

# Attachment of Exterior Wall Coverings Through Foam Sheathing to Wood or Steel Wall Framing

Installation Instructions  
Revised July 7, 2020

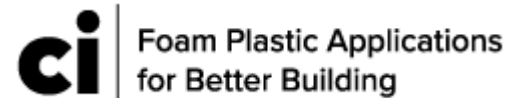


[Applied Building Technology Group \(ABTG\)](#) is committed to using sound science and generally accepted engineering practice to develop research supporting the reliable design and installation of foam sheathing. ABTG's educational program work with respect to foam sheathing is provided through a grant by the [Foam Sheathing Committee \(FSC\)](#) of the [American Chemistry Council](#).

ABTG is a [professional engineering firm](#), an [approved source](#) as defined in [Chapter 2](#) and [independent](#) as defined in [Chapter 17](#) of the IBC.

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Foam sheathing research reports, code compliance documents, educational programs and best practices can be found at [www.continuousinsulation.org](http://www.continuousinsulation.org).

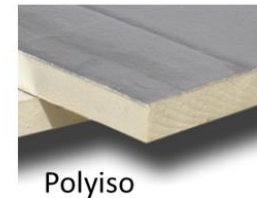
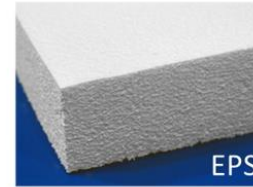


# Scope

- This presentation is based off solutions that are now recognized in the 2015 and 2018 editions of the *International Building Code (IBC)* and the *International Residential Code (IRC)*
- The code language affirms current research that has been done on the topic:
  - [NYSERDA Fastening Systems for Continuous Insulation](#) (2010)
  - Baker/DOE [Cladding Attachment Over Thick Exterior Insulating Sheathing](#) (2014)

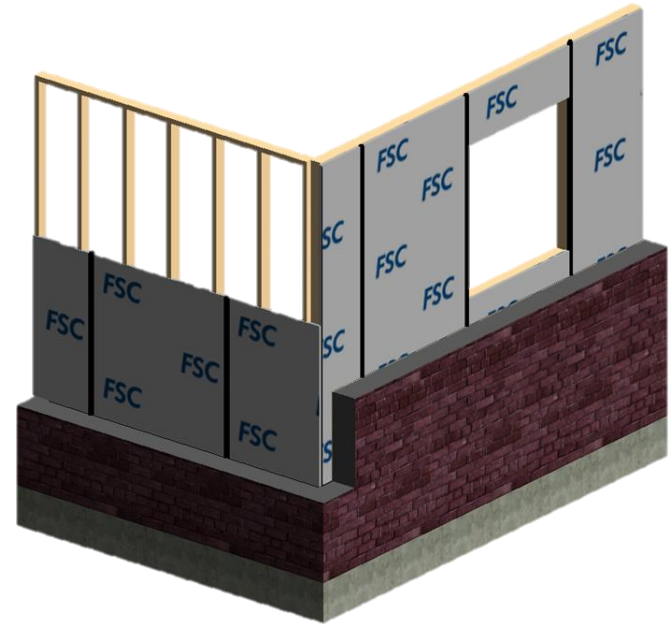
# Foam Plastic Insulating Sheathing (FPIS) Products

- Offered in three types:
  - Expanded Polystyrene (EPS) - ASTM C578
  - Extruded Polystyrene (XPS) - ASTM C578
  - Polyisocyanurate (Polyiso) - ASTM C1289
- Come in many thicknesses to accommodate almost any end use
  - In this situation limited to 4" thickness
- FPIS as continuous exterior insulation is seeing increased recognition in the market for compliance with the energy codes.



# Attachment Methods

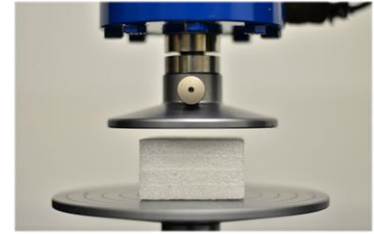
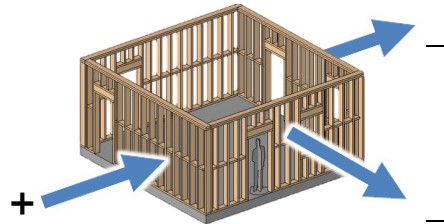
- Exterior wall coverings are attached directly through the FPIS into the framing or to furring attached through the FPIS to framing
- FPIS installed in accordance with:
  - [DRR 1303-04](#) or
  - [ABTG Report No. 1503-02](#)
  - Manufacturer's installation instructions
  - The following general installation guidelines



# Step 1: Verify FPIS and Framing

- FPIS must have min. compressive strength of 15 psi
- Must comply with ANSI/SBCA FS100 where wind pressure resistance is required

Note: Wind speeds shown in Table 1 are  $V_{ASD}$ . Where  $V_{ULT}$  is used, multiply wind speeds by a factor of 1.26



ASTM D 1621

**TABLE 1: Components and Cladding Design Wind Pressure Loads (PSF)<sup>1,2,3,4</sup>**

Design Wind Speed (mph, gust) and Exposure	85/B	90/B	100/B	110/B	120/B	130/B	140/B	150/B
	-	-	85/C	90/C	100/C	110/C	120/C	130/C
Exposure	-	-	-	85/D	90/D	100/D	110/D	120/D
Negative Pressure (Suction) Design Wind Load	-17.4	-19.5	-24.4	-29.1	-34.7	-40.7	-48.6	-57.6
Positive Pressure Design Wind Load	13.0	14.6	18.2	21.8	25.9	30.5	36.3	43.0

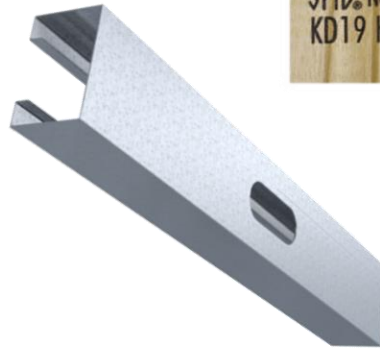
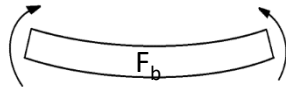
**TABLE NOTES:**

1. Tabulated wind pressures are for *mean roof height* not exceeding 30 feet (measured vertically from grade plane to middle of roof slope, enclosed buildings, and importance factor equal to 1.0. For other conditions of use, calculate wind load in accordance with Section 4.2.
2. Refer to the applicable building code or the ASCE 7 standard for wind exposure descriptions (B = suburban/wooded terrain; C = open flat terrain; D = ocean/lake exposure).
3. Where topographic effects occur (e.g., wind speed up due to hill-top exposure), wind load shall be calculated in accordance with Section 4.2.
4. Tabulated wind pressures are for wall corner zones using an effective wind tributary area of 10 square feet. For lesser design wind pressures away from wall corner zones, refer to the applicable building code or the ASCE 7 standard.

# Step 1: Verify FPIS and Framing

- Wood framing may be any softwood species with specific gravity 0.42 or higher
- Steel framing must be:

Thickness	Minimum $F_b$
33 mil, 43 mil	33 ksi
54 mil	50 ksi



## Step 2: Verify Fasteners

- Exterior coverings may be attached through FPIS directly to structural members:

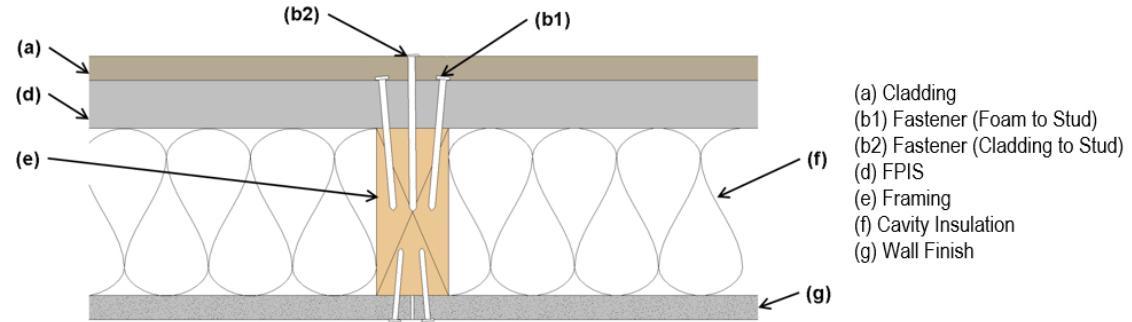


Figure 1a: Plan View – Direct Cladding Attachment through FPIS to Wood Stud

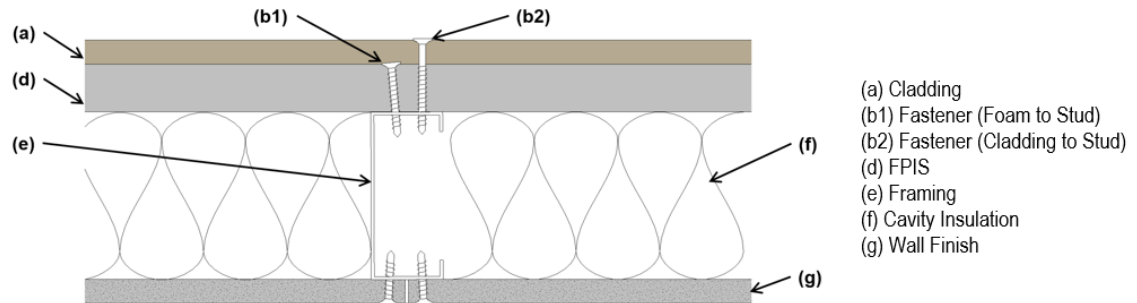


Figure 2a: Plan View – Direct Cladding Attachment through FPIS to Steel Stud



# Step 2: Verify Fasteners

- Exterior coverings may be attached through FPIS to furring:

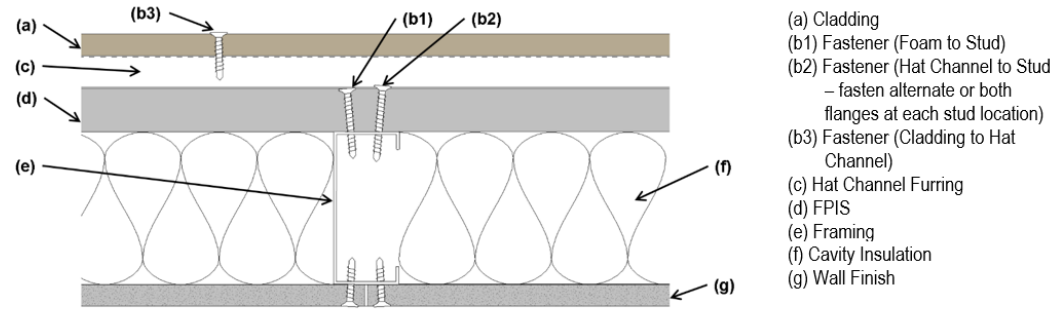


Figure 2b(2): Cladding Attachment through Hat Channel Furring aligned Perpendicular to Steel Stud

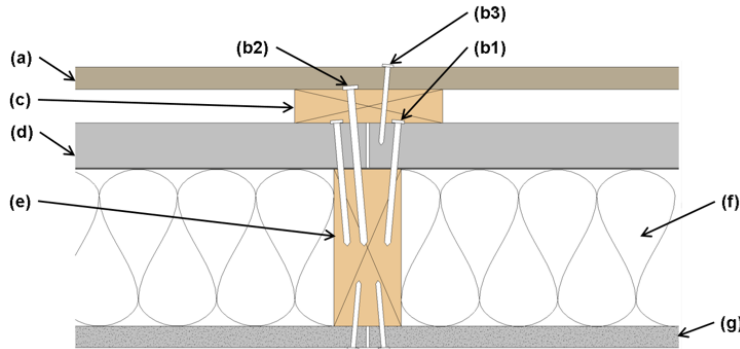


Figure 1b: Cladding Attachment through Furring to Wood Stud

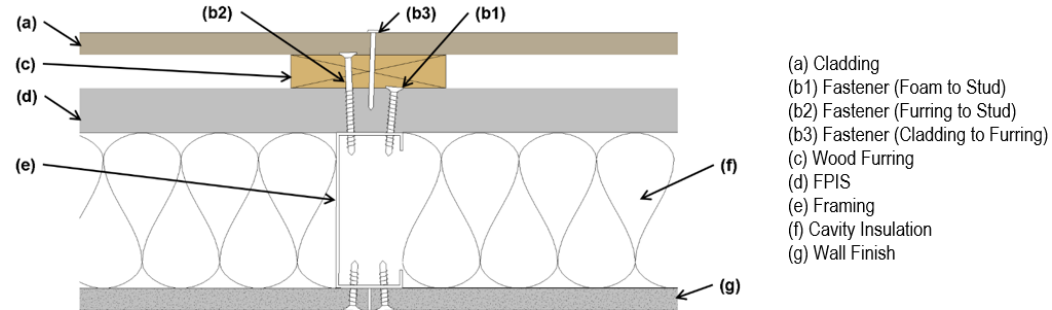


Figure 2b(1): Cladding Attachment through Wood Furring aligned Parallel to Steel Stud

## Step 2: Verify Fasteners

- Exterior coverings may be attached through FPIS to wood structural panels (WSP):

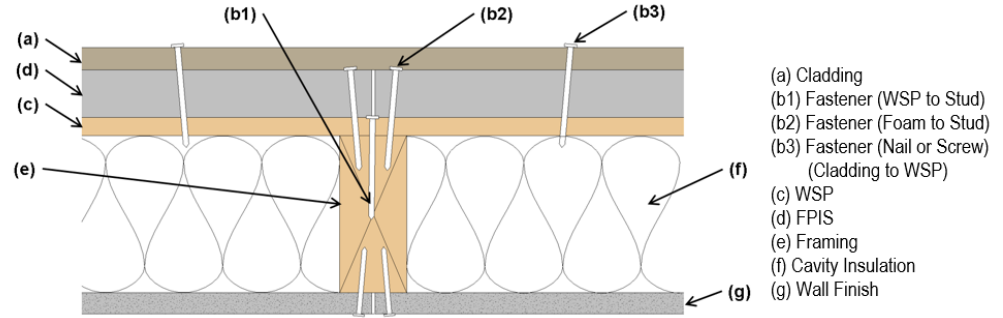


Figure 1c: Cladding Attachment Direct to Wood Structural Panels (WSP) with Wood Stud

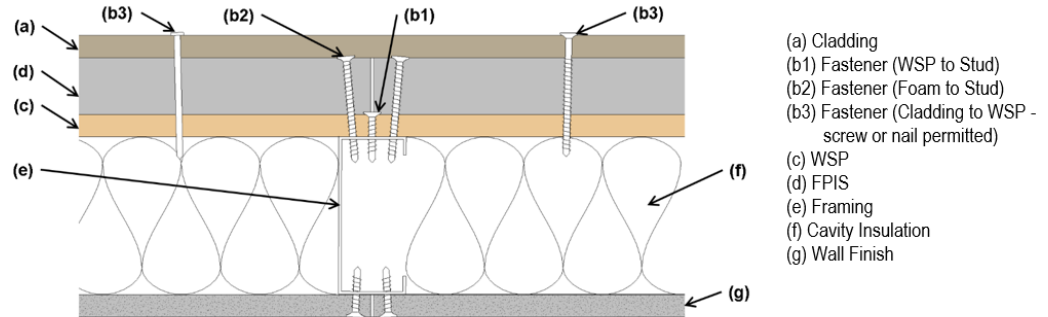
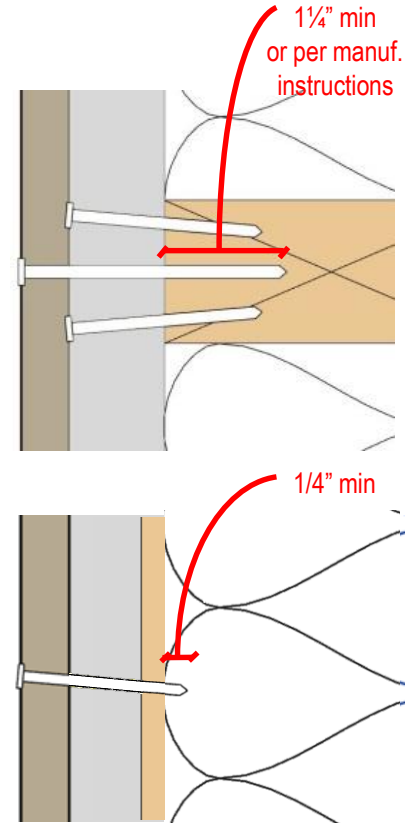


Figure 2c: Cladding Attachment Direct to Wood Structural Panels (WSP) with Steel Stud

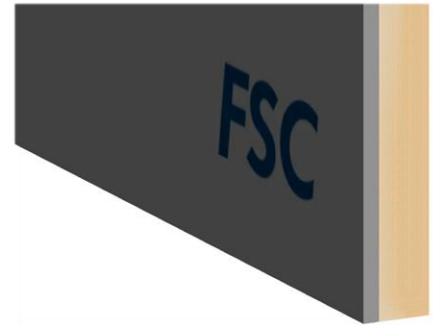
## Step 2: Verify Fasteners

- Fasteners must meet penetration requirements per IRC 2018 Table R703.3(1) into:
  - Framing
  - Sheathing
- Where penetration into framing is not required, fasteners must extend  $\frac{1}{4}$ " beyond the opposite face of the sheathing per IRC 2018 R703.3.3 & Table R703.3.3



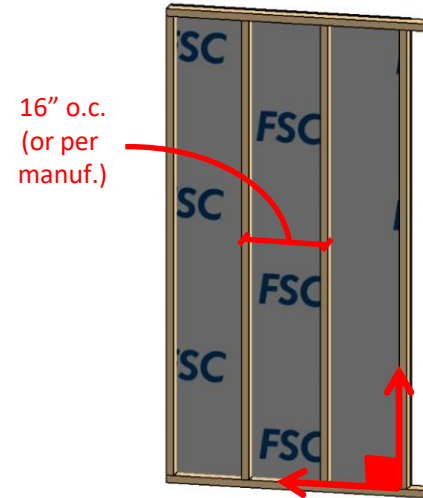
## Step 3: Place Insulation Boards

- Ensure wall is square and true
- Align boards with bottom edge of wall



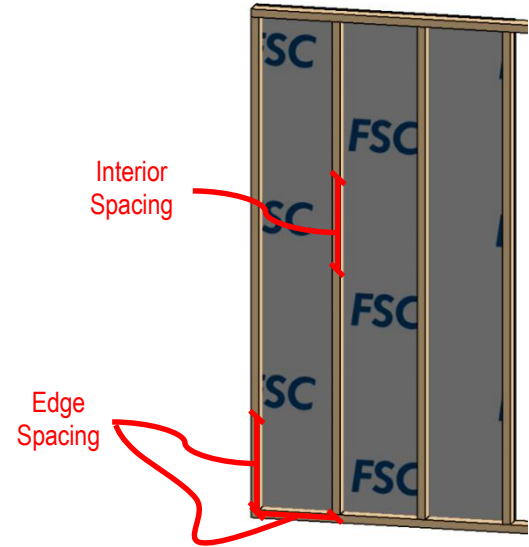
## Step 3: Place Insulation Boards

- Verify stud spacing, blocking, and bracing requirements with manufacturer
- Provide vertical framing or blocking for attachment of siding and trim at transitions



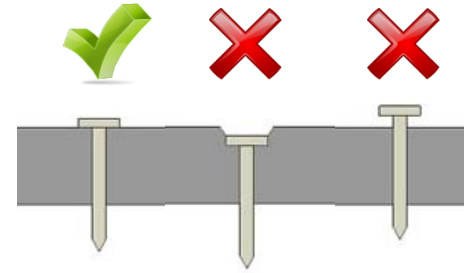
## Step 4: Attach Insulation Boards

- Space fasteners per manufacturer's instructions
  - Around edges of panel
  - Through panels and into interior members



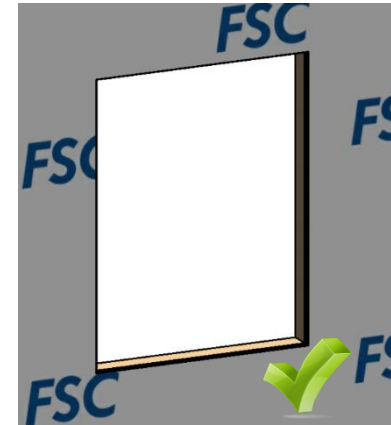
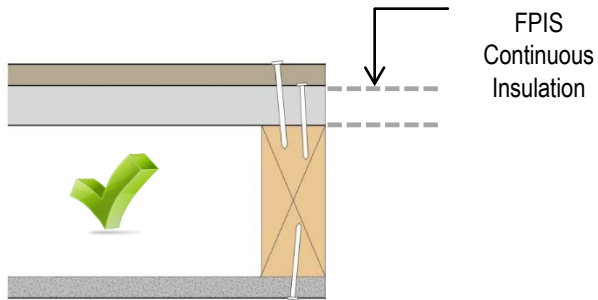
## Step 4: Attach Insulation Boards

- Drive nails flush and snug
- Do not overdrive nails
- Do not underdrive nails
  - Exception: Leave 1/32" gap (or as required by manufacturer) to allow for lengthwise thermal expansion of vinyl or aluminum siding



# Step 5: Trim Boards at Openings

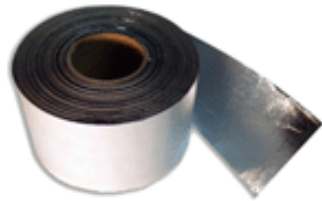
- Trim boards at all window and door openings
- Cover all framing with FPIS
- Fit joints tightly





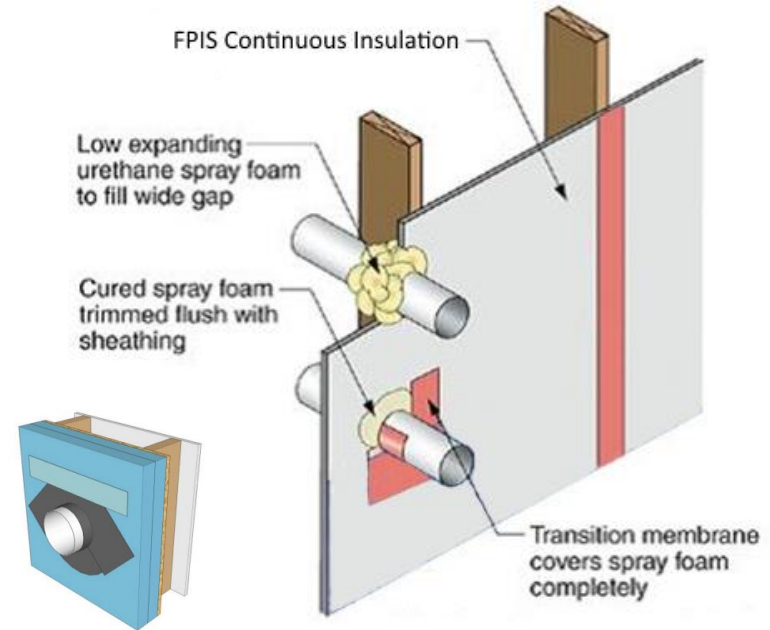
## Step 6: WRB and Flashing

- Ensure that a code compliant water-resistive barrier (WRB) and required flashing is provided
- If using FPIS as a WRB:
  - Seal all joints and openings and penetrations per manufacturer's installation instructions



# Step 6: WRB and Flashing

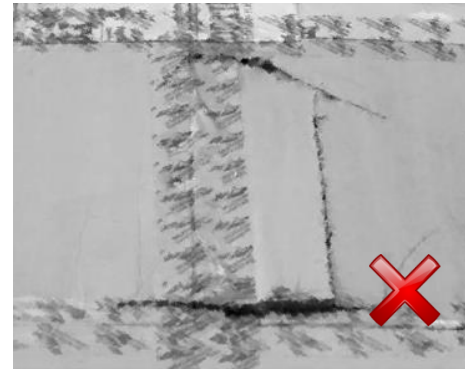
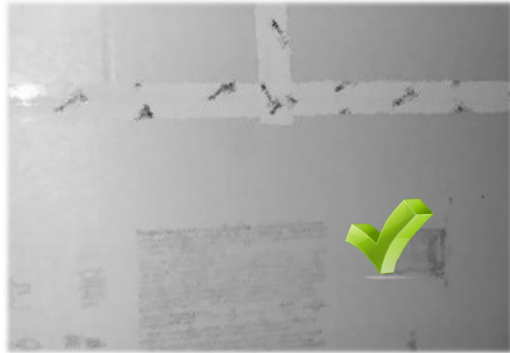
- At pipe and other small penetrations, seal gaps with silicone or expanding spray foam sealant
- Seal joints and openings with joint tape per manufacturer's instructions



Source:  
DOE Building America

## Step 6: WRB and Flashing

- Repair damaged areas per manufacturer's instructions



# Suggested Resources

- [Cladding Attachment - ContinuousInsulation.org](https://www.continuousinsulation.org/cladding-attachment)
- [Structural Application - ContinuousInsulation.org](https://www.continuousinsulation.org/structural-application)