Windows Installed into Walls with FPIS and Wood Framing

Picture Frame Method

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Background

- There are many acceptable ways to mount and detail windows for support and weather resistance.
- This installation best practice provides only a representative solution for integrating windows with Foam Plastic Insulating Sheathing (FPIS).
- It is the responsibility of the user to verify the appropriateness of any specific detail for their specific conditions.

Scope

- The installation approach featured in this presentation:
  - Is a “picture frame” installation concept with window flanges mounted directly to the picture frame.
    - Represents a common method for installing windows typically used for foam thicknesses of ¾ inch to 1½ inches to match common lumber dimensions.

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Scope

- The installation approach featured in this presentation:
  - Uses FPIS as the water-resistive barrier (WRB).
    - Refer to DrJ DRR 1410-05 and the FPIS manufacturer's installation instructions.
    - Use of a separate WRB material layer is also common and acceptable with appropriate installation and detailing.

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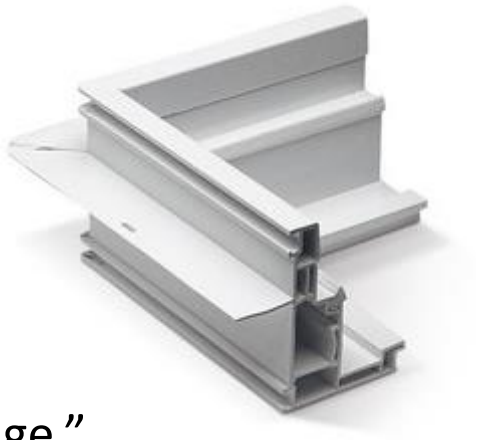
Scope

- The installation approach shown includes windows with integral mounting flanges.
- Integral mounting flange windows:
  - Are sometimes referred to as “integral nailing flange,” “integral fin,” or “integral mounting fin.”
  - An integral flange is extruded with the frame and forms one continuous piece around the perimeter.
  - A mounting flange is typically about 1½” wide and is set back about 1” from exterior window face. Fasteners are installed through the pre-punched holes in the flange.



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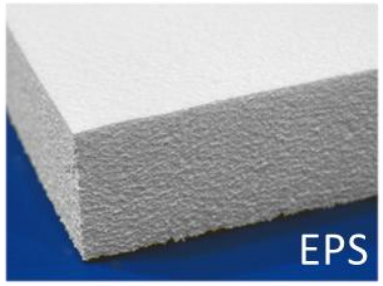
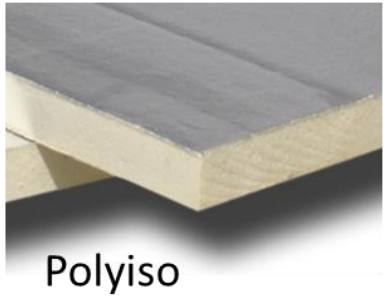
About FPIS

- Three types of FPIS:
  - Expanded Polystyrene (EPS) - ASTM C578
  - Extruded Polystyrene (XPS) - ASTM C578
  - Polyisocyanurate (Polyiso) - ASTM C1289
- R-values ranging from R-4 to more than R-6 per inch.
- Come in many thicknesses, compressive strengths, and densities.





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Typical FPIS Applications

- Often used as exterior **continuous insulation (ci)** on buildings to comply with energy codes or for improved performance.
  - Can be used as an **air-barrier (AB)** and **water-resistive barrier (WRB)** per manufacturer's code approvals and instructions.
  - Proprietary FPIS products are also available as a structural insulating sheathing composite for **wall bracing.**

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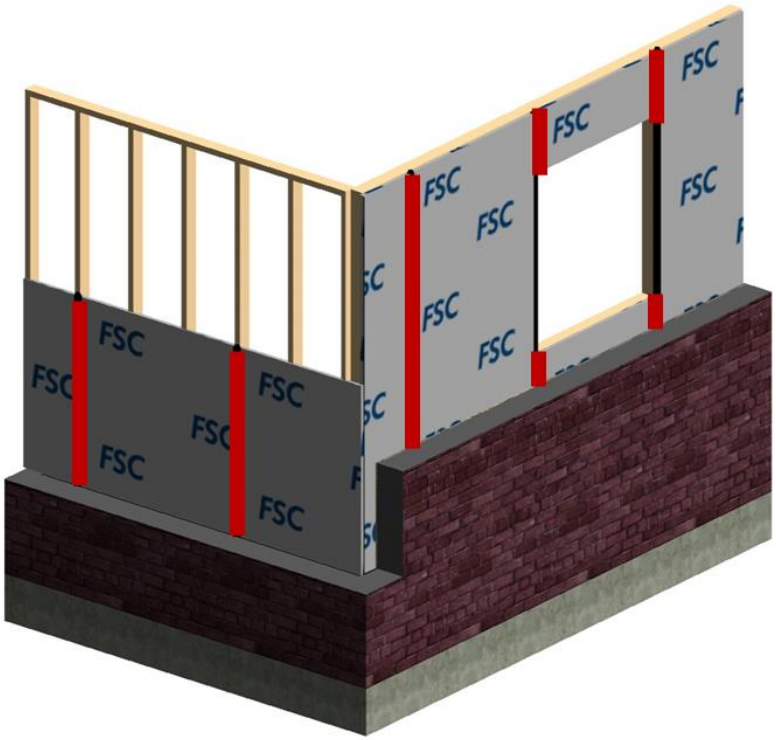
Installation Guidance

- DrJ Best Practices
- Window, FPIS, WRB, or Flashing manufacturer's installation instructions
- An approved design
- The following general installation guidelines



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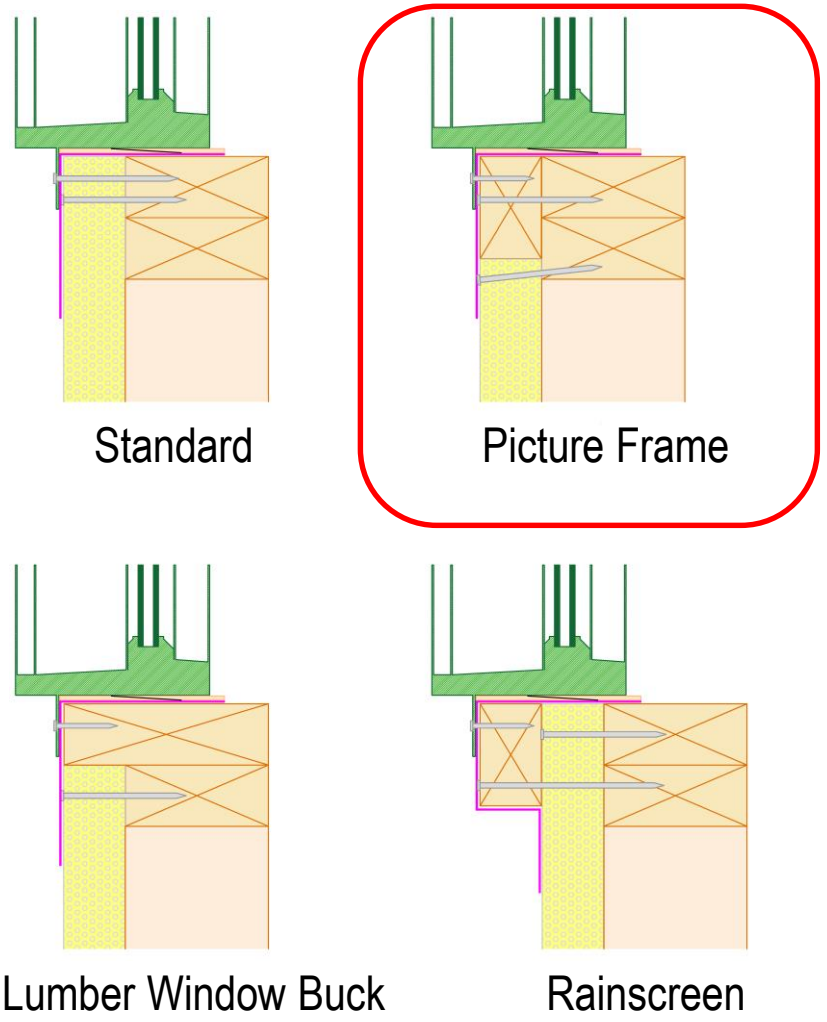
Key Principles

- The intent of any acceptable detail for integrating windows with FPIS is:
  - To provide adequate structural support to the window unit.
  - To prevent water penetration at the window-wall interface by flashing to direct water onto the exterior surface of the WRB layer and/or cladding and away from the window opening.
  - To provide adequate drainage at the window sill for any incidental leakage of water that may still penetrate into the rough opening.

Framing Methods

- There are four typical methods for window framing.
- This program covers the “Picture Frame” method.



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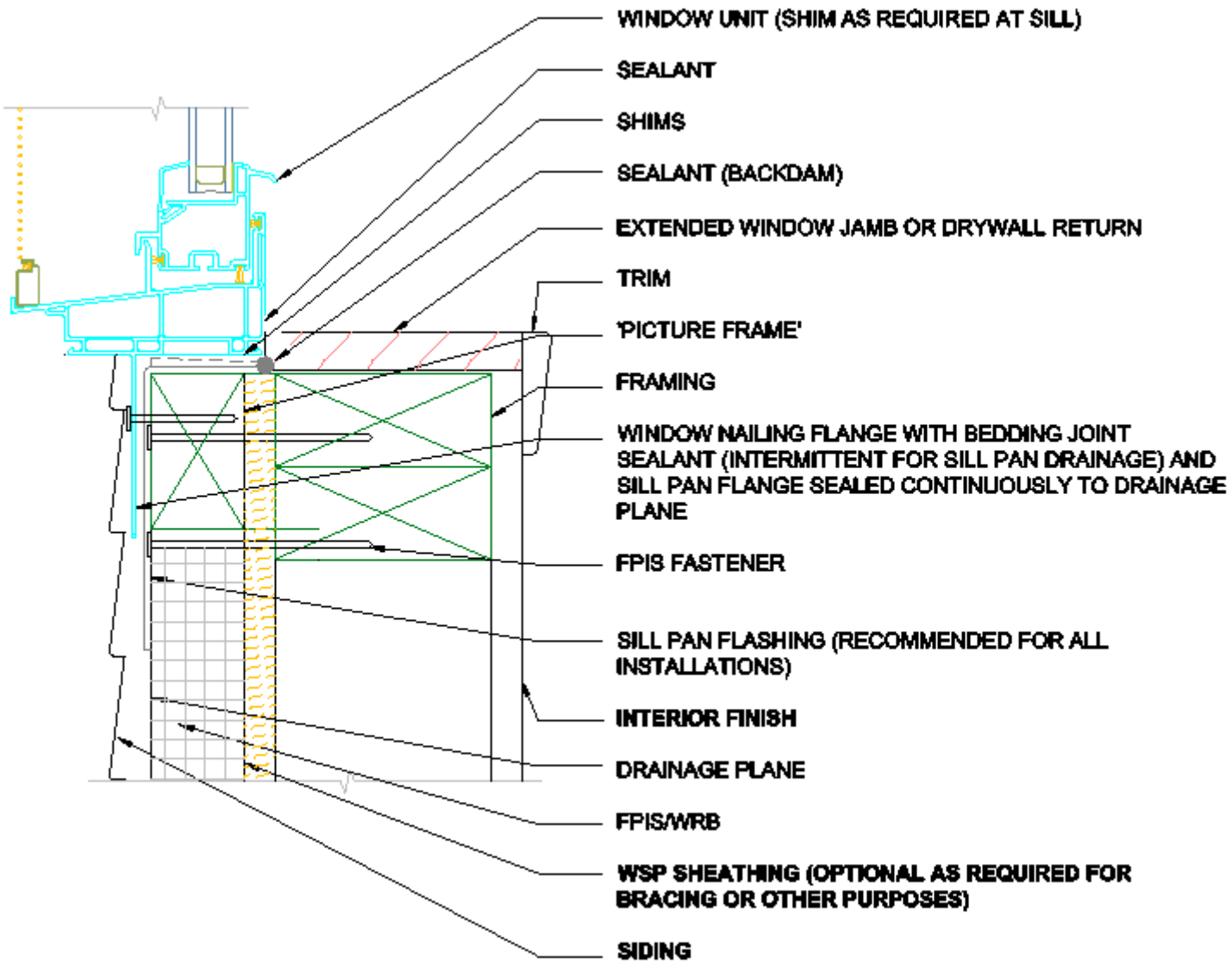
Picture Frame Installation - Sill



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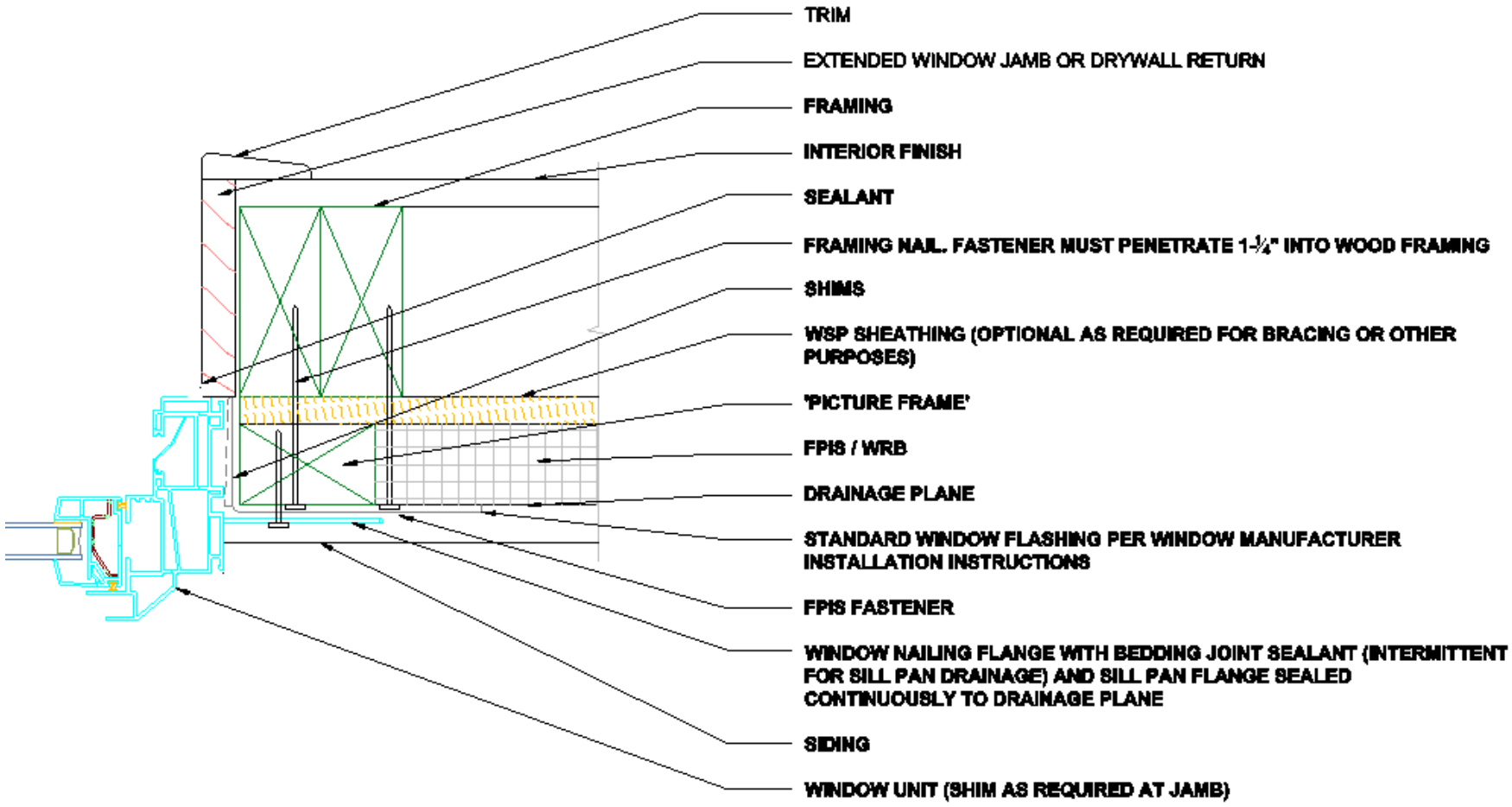
Picture Frame Installation - Jambs



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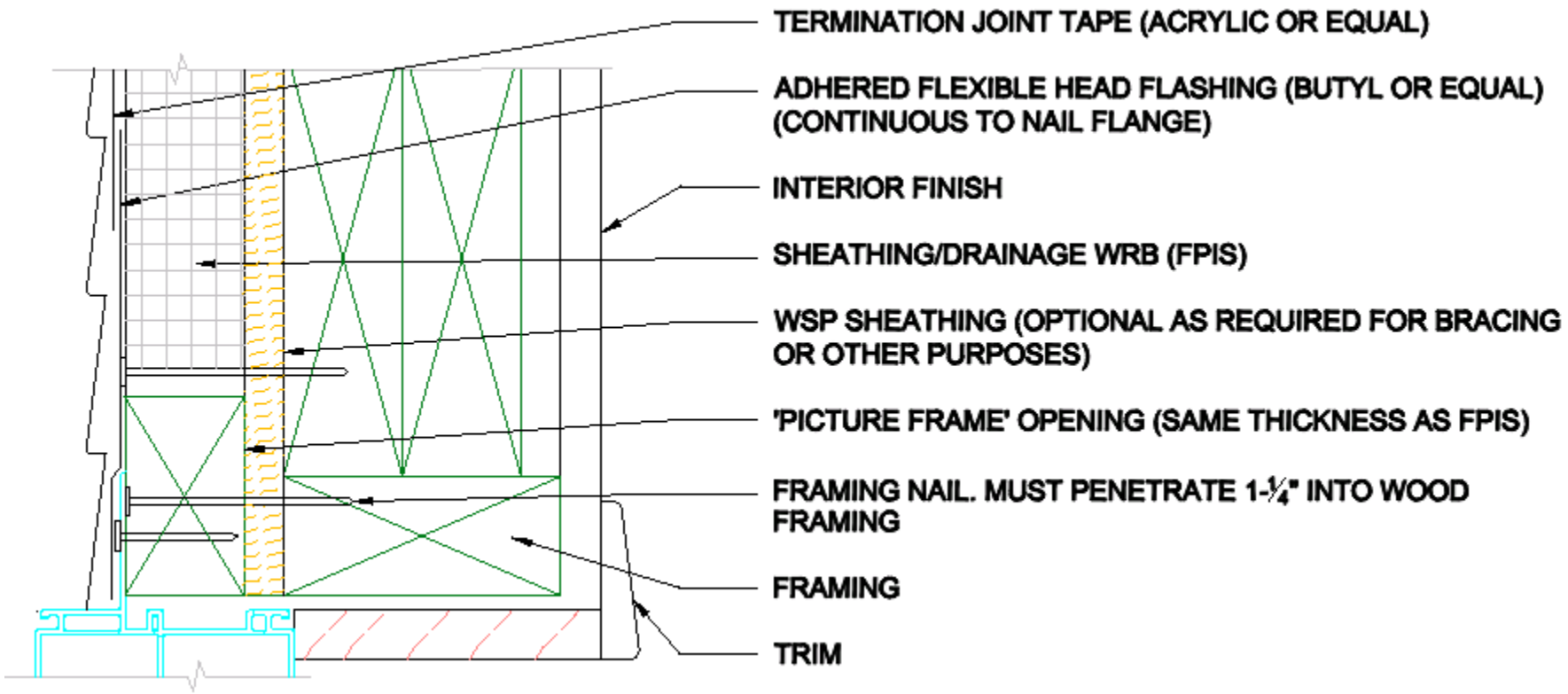
Picture Frame Installation - Header



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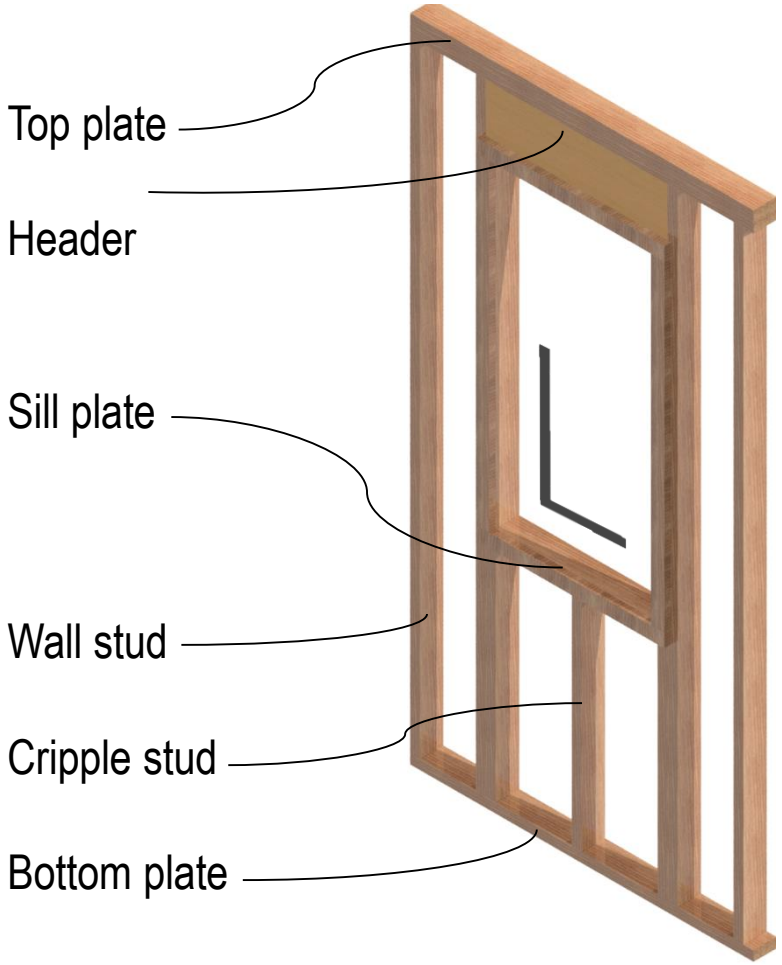
Step 1: Frame Window Opening

- Frame walls as required by the applicable code.
- Ensure window rough opening is square and true.
- Ensure appropriate framing in accordance with window installation method selected and support for FPIS edges is provided.



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Step 1: Frame Window Opening

- Frame exterior side of window opening with a “picture frame”.
- Use material that is the same thickness of the FPIS that will be installed.
- Picture frame material should be at least 1-1/2” wide to allow for support of the window flanges and to prevent splitting from the fasteners.
- Fastener size and spacing to be designed to support the weight of the window and accessories as well as to provide resistance to wind loads transverse to the wall surface.
- Picture frame member may be placed only at sill if just needed for added sill support

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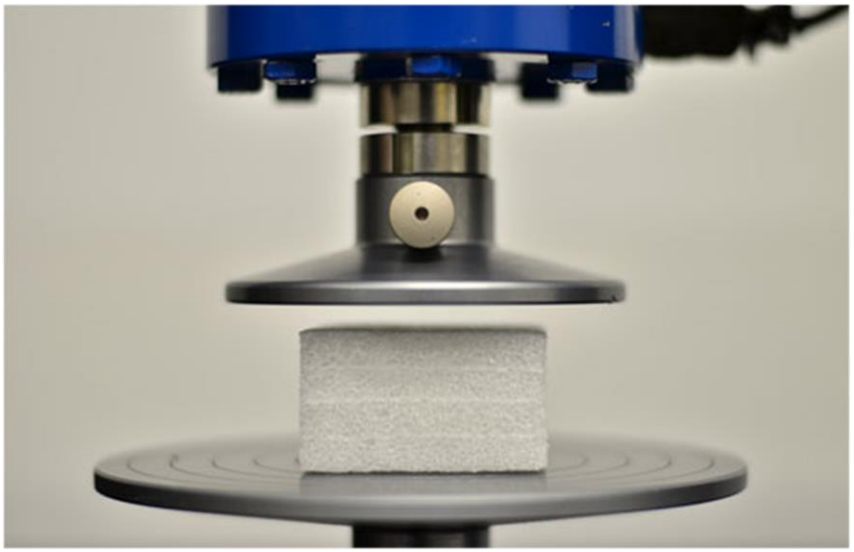
Step 2: Verify and install FPIS

- FPIS material must comply with:
  - ASTM C578 (EPS, XPS)
  - ASTM C1289 (Polyiso)
- Wind pressure resistance
  - See ANSI/SBCA FS-100 for guidance
  - Only required when FPIS not used as oversheathing



ASTM D 1621

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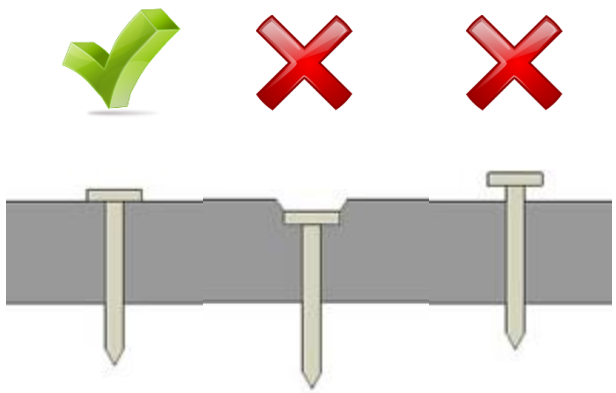
Step 2: Verify and Install FPIS

- Drive nails flush and snug with the surface of the insulation board.
- Do not overdrive nails.
- Do not underdrive nails.
- Many FPIS manufacturers recommend use of cap nails.



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Step 2: Verify and Install FPIS

- Follow manufacturer's installation guidelines
- While not prohibited, avoid placing vertical joints in the sheathing over a window head where practical.
- See "FPIS Installation Instructions" program.

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Step 3: Verify Flashing and Sealant Materials

- Ensure chemical compatibility of all sealants and flashings with intended substrates; refer to sealant and flashing manufacturer's data.
- Use flashing tape and sealants recommended by the window and FPIS/WRB manufacturers.

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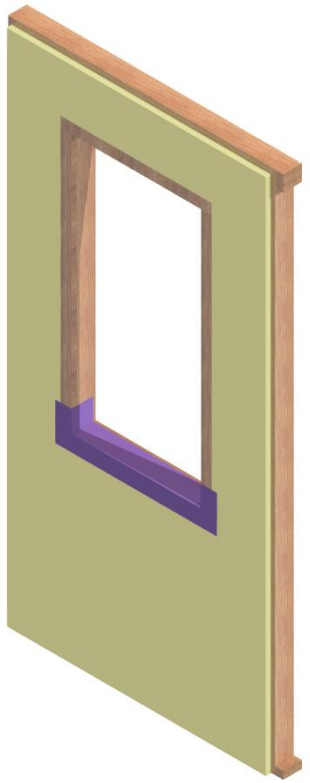
Step 4: Apply Sill Flashing

- Apply all flashings in shingle fashion (e.g., jamb flashing overlaps sill flashing and head flashing overlaps jam flashing).
- Overlap and seal sill flashing at center of sill if a multi-piece sill or pan flashing is used.



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Step 4: Apply Sill Flashing

- Alternatively, use a manufactured sill pan to simplify sill drainage installation.

Manufactured Sill Pan

Step 5: Apply Jamb Flashing

- Apply flashing at jambs

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Step 6: Apply Head Flashing

- Apply flashing at head

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Step 7: Apply Sealant

- Apply sealant at jambs and head (or as required by manufacturer's install instructions).
- Sill is left open to allow the cavity below the window to drain to the exterior.

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Step 8: Install Window Shims at Sill

- Apply setting blocks and/or shims between the rough opening and window frame.
- The window frame must be anchored to the wood rough opening as required by the window manufacturer or in accordance with an approved design for sill support.

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Step 9: Install Window

- Install window plumb, level, and square per manufacturer's instructions.

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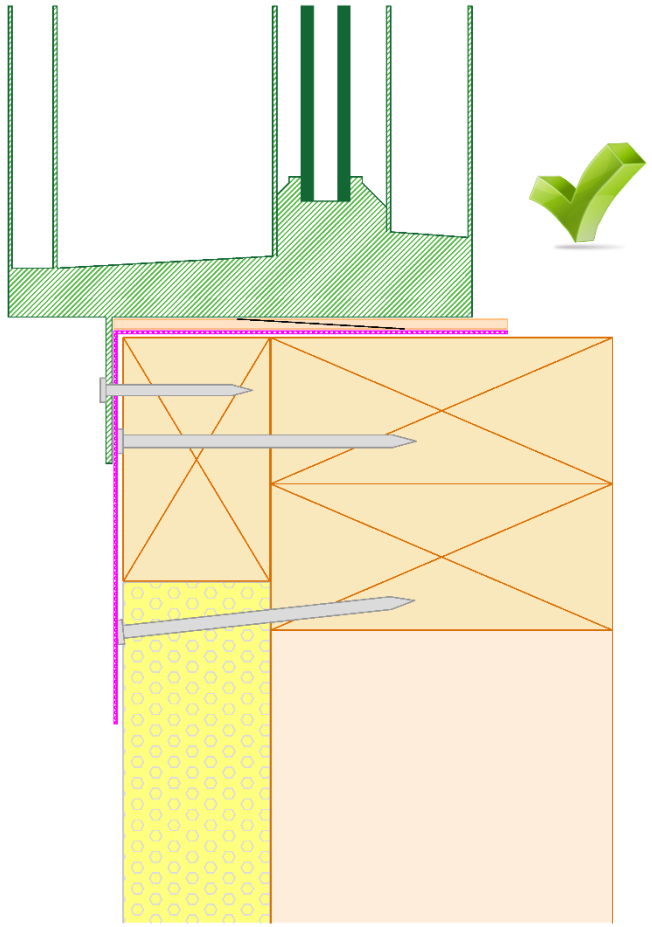
Step 9: Install Window

- The window frame must adequately bear on the wood sill particularly if using a non-structural flange window.
- Providing adequate sill support is good practice and often required by window manufacturer installation instructions.



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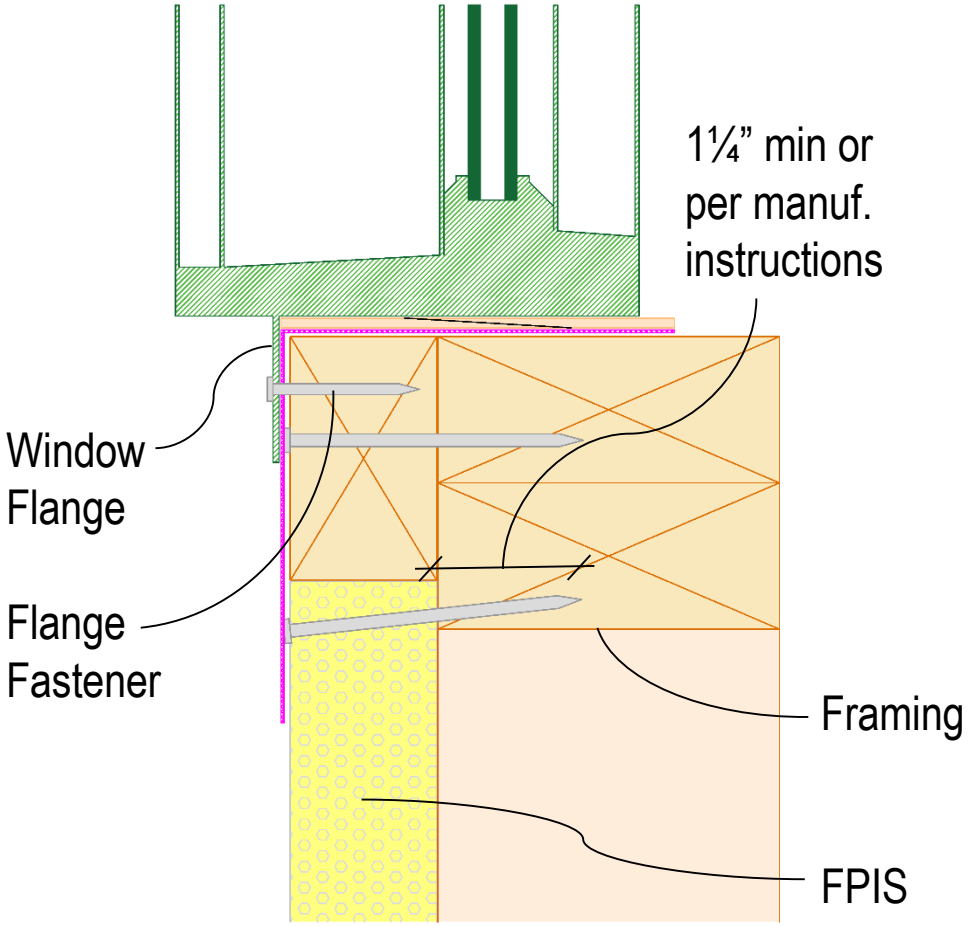
Step 10: Verify Window Fasteners

- Window flange fasteners must penetrate a minimum of 1¼” into framing members per IRC 2015.
- Follow manufacturer installation requirements for size and spacing.



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Step 11: Install Window Shims

- Apply shims between the rough opening and window frame.
- Anchor the window per the manufacturer's installation instructions.

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Step 12: Apply Jamb Flashing

- Install flashing over the nailing flanges of the jambs to provide a final layer of protection against water intrusion.
- The sill is not sealed, allowing for drainage of the rough opening, back to the exterior.
- Where applicable, install drip cap per manufacturer

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Step 13: Apply Head Flashing

- Apply head flashing.
  - Typically, butyl flashing tapes are used for this purpose.
- Overlap window head flange and jamb flashing.

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Step 14: Tape Head Flashing

- For extra durability and protection, terminate the top edge of the head flashing tape with the FPIS manufacturer's approved joint tape.
- Typically, acrylic tapes are used for this purpose.

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Step 15: Apply Sealant

- Air seal window around entire perimeter on the interior with sealant or expanding foam made for this purpose.

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Step 16: Install Cladding

- See Installation Instructions

  “Attachment of Exterior Wall Coverings Through Foam Plastic Insulating Sheathing (FPIS) to Wood or Steel Wall Framing.”

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Additional Reading

- *Fastening Systems for Continuous Insulation*, New York State Energy Research and Development Authority (NYSERDA), April 2010.
- *ASHRAE Journal*, "Stuck on you," Feb 2013.
- *ASHRAE Journal*, "Windows can be a pain," Lstiburek, April 2015.

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