

Chapter 11 - Exterior Insulation

Contents

Chapter 11 - Exterior Insulation	11-1
Timing & Prerequisites:	11-2
Styrofoam Insulation.....	11-3
Styrofoam Insulation Boards.....	11-3
Install Anchor Points	11-4
Apply Styrofoam Board to Exterior Walls.....	11-4
Install Styrofoam Insulation Board on Walls above Lower Roofs.....	11-5
Insulating Adjoining Attic Walls.....	11-6
Install 1” Styrofoam board to attic walls which adjoin interior walls.....	11-6
Apply Styrofoam Boards to Fire-Rated Walls.....	11-6
Tape the Seams	11-6
Tyvek Wrap	11-7
Apply Tyvek to Porch Gables.....	11-7
Exterior Insulation Quality Assurance.....	11-7

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>Fire Rated Plane</i>
1" Styrofoam Tyvek 2" Cap nails Construction tape	1" Styrofoam (fire-rated) 2" Cap nails Construction tape Expanding Foam

Styrofoam Insulation

Critical Issues

- Styrofoam sheets are to be cut with a hand saw or utility knife. 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 after it has been inspected.

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.
- 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 work above porch and lower roofs, harnesses and anchor points must be used.

- **Visually inspect the anchor to ensure that it has not been damaged prior to installation and before each use. This product's only use is to provide an approved anchor point for workers engaged in acts that require the use of fall protection equipment.**

Install Anchor Points

For two-story houses (Anna & Rachel), anchor points need to be installed below the frieze boards for use when working on porch and lower roofs.

- Attach one or more “Red Butterfly” anchor points to the area below the frieze boards on both the front and back gables. One anchor will be needed for each volunteer who will be working on the roof below.
- Ideally, the anchor points would be installed into the double top plate of the wall below the gable end truss.
- Attach the anchor point with a minimum of twelve (12) #8x2 wood screws (6 per center row on each side) through the OSB into the 2x4 framing behind. **All 12 screws must be installed into the framing.**

Per the manufacturer: “Must use a minimum of 12 #8x2 wood screws (6 per center row each side for wood truss attachment).”

- Leave the anchor points installed until the siding is installed.

Apply Styrofoam Board to Exterior Walls

- 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.
- Cut the Styrofoam boards to fit around anchor points and scaffolding braces. Ensure the cut-out areas are large enough to allow access for removing the anchors and braces later. The cut outs can be saved for installation when the anchors and braces are removed.

Install Styrofoam Insulation Board on Walls above Lower Roofs

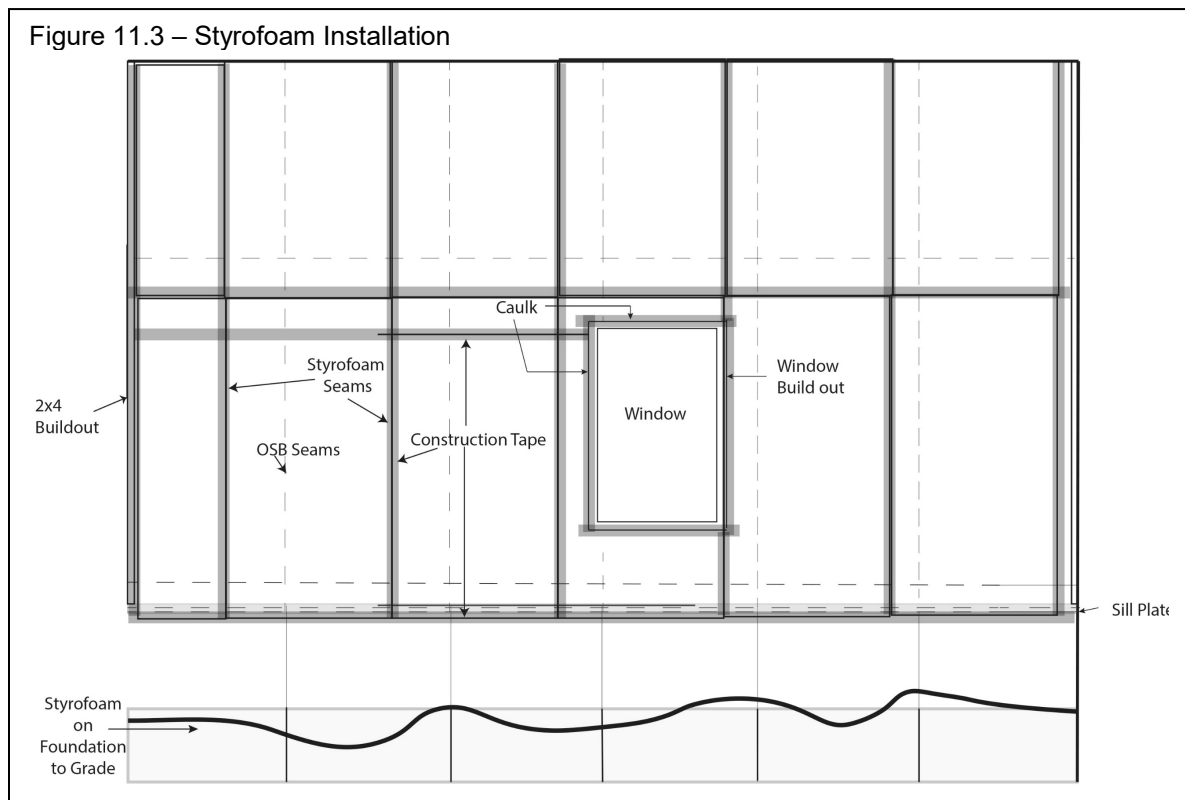
Critical Issues

- Do not install Styrofoam Insulation board on the lower 1' 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 1' of the wall. This Styrofoam will be added after the roofing is complete.

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

Extend the Styrofoam to the edges of the door openings. If the doors have not been installed, the Styrofoam will be cut back when the doors and jamb extensions are installed. See "Installing Exterior Doors" in "Windows and Doors".



Insulating Adjoining Attic Walls

Install 1” Styrofoam board to attic walls which adjoin interior walls.

In the Anna and Rachel house models the lower attics have an adjoining wall with the second floor. The wall is divided into two sections by the roof.

The exterior side of the wall **above** the roof line will be insulated with 1” Styrofoam, as described above; and the interior side of the entire wall will be insulated with batt insulation like the rest of the house and is addressed elsewhere.

The attic side of the wall **below** the roof line must also be insulated as follows:

- Install a layer of 1” Styrofoam to the attic side of the wall below the roof line. Install the Styrofoam with 1 ¾” cap nails, 1 nail every 16” along the vertical studs.
 - Cover the Styrofoam with Tyvek House Wrap. Install the House Wrap with 1 ¾” cap nails, 1 nail every 24” around the perimeter and 1 nail every 24” along the vertical studs.
- ❖ It is easier to insulate the section below the roof line before the lower roof trusses are set. Install the Styrofoam and Tyvek to the bottom section of the wall once the roof ledger for the lower roof is attached to the wall.

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 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 Styrofoam boards.
 - Between the door jamb extensions and the Styrofoam 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.

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.

Exterior Insulation Quality Assurance

- 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.