Container Installation Guide

Panels and Inserts

The InSoFast CX Container panel and the Inserts are designed to fit most shipping containers. Containers have three types of corrugations: side wall, end wall, and ceiling. Refer to the container diagrams to determine if the InSoFast products will fit your container's corrugations. See Page 8.

Estimating

Side walls: CX Panel (5 panels/box) 36.67 s.f.

End wall: Inserts - 4' (20/box) 72 s.f. coverage

UX 2.0 or EX 2.5 (5 panels/box) 40 s.f.

Ceiling: Inserts - 4' (57/box) 160 s.f. coverage

UX 2.0 or EX 2.5 (5 panels/box) 40 s.f.

Floor: UX 2.0 or EX 2.5 (5 panels/box) 40 s.f.

Tools and Supplies

- Long snap off blade utility knife
- Saw – hand, jig, circular, or table saw
- Sealant and Gap and crack foam for sealing corners/openings and at the top of the wall
- PL Premium 3x Stronger Construction Adhesive
    - 28 oz. tube covers 50 s.f. of InSoFast Panels
    - 28 oz. tube covers 100 l.f. of InSerts

Adhesive for Panels

- PL Premium 3x Construction Adhesive is the only recommended adhesive for adhering the InSoFast panels. Other formulas and brands may not work as expected.
- PL Premium 3x is a moisture-cured glue that takes as little as 24 hours to cure. Under cold or dry conditions, the adhesive will take longer to cure. If you are in a dry climate, you may want to lightly mist the panel with a spray bottle of water to expedite the curing process.
- PL Premium 3x is freeze-thaw stable but it does not cure during freezing temperatures. Even with heating the inside of the container, conditions outside the container will effect the cure time.
- It will be necessary to brace panels on the ceiling while the adhesive sets.
- Ensure adequate time for the adhesive to cure before attaching finished materials such as drywall and cabinets.

Container Preparation

If the container has large dented areas, we recommend hammering them as smooth as possible before installing InSoFast products. As an alternative, the foam of the panel or insert can be removed to accommodate the dented area by scraping or cutting out the excess.

Eliminate any leaks before installing InSoFast panels. Do not penetrate the steel walls of your container with screws or fasteners. This compromises the continuous seal and can introduce moisture-related issues.

Ensure all surfaces are clean of any debris, dust, loose paint, etc before installing InSoFast panels. It is up to the installer to determine the suitability of the adhesive for the surface you are bonding to. If in doubt, an adhesive performance test can be done. See www.insofast.com for more details.

Cut out all openings before installing any InSoFast panels or inserts.

Installing CX Panels on the Side Walls

The InSoFast CX Container Panel is designed for the side walls of most shipping containers. The CX panels are set up for an 11" repeating pattern of the corrugation and the panel size is 44" x 24". They are installed horizontally with the studs running vertically.

Lay out the first row of CX panels to determine the fit to the container. Variations in the corrugations may require the panels to be trimmed or spaced out slightly. If the panels need to be adjusted, it is best to then stack bond the panels instead of installing in a running bond pattern. Leave a 1/4" gap to allow for spray foam sealant.
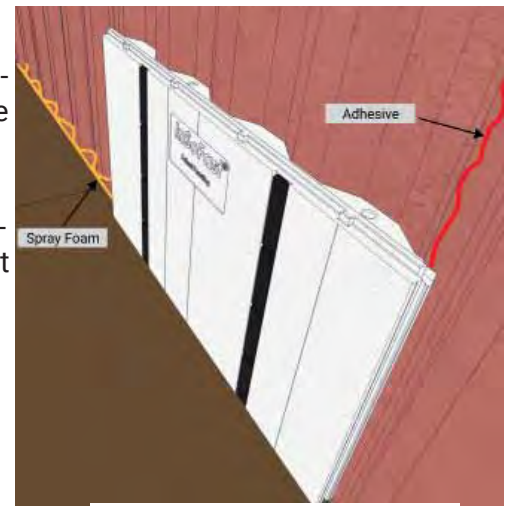

CX Panels fit the side wall corrugations

Place Adhesive on the backside of the panel

PL Premium 3x adhesive is applied in a ⅜" bead on the backside of the studs which have the ribbed surfaces. It is important that there is enough adhesive to squish into the dovetails on the back side of the stud when pressed to the container wall. To verify that enough adhesive is used, press the panel into place. Pull the panel back and check to see if the adhesive has spread out the width of the stud. It is normal for the panel to "float out" from the side of the container when it is accommodating irregularities in the container walls. Additional adhesive may be necessary in some areas. If you find an area that has not bonded to the container, simply drill a hole through the foam and inject additional adhesive.

Since there is no stud at the cut ends of the panels, an additional bead of PL Premium 3x is applied at the start and end of each wall.

3/8" Bead of PL Premium

It is important to seal the bottom of the first row of panels. Apply a continuous bead of spray foam or adhesive along the bottom of the side wall of the container.
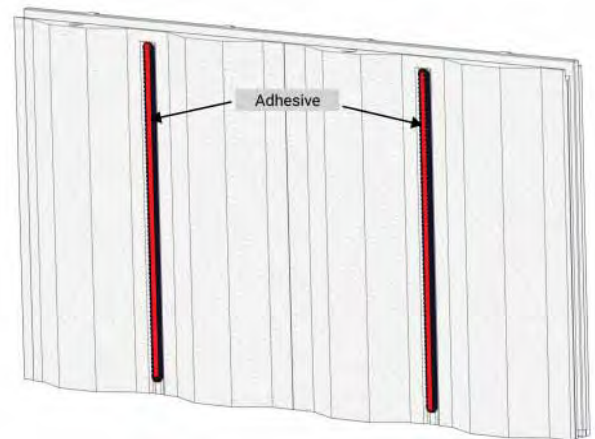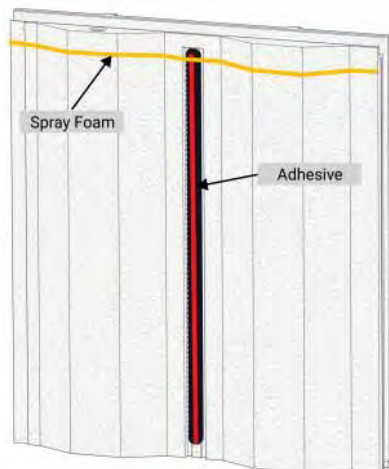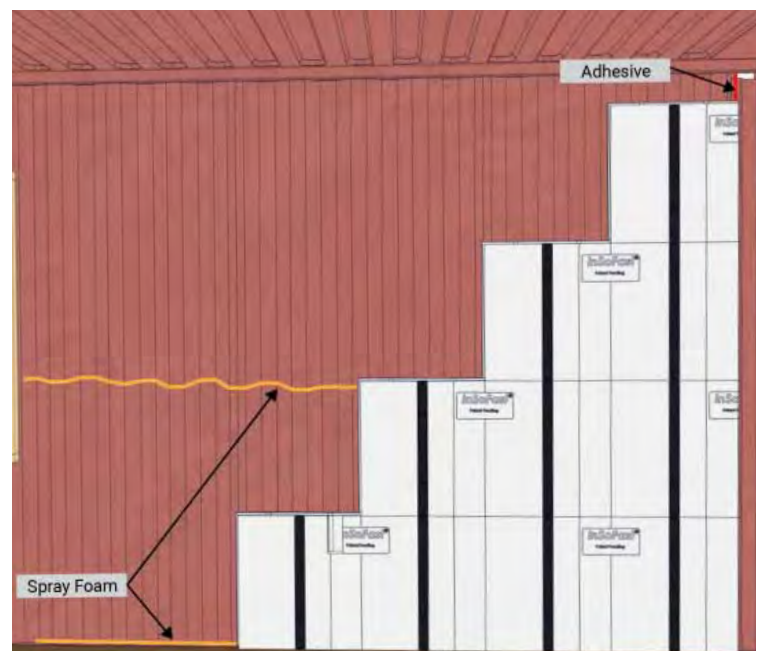
Install CX Panels in a running bond pattern

To start the second row, cut a panel in the center with a long snap off blade utility knife. This will start the running bond or staggered pattern.

At the top of the second row, run a bead of spray foam on the back side of the panel or directly on the container wall. We recommend sealing every 4' to prevent air movement.

Spray foam along the top every 4'

Install CX panels in a running bond pattern.

Installing UX 2.0 or EX 2.5 Panels on the End Wall

The End wall of the shipping container is insulated with End Wall Inserts and the UX 2.0 or EX 2.5 standard flat panel. These panels are 48" x 24" and are installed on end.

Install End Wall Inserts

Run a bead of PL Premium 3x along the length of the insert and press into the corrugated space of the shipping container's wall.

You can use duct tape to hold the Inserts in place until the adhesive has set or until you are ready to install the InSoFast panels. Position any duct tape so that it doesn't interfere with the stud bonding to the shipping container rib.

Adhesive on insert   Install Inserts

Install UX or EX Panels

Start with a continuous bead of spray foam or adhesive along the bottom of the end wall of the container.

Add a bead of PL Premium 3x along the corner where the first row of panels meet the corner of the container.

We recommend installing panels standing on end with the embedded studs running perpendicular to a shipping containers corrugated ribs. The goal is to provide as much contact between the studs and steel in order to maximize the holding power of the studs.

You may want to trim the end of the UX or EX panel to "move" the stud down closer to the floor allowing baseboard to be attached.

For a standard 8' high container, the panels can be installed in a stacked method or a running bond pattern. The running bond pattern works better to eliminate waste on a 9' high container. Use the cut off end of the top panel to start the next column.

On the back of the panel, run a 3/8" bead of adhesive along dove-tailed ribbing of each stud.
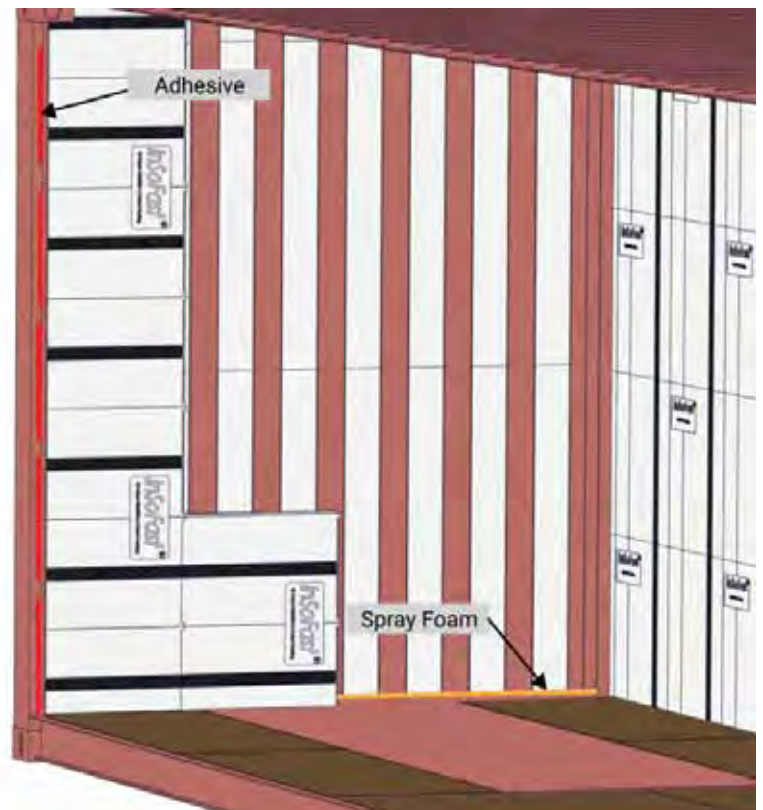
Install UX panels in a running bond pattern vertically.

Seal the gaps at the tops and edges of the corners with spray foam.

We do not recommend installing UX 2.0 or EX 2.5 panels without the Inserts. The Inserts are needed to prevent convecting looping behind the wall. If the end wall inserts are not used, seal the corrugation with spray foam at every 4' height horizontally to minimize the convective loop.

Installing UX 2.0 or EX 2.5 Panels on the Ceiling

The ceiling of the shipping container is insulated with ceiling inserts and the UX 2.0 or EX 2.5 standard flat panel. The panels are 48" x 24".
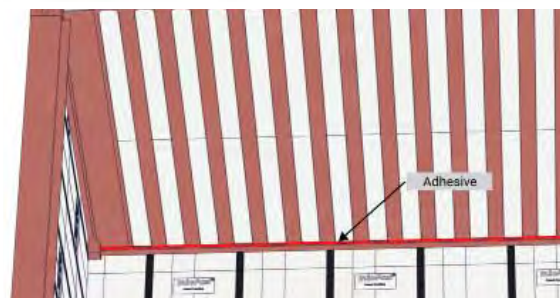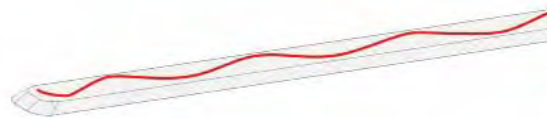
Install Ceiling Inserts

The ceiling inserts will need to be trimmed to fit the rounded ends of the corrugation. Use a long snap off blade utility knife with a sawing motion.

Run a bead of PL Premium 3x adhesive along the length of the insert and press into the corrugated space of the shipping container's ceiling.

You can use duct tape to hold the inserts in place until the adhesive has set or until you are ready to install the InSoFast panels. Position any duct tape so that it doesn't interfere with the stud bonding to the shipping container rib.
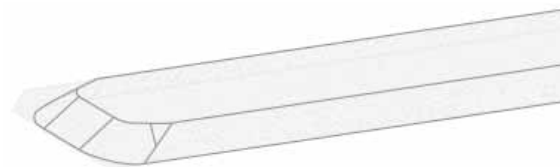
Trim ceiling inserts. Apply adhesive.

Run a bead of adhesive along the sides of the ceiling.
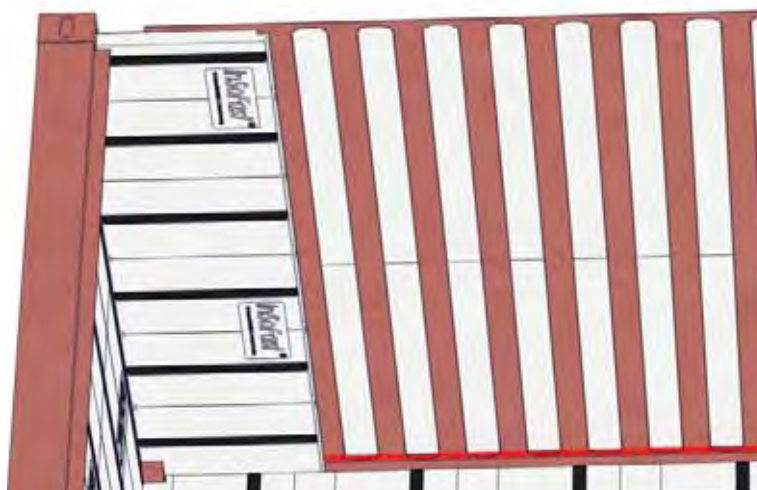
Install UX or EX Panels in a stacked pattern

We recommend installing panels with the embedded studs running perpendicular to a shipping containers corrugated rib. The goal is to provide as much contact between the studs and steel in order to maximize the holding power of the studs.

Add a bead of PL Premium 3x along the side of the corner of the container where the first row of panels are placed.

On the back of the panel, run a 3/8" bead of adhesive along dove-tailed ribbing of each stud.

Install the wall panels before the ceiling panels. This allows the ceiling panels to sit on top of the wall panels around the perimeter.

The running bond pattern in not required on the ceiling.

Install UX panels in a stack pattern.

Brace firmly until all adhesives has cured. The ceiling panels can be shimmed into place along the edges on top of the wall panels by using 1x material or scrap foam. Before shimming, make sure that the side wall panel's adhesive is set.

Remove the shims, if used, and seal the area between the ceiling and wall panels with spray foam.

Spray foam the gap between ceiling and walls.

Installing UX 2.0 or EX 2.5 Panels on the Floor

The floor of the shipping container is insulated with the UX 2.0 or EX 2.5 standard flat panel. These panels are 48" x 24" and are installed in a running bond pattern.

Install the floor panels in the "floating" method without any adhesive. An alternative is to bond the panels in place with a 3/8" bead of adhesive along dove-tailed ribbing of each stud.

Install UX panels in a running bond pattern.

Installing Subflooring

Install subflooring with a gap for expansion. Fasten with standard coarse thread all purpose construction screws. When panels are installed as a "floating" floor, it is important to layout the subflooring so that the long seam of the plywood does not line up with the seams in the InSoFast panels. The short seams should land over the top of a stud.
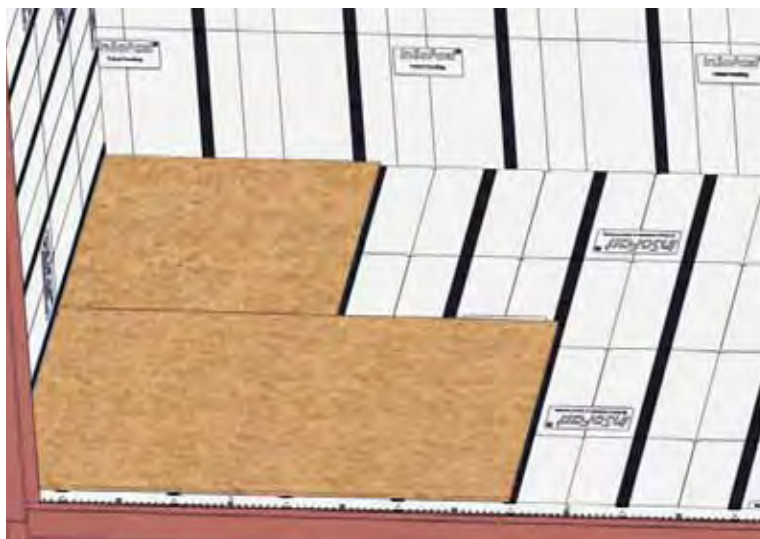
Make sure the long seam of the plywood does not line up with the InSoFast panels.

Controlling Condensation

A shipping container provides the perfect air tight "building envelope". This type of construction requires a heating, ventilating, and air-conditioning (HVAC) system that provides fresh air exchange and controls latent moisture. It is also very important to prevent condensation that is caused by air leakage or infiltration. This is done by air sealing with expanding spray foam gap and crack filler or sealant:

• At and around any cutout, outlet, penetration or opening through the InSoFast panels, container walls, ceilings or floors.

• Anywhere the InSoFast panels intersect the container, ceiling, sides or floors.

• The backside of the InSoFast panels to the container wall every 4' horizontally as the panels are being installed.
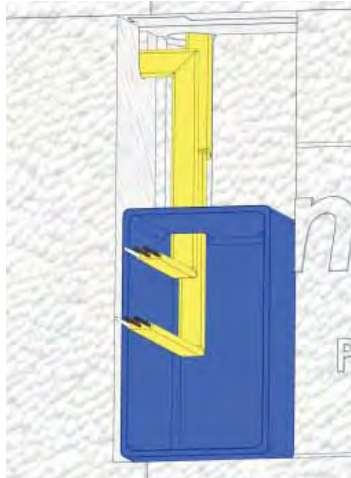
Electrical

Electrical Raceways are spaced horizontally every 24" o.c. and vertically every 22" o.c. as marked by a reference line on the face of the panels.
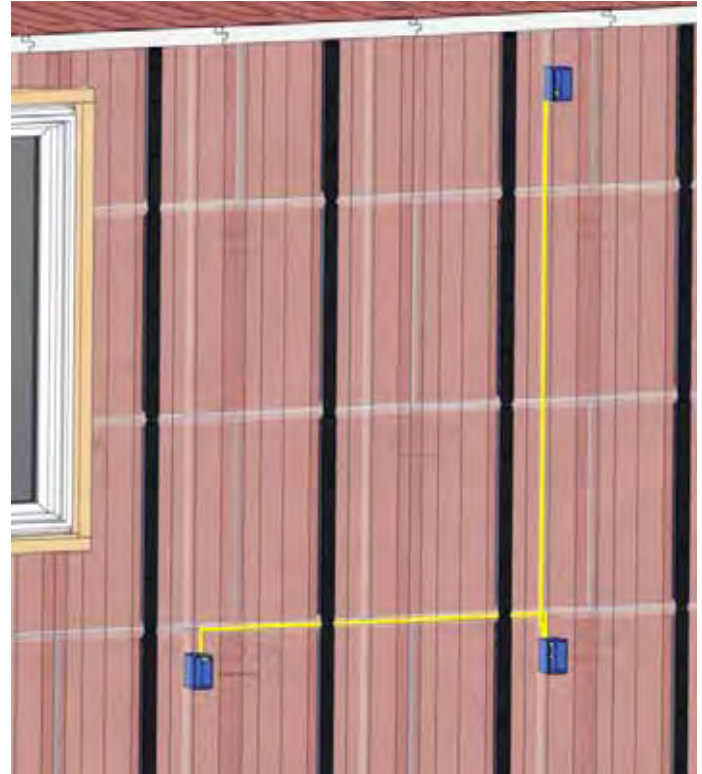
Cut out for the boxes.

Run wires through the raceways.

Use PL Premium 3x to glue the boxes in place.

Use spray foam to cover the wiring and fill the opening, this satisfies the code requirement for wire attachment out of the box.

Electrical wiring coming out of box.

Vertical and horizontal wiring chases built in.

Need more insulation?

When higher R-values are required for the walls or ceilings, additional sheet foam can be added.

Install the InSoFast panels and simply tack or glue sheets of foam in place. Install drywall or other interior finishes using longer screws to penetrate at least ½" into the face of the InSoFast stud.

CX Container panels can also be installed on the exterior, providing a greater R-Value and also an attachment for siding.

Installing Drywall over InSoFast Panels

It is not necessary to trim the drywall sheets to align on the InSoFast studs. Because the panels provide solid backing for the drywall, you can float the butt seams between the studs. Where two drywall sheets meet, run a 3/8" bead of PL Premium 3x along both sides of the seam to bond the drywall to the panels.

Drywall can also be installed vertically to eliminate butt seams. This requires the "floating" method above for the tappered edge seams.
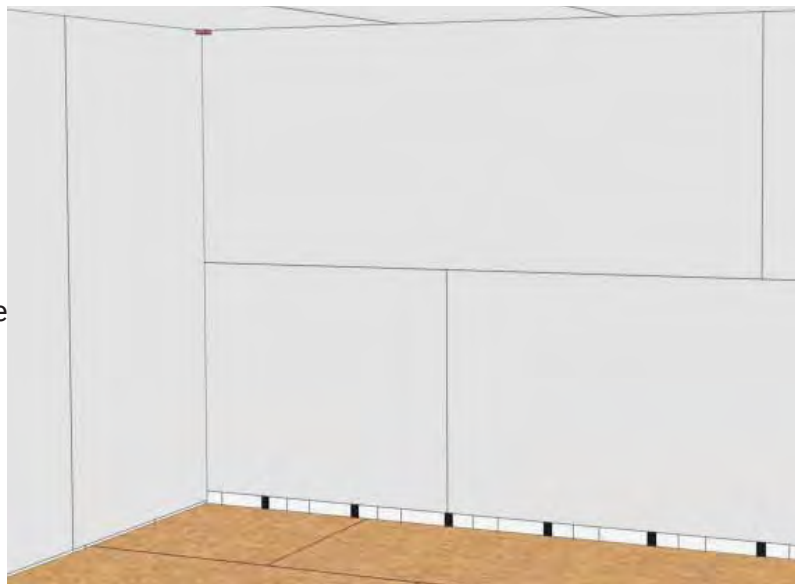
Install drywall.

Windows/Doors

Cut out of any openings before installing the InSoFast panels or inserts. There are many methods for installing windows and doors. We will only be showing one method for utilizing a wood jamb when a structural header is not required. Whatever method you choose to use, the jambs or framing for any openings should be done before the InSoFast panels are installed.

Quick Wood Jamb Method

On a 2x4, trace the corrugation and cut apart. This creates the interior and exterior part of the bottom and top jamb. The side jambs are created in a similar manner, cutting lengthwise with a circular saw set to the angle of the container to accommodate the corrugation.
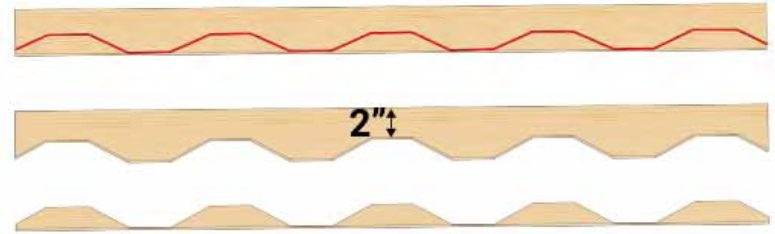
Cutting out the wood jamb.

Use caulk and screws on each side to join the jambs together, sandwiching the container in between.

The wood jamb should protrude inward 2" so that it will be flush with the InSoFast panels.

Flash, seal, and install the window per manufacturer's instructions.

Wood jamb installed.

Installing InSoFast Panels around Windows/Doors

An additional bead of PL Premium 3x is required around all openings to provide addtional bonding aournd the cuts.

PL Premium on the studs and around the cut out.
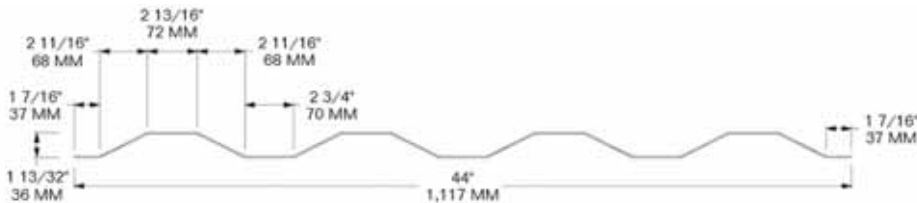Spray foam on the top of the panel.

Sealing around Windows/Doors

Leave a ¼" gap around all window/door openings to that after all the panels are installed, the gap can be filled with spray foam.
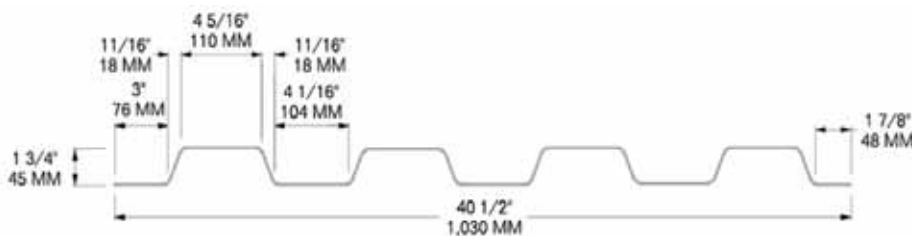
Leave a ¼" gap for spray foam.
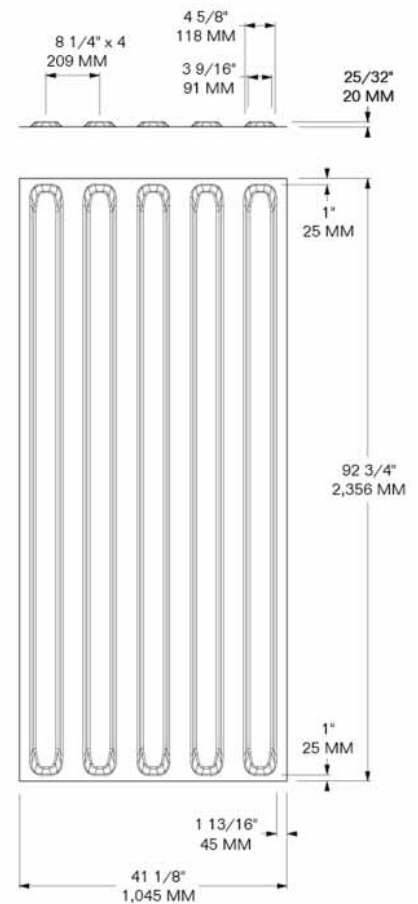
Container Specifications

CX Panels are design to fit this side wall corrugation

2 11/16" 68 MM
2 13/16" 72 MM
2 11/16" 68 MM
1 7/16" 37 MM
2 3/4" 70 MM
1 7/16" 37 MM
1 13/32" 36 MM
44" 1,117 MM

Ceiling Inserts are designed to fit this ceiling corrugation

8 1/4" x 4 209 MM
4 5/8" 118 MM
3 9/16" 91 MM
25/32" 20 MM
1" 25 MM
92 3/4" 2,356 MM
1" 25 MM
1 13/16" 45 MM
41 1/8" 1,045 MM

End Wall Inserts are designed to fit this end wall corrugation

11/16" 18 MM
4 5/16" 110 MM
11/16" 18 MM
3" 76 MM
4 1/16" 104 MM
1 7/8" 48 MM
1 3/4" 45 MM
40 1/2" 1,030 MM

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InSoFast®
Engineered Insulation

CX LowPro Insulated Stud

The CX LowPro is designed for use on the interior or the exterior of a shipping container. The inserts can be installed in an alternating pattern or in every corrugation. The LowPro easily be trimmed for partial corrugations and around openings.

The PL Premium has a working time of about 25 minutes. To obtain a more uniform flat surface, work in sections. It is best to wait until the sheet foam is in place before firmly pressing the assembly in place. Avoid pressing on the LowPro inserts which may push the LowPro inserts too low.

Best Practice for a Flatter Surface

It is best to work in a section of three LowPro corrugations (See bottom of page 11). Glue in place the LowPro and Side Wall Inserts without fully pressing into place. Then install the sheet foam between the LowPro Inserts. Press firmly on either side of the LowPro Inserts to fully seat the inserts and sheet foam at one time. This method will produce a more uniform surface.

Install the LowPro Stud Inserts

Apply a 3/8" bead of PL Premium 3x Construction Adhesive horizontally across the top of the insert and over the ribbed surface on the backside of the stud to form a "T".

Apply an additional bead of adhesive along the bottom of the LowPro for the first row only.

Install the LowPro Inserts in the corrugations.

Install the Foam Side Wall Inserts

Run a horizontal bead of PL Premium 3x on the backside of the insert at the bottom, middle, and top. Press into place.

Recommended Adhesive

PL Premium 3x Construction Adhesive is the recommended adhesive for adhering the InSoFast panels. Other formulas and brands may not work as expected.

TIP: When bonding InSoFast panel/studs, to metal add water in the form of a very light or atomized spray from a plant mister bottle to the adhesive, this accelerates the adhesive's set. If needed use mechanical support for 24 hours while the adhesive cures. When bonding the InSoFast panels/studs, avoid cure and surface temperatures below 40°F above 90°F.

Visit loctiteproducts.com for more info.

Install the Side Wall Inserts in the alternating corrugations.

Install Sheet Foam Between the LowPro Stud Inserts

When LowPro inserts are installed in an alternating pattern, cut the sheet foam in approximately 16" wide panels. If the LowPro is installed in every corrugation, cut the sheet foam in 5" wide panels. The sheet foam should be sized to leave a ¼" wide gap to be air sealed with spray foam.

To prepare the surface of the container for the sheet foam, apply a bead of PL Premium 3x near the bottom, in the middle, and at the top where the sheet foam is to be placed. Then apply spray foam along the lip of the LowPro inserts vertically on each side.

Install the sheet foam. Press firmly in place to seat the inserts properly. If the sheet foam will not sit tightly, use a nail or pin to hold in place until the adhesive sets up.

Omit spray foam at bottom for drainage.

Place PL Premium horizontally and spray foam along the edges.

Fit inserts and sheet foam tight to the bottom rail. Do not caulk or seal to the bottom rail to provide for drainage.

Seal Top of Wall

For exterior applications with siding, seal the insulation system at the top of the wall. Cut the inserts and foam board, leaving a ¼" gap, to allow for a continuous bead of sealant along top edge of the inserts and foam board.

Insert 16" sheet foam between the LowPro Inserts.

Use 5" wide sheet foam when LowPro is installed in every corrugation.

Additional Insulation for Higher R-Values

LowPro Plus

Allow the adhesive of the LowPro Basic assembly to set up before continuing with additional sheet foam. Fasten additional sheet foam over top of the finished LowPro wall using plastic foam board washers and screws into the InSoFast studs. Make sure to mark the stud location as the sheet foam in installed. Only use enough fasteners to hold the sheet foam in place until the siding is installed.

LowPro Plus

LowPro Plus Method #2

Method Two

Instead of using multiple layers of foam, this method uses a single 16" wide piece of 1-½" foam between the LowPro stud inserts and strips of ¾" foam on top of the LowPro. There is no need to mark stud locations as they are centered between the strips.

Use spray foam to seal all of the gaps.

Figuring Interior and Exterior R-Value

Both CX 44 and LowPro can be used on the interior or the exterior. You can optimize the amount of insulation on the interior or exterior to suit your needs.

Interior & Exterior Wall Assembly R-Value	
Component	R-Value
Interior Air Film	.68
½" Drywall	.45
CX 44 Panel	11.0
Container Sidewall	0
LowPro Basic	7.0
Exterior Air Film	.17
Assembly R-Value*	R-19.3
Add R-Value of Exterior Cladding	
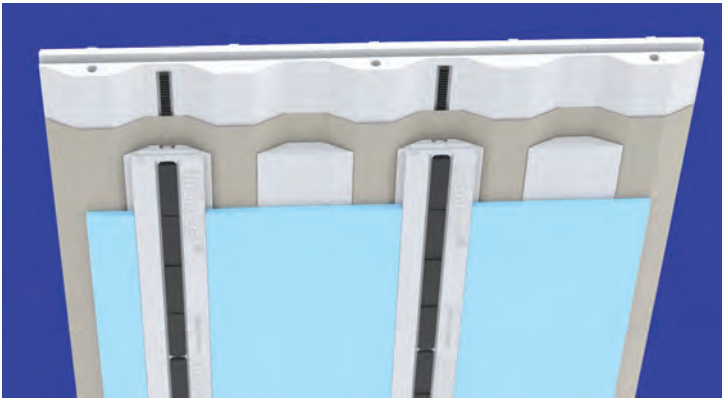
Interior and Exterior

Rain Screen Assemblies for Exterior Applications

For applications requiring rain screen, wood furring strips installed to allow moisture to migrate down. An alternative "no wood" method, utilizes thicker foam over the LowPro Insulated Stud.
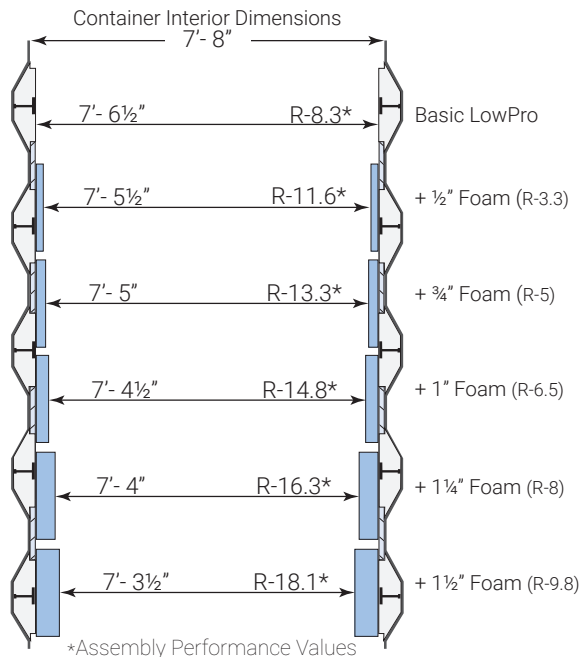

LowPro Foam Rain Screen

LowPro Wood Furring Rain Screen

R-Value vs Space - Evaluating your Project's Insulation Requirements
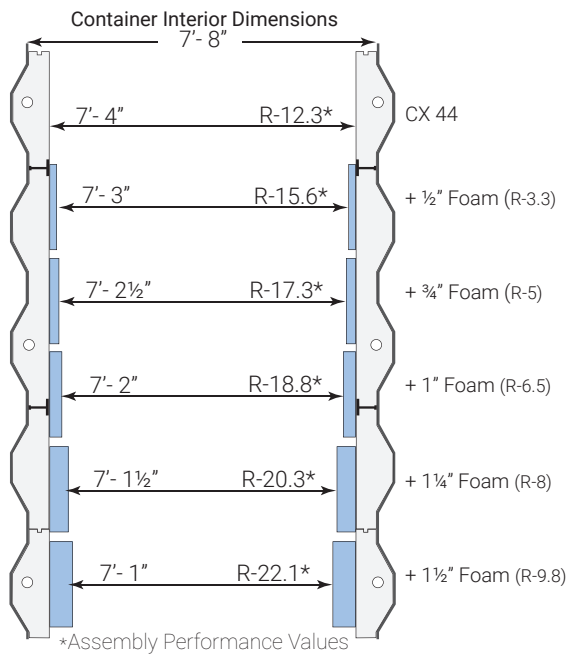
LowPro Basic Plus Additional Sheet Foam

LowPro Basic

LowPro Plus

Container Interior Dimensions
7'- 8"

7'- 6½"	R-8.3*	Basic LowPro
7'- 5½"	R-11.6*	+ ½" Foam (R-3.3)
7'- 5"	R-13.3*	+ ¾" Foam (R-5)
7'- 4½"	R-14.8*	+ 1" Foam (R-6.5)
7'- 4"	R-16.3*	+ 1¼" Foam (R-8)
7'- 3½"	R-18.1*	+ 1½" Foam (R-9.8)

*Assembly Performance Values

LowPro Basic Wall Assembly R-Value	
Component	R-Value
Interior Air Film	.68
½" Drywall	.45
LowPro Basic	7.0
Container Sidewall	0
Exterior Air Film	.17
Assembly R-Value*	**R-8.3**
Add R-Value of Additional Foam	

Sheet foam R-Values vary by manufacturer. Examples shown use polyiso foam. Verify manufacturer's specifications.

Building Codes allow fastening drywall and exterior finishes through 1-1/2" of continuous insulation. Thicker applications require furring strips.
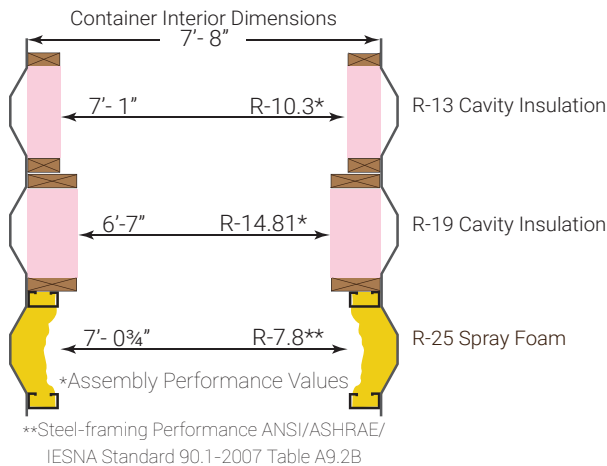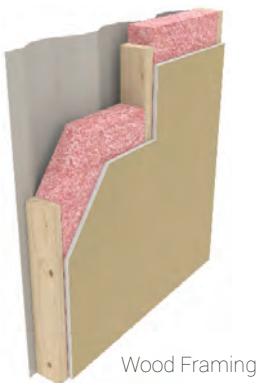
CX 44 Panel Plus Additional Sheet Foam

CX 44

CX 44 Plus

Container Interior Dimensions
7'- 8"

7'- 4"	R-12.3*	CX 44
7'- 3"	R-15.6*	+ ½" Foam (R-3.3)
7'- 2½"	R-17.3*	+ ¾" Foam (R-5)
7'- 2"	R-18.8*	+ 1" Foam (R-6.5)
7'- 1½"	R-20.3*	+ 1¼" Foam (R-8)
7'- 1"	R-22.1*	+ 1½" Foam (R-9.8)

*Assembly Performance Values

CX 44 Wall Assembly R-Value	
Component	R-Value
Interior Air Film	.68
½" Drywall	.45
CX 44 Panel	11.0
Container Sidewall	0
Exterior Air Film	.17
Assembly R-Value*	**R-12.3**
Add R-Value of Additional Foam	

Sheet foam R-Values vary by manufacturer. Examples shown use polyiso foam. Verify manufacturer's specifications.

Building Codes allow fastening drywall and exterior finishes through 1-1/2" of continuous insulation. Thicker applications require furring strips.

Wood and Steel Framing 16" o.c.

Wood Framing

Container Interior Dimensions
7'- 8"

7'- 1"	R-10.3*	R-13 Cavity Insulation
6'-7"	R-14.81*	R-19 Cavity Insulation
7'- 0¾"	R-7.8**	R-25 Spray Foam

*Assembly Performance Values

**Steel-framing Performance ANSI/ASHRAE/IESNA Standard 90.1-2007 Table A9.2B

2x4 Framing with R-13 Wall Assembly R-Value		
Component	Framing R-Value	Cavity R-Value
Interior Air Film	.68	.68
½" Drywall	.45	.45
2x4 Stud	4.38	--
R-13 Fiberglass	--	13.0
Container Sidewall	0	0
Exterior Air Film	.17	.17
R-Value	5.68	14.30
% of Wall	25%	75%
Assembly Performance R-Value*		**R-10.3**

End Wall - Nose Corner Detail

If you start with the side wall panels first, follow the illustrations noted below. Another option is to install the End Wall Inserts and flat panels all the way to the side wall of the container. Then the side wall pieces will be trimmed to fit against the end wall flat panels.

Fitting Pieces in the Corner

The end of the shipping container uses scrap pieces of panels cut to fit into the corner. The image illustrates the cut pieces used in each corner.

Colored panels show how to minimize waste.

Cutting the First CX 44 Panels

With the CX 44 panel facing up, mark a cutting line between 13" and 14" from the left side of the panel (dimensions will vary per container).

Starting with the larger piece, finish the bottom row on the right side of the container. The cut off piece will need to be trimmed to fit the second row on the left side as shown with blue shaded panels.
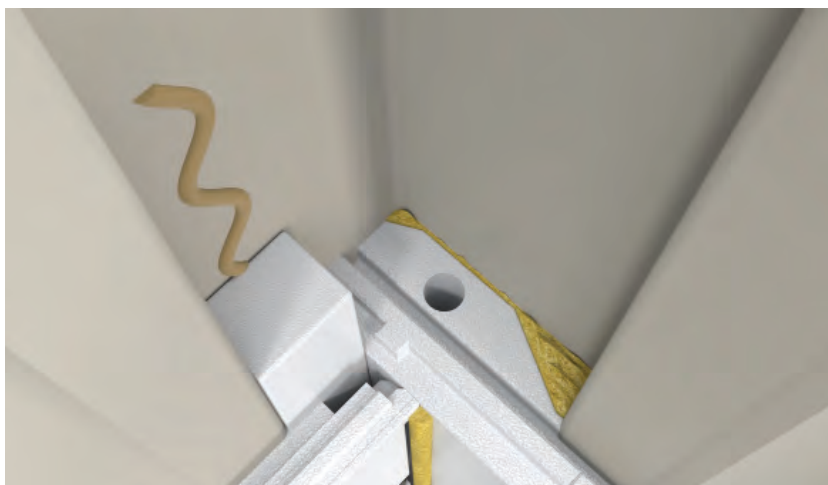
Repeat this process, making sure to cut the green shaded panel from the left side.

Corner Void

Fill the void in the corner with scrap pieces of InSoFast panels, sheet foam, or spray foam.

Fill the corner with foam.

Finish installing inserts and panels on the end wall.

Corner detail for LowPro. Spay foam gaps.

Finish the End Wall

Install the inserts and InSoFast panels on the end wall. Seal the corners with spay foam.

Additional Ceiling Information

Installation and Bracing

The UX 2.0 or EXi 2.5 flat panels installed on the ceiling will need to be braced until the adhesive has set. See page 4 of the Container Installation Guide.

Installing the side wall panels first enables you to shim the panels up in place at the edges. This eliminates a row of bracing on each side.

The shims are removed after the adhesive has set. After utilities have been installed, fill gap with foam.

Installing the ceiling panels.

Make a "T" style brace with 2x4s to hold the panels in place until the adhesive cures. Because the panels have a tongue and groove edge, the braces can be installed roughly 4' o.c. Be gentle - don't pound the vertical braces into place to avoid bowing the ceiling.

Do not install drywall until adhesive is cured. Low temperature or low humidity will increase the cure time needed.

Installing blocks to hold panel in place around perimeter.

Increasing Ceiling R-Value

Additional insulation can be added to the InSoFast system to obtain higher R-Values. Install the ceiling inserts along with the UX 2.0 or EXi 2.5 flat panels.

Install ceiling framing fastened to the InSoFast studs of the side wall panels.

Framing may be lowered to allow for additional continuous insulation above the framing.

Install cavity insulation.

2x4 framework for allows for additional insulation.

Ceiling Assembly R-Values
per Equivalent 2015 IECC (R402.1.2, R402.1.4)
Insulation and Fenestration Requirements by Component

Ceiling Insert	Ceiling Insert	Ceiling Insert	Ceiling Insert	Ceiling Insert
InSoFast UX 2.0	InSoFast EXi 2.5	InSoFast UX 2.0	InSoFast UX 2.0	InSoFast UX 2.0
		R-4.1 / R-15	R-9 / R-15 / 24" o.c. Framing	R-15 / R-15 / 24" o.c. Framing
R-13	R-15	R-30	R-38	R-49
U-Factor .092	U-Factor .078	U-Factor .035	U-Factor .030	U-Factor .025

Insulating the Inside of Swing Doors

Before you start

There are many styles of shipping container doors and just as many ways to insulate them. We will show how to use the InSoFast EXe 2.5 flat panel to insulate this door.

The EX Series panels are 2-½" thick and will stick out past the door frame. Additional insulation will be added over the door frame to make a flush surface. See page 18.

Cutting Panels to Width

The EX panel is 48" long. You will need to cut the center piece out of four panels for each door. It should be friction fit but not so tight that the panel bows. This will eliminate the need to have to brace the panels while the adhesive sets. You want to make sure that the three studs in the panel are centered in the opening.

Center the panel in the opening.

Cutting diagram that illustrates when InSoFast panels and sheet foam is used.

Cutting the Panels to Height

When measuring the bottom panel, include the angled part in the measurement as shown with the black dotted lines.

Cutting the Angles

Cut the angles on the panels. The beveled cut starts about 1" back from the front face of the panel. Use scrap foam to get the angle correct with a test cut. The angle is generally around 25°.

Don't cut the angle all the way through. Keep a flat area on the bottom.

Cutting out for the Rails of the Top and Bottom Panels

Measure the depth of the top and bottom rails which are about 1-½" deep.   Roll the panel up and into place over the top of the bottom rail. Make an impression on the back of the panel by striking the front surface. This will leave an impression for the groove cut across the panel.

This can also be done in two pieces instead of creating the groove cut on the back of the panel.

Removing Foam for Fastener Heads

Press the panel firmly against the door to leave bolt impressions in the panel. Drill out with a 1" spade bit. Remove enough foam so the panels sit tight against the door. Dry fit the panels and leave in place.
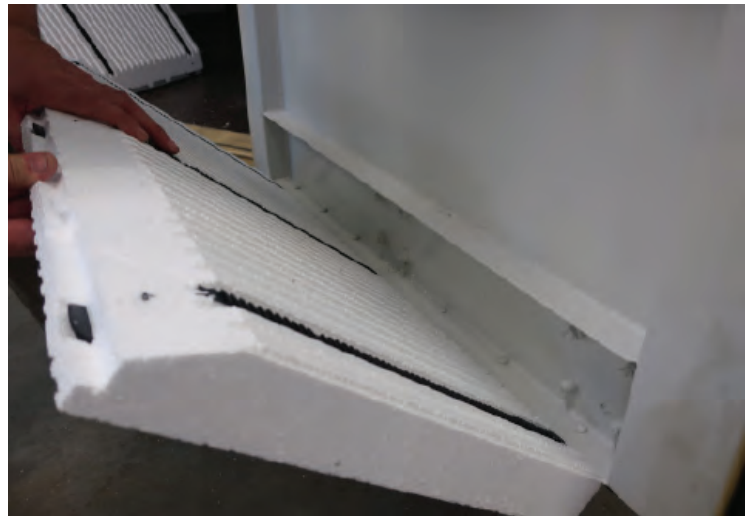
Press the panel against the rail.

Foam is removed to accommodate the rail.

Drill out the foam where the fastener heads are located.

Filling between the Panels

Use sheet foam (by others) to fill in around the cut panels. An alternate method is to use the InSoFast cut off pieces trimmed down to the correct height to fit between panels and then cut to the proper thickness to cover the exposed rib of the door which is about 1".

Measure for the thickness needed.
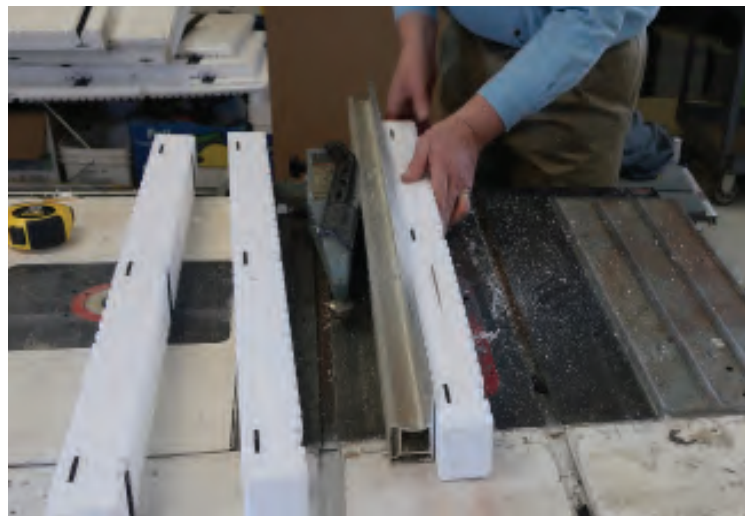
Make the cut so that the front of the panel is useable (cut off the back side).

Cutting Vertical Side Pieces

You can either use the cut off ends of the panels that were set aside that are cut and ripped to thickness or use 3/4" foam board. Hold back the foam to accommodate a wood trim piece to avoid seeing the foam.

Apply adhesive.

Glue Panels in Place

Remove all the dry fit pieces. Add a liberal amount of Loctite PL Premium 3x adhesive to the studs and foam. The vertical foam pieces will have to be taped in place until the adhesive has set.

The pink foam is kept back to allow for the trim piece.

Use plenty of adhesive on the doors.

Finishing the Door

Allow the adhesive to fully cure before applying finishes.

3/4" foam on the vertical rails.

Nailing on cedar siding.

Plumbing Installation in the CX 44 Panel

When possible, waste lines and especially water supply lines should be located on interior walls. Colored electrical tape was used to layout the plumbing and electrical runs before any foam was cut. A hot knife is a great tool for quickly removing foam without the mess.

In the CX 44 panel, 1-½" and 2" waste pipes can be located in the thicker part of the foam. 1-½" waste pipes can also run horizontally anywhere in the panel. Larger waste pipes will need to be boxed out.

When running waste pipes through the floor and ceiling, avoid cutting the structural beams of the side of the container as well as in the floor system.

In mild climates, water lines can be flush with the interior face of the panels directly behind the drywall. Make sure to use protection plates where ever piping runs through the stud. Make sure to seal around pipes at any penetration to prevent air flow.

Pipes Running from Wall to Ceiling

Supply lines can be run from the wall to the ceiling. This can only be done in a mild climates or when the container is insulated on the exterior as well to protect pipes from freezing. See lower right photo.

The CX 44 panel can accommodate a 2" PVC pipe.

Use hot knife to cut out for pex pipe.

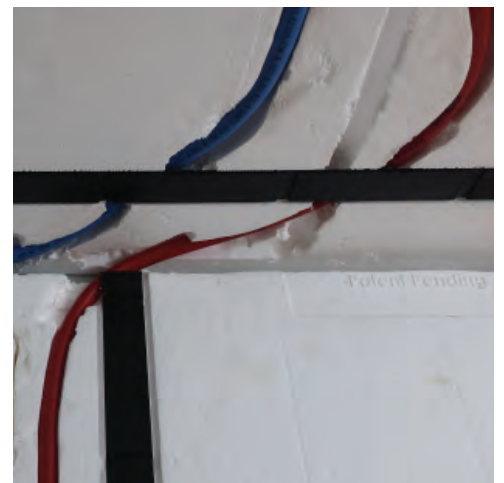Drill behind the stud for the pex pipe.

Install bend supports.

Use protection plates where necessary.

Pex pipe running along side waste.

Pex pipe can go around a corner without kinking.

Electrical Installation

The CX 44 panel has built in horizontal and vertical raceways, meeting the national electrical code depths requirements for Romex.

The steel container is no different than running wires through steel framing.   Code requires the steel container be grounded. This is usually done at the electrical panel with a bonding screw. It is the same concept as grounding a metal electrical box.

A hot knife is useful for cutting out electrical boxes and to access the raceways. Electrical outlets can be located anywhere in the panel. You can also use a long snap off blade utility knife or small saw to cut the foam.

CX 44 Panel has horizontal and vertical raceways built into the panel.

Outlet located below horizontal raceway.

Cutting out using hot knife with sled attachment.

Foam in box after wiring has been run.

Bend over the tip of with wire when pushing through.

Pushing a long run.

Wire in horizontal raceway.

Running Wire around Corners

When changing direction, you will have to cut a hole to access the raceways. Save this piece to glue back in after your inspection.

When routing wires up the wall into the ceiling, cut access holes at the top of the wall and on the ceiling at the raceways locations. The raceways will not match up. Run the wire along the top of the CX 44 panel, making sure to push the wire all the way back to the beam. Code requires that the wire be 1-¼" back from the face otherwise a metal protection plate is required.

The electrical boxes can be adhered or mechanically attached. Verify with electrical inspector for local code requirement.

Cutting out raceway intersection.

Cutting out for round outlet box.

Run wire around the corner.

Running wiring down the wall.

Push with wiring all the way back to the beam.

Exterior Applications

Siding/Claddings

The InSoFast family of products is very adaptable to virtually any type of cladding.   See insofast.com for technical details on siding attachment. The panels can support up to 2" thick adhered cultured stone. For all finish types, please refer to the finish manufacturer's installation instructions for fastener size and spacing.

Openings and Other Through-Wall Penetrations

Mechanical penetrations are treated as they would be for typical construction.

All through-wall penetrations should be installed and sealed back to the container before the InSoFast panels are installed. Install flashings and sealants per manufacturer's installation instructions. Cut and fit the InSoFast panel around the penetration, leaving a ¼" gap. Fill the gap between the penetration and the InSoFast panel with a foam sealant.

For exterior applications with siding it is important to seal the insulation system at the top of the wall. Properly detailing the roof and siding connection by providing flashing that extends over foam and siding.

Exterior applications with wood framing may require a weather resistant barrier (WRB). Follow WRB manufacturer's installation instructions.

Fastener Selection

Use corrosion-resistant fasteners long enough to penetrate 1" into the embedded InSoFast stud.

Architectural Build Outs

To show adaptability the following pictures show how the container was boxed out to create the needed depth for the vertical siding. Wood framing was screwed to the InSoFast studs. Weather resistant barrier was installed over the sheathing only.

Screw framing into InSoFast stud.

Boxing out the low part of the exterior.

Exterior build out is ready for WRB.

Bottom of Container

If you are insulating and siding down to cover the beam on the bottom of the container, below are two options. Container beam locations and style vary with manufacturer. The 2x6 framing can be screwed to horizontal beam with self taping screws for steel.

Nail or screw on horizontal siding.

Option one for insulating and furring out the beam.

Option two for insulating and furring out the beam.

Install a metal flashing at the underside of the container to cover all foam along the bottom edge.

Bottom flashing installed over the WRB.

Raw steel was added on lower part of wall.

Corner Boards

For easy siding attachment at corners, install a metal flashing approximately 1-½" wider than the corner board.

For the corner, the UX 2.0 flat panel was glued vertically to the corner beam of the container to provide better attachment for the metal flashing.

Metal flashing installed for added attachment.

Finished corner.

Vertical Siding

Vertical siding can be installed easily by adding wood furring strips over the InSoFast panels.

Vertical siding is nailed to wood furring strips.

IMPORTANT NOTICE: Container Surface Temperatures

PL Premium 3x Construction Adhesive

PL Premium Construction Adhesive 3x is freeze/thaw stable. While freezing will not damage the adhesive, it will not cure until temperatures are warm enough to complete the cure process.

When bonding InSoFast panel/studs to metal, add water in the form of a very light or atomized spray from a plant mister bottle to the adhesive, this accelerates the adhesive's set. If needed use mechanical support for 24 hours while the adhesive cures. When bonding InSoFast foam insulation, use above 40°F (4°C) and avoid cure and surface temperatures above 90°F (32°C). See website for further information.

Cold Weather Tips: Interior Installation

Heating the interior of the container will not be sufficient for the adhesive to cure because the insulation panels will not allow heat to transfer to the container surface. It is recommended to either move the container to a heated area or tent and heat the exterior until the adhesive has cured.

Cold Weather Tips: Exterior Installation

The interior of the container can be heated until the adhesive has cured.

If you opt to use nail guns to install siding, it is only recommended when temperatures are above 60° F. Smaller nail size and shank diameter will perform better at lower temperatures. It is up to the contractor, and/or building official to determine the suitability for the use of nails when installing siding. It is important for the contractor to verify that the fasteners do not crack the stud and that they are not over-driven or under-driven into the stud. Install the exterior panels first while heating the interior. Allow adhesive to cure before installing interior insulation.

For complete and up-to-date information, visit InSoFast.com and our YouTube channel.

InSoFast LLC Limits of Liability and Disclaimer of Warranty:

Nationwide Code Approval : TER 1910-03, (ICC-ES Equivalent) (Canadian ULC)