TABASHEER FORM-WALLS

INSTALLATION MANUAL
Footing or pad must be level, uniform, and wide enough for the form and cleats to rest on. (diagram 1-1)

Footings must be proper width and thickness for soil conditions. Check with local code officials for guidelines.
Foam planks used in corners must be trimmed so that pre-cut insulation slots line up. *(diagram 2-1)*

- **Cut Off 2-inches From This Plank**
- **Trim Both Inner Planks** *(Cut-Offs Will Vary With Thickness of Wall)*
- **Note How Slots Line Up**

![Diagram 2-1](image)

To make the slots necessary for the corner tie to fit, firmly press corner tie onto the panels so that it leaves an indentation in the insulation. *(diagram 2-2)*
90° Corners continued

Remove the tie and following the indentation lines, cut 2-inch deep slots with a hand saw. Pre-cut slots on planks must be extended to 2-inches deep, also. (diagram 2-3)

Dotted Lines Indicate Indentions to be Handcut

Insert corner tie into slots. Bottom corner tie must be placed flush with bottom side of insulation planks. (diagram 2-4)
90° Corners continued

TURN THE ASSEMBLED CORNER OVER
& repeat the step of pressing corner tie firmly into the insulation.

Again, following the indentation lines, cut 3/4-inch deep slots with a hand saw. (diagram 2-5)

Corner tie is placed halfway into insulation planks. This allows next course of planks to be placed. These steps are repeated for each course, up the wall.

For some concrete wall thicknesses, pre-cut slots on planks will not match up to corner tie. In this case, they must be cut in with a hand saw. (diagram 2-6, 2-7)
Wall Form Assembly

Half ties are inserted in every slot along the bottom of form. Note that the half tie is flush with the plank. Full ties are inserted into top of planks. This allows next course of planks to be placed. (diagram 3-1)
Wall Form Assembly continued

When assembled wall reaches three courses high, secondary cleats are placed against the form and anchored to the footing or pad. Note that the ends of the insulation planks are arranged in a random pattern, up the wall. (diagram 3-2)

Placing Horizontal Rebar
When required by code, horizontal rebar rests on a row of spacer ties. Bar should be wire-tied to the ties every 2-feet to prevent it from shifting. (diagram 3-3)
In-Wall Bracing

Horizontal in-wall bracing is inserted at the 4-foot height, corner-to-corner around full perimeter. (diagram 4-1)

Horizontal in-wall bracing does not overlap corner ties. In-wall bracing stops just before corner tie. (diagram 4-2)
In-Wall Bracing continued

Horizontal in-wall bracing must centered on the full ties. (diagram 4-3)

RIGHT

FRiction-Fit
In-Wall Bracing

Ring Slots

WRONG
diagram 4-2

RIGHT

Firmly wire-tie in-wall bracing to a full tie every 2-feet. (diagram 4-4)

In-Wall Bracing Tied
Every 2 feet

When overlapping sections of in-wall bracing, be sure to overlap 16-inches and match up the zig-zag patterns of both sections before wire-tied together. (diagram 4-5)

In-Wall Bracing Overlapped 16 inches
and Wire-Tied Together
Window/Door Casing & Bracing

Openings can be built during form wall assembly or they can be cut in after the form wall is assembled. *(diagram 5-1, 5-2)*

Prior to Concrete Placement

Before placement of concrete, wood blockouts are securely anchored at head and jambs. A temporary 2x4 wood brace is added to openings over 2-feet tall. Wood sill blockout is not placed at this time.

Concrete Placed up to Sill Height

After placement of concrete up to the sill height, wood blockout is positioned at the sill, between the forms walls and anchored. Before placing anymore concrete, a temporary 2x4 wood brace is added to openings over 2-feet wide.
Window/Door Casing & Bracing continued

Blockouts for Doors
The jamb (side) blockouts for doors should be trimmed approximately 1/2-inch short. That space is left between the blockout and the footing or pad. This will allow the form to *settle without putting stress on the jambs. (diagram 5-3)

*As concrete is being placed, a small amount of settling or compacting of the forms may occur. This is due to the downward pressure (by the concrete) on the plastic spacer ties and the steel rebar.
Exterior Bracing

When assembled wall reaches 4-feet high, exterior vertical braces must be anchored to the form. Braces are placed 8-feet apart along one side of the form wall. Additional braces should be used next to window and door jambs. (diagram 6-1)
Exterior Bracing continued

16-Gauge Wire Slipped Behind Tie Pad

diagram 6-2

Vertical Bracing Wire Tied with 16-Gauge Wire to Full Tie Pad

Vertical Bracing

diagram 6-3

Two Common Ground Anchoring Methods

Wooden Stake

diagram 6-4

Turn Buckle
Exterior Bracing continued

The Lite-Form® Nylon Scaffold Bracket is anchored by sliding it into the utility cut-outs found in a common metal 2x4 stud. (diagram 6-5)

Specifications for Steel Studs Using Lite-Form® Scaffold Bracket

Overall Stud Dimensions
16-guage Only

Utility Cutout Dimensions

Typical Brands and Styles

Steel stud design should be tested, using a sample, to insure that the scaffold bracket will be seated properly.
Exterior Bracing continued

An adjustable Brace/Scaffold is an accessory item which is built by the contractor and reused several times. It consists of three primary parts:

A. Adjustable Scaffold Cleats
B. Vertical 2x4 Scaffold Studs
C. 2"x12" Working Platform Rated Planks

Once a set of parts has been constructed, they streamline project set-up and increase worker safety on the job. Major features are:

A. Eliminate Top Ladder Brace
B. 12" Adjustable Working Platform
C. Used on One Side of Entire Form
D. Used on Inside or Outside of Form

Adjustable Scaffold Cleat

Adjustable Scaffold Cleats are pre-assembled with sections of 2x4 studs and 1/2-inch plywood, using drywall screws. This design allows them to be quickly attached and removed from the vertical scaffold stud. (diagram 6-7, 6-8)
Top Assembly of Form Wall

When assembled wall reaches full height, vertical rebar is placed in-between the foam planks and inserted into the PVC collar up against the other rebar protruding from footing or pad. *(diagram 7-1)*

Top corner ties are used once the wall reaches full height. *(diagram 7-2)*

Full width in-wall bracing is friction fitted along the top of the wall form. Wherever a half tie is located, that slot is hand cut 1-inch deep & the half tie replaced. In-wall bracing is then pressed into the cavity around the entire perimeter of the form. *(diagram 7-3)*
Top Assembly of Form Wall continued

Form Wall at full height

Top Corner Tie

Half Tie (Every Other Slot)
Vertical Brace Wire Tied to Horizontal In-Wall Bracing at Top
In-Wall Bracing at Top
In-Wall Bracing 4 foot height

Vertical Bracing Wired Tied to In-Wall Bracing
Half Tie
Friction Fitted In-Wall Bracing

Wire "Punched" Through Form Form

Images:
Checking Alignment

Once form walls are completely assembled and braced, check the accuracy of the form's straight walls by stretching a stringline from corner to corner. Compare the alignment of the assembled wall and string. It may be necessary to adjust lateral braces or additional braces, to bring wall into full alignment. (diagram 8-1)

Before Pouring Concrete, Complete Check List!

✓ All ties are in place
✓ Rebar is in position
✓ All bracing is safely anchored in place
✓ Blockouts & bulkheads are braced
✓ Final check on dimensions & alignment
Blow-Out Repair Kit

A blow-out repair kit should be made BEFORE the concrete arrives. It is used to repair a form blow-out or break and is constructed of 2 pieces of wood 2x4s approx. 18-inches long, a piece of 1/4-inch thread rod, nuts, and washers. Thread rod must be long enough to go through the forms and 2x4s. (diagram 9-1)

As concrete is being placed, forms should be visually checked for possible breaks. Form breaks rarely happen but when they do, it's important to stop pouring the concrete as soon as possible...remove the built-up concrete from opening and reposition or replace the broken form pieces. Repair kit is placed over both sides of the break and tightened snugly. Resume placing concrete and remove kit in approximately 30 minutes. Holes created by the blow-out kit should be filled with expandable insulation or fresh concrete to insure against water penetration later. (diagram 9-2)
Concrete Specifications

Size and Type of Concrete "Aggregate"
Aggregate refers to the rocks and stones in the concrete. Concrete suppliers must receive clear instructions on the proper aggregate size and type. Smooth aggregate of 1/2 to 3/4-inch is recommended. (diagram 10-1)

![Sharp Aggregate](image)

**NO**
(diagram 10-1)

![Smooth Aggregate](image)

**YES**
(diagram 10-1)

Large, sharp-edged aggregate increases the chance of concrete to lodge or get plugged in the form.

Proper Consistency of Concrete "Slump"
Slump refers to how thick or thin the concrete mixture is. Very thick concrete doesn't fill the forms well and may cause voids. Very thin concrete pours well but increases form pressure and may lead to blowouts. Concrete should be ordered with a 4 to 6-inch slump. (diagram 10-2)

![No Slump](image)

**NO**
(diagram 10-2)

![Proper Slump](image)

**YES**
(diagram 10-2)

![Wrong Slump](image)

**NO**
(diagram 10-2)
Concrete Specifications continued

Placing the Concrete
Concrete is often placed in the insulating form walls with a concrete pump. Be sure and follow these simple steps so that your project goes well:

a. Do NOT insert the delivery hose straight down, into the form. Lay the hose flat, on top of the form and let concrete drop naturally into the form. If your concrete supplier has them, request two, 90° elbows for the end of the delivery hose. The elbows reduce the pressure of the concrete as it is being placed. (diagram 10-3)

b. Do NOT exceed 4-foot lifts at a rate of approximately 8-feet per hour. Pouring in higher than 4-feet can cause immediate form failure. (diagram 10-4)

c. Use a 3-inch delivery hose. If necessary, have your concrete pumper supply a reduction coupling.

d. Do NOT pour into forms which are over 12-feet tall. If total wall is to exceed 12-feet, stage the project as two separate pours with reinforcing steel between cold seams.

e. Only experienced operators should be allowed to use an electric vibrator with 1-inch head to consolidate concrete. Concrete can also be consolidated from the outside by tapping the tie pads with a rubber mallet. (diagram 10-5)

f. If a winter project is delayed for several days, assembled forms should be covered to avoid the accumulation of ice or snow at the bottom of the form. If this debris is not removed, they will cause voids in the wall when the concrete is placed.

Form Settling
As concrete is being placed, a small amount of settling or compacting of the forms may occur. This is due to the downward pressure (by the concrete) on the plastic spacer ties and steel rebar.
Stripping & Backfilling

Stripping the Insulation
If the forming insulation is to be stripped off after concrete placement, the form must be assembled using XPS (Extruded Polystyrene) insulation planks. Planks should not be treated with release agents prior to assembly. Care should be taken to assemble the form so that the manufacturer’s imprint is on the OUTSIDE of the form.

To prepare Insulation for stripping, strike the head of the exposed plastic tie pad with a hammer, breaking it loose from the tie.

A wide, smooth-bladed tool may be used to begin breaking insulation away from concrete. However, most planks can be removed by hand and salvaged for assembly into another form.

Once insulation is removed, a sharp-bladed tool is used to cut plastic ties flush with concrete surface. For best results, insulation should NOT be stripped SOONER than three days after concrete placement.

Backfill & Drainage
For below-grade projects, steps must be taken (BEFORE backfill is placed) to avoid water penetration and failure of finished concrete walls. Local building code officials are familiar with the techniques which are recommended or required for their area. Some common techniques are:

1. Cover footing and wall (up to grade) with proper waterproofing material
2. Install a drainage system at the footing
3. Add backfill material which promotes good drainage
4. Site should be landscaped to avoid water build-up near the wall
5. Include a rain gutter system to catch and move water away from wall

Backfill should be done NO SOONER than 48 hours after concrete placement. Care should be taken when operating heavy equipment near the wall to avoid damage to it.

*To avoid damage to the insulation, select products which are specifically approved for application directly over rigid Polystyrene insulation.
Exterior Finishing

Wait approximately 12 hours after inserting concrete, then remove all bracing. If a portion of the insulation form is to be removed, it should be done now by breaking the outer tie pad with a hammer (diagram 12-1) and prying the foam form off by hand. (diagram 12-2) Then cut the tie pads from the concrete with a sharp blade such as an ice scraper or straight edge spade. (diagram 12-2)

Below Grade Finishing
Local building codes may require different treatments. Follow manufacturer's directions for all products.

Dampproofing
Select only latex or low-solvent liquid dampproofing which is approved for application directly onto rigid polystyrene insulation. Apply a liberal coating directly onto the form, sealing around the exposed plastic ties and seams in the form wall. (diagram 12-4)

Waterproofing
Self-adhesive membranes or approved liquid waterproofing materials can be applied directly to the form walls. Follow manufacturer's recommendations for application directly onto rigid polystyrene insulation. (diagram 12-5)
Exterior Finishing continued

Above Grade Finishing
Local building codes may require different treatments.
Follow manufacturer's directions for all products.

Stucco, EIFS, Synthetic Masonry
Insulation surface must first be roughened by sanding or scratching. For single coat products, a generous coat of material is recommended to thoroughly cover the exposed plastic tie pads. For products having a base coat and mesh, the mesh is anchored directly to the exposed tie pads. Follow manufacturer's instructions for proper placement, temperature control, etc. Forms walls which have been exposed to the environment for more than 90 days will normally have a light coat of fine "powder" which must be thoroughly brushed off before applying finish. (diagram 12-6)

Brick
With a concrete brick ledge, brick veneer (fascia) can be added directly over the form walls. Brick anchors may be attached to the exposed plastic tie pads or may be inserted through the form wall, into the form cavity, prior to placement of concrete. Follow local building codes or accepted practices for the placement of brick anchors. (diagram 12-7)

Siding
Wood, metal, or synthetic siding may be added directly to the form walls. This is done by attaching a continuous vertical drywall metal "L" (1/2"x1") furring strip to the tie pads. A 1-inch deep vertical slot is first cut next to a row of tie pads using a saw or hot knife. The "L" angle is inserted into the slot and anchored to the tie pads. Follow manufacturer's recommendations for proper spacing of furring strips and anchoring of siding (diagram 12-8)
Interior Finishing

Electrical/Plumbing Lines
Follow local codes for the types of electrical and plumbing components which are acceptable for the project.

Electrical and plumbing lines are concealed in the insulation by cutting or carving a pathway approximately 1/2-inches deep with a saw, router, or electric hot knife. For junctions or switch boxes, insulation is completely removed and items are anchored directly into the concrete. Electric lines can be protected by running them inside approved metal or plastic conduit. Damage to lines can also be avoided by covering the pathway with a 16-gauge metal strip, approximately 2-inches wide, anchored to the exposed tie pads with a drywall screw. (diagram 13-1)

Electric lines can be held to the back of the pathway by using approved electrical anchors or expandable insulation placed approximately 2-feet apart.

Drywall
Sheetrock is attached with drywall screws anchored into exposed tie pads, every 16-inches on center. Typically, a vapor barrier is not required, behind sheetrock. (diagram 13-2)
T-Intersections

T-intersections are created in much the same matter as 90° corners, using a T-intersection tie. (diagram 14-1)

1. Insulation planks are trimmed so that spacer ties line up.
2. New slots are cut with a saw to accommodate T-intersection tie.
3. A T-intersection tie (inserted flush with insulation) is used at the bottom of the "T" and every course up the wall and at top of finished wall.

For walls that are over 8-inches thick, 90° corner ties must be substituted for T-ties. The "T" shape is assembled by alternating the position of the corner tie, as the wall is assembled. (diagram 14-2)
45° Corners

A 45° corner is created with a 3-piece Corner Tie Kit. This kit consists of an inner tie, outer tie and a wire connector. The inner and outer ties are identical and are interchangeable. Ends of form walls must be mitre-cut for proper fit. New slots will have to be cut, for these ties. Ties must be used at the bottom and in all courses, up the the wall including the top of finished wall. \(\text{(diagram 15-1)}\)

For concrete wall thickness of 4, 6 and 8-inches installer may use a single piece 45° corner tie. \(\text{(diagram 15-2)}\)

As with all corners, ties must be used at the very bottom of the form with a slot which is deep enough to be flush with edge of insulation plank. When placing subsequent rows of ties, they are placed so that half of the tie is left exposed. The tie is now ready to receive the next row of insulation planks,
Modify Corner Tie Width

12-inch wide corner ties can be modified for use in 14, 16, 18, 20, 22, and 24-inch thick forms. The diagram below shows how the corner tie is cut apart and wire-tied using #12 wire at new thickness. (diagram 16-1)
Brick Ledge

Brick ledges are used to create a concrete support for brick fascia (veneer) or a floor system. This technique creates a 4-inch wide ledge by reducing the concrete wall width (above the ledge) by 4-inches. Prior to assembly, the edge of the insulation planks at the ledge is field trimmed by installer with a hand or power saw at a 60° angle. (diagram 17-1)

At the ledge, the form is supported by inserting a wide half tie in every other slot and a narrow full tie in every other slot. In addition, lengths of metal suspended ceiling frame* are trimmed to span the wider wall, every 24-inches along the ledge. Slots must be cut for this frame which will remain in the wall.

*Purchased by installer at building materials center.

The common or back side of the wall must have continuous vertical bracing every 8-feet along the wall (if vertical in-wall bracing is not used, vertical bracing must be placed every 4-feet). Vertical braces must be wire tied to the form at the ledge and at top of finished wall. Friction fit horizontal in-wall bracing is recommended at the top of the ledge, to keep it properly aligned. (diagram 17-2,17-3)

Outside Wall View

Half Tie
Every Other Slot
Along Top

If the upper and lower portions of the ledge are to be filled with concrete in one operation, installer should place concrete up to ledge, float it smooth and place concrete in the upper portion of ledge.

Inside Wall View

Half Tie
Every Other Slot

Suspended
Ceiling Frame
Every 24-Inches

Insulation Plank
Cut at 60° Angle
Double Exterior Bracing

Forms which are assembled 14-feet tall or taller require double lateral braces at each vertical brace. Lateral braces of 2x4 dimensional lumber or 16-gauge steel should be set at a 45° angle or more. Lateral braces can be anchored to vertical brace with Lite-Form® scaffold bracket or anchored directly with 3-inch drywall screws. Lateral braces are firmly anchored at base with stakes or adjustable form anchors.
(diagram 18-1)
Bulkheads

Bulkheads may be constructed by inserting dimensional lumber inside the form wall and anchoring with 3-inch drywall screws and insulation washers every 8-inches up the form wall, on both sides. For bulkheads over 4-feet tall, diagonal bracing with 2x4 dimensional lumber should be added, anchoring it midway to the bulkhead and at base with stake or mechanical fastener. (diagram 19-1, 19-2)
Utility Cutouts

Holes for utility lines (water, gas, etc.) are cut into the form wall with a saw. These cutouts are made when the wall has been fully assembled. Blockout is constructed by placing any sturdy material into the hole which matches the hole dimension. If Blockout is to be removed it should be done approximately 1 hour after concrete placement. (diagram 20-1)

Large cutouts can be reinforced by attaching a 3/4-inch plywood collar around the blockout. Collar is anchored to the plastic tie pads using drywall screws. (diagram 20-2)
Termite Prevention

Metal Flashing Barrier
A 20 to 22-guage metal strip is placed at the top of the concrete wall before the wood sill plate is attached. This must be a continuous flashing with no gaps, at least 1-inch wider than the upper wood plate. Flashing should be galvanized or plated for exterior use with edges bent down, to shed moisture. This barrier will not prevent termites or ants from tunneling inside the insulating form walls, but should offer long-term protection for the wooden portions of the building. (diagram 21-1)

Inspection Strip
Prior to covering or finishing the exterior of the walls, remove a continuous strip of insulation (to expose the concrete) around the entire perimeter of the structure. Strip should be approximately 1-foot above grade level and should be 6 to 8-inches wide. Trim the bottom edge of the strip at a 45° slope so it will shed moisture. Stucco finish can now be used to cover the remaining insulation and inspection strip. Since these insects do not normally migrate in the open, the inspection strip will deter their movement. If an infestation does occur, it can be seen quickly with an inspection by the homeowner or a pest control professional. (diagram 21-1)

When using Lite-Form® to build below-grade walls, installers must comply with building codes as they relate to potential infestation by termites. Lite-Form® shall not be responsible for direct or indirect damage to structures due to termite infestations.
Floor Systems

A variety of flooring systems can be anchored to the finished form walls. This includes pre-engineered trusses, conventional trusses as well as pre-cast concrete floors. The examples below are typical installation procedures for a variety of situations. Local building codes for anchoring specs, spacing of anchors, etc. must be followed for each project. (diagram 22-1, 22-2, 22-3, 22-4)

Concrete Lower Wall, Light Frame Construction with Top-Bearing Connection

Common Concrete Walls, Floor Ledger with Side-Bearing Connection

Common Concrete Walls, Floor Ledger with Thru-Bolt Connection

Step Back Concrete Walls with Top-Bearing Connection
Attaching Lower Form to Upper Form

Multi-story concrete walls are constructed by assembling and pouring the forms, one story at a time. Vertical reinforcing steel is placed into the concrete of the lower form (spacing is dictated by local codes and conditions) so that it extends 12 to 18-inches into the cavity of the upper wall form. With the lower story completed, the floor system should be installed before the upper wall forms are put into place. Upper form walls can be secured to the lower form walls in two ways:

**Truss Plates**
Immediately after concrete is placed into lower form, 3-inch truss plates are first bent 90° to allow 2-inches of exposed area (teeth facing up), once they are set. Plates are then "wet set" approx. every 4-feet along the entire perimeter of the form and approx. 6-inches from the edge of each corner. As upper form is being placed, it is pressed firmly onto the "teeth" of the truss plate. Forms should be braced immediately after placement onto lower form. *(diagram 23-1)*

**Exterior Cleats**
3-foot lengths of 1x2 dimensional lumber are temporarily anchored to the spacer tie pads of the lower wall with 2-inch drywall screws. Cleats should be placed every 24 to 32-inches and immediately next to corners and should extend approx. 3-inches up, beyond lower wall. They are removed after concrete has been placed. *(diagram 23-2)*
Engineered Floor System

Detail as drawn is a general guide only and does not replace manufacturer's guidelines for application of their products or the prevailing construction codes for a particular region or project design. (diagram 24-1, 24-2)
1-Foot & 2-Foot Offsets

Forms for offsets can be assembled with two standard corner ties. For 1-foot offsets, a portion of the corner tie is trimmed or cut off. As with standard corners, insulation planks must be trimmed and slots added, to accommodate the corner ties for each 8-inch course, up the wall. Trimming and slotting dimensions will vary and are determined by the concrete wall thickness. Corner ties must always be placed at the bottom of the form. Slots must be cut deep enough to allow the ties to be inserted flush with the insulation. Subsequent ties are placed so the tabs support two courses of insulation. (diagram 25-1, 25-2)

1-Foot Offset (using trimmed corner ties)

![Diagram 25-1](image)

2-Foot Offset (using complete corner ties)

![Diagram 25-2](image)
Custom Corners

The hinge tie is used to form corners other than 90° or 45°. The center of the tie is flexible (hinged) so that it can accommodate nearly any corner angle. Typically, only one hinge tie is used at the outside of the corner with full ties being used on either side. Special slots must be cut to accommodate the hinge tie and full ties. It is important that the full ties be positioned as close as possible on either side of the hinge tie. This is necessary for proper support of the corner. At the bottom of the form, the hinge tie and supporting full ties must be pressed completely into the slots so that it is flush with the insulation planks. For subsequent rows, ties are pressed half-way into the planks so that top of tie is exposed. Tie is now ready to receive the next row of insulation planks. Before assembly all insulation planks should be mitre-cut to the proper angle. (diagram 26-1)
Transition Corners

Transition corners may be appropriate for below-grade projects which are in sloping ground conditions where some of the concrete walls will be totally below-grade while others are "walk-out" walls. Changing the wall thicknesses is normally done at the project's corners with the use of a transition corner tie.

![Diagram 27-1](image)

This diagram shows an 8-inch and 4-inch concrete wall meeting at the transition corner. Transition ties for other combinations are available. Transition corners are assembled in the same manner as standard 90° corners. *(diagram 27-1)*

**Using Standard 90° Corner Tie for Transition Corner**

![Diagram 27-2](image)

This diagram shows a 10-inch concrete wall with a transition to an 8-inch concrete wall. A 10-inch corner tie is used. *(diagram 27-2)*

![Diagram 27-3](image)

This diagram shows a 10-inch concrete wall with a transition to an 6-inch concrete wall. A 10-inch corner tie and filler block are used. *(diagram 27-3)*
Winter Projects

After pouring concrete in cold weather, a temporary blanket of insulation should be laid over the exposed concrete at the top of the form. Keep in place for at least 72 hours. Because of the high insulating value of the form walls, this protection from cold temperatures is all that's needed. *(diagram 28-1)*

**Concrete Additives**

Winter temperatures may force the concrete supplier to include additives to the concrete so it will not freeze during delivery and placement. Hot water may be used in the mixture during mild winter conditions. Anti-freezing agents may be added to the mixture during more severe conditions.

**Delays**

If it will be several hours or days before concrete is placed in an assembled form, it should be covered at the top to avoid accumulating snow or ice inside the form. Accumulations of snow or ice must be removed before concrete placement. If left in place, it could cause major voids at the bottom of the wall.
Radius Walls

Curved wall forms are produced by assembling the 8-inch wide planks of insulation vertically, similar to the staves in a wooden barrel. The result is that the curve is broken down into 8-inch wide flat sections on the outside of the curve and specially cut, narrower sections on the inside of the curve. (*diagram 29-1*)

Determining Radius
The radius of the curve is determined by the width of the inner planks of insulation. Deciding how narrow these planks should be, can be worked out mathematically, by scale drawings or by laying out a full-size pattern on a flat work surface. (*diagram 29-1*)

Reductions for Inner Form Wall
Once the proper width for the inner wall planks has been determined, they should be trimmed the edges should be mitre-cut with a table or bench saw. Tie slots are re-cut to proper depth.

Assembly of Curve
It is best to assemble the curved portion of the wall by itself, adding the assembled section to the straight portion of the form. Points to remember, as you assemble:
- Ties will be inserted sideways
- Half ties must be used at top and bottom as with a typical form.
- Walls over 4-feet tall should include steel in-wall bracing.

Steel Strapping Brace
Steel strapping is mounted around the outside of the curve and anchored. This is done by stretching the strapping taut and anchoring it to the forming tie pads on the straight section of the form. For best results, strapping should be stretched using standard tensioner and locked with standard strapping seals. If these tools are not available, pliers can be used to achieve proper tension on the strapping. (*diagram 29-2*)
Radius Walls continued

Bracing
Once assembly is completed, move the form into position. Adjust the form for proper alignment and anchor the form guides at the footing. A top ladder brace is constructed by using two pieces of 1/2-inch plywood which has been cut to match the inner and outer form wall. Each piece of plywood should be approximately 6-inches wide. 1x2 lumber is used to anchor the pieces together. A ladder brace is put in position at top of form. (diagram 29-3)

Clamping & Anchoring
The curved ladder brace must be securely anchored to the ladder braces on the rest of the form. Plastic twine is used to clamp the curved section to the rest of the form at the common seam. For most curves, it is not necessary to install an inner form guide at the bottom. (diagram 29-3)
Sloped (Raked) Forms

When constructing entire buildings, the top of the concrete form may be sloped (raked) at the gable ends of the walls. This can also occur at the top of a retaining wall which is sloped because of landscaping. This unique feature can be assembled and poured along with the conventional portion of the walls.

Assemble Forms Beyond Trim Line
Once forms have been assembled beyond their trim point, snap a chalkline along the form wall and trim form with a hand saw. Where necessary, cut new slots in the insulation approximately 8-inches apart to accommodate half ties. Exterior vertical bracing must extend a least to the top of finished height of wall. (diagram 30-1)

Top Bracing
Insert a continuous length of in-wall bracing accessory along the top of the trimmed form. Bracing should be same width as form cavity and fit snugly into it. Insert half ties into the slots and wire-tie in-wall bracing to them every 2-3-feet.

Placing Concrete
Standard 6-inch slump concrete can be used. For extreme angles, it is recommended that slump be no more than 4-inch. This will reduce the possibility of concrete drifting, once it is placed.
Arched Openings

Blockouts for roundtop and eyebrow windows can be formed by first cutting the opening in the form walls with a saw, then anchoring lengths of 2x4 wood studs into the opening along the curve of the blockout. Studs should be spaced without gaps between them. Each length is anchored with 3-inch drywall screws and plastic washers on both sides of the form. After installing a dimensional lumber lintel at the bottom of the opening, insert a single piece of 3/4-inch plywood or 2-inch insulation, cut to match the opening. This should fit snugly so it will keep the blockout properly aligned. This piece is removed after concrete placement. (diagram 31-1)
Pilasters may be assembled with solid panels of rigid insulation which have been cut into six pieces for each pilaster. (diagram 32-1)

Pilaster pieces are assembled by using 3-inch drywall screws and corner clips at the bottom and top and every 8-inches up the pilaster (diagram 32-2). Anchor the front and back of pilaster together with Quik-Strip® spacer ties (diagram 32-3). To place these ties, 2-inch wide slots are cut into the panels starting 4-inches up from bottom of pilaster & every 12-inches up the wall. Ties are locked in place with lengths of #4 steel rebar through the loops of the ties.

Corner Clip Installation

Top View

Note: If side of pilaster is longer than 12-inches, Quik-Strip® Ties must also be inserted across the pilaster and anchored with rebar.
Pilaster continued

Once assembled, the pilaster is integrated into the straight portions of the form wall. This is done by hand cutting 1-inch wide slots into the insulation panels, every 8-inches up the pilaster. *(diagram 32-4,32-5)*

**Outside Wall View**

**Inside Wall View**

- Rebar
- Corner Clip

**diagram 32-4**

- Hand-Cut Slots For Tie Connection With Rest of Form Wall
- Corner Clip

**diagram 32-5**

- Note: Full Tie Joining Pilaster to Form Wall Planks are Turned on Side to Accept the Handcut Slots on Pilaster.
Piers may be assembled in much of the same manner as the pilaster with solid panels of rigid insulation which have been cut into four pieces for each pilaster. (diagram 33-1)

Piers pieces are assembled by using 3-inch drywall screws and corner clips at the bottom and top and every 8-inches up the pier. Anchor the sides of the pier together with Quik-Strip® spacer ties (diagram 33-3). To place these ties, 2-inch wide slots are cut into the panels starting 4-inches up from bottom of pilaster & every 12-inches up the wall. Ties are locked in place with lengths of #4 steel rebar through the loops of the ties. (diagram 33-4)
Efficiency Bracing

If the finished commercial form walls are **4-feet high or shorter**, efficiency bracing is recommended. *(diagram 34-1)*

If the finished commercial form walls are **taller than 4-feet**, typical bracing should be used as shown in the Basic Residential.

```
(2x4 Lateral Wood Brace Every 8-feet)
Lateral Brace Anchored to Steel Stud With 3-Inch Self Tapping Screws
Continuous 16-guage Steel Stud
Half Tie
Wire Looped Around Steel Stud & Half Tie
Pilaster
Efficiency Bracing
Commercial form wall at full height. *(diagram 342)*
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Access Ports

Access ports are used to assist in placing concrete into an assembled form which is over 12-feet tall. Ports should be placed approximately half-way up the assembled wall. This provides a dependable height for dropping concrete, reducing the risk of a form failure.

Before cutting the access port, insert a nail into the piece of wall that is to be removed. This will simplify removal and handling. Access ports are cut on one side of the form by extending the tie slots with a handsaw. (diagram 35-1)

Spacer ties are moved away from cut out section. Remove the section. The removed sections must be salvaged and replaced after concrete has been placed. (diagram 35-2)

Concrete is placed in 4-foot lifts (average of 8-feet per hour) up to the level of the ports. Insulation plugs are reinserted and ties are lowered and ties are moved back in place. With that complete, final concrete placement is done from the top of the form wall. (diagram 35-3)
Beam Pockets

Pockets are constructed by inserting pieces of 2-inch thick insulating form between the rows of forming ties. Pieces are trimmed to match depth and width of required pocket and held in place with steel rods. Approximately 30 minutes after concrete is placed, steel rods are removed. Insulation sections are removed later to expose pocket for beams or joists. (diagram 36-1)

[Diagram 36-1: Beam Pockets]

[Diagram 36-2: Beam Pockets with additional details]
Adjusting For Uneven Footing

Conditions may exist where the concrete footing or pad is not level. The following technique is used to correct errors of less than 2-inches.

Step 1
Determine the highest corner along the footing or pad. Assemble and place that corner of the form. Since this corner is at the correct height, no adjustment is needed. Then temporarily set the remaining corner forms in place.

Step 2
From the first corner, set an accurate, horizontal string line at that height, around the perimeter of the form, comparing the string line with the other corner forms you have placed. Raise the corner forms to the proper height by "wet setting" with mounds of fresh concrete under them, pressing them into the concrete until they match the string line height. (diagram 37-1)

Step 3
Using the string line as a guide for proper height, continue setting the first course or sections between the corners. As with the corners, place mounds of fresh concrete at the point where the sections lock together. Wet set the sections by pressing them into the mound so that it is at the proper level. Continue setting the first course of forms in this manner, referring to the string line for proper height. (diagram 37-1)

Step 4
With the first course of forms in place and at the proper height, insert concrete into the forms to a level approx. 1/2 the height of the first course. Care should be taken to see that the forms do not shift during placement, alignment cleats or other weighted objects can be used to along sides of the forms to keep it from shifting. As concrete is going in, compare form heights to string line to be sure they have not shifted. Allow concrete to set for approx. 20 minutes. After the waiting period, form assembly can continue in the normal manner.
In-Wall Bracing is an internal alignment brace (diagram 38-1) which can be used in a variety of ways, as explained in the Installation Guide and Assembly Manual. This welded-wire girder is placed horizontally or vertically within the form cavity to assure a straight, precise form wall. It reduces the amount of outside bracing needed to hold the form in proper alignment. In-Wall Bracing is available in 2 3/4, 4, 6, and 8-inch widths and can be used in virtually all widths of concrete wall forms by placing them: (1) along the spacer tie discs, (2) offset, next to one side of the form or, (3) friction-fit, spanning the full width of the form cavity.

4-Inch Forms

- 4-inch Bracing, Friction-Fit Into Form

6-Inch Forms

- 4-inch Bracing, Wire-Tied at Disc on One Side of Form
- 6-inch Bracing, Friction-Fit Into Form

8-Inch Forms

- 4-inch Bracing, Wire Tied at Discs Centered in Form
- 6-inch Bracing, Wire-Tied at Disc on One Side of Form
- 8-inch Bracing, Friction-Fit Into Form

10-Inch Forms

- 4-inch Bracing, Wire-Tied at Disc on One Side of Form
- 6-inch Bracing, Wire-Tied at Discs Centered in Form
- 8-inch Bracing, Wire-Tied at Disc on One Side of Form

12-Inch Forms

- 4-inch Bracing, Wire-Tied at Discs Centered in Form
- 8-inch Bracing, Wire-Tied at Discs Centered in Form

Horizontal Bracing

Bracing should be installed every 4-feet up the form wall and at top of wall, around the entire perimeter. This procedure insures a straight wall from corner-to-corner. When using bracing which is less than full cavity width, it must be securely wire-tied (to spacer ties) every 2-3 feet along the brace. Bracing should not be placed on same level as horizontal rebar. When overlapping sections, match the diagonal bracing patterns of both sections before wire-tying. Failure to do this can cause voids in concrete, due to lodging.
In-Wall Bracing Alternatives continued

Vertical Bracing, 2 3/4" Width
This bracing is commonly used when Lite-Form® forms components are assembled at the jobsite. For concrete walls of 14-inch or wider, 4, 6 or 8-inch bracing should be used. Refer to Basic Residential section, "In-Wall Bracing: Optional Vertical Bracing" for details on use. Bracing is placed every 4-feet around the entire form by "weaving" it along a vertical row of spacer ties. (diagram 38-3)

In-Wall Bracing is NOT meant to replace horizontal or vertical steel reinforcing (rebar) which may be required under code.
Concrete Residential Basement with concrete upper wall engineered for Sioux City, Iowa and similar zones

22. #4 vert. rebar at window/door jambs (not shown)
21. #4 horiz. rebar continuous at 8 inches
20. #3 vert. rebar every 32 inches
19. #3 vert. rebar every 32 inches, 2 feet 6 inches long. Extends 6 inches into basement wall
18. 4 inch in-wall bracing at 4 foot height
17. 2 inch insulating foam
16. 1/2 inch drywall
15. Floor underlay and carpet
14. Engineered wood floor joist
13. 2 x 4 sill plate continuous, anchored every 32 inches or per code
12. 8 inch in-wall bracing
11. 6 inch in-wall bracing at 4 foot height
10. Waterproof exterior per code
9. 1/2 inch drywall interior
8. 8 inch in-wall bracing
7. 2 inch insulating wall form
6. 8 inch reinforced concrete wall per code
5. Rebar tied into footing - overlap 12 inches
4. Reinforced concrete floor per code
3. Reinforced concrete footing per code
2. Drainage tile
1. Gravel backfill for drainage
Version B

Concrete Residential Basement with concrete single upper wall

A

Basement & Foundation

1. Gravel backfill for drainage
2. Drainage tile
3. Reinforced concrete footing per code
4. Reinforced concrete floor per code
5. Rear tied into footing - overlap 16 inches
6. 1/2 inch drywall interior
7. Waterproof exterior per code
8. 8 inch reinforced concrete wall per code
9. 8 inch in-wall bracing at 4 foot
10. 2 inch insulating form wall

*NOT TO SCALE

B

Main Floor & Basement

11. 8 inch in-wall bracing, top of wall
12. 2x10 wood rim joist continuous anchored into concrete every 32 inches with 1/2 x 8 inch bolts
13. Metal joist hanger
14. Floor joist
15. Floor underlay and carpet
16. Insulating wall with 60-degree cutoff at brick ledge
17. Vertical rear per code, ties into basement - overlap 16 inches
18. Brick fascia supported at basement ledge, anchored with metal tabs per code
19. 1/2 inch drywall Interior
20. 2 inch insulating wall form
21. 4 inch in-wall bracing at 4 foot height
22. 4 inch reinforced concrete wall per code

*NOT TO SCALE

C

Roof & Main Floor

23. Vertical & horizontal rear per code
24. Exterior finish as needed
25. 4 inch in-wall bracing, top of wall
26. 2x8 plate continuous, anchored per code
27. Engineered roof as needed

Alternate Details for Brick Ledge and Floor Joist Treatment

28. 4 x 6 x 3/8 inch steel support, continuous
29. Anchor into concrete per code
30. Alternate floor support - 2x4 sill plate continuous
Version C

Concrete Residential Basement with concrete multiple upper walls

A
Basement & Foundation

10. Waterproof exterior per code
9. 1/2 inch drywall interior
8. 8 inch In-wall bracing
7. 2 inch Insulating wall form
6. 12 inch reinforced concrete wall per code
5. Rebar tied into footing
4. Reinforced concrete floor per code
3. Reinforced concrete footing per code
2. Drainage tile
1. Gravel backfill for drainage

B
Main Floor & Basement

20. 8 inch In-wall bracing
19. 2 inch Insulating wall form
18. 1/2 inch drywall interior
17. Floor underlay and carpet
16. Floor joist
15. 2 x 4 sill plate
14. 12 inch reinforced concrete wall per code
13. Exterior finish not applied
12. Rebar tied into basement
11. 8 inch In-wall bracing

C
Second Story & Main Floor

23. Floor joist
22. 8 inch In-wall bracing
21. 8 inch Insulating wall form
20. 1/2 inch drywall interior
19. Floor underlay and carpet
18. Floor joist
17. 2 x 4 sill plate
16. 12 inch reinforced concrete wall per code
15. Exterior finish not applied
14. Rebar tied into 1st floor
13. 8 inch In-wall bracing

D
Roof & Second Story

37. Engineered roof as needed
36. 2 x 6 plate continuous
35. 4 inch In-wall bracing
34. Exterior finish not applied
33. 2 inch Insulating wall form
32. 1/2 inch drywall interior
31. 4 inch reinforced concrete wall per code

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