

Chapter 11 - Exterior Insulation

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Things to Consider

- Styrofoam insulation will be installed starting at the bottom of the sill plates up to the bottom of the truss tails or gable end rakes with minimum gaps.
- The seams of the panels of the Styrofoam boards will be offset from the seams of the OSB. The offset will improve the thermal break and prevent air loss.

Safety Issues

- Do not leave pieces of Styrofoam laying in the work area. When wet, it is very slippery.
- Ensure knife blades are retracted or covered when not in use.

Timing & Prerequisites:

- Typically, the roof trusses and sheathing will be installed prior to exterior insulation board installation. One exception will be installation of exterior insulation on the gable end trusses, if they are to be prepped before installation.
- The House/Project Lead will work with the Construction Superintendent to coordinate these volunteer activities.

Materials Needed	
<i>Water Plane</i>	<i>Blocking</i>
1" Styrofoam Tyvek 2" Cap nails Construction tape	7/16" OSB Blocks 2 1/2" Exterior Wood Screws
<i>Fire Rated Plane</i>	
1" Styrofoam (fire-rated) 2" Cap nails Construction tape	

Insulation Build-outs

Build Out Corners

With the switch to 1" Styrofoam exterior insulation, corner build outs are no longer needed.

Build Out Meter Box

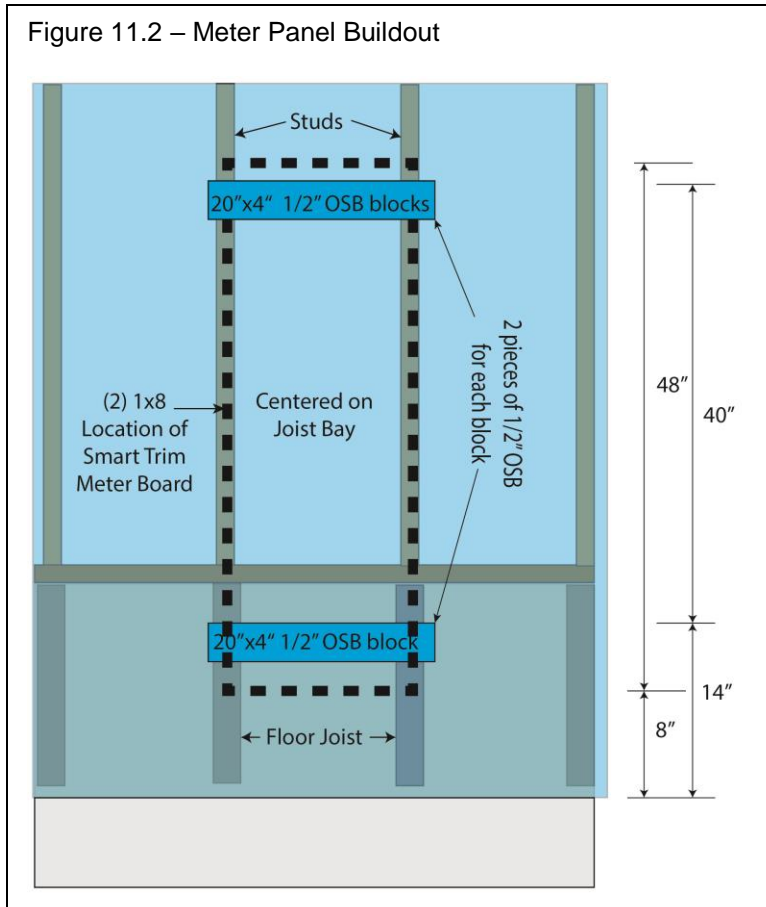
1. Consult the Construction Superintendent for the location of the electrical meter box. The height and width of the Smart Trim Mounting Panel, which will be installed later for mounting the meter box, is detailed in the Rough Mechanical chapter.

Blocking is required behind the Smart Trim Mounting Panel to ensure the panel is secured to the building framing. The blocks will be cut from 7/16" OSB. Stack two (2) pieces of 7/16" OSB cut to 20" x 4" for each block.

Normally the blocking will be installed as follows: (see figure 11.2).

- Top block is installed horizontally, with its top edge at 54" above the foundation.
 - Bottom block is installed horizontally, with its top edge at 14" above the foundation.
2. Draw one horizontal line 54" above the foundation and one horizontal line 14" above the foundation. OSB blocks will be installed below these lines for anchoring the Smart Trim later.
 3. Identify the location of the framing lumber behind the location of the Electric Meter Mounting Panel. Mark the center of the joist bay.
 4. Cut four (4) 20" x 4" blocks of 7/16" OSB. Sandwich two (2) blocks below each line and centered in the joist bay and attach with 2 1/2" exterior wood screws through the blocks into the framing lumber below. It is best to pre-drill the holes for the screws.
 5. The 1" Styrofoam insulation will be cut out around these blocks.

Figure 11.2 – Meter Panel Buildout



Build Out Mail Box

1. Locate the placement of the mail box. The top of the box will be 44" from the porch floor.
2. Draw a horizontal line at 44" above the porch floor.
3. Cut two (2) 20" x 4" blocks of 7/16" OSB.
4. Stack the two pieces below the line and attach them with 2 1/2" exterior screws into the framing lumber behind the wall.
5. The 1" Styrofoam insulation will be cut out around this block.

Build Out Door Bell

1. Draw a horizontal line at 38" above the porch floor; adjacent to the front door; just below the mail box block.
2. Cut two (2) 20" x 4" blocks of 7/16" OSB.
3. Stack the two pieces below the line and attach them with 2 1/2" exterior screws into the framing lumber behind the wall.
4. The 1" Styrofoam insulation will be cut out around this block.

Styrofoam Checklist

- Seams in the exterior OSB attached to the wall panels and the OSB attached to floor joists are sealed with silicone caulk.
- Take pictures of completed items.

Styrofoam Insulation

Critical Issues

- **Styrofoam sheets are to be cut with a hand saw. Do not use circular saws, the dust is bad for the tools.**

Styrofoam insulation boards are added to the exterior of all conditioned walls to increase the insulation rating of the walls. Current specifications call for R-19 walls. Adding the exterior R-5 Styrofoam to the internal R-14 insulation meets the requirement.

Styrofoam insulation boards are also added to the gable end trusses (unconditioned walls) when they line up with conditioned walls below. A straight wall surface will be required for installing the siding.

When the seams of the Styrofoam are properly taped, the Styrofoam also creates a water plane.

Styrofoam Insulation Boards

- 1" Styrofoam will cover all other exterior walls.
- 1" Styrofoam will also be used to cover the exterior Fire-Rated drywall.
 - One exception is some transition trusses. (See "Apply Tyvek to Transition Walls" below).

Apply Styrofoam Board to Exterior Walls

Critical Issues

- **Do not allow Styrofoam board seams to coincide with OSB seams.**
- **Fit insulation boards snugly together. There should not be voids between panels.**
- **Cap nails must align with studs to facilitate installation of the siding.**
- **Cap nails must be driven in until they slightly dimple the Styrofoam. Bent nails should be removed.**

Safety Issues

- **Use extension ladders or scaffolding to install upper rows. Do not use step ladders in the dirt.**
- **Ladders must be positioned securely and tied in as necessary. Outriggers should be used if a flat surface is not available.**
- **Do not lean out away from the ladder. Keep your belt buckle inside the ladder.**

- **For gable end work above porch and lower roofs, harnesses and gable end anchors must be used until the last anchor has to be cut and covered up.**

- Apply sheets vertically over the OSB. (See Figure 11.3).
- Stagger the Styrofoam board seams from the OSB seams.
- Install the sheets of 1" Styrofoam with 2" cap nails; 1 nail every 16" vertically into the studs in the wall. (Use the nail heads in the OSB as an indicator of the stud's location).
- The 2" Styrofoam boards on the foundation walls which were installed by the Contractor extend up from the footer to 1" below the grade.
- The Styrofoam boards on the walls will extend from the sill plate, up to the bottom of the tails of the common trusses or the rakes on the gable end trusses.
- No Styrofoam boards are to be installed over the foundation wall above the grade.

Install Styrofoam Insulation Board on Walls above Lower Roofs

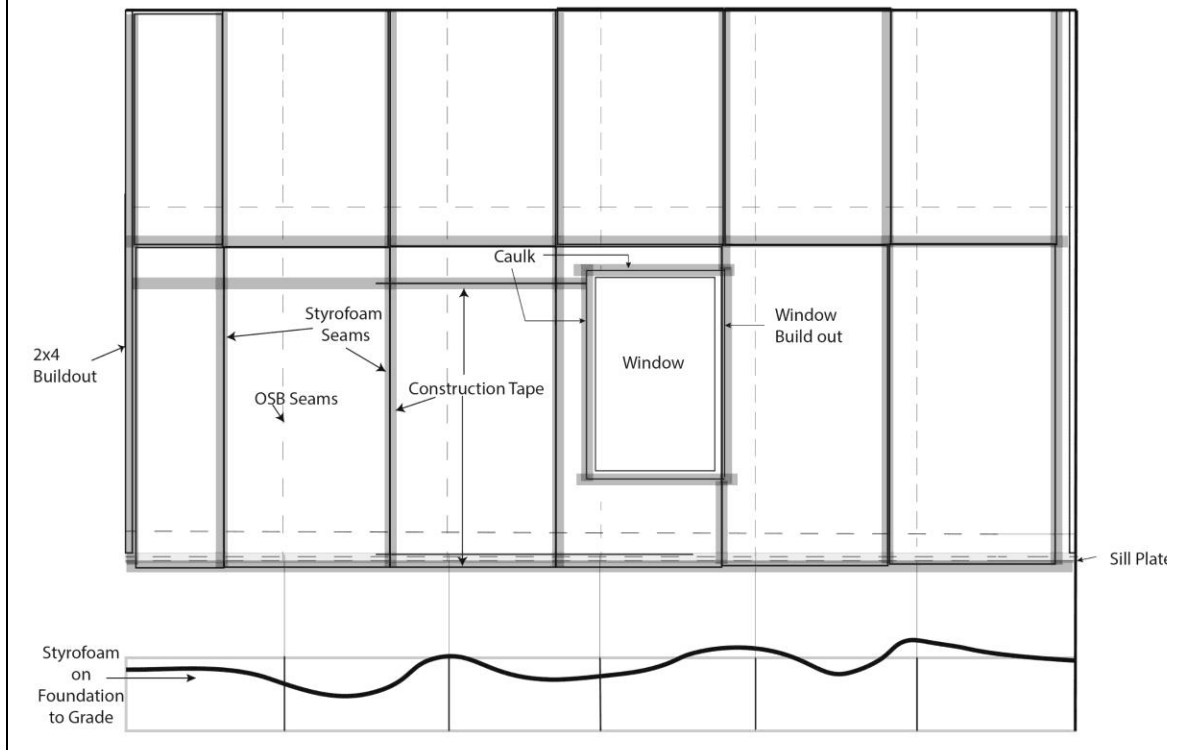
Critical Issues

- **Do not install Styrofoam Insulation board on the lower 2' of any wall above a lower roof until after the roofing is complete.**
- **Do not nail the bottom of the Styrofoam board within 6" of the roof.**

If the roofing is not complete before the Styrofoam is installed on a wall above a lower roof, leave the Styrofoam off the lower 2' of the wall. This Styrofoam will be added after the roofing is complete.

The Styrofoam insulation board should extend down over the step flashing and fit snugly to the roof.

Figure 11.3 – Styrofoam Installation



- If the exterior doors have been installed, apply Styrofoam boards tight to the edges of the jamb extensions. No voids.

Apply Styrofoam Boards to Fire-Rated Walls

Critical Issues

- Do not install the Styrofoam boards until the fire-rated drywall or Densglass has been inspected.

If one or more walls have been covered with exterior fire-rated drywall for fire-rating, either 1" or ½" Styrofoam insulation will be used over the 5/8" exterior fire-rated drywall.

- Apply sheets vertically over the exterior fire-rated drywall.
- Stagger the Styrofoam board seams from the exterior fire-rated drywall seams.
- Install the sheets of ½" Styrofoam with 2" cap nails; 1 nail every 16" vertically into the studs in the wall. (Use the nail heads in the exterior fire-rated drywall as an indicator of the stud's location).

Tape the Seams

Critical Issues

- All Styrofoam board seams must be covered with construction tape to prevent air loss and to create a water plane.

- When installation of external Styrofoam insulation boards is complete, add the Construction tape over all the seams including:

- Between the wall boards.
- Between the pieces over the build outs and the wall boards.
- Between the door jamb extensions and the wall boards.
- Apply construction tape to each seam; ensuring the tape covers the entire seam.
- Create a water plane by applying the tape from bottom to top. If multiple pieces of tape are used, the upper pieces overlap the lower pieces by 1”.
- Unroll the tape as it is being applied to the insulation boards to prevent the tape from sticking to its self.
 - Unroll the first 6” of tape and stick it to the Styrofoam.
 - Continue to unroll the tape and apply it to the Styrofoam as it is unrolled.
 - Cut the tape after it is attached to the Styrofoam boards.

Tyvek Wrap

Tyvek wrap is added to exterior walls which are not covered by Styrofoam to create a water plane.

Install the Tyvek wrap horizontally on the walls; completely covering the wall and any sill plates or beams below the wall. If more than 1 layer of wrap will be needed, install the lower layer first; then extend the upper layer down over the lower layer by 6”.

Apply Tyvek to Porch Gables

Install Tyvek wrap over the OSB sheathing on the gable end trusses. Allow the Tyvek to hang down over the porch beams. The Smart Trim will secure the bottom of the Tyvek.

Apply Tyvek to Transition Trusses

Install Tyvek wrap over the OSB sheathing on any transition truss which is not contiguous with a wall below and which encloses a non-conditioned space of the house.

Exterior Insulation Checklist

- Ensure all gaps in the Styrofoam are filled with pieces of Styrofoam and they are taped in place with construction tape.
- Ensure all corners are sealed with construction tape.
- Ensure all seams between the Styrofoam boards are sealed with construction tape.
- Ensure all cap nails are dimpled in.
- Ensure work site is clean and materials are properly stored before proceeding.
- Take pictures of completed items.