



WEB BASED APPLICATION SPECIFIC INSTALLATION INSTRUCTIONS



Installing Bay, Bow and Garden Windows

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Installing Bay, Bow, and Garden Windows

One of the pleasant options available when you replace your old windows is the opportunity to put in a more decorative window than the one you are removing. The most popular of the up-grade windows are the Bay, Bow, or Garden Window.

Bay Window

A Bay Window has three glass units - usually two operating on the side of one fixed in the center. The Bay Window can have double-hung or casement windows for the operating units and a picture window for the fixed center unit. The two operating units are usually at a 30 degree, 45 degree, or 90 degree angle to the wall of the house, and the center fixed unit is usually larger than the two flanking operating units.



Bow Window

A Bow Window has three or more, up to 5, glass units of the same size and two or more of them are operating units. In fact, all the units can be operating. Bow Window units form a gentle curve since each unit is usually only angled at 10 degrees from the adjacent window unit.

Garden Window

Garden Windows are similar to a 90 degree Bay Window but have a sloped roof of glass, and can have the front panel operate as well as the two side units.

Each Bay and Bow Window is factory assembled with a structural, (1" or thicker) weathertight laminated headboard, seat board, and side panels.



Garden Windows have the seat board and side panels but with the glass roof panel, there is no need for a headboard.

Because they are factory pre-assembled, they can be mounted as a unit. However, they usually cannot be installed to the blindstop as in other vinyl window products. Installation can only be done by removing the old window frame along with the old sash.

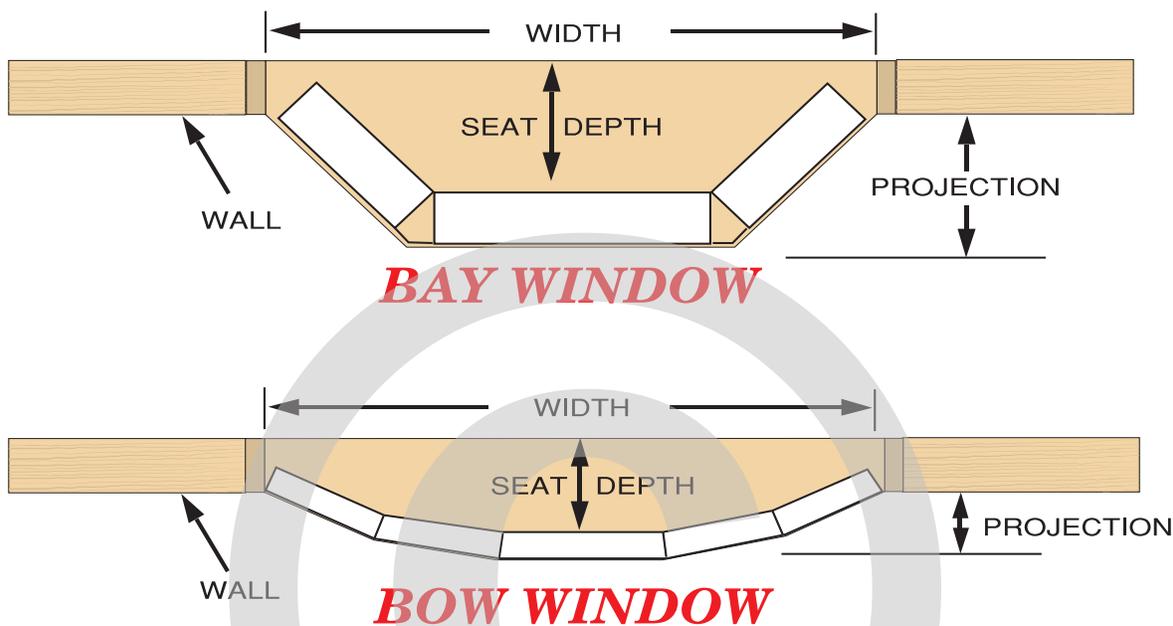
Once the old frame is removed, the Bay or Bow Window can be custom made to any size. It is structurally integrated, and can be placed in the opening without making any major changes to the opening.

Projection & Seat Depth

It is helpful to determine the distance a Bay or Bow Window will extend from the house and how deep the seat board will be. The following charts and illustrations will help you determine the approximate distances of projection and seat board depth. They may vary by a small amount and are meant as an estimate only.

Garden Window Projections

Garden Windows are ordered from the factory to standards determined by the manufacturer. Check with the dealer for the projection and side dimensions for a given height and width.



Bay Window Projections

Bay Windows usually are three windows only. The configuration can consist of a picture window flanked by two operable double-hungs or casements, or the center unit can also be operable. Bay Windows come in two standard angles of 30° and 45°.

The following diagrams and chart show relative values of the dimensions for the assembled Bay Window assuming a standard Side Board Depth of 6"

Mullion Angle	Width of Flanker	Projection	Seat Depth	Center Window Factor
30 degree	16"	8 3/4"	10 1/2"	34 1/2"
	22"	11 1/2"	13 1/4"	44 3/4"
	28"	14 1/2"	16 1/4"	55 1/4"
45 degree	16"	12 1/4"	14 1/4"	31"
	22"	16 3/4"	18 1/2"	39 1/2"
	28"	21"	22 3/4"	48"

NOTE: Center Window Factor: Deduct Factor from total Bay Width to determine Center Window Size.

Bow Window Projections

The Standard Bow consists of 3, 4 or 5 lites, connected by 10 degree angle mullions. The opening widths are shown with approximate projections.

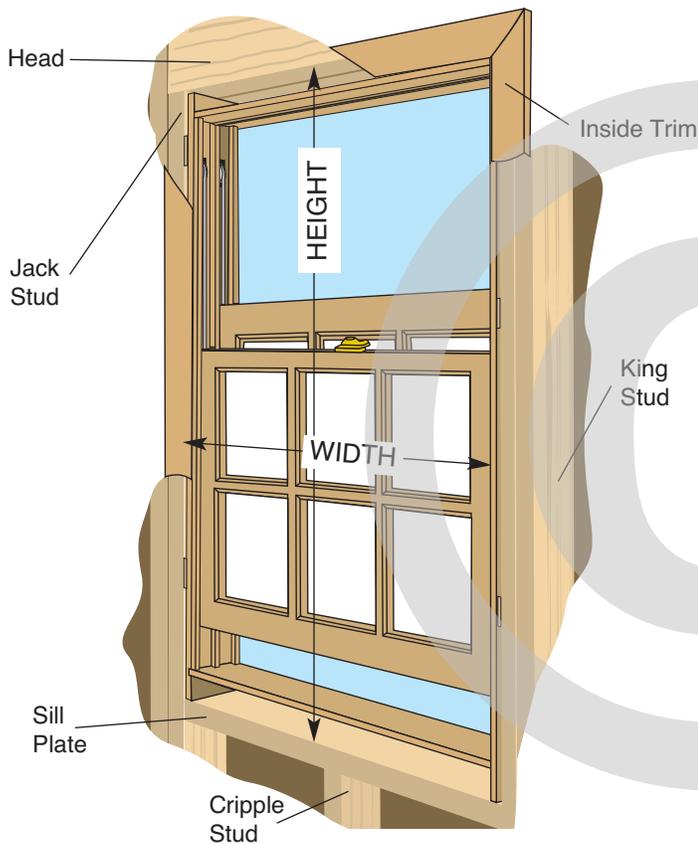
Opening Width	Number of Lites	Approximate Projection & Seat Depth
48" - 60"	3	3"
61" - 65"	3	3 1/2"
66" - 72"	3	4"
73" - 78"	4	6 1/2"
79" - 84"	4	7"
85" - 90"	4	7 1/2"
91" - 96"	4	8"
97" - 101"	5	10"
102" - 108"	5	11"
109" - 114"	5	11 1/2"
115" - 120"	5	12"

NOTE: Projections over 8" require Bracing, and a roof where soffits do not sufficiently cover the window. Seat Depth roughly equals Projection since the thickness of the window & frame is approximately the same as the standard wall depth of 4 1/2".

Installing Bay or Bow Windows

As with any replacement, accurate measurement is the key to a simple and successful installation. Refer to the measurement and specifying section to familiarize yourself with the parts and pieces that have to be removed. You must be able to measure the existing window and be able to add the proper inches to the height and width to accommodate the frame that must be removed, but is hidden beneath the trim.

If you're not sure of the dimensions, don't be afraid to remove any trim when you measure. It is more prudent to be concerned with a properly installed and sealed new window, rather than with tampering with the old window.



Removing the Old Window

There are two types of old windows that are usually replaced with a new Bay or Bow Window- a picture window/double hung or slider combination, or an old Bay or Bow Window. If the window to be replaced is a combination window, then it is best to remove the entire window, frame and all.

If the window to be replaced is an old Bay or Bow Window, it might be easier to just remove the window parts and leave the old head and seat board. If the old head and seat boards are structurally sound, the new window might be able to be installed to fit within these boards and limit the amount of disturbance you must make to the trim and siding around the old Bay or Bow Window.

If the total old Bay or Bow Window needs to be removed, the old roof and outer lower support may also need to be replaced regardless of their condition. New, custom made Bay or Bow Windows may have a different angle or curve than the old bay or bow, and the roof and lower support would have to be rebuilt or replaced to match the shape of the new window and avoid leaks or an unsightly installation. Minor variances can be accommodated by quality capping and trim. Remember, the finished looks are as important as the structural support.

Whenever possible, work with the factory and try to be able to make a custom window and save the work. If the home owner wants new trim outside, at the most offer it as an extra, because if the window fits the opening, new outside trim may not be necessary.

Follow the drawings and remove all parts of the old windows until you are down to the head and seat board. The existing header, sill, roof and support are all held fast to the wall. Removing the old window shouldn't interfere with any of these.

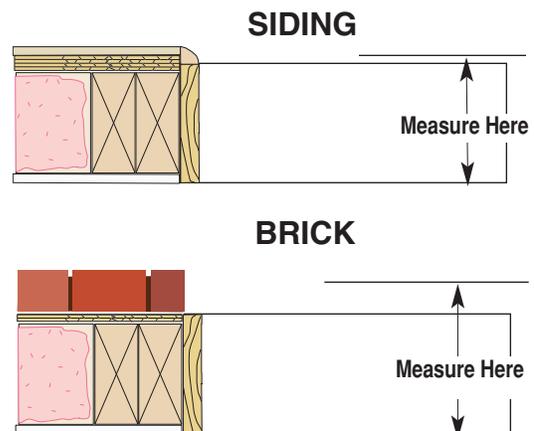
The only item you may want to check would be the support since the new window might be heavier because of the insulated glass in the window units. Carefully removing the covering of the support structure will probably allow you to add additional support if necessary. The old covering can be re-applied and trimmed new to blend the new window to the existing siding.

Custom Wall Depth

Most bay, Bow, or Garden Windows have 6" standard side board depths. For most applications these are the correct dimensions.

For some applications, however, the opening is extra deep requiring a custom side board depth.

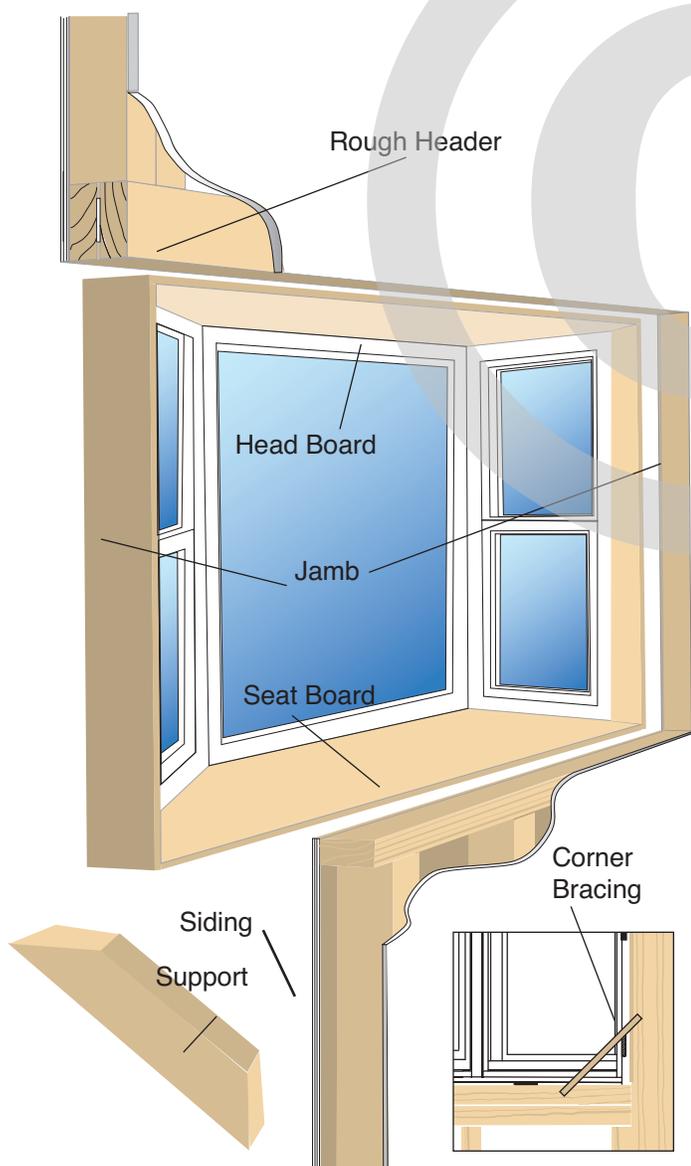
Using the diagrams for Siding and Brick, measure the opening depth.



Removing an existing combination window should clear the opening down to the header, sill, and jack studs, as shown. Carefully remove all the exterior trim, drip capping, and brick mould casing. If the house has been re-sided, remove the old "J" channel and replace with new so that it can butt-up to the new window correctly.

Carefully measure the rough opening and compare it with the outside dimensions of the new Bay or Bow Window. Sometimes, the construction in an older home diverts from the expected. Large spaces were framed out and filled with insulation up to the old window. These spaces can be filled in with 2x4 stock, 5/4 stock, even 1 inch stock. The concern you should have is to make sure that the new window is structurally supported around the entire perimeter, and that the opening is not more than 1/4" to 1/2" larger than the new window. It is always easier to make the opening smaller to fit the window.

If the opening should be smaller than the window, it will probably not be more than 1/2" to 1" smaller.



If the opening is smaller in the width you can replace one of the jack studs with a 5/4 " x 4" board and gain 3/8" more clearance. Replacing both jack studs with 5/4" stock opens the width 3/4". Before replacing the jack studs, prop up the header with a temporary brace. Cut and remove the jack stud carefully. Install a steel corner brace where the header meets the king stud. Cut and install the 5/4 stock to the right length, and nail securely. Install a steel corner brace where the jack stud meets the rough sill. If the jack studs are to be replaced on both sides, cut and install a new rough sill after the new jack studs are installed and the temporary header bracing is removed.

If the opening is too small in height, the rough sill can be replaced with 5/4 stock which will increase the opening height 3/8". If that still isn't enough, then the cripple studs beneath the rough sill may have to be shortened. It is advisable not to tamper with the header because that involves major construction work.

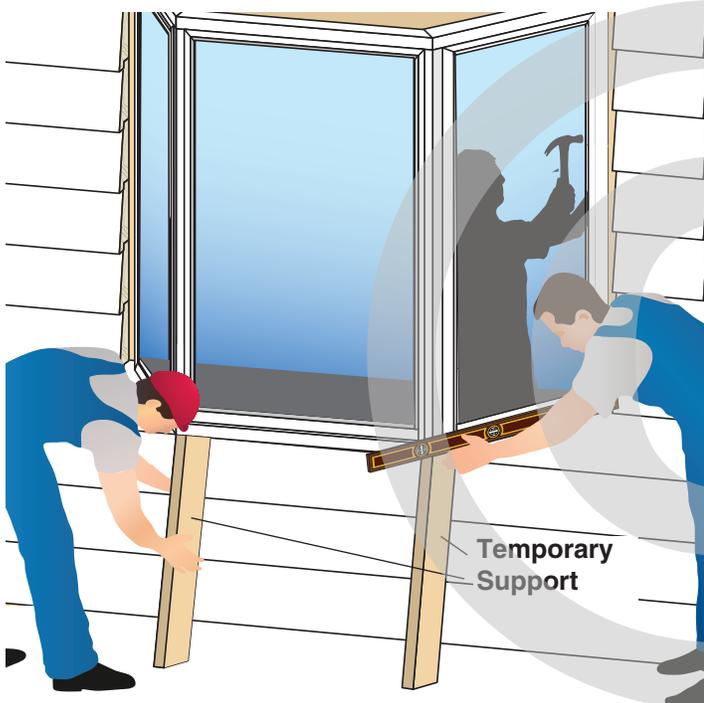
Installing the New Bay, Bow, or Garden Window

Bay, Bow, and Garden Windows designed for replacement come as an integral unit which includes head and seat boards, all the windows, complete in a sealed unit ready for installation. If the top and bottom are not sealed with coated aluminum to weather-proof them, it is advisable to do so before installation. Even if you intend to cover the top and bottom, the extra step will prevent any deterioration of the unit from moisture buildup.



Bay or Bow Window units are bulky and heavy and will require help in installation. Use at least one person for every three feet of width. Because they are built within 1/4" of the opening height, it is nearly impossible to install the units from the outside due to the height of the opening off the ground. It is simpler to insert the window into the house, right it to its proper up-right position, and install it slowly from the inside as shown.

First rest the outer edge of the projection on the sill, tilt the window unit up-right until the upper edge of the projection fits under the header. Maneuver the window unit outward until it is about halfway outside. The sill will now be holding the weight of the unit. Have one or two of your helpers go outside to help steady the window as you continue to push it through the opening.



If there is no existing exterior support, use 2 x 4 studs as shown. Pre-cut to the anticipated length to support the outer edge of the projection as it is eased outside. Work the unit outside until the edges of the side boards, head board, and seat board are flush with the interior wall surface.

Secure the outer edge of the projection with adequate support from the temporary braces. Using a level, be sure that the window sits plumb and square in the opening. Using 3" wood screws, countersunk in the sides, head, and seat, gently anchor the window unit in the opening using shims under each screw. Check the plumb, square, and level again and adjust as necessary. Then you can tighten the screws.

Any Bay, Bow, or Garden Window with a projection over 8" outside the exterior siding of the house needs

support brackets. If none are supplied with the unit, a pair can be cut from 2x12, or 2x10 pressure treated lumber. They can then be covered with pre-finished aluminum capping stock or form the base for an enclosed support, as shown.



Making a Support for Bay, Bow, or Garden Windows

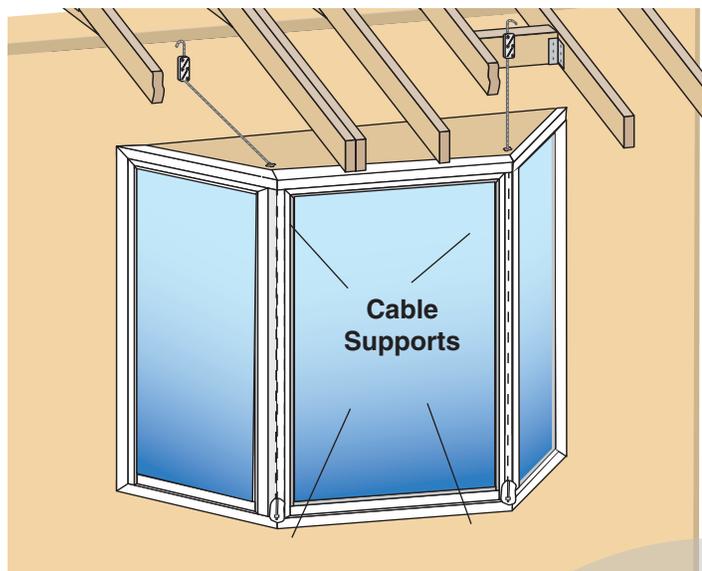
Outside the house, set a knee brace or angled support under each mullion of the window. Place the long leg of the brace against the house, and drill pilot holes through the brace into cripple studs in the wall. You can identify the location of the cripple studs after you have removed the old window. Nails in the rough sill will show where they are. If there is no cripple stud in a proper position, move the brace left or right (within reason) until it lines up correctly.



The idea is to support the window, under the mullions, as close as possible, yet maintain a balanced, symmetrical look to the braces. If they are to be covered, the symmetry is less important.

Fasten the support bracket using a 3/8" lag bolt that is long enough to penetrate into the stud at least 2". Fasten the brace to the underside of the Bay or Bow unit with a wood screw of sufficient length to anchor into the seat board, but not puncture through.

Using a Cable Support System



Most manufacturers can supply a cable support system for Bay and Bow Windows to eliminate the need for knee brackets. Garden Windows, with glass roofs that cannot use a cable system, will still require knee brackets. If a cable support system is not available from the manufacturer, lumber and building materials dealers can usually supply a kit.

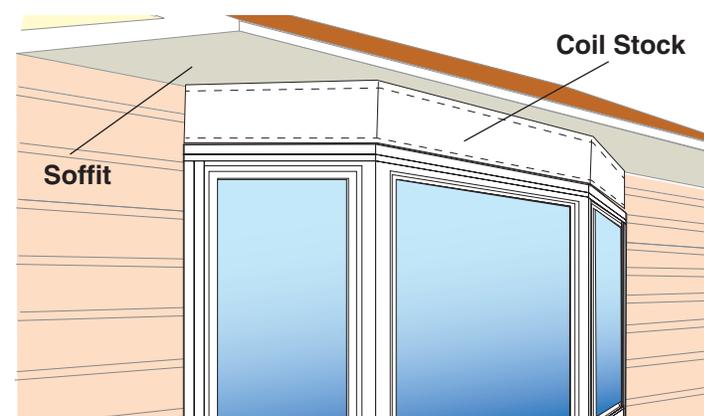
The typical cable kit consists of two threaded pins, washers and nuts, cables, and cable anchor brackets. Cable support systems work easiest where there is an overhang (soffit or cantilevered floor) above the installed window. Follow the instructions supplied with the cable system.

In the overhang are roof rafters or floor joists to which the cables are anchored. The cables run through the hollow mullions separating the windows in the unit, and the cables are finally anchored to the threaded pins which protrude through the bottom of the seat board on the window.

The washer and nut are applied to the threaded pin. Each nut is tightened until the window unit is level and plumb. Once the window is level, the temporary bracing can be removed. The cable support system can be adjusted periodically to compensate for changes caused by temperature, humidity, or settling of the wall.

For installations where there is no overhang, refer to the instructions to add a roof. The cable system can be substituted for the plumber's tape. The cable anchor is bolted to the stud in the wall under the roof, and the cable and pins are installed the same way. Remember, because of the angle of the cable, stress is placed at the point where the cable exits the top of the headboard. It is recommended to also use support angles below the seat board in installations where the cable cannot be hung from a rafter or joist above.

Adding a Roof



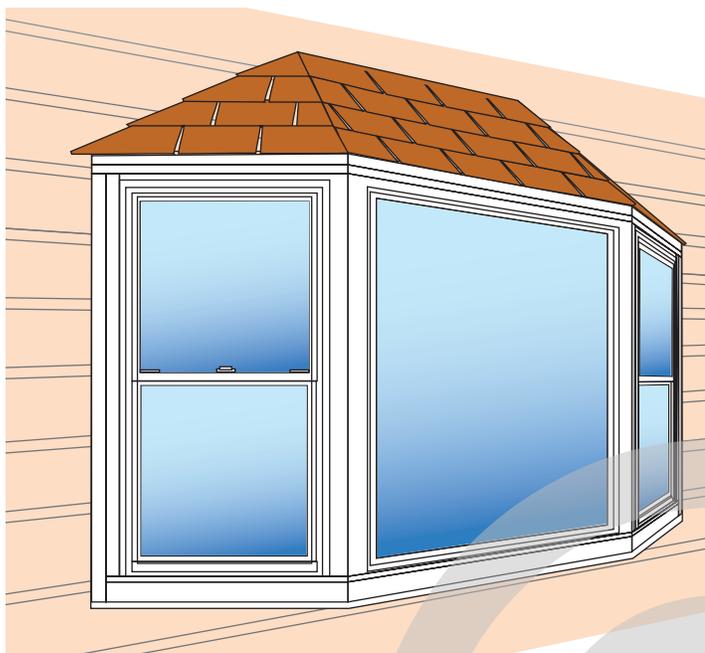
Garden Windows have their own integral roof with a glass panel. Bay and Bow Windows do not have a water-tight roof or headboard. If the new Window sits close to an existing overhang (cantilevered upper floor or soffit) capping from pre-finished aluminum coil stock can be applied and blend the unit into the overhang as shown and no roof is needed. However, for installations where there is no overhang, a roof is necessary to avoid water leakage. The addition of a roof can be a decorative addition as well.

There are pre-cut, or pre-fab roof kits available from various manufacturers. Most times, because the Bay or Bow Window is custom sized, pre-made roofs are not available, so it may be necessary to build your own. If you install a pre-cut roof, follow the manufacturer's instructions.



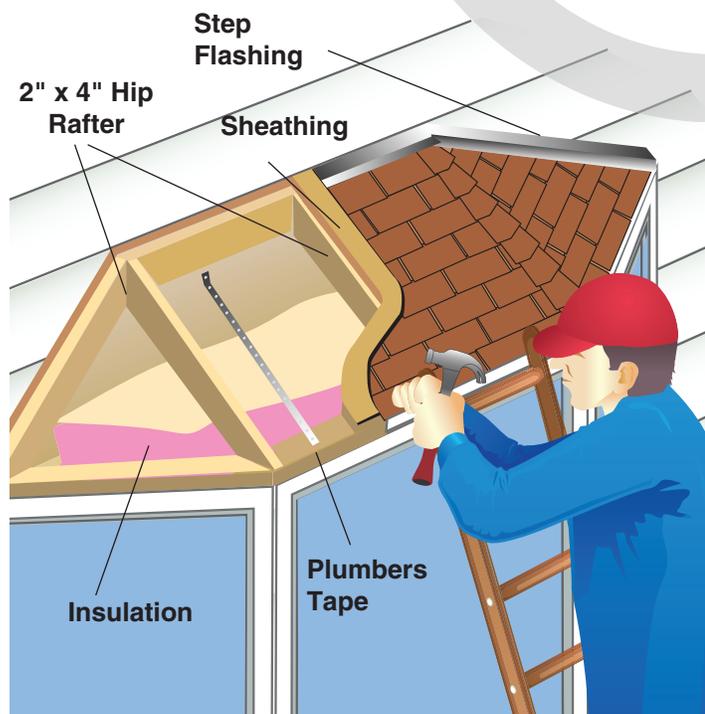
To fabricate a roof for your new window begin by marking the siding in the shape of the roof to be added. Cut back the siding to the sheathing at least 12 inches above the top of the Bay, Bow, or Garden Window Unit. Using plumbers' tape (metal strapping) attach the strap to a wall stud about 10" above the top of the window unit. Pull the strap out to the window corner, or a mullion and use a screw to anchor it to the head board. Do this on both sides.

Depending on the projection, make a hip rafter out of 2x4's (when space is limited 5/4 stock or 1-1/4" thick wood is desirable) as shown. Install an end rafter on each side.



Fasten additional hip rafters, (about every 16") as necessary. Place a batt of insulation on the head board, and sheath the roof with 3/8" exterior plywood as shown.

If desired, a preformed drip edge can be nailed to the sheathing before roof shingles are applied. It is imperative that step flashing be used under the siding, and strip flashing be used over the shingles to keep water from the headboard area. Use a roof sealant as necessary to seat the flashing.



Fasten hip shingles over the hip ridges, and trim the shingles to finish the roof.

The sides of the unit, and the joint of the siding to the seat board should be sealed with moulding and caulk as necessary. As stated before, "J" channels can be applied and lapped to the rough opening prior to the installation, and caulk and necessary capping applied after the Bay, Bow, or Garden Window unit is mounted, braced, and the roof installed.

If the new window is installed over an existing head and seat board, re-apply, or replace the channels, drip caps, and capping as necessary. Caulk at all joints.

Finishing the Interior

Once the new window has been supported and sealed on the exterior, the interior moulding can be applied.

Install insulation into the space between the side boards, the head board, and the rough opening. Using casing, install the trim on all four sides as shown. Using wood putty, fill and sand the mounting screw holes in the side, head, and seat boards.

Finish the headboard, seat board, and side jambs with paint or stain. For Garden Windows, you might want to finish the seat board with a plastic laminate to prevent water stains from the plants.



Picking the Proper Sealant

AWDI understands that the application of a sealant is as crucial as the choice of sealant. When a bead of sealant is applied to a joint there are three factors to consider:

- Adhesion
- Flexibility
- Durability

Within these three performance aspects there are countless combinations of applications, substrates and conditions a sealant is exposed to.

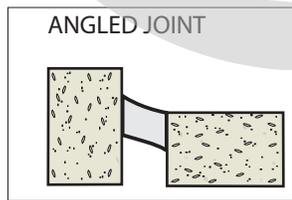
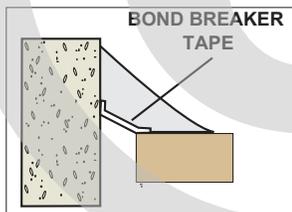
Bedding Joints:

For bedding joints, it is especially important that the sealant is of the right consistency and made up of 100% solids so it will not shrink after cure, unlike solvent and latex based sealants that shrink and create gaps after curing.



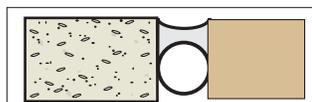
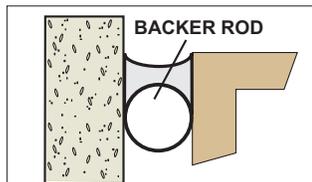
Fillet Joints:

A fillet joint is formed when two surfaces come together to form a right angle. The sealant used to join these two surfaces is triangular in shape. The sealant must adhere to the variety of substrates you're faced with. Without strong adhesion there is a high chance that the sealant will pull away from the substrate allowing for air and water infiltration.



Control Joints:

A control joint is formed when two similar or dissimilar materials meet or when substrates do not form a right angle. This joint will require both a backer rod and sealant for proper application. This joint can be as wide as 5/8 inch and be prone to extreme movement, a highly flexible sealant is necessary for a reliable seal with this application. In order to successfully install a window or door and effect a lasting weathertight seal,



AWDI recommends an ASTM C920, Class 50 sealant such as OSI® QUAD® MAX that is designed for exterior/interior use for sealing around windows, siding and doors. Sealants like OSI® QUAD® MAX bond best to a wide variety of materials and their versatility in performance provides valuable features and benefits for all installers.



Desired Properties

- No Shrinkage
- Locks out air and water infiltration to protect integrity of the seal
- Proven Wet Surface Application
- Ability to use the same sealant in warm and cold temperature situations to produce consistent results. 0F – 140F cold and warm weather application
- Strong Adhesion / All Surfaces Will stick to even the most difficult to bond building materials
- 5X stretch, 50% joint movement Long term durability assurance even with expansion and contraction of building materials
- 24 hour fast cure, paintable 1 HR. Fast cure to protect the building structure from outside forces and quick paintability saves time
- Achieves bubbling resistance faster to ensure optimal aesthetics
- 4,600 + Color Matches ensures perfect color match to all primary building materials
- Dirt & Dust Resistance ensures optimal visual appeal long after an installation
- UV Resistance
- Long term durability to compliment the durability of the building structure

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 to industry standards and is labeled conforming to standards as a low expansion, low pressure foam.

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



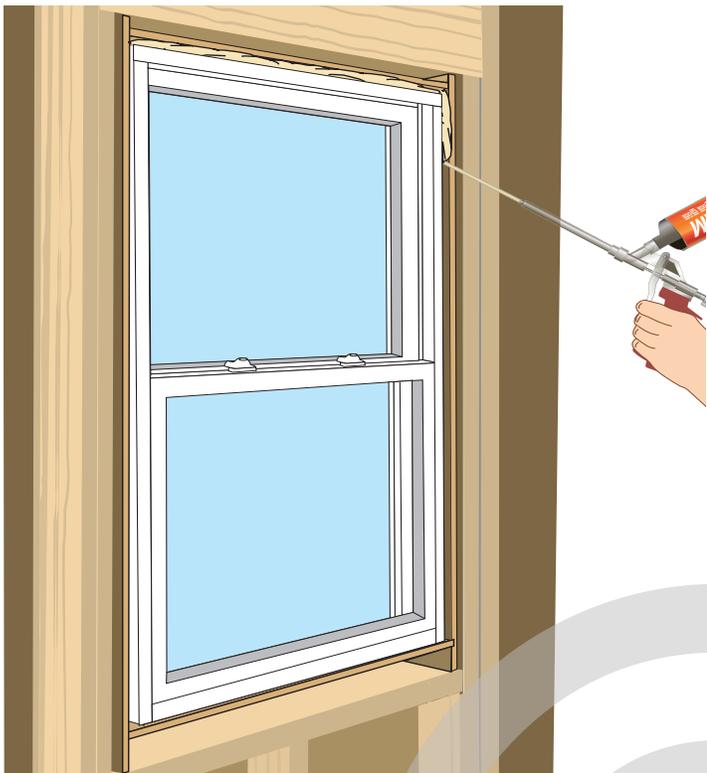
density of 1.8-2.3 pound per cubic foot (pcf), and can provide structural enhancement in certain framed buildings. The smaller cells trap insulating gas from the curing, which has a lower thermal conductivity than still air, and increases the R-value to anywhere from R5.8 to R6.9 per inch.

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

- Industry tested and labeled as a Low Pressure/Low Expansion; i.e., will not warp or deform windows & doors
- 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



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.

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 be 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 ccSPF's like OSI® QUAD® Foam which is a polyurethane closed cell, low pressure/low expansion sealant to fill the gaps as protection against moisture and air. OSI's closed cell foam also achieves a thermal performance of R5 per inch.

Application

OSI® QUAD 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 1/4" wide.

