

AAMA 2400-02

(Formerly CAWM 400-95)

**Standard Practice for
Installation of Windows
with a Mounting Flange in
Stud Frame Construction**



June 30, 2005



To Whom It May Concern:

An inconsistency in the AAMA 2400, Standard Practice for Installation of Windows with a Mounting Flange in Stud Frame Construction has been brought to our attention. Paragraph 5.5.4.2 states "Apply the first strip horizontally immediately below the sill, cut it sufficiently long to extend past each side of the window, so that it projects even with the vertical jamb flashing to be applied later. (See Figure 2)." While the note in Figure 2 states "Extend sill flashing horizontally to project beyond vertical jamb flashing applied later." This raises two questions. Should the sill flashing be just even with the edge of the jamb flashing or extend past the jamb flashing? If the sill flashing extends beyond the edge of the jamb flashing, how far should it extend? It is AAMA's position that the text in a document is considered authoritative over the text in an illustration.

However, the two statements are not really in conflict with each other. The requirement given in the text represents the minimum requirement necessary to follow the procedures in the standard practice. Certainly, extending the sill flashing beyond the edge of the jamb flashing exceeds the requirement in the standard practice but exceeding the minimum in this case is not harmful and may be beneficial. If the sill flashing is cut exactly to the width of the window opening plus twice the width of the jamb flashing then it must be installed with some precision since it must align with the edges of the jamb flashing which is applied later. In addition, if the building framing is constructed without hard sheathing, it may be wise to extend the sill flashing past the next framing stud in the wall. This allows mechanical attachment of the upper corner of the sill flashing to a structural building component and can prevent curling of the ends of the sill flashing which might make installing the window and subsequently the jamb flashing easier and more successful. Again, the requirements in the standard practice are to be considered a minimum requirement and exceeding the requirements to improve the installation is considered desirable.

All AAMA documents are periodically reviewed and updated. The AAMA Western Region currently has a task group looking at developing guidelines for forensic investigations of window installations. A copy of this letter will be provided to that task group for consideration and may result in this apparent inconsistency being clarified in a future edition of the document.

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Technical Director
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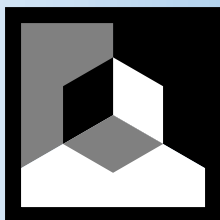


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1.0 SCOPE

1.1 This practice covers the installation of windows in residential buildings of no more than four (4) stories in height.

1.2 This practice applies to windows with a mounting flange where the flange is employed for securing the window into a vertical stud frame wall.

1.3 This practice covers the installation process from pre-installation procedures through post-installation procedures. It does not cover the fabrication or assembly of units whether such fabrication takes place in a factory or at the intended installation site.

1.4 This practice covers aspects of installation relating to installation effectiveness and reasonable durability in service. It does not cover aspects of installation relating to window handling and storage or the safety of the person installing the units.

1.5 This practice provides minimum requirements that will help to ensure the installation of windows in an effective manner. Actual conditions in buildings vary greatly, and in some cases substantial additional care and precaution will have to be taken.

1.6 This practice does not purport to address all of the safety problems associated with its use. It is the responsibility of whomever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

1.7 This practice is not intended to replace a manufacturer's installation instructions or federal, state, or local building codes. In all cases follow manufacturer's instructions and applicable building codes for any special procedures, applications, or requirements.

1.8 This practice may not apply to windows whose mounting flange has been bent, cracked, cut, or removed. If such damage or modification has occurred, consult the manufacturer for repair or special installation instructions.

1.9 This practice only addresses the recommended methods and/or sequences used to apply/modify the weather resistant barrier or other flashing and sealing materials to the rough framed opening.

1.10 The primary units of measure in this document are metric. The values stated in SI units are to be regarded as the standard. The values given in parentheses are for reference only.

2.0 REFERENCED DOCUMENTS

References to the standards listed below shall be to the edition indicated. Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as to referring to the latest edition of that code or standard.

2.1 ASTM, American Society for Testing and Materials

E 2112 "Standard Practice for Installation of Exterior Windows, Doors and Skylights"

B 633 e1 "Specification for Electrodeposited Coatings of Zinc on Iron and Steel"

B 766 "Specification for Electrodeposited Coatings of Cadmium"

B 456 "Specification for Electroplated Coatings of Copper plus Nickel plus Chromium"

C 755 "Practice for Selection of Vapor Retarders for Thermal Insulation"

D 779 E1 "Test Method of Water Resistance of Paper, Paperboard, and Other Sheet Materials by the Dry Indicator Method"

2.2 AAMA, American Architectural Manufacturers Association

800 "Voluntary Specifications and Test Methods for Sealants"

TIR-A9 "Metal Curtain Wall Fasteners"

IM-TM "Installation Masters Training Manual"

3.0 DEFINITIONS

3.1 Galvanic Corrosion: A form of deterioration of metal resulting from the electrochemical reaction that occurs when certain dissimilar metals are in contact in the presence of moisture.

3.2 Residential Building: Any building used or intended primarily for a single or multiple family dwelling.

3.3 Mounting Flange: A fin projecting from the window frame parallel to the plane of the wall, also known as a nailing fin, for the purpose of securing the frame to the structure.

3.4 Flashing: Sheet material that bridges and protects the joint (gap) between the window frame members and the adjacent construction for the purpose of preventing water

penetration by draining water away from the window flange to the exterior.

3.5 Weather Resistant Barrier: The surface or surfaces of a wall responsible for preventing water infiltration into the building interior.

3.6 Shim: A thin, flat or wedge shaped piece of suitable material used to level or plumb a window frame during installation.

3.7 Sealant: Any of a variety of compounds used to fill and seal joints or openings in wood, metal, masonry, and other materials, as contrasted to a sealer; which is a liquid used to seal a porous surface. Some common types of sealants are: polysulfide rubber, silicone, acrylic latex, butyl rubber, and polyurethane.

4.0 SIGNIFICANCE AND USE

4.1 This practice recognizes that the effectiveness and durability of installed units depend not only on the choice and quality of materials, design, adequacy of assembly, and support system, but also on their proper and workmanlike installation.

4.2 Improper installation of units may reduce their effectiveness, lead to excessive air, water and sound leakage, condensation, and may promote the deterioration of wall constructions, windows, doors, and their respective finishes.

4.3 The application of this practice also requires a working knowledge of applicable Federal, State, and local codes and regulations regarding windows, specifically, but not limited to:

- a) a required means of egress or rescue;
 - b) requirements for safety glazing; and
 - c) minimum grades of weather resistant barrier materials.
- Consult with local building codes prior to installation.

4.4 The application of this practice also requires a working knowledge of the tools, equipment, and methods necessary for the installation of windows. It further assumes familiarity with caulking and sealing and with glass handling procedures, painting where applicable, and an understanding of the fundamentals of residential construction that affect the installation of these units.

4.5 Finish and Sealant Protection

4.5.1 Caution shall be used to avoid damage to windows during and after installation. Prior to installation, store windows in a near vertical position in a clean area, free of circulating dirt or debris and protected from exposure to weather elements.

4.5.2 Field-applied protective coatings may damage window sealants and gaskets and may not be recommended. Contact the window manufacturer before applying any such coatings.

5.0 PROCEDURE

5.1 Framing Requirements

The rough framed opening to receive the window shall be sufficiently larger in width and height than the actual frame dimensions of the window. To assure adequate clearance, the framer shall follow the manufacturer's literature for the recommended rough opening dimensions. The framing shall be plumb, square, level, and structurally adequate. The studs shall be free of voids, holes, chipping, twisting, or other conditions that will not allow the sealant to maintain continuous contact. (See Figure 1)

5.2 Corrosion Resistance

5.2.1 Metal products shall be isolated from dissimilar or corrosive materials with a nonconductive coating or sealant material.

5.2.2 All fasteners shall be corrosive resistant, in accordance with ASTM B 633, B 766, or B 456 as indicated in AAMA TIR-A9.

5.3 Flashing Requirements

Proper flashing and/or sealing is necessary as a barrier to prevent water from infiltrating into the building. Flashing and/or an appropriate method of sealing shall be designed as a part of an overall weather resistant barrier system. It is not the responsibility of the window manufacturer to design or recommend a flashing system appropriate to each job condition.

***NOTE 1:** The responsibility for protecting any flashing material from damage caused by weather, other trades, or vandalism, and properly integrating the flashing system into the weather resistant barrier for the entire building, is the responsibility of the general contractor or his designated agent.*

5.3.1 Penetration Flashing Material – Flashing material shall be barrier coated reinforced and shall provide twenty-four (24) hour minimum protection from water penetration when tested in accordance with ASTM D 779. Flashing material shall carry continuous identification.

5.4 Sealant Requirements

5.4.1 Sealing/caulking required between the window and the flashing can be accomplished with sealant material conforming to AAMA 800. Use sealant recommended and approved by the sealant/flashing manufacturer, following their printed application procedures. ASTM E 2112 gives guidance on sealant selection and application.

5.4.2 Where sealant is required in this standard, an application of a nominal 10 mm (3/8 in) diameter sealant bead or an equivalent butyl mastic sealant tape as recommended by the sealant manufacturer is intended.

5.4.3 Where wet sealant is used, the installer shall look for the sealant to “squeeze out” or appear along the edge of the flange/flashing to assure a continuous seal. “Squeeze out” shall be promptly troweled smooth.

5.4.4 Install the window immediately after sealant application, before a skin forms or contamination occurs on the sealant surface.

5.5 Application

5.5.1 One of the two following methods shall be selected as the application to be followed. Once a method is selected, all procedures of that method shall be performed in the described sequence. Substitution of a procedure from one method to the other is not permitted.

5.5.2 If the weather-resistant barrier is applied to the wall prior to the window installation, the weather-resistant barrier may need to be modified. See AAMA Installation Masters Training Manual Section 16.8.4 for recommended weather-resistant barrier modification.

5.5.3 Method A

5.5.3.1 A strip of approved flashing material shall be at least 230 mm (9 in) wide. Flashing shall be applied in a weatherboard fashion around the full perimeter of the opening according to the following procedures:

5.5.3.2 Apply the first strip horizontally immediately below the sill, cut it sufficiently long to extend past each side of the window, so that it projects even with the vertical jamb flashing to be applied later. (See Figure 2).

5.5.3.3 Fasten the top edge of the sill flashing to the framing. Place fasteners along the edge of the rough opening where they will be covered by the mounting flange of the window later. Fasten the top edge of the sill flashing, but do not fasten the lower edge or the last 230 mm (9 in) of each end, so the weather resistant barrier applied later may be slipped up and underneath the flashing in a weatherboard fashion. (See Figure 2).

5.5.3.4 For mechanically joined frames, apply sealant at corners the full length of the seam where mounting flanges meet and to the outside of the frame corner joints. (See Figure 3A). Apply a continuous seal to the backside (interior) of the window mounting flange in line with any pre-punched holes or slots in the mounting flange. (See Figure 3A). The window shall then be installed in accordance with Section 5.6 installation procedures.

5.5.3.5 Next, apply a continuous seal to the exposed mounting flange at the top (head) and sides (jambs) of the installed window. Apply sealant in line with any pre-punched holes or slots on the mounting flange and over the heads of the fasteners. Continue jamb sealant vertically approximately 215 mm (8 1/2 in) above the top of the window. The sealant applied horizontally across the head should not extend beyond the jamb sealant. (See Figure 4A).

NOTE 2: *The application of sealant to the exterior surface of the mounting flange may not be necessary if using a self-adhesive type flashing over the mounting flange. Consult the flashing manufacturer.*

5.5.3.6 Starting at each jamb, embed the jamb flashing into the seal and fasten in place. Do not fasten the bottom 230 mm (9 in) of the jamb flashing, so the weather resistant barrier applied later may be slipped up and underneath the flashing in a weatherboard fashion. Extend this flashing to approximately 13 mm (1/2 in) less than the bottom of the sill flashing and beyond the top of the window to approximately 13 mm (1/2 in) less than the top of the head flashing. (See Figure 4A & 5).

5.5.3.7 Finally, embed the flashing into the sealant on the mounting flange at the window head. Cut this flashing sufficiently long so that it will extend approximately 25 mm (1 in) beyond each jamb flashing. Fasten flashing in place. (See Figure 5).

5.5.4 Method B

5.5.4.1 A strip of approved flashing material shall be at least 230 mm (9 in) wide. Flashing shall be applied in a weatherboard fashion around the full perimeter of the opening according to the following procedures:

5.5.4.2 Apply the first strip horizontally immediately below the sill, cut it sufficiently long to extend past each side of the window, so that it projects even with the vertical jamb flashing to be applied later. (See Figure 2).

5.5.4.3 Fasten the top edge of the sill flashing to the framing. Place fasteners along the edge of the rough opening where they will be covered by the mounting flange of the window later. Fasten the top edge of the sill flashing, but do not fasten the lower edge or the last 230 mm (9 in) of each end, so the weather resistant barrier applied later may be slipped up and underneath the flashing in a weatherboard fashion. (See Figure 2).

5.5.4.4 Next, fasten strips of flashing along each vertical edge (jamb) of the opening. Position fasteners along the edge of the rough opening where they will be covered by the mounting flange of the window later. Extend this flashing to approximately 13 mm (1/2 in) less than the bottom of the sill flashing and beyond the top of the window to approximately 13 mm (1/2 in) less than the top

of the head flashing. (See Figure 3B). Do not fasten the bottom 230 mm (9 in) of the jamb flashing, so the weather resistant barrier applied later may be slipped up and underneath the flashing in a weatherboard fashion.

5.5.4.5 Apply a continuous seal to the backside (interior) of the mounting flange near the outer edge or a continuous seal to the perimeter of the opening at a point to assure contact with the backside (interior) of the mounting flange. Apply sealant in line with any pre-punched holes or slots on the mounting flanges. (See Figure 4B).

NOTE 3: *Caution shall be taken to avoid disrupting the continuous seal.*

5.5.4.6 For mechanically joined frames, apply sealant at corners the full length of the seam where mounting flanges meet and the outside of the frame corner joints. (See Figure 4B).

5.5.4.7 The window shall be installed in accordance with Section 5.6 installation procedures.

5.5.4.8 Next, apply a continuous seal to the exterior face of the mounting flange at the window head in line with any pre-punched holes or slots on the mounting flange and over the heads of the fasteners. Cut the head flashing sufficiently long so that it will extend approximately 25 mm (1 in) beyond each jamb flashing. Embed the bottom of the flashing over the sealant and the mounting flange and fasten in place. (See Figure 5).

5.6 Installation

5.6.1 Shim window as necessary to insure a square, level and plumb installation. The sill must be supported in a straight and level position to prevent sagging, deflection and sill rotation.

Some manufacturers require a continuous shim under the window sill. Follow manufacturer's recommendations.

5.6.2 Close and lock the window. Shim and adjust the window as necessary to achieve a plumb, square and level condition, as well as centering the window in the frame opening. Secure the full perimeter with the minimum equivalent of 6d fasteners on a maximum of 405 mm (16 in) centers using pre-punched holes, if provided. Hinged and pivoted windows may require additional fasteners located near the hinge or pivot point. For certain windows it may be appropriate to fasten the head in a manner to allow for possible movement. In all cases follow the manufacturer's instructions for any special procedures or applications

NOTE 4: *Avoid overdriving fasteners. Use an appropriately sized fastener to cover the width of any pre-punched hole and adequately secure the window to the structure.*

5.6.3 In each direction from all corners there shall be a fastener within 250 mm (10 in), but no closer than 75 mm (3 in) to prevent frame distortion or fracture of joint seals.

NOTE 5: *If any damage to window frame joint seals or mounting flanges is observed during installation, the installer shall repair it or consult the manufacturer.*

5.6.4 The Owner/General Contractor is responsible to ensure that the weather resistant barrier (i.e. building paper, insulating board, or other materials by other trades) is effectively integrated around the window frame in a weatherboard fashion. (See Figure 6).

5.6.5 After installation is complete, check the window for proper operation and locking.

6.0 DRAWINGS

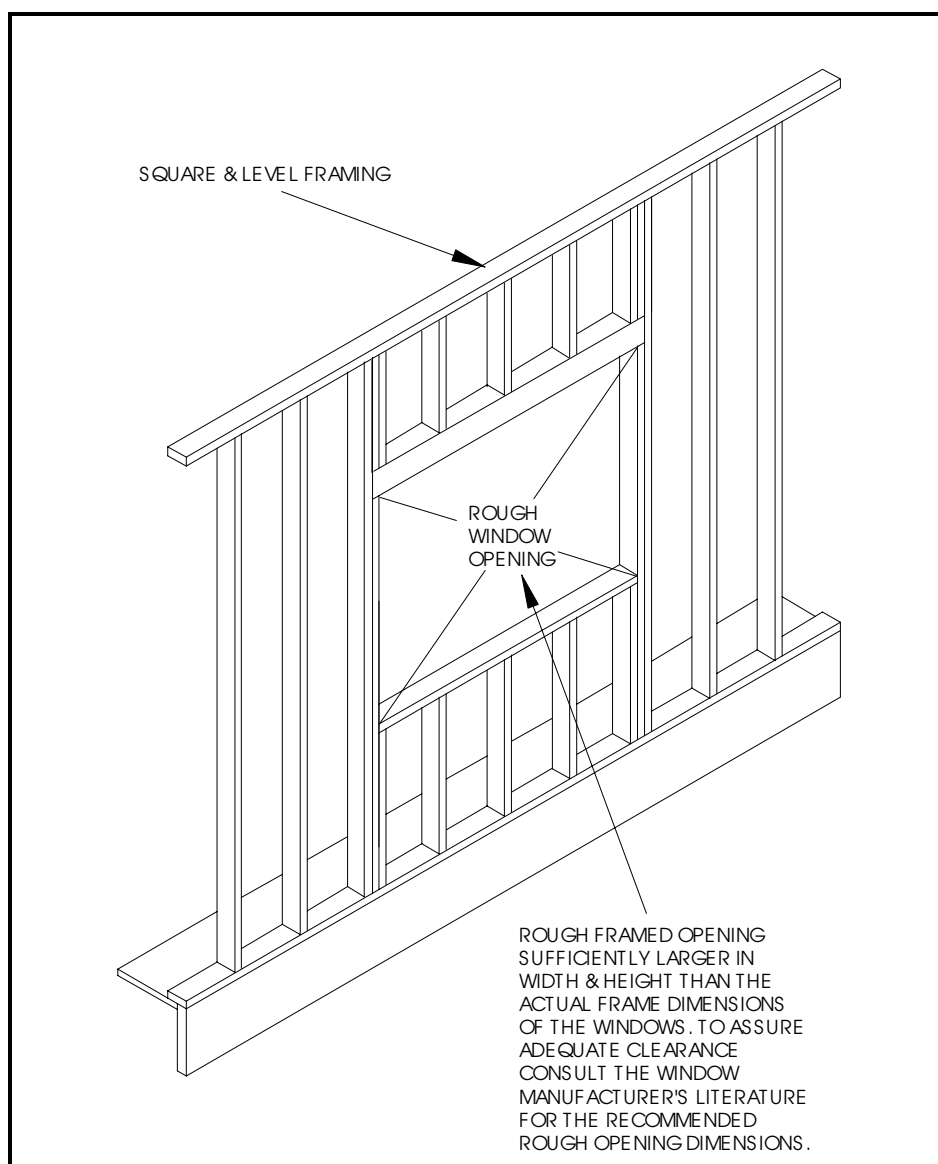


Figure 1: Rough Window Opening

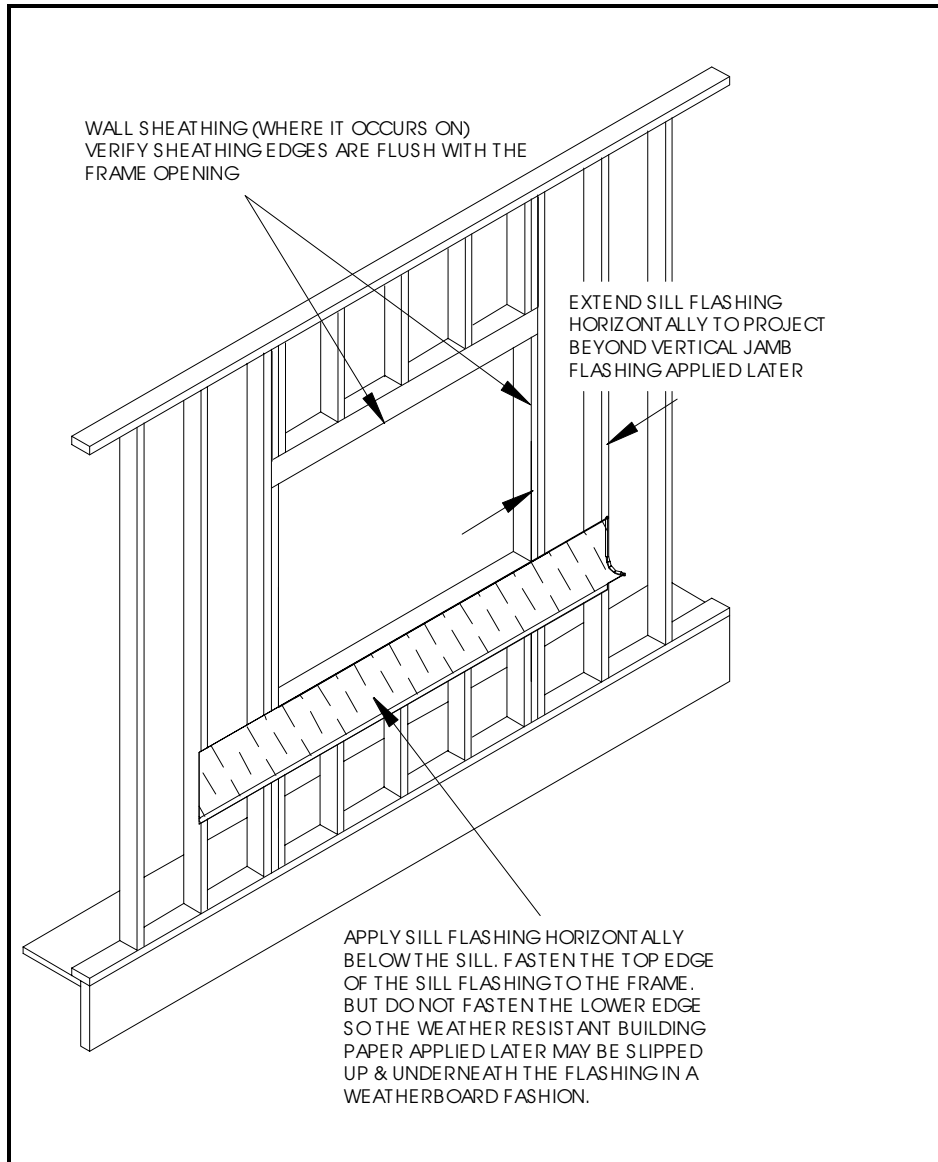


Figure 2: Sill Flashing

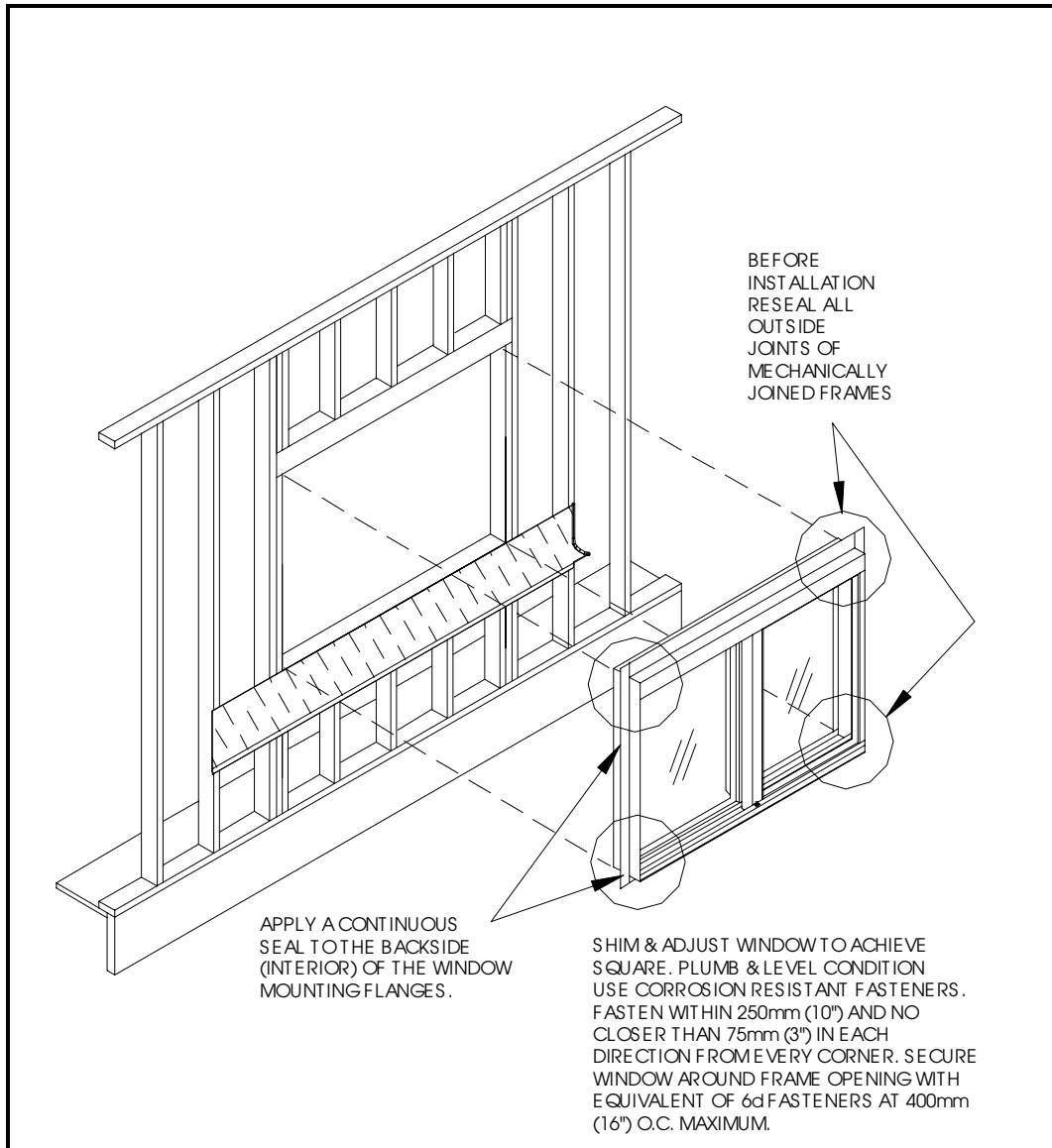


Figure 3A: Window Installation (Method “A”)

NOTE: In applications where wall sheathing is used, sheathing shall be applied prior to flashing and window installation.

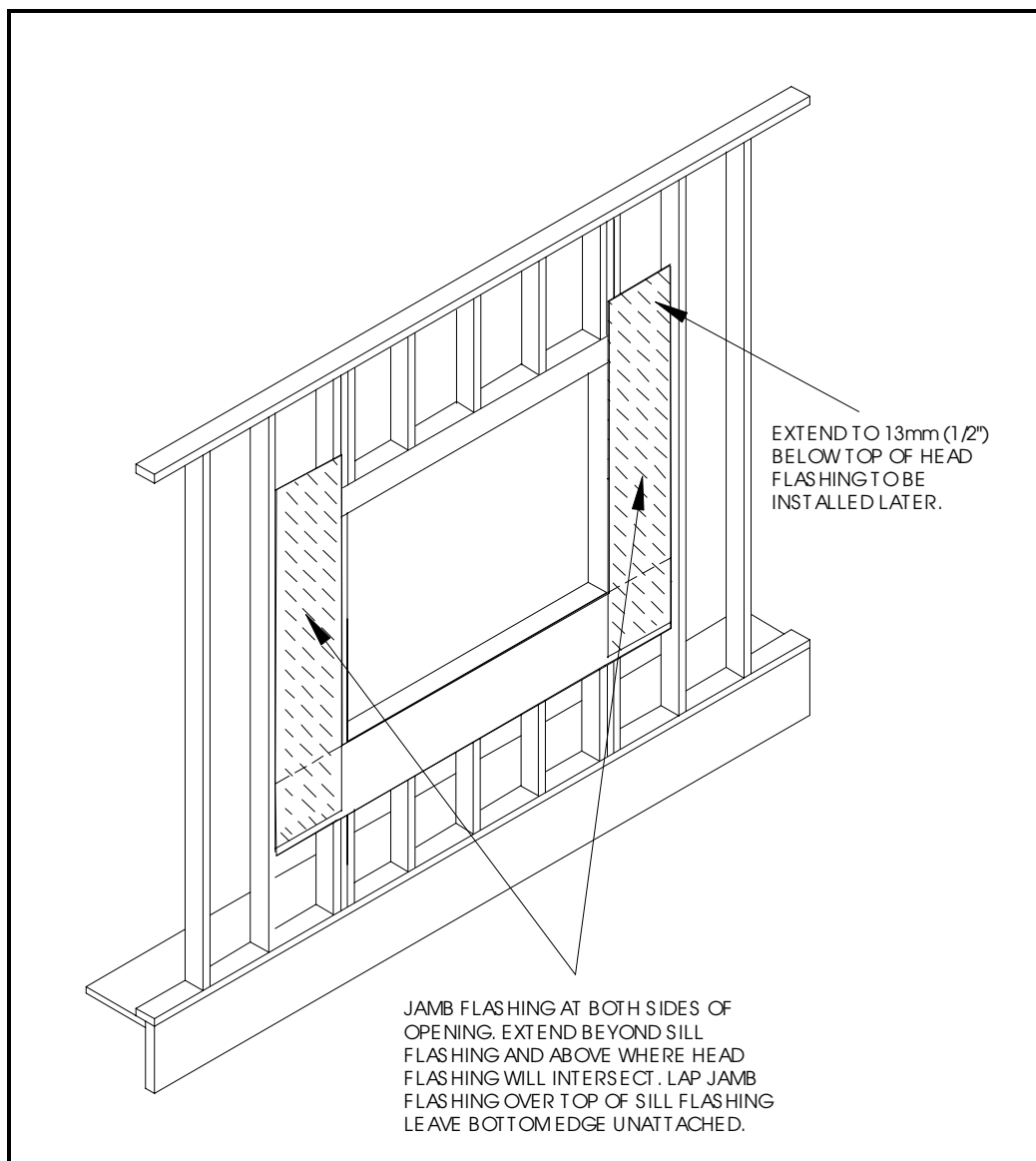


Figure 3B: Jamb Flashing (Method “B”)

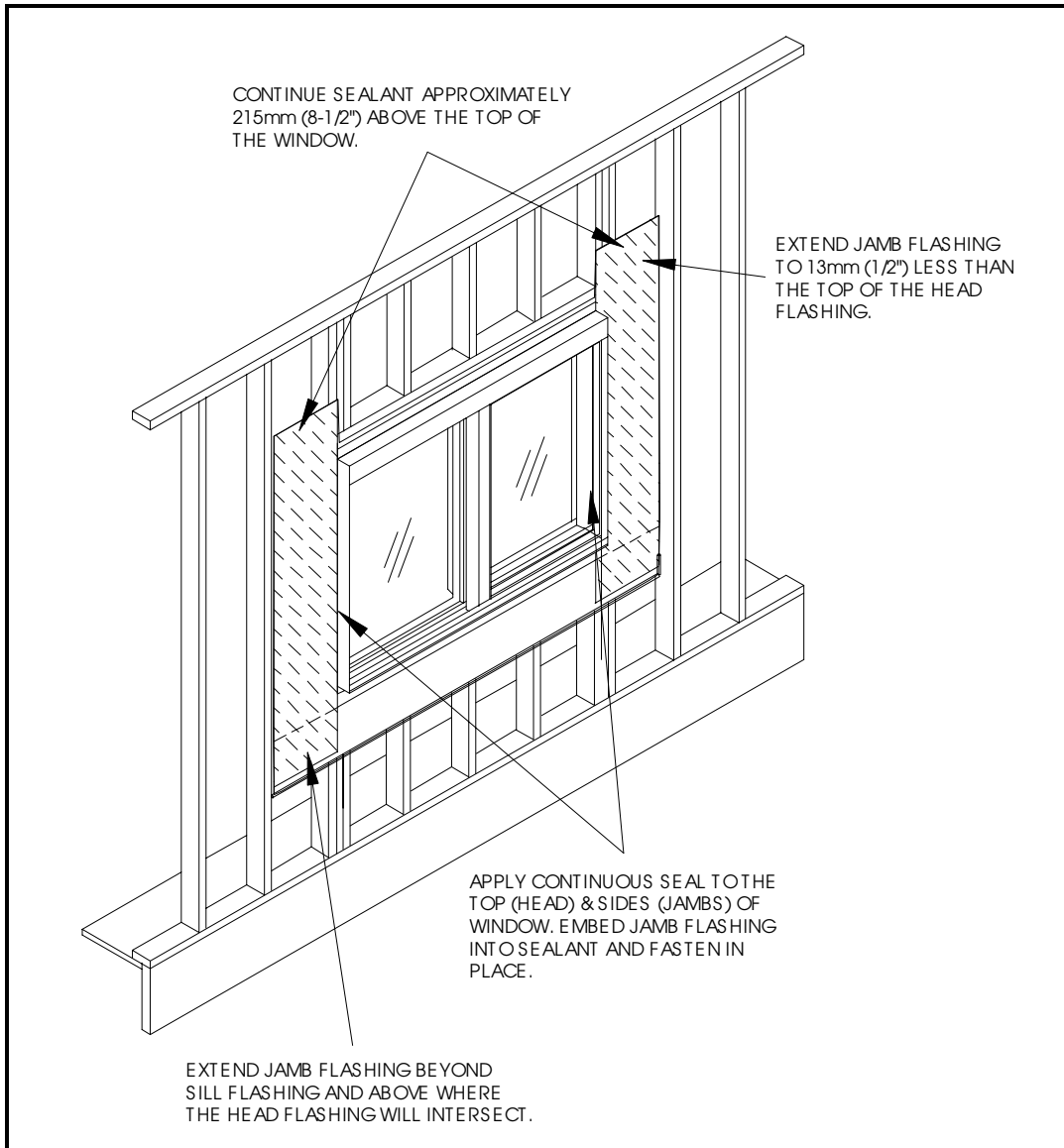


Figure 4A: Jamb Flashing (Method “A”)

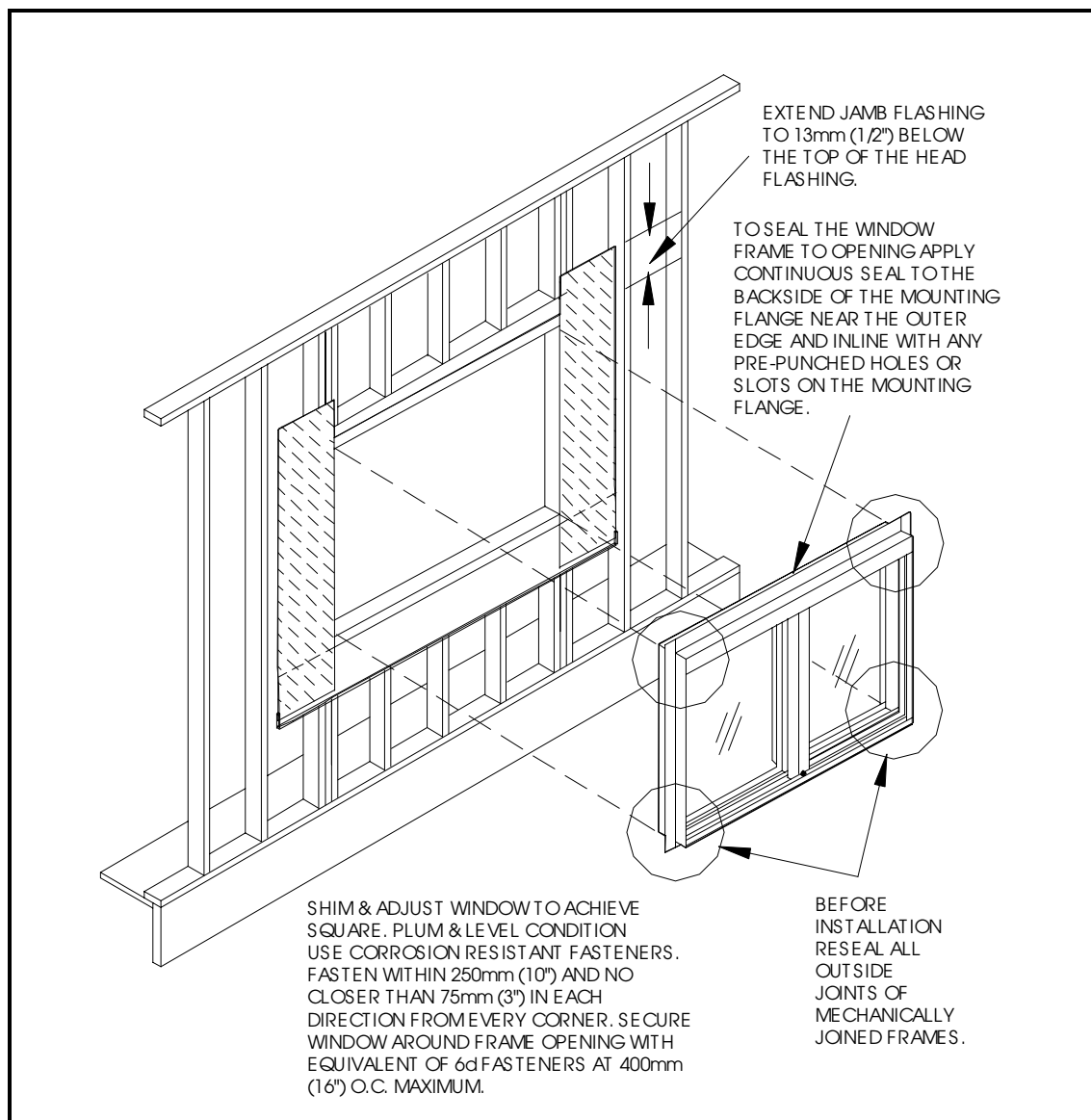


Figure 4B: Window Installation (Method "B")

METHOD "A":

EMBED BOTTOM OF THE HEAD FLASHING
AGAINST THE PREVIOUSLY APPLIED SEALANT.
(FLASHING GOES OVER SEALANT) EXTEND
HEAD FLASHING BEYOND EACH JAMB
FLASHING. FASTEN IN PLACE.

METHOD "B":

APPLY CONTINUOUS SEAL ALONG TOP
(HEAD) MOUNTING FLANGE. EMBED
BOTTOM OF HEAD FLASHING
AGAINST SEALANT (FLASHING
GOES OVER SEALANT).
EXTEND HEAD FLASHING
BEYOND EACH JAMB
FLASHING. FASTEN
IN PLACE.

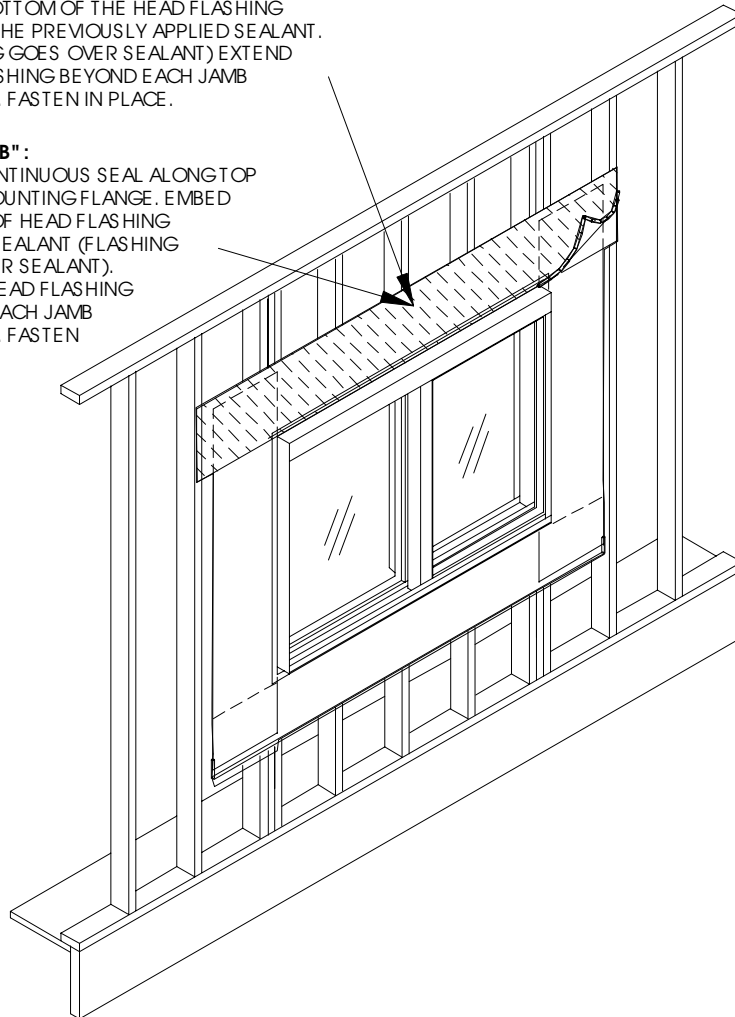


Figure 5: Head Flashing

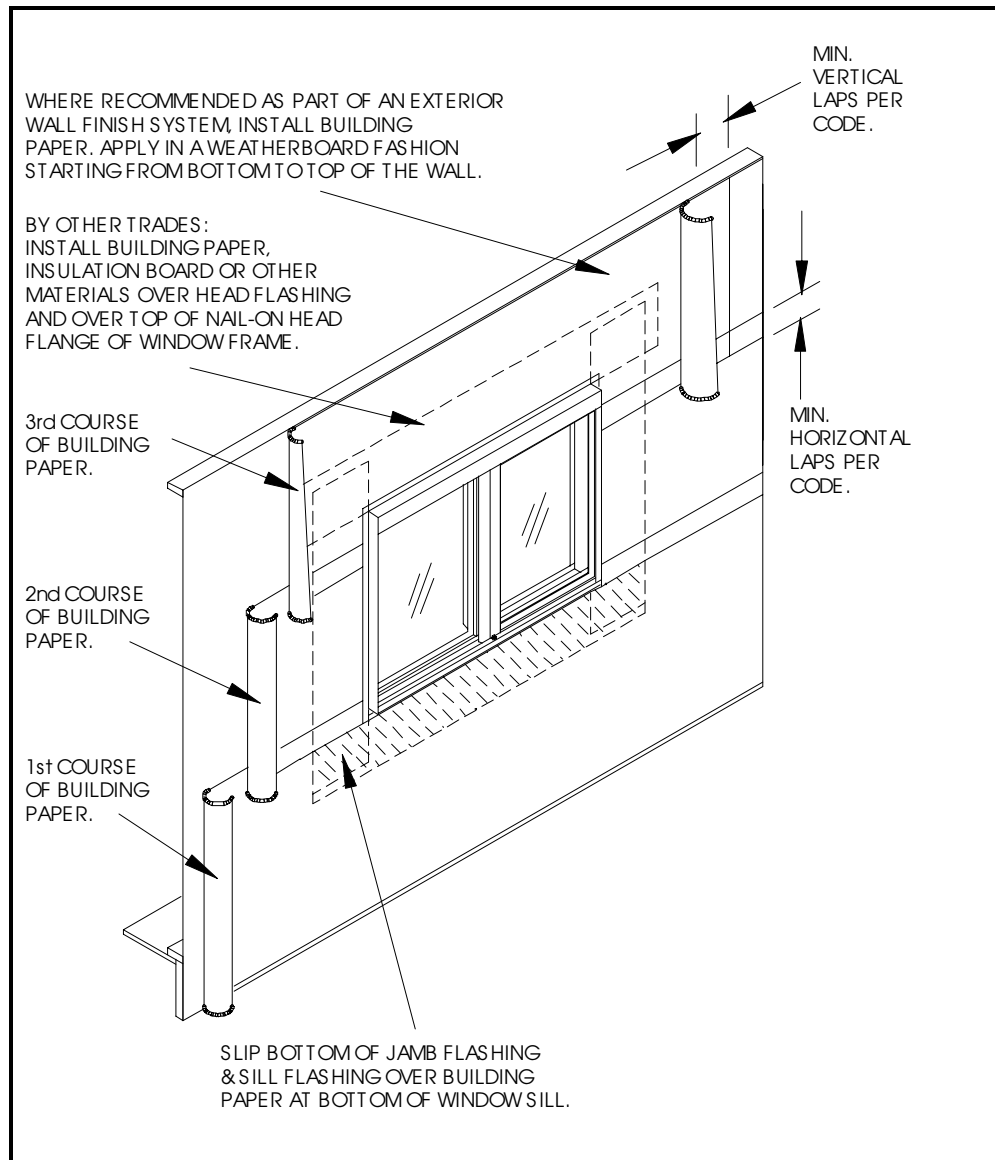


Figure 6: Primary Weather Barrier Application By Others



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