WEB BASED
APPLICATION SPECIFIC
INSTALLATION INSTRUCTIONS

Cavity and Pocket Insulation

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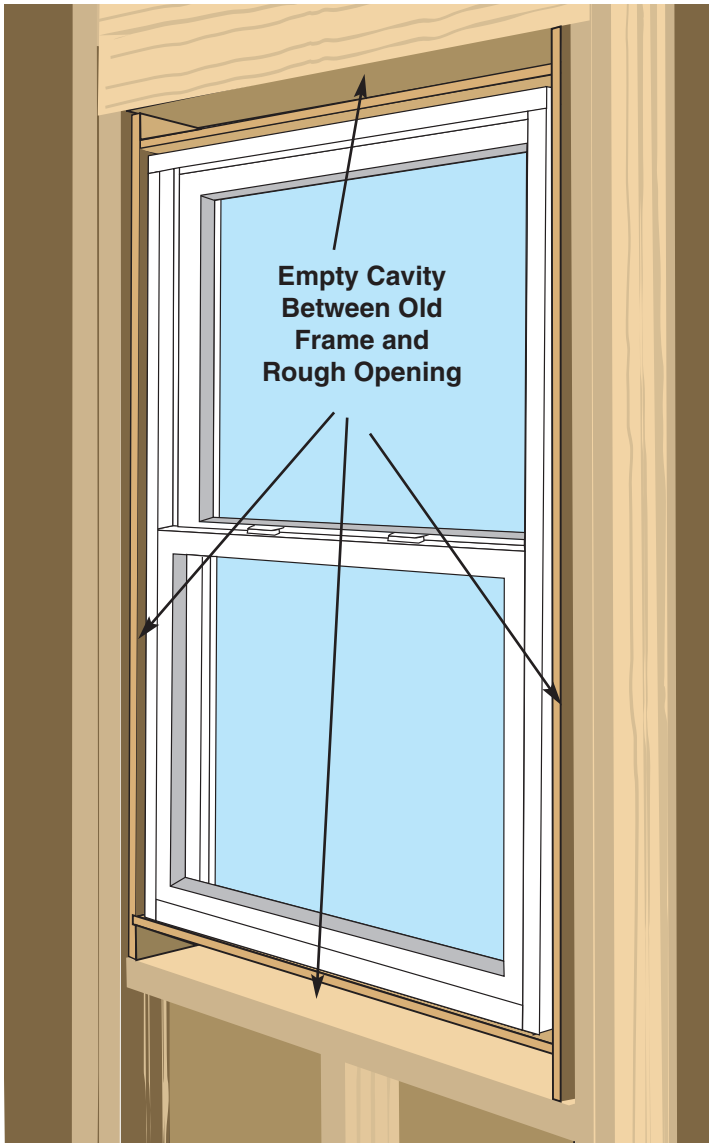
Insulating the Frame and Sash Pockets



There are 3 major performance problems associated with old windows and doors. Convection, Conduction and Radiance are usually well handled by replacing the old operating window or door with a modern, well manufactured new window with high performance glazing.

The real culprit, in most poorly performing old windows, is air infiltration. It is well documented, that a crack, 1/16", around the perimeter of the old sash or the old window frame will cause drafts, and the feeling of "cold" as if there were a hole in the wall the size of a brick. 10 windows or more, and the hole is like 10 bricks, and that can make a cold winter day feel unbearably cold and drafty.

Too often, replacing old drafty windows with new, high efficiency replacement windows, doesn't change much in the way of drafts and comfort. In fact, the air-tight replacement window magnifies the air leaks around the new window.

Uninsulated sash pockets and window frame cavities are the number one complaint. The new window may be well insulated but the hidden space between the old window frame and the rough opening needs to be insulated if the replacement is to succeed.

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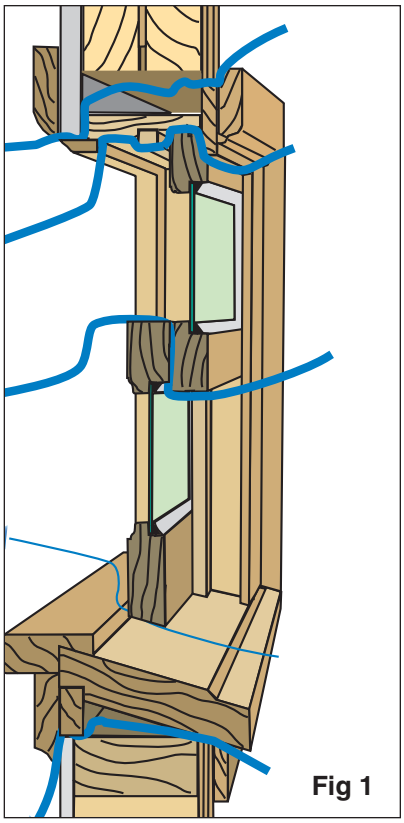
Before Replacement

Figure 1:
Most older windows were installed when energy costs were lower and building codes were not so stringent.

Air could come into the home and heat could escape through joints in the window frame and the rough framing and siding and wall board.

Also leaking air and heat are the joints between the sash and the window frame and the interlock of the sash. Even well weatherstripped windows wear out eventually.



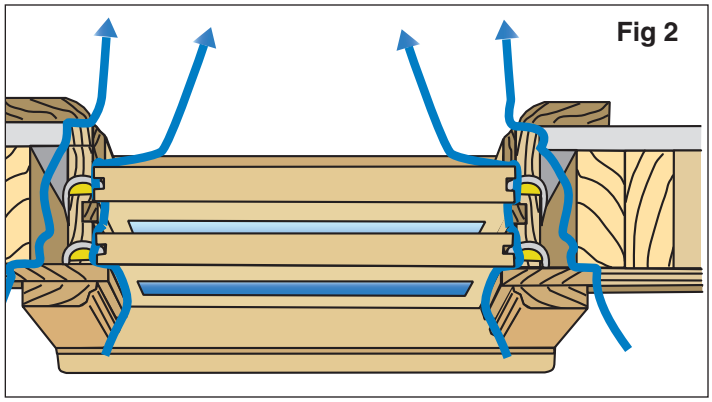
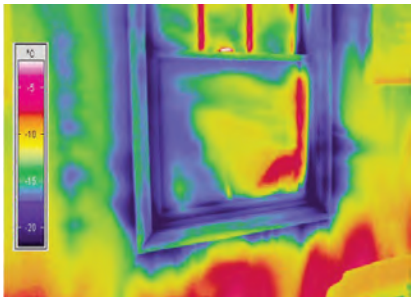


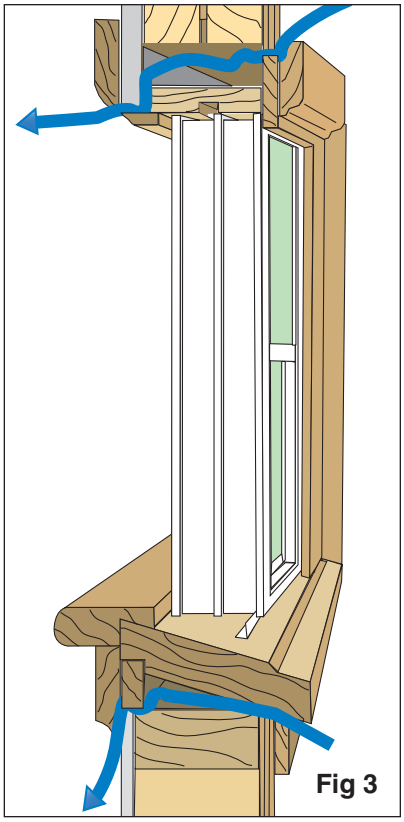
Figure 2:
Adding to the air leak and heat escape is the lack of insulation in the interior pockets. There are pockets of empty space where the old weights and balances were hidden, and between the tapered sill and the flat rough sill, and above the window header — as well as the side jamb cavities.

Thermal imaging shows the heat loss through the window and through the frame around the window.



After Replacement

Figure 3:
Modern Replacement Windows have tighter tolerances in the weatherstripping and at the interlocks. This better design and construction cures most of the window caused air and heat transfers because the gaps have been closed.



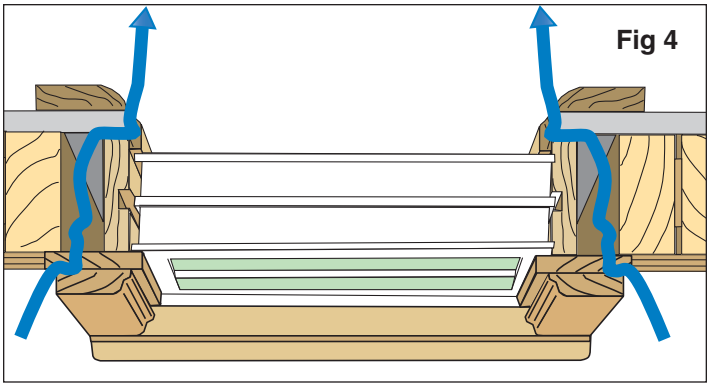
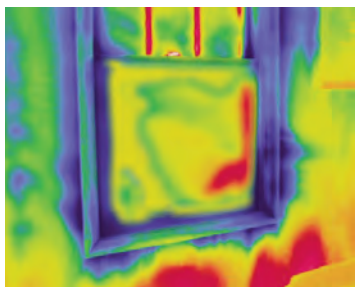


Figure 4:
Too often the new window is fit to the left-in-place old window frame without insulation in the weight/balance pockets, below the sill and above the header - or in the jamb cavities. This leaves significant drafts, heat loss and dissatisfaction with the performance of the new windows. Thermal images show the cold around the new window even though the window itself is "warmer".



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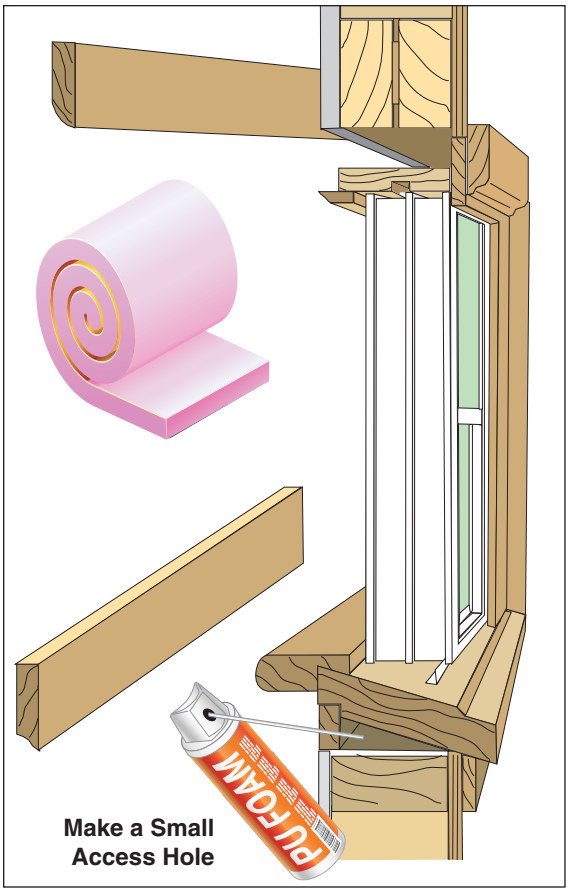
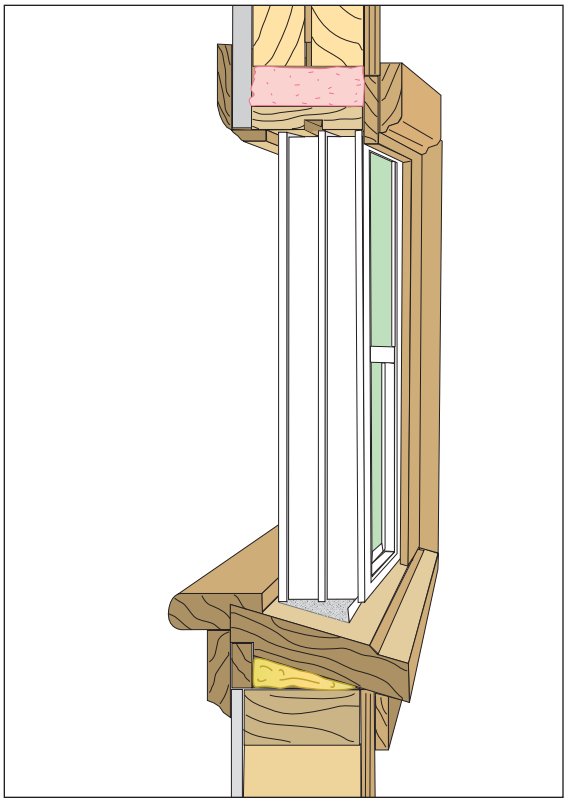
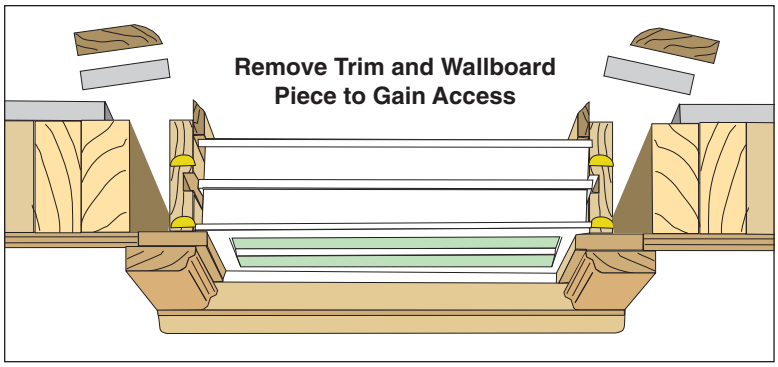
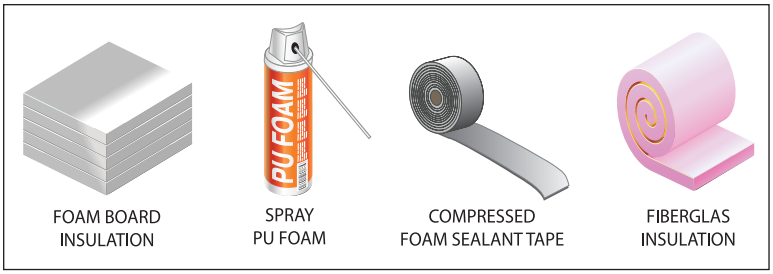
Insulate the Cavities







There are a number of choices to insulate inside the cavities between the old window frame and the rough framing.

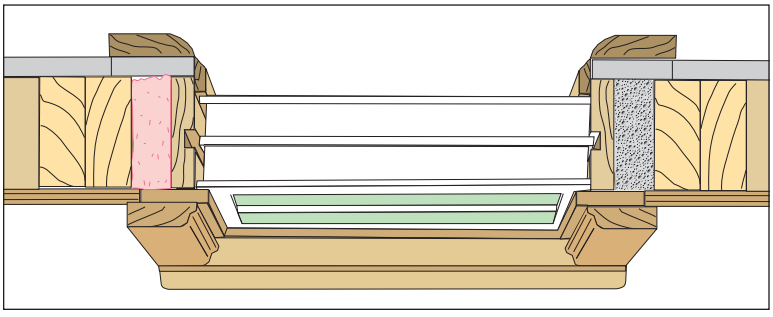


Spray PU Foam is the easiest because it doesn't require full removal of the trim if the nozzle can be inserted into the gap.

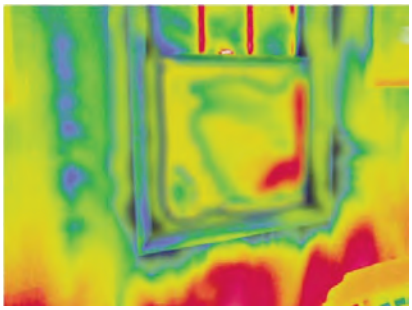
However, Spray PU Foam expands and you must be careful not to have it expand to where it deforms the window and wall parts.

Foam board needs to be cut precisely, while fiberglass batts can be inserted more easily.

Compressed foam conforms to the contours between the rough opening and the new window, best.



Thermal Images of fully insulated gaps, using any of a variety of material choices, demonstrate that the total opening will block air infiltration and heat loss as well as the new window.



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Spray Foam Insulation

While the term “Spray Foam” is often widely used in construction, there are two different types and each has its advantages and disadvantage.

Spray foam has been shunned by window installers and manufacturers over the years because foams, in the past, have either continued to expand after trim has been applied deforming the more pliable vinyl window frames, or because they have been over used to fill the gaps left when old windows are removed and the underlying rough opening has been exposed.

Make sure the foam you use has been tested in accordance with AAMA 812 and meets standard for low pressure development.

Most standards applying to window installation do not delineate between open cell foam and closed cell foam, the more popular “minimal expansion” foams are most frequently used and they are mostly closed cell. More confusing yet, is when foams are recommended, the compressed foam tape alternatives are called out to be open cell.

When it comes to Spray Foams, it helps to understand the differences.Open-cell spray foam (ocSPF) has a cell structure where the cells are filled with air. The open-cell structure renders soft, flexible foam, with a density of about 0.5-0.8 pounds per cubic foot (pcf).

The R-value per inch of open-cell foam typically ranges from R3.6 to R4.5 per inch. Unlike fiberglass and cellulose, the fine cell structure of ocSPF makes it air-impermeable at certain thicknesses. The air-impermeability of ocSPF qualifies it as an air-barrier material, dramatically reducing air leakage through the building envelope, significantly lowering the building’s heating and cooling costs. However, ocSPF, like fiberglass and cellulose insulations, is moisture-permeable, and may require the installation of a vapor retarder in colder climates.

Closed-cell spray foam (ccSPF) has a closed cell structure which yields rigid hard foam, with a density of 1.8-2.3 pound per cubic foot (pcf), and can provide structural enhancement in certain framed buildings. The smaller cells trap insulating gas from the curing, which has a lower thermal conductivity than still air, and increases the R-value to anywhere from R5.8 to R6.9 per inch.

Like ocSPF, ccSPF is also air impermeable at certain thicknesses and can qualify as an air-barrier material. The bigger benefit is that the closed-cell structure of ccSPF also makes it water-resistant, and is the only spray foam that can be used where contact with water is likely.

At a thickness of 1.5 inches, no additional vapor retarder is required for most applications.

Desired Properties

- Make sure the foam used has been tested in accordance with AAMA 812 and meets standard for low pressure development.
- Quick Setting Formulation: can be cut or trimmed in less than 1 hour
- Cold Temperature Application: can be applied in temperatures as low as 14F
- Insulation Value of R5: makes it an efficient method for stopping air and moisture infiltration
- Remains Flexible Once Cured: will not crack or dry out

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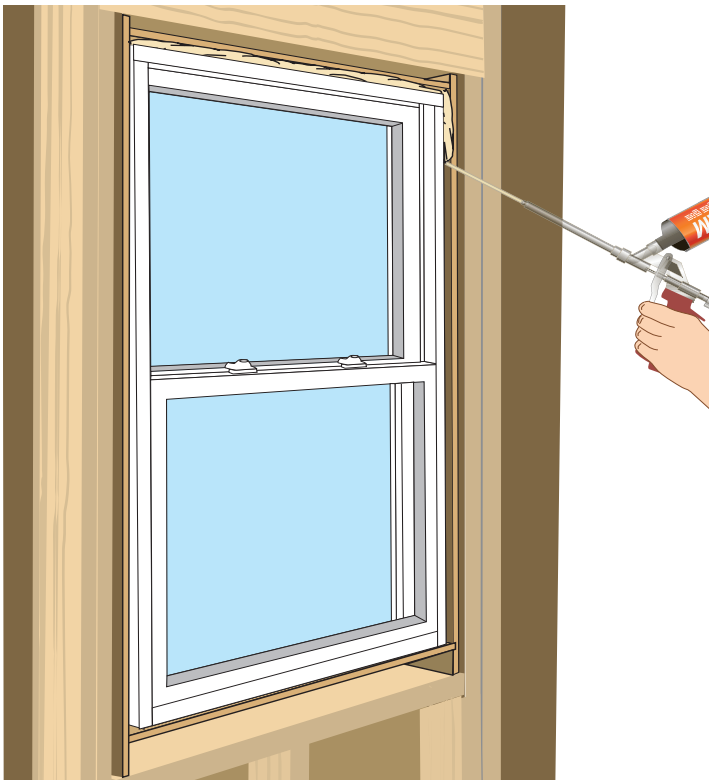


Using Spray Foam

For the best installation, it is necessary for the gap around the window or door to be sealed to block out air, water and vapor penetration. ccSPF can do that well if selected and used properly. Improper use can create water traps, impede drainage and exert excessive pressure to the window frame during expansion.

Remember: Vapor barriers need to applied on the warm side of the opening. Double vapor barriers (one on the warm side and another on the cool side) encourage condensation between and will trap the resulting condensation. Also, window installation cavities (the space between the window frame and the rough opening, or left-in-place old window frame) need to "breathe" to the outside, and allow drainage of collected water to the outside.

Used wisely, ccSPF can be the best solution. AWDI recommends DAP® DRAFTSTOP 812 Window and Door foam. DAP® DRAFTSTOP 812 also achieves a thermal performance of R-5 per inch.

Application

DAP DRAFTSTOP Foam is applied using a Foam Applicator Gun. This foam and gun combination allows for more precise application than the straw grade foam alternative. This gun offers a rear valve used to control the size of bead applied into the openings. The valve also allows the life of the foam to be extended by closing the opening of the barrel for future use.

For even smaller openings, a detachable screw on top is included with the gun to be able to fill gaps as small as ¼" wide.

Important tips:

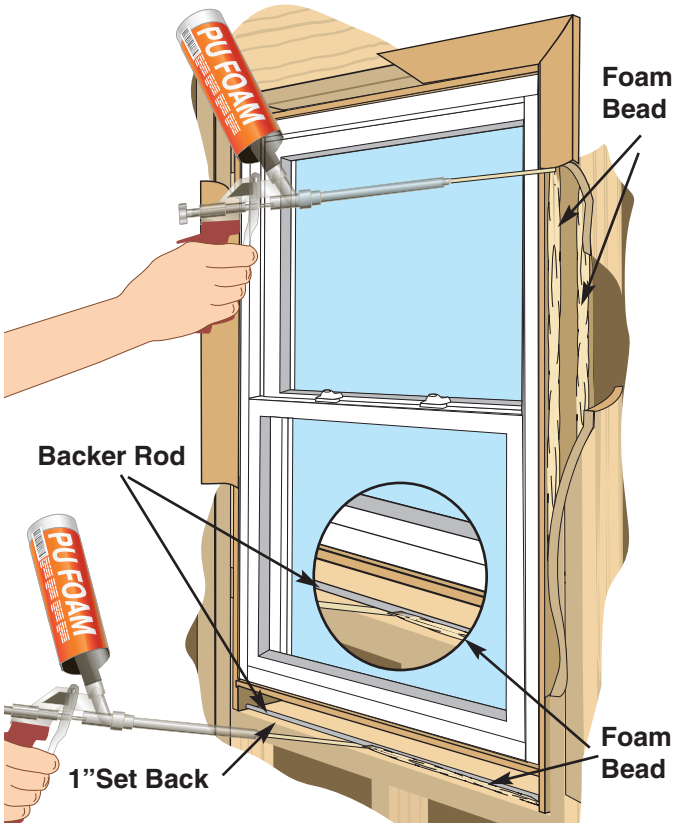
• Similar to the sealant gun, it is critical that you balance the movement of the foam gun or straw barrel and how you dispense the foam so that the foam makes contact with both the rough or existing window frame and replacement window frame.

• If the dispensed foam does not make contact with both the rough frame and the window frame, there won't be an adequate bond to seal out water and air.

• Industry Standards suggest application of 1 inch beads, separated by an equal space. Be careful not to create two vapor barriers - one at the exterior and one at the interior. Make sure there is the ability for the opening to breathe to the cold side for drying and drainage. Use backer rod about one inch in the sill as a stop to make a workable back dam

• When applying foam around the perimeter of the window or door, you must maintain a minimum depth of 1 inch. This depth is required to provide the correct thermal performance, to help improve energy savings, and to protect against condensation problems.

• When applying foam as a back dam to the gap between the window frame and the rough sill, do not allow the foam to extend to the exterior edge of the opening. Maintain a minimum of a 1 inch gap between the foam and the exterior edge of the rough sill. If foam fills this gap at the sill, any water from leakage will not be able to drain to the drainage plane or exterior cladding surface. Place backer rod the length of the sill, 1" from edge and use it as a back dam guide.



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