In, on & around concrete



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Steel-Ply Forming System

The Steel-Ply forming system is a pre-engineered, factory-built, reusable concrete forming system. It may be used in handset or gang form applications, for commercial or residential structures. The Steel-Ply forming system can form walls of almost any shape or size, with accessories for special structures and details. This system is more productive and economical than job-built plywood formwork or other forming methods.



Steel-Ply saves time

The Steel-Ply forming system saves time because it is easy to set up and strip. No measuring, sawing, drilling, or nailing is required. Minimal training is needed, so workers are quickly up to maximum efficiency. The only tool required for setup and stripping is a hammer.



Steel-Ply saves materials

Unlike job-built formwork, which must be tailored for each specific pour, the Steel-Ply forming system comes in a variety of standard sizes which can be combined to form virtually any dimension. Steel-Ply panels and fillers are made of specially laminated plywood mounted on rugged steel frames. They can be used up to 200 times before being re-plyed.



Quality, consistency and safety

No matter what the application, the same basic components and methods are used. Labour performance becomes consistent and predictable, and the laminated plywood panels and tight-fitting side rails produce a high quality concrete surface. This engineered system is designed and manufactured with a known strength factor, a major consideration for job site safety.



System design

Steel-Ply panels and fillers are constructed from a rugged steel frame. The side rail of the form is rolled exclusively for the Steel Ply and has a minimum yield stress of 380N/mm2. Cross-members have a minimum vield stress of 413N/mm2 and are located at one foot centres on all panels and fillers.

Steel Ply's special 19mm 100/30 High Density Overlay (HDO) plywood provides a smooth finish. Each piece is edge sealed to repel moisture and prevent de-lamination. With proper care, contractors can expect up to 200 reuses before plywood replacement.

Steel-Ply requires little training because it has no top or bottom, left or right, and can be used vertically or horizontally. Dado slots at cross-members simplify tie placement. Slots for hardware attachment are located between cross-members. All Steel-Ply components combine to provide a 47kN/m2 rated system with a predictable safety factor over the service life of the form. The complete Steel-Ply system consists of over 100 standard panel and filler sizes. Metric panel and filler heights range from 600mm to 3m in 300mm increments. Panel widths are 600mm and filler widths range from 100mm to 550mm in 50mm increments. A 150mm wide filler and steel 25mm and 50mm fillers are also available. Wedge Bolts connect panels, fillers and ties in one simple operation.









Quick-Hook Handle

The Steel-Ply panel is also available with a patented Quick-Hook Handle design. This exclusive design meets the OH&S requirement for fall protection.

The Quick-Hook Handle is integral to the panel design with staggered locations between the cross-members. This provides convenient climbing and attachment points for personal safety equipment. This design improves worker safety without any reduction in productivity.

The same Quick-Hook Handle is used to carry the panel. The design provides enough clearance for hands, but does not interfere with panel stacking for storage.

When a Quick-Hook Handle is not accessible, the installation of Safety Eyes on any Steel-Ply panel allows easy attachment of personal safety equipment. Safety Eyes are attached to vertical side-rails to provide safe climbing points on gang form applications.









Connecting Hardware

Wedge Bolts

Two identical Wedge Bolts function as a lock-bolt set, one as a connecting bolt, the other as a clamping wedge. At typical siderail-to-siderail connections, the loop end of the tie is positioned in dado slots and is secured by the same Wedge Bolts. For typical walls, form connecting Wedge Bolts are only required at standard tie connection positions. Additional Wedge Bolts are utilized at other positions for attachment of walers, scaffold brackets or other accessory components.

Long Bolts

The Long Bolt is designed to be used with the 25mm and 50mm Steel Filler. The long connecting bolt is punched with two holes to accommodate a 16d nail to be used to shorten the bolt for Steel Fillers. A vertical Wedge Bolt secures the two panels and filler through the adjoining side rails.

Adjustable Long Bolts

The Adjustable Long Bolt is designed to allow two steel fillers to be used sideby-side. It can accommodate a 25mm with a 50mm steel filler.

Base Tie Bolts

The Base Tie Bolt secures a tie to an end-rail or a side-rail resting on a footing. It also can be used in situations where panels butt against an existing vertical surface.

S-Panel Ties

The S-Panel Tie, or wire tie, is the most commonly used tie for commercial and industrial structures. The standard break-back for the S-Panel Tie is 25mm, with other break-backs available upon request. The S-Panel Tie can be manufactured to almost any length, with optional cones and water resistant washers to meet job specifications.

X-Flat Ties

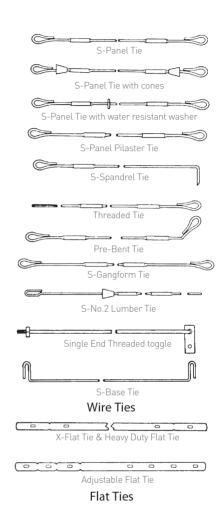
X-Flat Ties are commonly used for residential foundations when the 25mm standard break-back is not required. The end of the tie extends beyond the back of the form for quick inspection of tie location.

Threaded Ties

The Threaded Tie provides adjustment advantages for battered walls. Threaded Ties have a special thread design to gain maximum strength using the maximum diameter thread possible with Symons standard wire tie.

S-Base Tie

The S-Base Tie has an upturned loop at each end which projects up through the bottom rail. Wedge Bolts are inserted through the loop end to secure the tie and panel. The S-Base Ties are used for small retaining walls or against existing walls.







Corners

Inside and Outside Corners

Inside and Outside Corners are all-steel corners that lock adjoining forms together to make a 90° angle. Standard Inside Corners have a face dimension of 100mm x 100mm or 150mm x 150mm. Each Inside Corner is manufactured with reinforcing straps to maintain a 90° angle. Dadoes are placed 300mm O.C. for tie connection and slots are placed 300mm O.C. for connecting hardware.

Bay Corners

Inside Bay Corners opposite Outside Bay Corners form a 135° angle.

The Inside Bay Corner has a 75mm x 75mm face dimension, and the Outside Bay Corner has a 200mm x 200mm face dimension. Ties connect at adjoining panel joints to complete this forming detail. Bay Corners can also be used horizontal-y to form wall haunches and "Y" walls.

Hinged Corners

The Inside Hinged Corner may be used to form inside corners down to a 45° angle. The Outside Hinged Corner forms outside corners from 135° down to a 5° angle. In most wall applications, Inside Hinged Corners are used opposite Outside Hinged Corners. Always insert connecting Wedge Bolts toward the adjoining panels so that the angle will not be restricted.

In most wall applications, Inside Hinged Corners are used opposite Outside Hinged Corners. Always insert connecting Wedge Bolts toward the adjoining panels so that the angle will not be restricted.

45° Bay Corner Bracket

The 45° Bay Corner Bracket can be used in place of the Bay Corner. Two appropriately sized fillers are connected to form the outside 135° angle.

The strength of the panel design makes a waler necessary for alignment only, it is not a structural part of the formwork. Only one row of 50x100 walers on each tier of panels is required, with a variety of time and material saving attachment options available to increase your productivity.

Waler and Strongback Hardware

One-Piece Waler Bracket

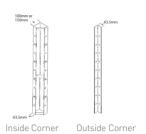
The One-Piece Waler Bracket is fast and simple to install. Just insert the Waler Bracket into any side-rail hole not being used for ties, place a single or double 50x100 piece of lumber on top of the bracket, and drop the attached wedge into position. No additional hardware is needed.

Z-Tie Holder

The Waler Tie and Z-Tie Holder combination is another method of attaching walers. Waler Ties are available in two lengths to secure double 50x100 or double 50x150 lumber walers. Once the Waler Tie is fastened with Wedge Bolts, the lumber is positioned and the Z-Tie Holder is used to complete the assembly.

Strongbacks

Strongbacks are vertical alignment members that are placed at 90° to walers. The Strongbacks are used to align the walers and are commonly placed at 2.4m O.C. Strongbacks can be doubled 50x100, 50x150 or 50x200 lumber secured with J-Strongback Hooks.



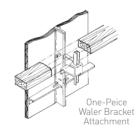
Inside

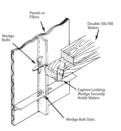




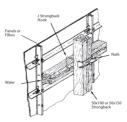
Inside Hinged Corner







Z-Tie Holder Attachment



Strongback Attachment

Form Alignment

Aligners are required to position forms, they are not intended to be used as bracing or to resist concrete pressure.

Attachment Plate

The Attachment Plate can be bolted or nailed to 50x100 lumber. Aligners are quickly attached or removed from the forms with standard connecting hardware.

Turnbuckle

Turnbuckles allow for 150mm length adjustment. The Turnbuckle is attached with nails to lumber and anchored before final adjustments are made. The end of the Turnbuckle contains a large slot to accommodate a Steel Stake.

Pipe Form Aligner

The Pipe Form Aligner eliminates the use of lumber and allows adjustments from 4m to 6m. The top end of the Pipe Form Aligner uses a Steel-Ply Adapter Plate which connects to the Steel-Ply panel. The bottom of the Pipe Form Aligner requires a Pipe Form Aligner Shoe for anchoring a 12mm diameter concrete anchor or a Steel Stake.

Pier Cap Braces

Pier Cap Braces are available in two turnbuckle lengths and two extension tubes. Used in conjunction with the Pipe Form Aligner Shoe and the Steel-Ply Adapter Plate, they provide an adjustment range from 1.75m to 4.35m.

Brace Kicker Bracket

The Brace Kicker Bracket has two holes for connecting an aligner and a kicker. It is used in place of the Pipe Form Aligner Shoe if a kicker is desired.

Scaffold Brackets

Scaffold Brackets are installed where one or more levels of work platform are required for personal safety. The maximum safe load capacity of the Scaffold Bracket is 226kg (4 to 1 safety factor).

The Scaffold Bracket comes with a wedge and cable attachment for quick assembly.

Note: Do not use Scaffold Brackets to support cantilevered concrete soffit forms, or for temporary storage of construction equipment or material.

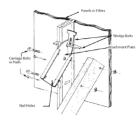
Filler Angle

Filler Angles provide a means to construct a custom size filler with 19mm plywood that can be connected to the side rails of adjoining Steel-Ply forms. These Filler Angles are recommended where reinforcing steel, pipes, or other penetrations must protrude through the form face.

Steel Filler

Steel Fillers are cold-formed U-shaped steel. The 25mm steel fillers are punched with connecting slots at 150mm O.C. A Long Bolt passes through the steel filler to grip adjoining panel side rails. The 50mm Steel Filler has connecting slots at 50mm O.C. It is used to "step" forms in 50mm increments.

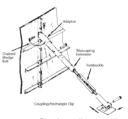
This steel filler reduces the need to build up under forms when step footings or changing wall elevations occur.



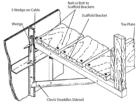
Attachment plate connection



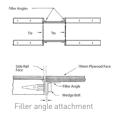
Adjustable turnbuckle form aligners

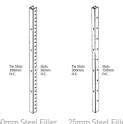


Pipe form aligne



Scaffold bracket attachment





50mm Steel Filler 25mm Steel Filler



Pilasters and Culverts

Pilaster

Pilasters of almost any dimension are formed quickly and easily using standard Steel-Ply panels or fillers with Inside Corners and Outside Corners.

Adjustable Pilaster Form

An Adjustable Pilaster Form is available to form standard pilasters from 25mm to 300mm deep in 25mm increments. The Pilaster Form eliminates Inside and Outside Corners and the need for having specific size fillers on hand. The Pilaster Brace eliminates lumber bracing to maintain right angles.

Culvert Form

Reusable steel Culvert Forms come in chamfer sizes of 150mm x 150mm, 225mm x 225mm and 300mm x 300mm. The Culvert Form permits monolithic pouring of the walls and elevated slab of culvert structures. The Culvert Form can also be used to make chamfered corners in vertical walls.

Lifting Brackets

Double Duty Lift Bracket

The Double Duty Lift Bracket provides an attachment point for rigging and handling gangs. A vertical capacity of 900kg (5 to 1 safety factor) meets OSHA requirements. Application drawings show locations and numbers of Double Duty Lift Brackets per gang.

Note: Do not break a gang form loose from a wall by lifting or tugging backwards with the Double Duty Lift Bracket.

Waler Lift Bracket

The Waler Lift Bracket is an alternative device for lifting gangs. A vertical capacity of 1800kg (5 to 1 safety factor) meets OSHA requirements.

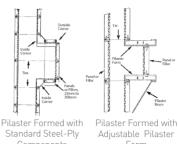
Note: Only vertical loads can be imposed at lift holes for the Waler Lift Bracket. A Lift Beam with vertical drop lines connected to Waler Lift Brackets must be used.

Column Lift Corner

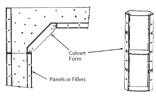
The Column Lift Corner can be used as the outside corner in the top two feet of ganged columns. The Column Lift Corner extends 50mm above the column and is secured with Wedge Bolts. Two Column Lift Corners are required per column. The Column Lift Corner has a safe load capacity of 900kg.



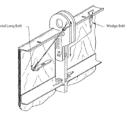




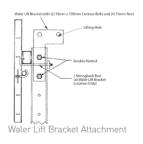
Components

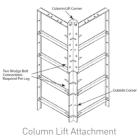


Culvert Form attached to Panels



Double Duty Lift Bracket Attachment





Lifting Brackets

Form Extension Bracket

The Form Extension Bracket is a convenient means to extend the height of a standard panel an additional 75mm to 300mm for straight or curved walls. The bracket is designed to be used with 19mm plywood and attached with a Wedge Bolt. The bolt comes up from the top rail of the panel below and is locked in with an S-Wedge. A slot in the centre of the bracket allows for Waler attachment.

Cantilever Bracket

The Cantilever Bracket is used to suspend a form on the opposite side of the wall. This allows different elevations at the bottom of forms so that a base slab can be monolithically poured with the wall. Maximum capacity is 300kg. Maximum spacing must not exceed panel length when forms are horizontal, and must not exceed 2.4m when panels are vertical.

Brick Ledge Bracket

The Brick Ledge Bracket is used to form brick ledges and support various framed box-outs. The bracket is attached to panels or fillers with Wedge Bolts. The bracket spans the wider side of a 50x100 piece of lumber to create the offset needed

Accessories

Bulkhead Forming

Key-way Forms come in 0.9m, 1.2m, 1.5m, 1.8m and 2.4m lengths. When bolted to Bulkhead Bars, they produce a key-way and hold the water stop in position. Bulkhead bars can be used for forming bulkheads in walls 100mm to 600mm

wide. Standard Wedge Bolts attach the bars to the side-rails of panels and fillers. Bulkheads can also be made by using Outside Corners and a panel/filler.

Haunch Forming

Haunch Brackets provide an ideal way to form haunches or corbels, without any additional lumber support. The Haunch Bracket connects easily with Steel-Ply panels and is designed to support 19mm plywood. Slots make securing walers a simple operation.

Stake Plate

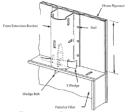
Stake Plates are positioned along the top edge of the Steel-Ply for Steel Stakes. The Stake Plates are typically located midway between Steel-Ply cross-members and end-rails to provide access for a stake puller.

Beam Pocket

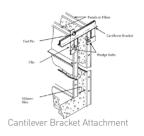
The Beam Pocket is a reusable tapered steel box-out that leaves a void pocket at the top of the foundation wall for steel or wooden beams. The standard $150 \times 200 \times 100$ mm deep size comes with a handle for easy carrying and removal.

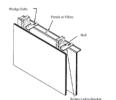
Footing Corner Bracket

Forming footings, pads and slabs is made easy with the Footing Corner Bracket. Attached at the top and bottom of each corner, Footing Corner Brackets hold the panels firmly. A wide range of dimensions in 50mm increments is possible.

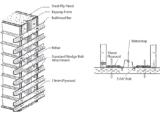


Form Extension Bracket Attachment

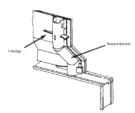




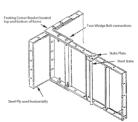
Brick Ledge Bracket Attachment



Bulkhead Assembly



Haunch Bracket Attachment



Footing Corner Bracket Attachment



Column Forming

Column forming

Outside Corners and panels or fillers can be combined to form square or rectangular columns.

Column Hinge

The Column Hinge helps set and strip Steel-Ply column forms efficiently. Column formwork can be handled as a single unit that is "closed" around reinforcing steel and "opened" after concrete is placed. Repetitive concrete column designs become very productive.

Quick Column Hardware

The Quick Column Hardware is used with the Column Hinge for even faster column forming. The hardware attaches to the Steel-Ply Outside Corner opposite the Column Hinge to provide a fast closure and release. Everything remains connected to the column formwork for maximum productivity.

Adjustable Column Form

The Adjustable Column Form is for columns up to 750mm square, in 25mm increments (except 700mm and 725mm). For columns 675mm or less, panels are placed in an overlapping manner. In these instances, 19mm holes are drilled through the plywood at the appropriate connection bolt slot in the cross-member for the hardware.

Column Filler Angle

The Column Filler Angle is used with 19mm plywood to extend the top of a column 250mm to 550mm wide. It is placed in a run-by configuration when column dimensions are under 550mm.

Adjustable Column Extender

Steel plate assemblies overlap Steel-Ply forms to extend columns 30mm to 300mm. They are used in a run-by configuration for column thickness's from 250mm to 550mm. The top angle of the plates have nail holes for connecting to deck plywood to facilitate monolithic deck and column pours.

Gang Forming

Productive System

Gang forms are easily assembled on the ground and then moved into place. Stripping the unit as a gang eliminates rebuilding. This saves time and material, increases production, and reduces costs. The lightweight Steel-Ply design is ideal for gang-forming. At just 39kg/m2, incl. hardware, Walers and Strongbacks, gang form size is limited only by crane capacity.

Gang Form Bolt

Gang Form Bolts and Wedge Bolts are used to connect panels and gang form ties. The patented Steel-Ply Gang Form Bolt connects panel side-rails and gang form ties in a single operation. This longer end allows you to break the ties back and strip the gang without disassembling the forms.

Walers are placed 450mm from the top and bottom of the gang, with one Waler for each tier of panels. Walers align forms within the gang and are assembled using 50x100 or 50x150 lumber with Gang Waler Rods, Waler Plates, and Contour Nuts for a secure connection.

Strongback

The same time and material advantages in waling with the Steel-Ply Forming System are also present in the use of Strongbacks which are needed only to align the Walers. They are usually placed at 2.4m centres, but spacing depends on the specific job conditions.

Steel-Ply Gang Filler

The Steel-Ply Gang Filler increases productivity by reducing the number of ties required in conventional gang-forming. This 50mm steel filler features pre-set tie hole locations for reusable 15mm Taper Ties (25mm to 12.5mm). She Bolts or Tie Rods with 15mm Tie Nuts to secure the tie.



















Strongback Align Walers

Load-Gathering and Heavy Duty Ties

The most economical and productive way to gang-form with Steel-Ply forming system is to use the load-gathering technique. Steel walers and strongbacks "gather" the load of the panels and high-capacity ties are installed through the panels and Walers. The load is transferred to the ties from the walers.

The strength and rigidity of the Steel-Ply system allows ties to be placed farther apart than in conventional gang forming. Fewer ties saves labour when setting, stripping and patching, and increases tie placement adaptability.

"Y" Walls

Load-gathered Steel-Ply reduces the number of ties, saving labour and material for typical "Y" walls. Standard Inside and Outside Corners and a Cantilever Bracket form trough walls. Inside and Outside Bay Corners and 45° Walers are combined with Walers and Waler Splices to form "Y" walls.

Heavy Duty Ties

Symons supplies 222kN She-Bolts or Taper Ties when 125mm steel walers are used. The strength of these ties, combined with the load-gathering ability of the Steel-Ply panels and Walers, permit 120cm x 150cm tie spacing in most gang form applications. Using fewer ties with each gang reduces overall labour and material costs. 378kN She-Bolts and 427kN Taper Ties are used with 200mm steel walers.

Spreader Clips

Spreader Clips are used with Taper Ties or She-Bolts. It is a U-shaped plate that fits over the Cast Bearing Washer and hex nut, preventing inward movement of the gang. A tie with Spreader Clips near the bottom of the forms and one tie with Spreader Clips near the top of the form prevents inward movement and maintains the desired wall thickness.

Maxi-Waler Gang Forming

Maxi-Waler Steel Channel

The Maxi-Waler System uses double steel channels attached to Steel-Ply at 0.6m O.C. vertical spacing. The channel serves as both load-gathering member and aligner for the gang. "L" Washers and Gang Waler Rods secure the steel channels to the forms for a positive connection.

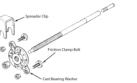
Vertical Walers

The Maxi-Waler System uses double channel steel walers to transfer the load from the channels. J-Strongback Rods and Plate Washers connect to the channels at specific vertical locations. To prevent slippage, Panel Waler Connectors and Clip Angles are bolted to the Waler at two connection sites. Walers are spaced at 1.2m centres for maximum form design utilization.

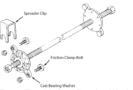
125mm and 200mm Steel Walers

For maximum form design utilization, Symons offers 125mm and 200mm steel waler sizes. Tie areas of up to 3 square meters can be achieved, resulting in fewer ties per pour and less tie patching labour and materials. The 5" and 8"cm walers are available in standard lengths of 1.2m, 2.4m, 3m, 3.6m and 4.8m. The 125mm walers are also available in a 1.8m length.

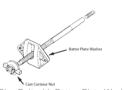




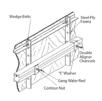
She-Bolt with Cast Bearing Washer



Taper Tie with Cast Bearing Washer



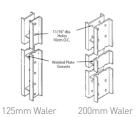
She-Bolt with Batter Plate Washer



Steel Channels gather loads and make alignments



Double Channel Steel Waler used as a Strongback





Horizontal Gang Forming

Horizontal Steel-Ply Gangs

Horizontal Steel-Ply gang forms utilize vertical steel walers. This permits the use of high capacity Taper Ties or She-Bolts. Horizontal Steel-Ply gangs are assembled using 1.8m and 0.9m panels in a "brick" pattern layout.

Waler Connection

Steel walers are easily connected with 200mm Gang Waler Rods, Plate Washers and Contour Nuts. Walers are placed 450mm from gang ends and at 0.9m O.C. spacing.

Panel Waler Connector

To prevent waler slippage, a Panel Waler Connector is attached through the Gang Waler Rod and bolted to the walers. Panel Waler Connectors can also connect the horizontal Strongbacks to vertical steel Walers.

Strongback

125mm walers used as strongbacks provide stiffness and horizontal alignment to the gang. These walers are attached with 216mm J-Bolts, Plate Washers and Contour Nuts. Strongbacks are usually placed at the top and bottom of each gang.

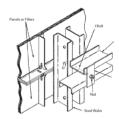
Panel Waler Connection

Typical Waler Connection

Core Wall Forming

Double Hinged Fillers

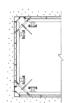
Double Hinged Fillers allow gangs for core walls and elevator shafts to be set, stripped, lifted and reset quickly. Minimal crane time is needed because they make all four sides of the gang into one movable unit. The Double Hinged Filler is designed with two hinge points to permit inward movement when a Turn-buckle connection is retracted. After positioning the gang for the next pour, the Turn-buckles return the gang form to the rectangular shape. Steel Walers and Strongbacks are used with high capacity She-Bolts or Taper Ties for higher productivity.



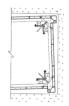
Versiform Walers used as a steel Strongback

Multi Shear Wall Bracket

The Multi Shear Wall Bracket supports ganged forms for multiple lifts. Used with the Guide Bracket to position gangs snug against the wall, the Multi Stear Wall Bracket can support 1360kg.



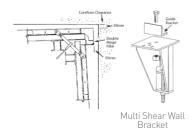
the Pouring Postition



Core Wall Forms in the stripping postition







Radius Wall Forming

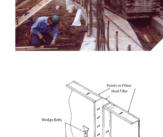
Curved Walls

The Steel-Ply forming system can be used more efficiently than conventional job-built forms for curved walls or tank structures. 600cm wide panels readily form curved walls down to a 4.5m inside radius (9m diameter). Standard fillers can be used to form smaller radius walls, for example: 200mm fillers are used to form a 1.5m radius. Steel fillers adapt to radius walls easily with no "cut-up" construction. A simple program is used to calculate the number and sizes of panels and filler needed. A layout will show where every piece is located on the curved wall.

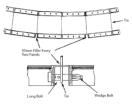
In most cases, Walers and Strongbacks are needed only on walls higher than 3m. Only the inside wall formwork needs to be braced, saving time and materials.

On high walls that need Walers and Strongbacks, special Waler Brackets can be used. Brackets for 50x100 or 50x150 lumber and Pipe Walers are available for fast Waler attachment.

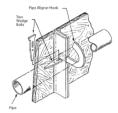
No blocking or shimming is needed.



Gang Form Adaptor Sleeve Attachment



Curved Wall Forms using Steel-Ply



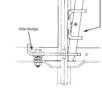
Typical pipe alignment

Transition Forming

Transitions from Steel-Ply to Sym-Ply® Wedge Bolts allow quick and easy connection between Steel-Ply and Sym-Ply. This combination allows contractors who own one or the other system to rent the other as needed. Transitions from Steel-Ply to Max-A-Form® or Flex-Form® Steel-Ply panels and fillers connect directly to Max-A-Form and Flex-Form with Wedge Bolts. This combination provides the strength and gang forming advantages of the all-steel systems with Steel-Ply versatility for details.



Residential and other repetitive handset jobs are perfect applications for the time-saving attached hardware feature. In this system, panels are supplied with the connecting Drop Bolts and Slide Bolts already attached. Since connecting bolts are already attached at the tie locations, workers immediately know where to position each form tie. An attached Hardware Kit is also available for contractors who wish to retrofit Steel-Ply panels and fillers they already own.

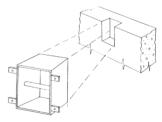


Ply to Stee transition

Attached hardware in the locaked position



Steel-Ply to Max-A Form transition



Beam pocket for foundation void

Beam Pocket

The Beam Pocket is a reusable tapered steel box-out that leaves a void pocket at the top of the foundation wall for steel or wooden beams. The standard 150mm x 200mm x 100mm deep size comes with a handle for easy carrying and removal.



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