the corner to a flexible unit.



T-Wall Detail
W/12x12 Inside
Corners



T-Wall Detail
W/12x12 Inside
Corners

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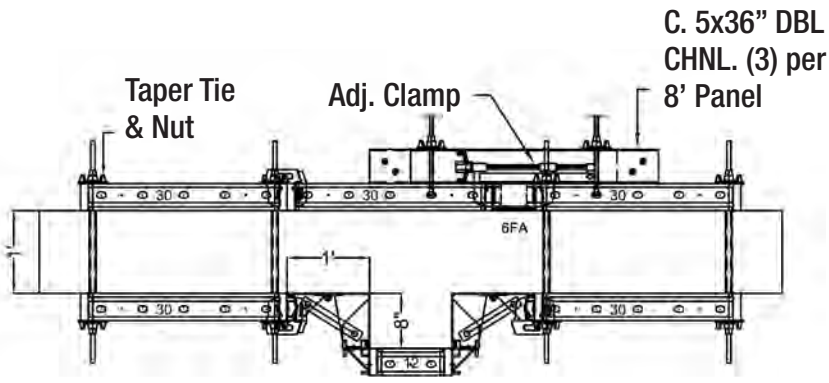
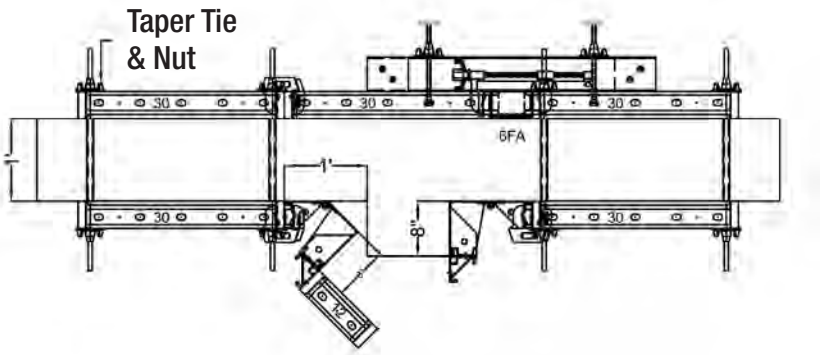
Harris 1500™ Pilaster Corners

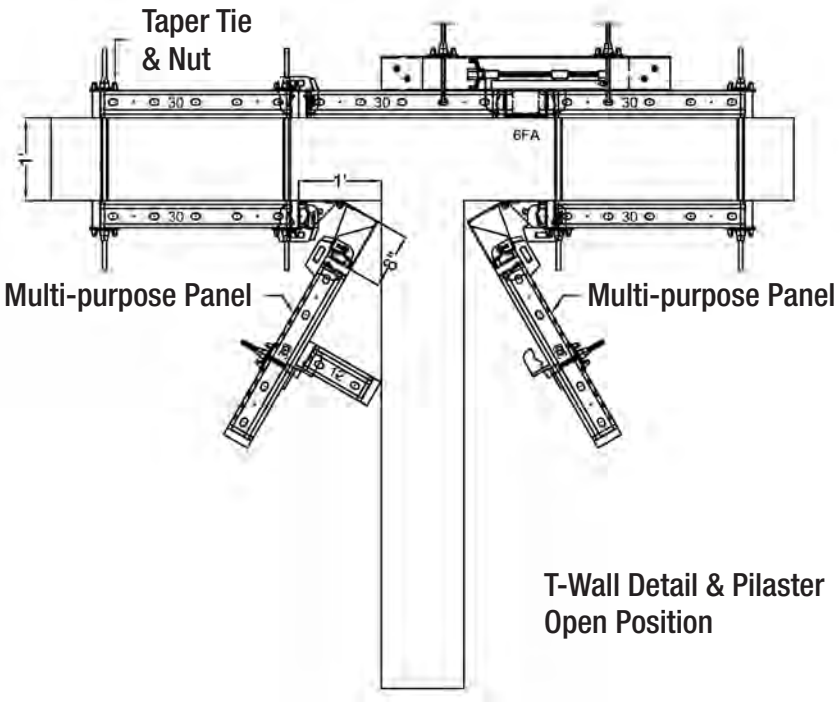
Pilaster details can be formed fast and economical. The pilaster corner is designed to be used in conjunction with standard panels or the multi-purpose panel. The form is designed to hinge on one side and rotate around the hinge point. Rotation is allowed to happen due to the unique rolled face of the inside corner. This rotation provides relief of 3⁄4". The pilaster form dimensions are 12" x 8". The 8" side goes on the pilaster face. Careful attention should be paid to inserting the pilaster locking bars prior to concrete placement.



Pilaster Detail
Closed & Locked Position



Pilaster Detail
Open Position



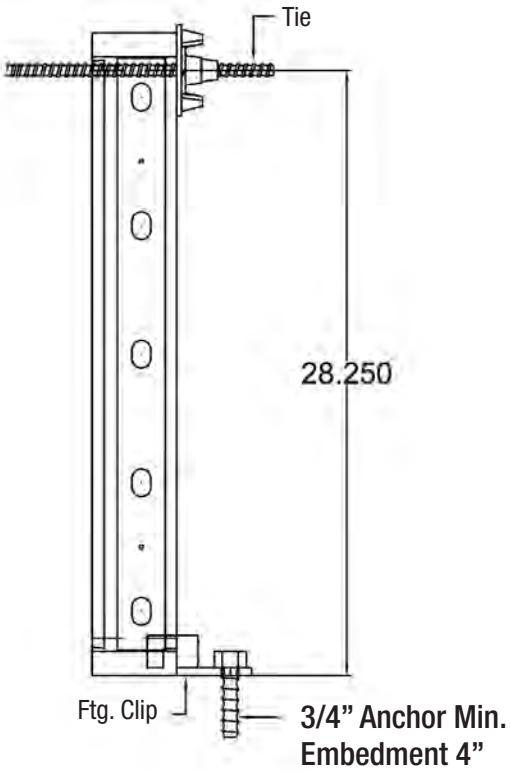
T-Wall Detail & Pilaster
Open Position

Harris 1500™ Horizontal Panel Forming

By laying panels on there sides, short walls, footings, and base mats can be formed using Harris 1500.

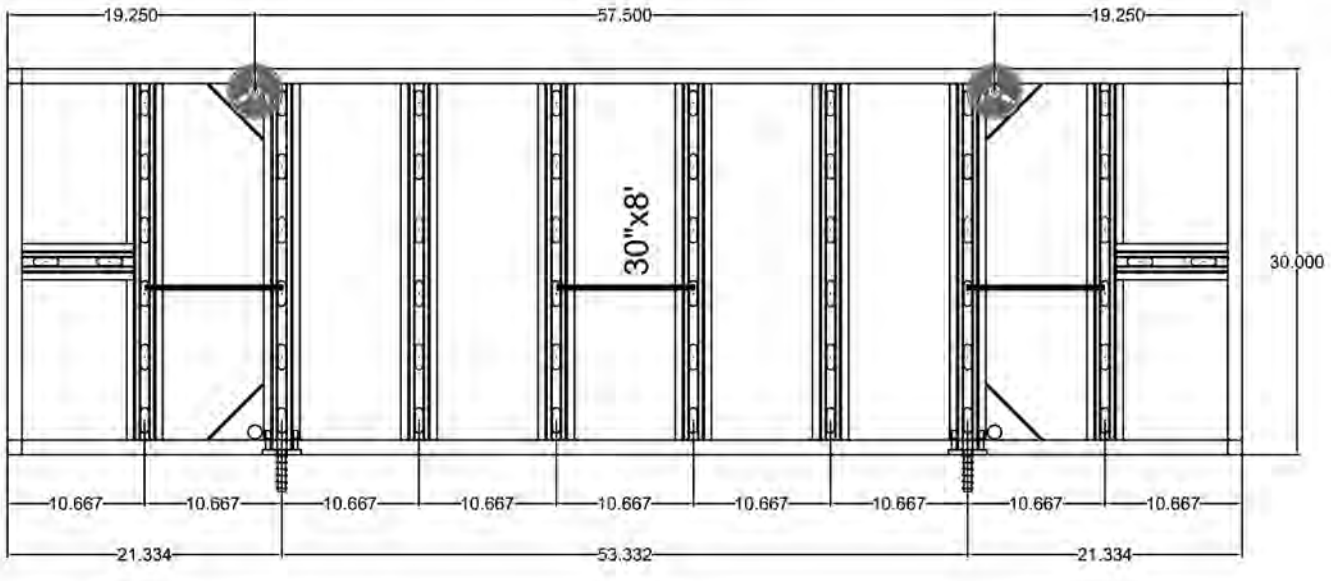
Through the use of the footing clip as a base anchor and tying across the top of the formwork, a variety of forming applications can be accomplished.

Note: Two ties and two footing clips are required per panel. The top tie bracket or existing tie hole can be used depending on pour height.



Tying Top & Bottom for Single layer Formwork:

2x per Panel in Each Case



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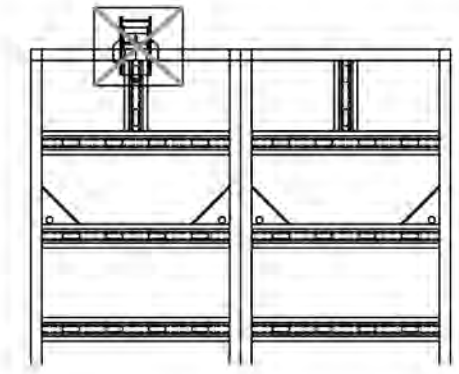
Harris 1500™ Crane Lifting

The crane hook is designed to lift only Harris 1500 panels and fillers. This crane hook locks into place and must be manually release from the form by releasing the spring loaded latch. The maximum allowable working load on each crane hook is 1600 pounds.

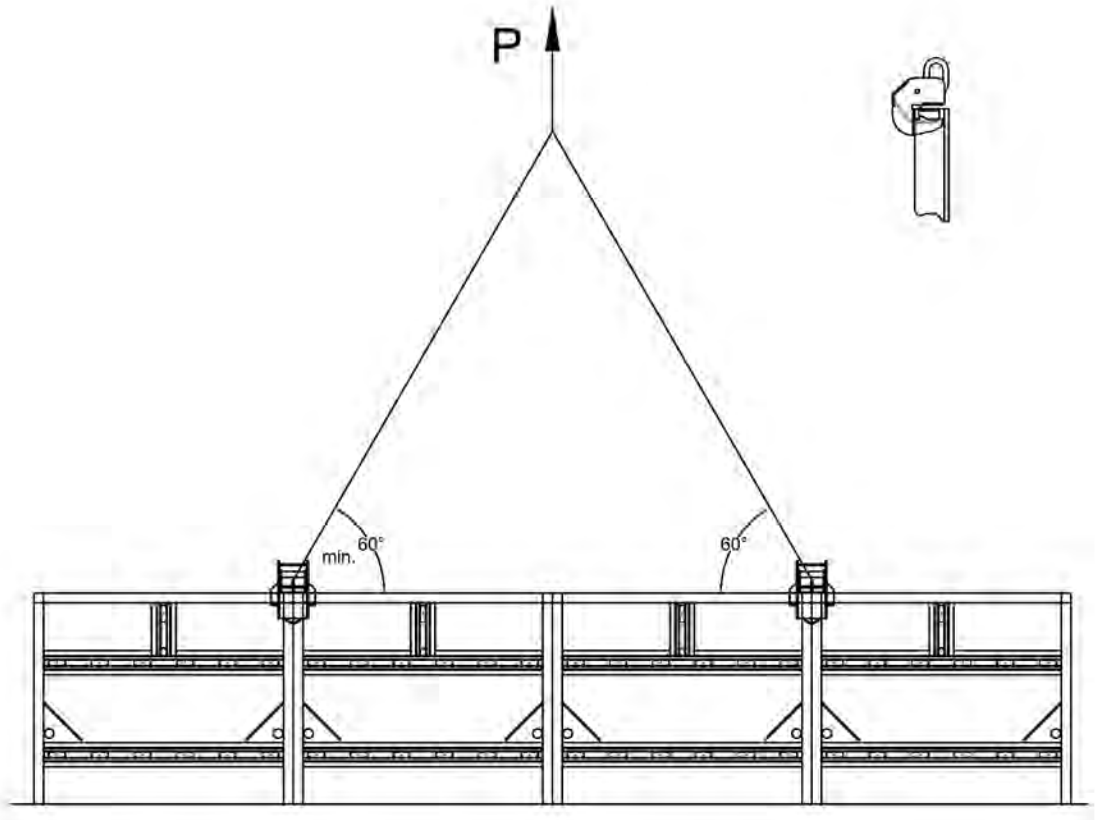
Always attach the crane hook to the panel joint to prevent any movement of the crane hook. When panels are on their side, the crane hook may be placed over the cross member location.

Make sure to balance the crane hook locations and keep the lifting lines above the 60 degree minimum angle.



DO NOT Suspend Crane Hook in Center Edge profile

- All lifting hardware must be tested and maintained by the contractor
- All gangs must have a tag line attached to guide the formwork into place
- Never stand under or near a gang during lifting
- Never use a the crane hook to lift gang in a horizontal configuration
- Never fly gangs with loose items on formwork



Harris 1500™ Notes


Cast Corner Block
Accessory Holes
One Hammer Strike Clamp
T Bolt Hat Section
Climbing Rods
16D Nail Holes
HARRIS 1500