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Section 1

Preparing for ThermoForm System

Tools for the Jobsite

- 2 cordless circular saws
  - 1 saw for ripping poly panels
  - 1 saw set up for grooving poly panels
    - This saw should have 2 blades mounted together to make the proper width groove
    - A table saw can be used in place of a cordless circular saw
- 4’ levels
- Rebar cutter or 4” grinder or metal cut off saw
- Scaffolding
  - Although not necessary, ICF scaffolding greatly facilitates construction by replacing kicker bracing and increasing jobsite safety
- Power fastener (for attaching C-channels to footing)
- Square
- Chalk line
- String line (for straightening walls)
- Hand saw
- 6’ or 8’ ladders

Tools Each Worker Should Have

- Tool pouch
- Hammer
- Aviator snips (for cutting stud rails and C-channels)
- Cordless screw gun

Fasteners

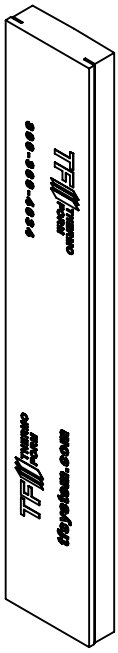
- 3” coarse thread construction screws (star drive / 6 lobe drive works best)
- 1-1/2” coarse thread construction screws (star drive / 6 lobe drive works best)
- 1/2” steel stud framing screws (darts) or sheet metal studs
- 1-1/4” round masonry nails, or power fasteners

Bracing Materials

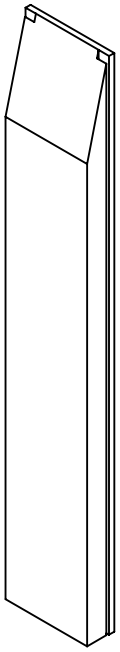
- 2"X6" ’s for corner bracing
- 2"X4" ’s for corner bracing and kickers
- Stakes or pins for anchoring kickers

This list may not be complete; it is intended to show the basic tools required to efficiently install ThermoForm system components.

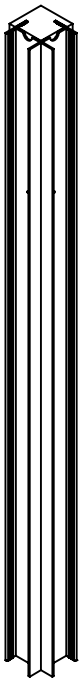
What components make up the ThermoForm System?



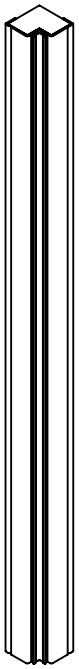
8" WIDE X 4' or 5'
2-1/2" THICK
MOLDED POLY PANEL



8" WIDE X 4' OR 5'
TAPER TOP
POLY PANEL

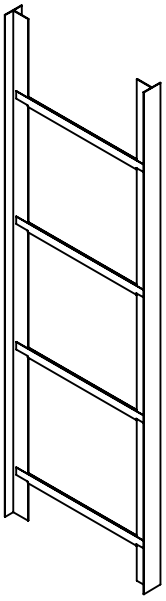


OUTSIDE PLASTIC
CORNER
90° & 45° AVAILABLE

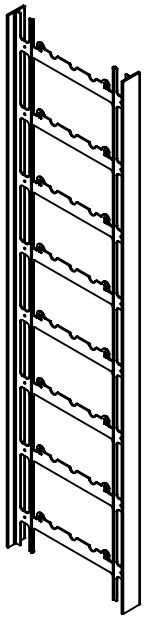


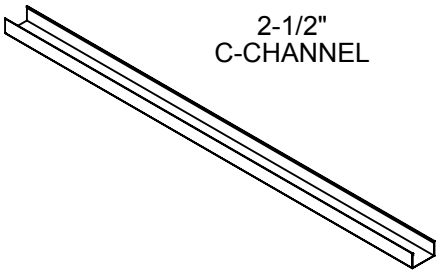
INSIDE PLASTIC
CORNER
90° & 45° AVAILABLE

STEEL STUD
12"-24" CONCRETE
UP TO 12FT HEIGHTS



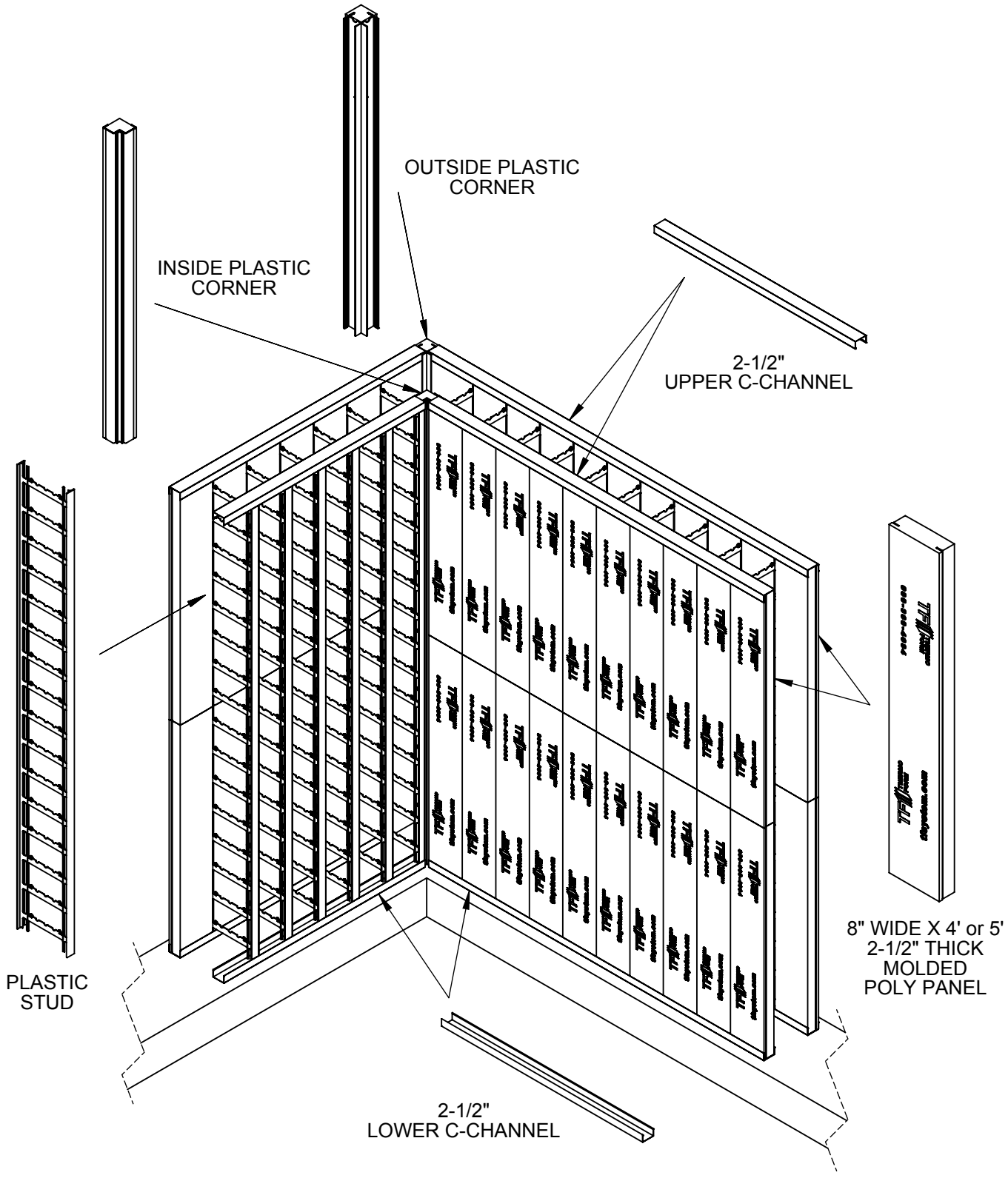
PLASTIC STUD
4"-10" CONCRETE
UP TO 12FT HEIGHTS





2-1/2"
C-CHANNEL

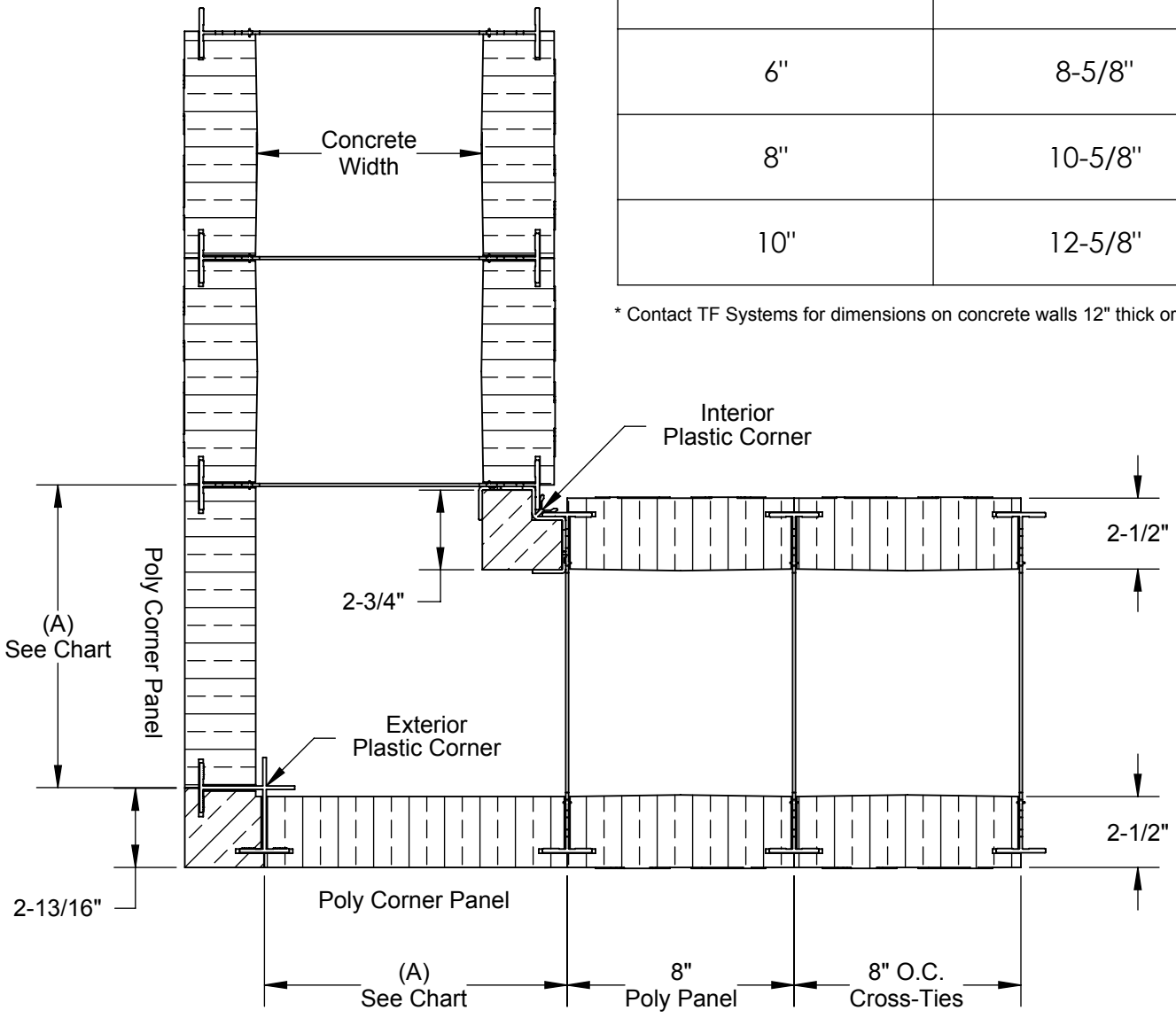
Where are the components located in the ThermoForm System?



Corner Set Dimensions

Concrete Width	(A) Width of Poly Corner Panel
4"	6-5/8"
6"	8-5/8"
8"	10-5/8"
10"	12-5/8"

* Contact TF Systems for dimensions on concrete walls 12" thick or greater



90° Corner Sets

ThermoForm

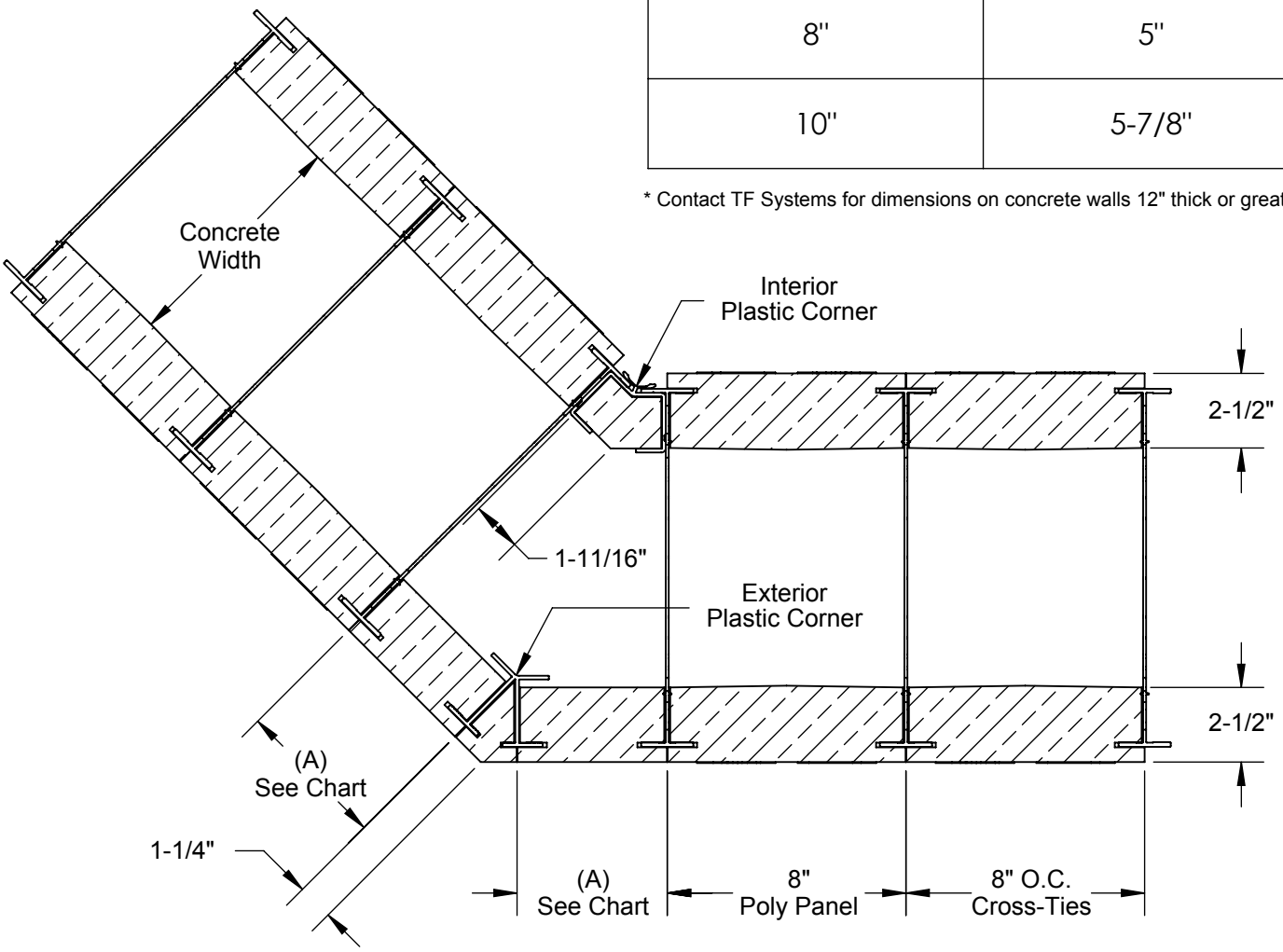
TF Forming Systems, Inc
800-360-4634
www.TFSystem.com

Date: 3/10/2014

Corner Set Dimensions

Concrete Width	(A) Width of Poly Corner Panel
4''	3-3/8''
6''	4-1/4''
8''	5''
10''	5-7/8''

* Contact TF Systems for dimensions on concrete walls 12" thick or greater.



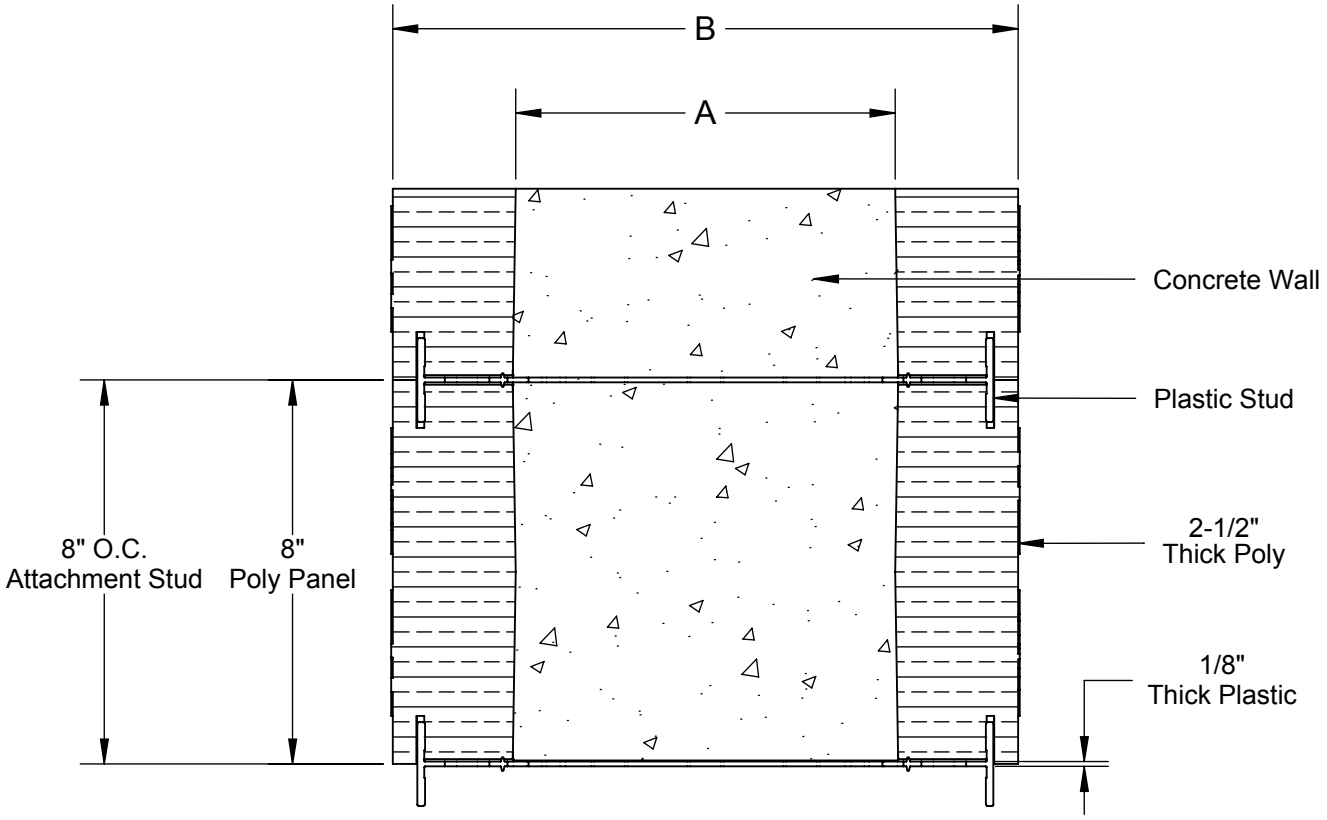
45° Corner Sets

ThermoForm

TF Forming Systems, Inc
800-360-4634
www.TFSystem.com

Date: 3/10/2014

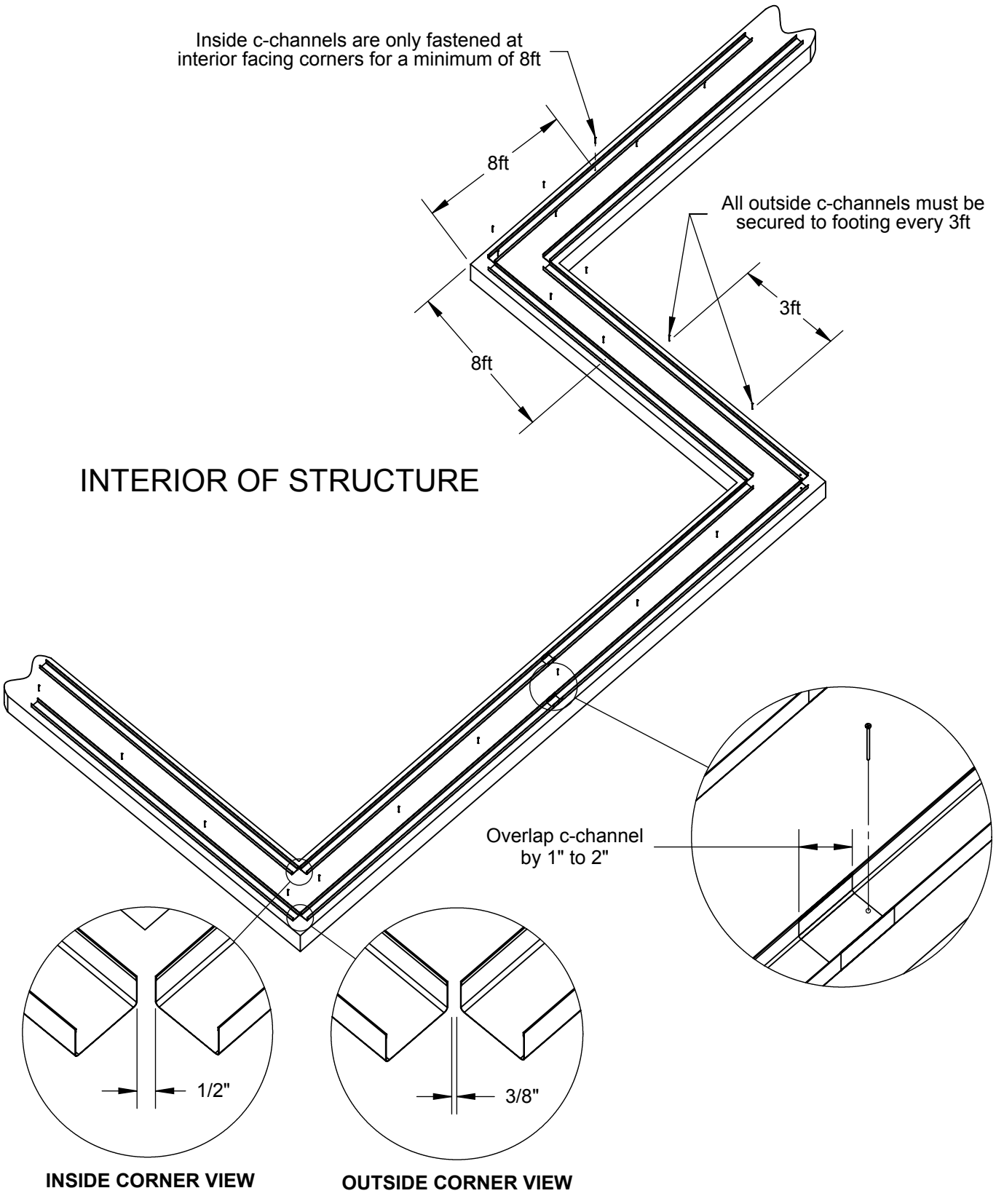
Wall Width Dimensions
Top View



System call out	(A) Actual width of concrete	(B) Outside to outside of rigid insulation
4"	4"	9"
6"	6"	11"
8"	8"	13"
10"	10"	15"

Section 2

90° Corner Assembly



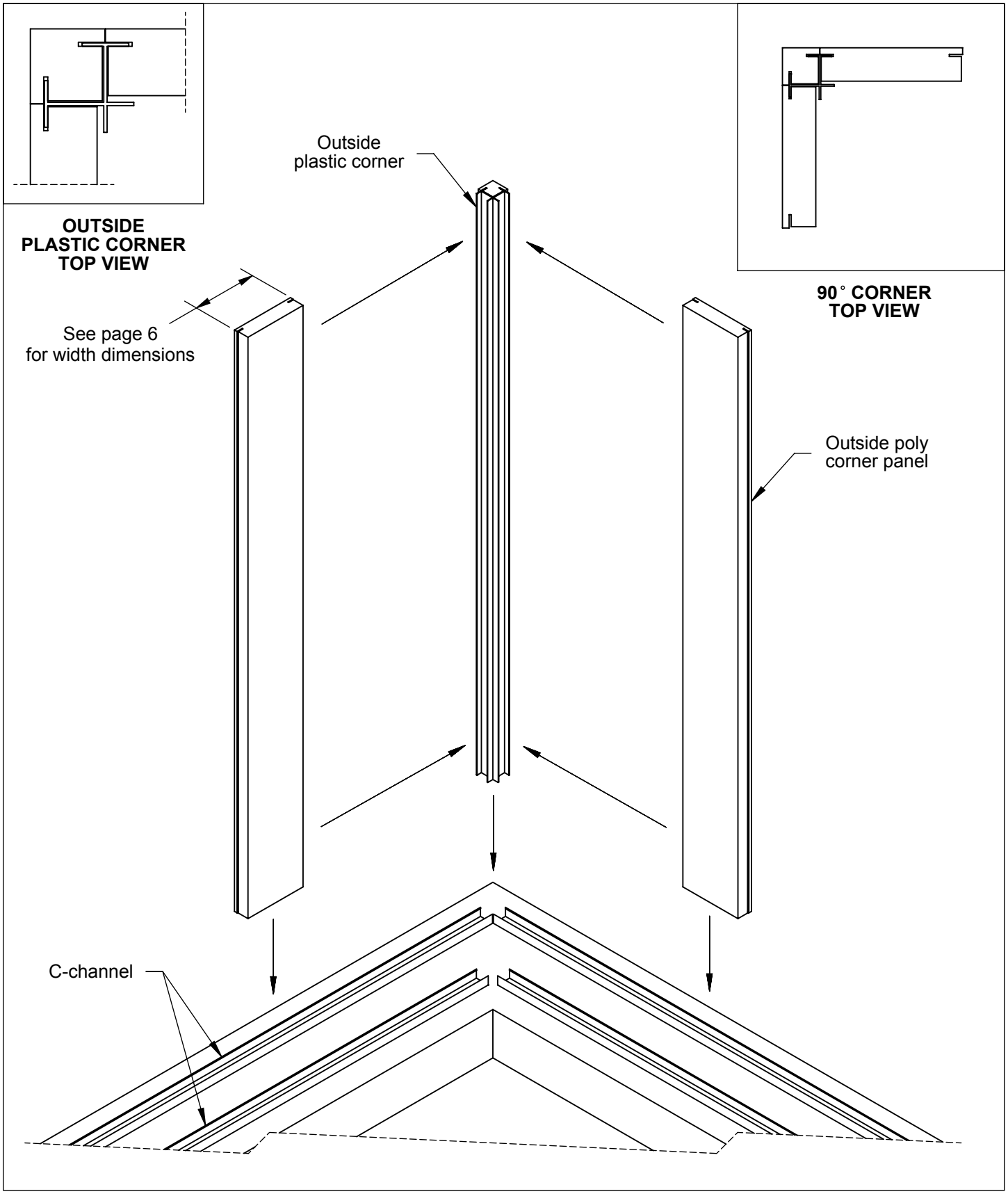
TF FORMING SYSTEMS

Lower C-Channel Mounting

ThermoForm

TF Forming Systems, Inc
800-360-4634
www.TFSystem.com

Date: 9/10/2013

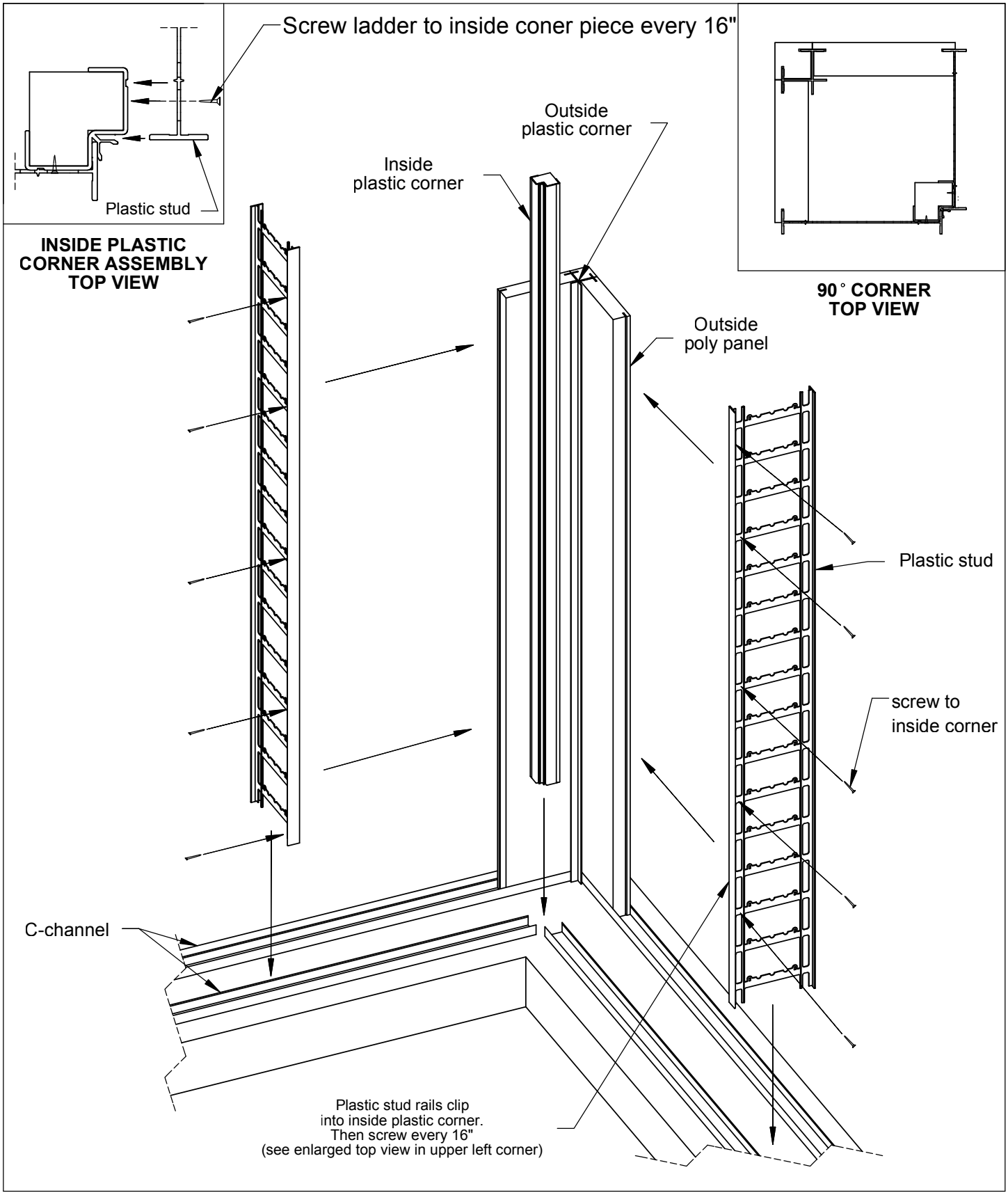


90° Corner Assembly

ThermoForm

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www.TFSystem.com

Date: 9/10/2013



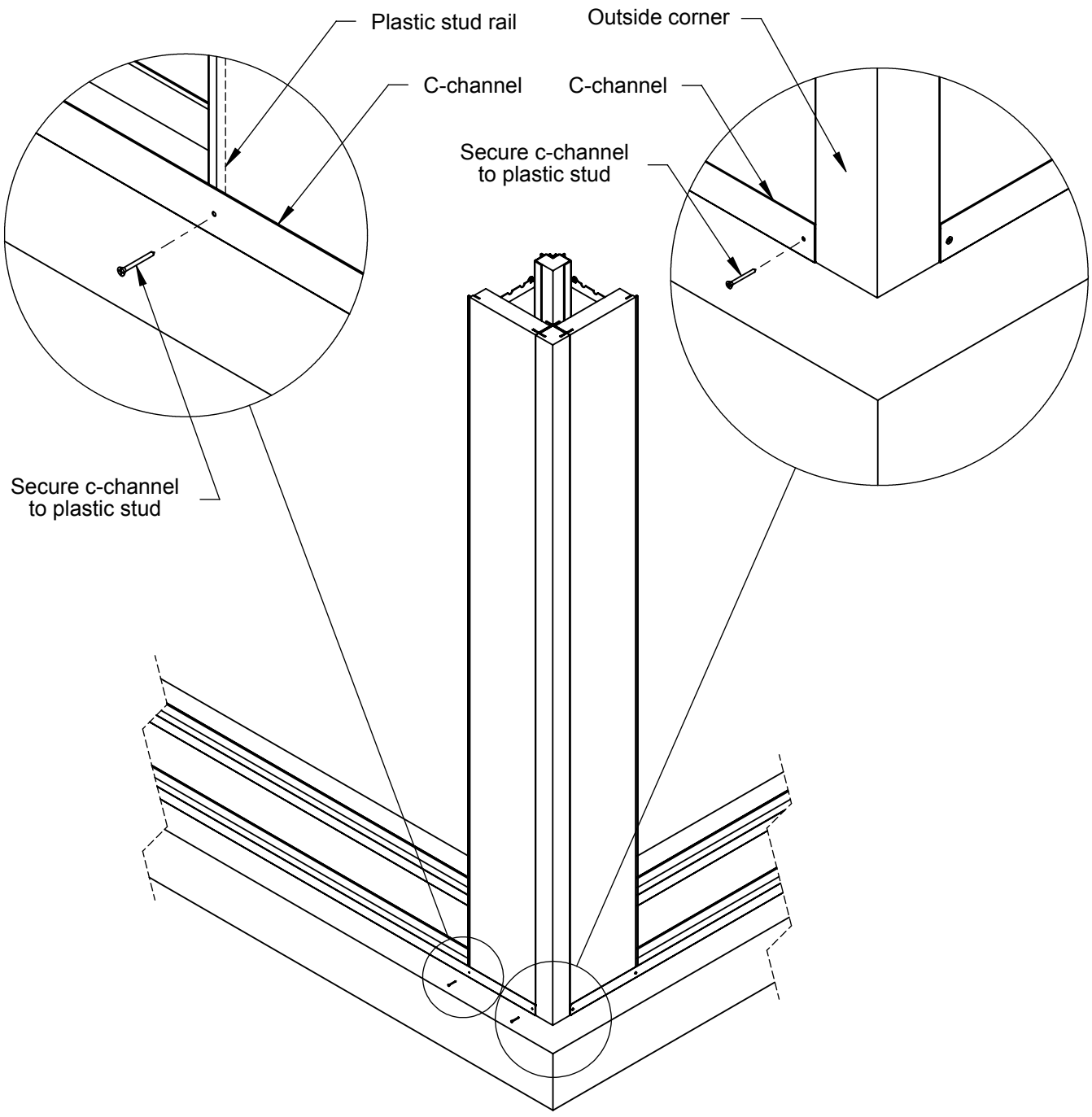
90° Corner Assembly

ThermoForm

TF Forming Systems, Inc
800-360-4634
www.TFSystem.com

Date: 7/12/2016

C-CHANNEL SHOULD BE SECURED TO BOTH THE PLASTIC STUD AND OUTSIDE PLASTIC CORNER



90° Corner Assembly

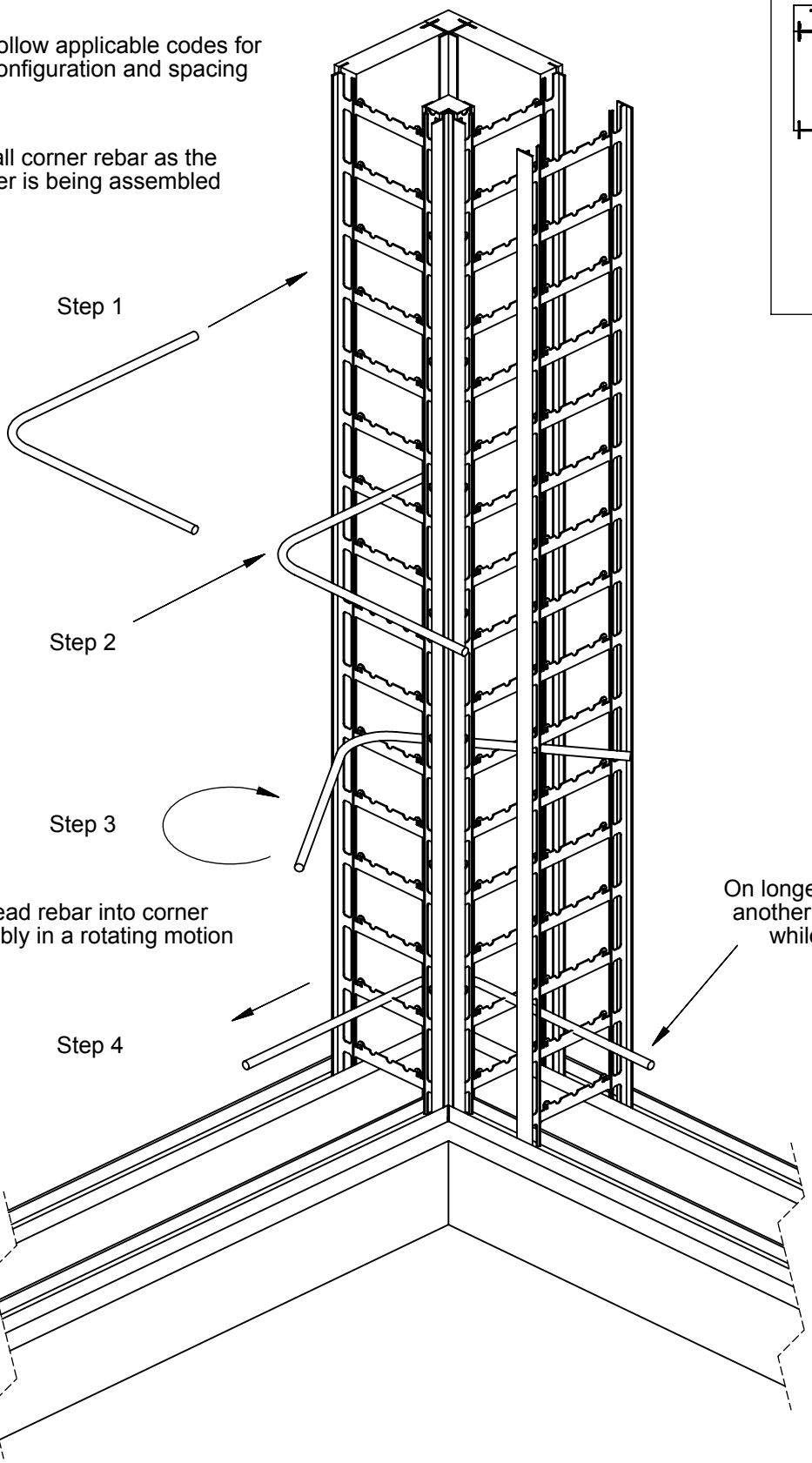
ThermoForm

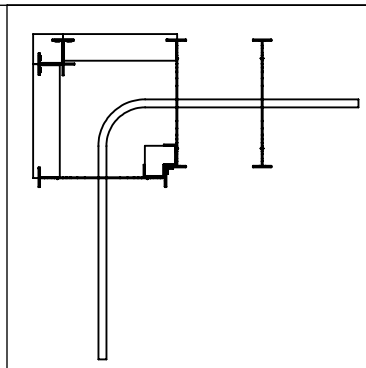
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www.TFSystem.com

Date: 9/10/2013

Always follow applicable codes for rebar configuration and spacing

Install corner rebar as the corner is being assembled





90° CORNER TOP VIEW

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90° Corner Assembly

ThermoForm

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800-360-4634
www.TFSystem.com

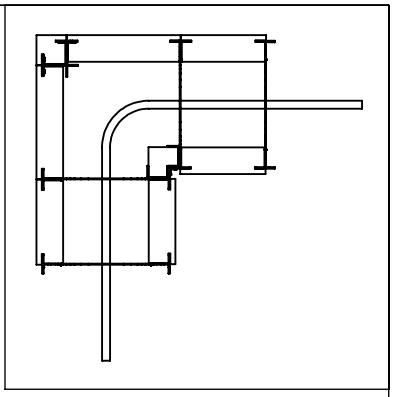
Date: 9/10/2013

Section 3

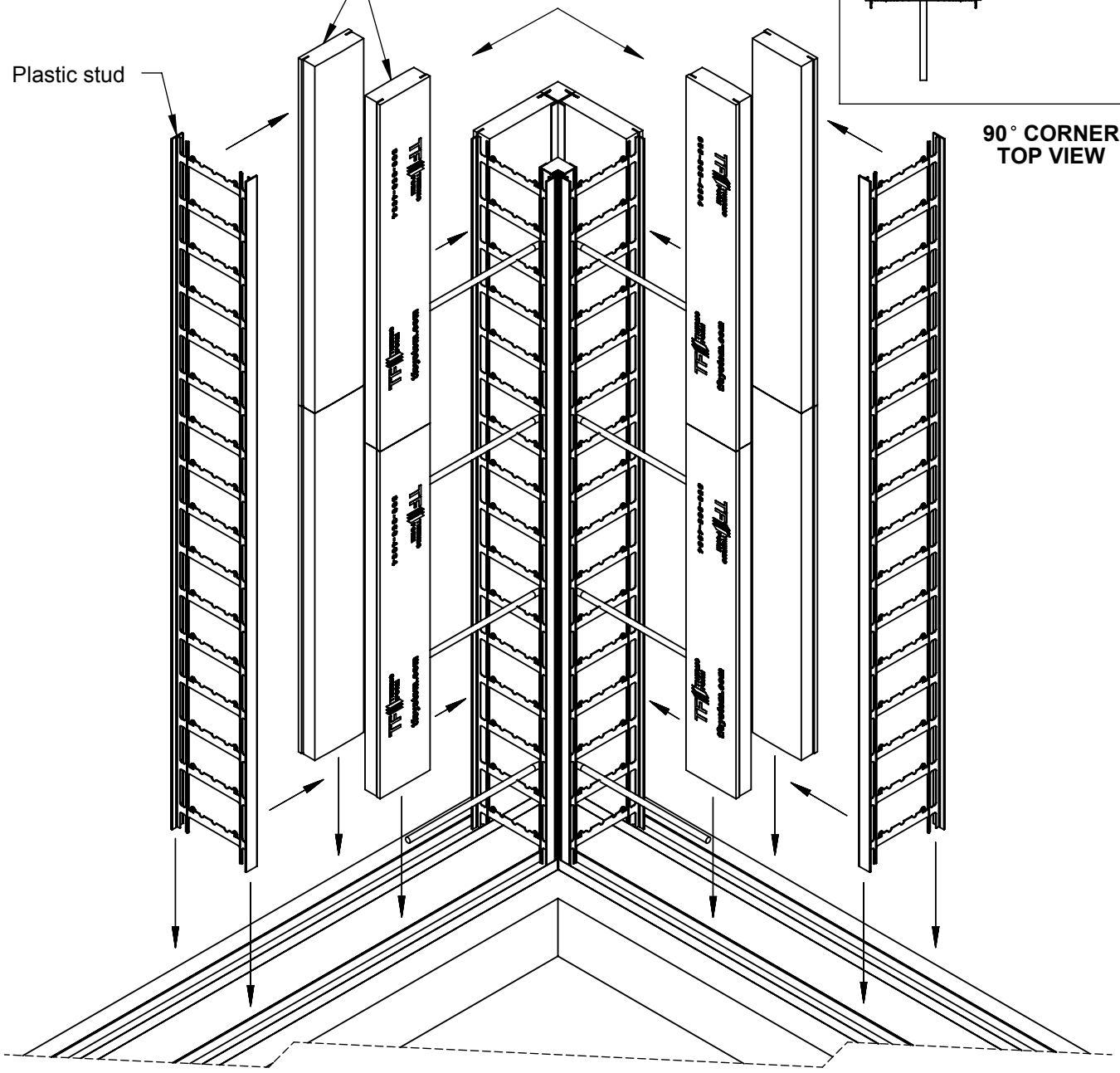
Straight Wall Assembly

ATTACH KICKERS TO HOLD WALL UPRIGHT AS NEEDED
(SEE DETAILS IN WALL BRACING SECTION)

BUILD OUT TO 10FT ON EACH SIDE



90° CORNER
TOP VIEW



* DO NOT kick the bottom of the forms tight! Just snug them up by hand. Kicking the bottoms too tight will cause the wall to lean out of plumb.

* As the wall is built, make sure the top can be easily pushed together and made plumb.

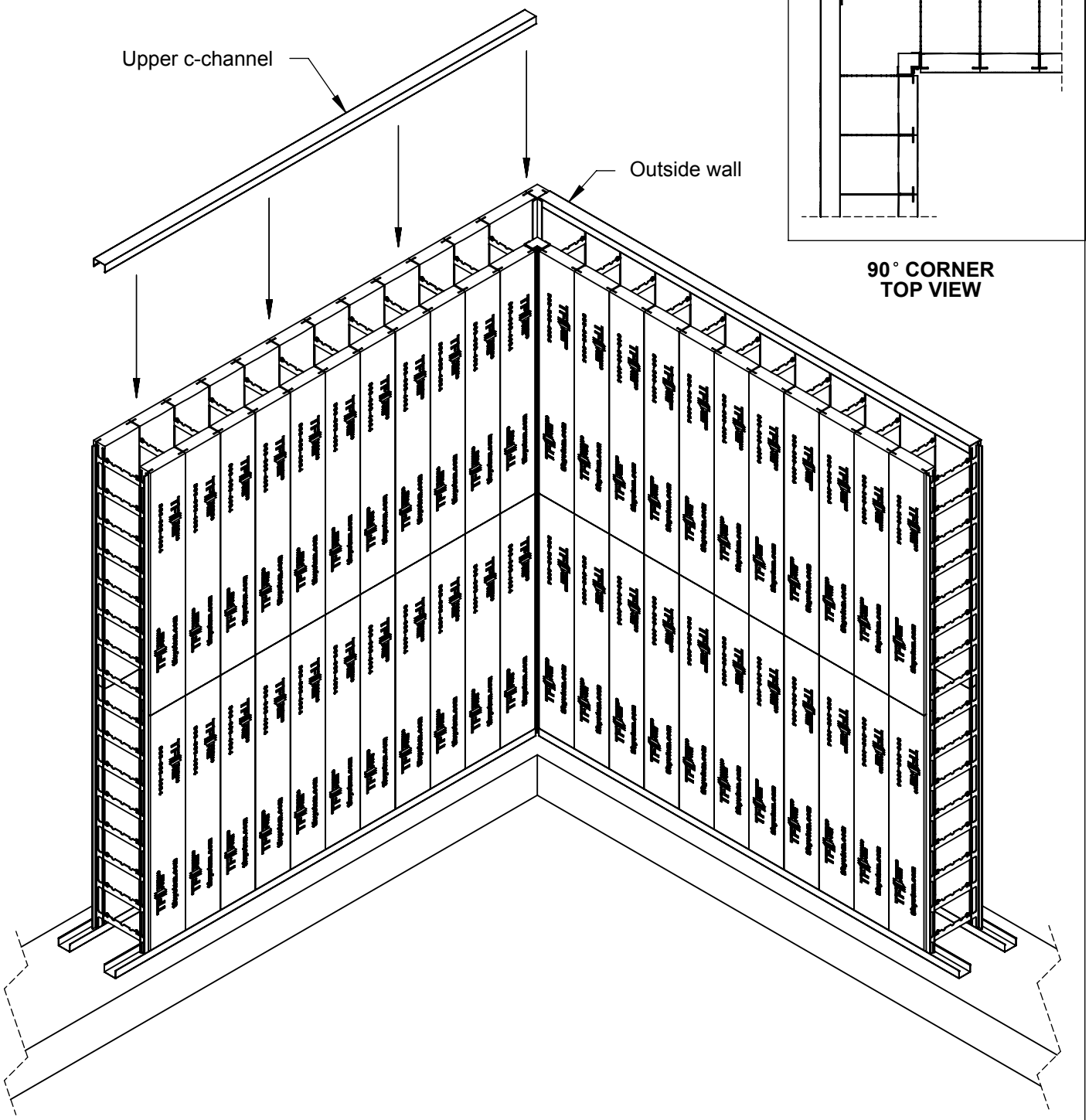
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Vertical Wall Assembly

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www.TFSystem.com

Date: 9/10/2013



90° CORNER TOP VIEW

* Build the wall out far enough to install a section of upper c-channel on the outside of the wall. (The inside c-channel will be installed later)

* Do not place upper c-channel on the inside wall until rebar is installed and tied. (Panels need to slide up to tie rebar)

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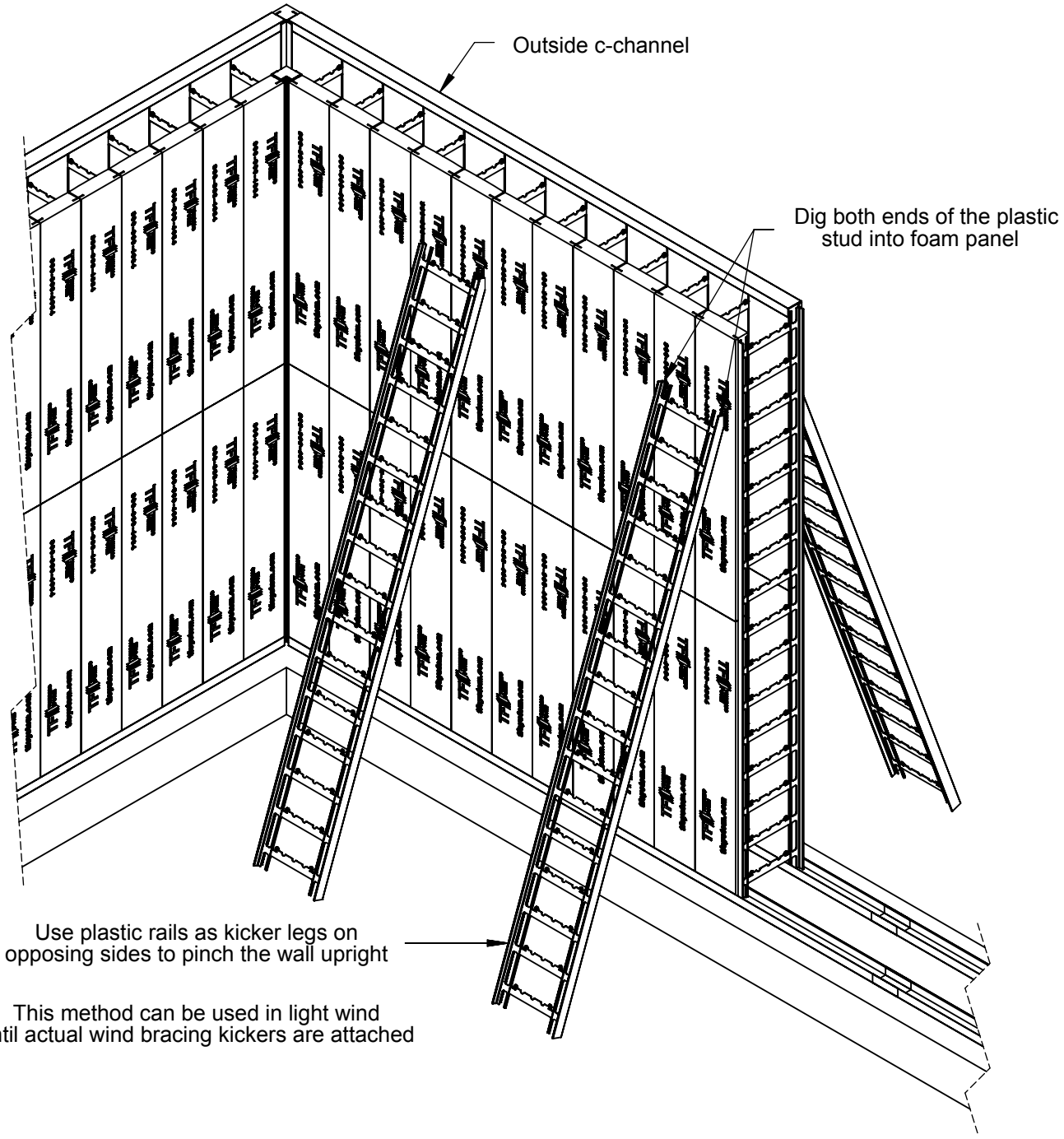
Upper Outside C-Channel

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www.TFSystem.com

Date: 9/10/2013

TEMPORARY KICKERS MAY BE NEEDED TO KEEP THE WIND FROM TIPPING THE WALL OVER

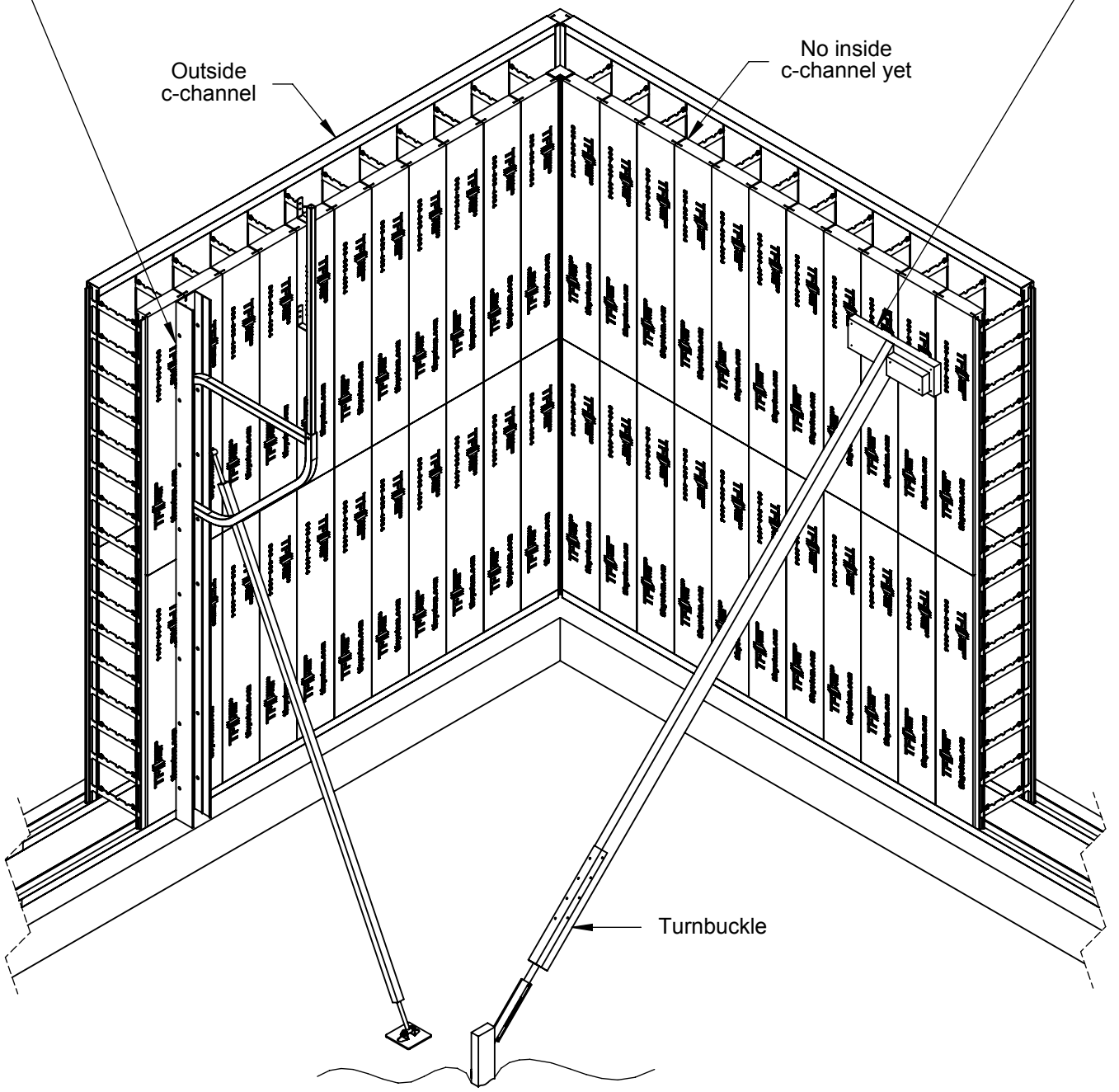


REECHCRAFT™ KICKER

Optional:
ICF scaffolding used when walk plank needed
(These braces are rentable in many places)

STANDARD 2"X4" KICKER

Using a turnbuckle attached to a kicker brace helps greatly with wall adjusting



Attach a scaffold/bracing system or kickers as you build the wall.
When attaching the scaffold/bracing system, screw into the rails just off center.
DO NOT place screws in the joint between panels. This may push panels apart causing a gap.

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Required Bracing

ThermoForm

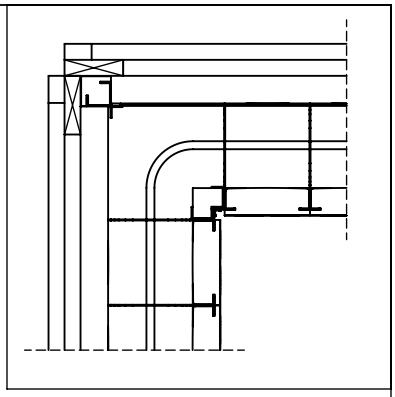
TF Forming Systems, Inc
800-360-4634
www.TFSystem.com

Date: 9/10/2013

Section 4

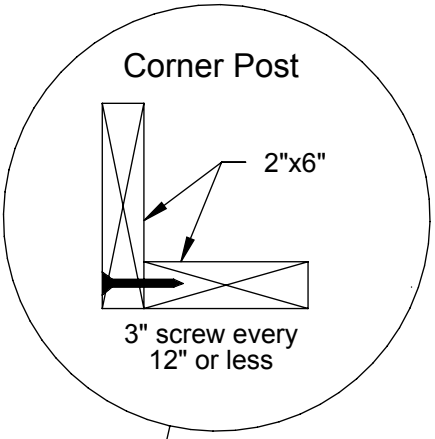
Bracing Corners

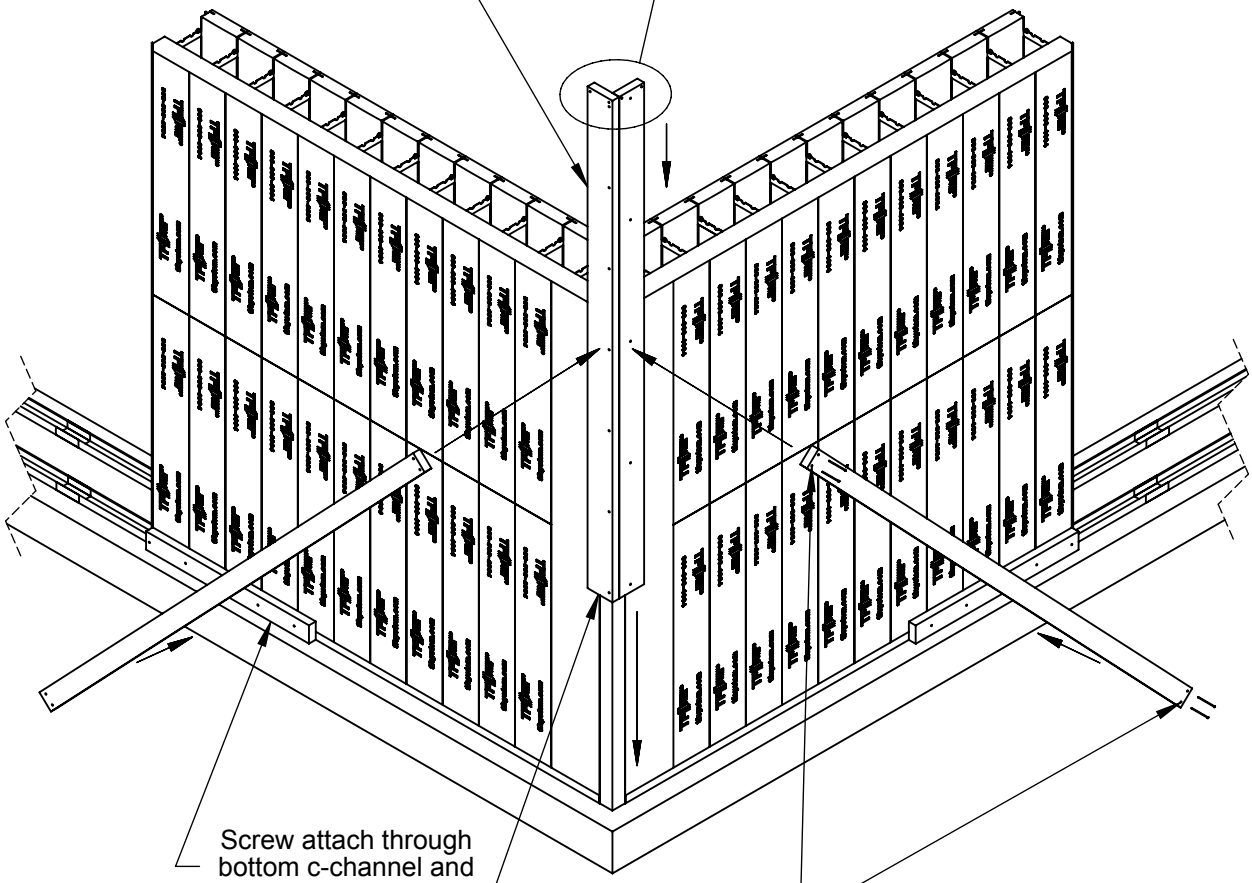
Bracing 8ft & 9ft corner assembly



90° CORNER TOP VIEW

Contractor assumes all responsibility for design and implementation of bracing





Note:

Use 3" screws to secure to plastic corner

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Corner Bracing (Part 1 of 4)

ThermoForm

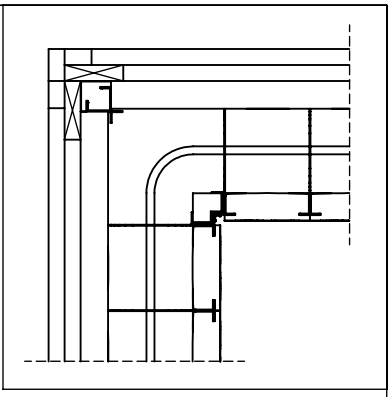
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800-360-4634
www.TFSystem.com

Date: 9/10/2013

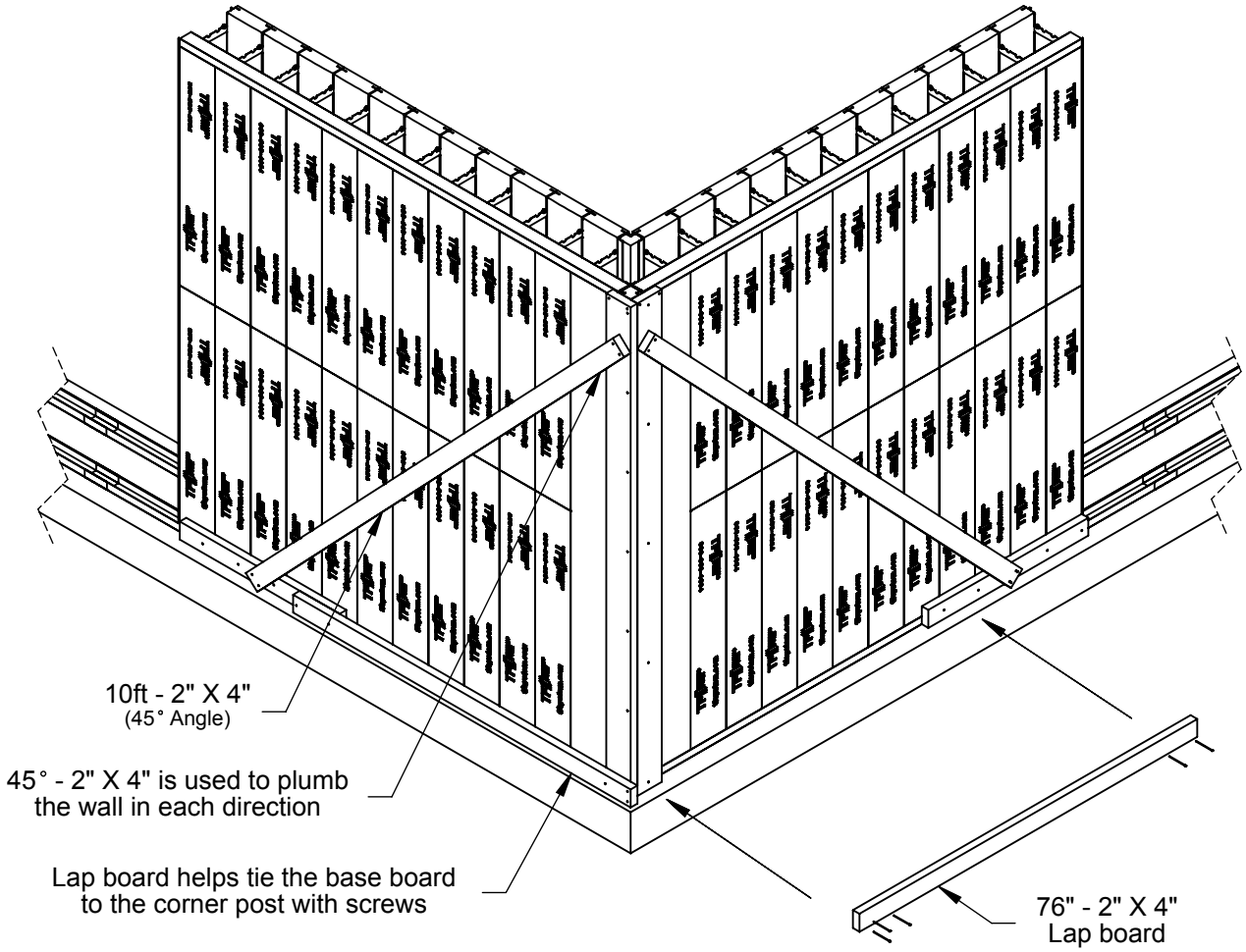
Bracing 8ft & 9ft corner assembly

Adding lap boards

Plumb each side



90˚ CORNER TOP VIEW

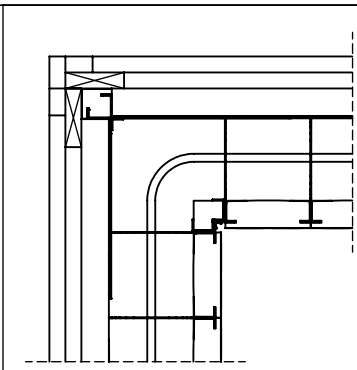


Contractor assumes all responsibility for design and implementation of bracing

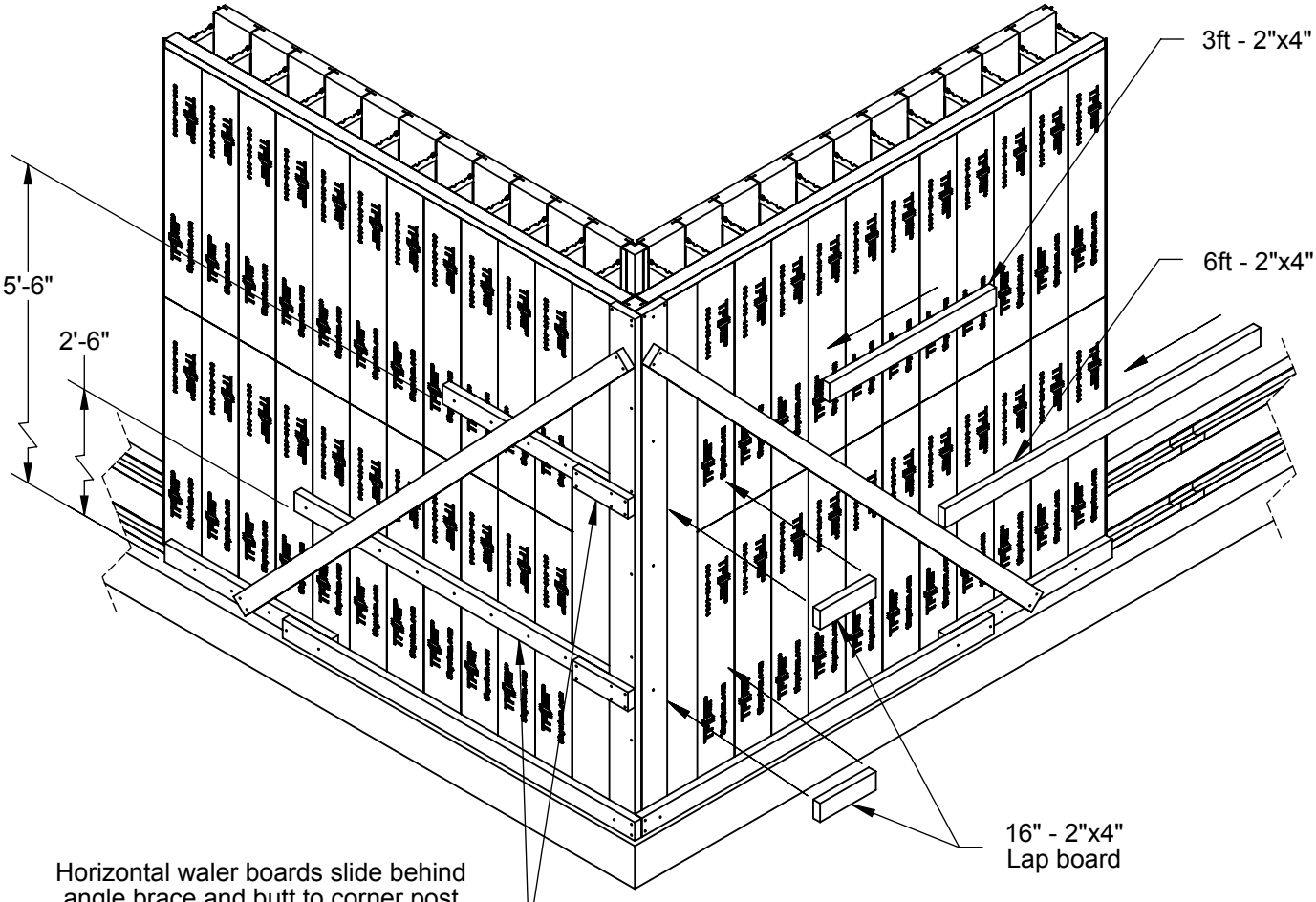
Bracing 8ft & 9ft corner assembly

Add horizontal walers

Add lap boards



90° CORNER TOP VIEW



Horizontal waler boards slide behind angle brace and butt to corner post

Screw attach to every rail with 3" screws

Add lap boards

Contractor assumes all responsibility for design and implementation of bracing

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Corner Bracing
(Part 3 of 4)

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Date: 9/11/2013

Bracing 8ft & 9ft corner assembly

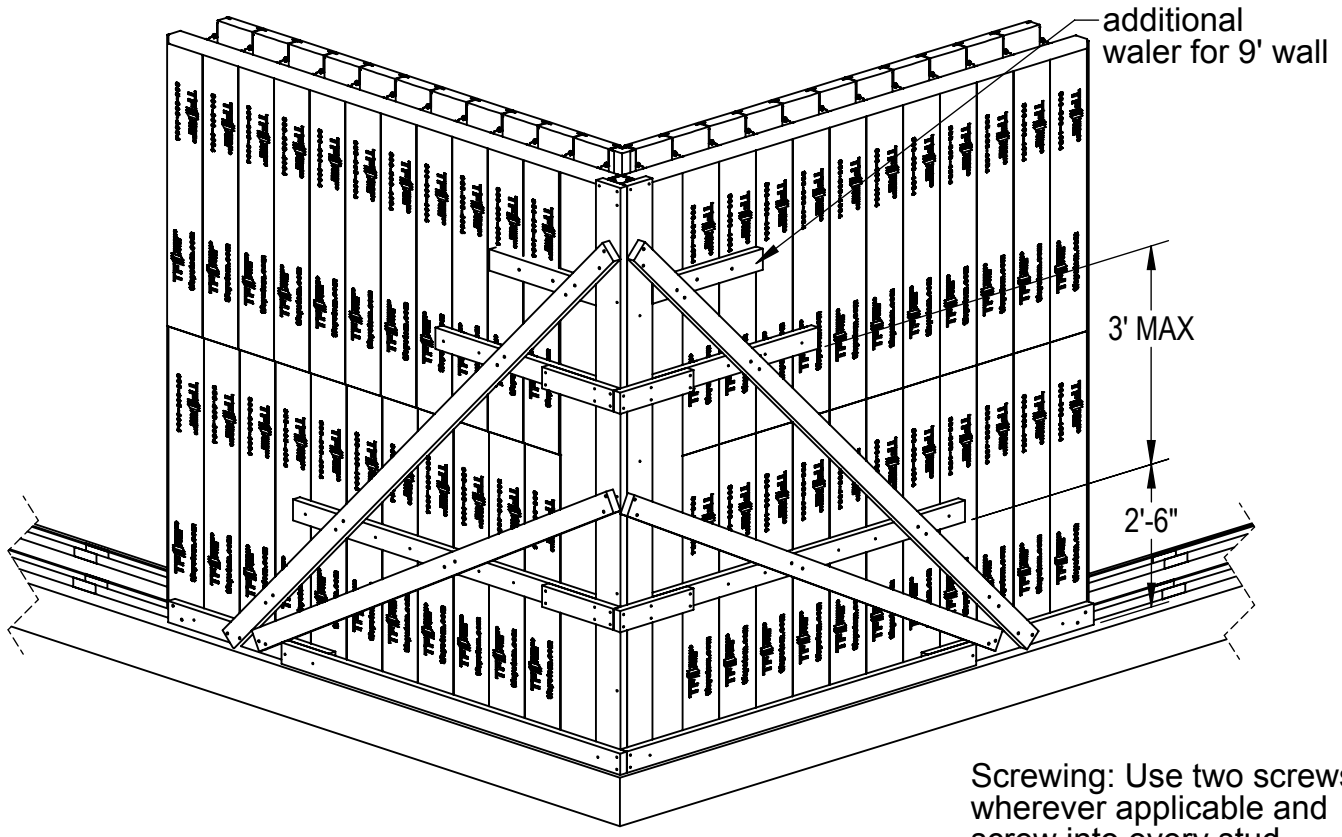
The first horizontal waler should be placed at 2'-6" from the footing

and then followed by horizontal walers at 3' max incriments from there on.

This requires an additional top waler to split

the top distance on a 9' wall.

Note:
This bracing is used to prevent the corner from twisting under pressure of poured concrete.



Horizontal corner brace layout

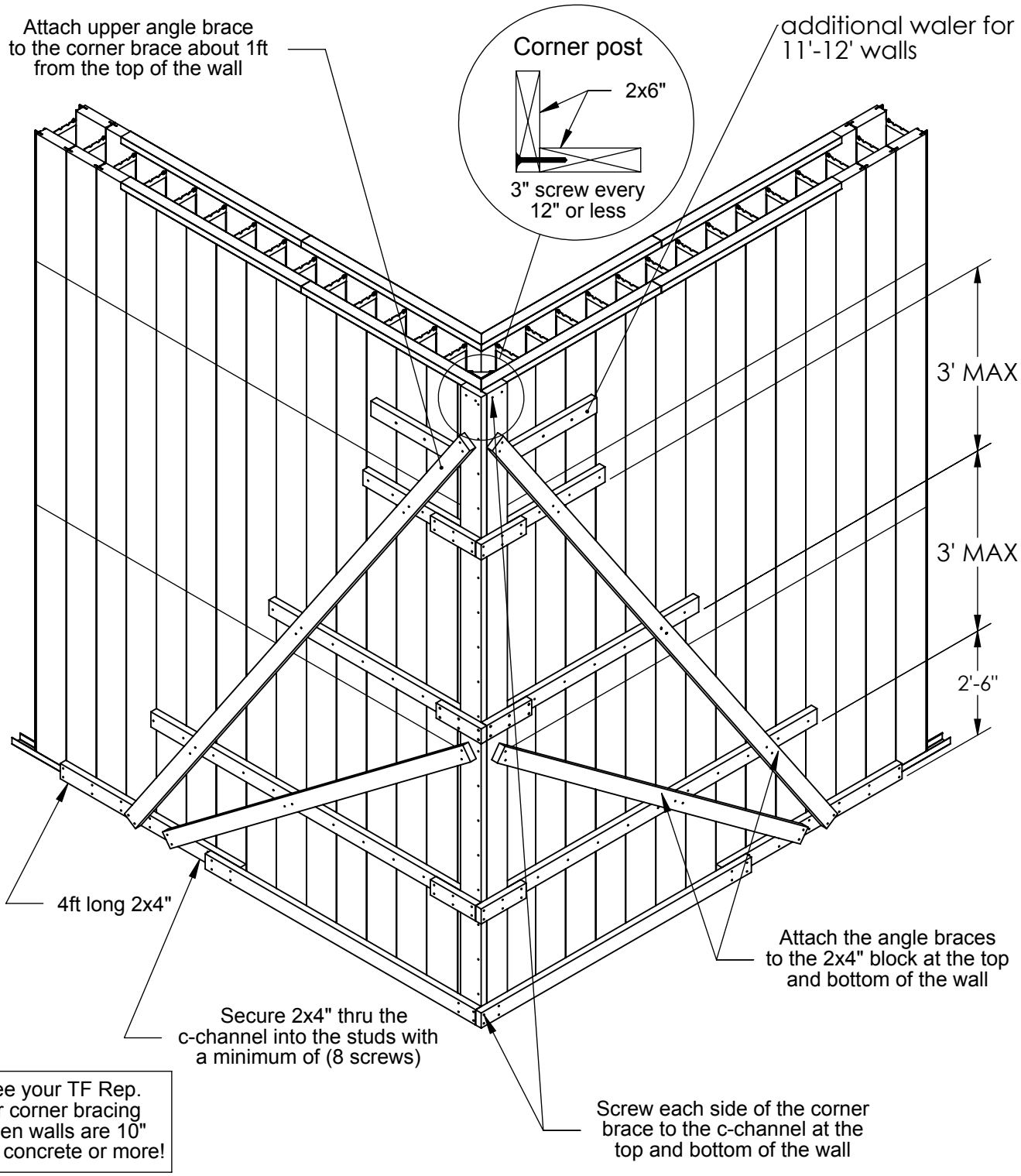
Screwing: Use two screws wherever applicable and screw into every stud

See your TF Rep. for setting up corner bracing on concrete 10" thick or more

Contractor assumes all responsibility for design and implementation of bracing

CORNER BRACING DETAIL 10FT-12FT TALL WALL

Make certain the corner form is tight into the corner brace



See your TF Rep. for corner bracing when walls are 10" thick concrete or more!

TF FORMING SYSTEMS

Corner Bracing Detail (10ft - 12ft tall wall)

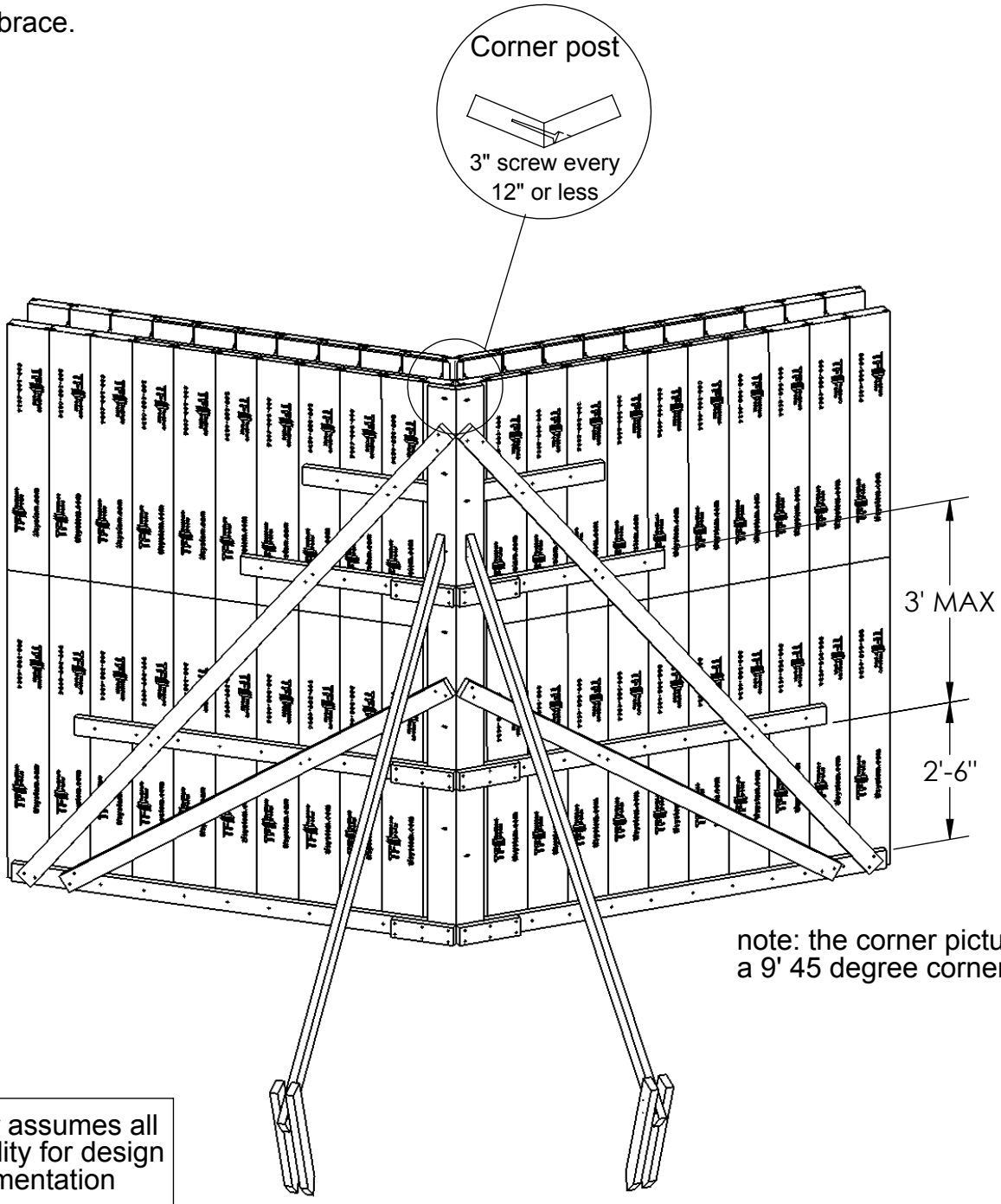
Thermoform

TF Forming Systems, Inc.
800-360-4634
www.TFSystem.com

Date: 7/14/2016

Corner Bracing on a Custom Angled Corner

Brace the same as a 90 degree corner except the addition of two kickers attached to the corner brace.



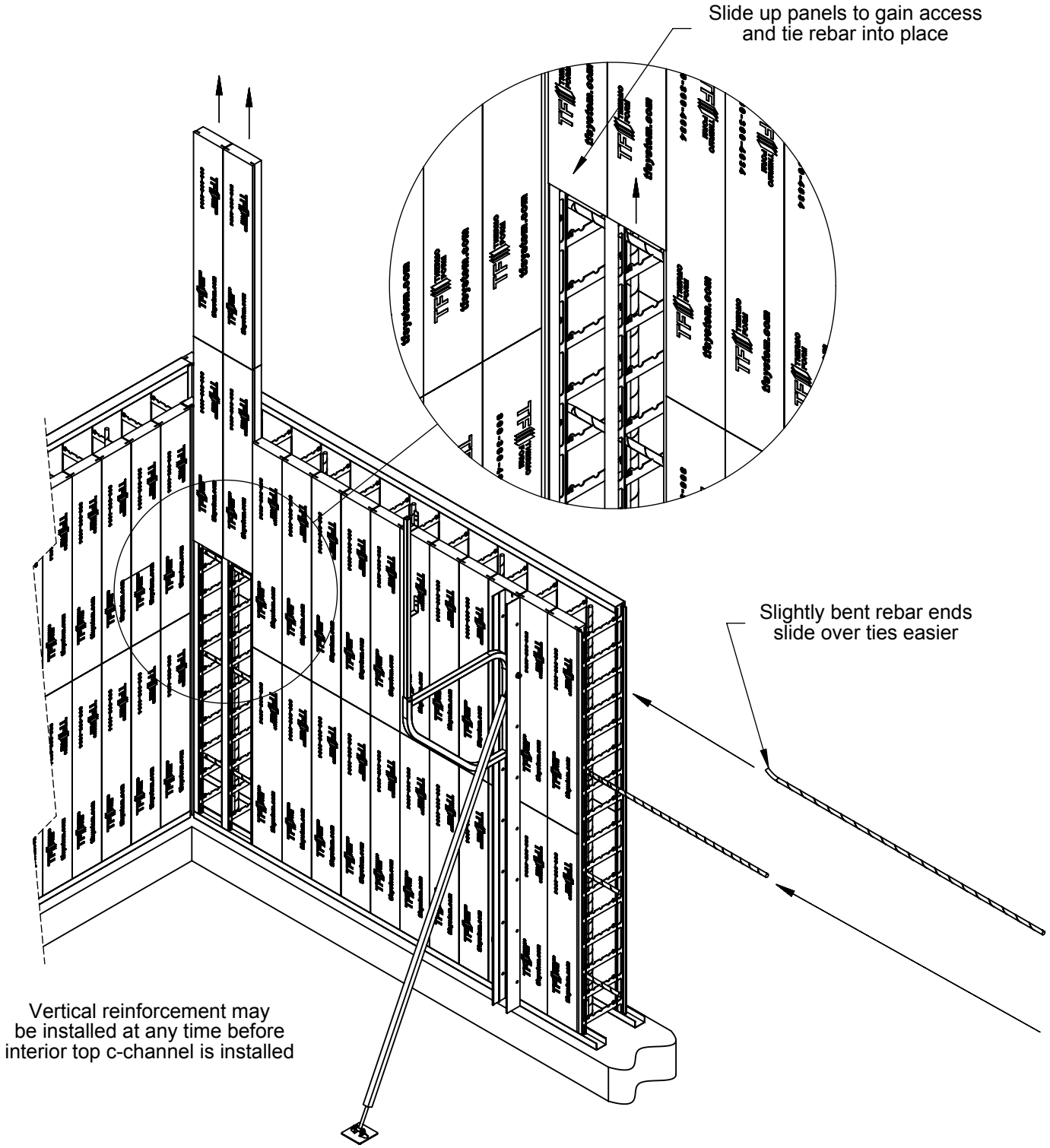
note: the corner pictured is a 9' 45 degree corner

Contractor assumes all responsibility for design and implementation of bracing

Section 5

Building Techniques

Slide rebar into position from the open end of wall



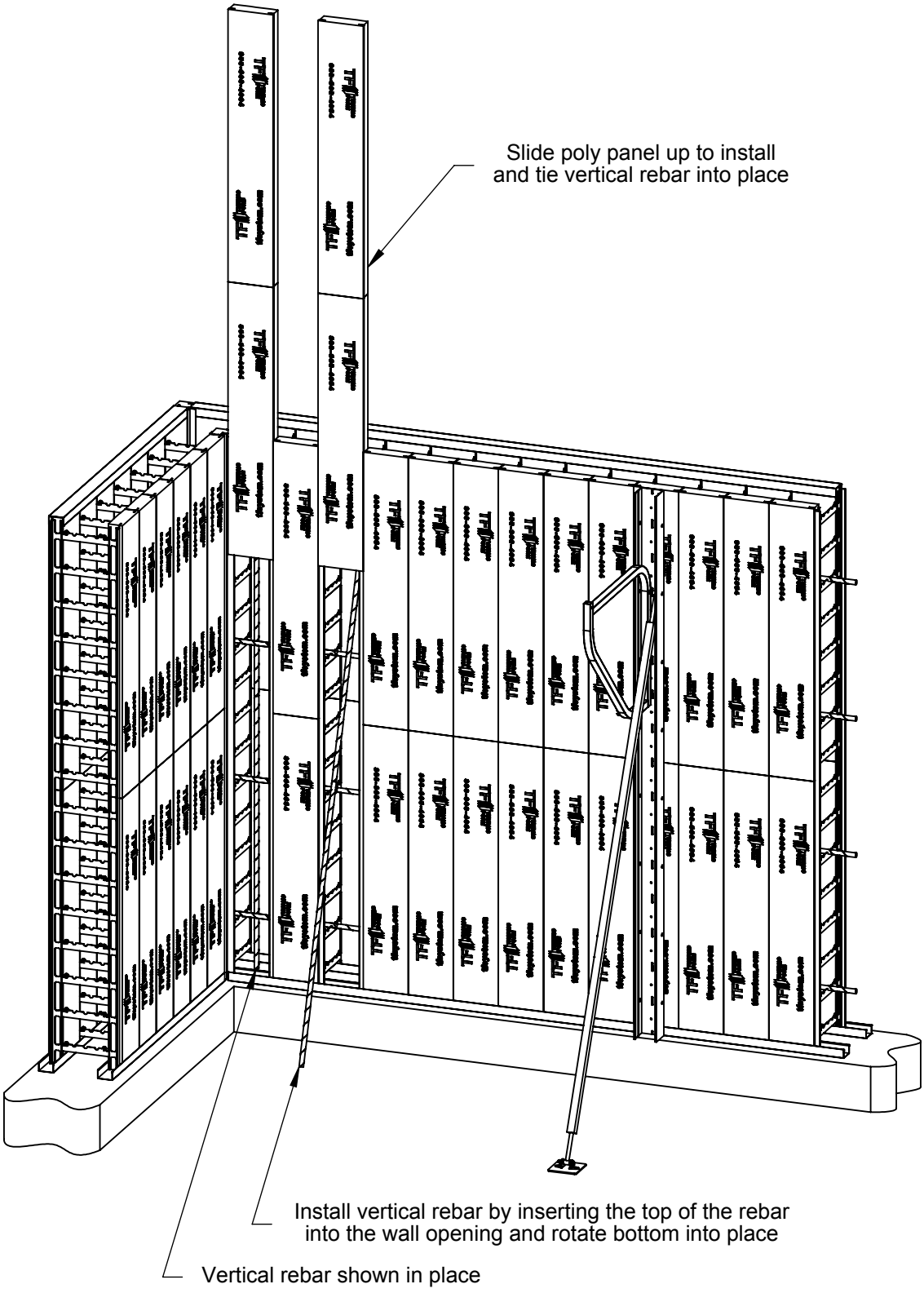
TF FORMING SYSTEMS

Horizontal Rebar Installation

ThermoForm

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800-360-4634
www.TFSystem.com

Date: 9/11/2013



Vertical Rebar Installation

ThermoForm

TF Forming Systems, Inc
800-360-4634
www.TFSystem.com

Date: 9/11/2013

After mounting upper c-channel with proper overlap, straighten wall with string line

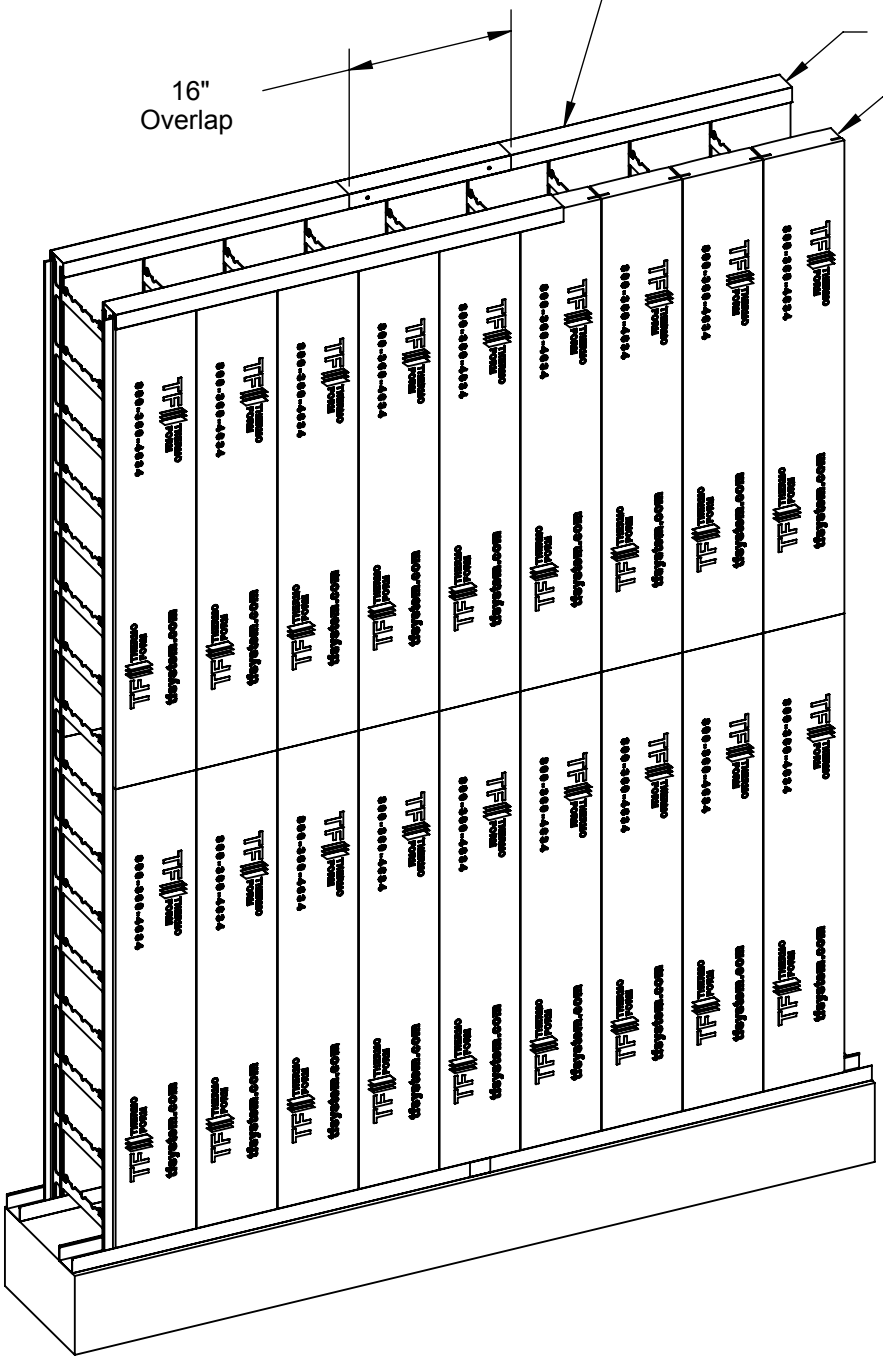
Once wall is straightened, screw c-channels together with steel stud screws or sheet metal screws

As you build the wall, install the upper exterior c-channel to help stiffen the wall and help hold everything together

Exterior c-channel

Interior of wall

16" Overlap



Installing upper interior c-channel is the last step. This will allow for the panels to be slid up for access to the cavity.

After all the rebar is tied, the wall is inspected, and the bottom of the cavity is cleaned out, then the interior c-channel may be installed.

TF FORMING SYSTEMS

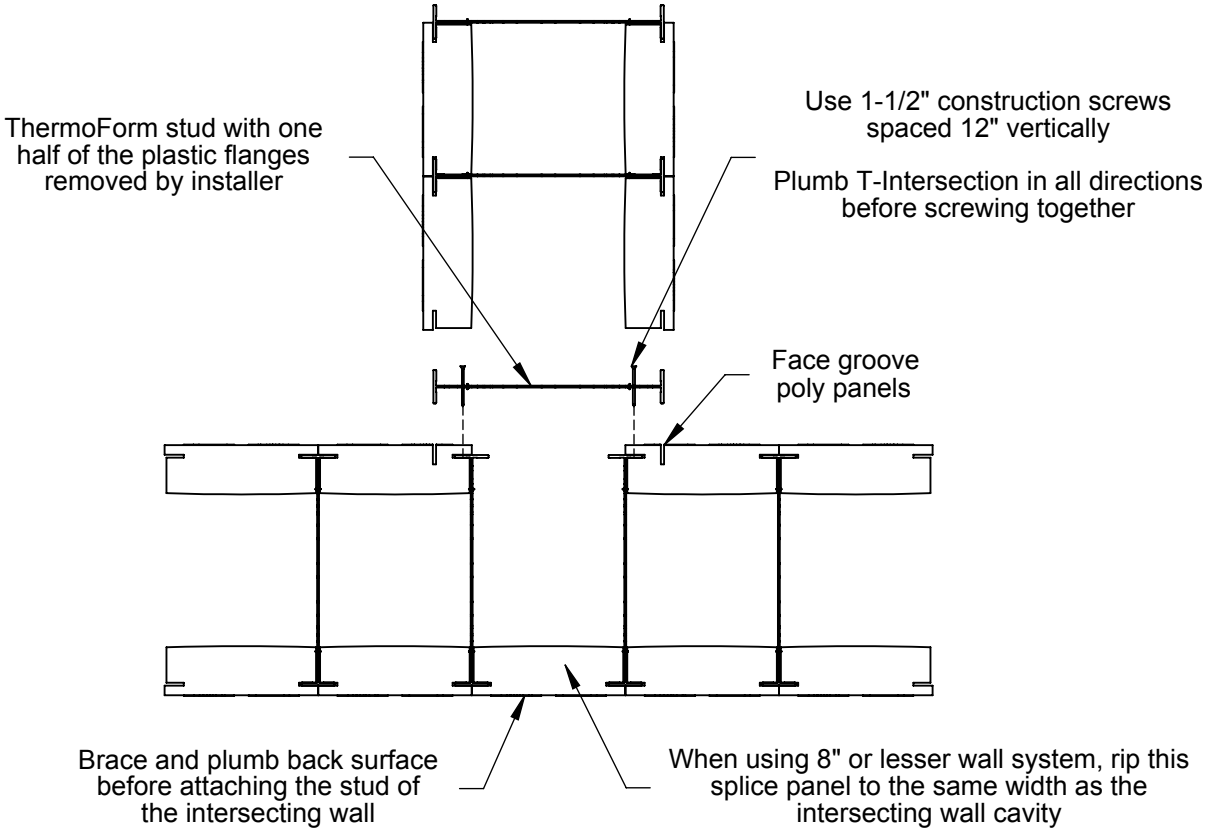
Upper C-Channel Installation

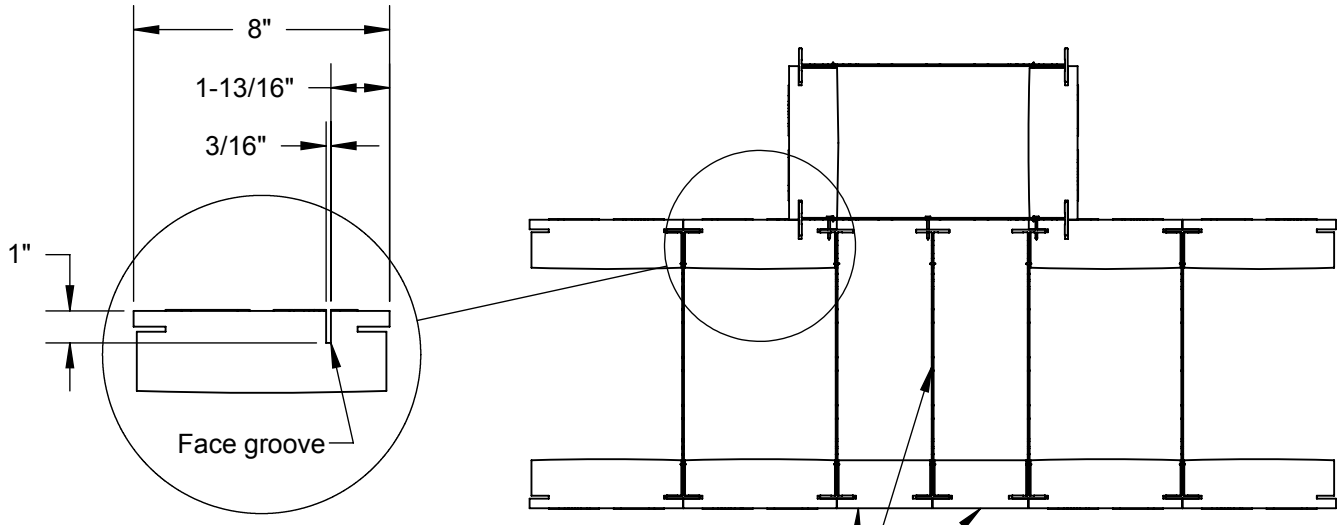
ThermoForm

TF Forming Systems, Inc
800-360-4634
www.TFSystem.com

Date: 9/11/2013

If you need a T-Intersection





When using **10" thick or larger wall system**, use two equally sized splice panels with a stud rail joining them

Contact a TF Forming Systems representative for additional bracing information

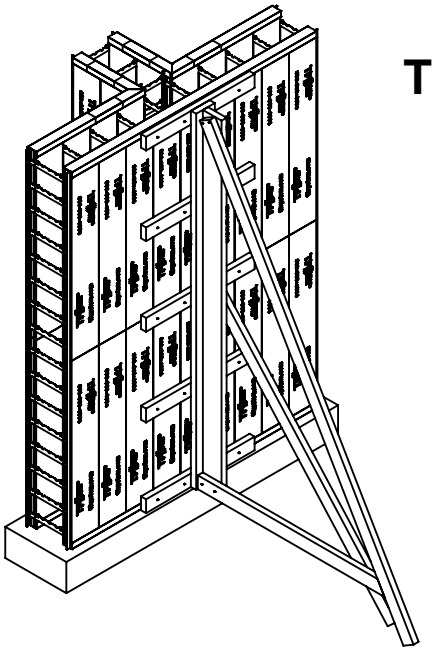
T-Intersection Top View

ThermoForm

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800-360-4634
www.TFSystem.com

Date: 9/11/2013

T - Intersection Bracing



Contractor assumes all responsibility for design and implementation of bracing

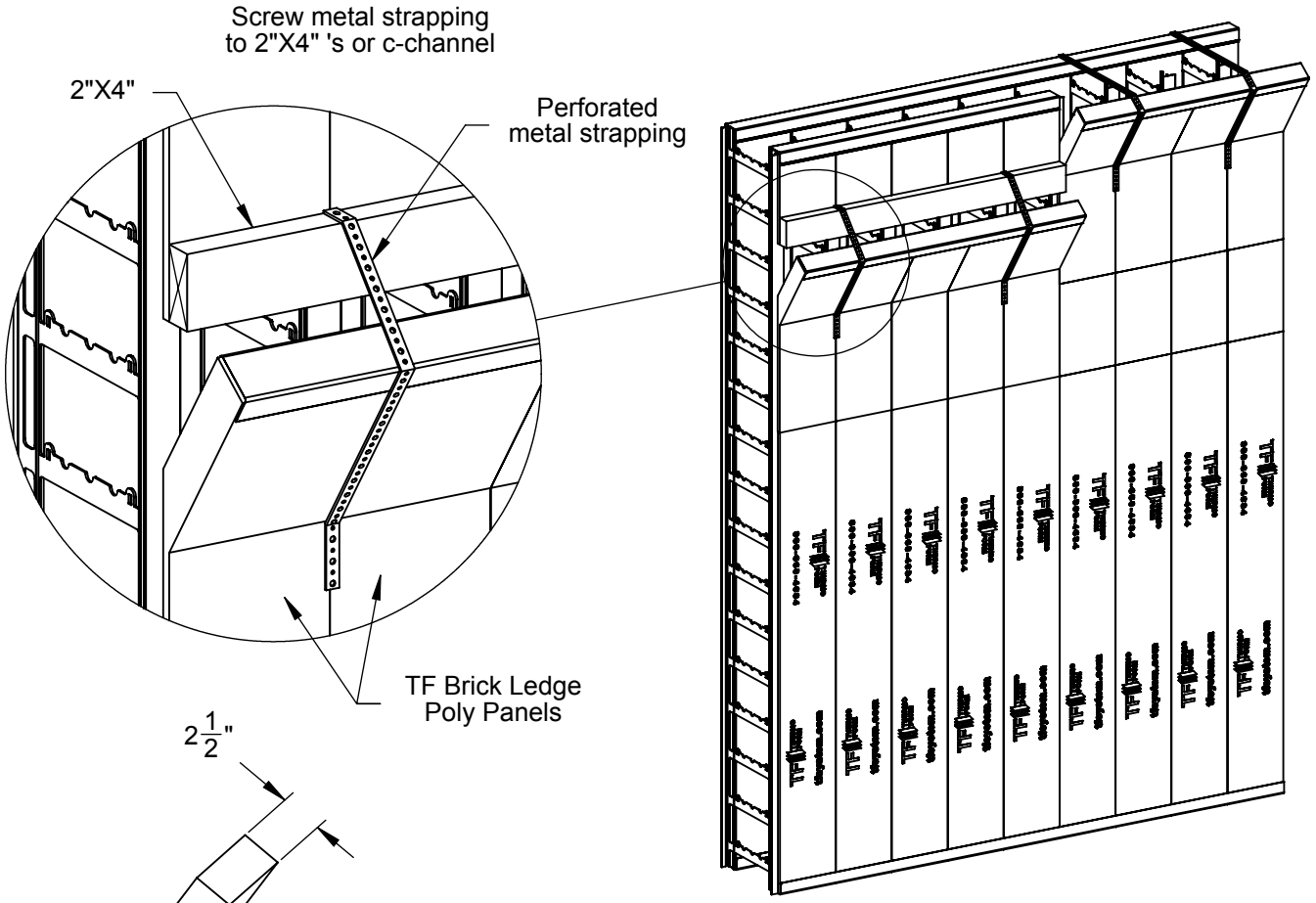
TF FORMING SYSTEMS

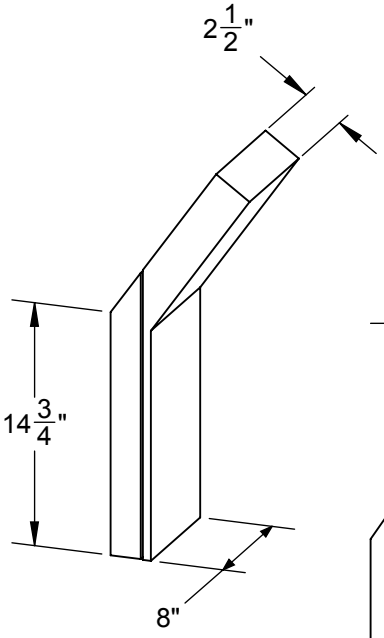
T-Intersection Bracing

ThermoForm

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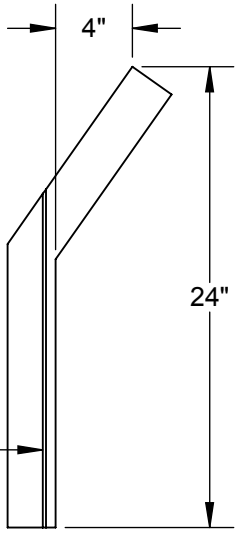
Date: 9/11/2013





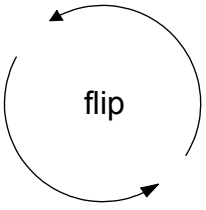
Factory groove is for 4" ledge unless ordered for a 6" ledge

4" Ledge

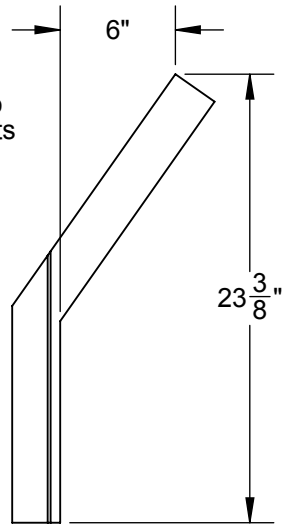


Cut panels 2' short of desired brick ledge height for a 4" ledge

Brick ledge inserts may be flipped to produce either a 4" or 6" ledge. Inserts are assembled into wall in the same manner as standard panels



6" Ledge



Cut panels 23-3/8" short of desired brick ledge height for a 6" ledge

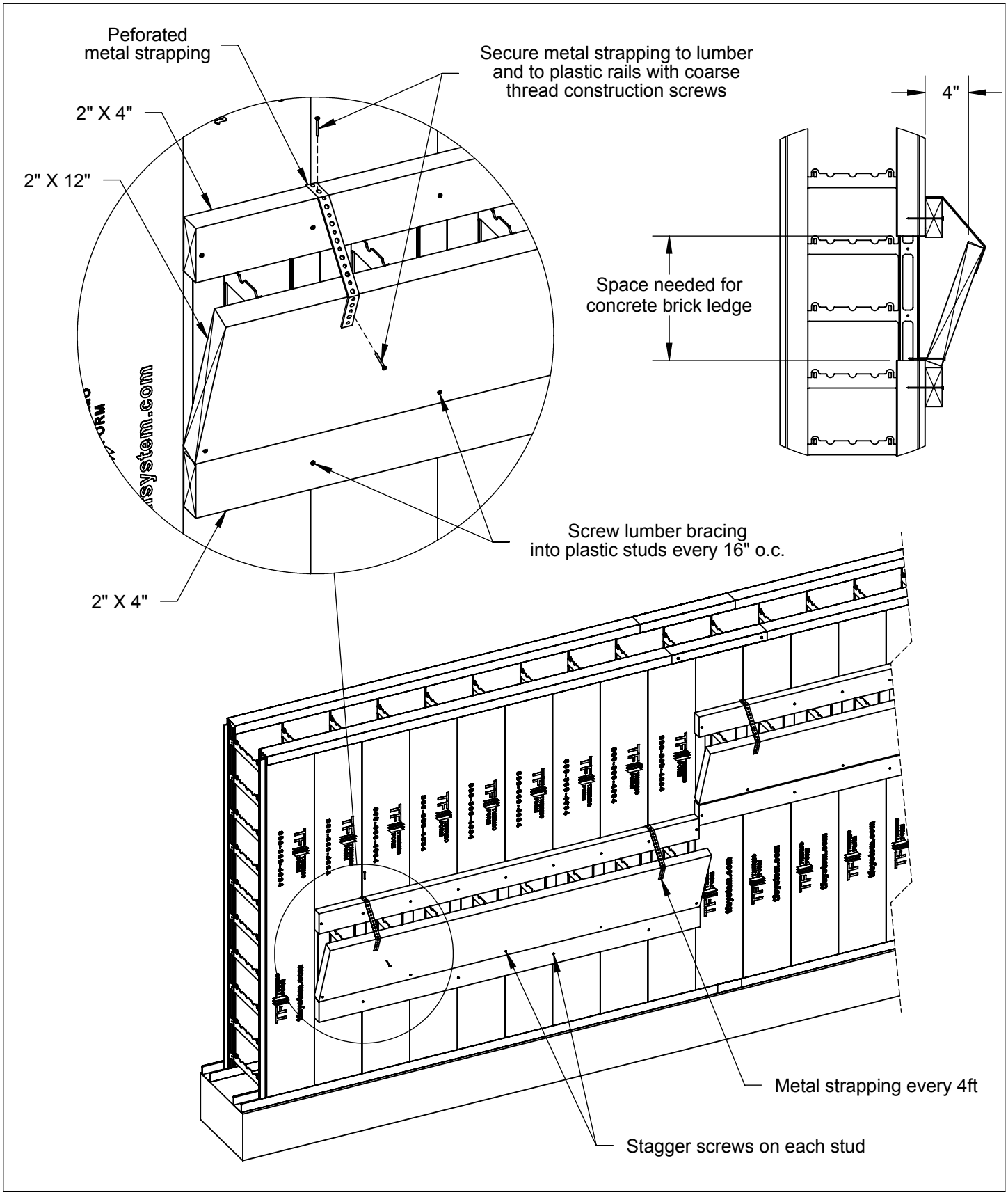
TF FORMING SYSTEMS

TF Brick Ledge Panels

ThermoForm

TF Forming Systems, Inc.
800-360-4634
www.TFSystem.com

Date: 2/14/2014



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Installing a Common Brick Ledge

ThermoForm

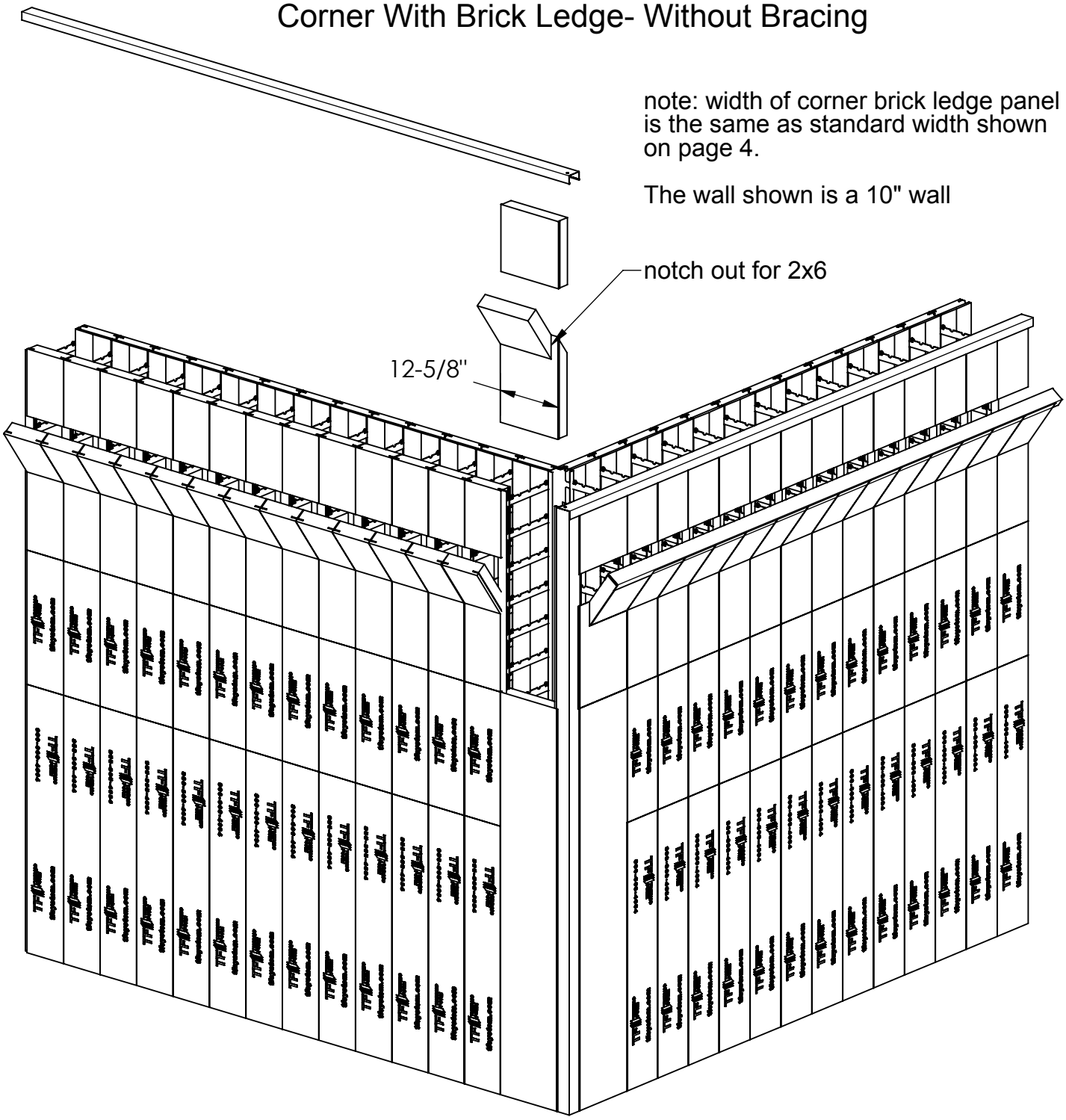
TF Forming Systems, Inc
800-360-4634
www.TFSystem.com

Date: 2/14/2014

Corner With Brick Ledge- Without Bracing

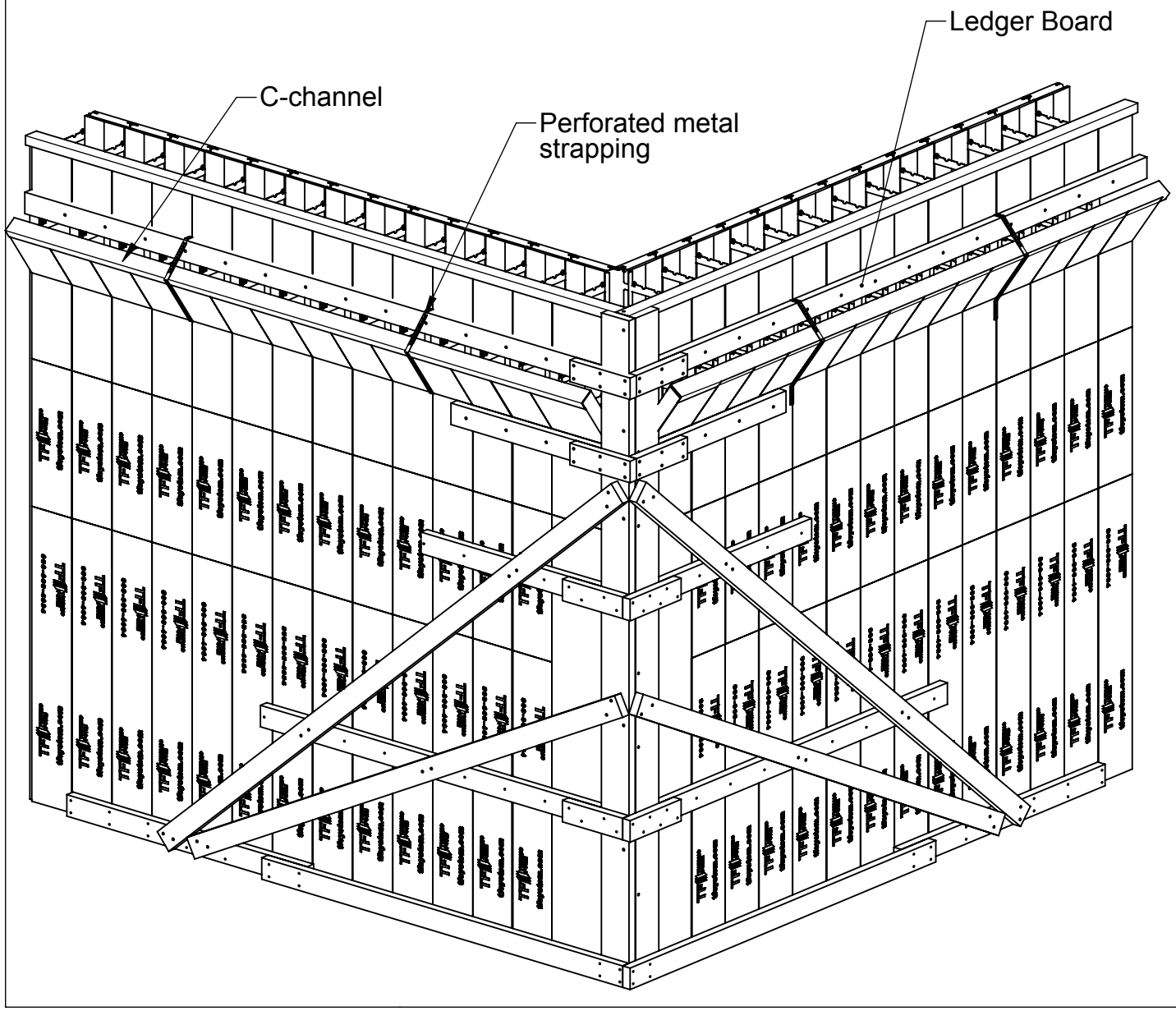
note: width of corner brick ledge panel is the same as standard width shown on page 4.

The wall shown is a 10" wall

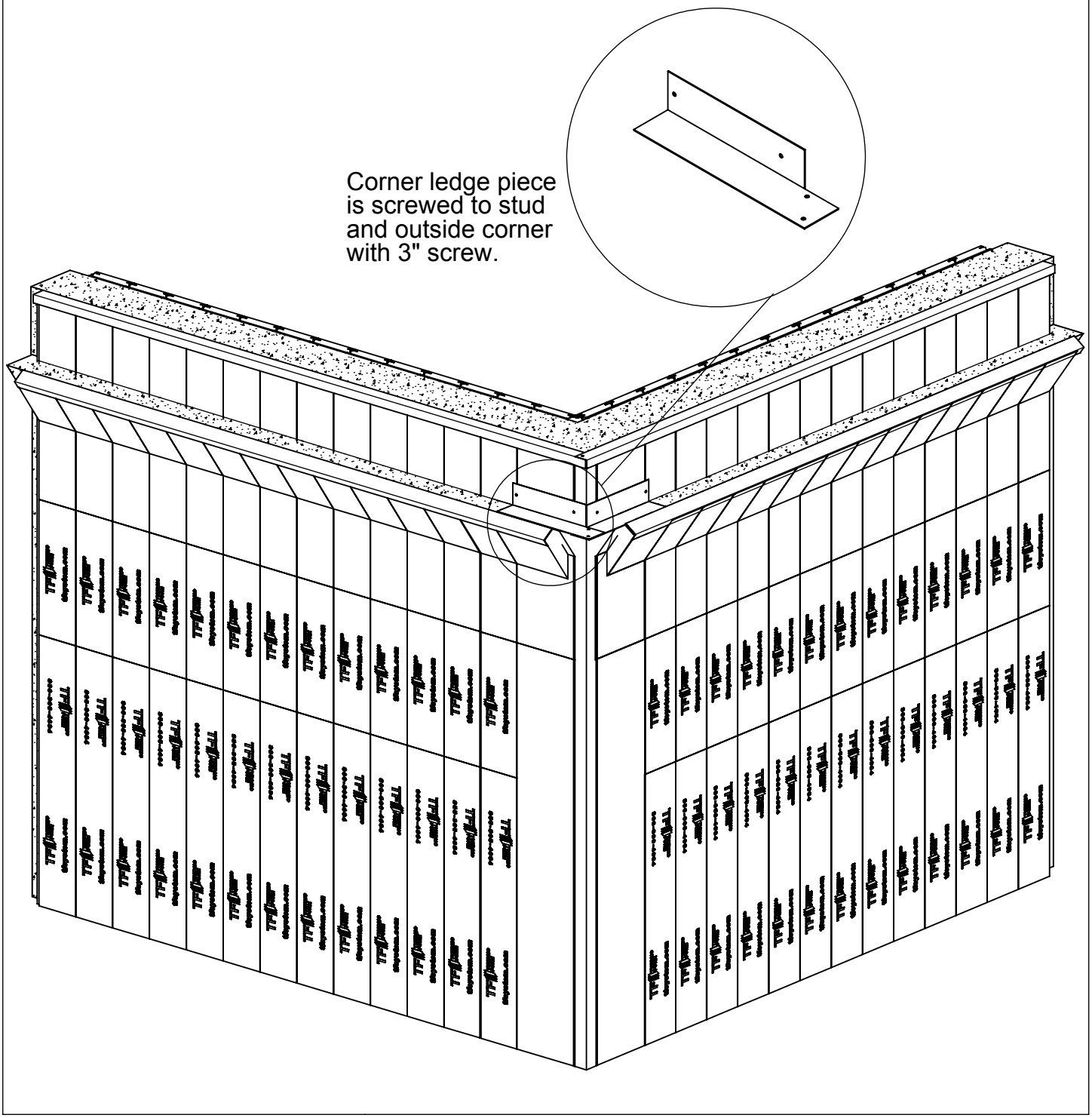


Bracing a Corner With a Brick Ledge

Brace the same as a normal 90 deg corner with the exception of a horizontal waler directly under the tapered panels and a ledger board across the entire top of the ledge. Look at corner bracing for exact dimensional placement of braces.



Final Brick Ledge Corner- Placing the Steel Cross-Over Piece



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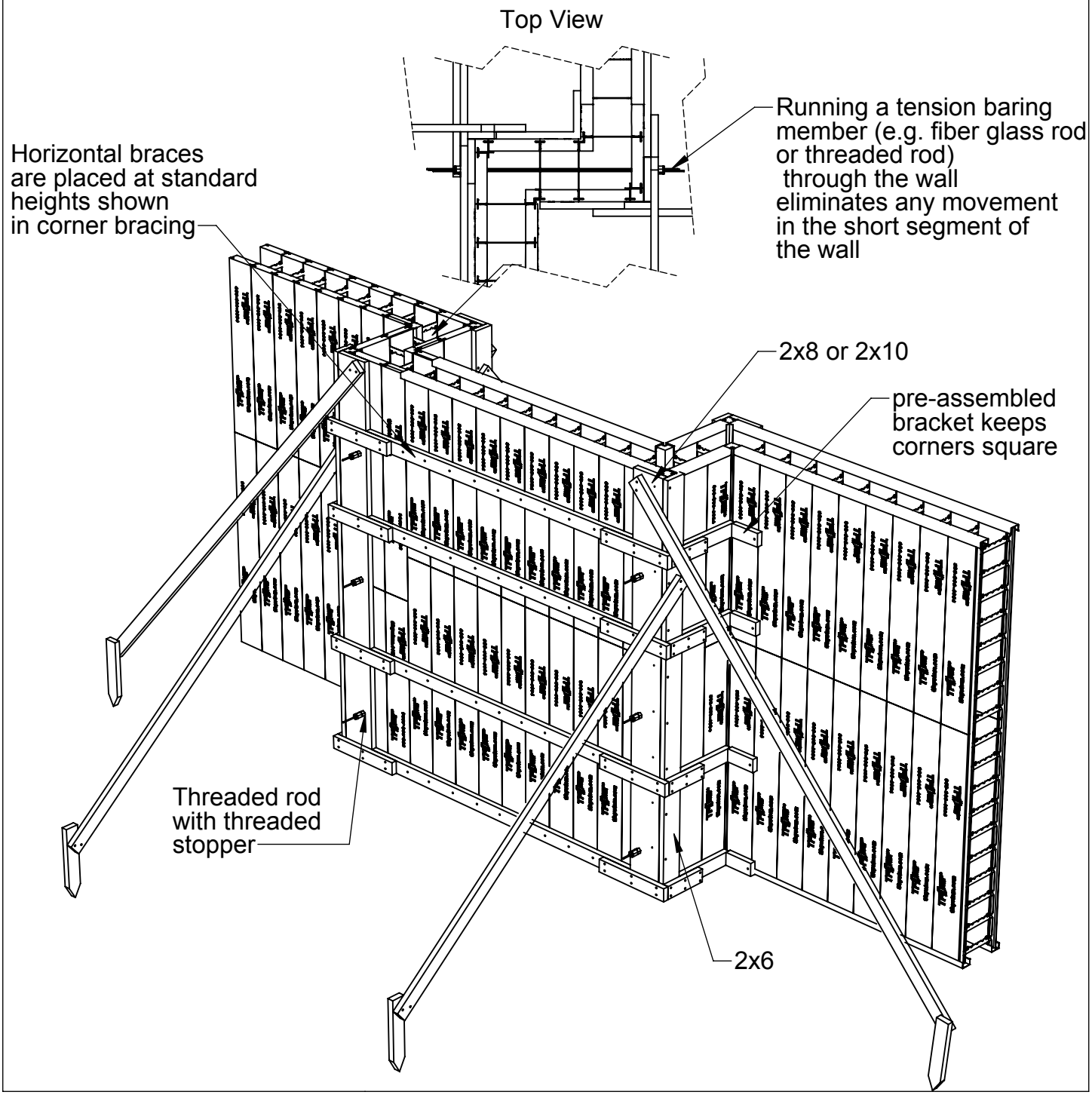
Final: Corner With Brick Ledge

TF Forming Systems, Inc.
800-360-4634
www.TFSystem.com

ThermoForm

Date: 7/21/2016

Proper Offset Wall Bracing



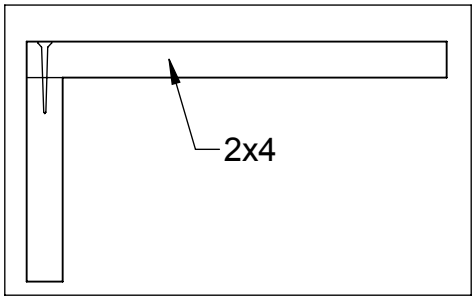
Bracing an Offset Wall (Exterior View)

TF Forming Systems, Inc.
800-360-4634
www.TFSystem.com

ThermoForm

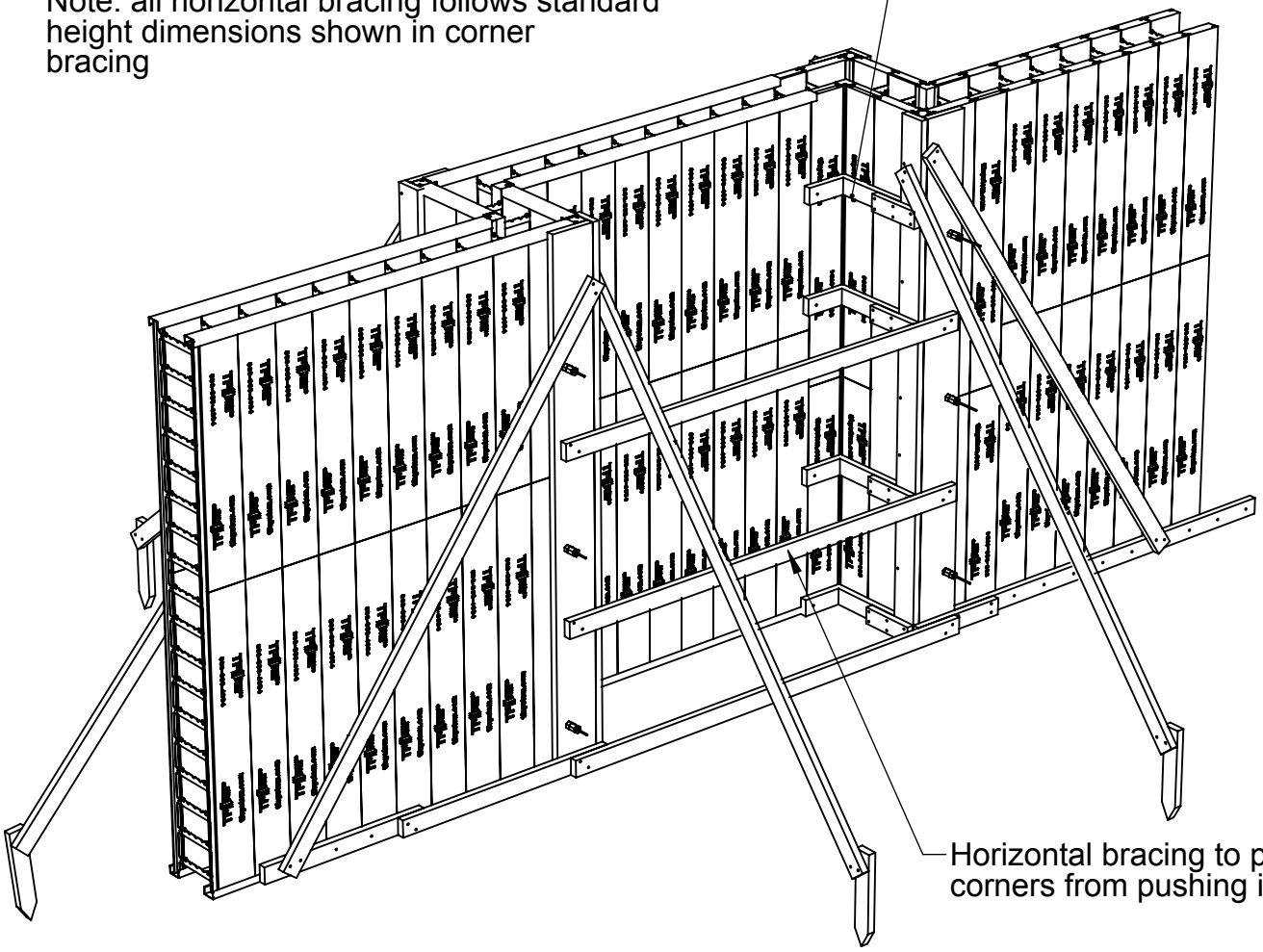
Date: 7/19/2016

Proper Offset Wall Bracing



Pre-assembled corner brace

Note: all horizontal bracing follows standard height dimensions shown in corner bracing



Horizontal bracing to prevent corners from pushing in

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Bracing an Offset Wall (Interior View)

TF Forming Systems, Inc.
800-360-4634
www.TFSystem.com

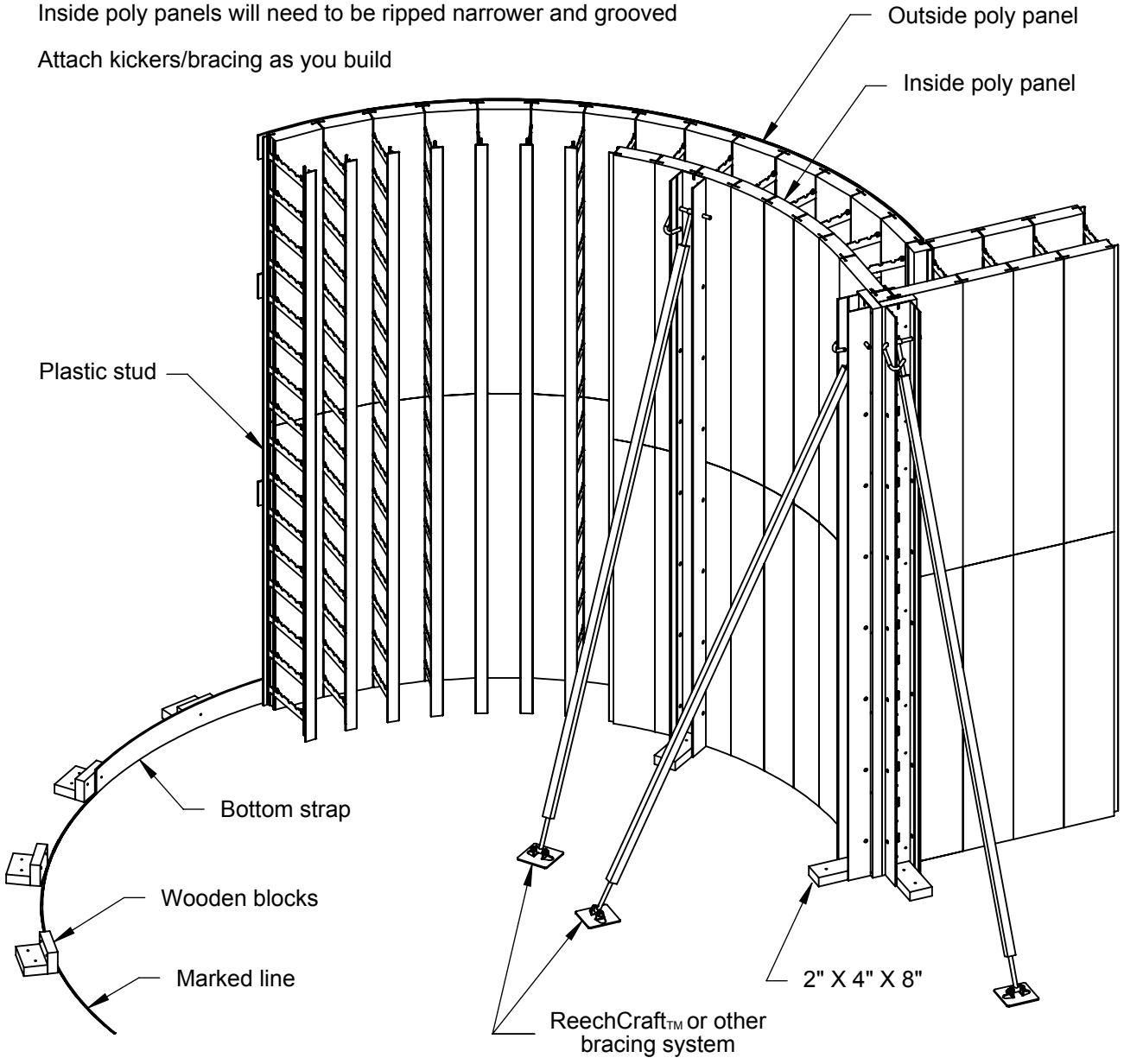
ThermoForm

Date: 7/19/2016

Building Steps

1. Mark a line to represent the outside radius of the poly panels
2. Nail down wooden blocks and strap along the marked line (allow enough room for strap thickness)
3. Screw bottom strap to wooden blocks
4. Erect outside poly panels and plastic studs

   (cut a bevel on each side of outside panels for tight radius wall situations, see next page)
5. Screw through bottom strap, though poly, and into plastic studs to hold bottom in place
6. Install inside poly panels after exterior panels are in place
7. Inside poly panels will need to be ripped narrower and grooved
8. Attach kickers/bracing as you build



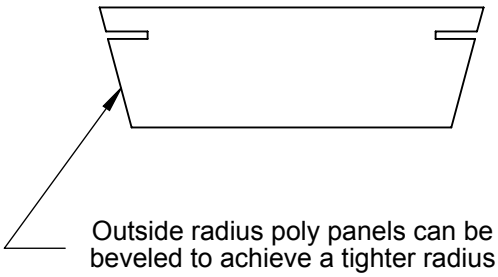
TF FORMING SYSTEMS

Round Walls - Building Steps

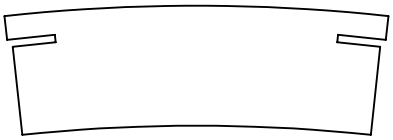
ThermoForm

TF Forming Systems, Inc.
800-360-4634
www.TFSystem.com

Date: 4/9/2014



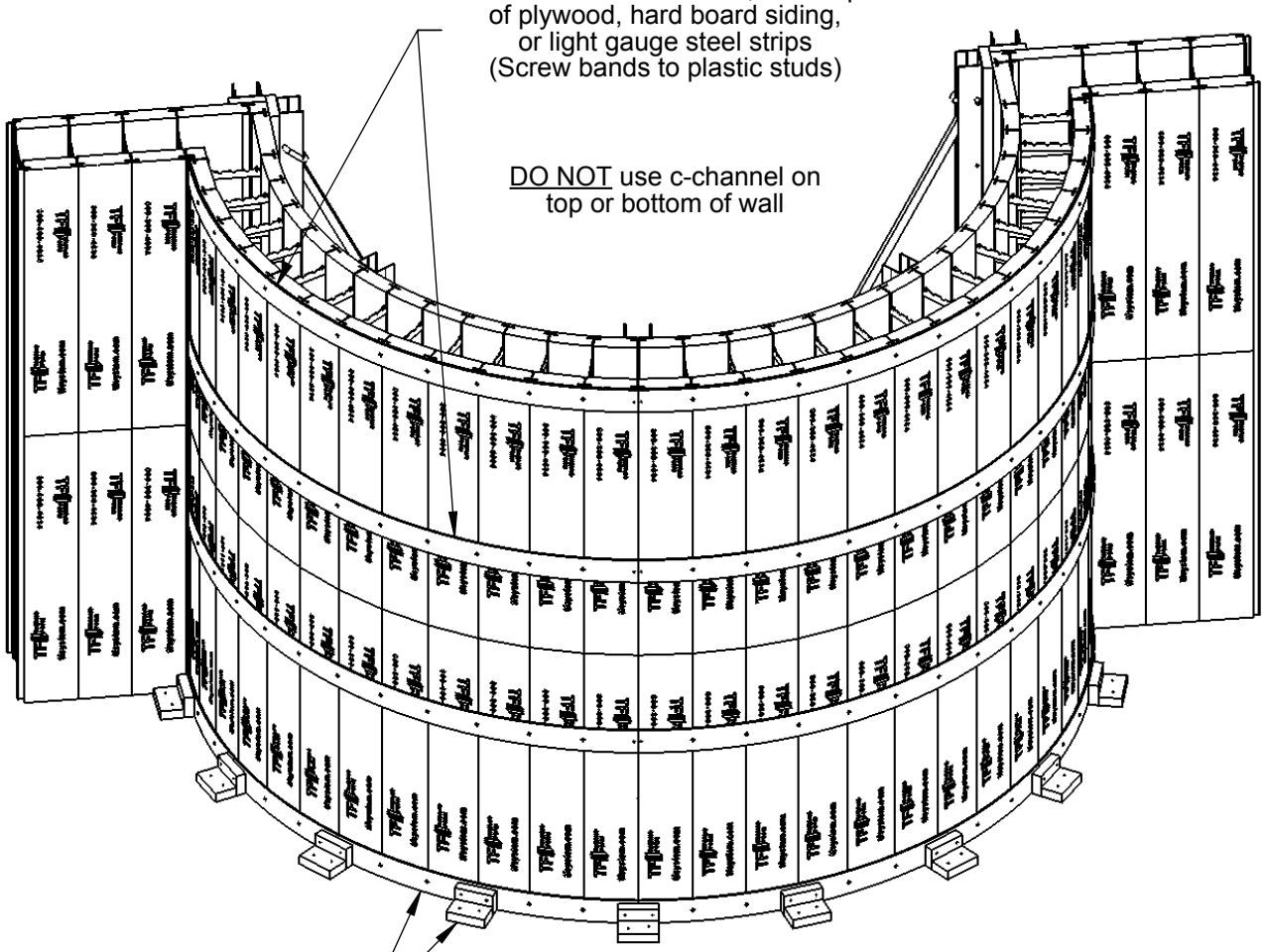
Outside radius poly panels can be beveled to achieve a tighter radius



Curved panels can be custom made for walls with tight radius (Contact TF System for details)

Brace with 1/4" Masonite, thin strips of plywood, hard board siding, or light gauge steel strips (Screw bands to plastic studs)

DO NOT use c-channel on top or bottom of wall



Bottom band gets screwed to blocks before building wall

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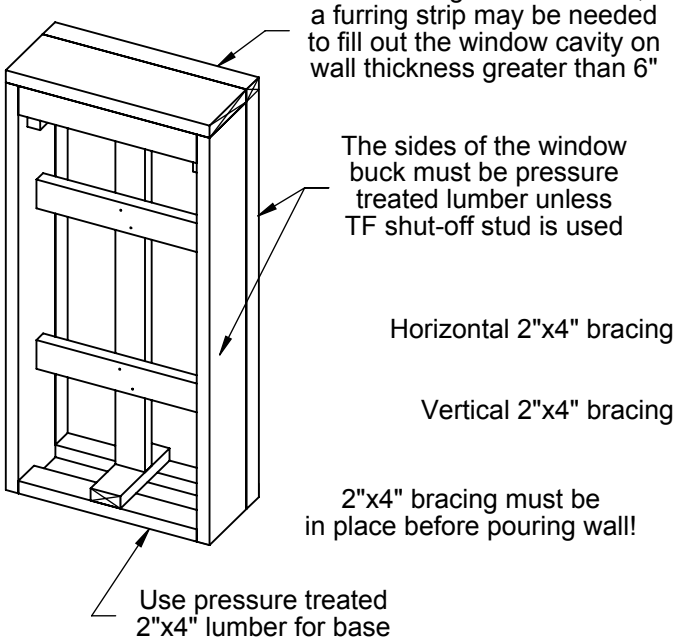
Round Wall - Completed

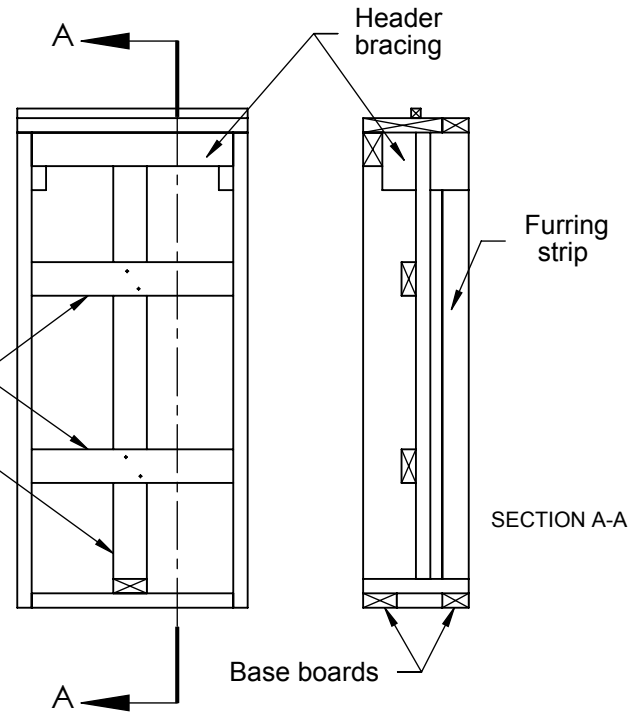
ThermoForm

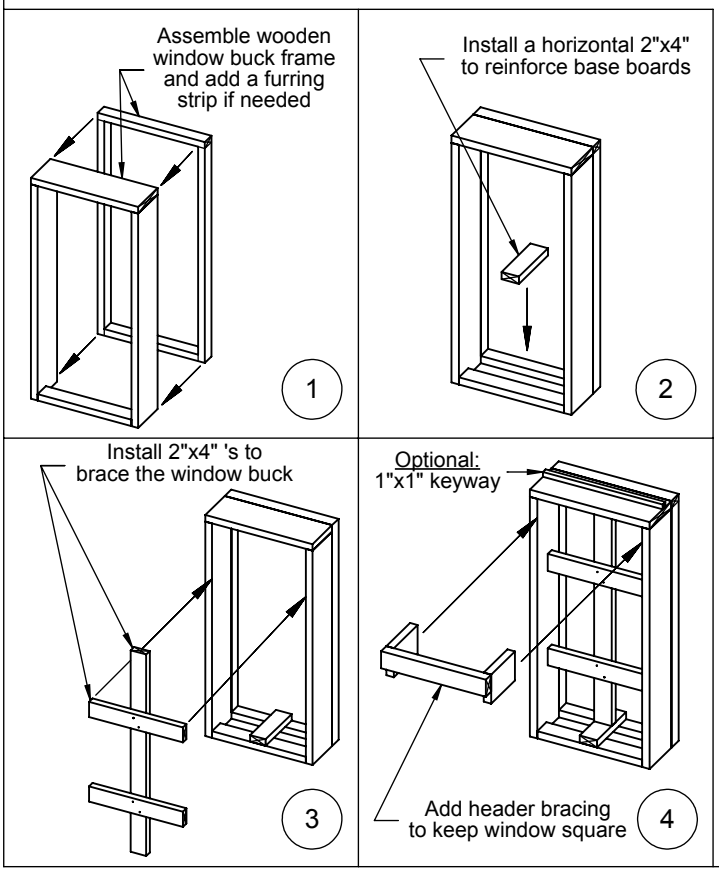
TF Forming Systems, Inc.
800-360-4634
www.TFSystem.com

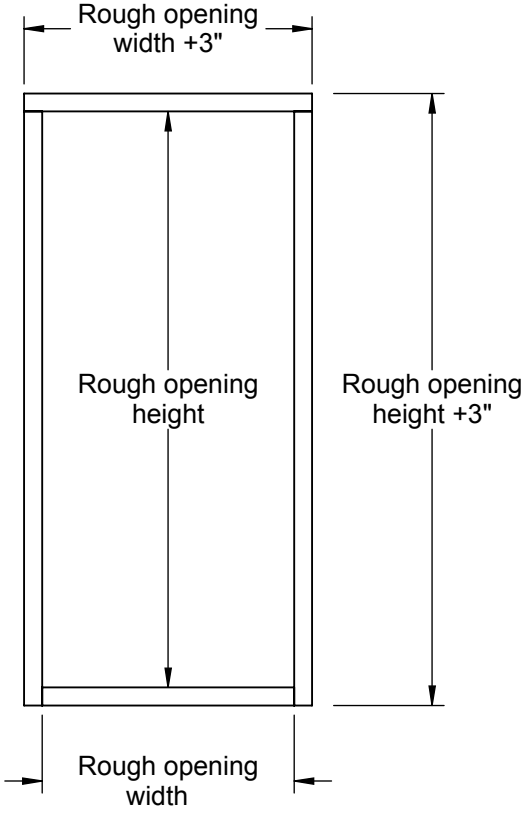
Date: 4/9/2014

Window bucks should be assembled ahead of time for increased speed and efficiency at the job site









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Window Bucks

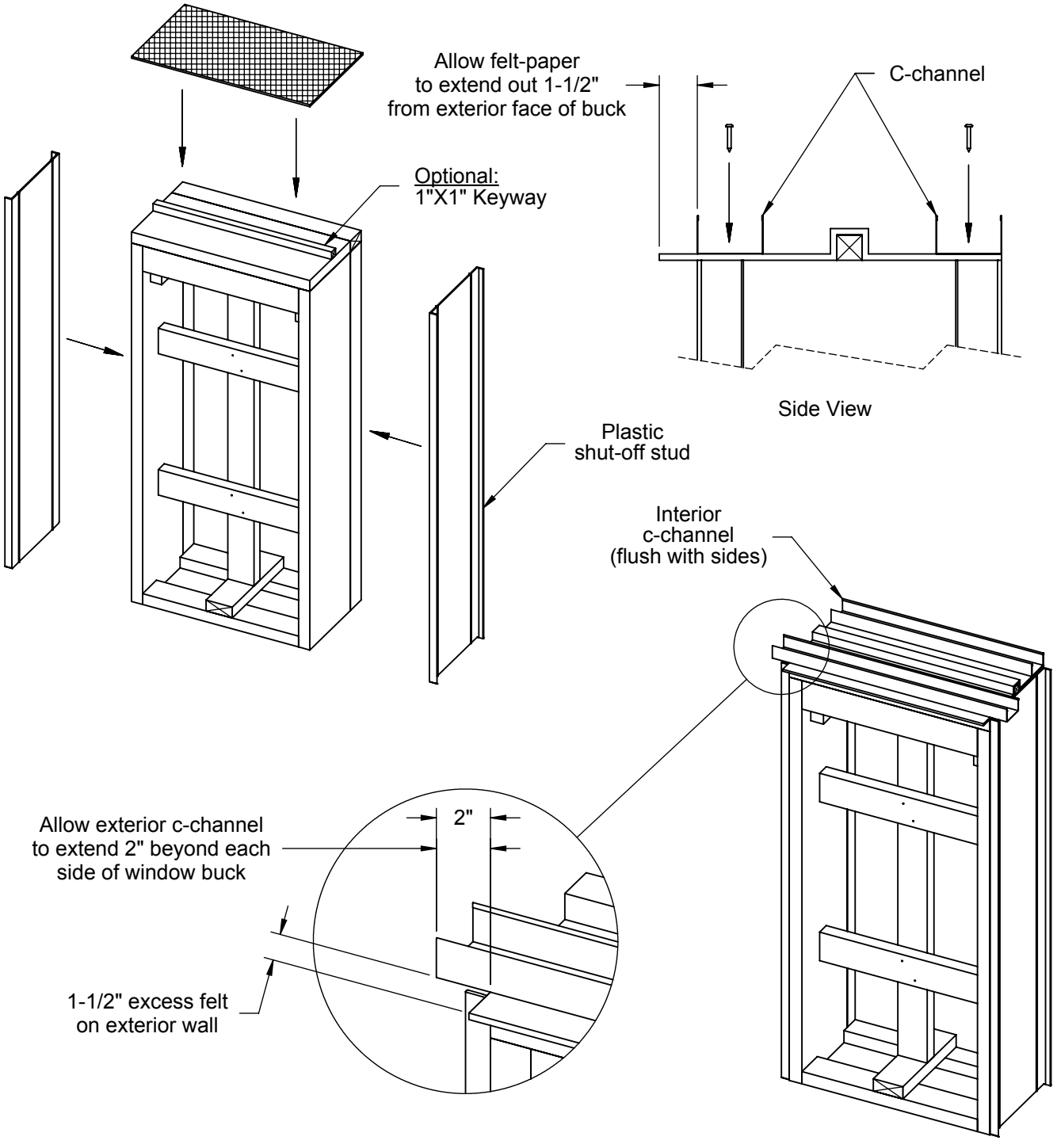
ThermoForm

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800-360-4634
www.TFSystem.com

Date: 9/11/2013

Staple down felt-paper to cover entire top surface of wood buck frame

Install c-channel to top of window buck with screws



TF FORMING SYSTEMS

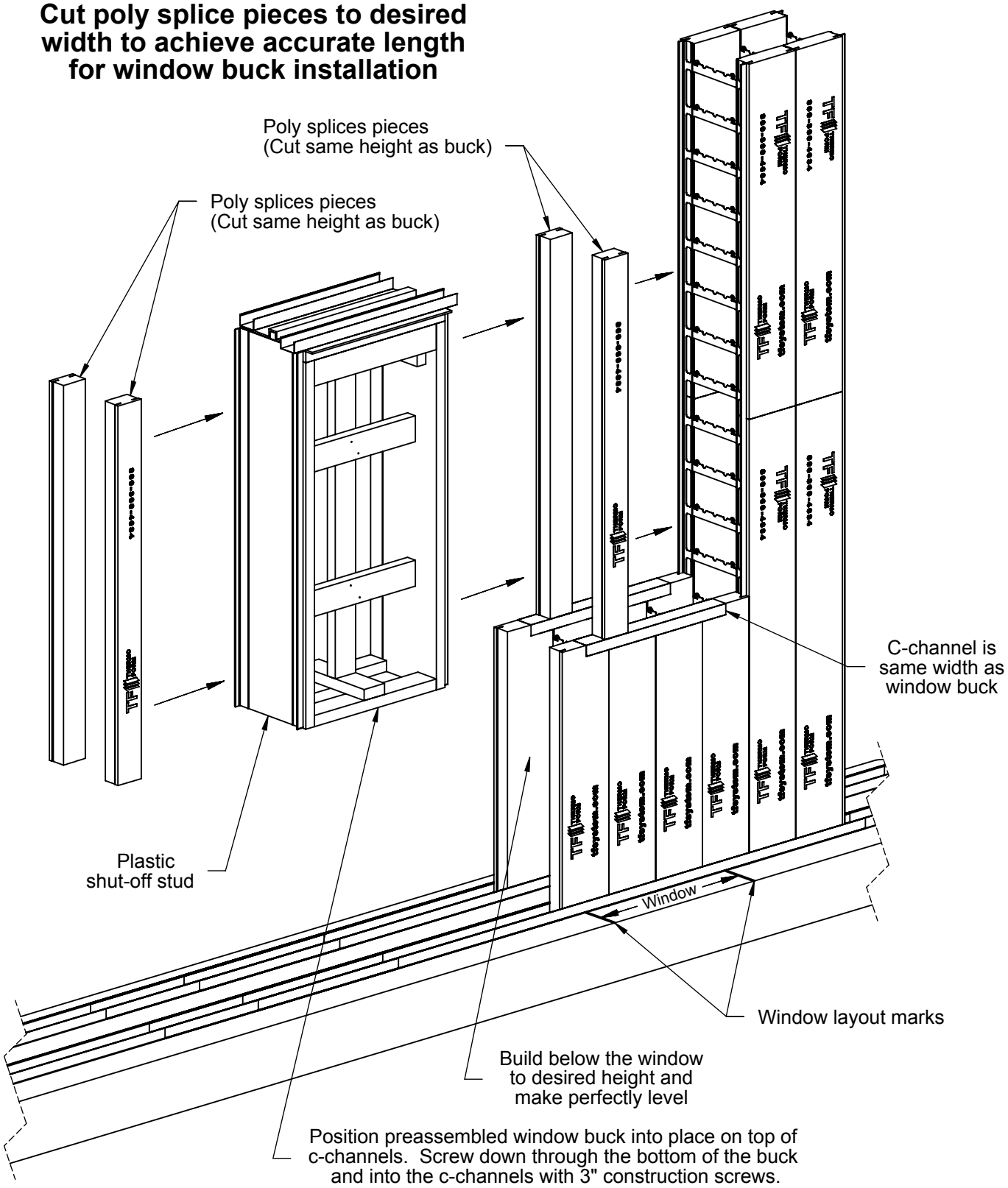
Window Bucks

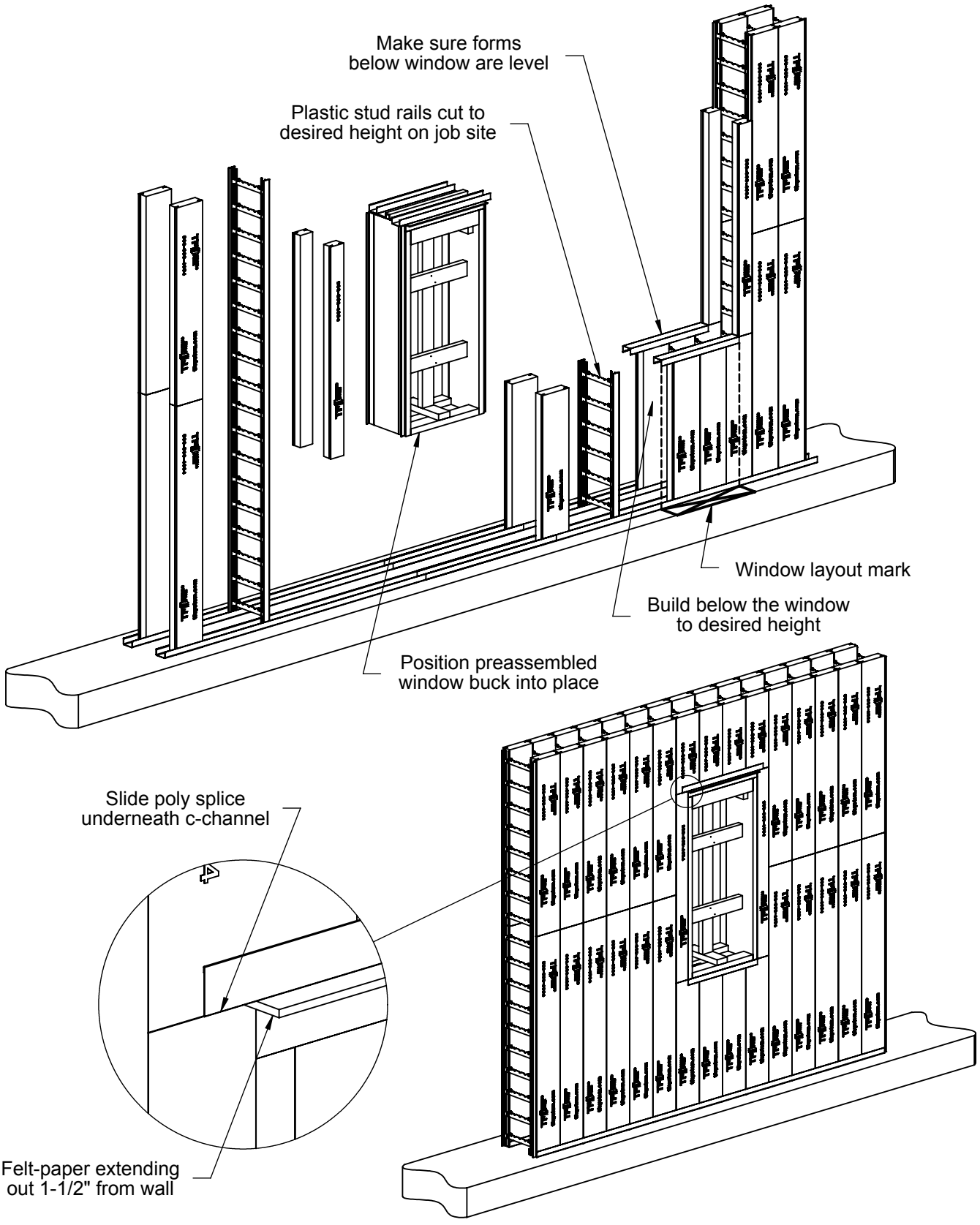
ThermoForm

TF Forming Systems, Inc.
800-360-4634
www.TFSystem.com

Date: 9/11/2013

Cut poly splice pieces to desired width to achieve accurate length for window buck installation



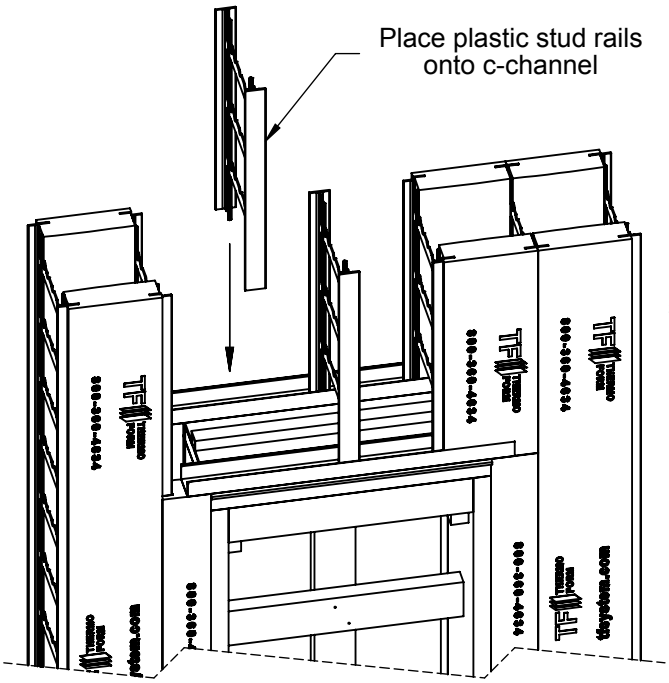


Window Bucks

ThermoForm

TF Forming Systems, Inc.
800-360-4634
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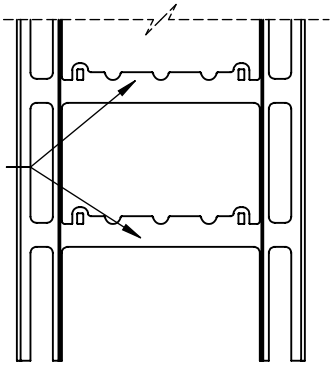
Date: 9/11/2013

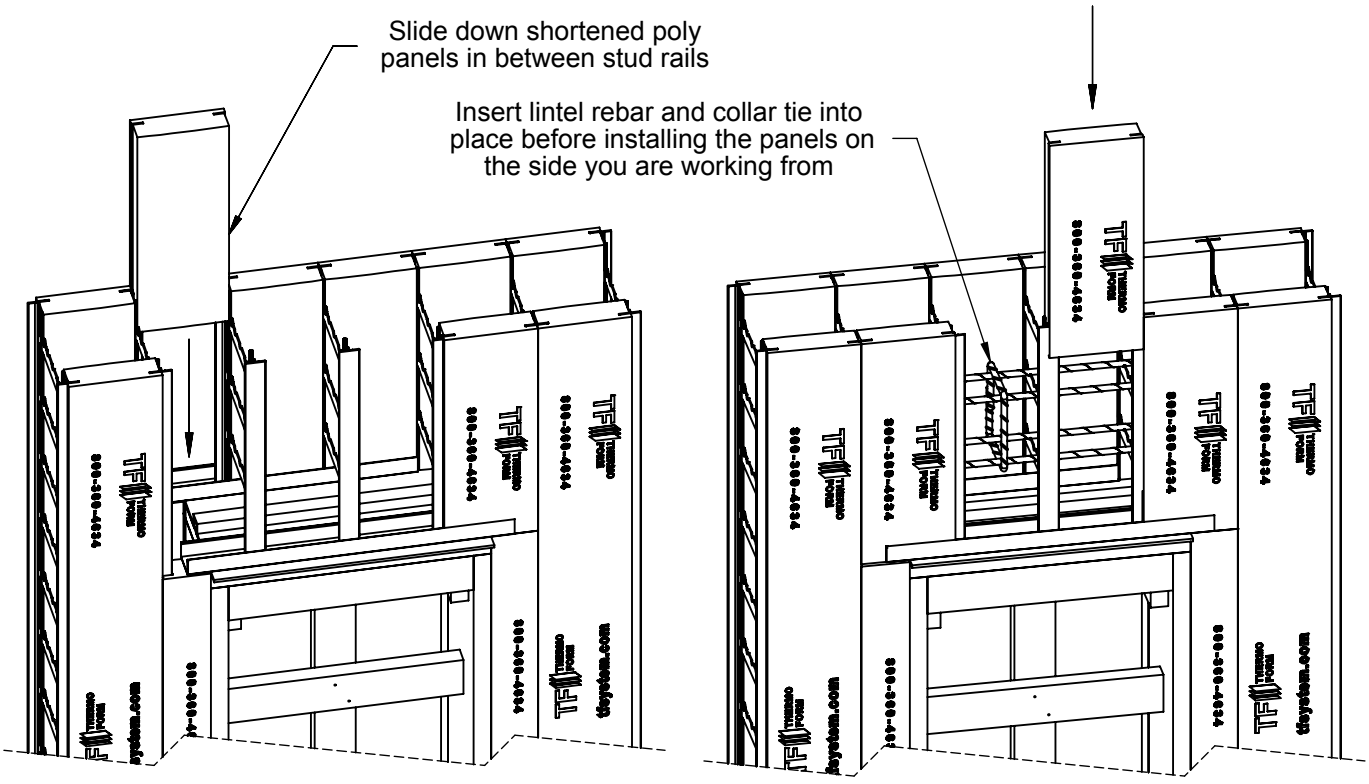


Remember to install header reinforcement according to code

Adjust the cut of the plastic studs so there are at least two cross-ties per stud.

Cut so that cross-ties line up horizontally with the cross-ties on the full rails on either side of opening.





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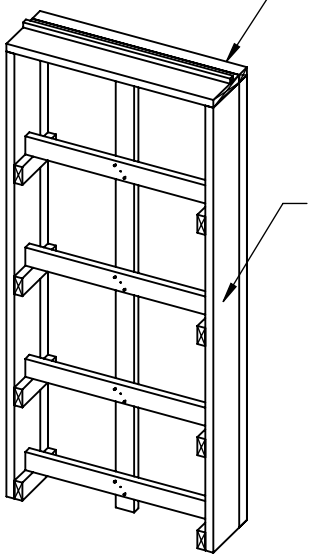
Window Bucks

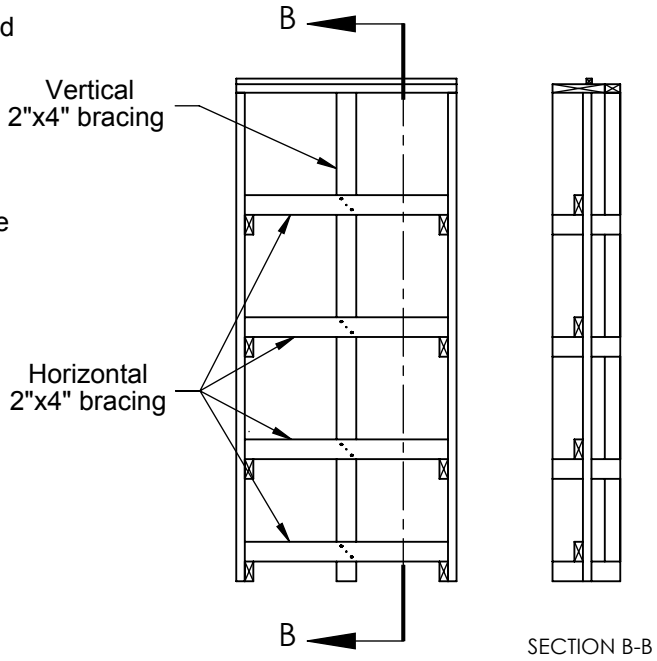
ThermoForm

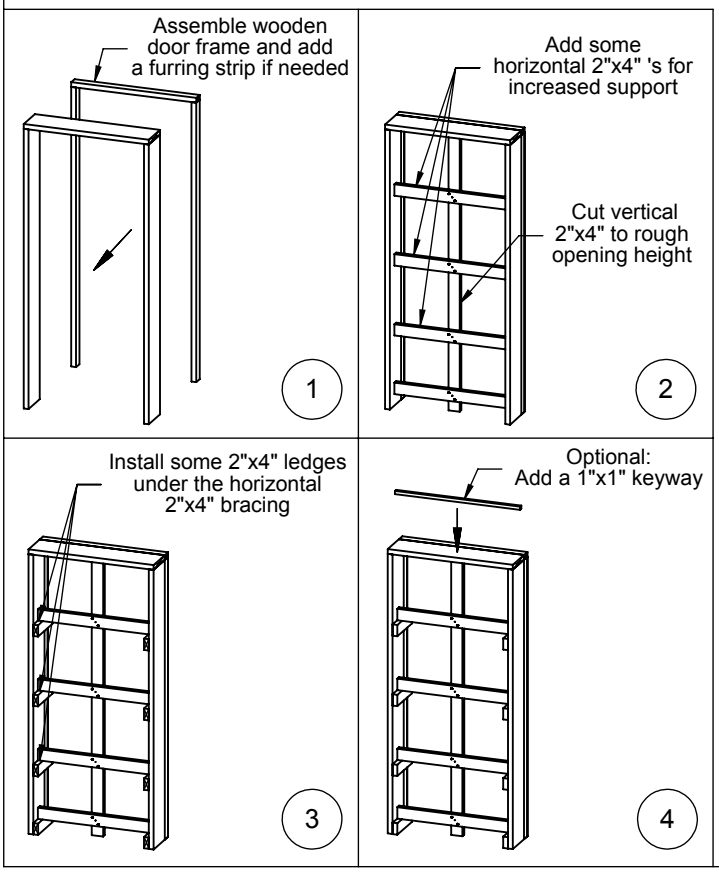
TF Forming Systems, Inc.
800-360-4634
www.TFSystem.com

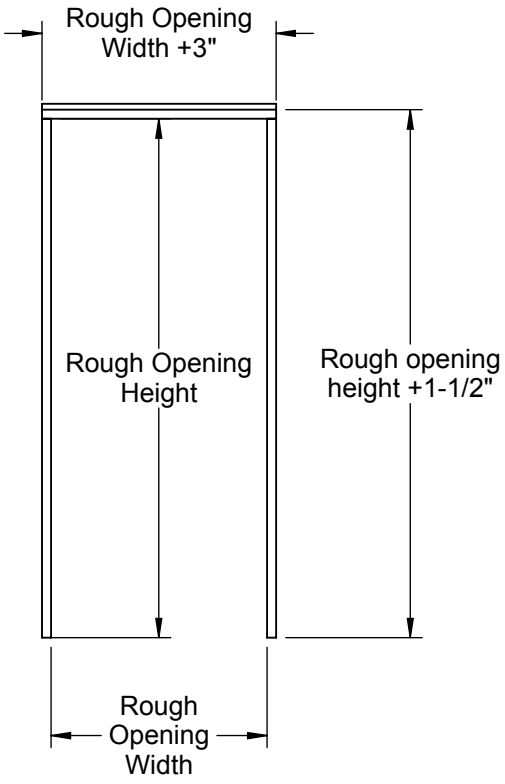
Date: 9/11/2013

Door bucks should be assembled ahead of time for increased speed and efficiency at the job site









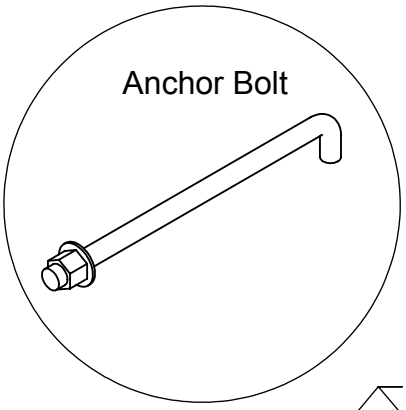
TF FORMING SYSTEMS

Building Door Frame

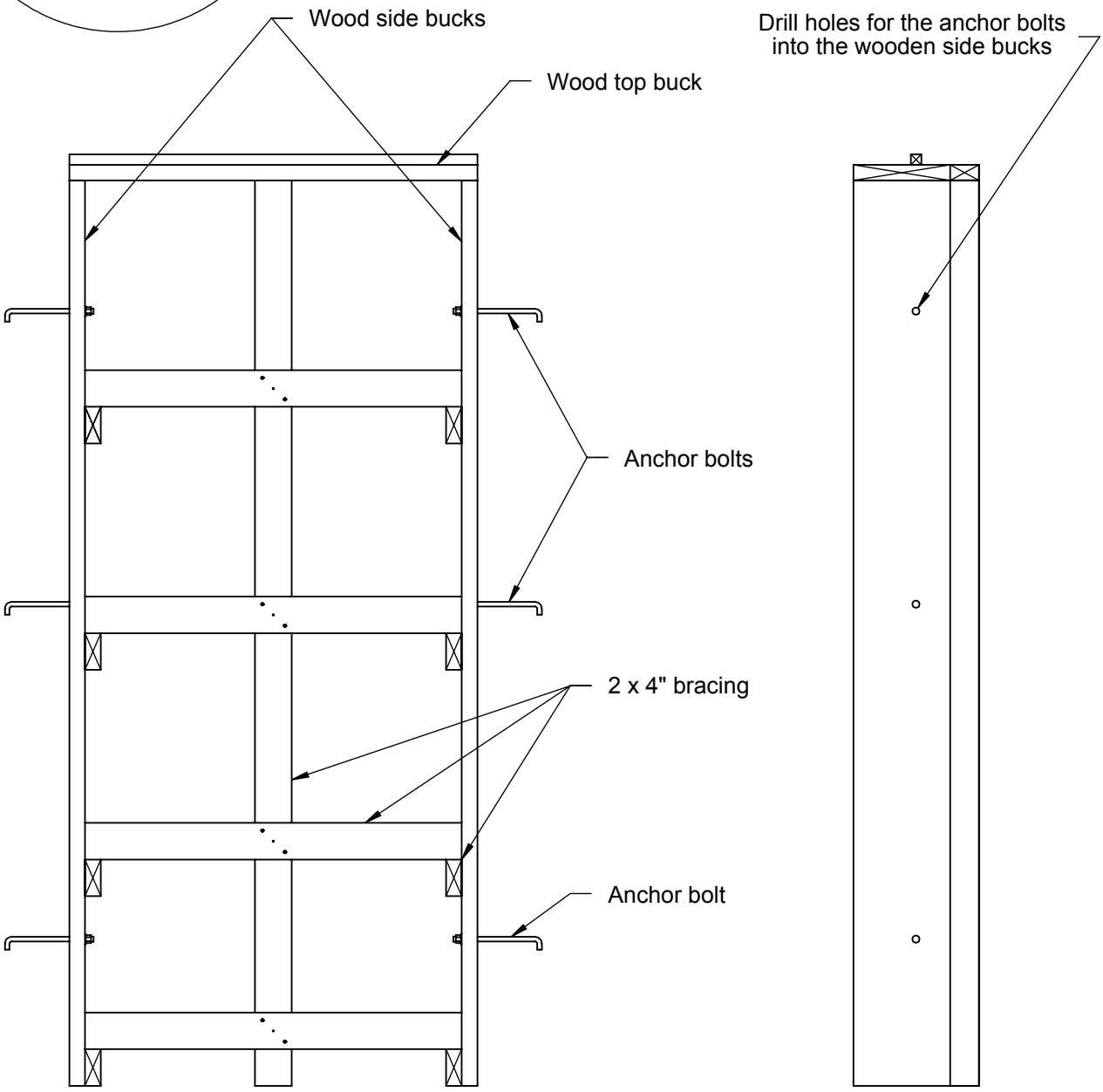
ThermoForm

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Date: 9/11/2013



Embed anchor bolts, according to code requirements, on both sides of door buck



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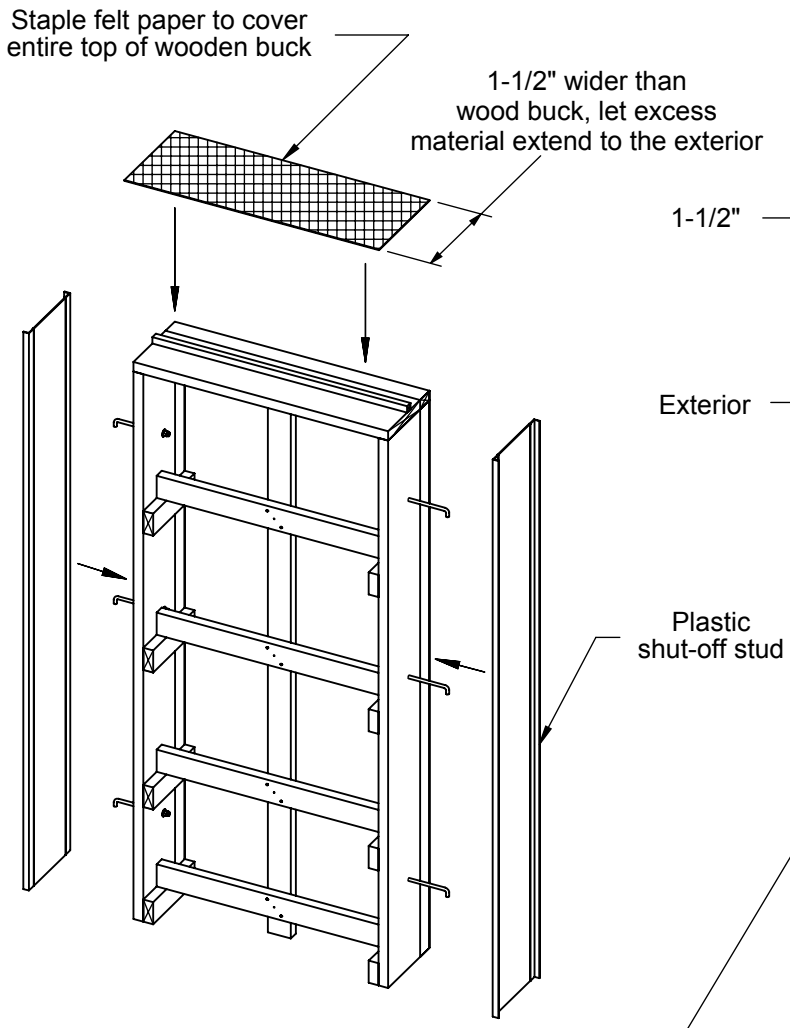
Installing Anchor Bolts

ThermoForm

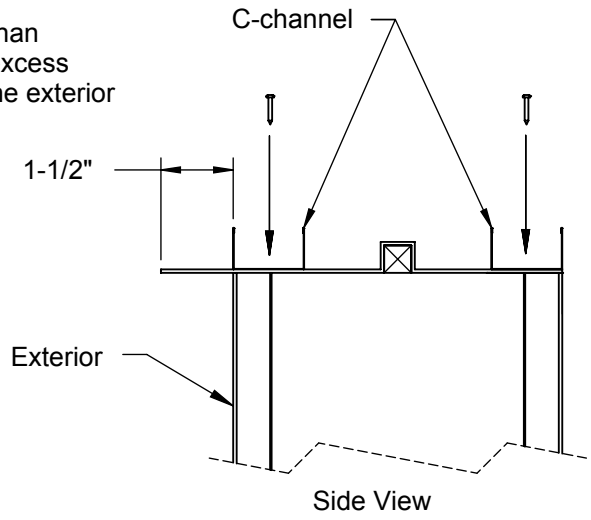
TF Forming Systems, Inc.
800-360-4634
www.TFSystem.com

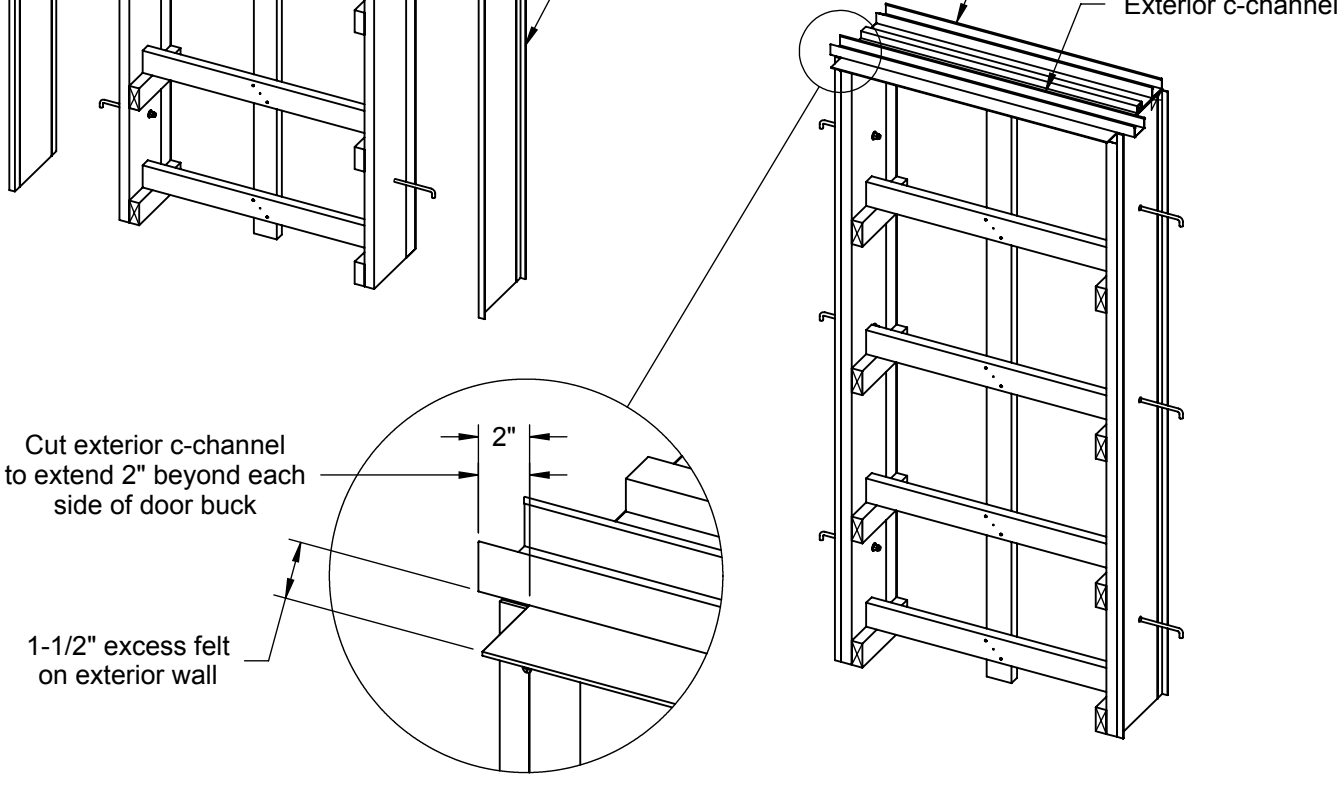
Date: 9/11/2013

Staple down felt-paper to cover entire top surface of wood buck frame



Install c-channel to top of door buck with screws



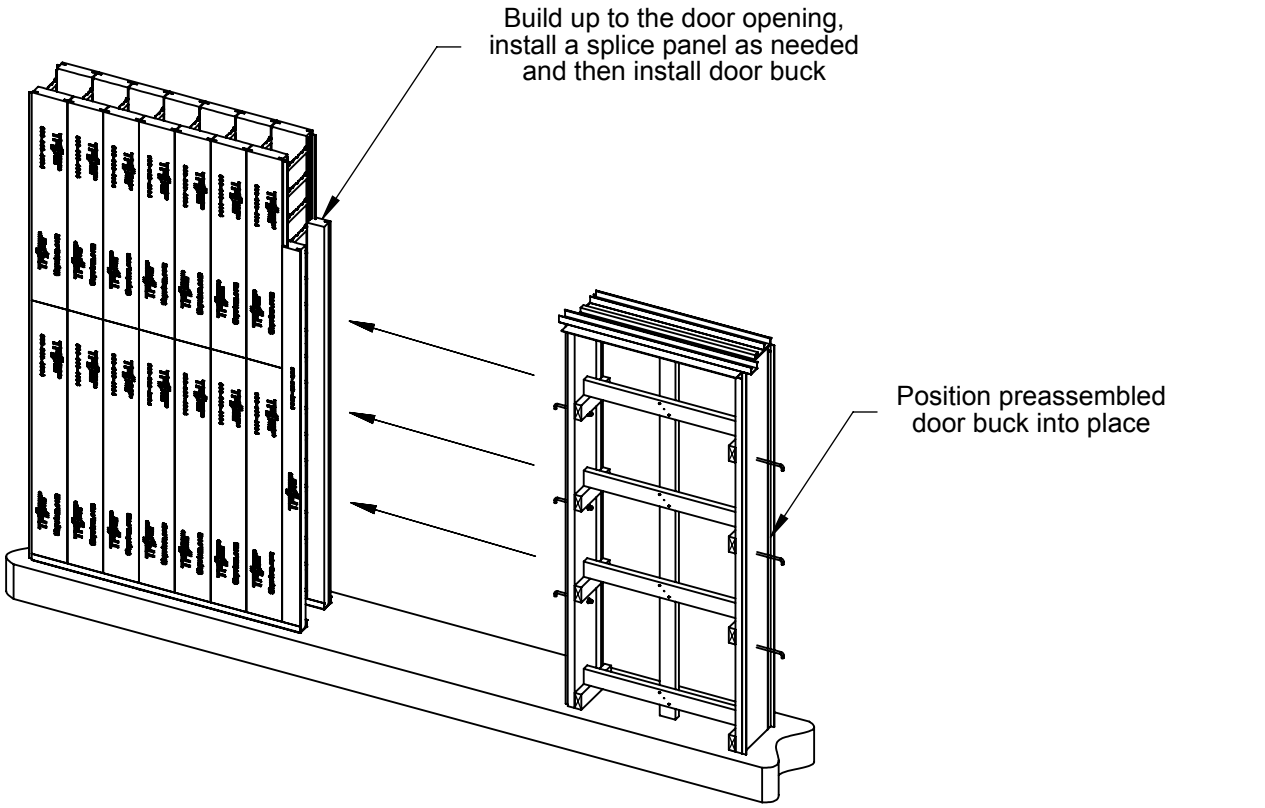


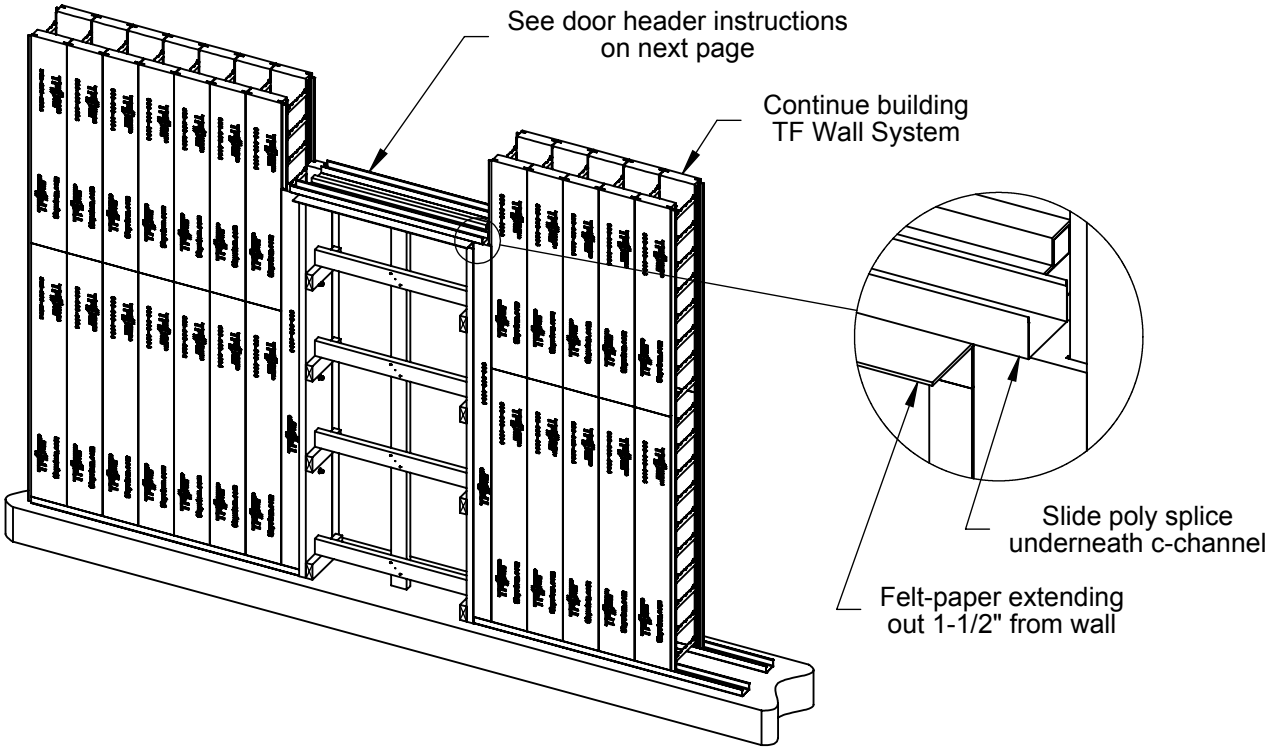
Installing Felt & C-Channel

ThermoForm

TF Forming Systems, Inc.
800-360-4634
www.TFSystem.com

Date: 9/11/2013





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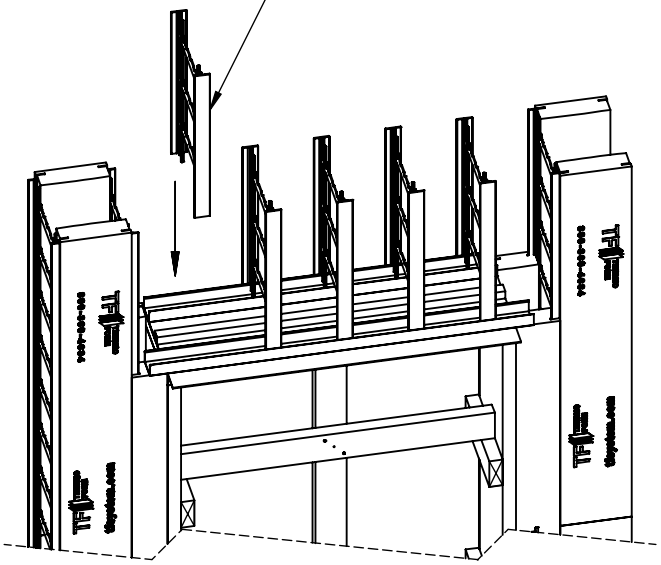
Installing Door Buck

ThermoForm

TF Forming Systems, Inc.
800-360-4634
www.TFSystem.com

Date: 9/12/2013

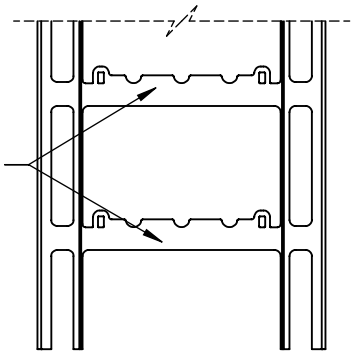
Place plastic stud rails onto c-channel



Remember to install header reinforcement according to code

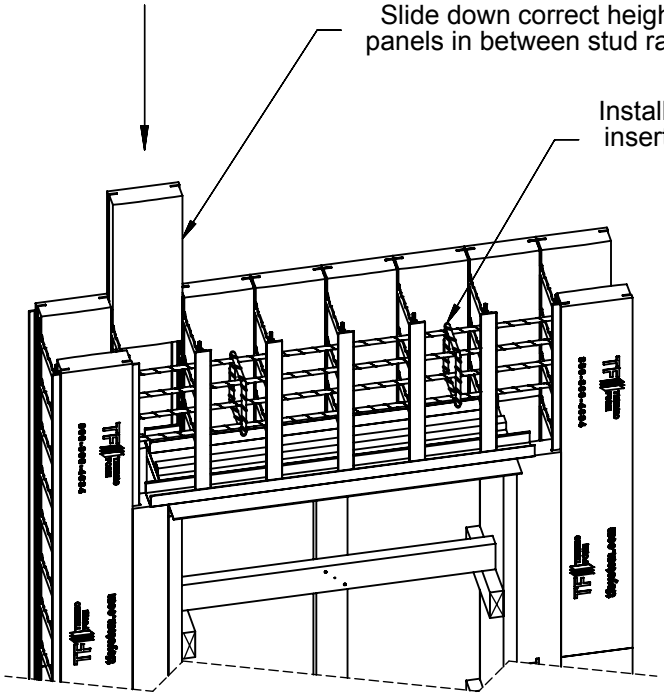
Adjust the cut of the plastic studs so there are at least two cross-ties per stud.

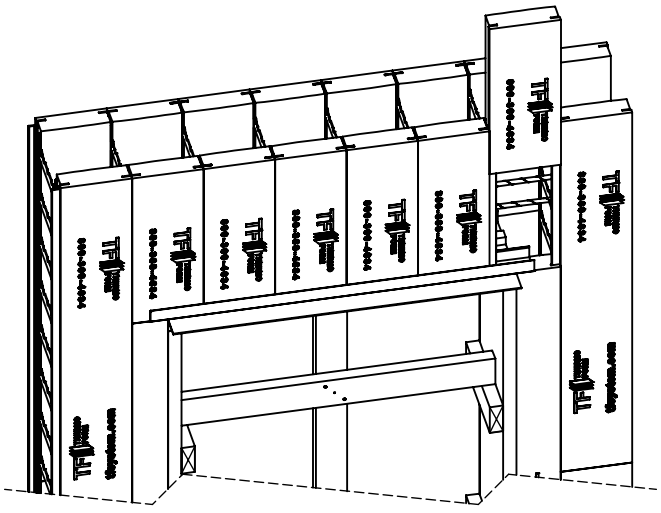
Cut so the cross-ties line up horizontally with the cross-ties on the full rails on either side of opening.



Slide down correct height panels in between stud rails

Install lintel and collar tie rebar before inserting poly panels on the side you are working from





TF FORMING SYSTEMS

Installing Door Header

ThermoForm

TF Forming Systems, Inc.
800-360-4634
www.TFSystem.com

Date: 9/12/2013

Section 6

Bracing Overview

Use common sense.....

We only provide basic examples of bracing. It is not possible to account for every situation on the jobsite. Construction experience and common sense are assumed. We will gladly provide bracing drawings, by email, of any situation as requested. The manual becomes too thick and people get lost when to much information is given. Please contact us when questions arise.

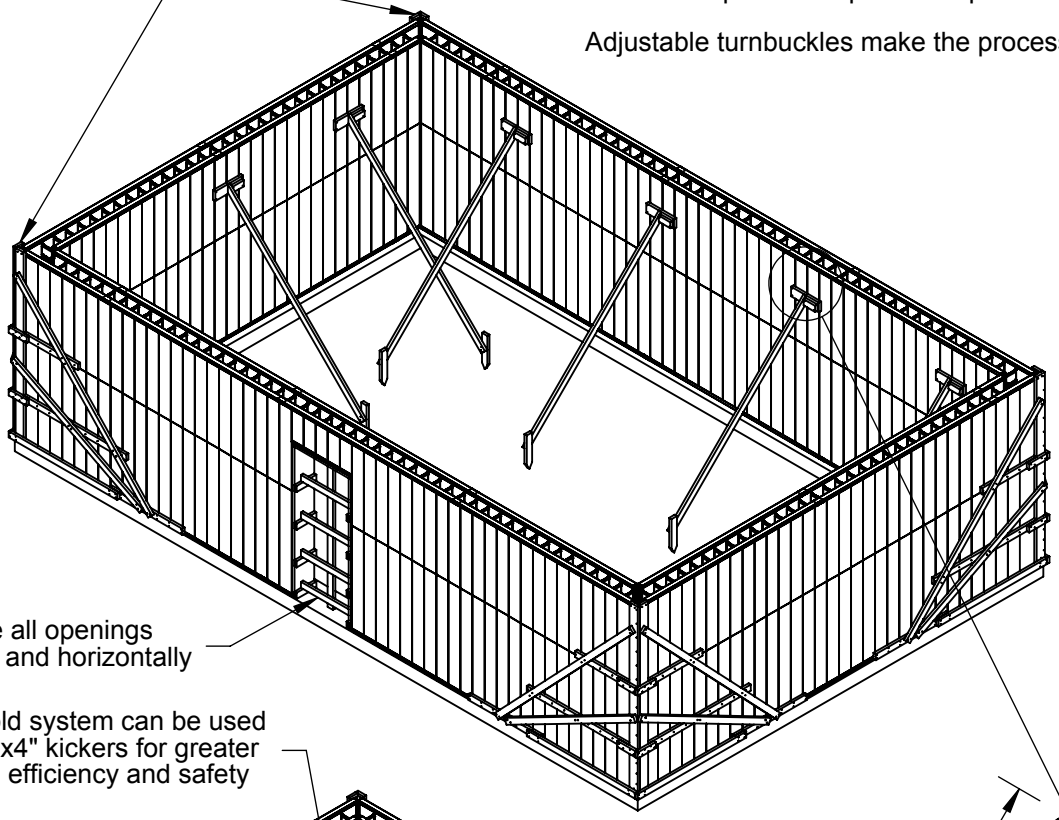
Header bracing has many variables involved, such as length of opening, height and width of concrete.

Bracing for high winds and gusts of wind also has many variables. Please call or email TF Forming Systems Inc. and we will be happy to provide advice for these situations.

BRACE ALL CORNERS

Use a kicker to brace wall on one side as needed or 8'-9' apart to keep the wall plumb and straight

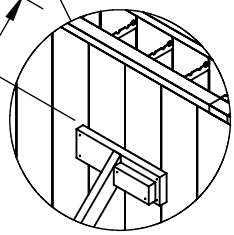
Adjustable turnbuckles make the process much easier

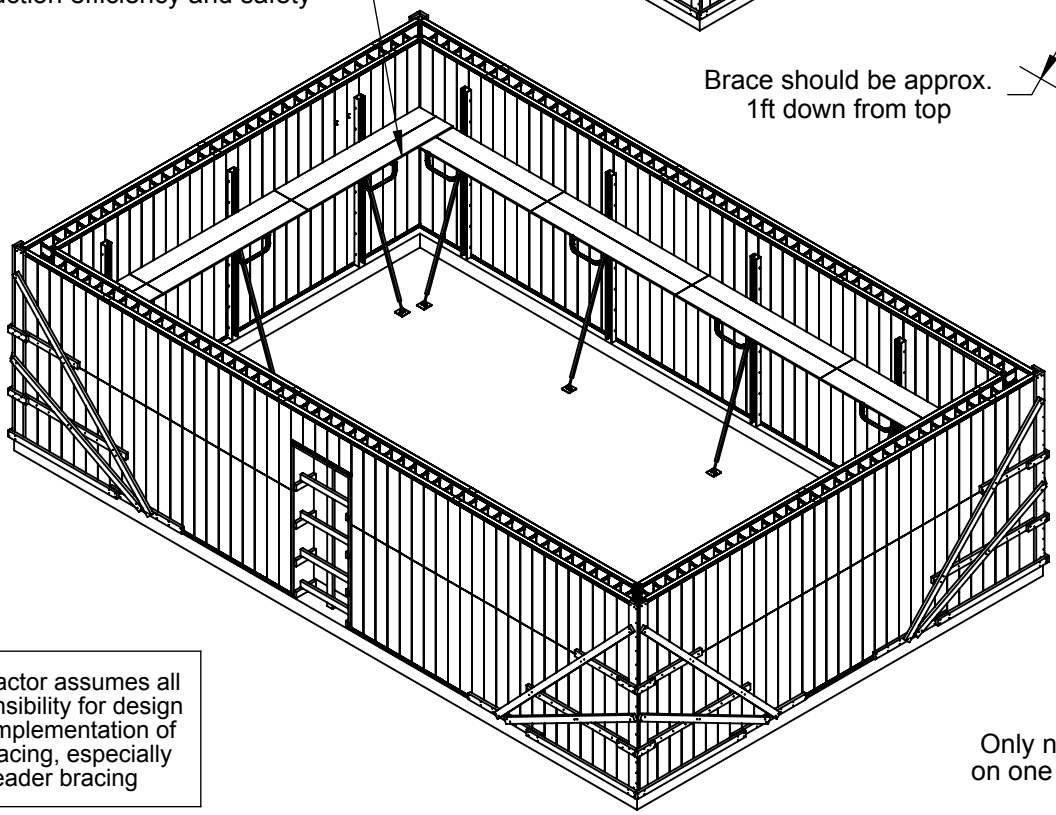


Brace all openings vertically and horizontally

An ICF scaffold system can be used in place of 2"x4" kickers for greater construction efficiency and safety

Brace should be approx. 1ft down from top





Contractor assumes all responsibility for design and implementation of all bracing, especially header bracing

Only need kickes on one side of wall

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Interior Bracing Overview

ThermoForm

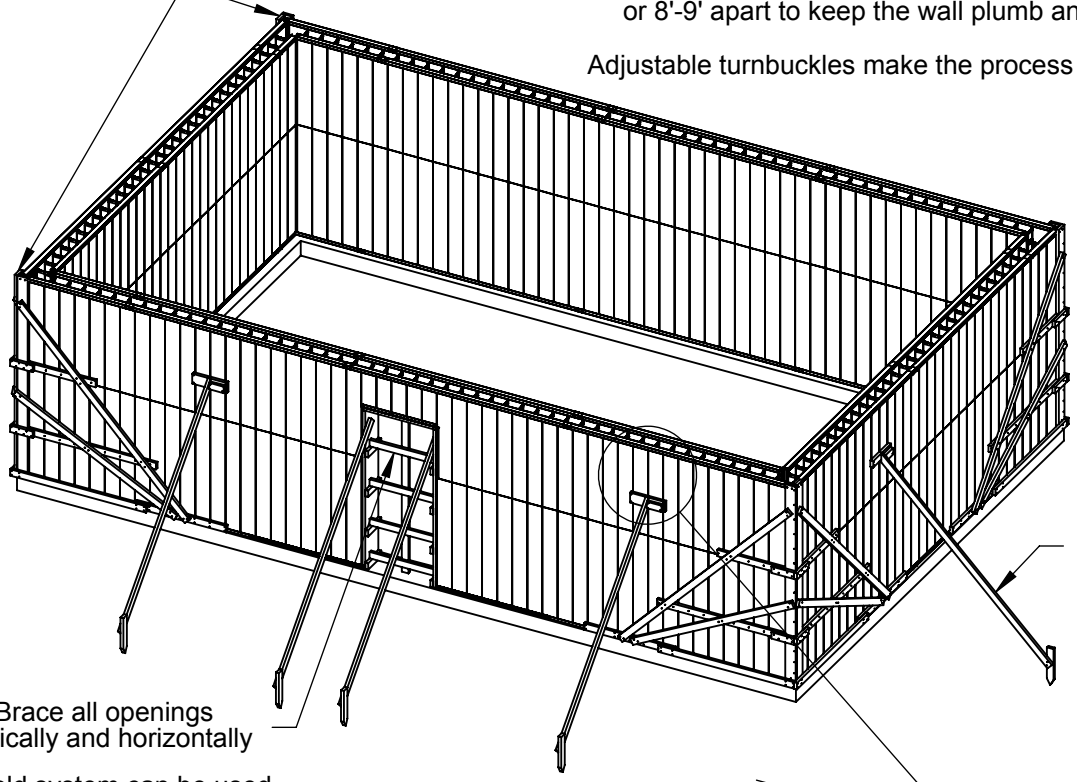
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Date: 7/21/2016

BRACE ALL CORNERS

Use a kicker to brace wall on one side as needed or 8'-9' apart to keep the wall plumb and straight

Adjustable turnbuckles make the process much easier

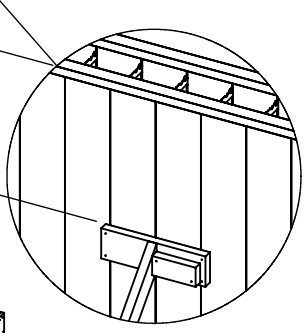


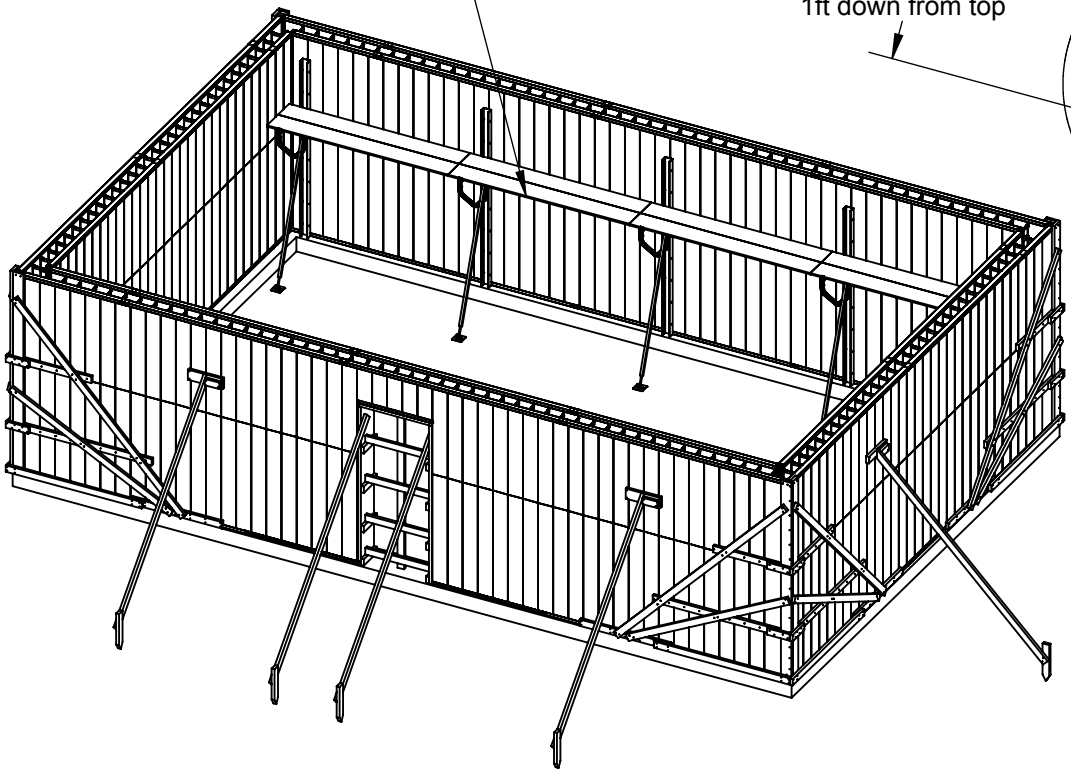
2"x4" kicker

Brace all openings vertically and horizontally

An ICF scaffold system can be used in place of 2"x4" kickers for greater construction efficiency and safety

Brace should be approx. 1ft down from top





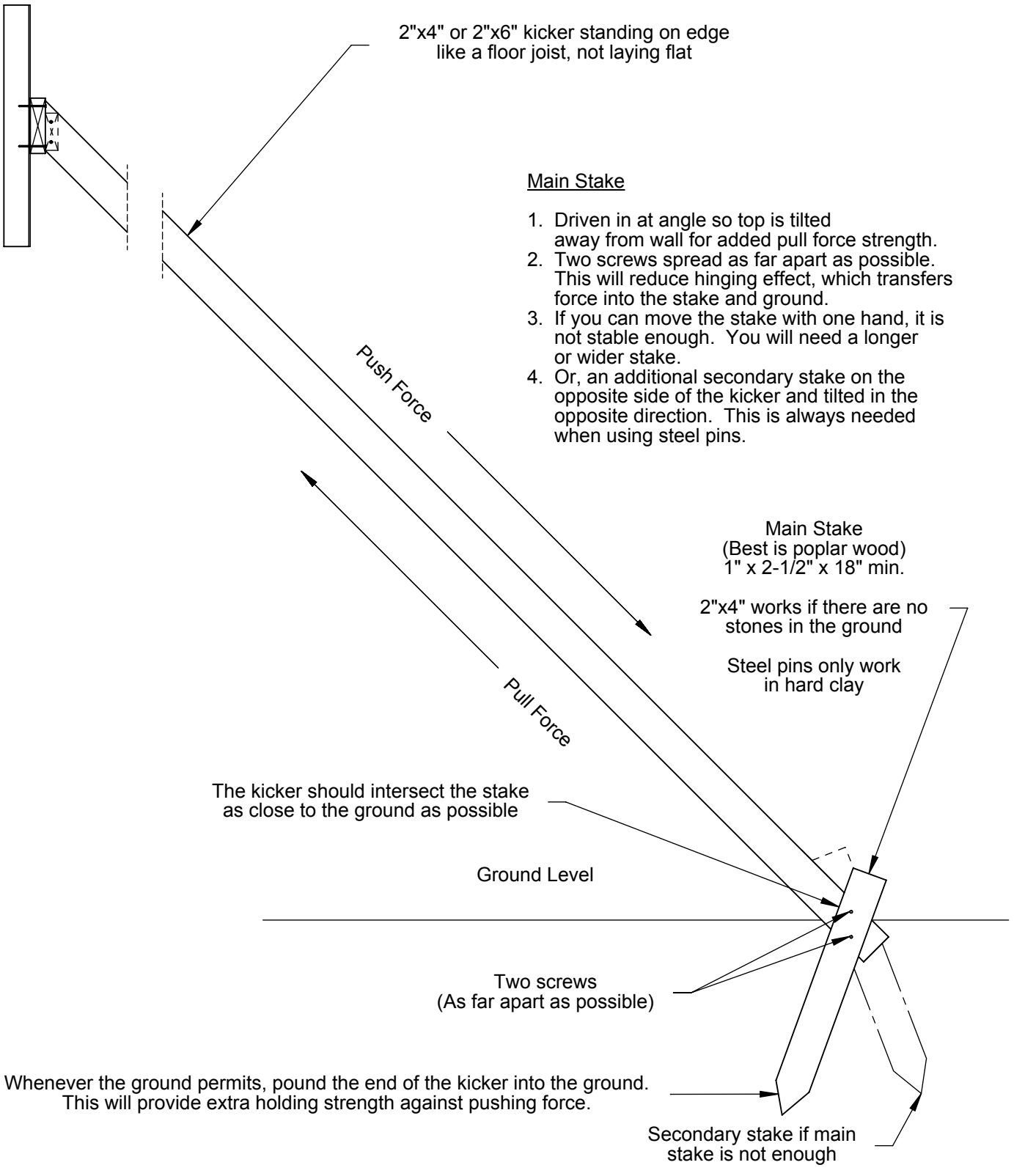
Contractor assumes all responsibility for design and implementation of all bracing, especially header bracing

Optional: Exterior Bracing

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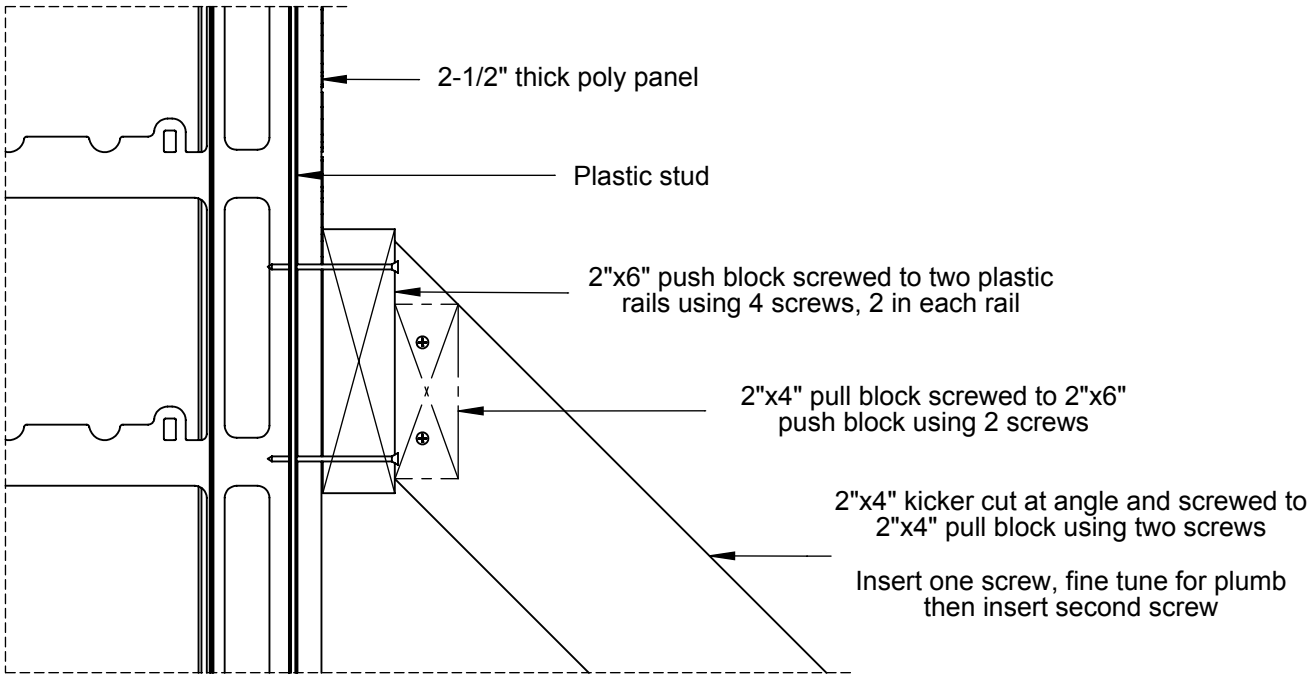
TF FORMING SYSTEMS

Standard Kicker

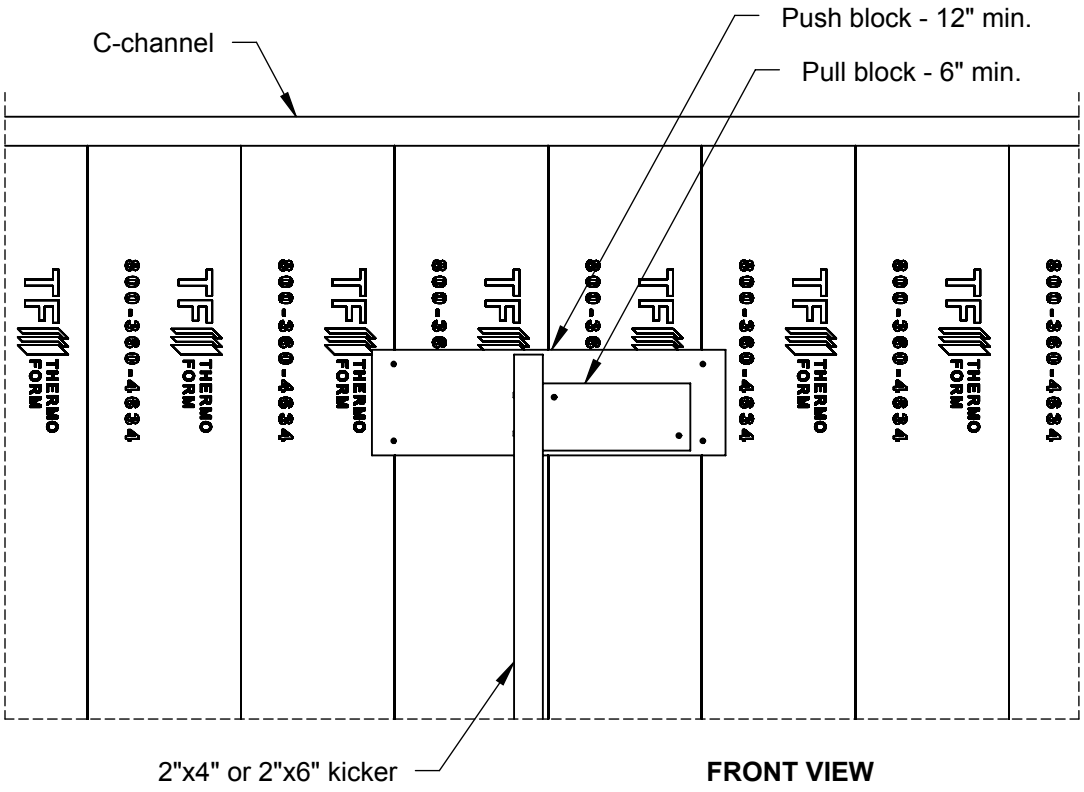
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Date: 9/12/2013



SIDE VIEW



FRONT VIEW

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Standard Kicker Installation

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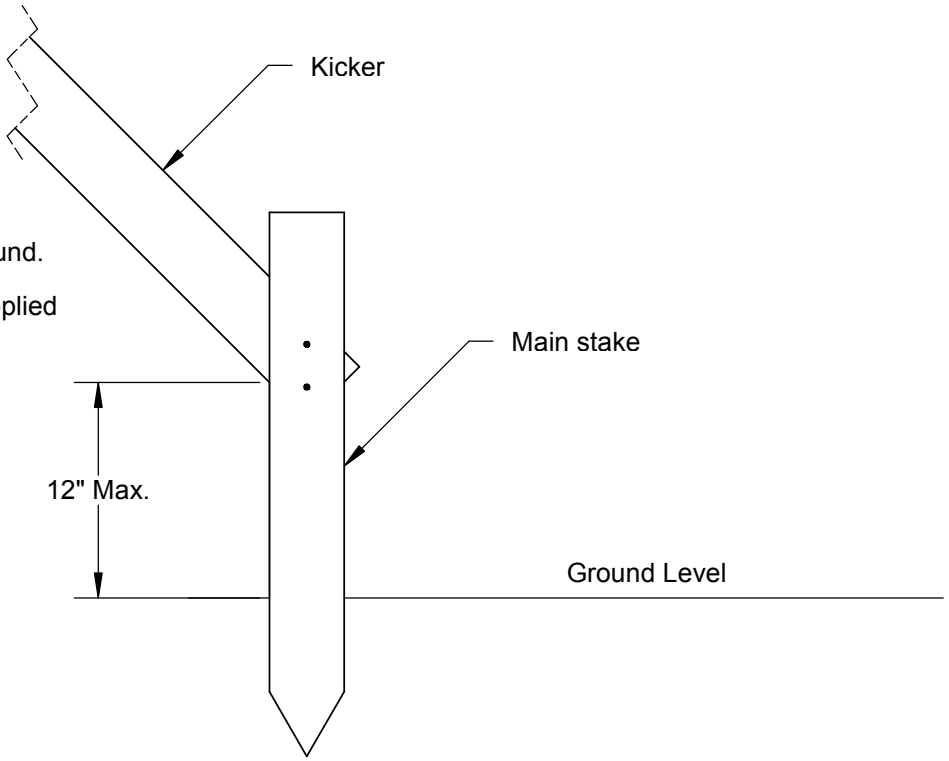
Date: 9/12/2013

WRONG!
DO NOT DO THIS

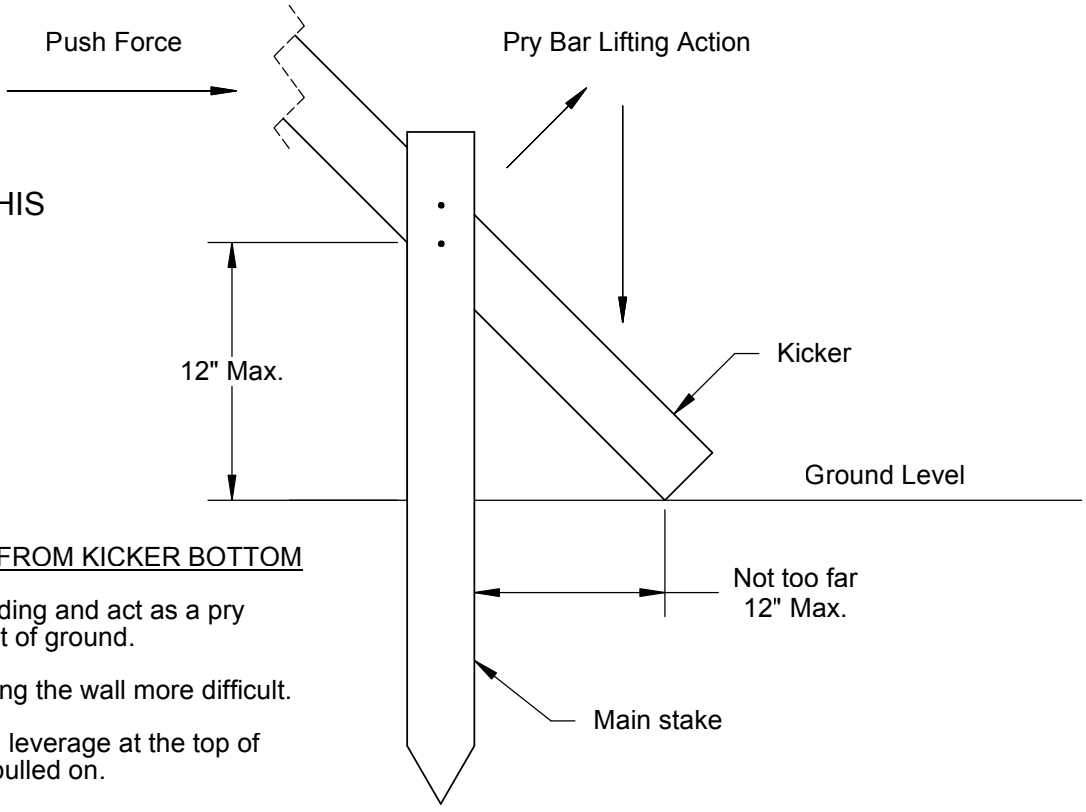
1. KICKER TOO HIGH

   Kicker should be touching ground.

   There is too much leverage applied to stake when attached high.



WRONG!
DO NOT DO THIS



2. STAKE TOO FAR FROM KICKER BOTTOM

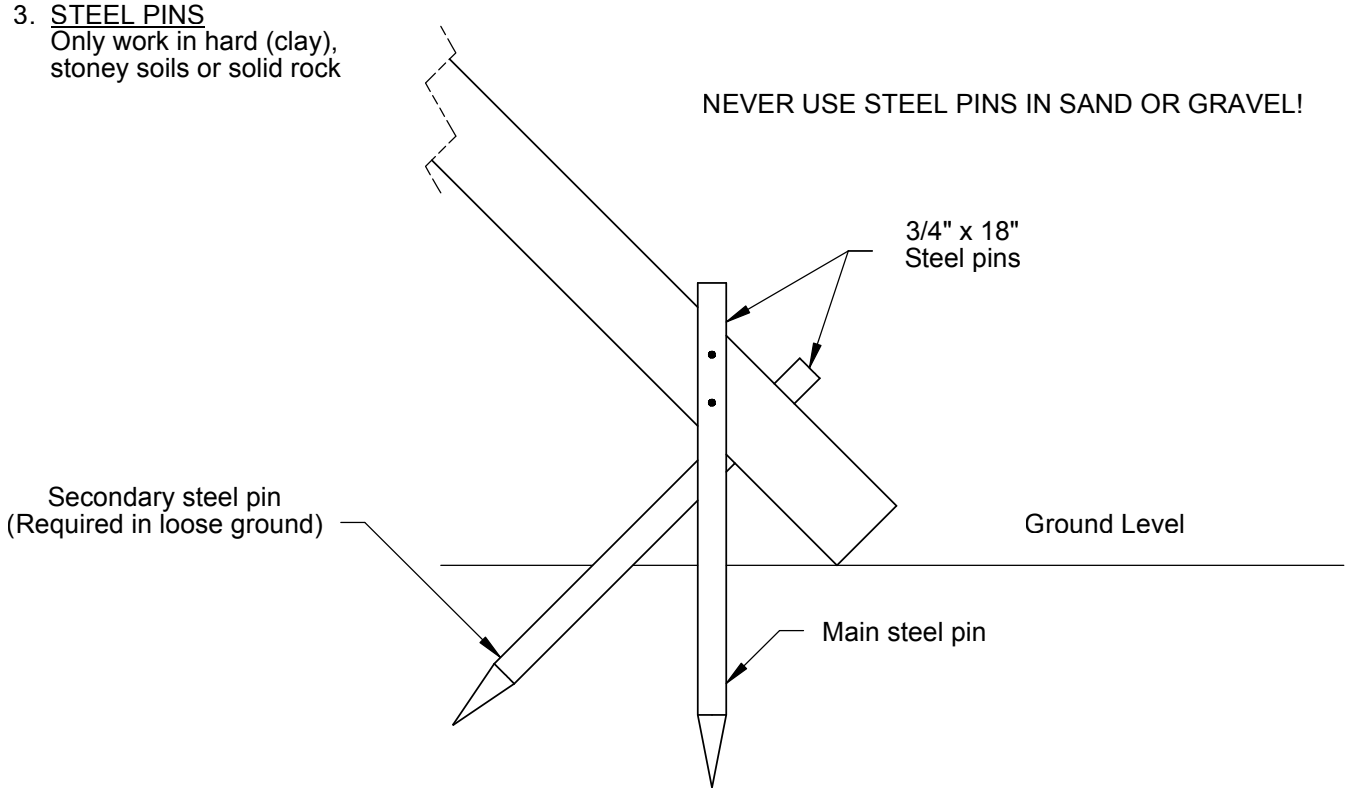
   This can cause binding and act as a pry bar to pull stake out of ground.

   Also makes plumbing the wall more difficult.

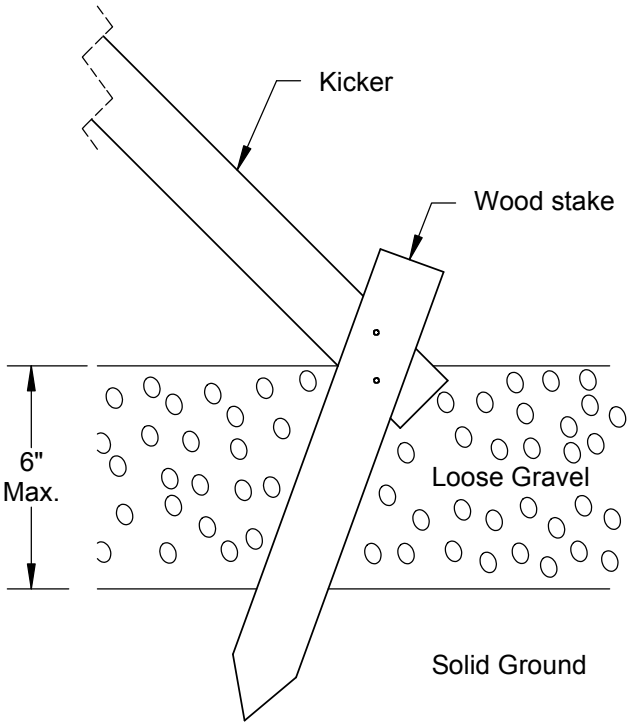
   Also puts too much leverage at the top of stake when being pulled on.

3. STEEL PINS
Only work in hard (clay), stoney soils or solid rock

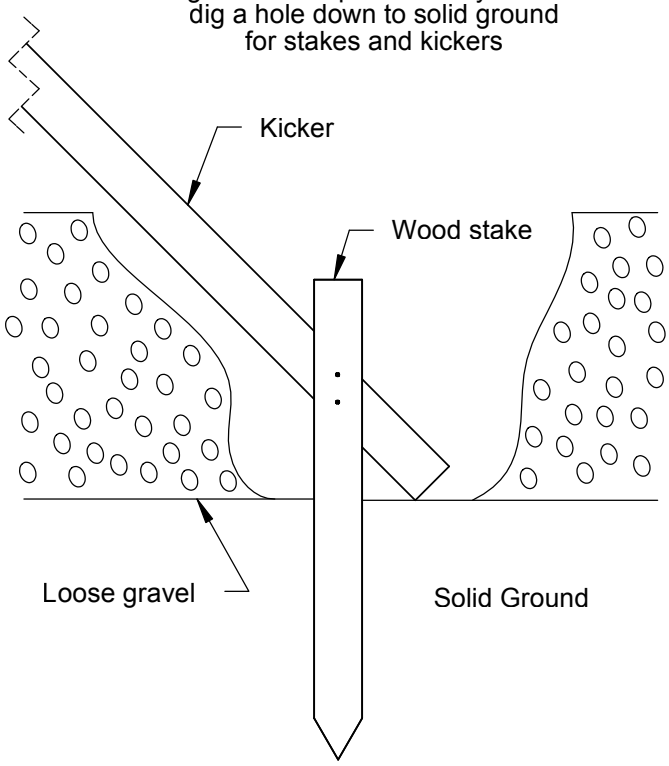
NEVER USE STEEL PINS IN SAND OR GRAVEL!

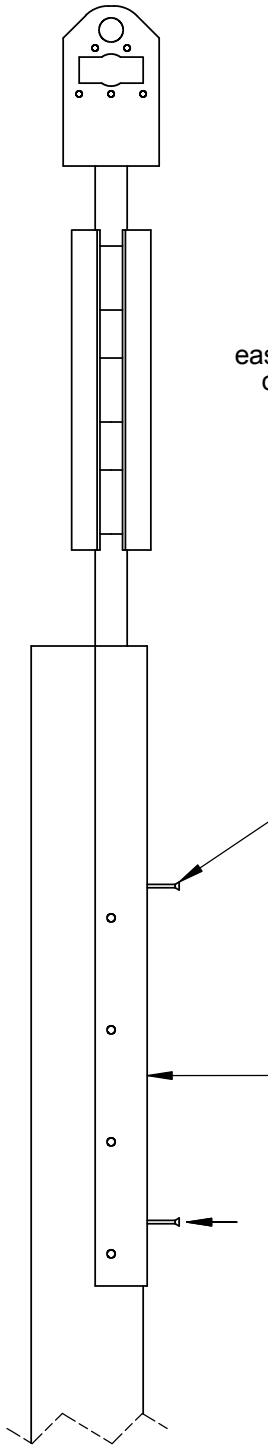


4. LOOSE GRAVEL
Doesn't hold wood stakes firmly enough



If gravel is deeper than 6" you must dig a hole down to solid ground for stakes and kickers





A turnbuckle attached to one end of a wood kicker greatly enhances the ease, speed, and accuracy of wood kickers. These turnbuckles can be rented or purchased at a reasonable price through a concrete contractors supply store. Typically they can be purchased for around $15.00 each.

Turnbuckle nailed or screwed to wood kicker
(Minimum of two fasteners on each side)

Turnbuckle end of kicker can be
attached to the wall or the stakes

It is preferable to attach the turnbuckle to
the stakes for easier access of adjusting walls

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Turnbuckle

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Date: 9/12/2013

Section 7

Pouring Concrete

PRE-POUR CHECKLIST

CHECK OUTSIDE PERIMETER FOR THESE THINGS

OUTSIDE CORNERS

- ☐ Any missing bracing lumber on outside corner bracing?
- ☐ Does the outside corner bracing match the detail manual drawing?
- ☐ Are there any missing screws?
- ☐ Are corners plumb in both directions?

BACK SIDE OF T-INTERSECTIONS

- ☐ Any missing bracing lumber?
- ☐ Does it look like the detail manual drawing?
- ☐ Are there any missing screws?
- ☐ Are there enough kickers to stop the back side of the T-intersection from popping or bowing?

KICKERS

- ☐ Are the stakes that the kicker attaches to strong enough?
  (If you can move the stakes with your bare hands, then concrete will move them)
- ☐ Are the walls plumb?
- ☐ Are any screws, bolts, or pins missing?
- ☐ Is a string line installed for plumbing wall?

RESPONSIBILITY FOR ONES OWN MISTAKES

All too often people try to blame the form system or the company when there is a mistake. THE NUMBER ONE MISTAKE IS THAT PEOPLE DO NOT READ THIS MANUAL! Please remember that the form system does not erect itself, it simply holds concrete to the shape it is braced.

Concrete

-Always follow project specific engineering and applicable codes when determining the concrete mix design and appropriate reinforcement.

-A standard 3/4" aggregate wall mix is suitable in most cases.

-A 3/8" aggregate wall mix is good for pumping applications

-TF Forming Systems, Inc. recommends a 5”-6" slump and professional consolidation of the concrete.

-Only use water to increase slump by 1" otherwise use water reducing agent. (Super plasticizor)

Methods of placing concrete

-Front discharge concrete truck (recommended)

-Concrete pump truck (recommended)

*Use a 5” to 3” reducing flexible hose, or

*Reduce to a 3" hose with a double 90° bend on the end and shut off if available.

-Rear discharge concrete truck

-Trailer or "pony" pump

-Conveyor Truck

-Crane and bucket

Pouring tips

-Pour in approximately 4' lifts.

-Break the fall of the concrete by forcing the concrete to fall over the cross ties of the stud rails, rebar intersection, or use a square shovel as a deflector.

-Consolidate each lift separately without over consolidating the previous lift.

-Use personnel who have experience pouring concrete walls.

-Check and straighten walls between lifts.

Post Pour

-Smooth the top of the wall.

-Be sure to install all anchor bolts or rebar for the next level.

-Clean the c-channel after the pour. (A small piece of polystyrene works well.)

Internal Consolidation

Mechanical vibration

Use a 1-1/2" maximum diameter concrete vibrator to internally consolidate the concrete. Contact a TF Forming Systems, Inc. technical representative before using a vibrator larger than 1-1/2".

Concrete should be a 5"-6" slump.

Stay at least six feet behind where the forms are being filled.

On the first lift, run the vibrator down to the footing and pull it back up once in every cell between the stud rails. You should see some water trickle out the bottom of the forms between the footing and the C-channel. If no water trickles out, your concrete slump needs to be checked; the concrete may not be flowing freely enough. For the second and succeeding lifts, drop the vibrator head one foot into the preceding lift to help knit the lifts together.

Vibrating Walls: Do's and Don'ts

Do understand that any form system can be blown out by over vibrating. Common sense is a must!

Do vibrate concrete walls whenever possible. A stiffer mixed concrete that is vibrated has much less head pressure than a wetter mixed concrete that is not vibrated.

Don't allow vibrator to sit in one spot. Always keep it moving.

Don't try to move or flow the concrete in the wall forms with a vibrator.

Don't pour a stiff mix in any wall that will not be vibrated. The chances of getting a void or honeycomb in the wall are significantly increased.

External Consolidation

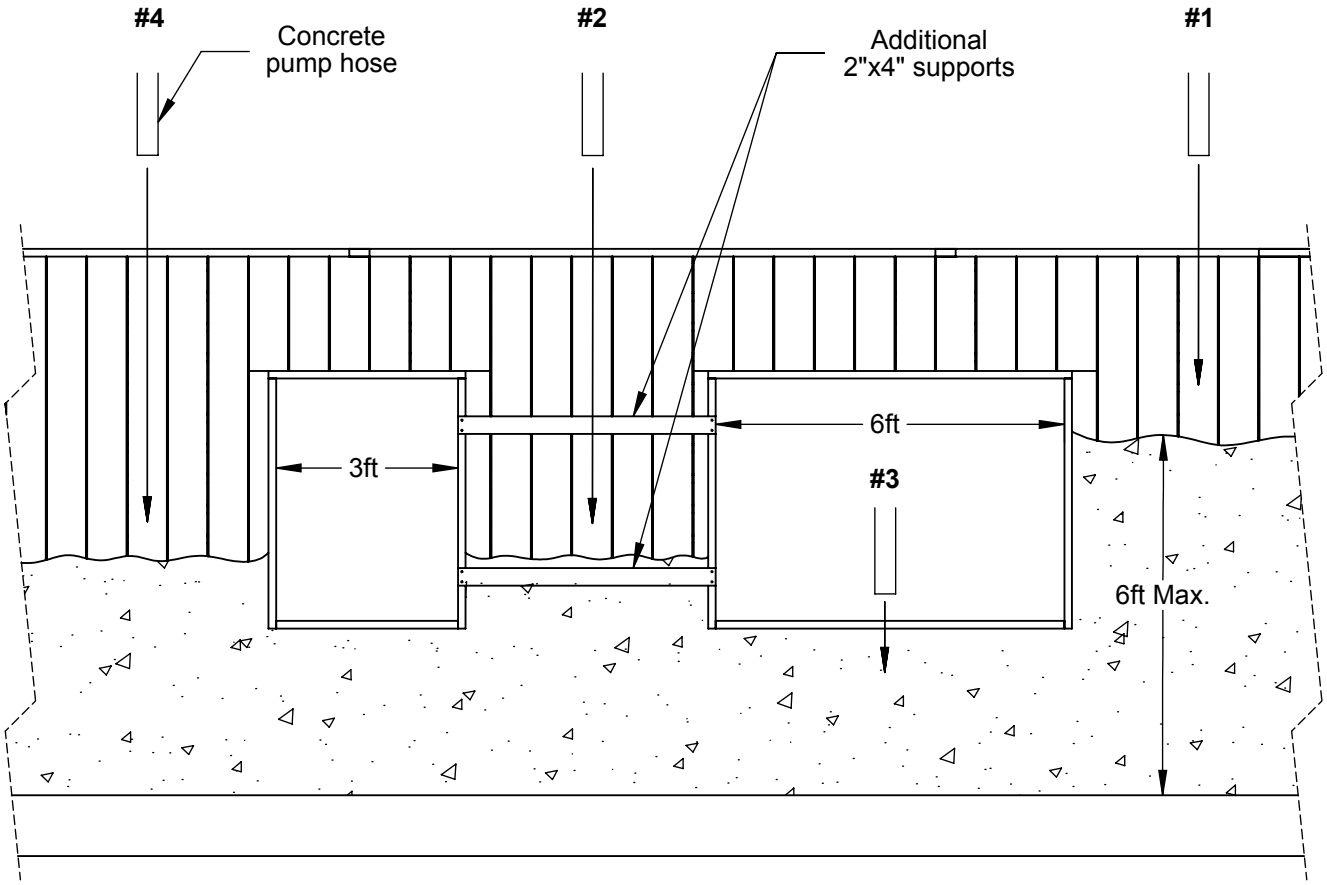
If you do not have access to a mechanical vibrator, use a hammer and piece of wood to tap the exterior of the wall.

Concrete should be at a 6"-7" slump when externally consolidating.

Stay at least 6 feet behind the filling position.

Place the board horizontally across two stud rails and tap with a hammer twice at several levels of each poly panel. Use medium velocity taps.

Common sense must be used. Vibrating walls takes skill and knowledge. You can blow out any form system if consolidation is done incorrectly.



Big Windows:

#1 Fill on one side of the window. Pull concrete to the center of the window opening as much as possible until concrete reaches 6' max in total height at the side of the window.

#2 Move to other side of the window and repeat. Fill only up to a maximum of 6'. Pull concrete towards center then proceed to step #3.

#3 Move hose to center of window and tell pump operator you need only one pump, for a small amount of concrete.

Continued on next page . . .

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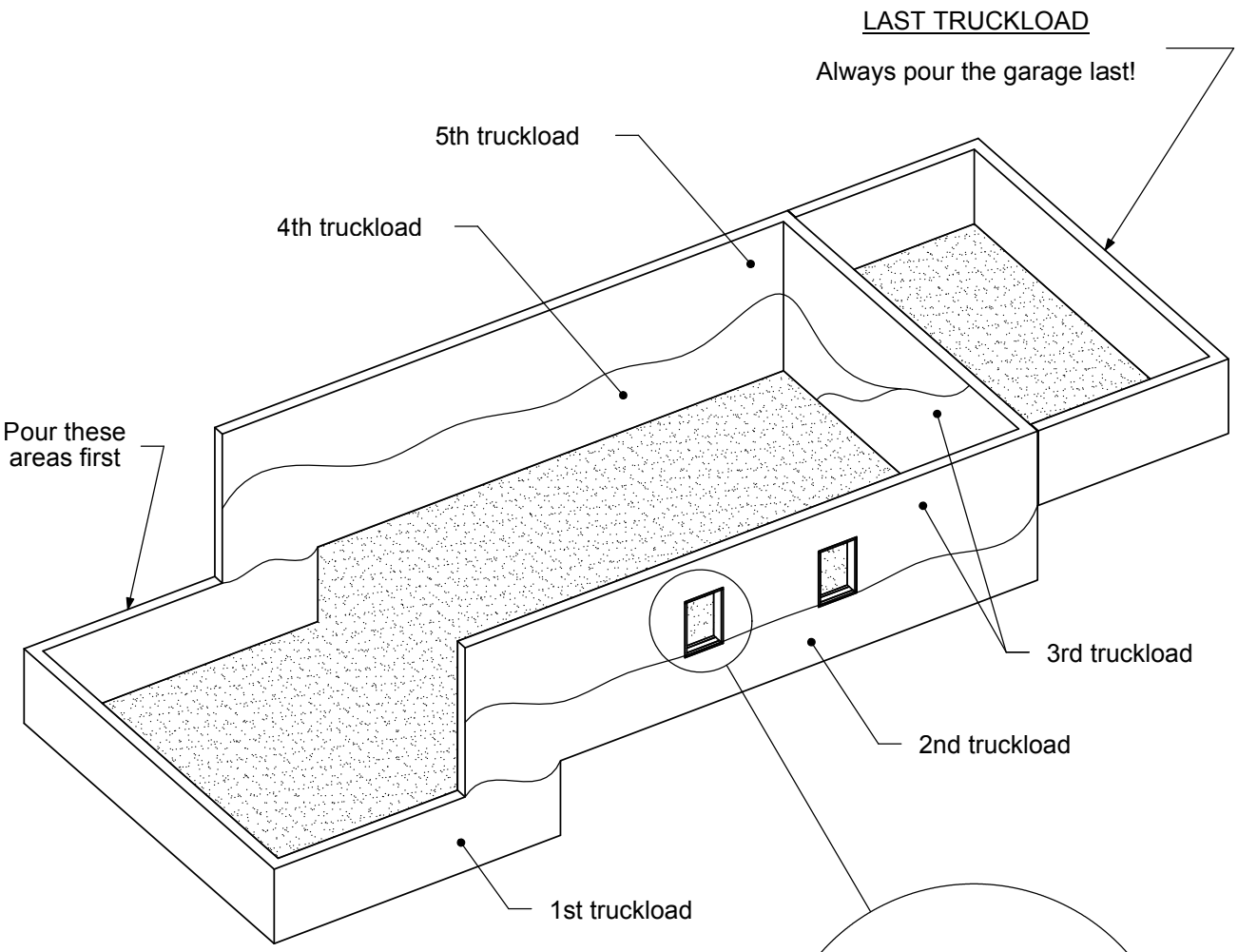
Small Windows:

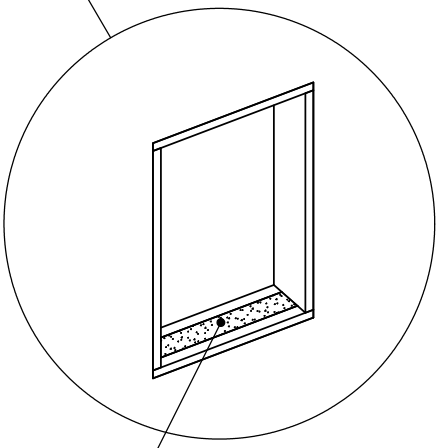
#2 Pour on one side of the window until concrete fills at least halfway across.

#4 Move hose and fill on other side until bottom of opening is full. Do not fill higher than 6' at any time.

Small Areas:

In small areas between windows, add some extra horizontal support by screw attaching 2"x4" 's to the window bucks on each side, plus screw to each plastic rail. These areas will have higher than normal pressure wave (Dynamic Load) that normally dissipates down a wall. In these areas, the dynamic load cannot dissipate, therefore creating higher than normal force/pressure on the forms.





Make sure that concrete has filed the cavity underneath the windows in the first lift

- Pour in approximately 4 foot lifts.
- Let the first lift set for approximately 15-20 minutes before starting the second lift.
- Consolidate each lift after it is placed. Use a 1-1/2" maximum diameter vibrator. Do not over consolidate.
- Pour frost walls first. Allow time for the concrete at the step transition to take the initial set.
- Pour garage frost walls last. If the volume of concrete is short, this section of wall is less critical and can usually be reached with a chute, which will reduce the amount of time a pump truck is needed on site.

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Pouring Example

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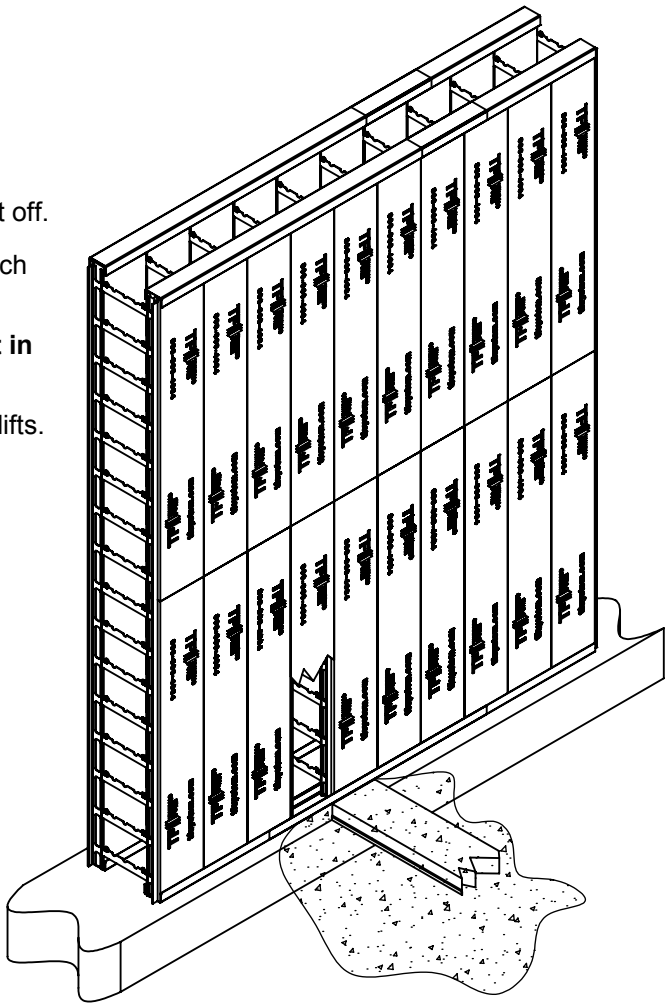
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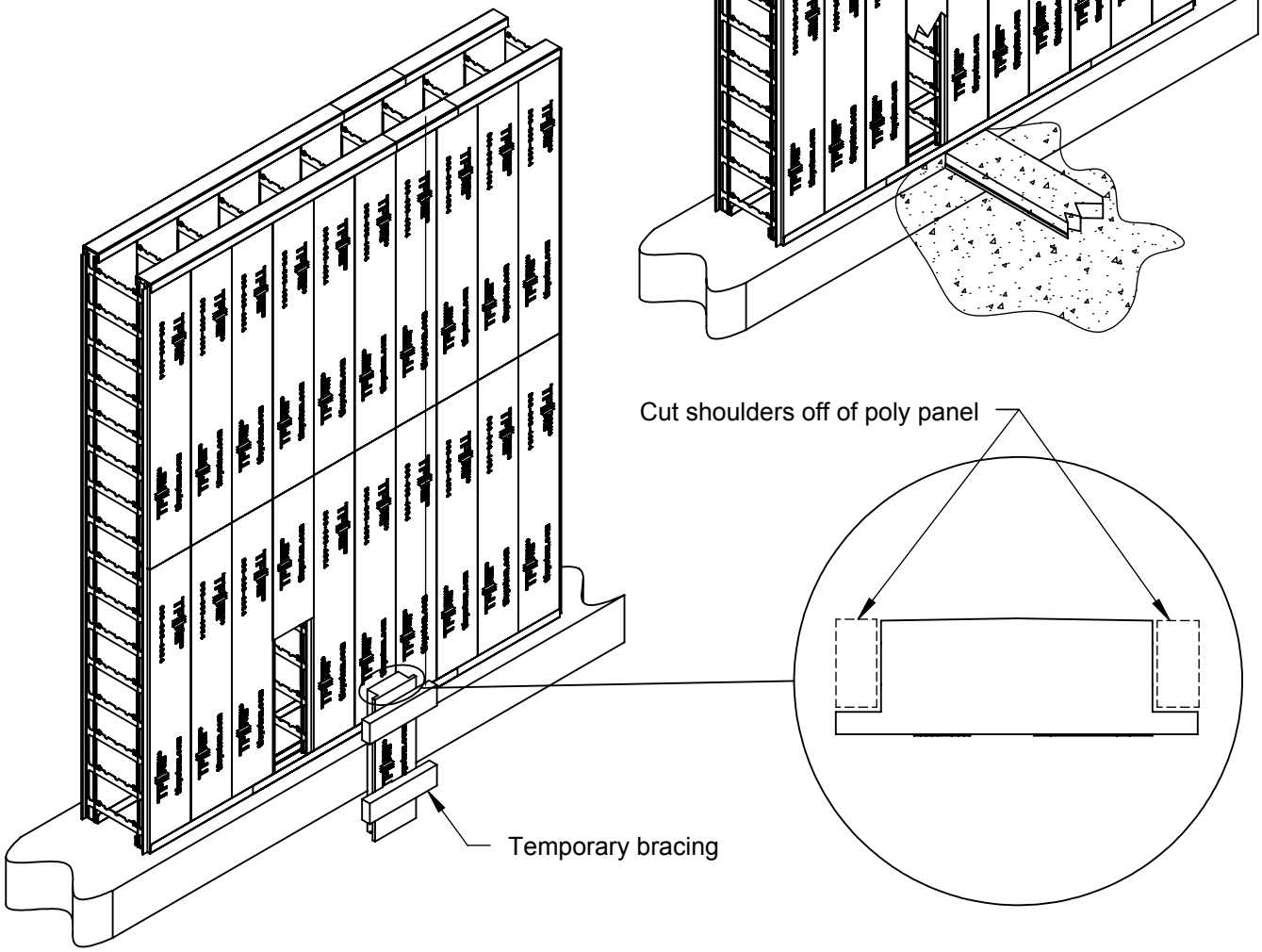
Date: 9/12/2013

INSTRUCTIONS:

1. Remove spilled concrete.
2. Cut out damaged area with a drywall saw.
3. Replace with new panel that has the shoulders cut off.
4. Screw plywood or 2"x4" 's into stud rail to hold patch panel in place.

   Replacement panel has no shoulders to hold it in place.
5. Carefully place concrete in repaired area in a few lifts.





TF FORMING SYSTEMS

Repairing a Blowout

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Date: 3/10/2014

Repairing a blowout

Occasionally a poly panel will fail, or "blowout" as it is commonly referred to, and concrete will escape from the form. This can be the result of improper bracing, lack of bracing in the necessary locations, incorrect pouring techniques, or a panel that was damaged in transport or installation.

Rule No. 1 - Don't Panic!

Blowouts happen with any type of concrete form including steel, plywood, and aluminum. One advantage of the ThermoForm system is that a blowout will only affect one panel; thus you will lose only a small amount of concrete, and if repaired correctly the resulting wall will be dimensionally correct and nobody will ever know the difference.

Rule No. 2 - Don't Rush it!

Let the concrete set up slightly so it doesn't continue to run out of the form as you start to repair it. Use this time to organize the tools you will need to complete the repair. You will likely need a shovel and wheel barrow, drywall saw, handsaw, screw gun and screws, and plywood or lumber to cover the replacement panel.

Rule No. 3 - Don't Hold up the Pour!

Have the rest of your crew continue to pour in another area while you repair the form. A blowout is no reason to risk the wrath of the concrete company by keeping their trucks on the job site too long.

Step No. 1 - Remove the concrete that has spilled from the form. It can be put back into the wall if possible or spread out in a thin layer to keep from interfering with pouring the concrete floor (if this is a basement pour).

Step No. 2 - Remove the damaged panel, or as much of the damaged plank as is required to complete the repair. If a portion of the panel is intact it may still be used in the form.

Step No. 3 - Replace the damaged panel or the portion of the panel that is damaged with a replacement panel pushed in place from the top of the wall. (See the diagram on the facing page.)

Step No. 4 - Carefully place concrete in repaired area in a few lifts so as not to put undue strain on the repaired area.

If these directions are followed carefully a blowout is quickly and easily repaired and does not affect the pour or the resulting wall in any way. The replacement poly panel will adhere to the concrete behind it and will stay in place after the temporary bracing is removed.

AFTER THE POUR

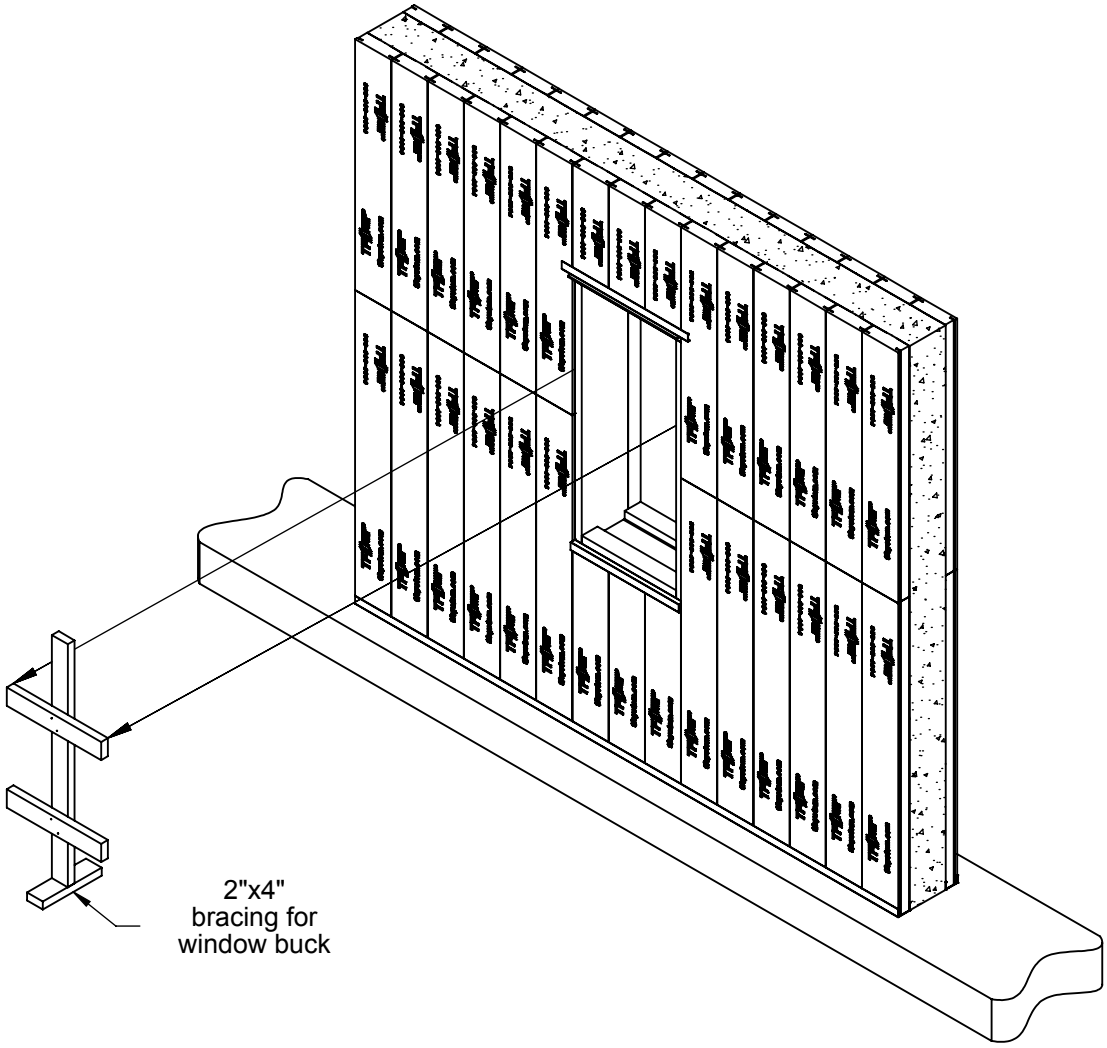
- Clean up concrete spills and splatter off turnbuckles, scaffold, and floor.

- Once the color of the concrete starts turning lighter, begin removing spillage off the poly panels, plastic rails, window & door bucks, and any bracing.

- Wait a proper amount of time to remove bracing. The next day is suitable to remove all bracing execpt that which is holding up headers and kickers.

- Header bracing must stay in place until concrete is cured sufficiently enough that it will support its own weight (and the weight of any load placed on it, such as a floor joist) without cracking. 7 days of cure is generally a safe guideline to follow. Ask an experienced and knowledgable concrete supplier when unsure.

Do not remove window or door buck bracing until concrete has cured for at least 24 hours!



NOTE:

Vertical braces should stay in place for 3 days

Follow ACI 318 guildlines for when to remove header bracing

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Day After the Pour
(Window or Door Buck)

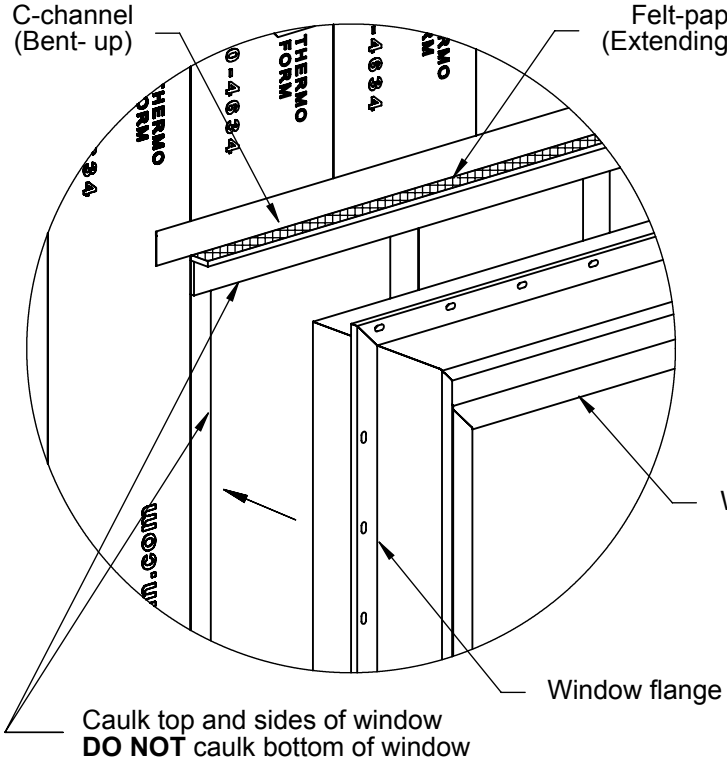
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Date: 9/12/2013

C-channel
(Bent- up)

Felt-paper
(Extending out)



Window

Window flange

Caulk top and sides of window
DO NOT caulk bottom of window

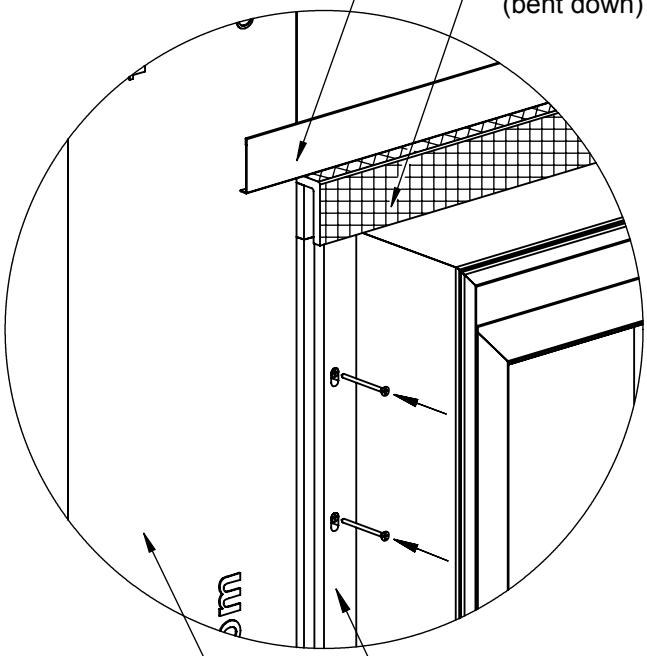
FOLLOW WINDOW MANUFACTURE'S INSTALLATION GUIDELINES

TF FORMING SYSTEMS RECOMMENDS USING A HOUSE WRAP TO SUFFICIENTLY MITIGATE WATER/MOISTURE INTRUSION AROUND OPENINGS

1. After removing the 2"x4" bracing, insert the window into wood frame. Caulk the window frame's top and bottom sides. Do not caulk the bottom. Use nails or screws to secure window flange to buck.

C-channel
(facing up)

Felt-paper
(bent down)

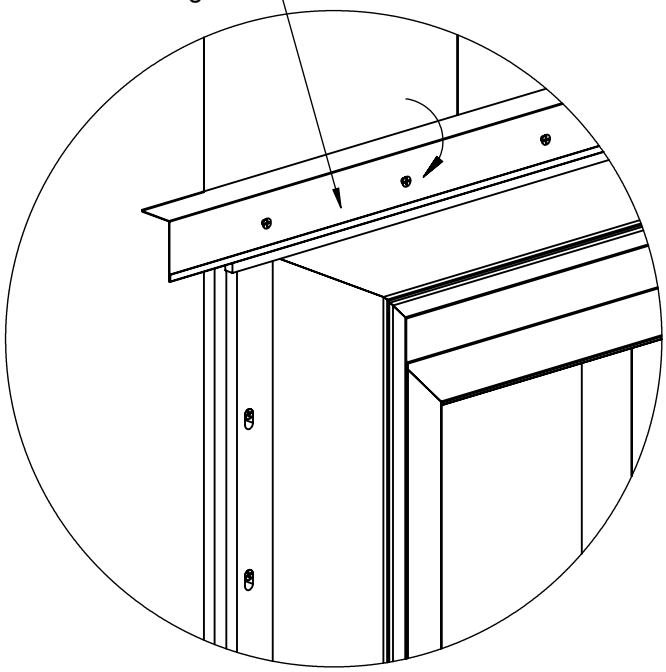


Window flange

Poly panel

2. Fold excess 1-1/2" felt-paper over face of window flange and staple into place.

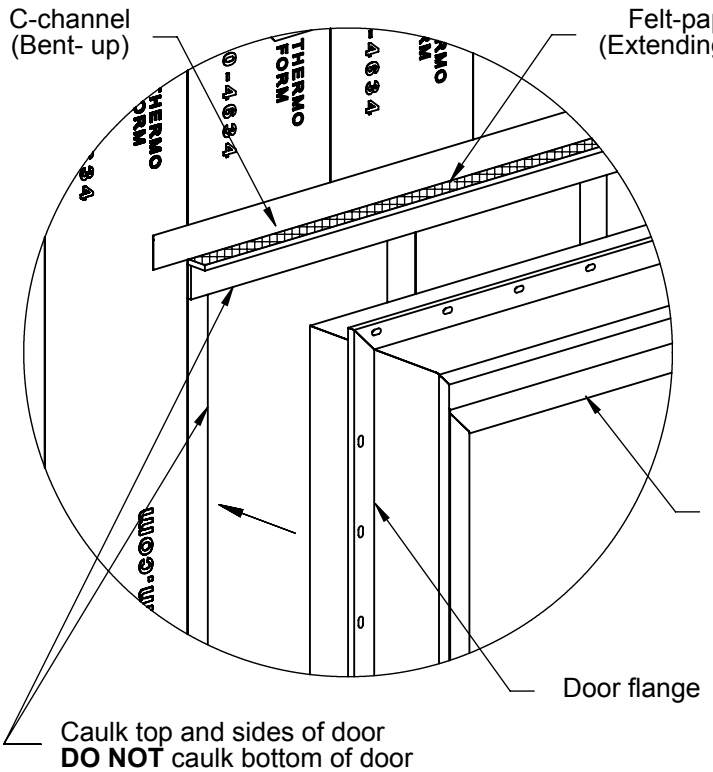
C-channel bent down
over window flange



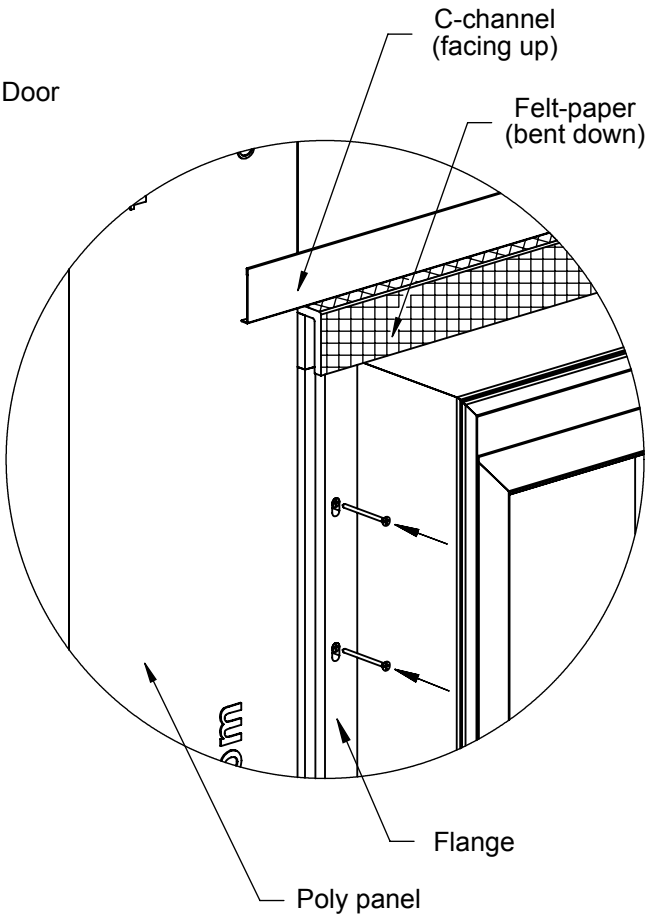
3. Once felt-paper is in place, bend flashing down 180° so that it is covering the window flange and felt-paper. Use screws or nails to hold it into position.

FOLLOW DOOR MANUFACTURE'S INSTALLATION GUIDELINES

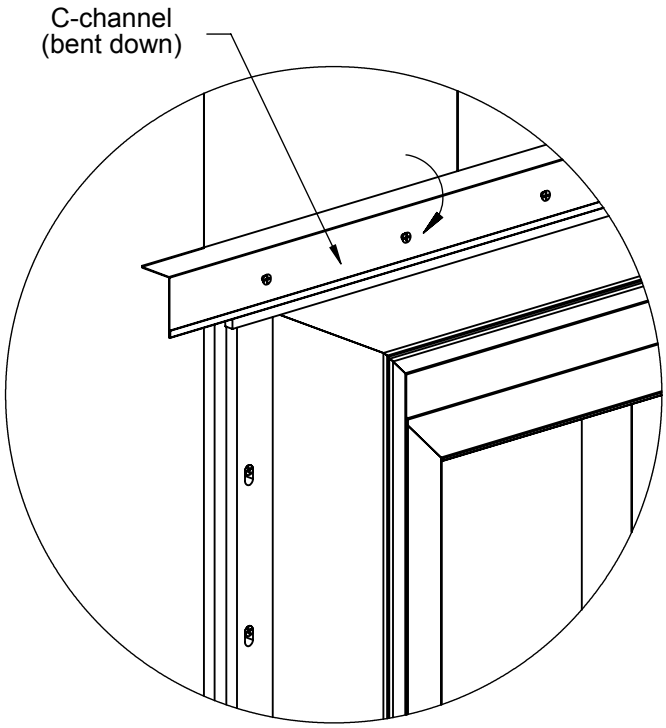
TF FORMING SYSTEMS RECOMMENDS USING A HOUSE WRAP TO SUFFICIENTLY MITIGATE WATER/MOISTURE INTRUSION AROUND OPENINGS



1. After removing the 2"x4" bracing, insert the door frame. Caulk around the door frame. Use nails or screws to secure door flange to buck.



2. Fold excess 1-1/2" felt-paper over face of door flange and staple into place.



3. Once felt-paper is in place, bend flashing down 180° so that it is covering the door flange and felt-paper. Use screws or nails to hold it into position.

Section 8

Best Practices

Suggested Best Practices to Help Ensure a Dry Basement

Please refer to the Building a Dry Basement Diagram

Engage the services of a knowledgeable excavator who has the experience and machinery to accomplish your requirements. He should know about soil types, aggregates, backfilling times and rates, water tables, etc. This person should be able to answer any question you may have regarding excavation services.

If there is ANY possibility of water intrusion through the walls of your basement a waterproofing membrane is required. This can be a sheet applied membrane, spray on coating (that is compatible with rigid foam insulation), or a dimple board product that directs water downward to a drainage system. Any of these systems can work well when combined with a well designed water management system.

A water management system should consist of drain tile, sump pit(s), sump pump(s), coarse aggregate, and a waterproofing product.

Drain tile should be installed on a level plane, next to the footers. There is also a product named Form-a-DrainTM that works very well as a combination of footer form boards and drain tile. Tile should be covered by clean crushed stone on both interior and exterior sides of the wall. On the exterior side, the tile should be covered by 24" of clean crushed stone, then covered with a filter fabric to keep sand and silt from clogging the drain tile and rendering it ineffective.

There should be a minimum of 4" of crushed stone under the basement slab (6"-8" is better) to create a drainage plane that directs water to the interior tile. On top of this layer of crushed stone should be a 6 mil plastic vapor barrier that has no holes in it and has the seams taped. There should be 2" rigid foam insulation (25 psi) on top of the vapor barrier and 4" of good quality concrete over the foam insulation.

In many areas Radon gas has proven to be present in unhealthy levels. You can design your drainage system to evacuate Radon gas by using sealed top sump pits and running PVC pipe to the exterior of your home. You may need to include a small fan in the system to pump the Radon gas out.

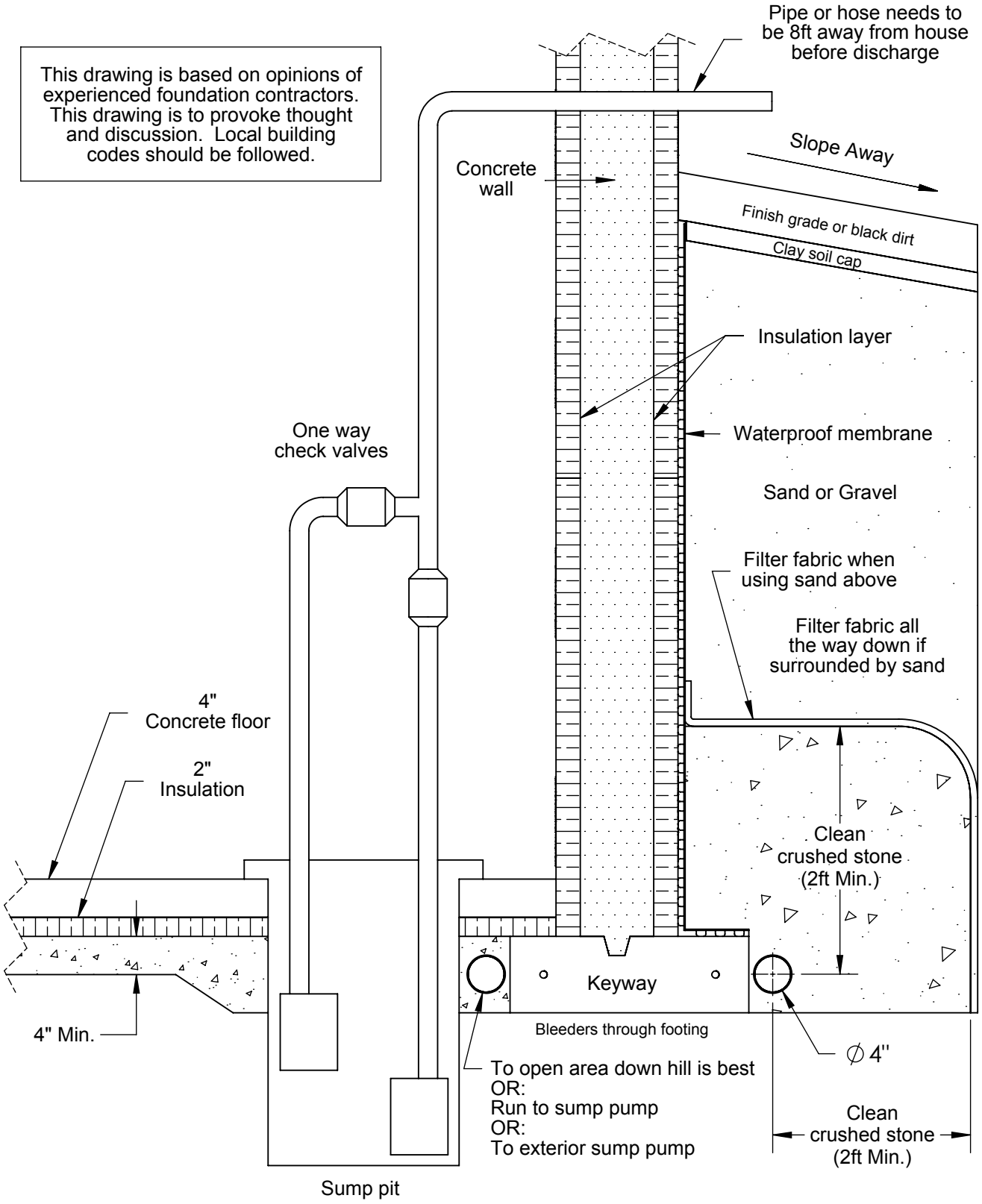
It is a good idea to have a secondary (backup) system in case your main sump pump fails.

When backfilling the exterior of the house, a competent excavator will use care to not damage the insulation or waterproofing membrane by using good quality material and not using boulders or blast rock with jagged edges near the walls. The finish grade MUST always slope away from the structure to direct runoff or roof water quickly away from the foundation.

A small investment in a quality drainage system will protect your basement living area for many years to come.

* These are only suggestions for ensuring a dry basement.
* Contractor assumes responsibility for design and implementation of drainage system.

This drawing is based on opinions of experienced foundation contractors. This drawing is to provoke thought and discussion. Local building codes should be followed.



Building a Dry Basement

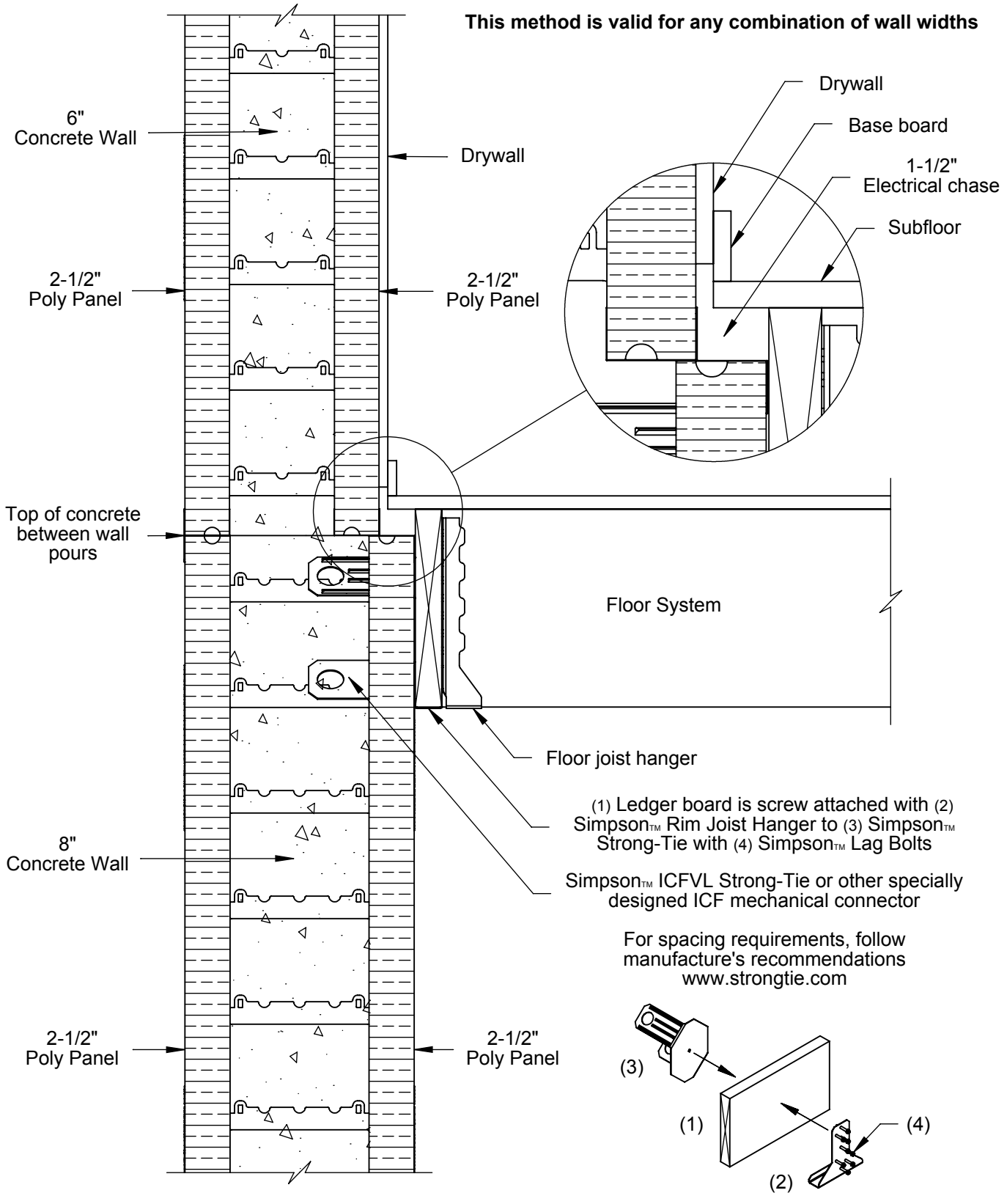
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Section 9

Floor Connection Details



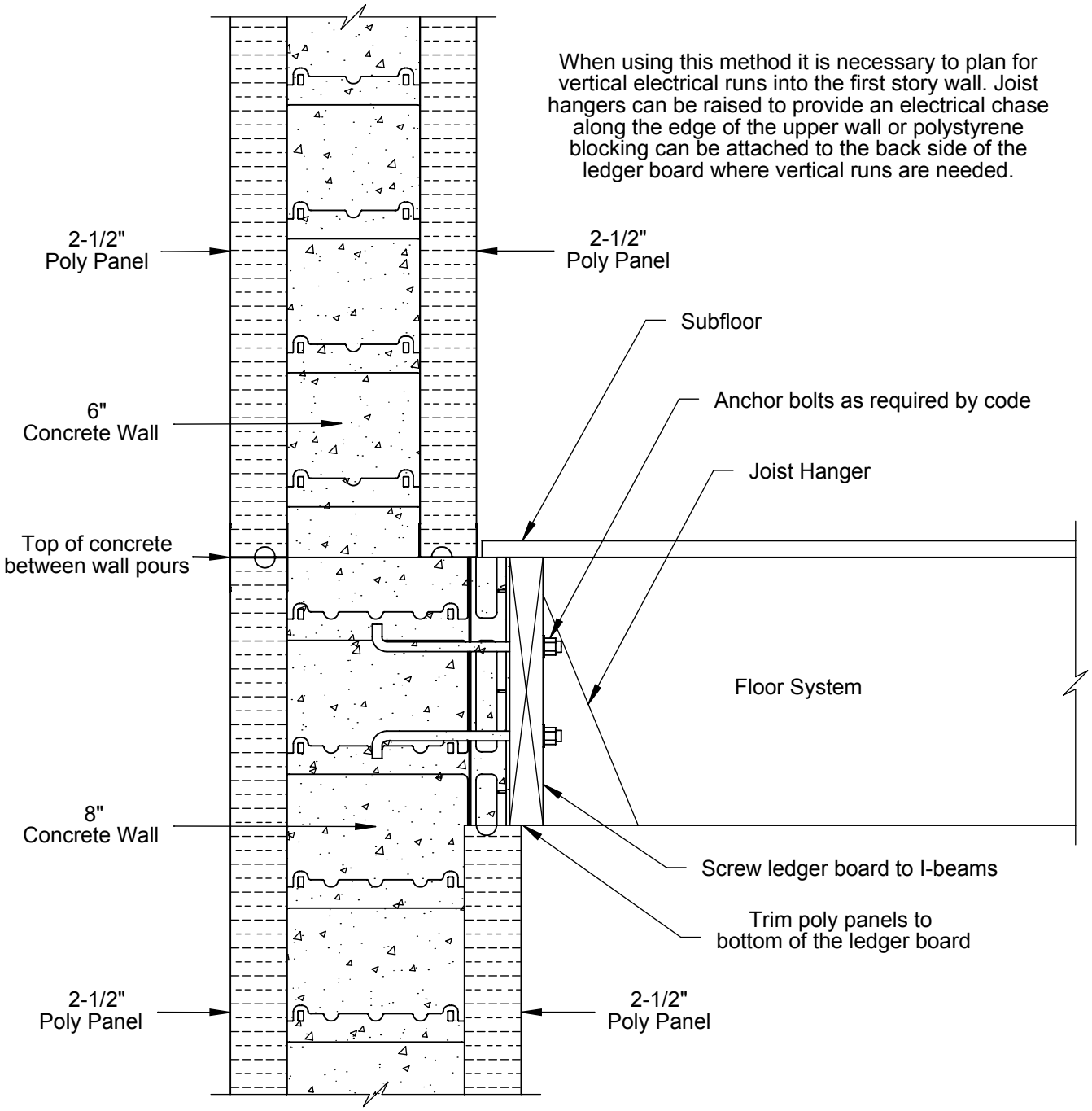
Ledger Board Detail
(with different wall widths)

Using Simpson™ ICF Connectors

TF Forming Systems, Inc.
800-360-4634
www.TFSystem.com

Date: 4/14/2014

This method is valid for any combination of wall widths



TF FORMING SYSTEMS

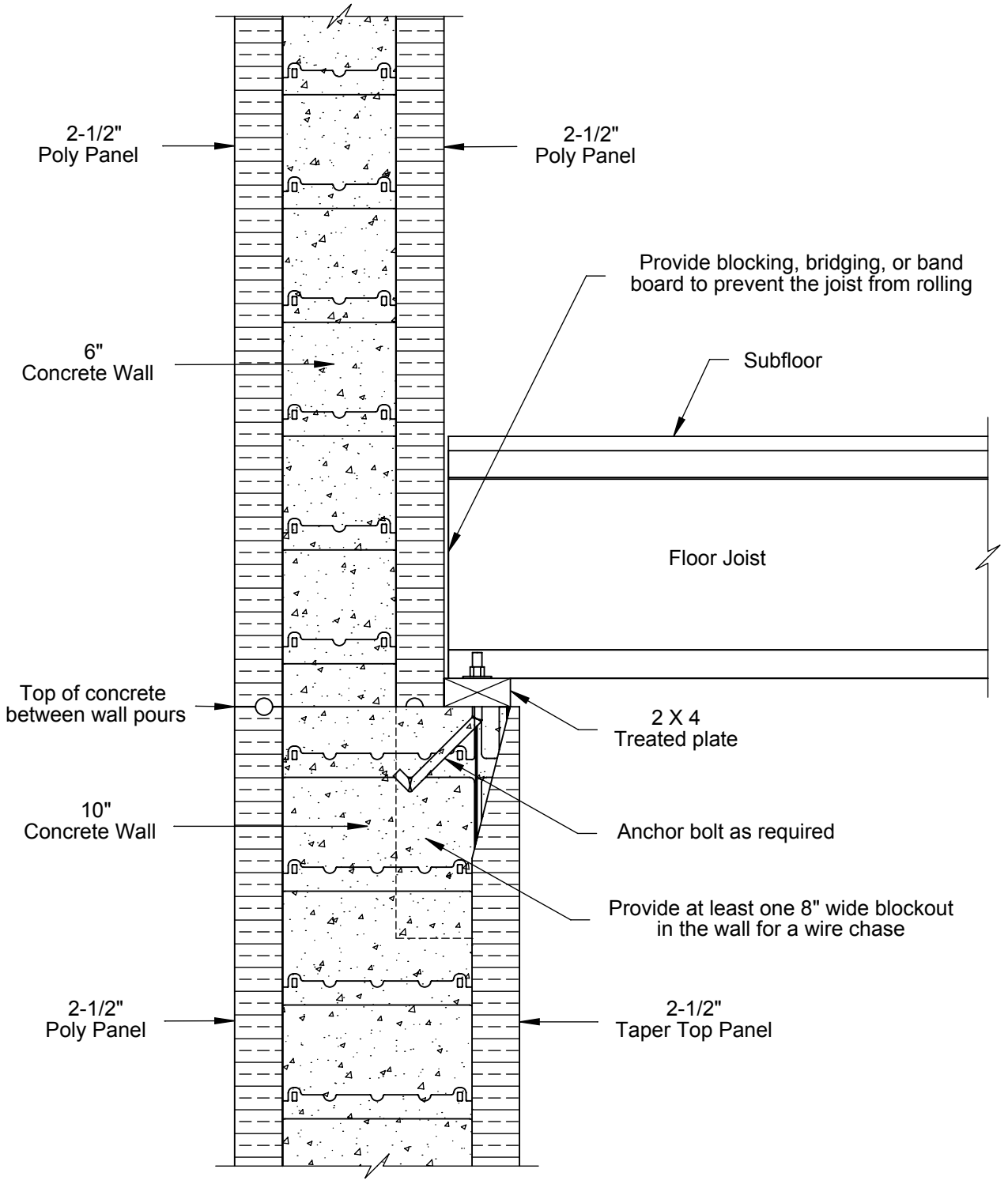
Ledger Board Detail

Any Combination of Wall Widths

TF Forming Systems, Inc.
800-360-4634
www.TFSystem.com

Date: 8/24/2014

This method is valid any time there is a 4" difference in wall widths between floors



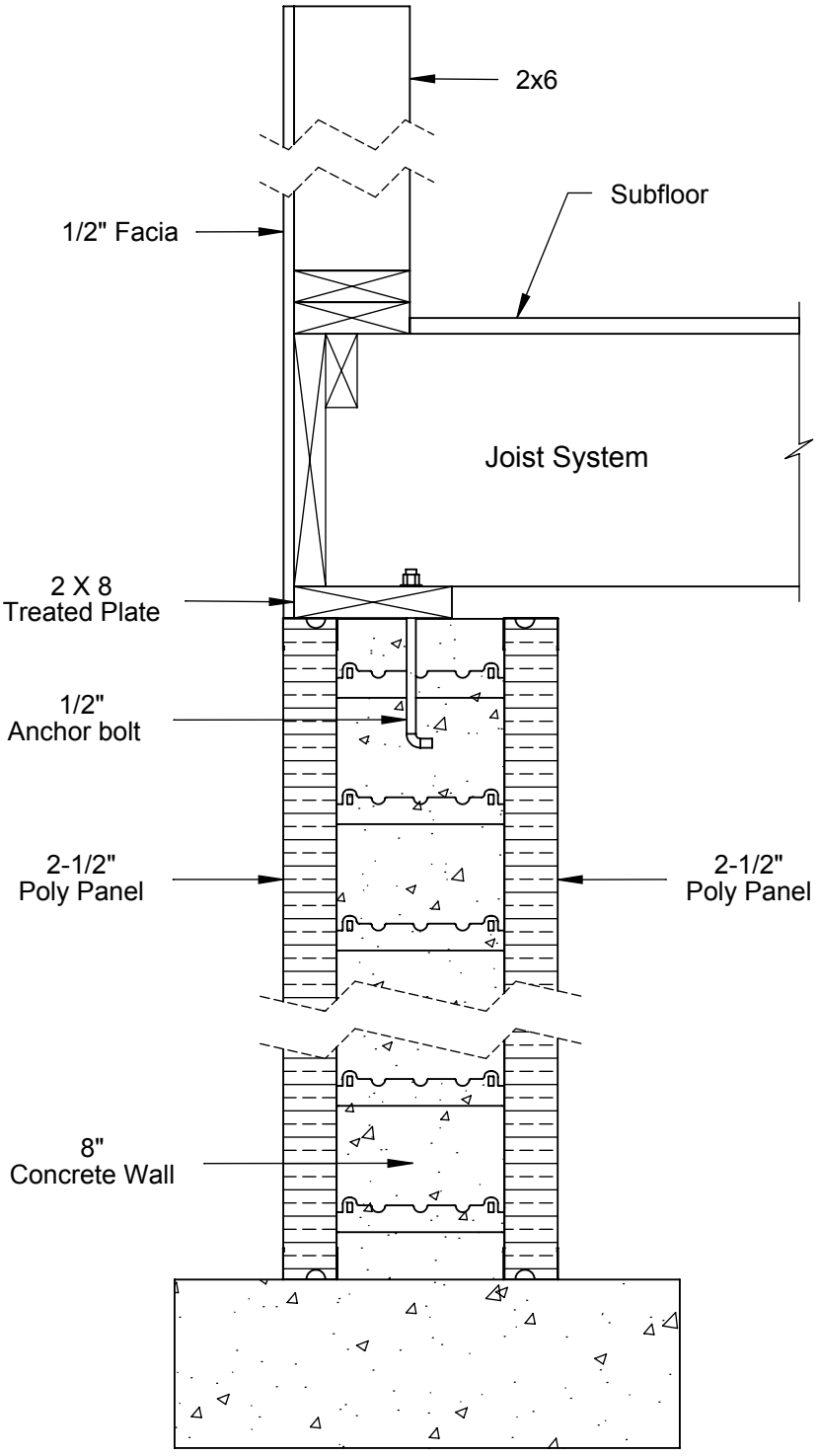
TF FORMING SYSTEMS

Bearing Ledge Detail

10" to 6"
ThermoFormWall

TF Forming Systems, Inc.
800-360-4634
www.TFSystem.com

Date: 4/16/2014



This method can be used with any ThermoForm wall width

TF FORMING SYSTEMS

Stick Wall Detail

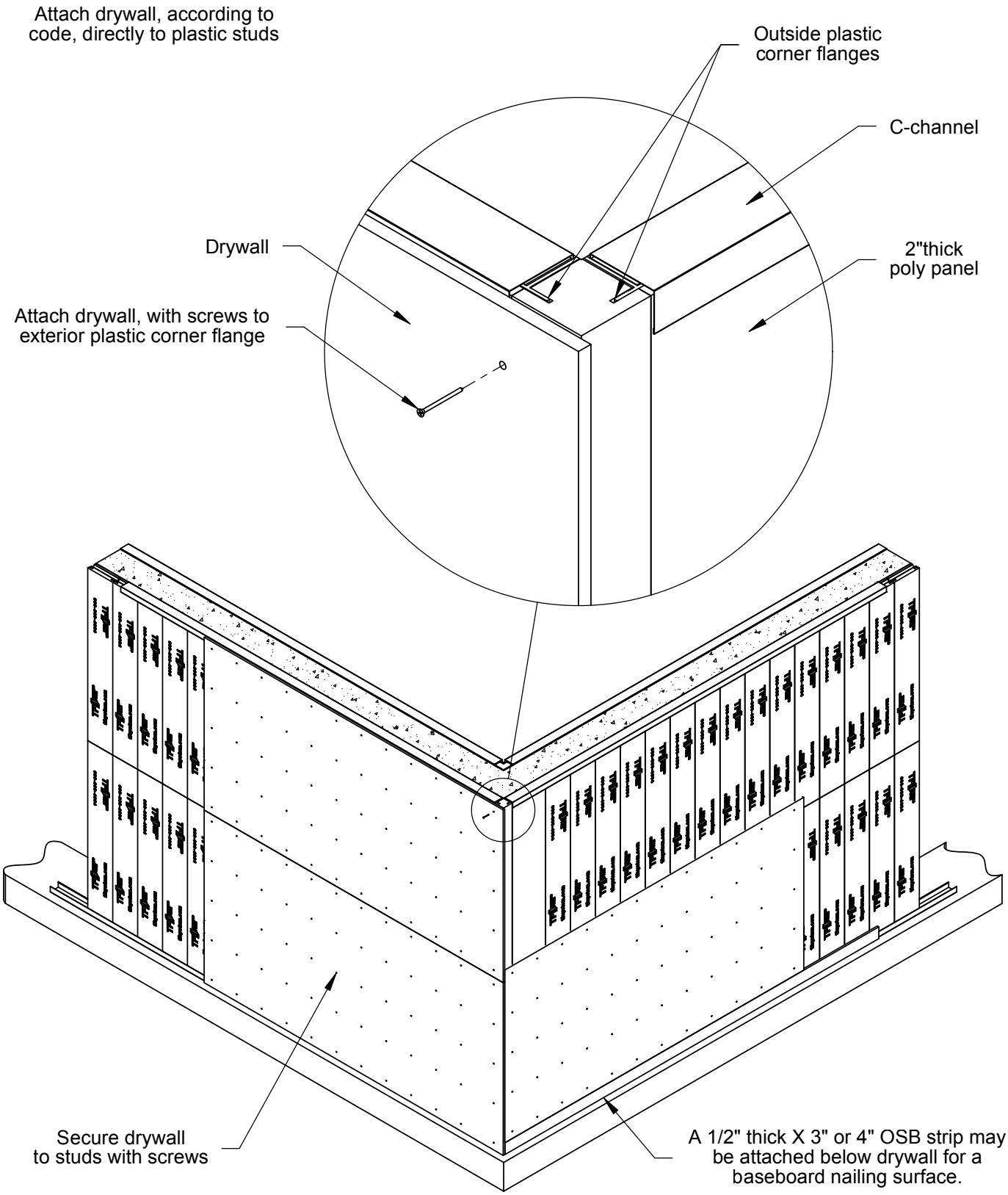
Stick Wall on 8" ThermoForm Wall

TF Forming Systems, Inc.
800-360-4634
www.TFSystem.com

Date: 6/24/2014

Section 10

Subcontractors



TF FORMING SYSTEMS

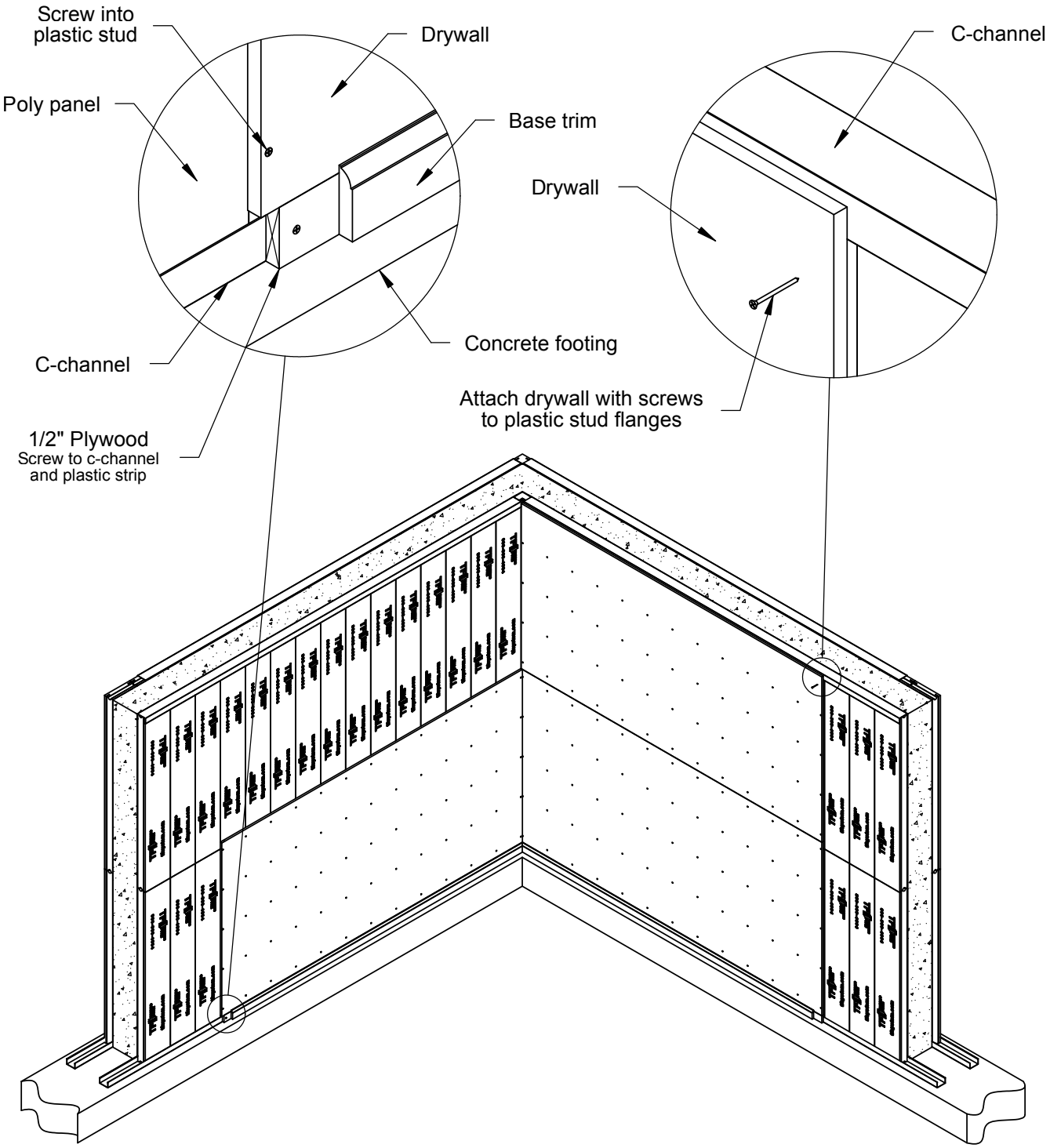
Attaching Drywall or Cladding on Interior Return Corner

ThermoForm

TF Forming Systems, Inc
800-360-4634
www.TFSystem.com

Date: 9/12/2013

Attach drywall, according to code, directly to plastic studs

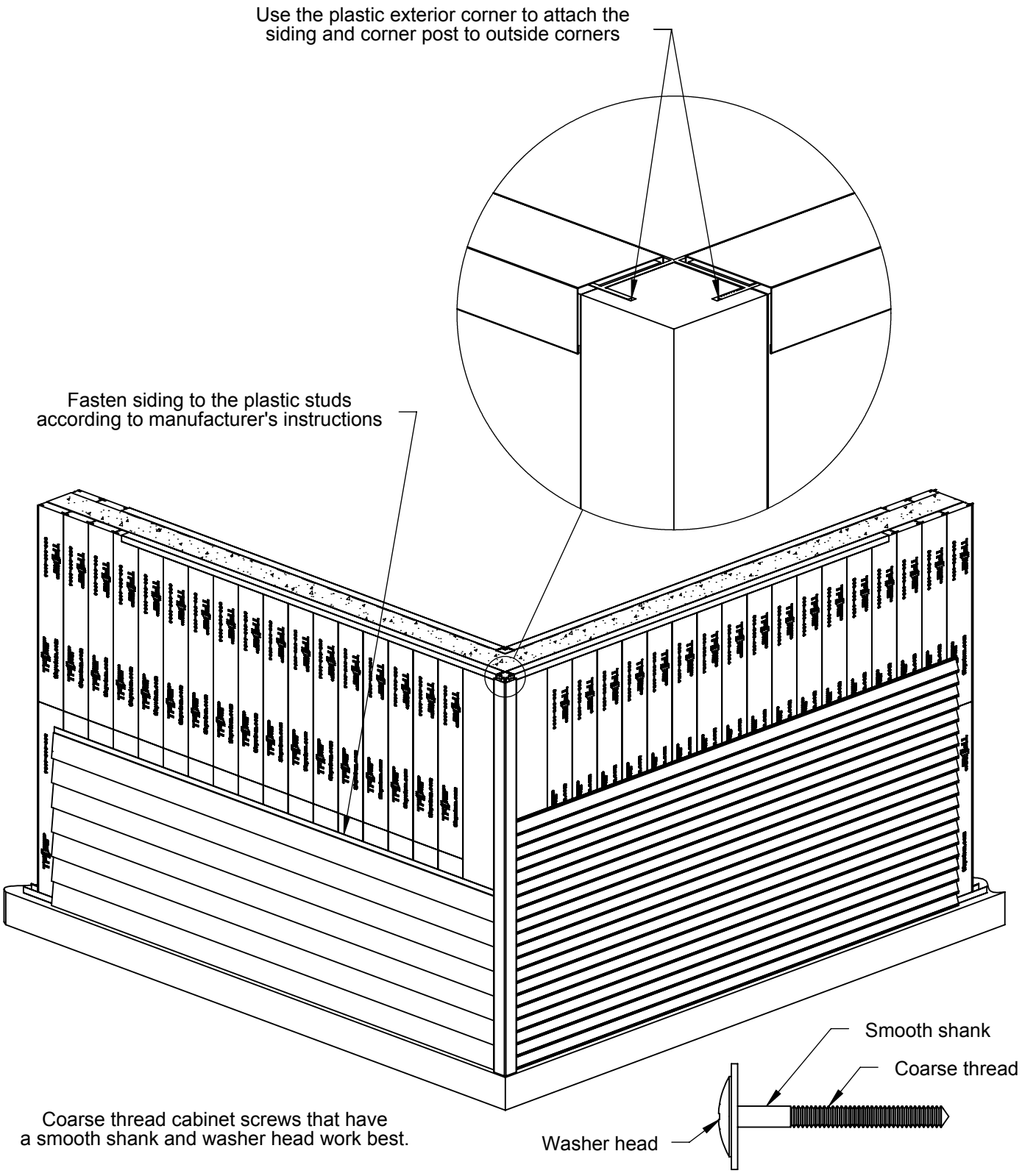


Attaching Drywall to Interior Corner

ThermoForm

TF Forming Systems, Inc
800-360-4634
www.TFSystem.com

Date: 9/12/2013



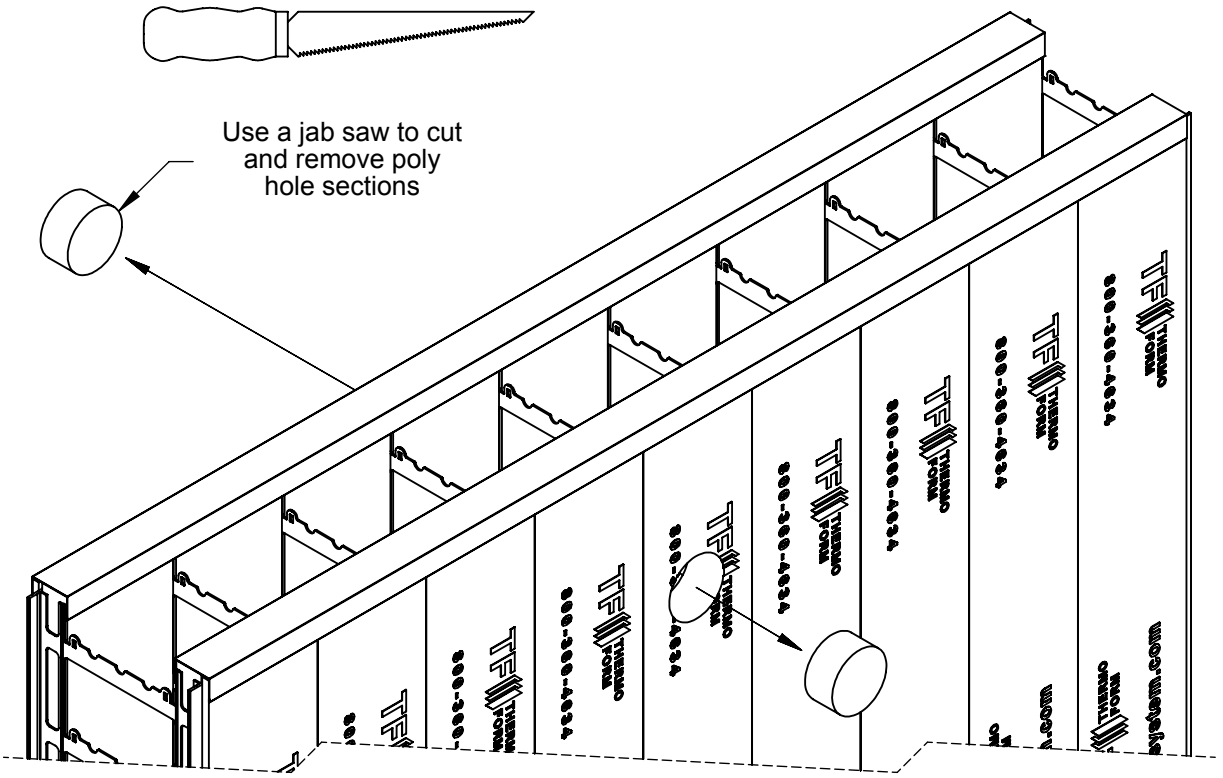
TF FORMING SYSTEMS

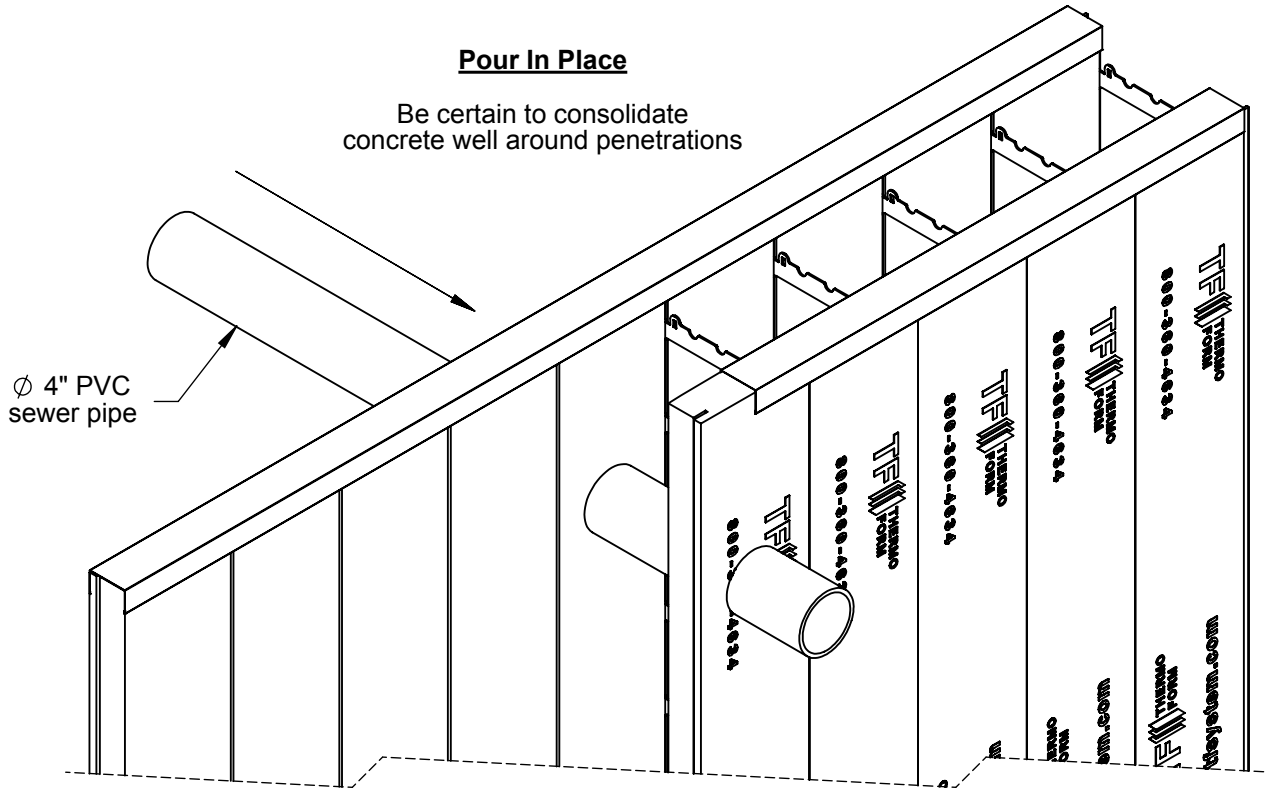
Attaching Siding

ThermoForm

TF Forming Systems, Inc
800-360-4634
www.TFSystem.com

Date: 9/12/2013





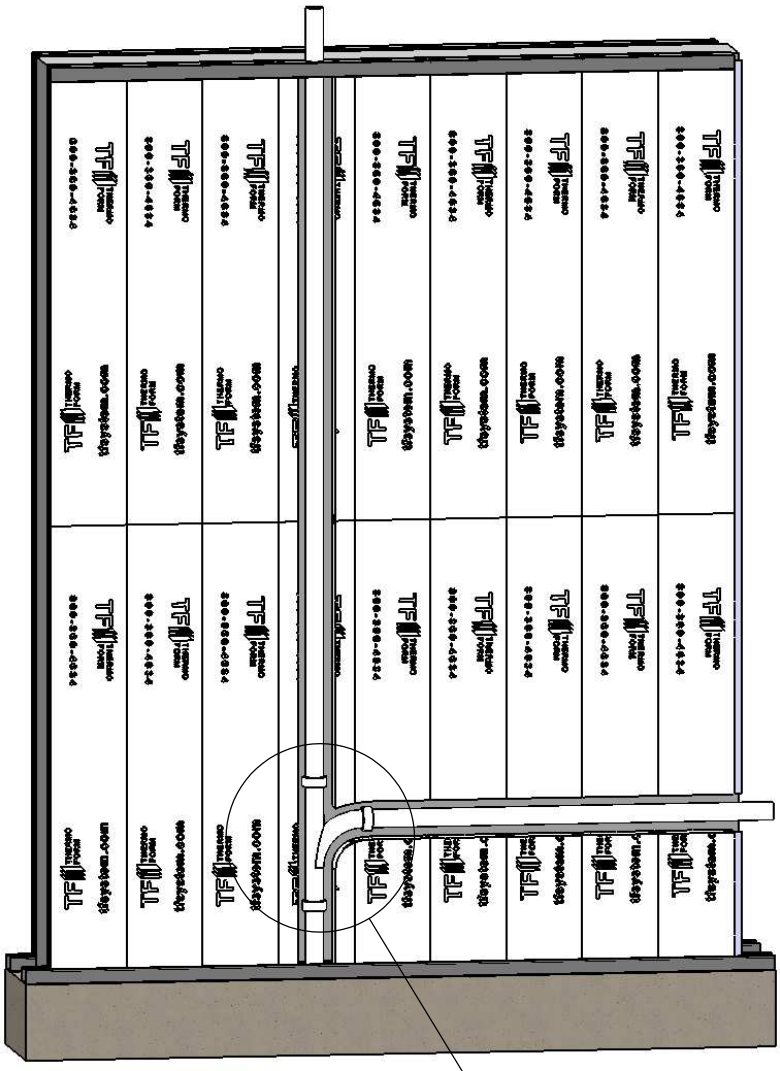
TF FORMING SYSTEMS

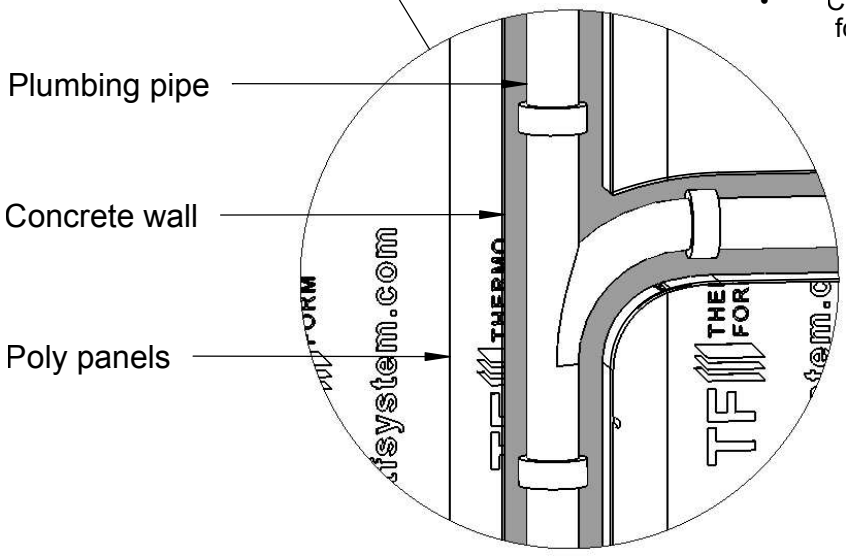
Installing Penetrations Through Wall

ThermoForm

TF Forming Systems, Inc
800-360-4634
www.TFSystem.com

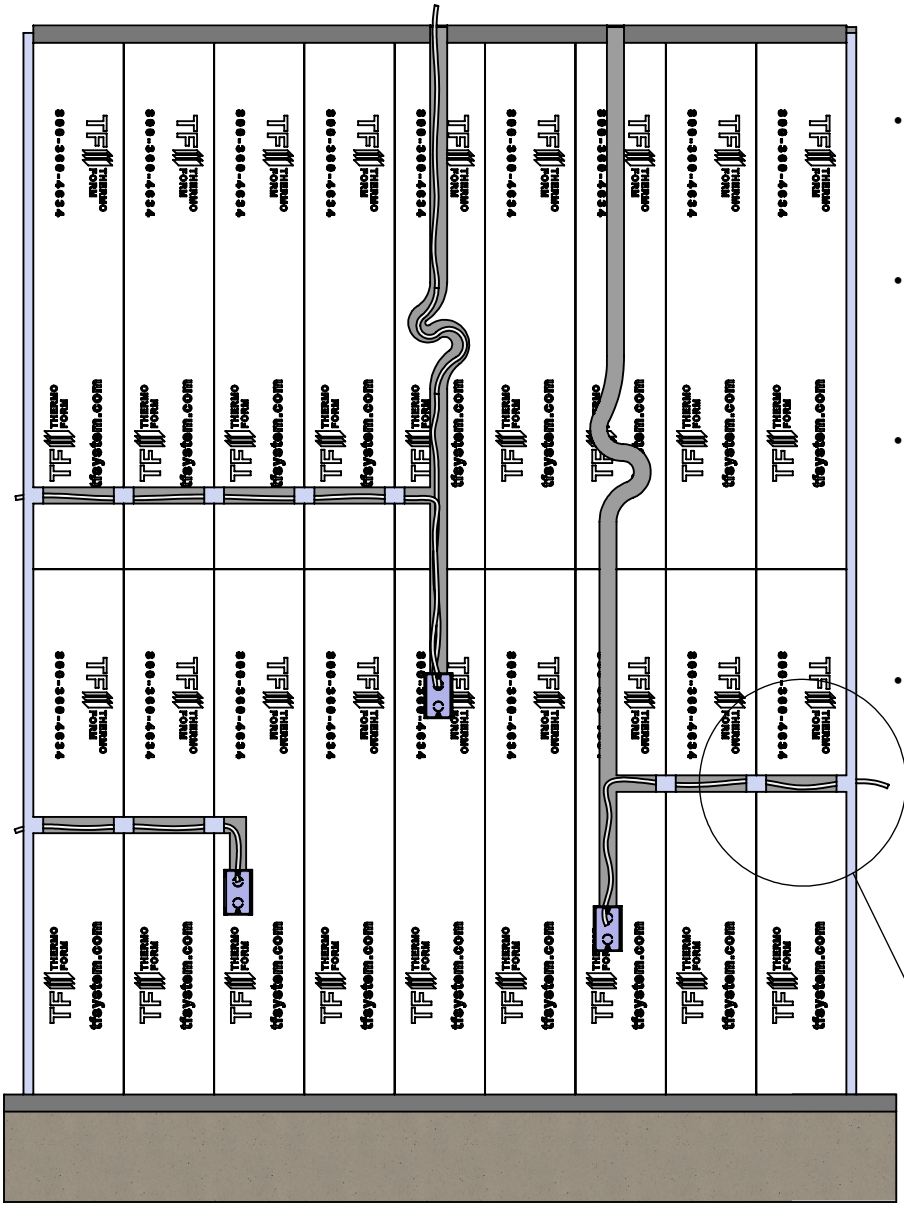
Date: 9/12/2013





Tips and Strategies

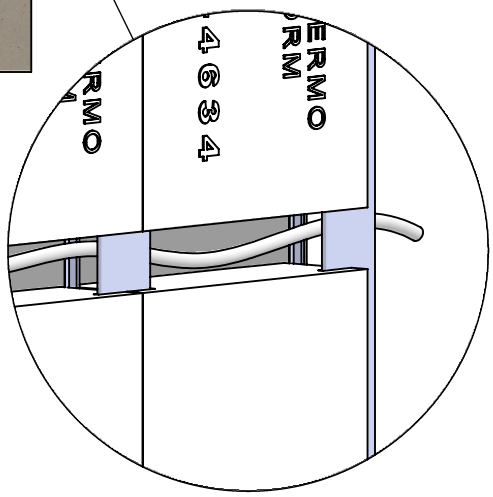
- 1-1/2" pipe max. will fit in stud cavity unless block-out is used in concrete to create more space.
- For larger diameter pipe chases, use pieces of polystyrene attached to the inside face of the insulation on the concrete form. This will create a block-out of the concrete for a pipe channel.
- Cut channels into the rigid insulation with a cordless saw, hot knife, router, or multi-tool.
- Cut across plastic studs with a cordless saw, multi-tool, or Ripit-Bit.
- Peel out polystyrene and plastic rail sections with claw hammer and flat chisel.
- Channel in picture is shown wider than normal for illustration purposes. Channels would normally be cut to closer tolerances for reduced R-value loss.
- Channel can be refilled with spray foam.



The wire chases are shown wider than normal for illustration purpose.

Tips and Strategies

- Cut rigid insulation with a hot knife, roto-zip, multi-tool, cordless saw, or Ripit-Bit.
- Cut through plastic rails with roto-zip, multi-tool, or cordless circular saw.
- Instead of having a straight vertical electrical chase, make an "S" curve in the poly. This will hold the wiring in place and keep it from falling out when it is bent around the curve.
- Follow all electrical codes, check with a local electrical inspector for codes. If there are any questions about attaching boxes, securing wiring, or any other concerns, contact Jerry Spude (Lead technical support) at TF Sysytem for solutions at 920-983-9960.



NOTE:

If you have a hot knife for cutting the insulation, you don't have to cut the plastic rails. The hot knife can cut away the insulation behind the face of the plastic rail revealing the open holes in the plastic stud. The wiring can be fed through the holes in the side of the plastic stud the same as running wiring in wood or steel studs.

About This Manual

This manual is intended to assist the contractor by illustrating techniques commonly used to erect walls using TF Forming Systems, Inc., ThermoForm Insulated Concrete Forms. A basic knowledge of construction terms and skills as well as concrete pouring techniques will help to ensure a successful project. Project specifications must meet or exceed local, state, and national codes and/or regulations.

Disclaimer

This publication is offered as a convenience to TF Forming System's users. The ideas and guidelines contained within this manual are those of the designers of this ICF System. All statements, drawings, and pictures are based upon experience and observation and do not replace professional opinion or governmental regulations. This manual does not create or provide any expressed or implied warranty to the reader. Due to differing conditions, tools, and individual skills, TF Forming Systems, Inc. and the designers of the ThermoForm system assume no responsibility for errors or omissions and reserve the right to make changes to both this publication and disclaimer without notice. All information made available by TF Forming Systems, Inc. neither endorses other products nor makes any warranties, representations, or guarantees concerning the safety or effectiveness of the products, techniques, or concepts discussed, illustrated, demonstrated, or described in this manual. Before beginning any project, review the plans and instructions carefully, and if any doubts or questions remain, consult local experts or authorities. Because local codes and regulations vary greatly, you should always check with authorities to ensure that your project complies with all applicable local codes and regulations. Always read and observe all the safety precautions provided by any tool or equipment manufacturers and follow all accepted safety procedures. You may reproduce pages of this manual, without alteration, for your own personal use and for non-commercial distribution. TF Forming Systems, Inc. requires written permission to reproduce materials for commercial distribution or other non-personal use. To receive written permission to reproduce this manual, either in parts or in its entirety, or to receive a copy of the TF Forming Systems, Inc. warranty and damages document, write to:

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