WEB BASED
APPLICATION SPECIFIC
INSTALLATION INSTRUCTIONS

# Window Fastening

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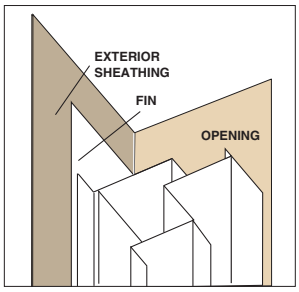
# Fastening Windows

## Three Window Frames

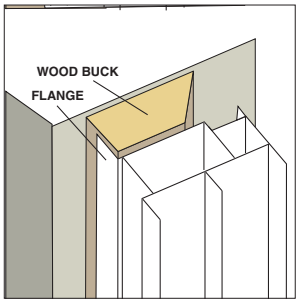
There are different window types, and each has a variety of ways it can be secured in the opening, approved for Coastal areas in the US.

**Fin Frame**




Windows with Fins usually are mounted using the fin, and securing the fasteners through the fin in to the wall sheathing. Occasionally, where required to meet load design, mounting screws can be applied through the frame into the structure.

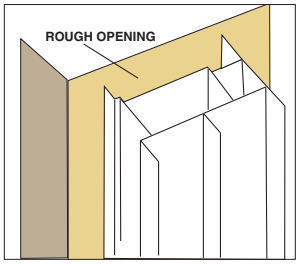
**Flange Frame (Unequal leg)**




Flange windows are not be confused with Fin windows. Flanged windows have a protrusion of about 1/2 inch on all four sides and can be called “unequal leg” windows. The flange is used to set the window in place against the opening or an installed buck. The flange allows the installation to be sealed with the flange acting as an overlap to prevent water penetration into the opening.

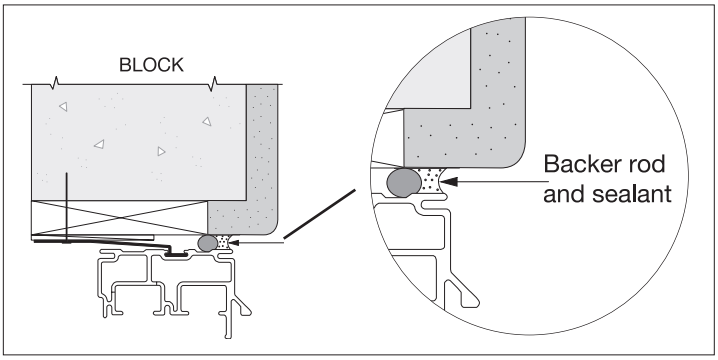
The flanged window is mounting to the opening using a clip system and/or mounting through the frame into the structure as required.

**Flush Frame (Box Frame)**

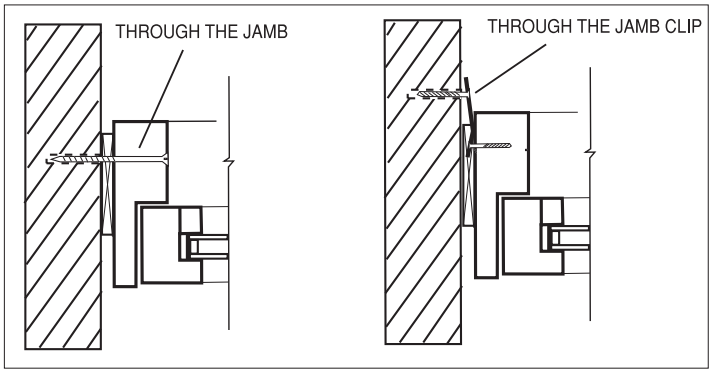



Flush Mount windows or box-frame as they are also called, contain no fin or flange and mount in the opening using clips and/or mounting through the window frame into the structure.

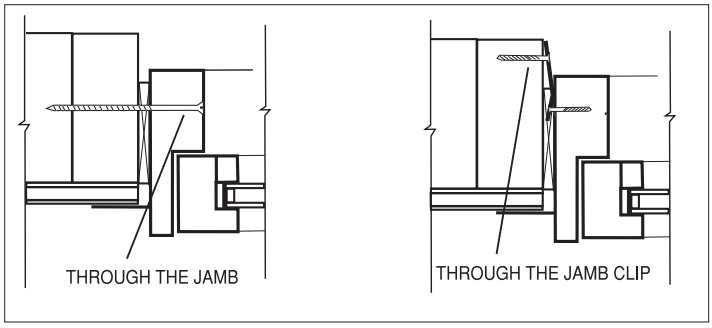
Flush or box mount windows will need backer rod and sealant and/or snap trim to adequately create the barrier to moisture and water intrusion or migration into the opening.



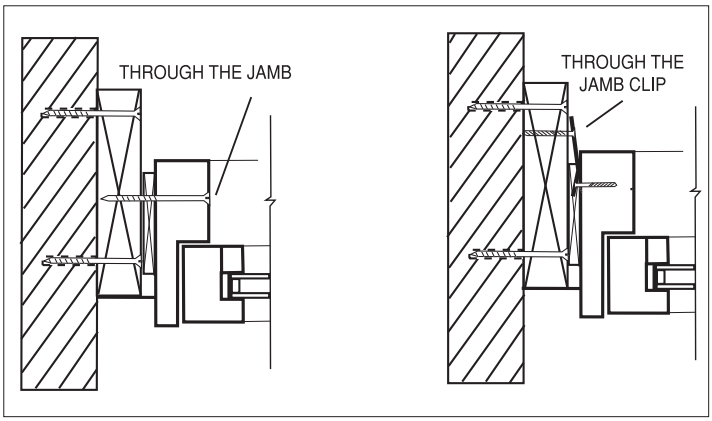

## Three ways to Mount a Flush Window




Where the shim or buck is less than 1-1/2 inches, window and door assemblies shall be anchored through the jamb, or jamb clip, and anchors shall be embedded directly into the masonry, concrete or other substantial substrate.




Where the shim or buck 1-1/2 inches or greater, the buck is securely fastened to the masonry,concrete or other substantial substrate and the buck extends beyond the inner face of the window or door frame, window and door assemblies shall be anchored through the jamb, or jamb clip, into the secured buck.




Where the framing material is wood or other approved framing material, window and door assemblies shall be anchored through the jamb, or through the jamb clip.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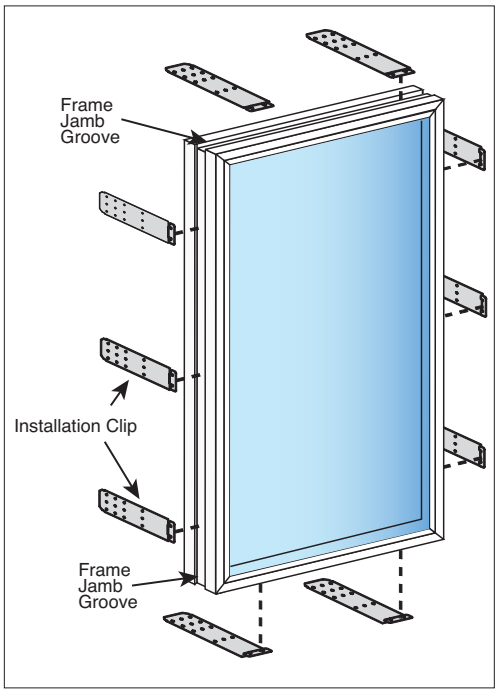
# Jamb Clips




While most windows are installed using screws through the frame into the rough opening, or through fasteners used with nailing fins or flanges, there are circumstances where another mounting system works better. Installation clips, which are basically flat steel straps are fitted with holes so they can be mounted to the window frame, and then mount to the rough opening.

This mounting system is especially suited for brick or masonry veneer openings, and for opening in block or poured concrete openings where traditional mounting methods are difficult

The window manufacturer or the architect/engineer on the job often recommends the placement and number of the clips. These recommendations are necessary because the size, quantity and placement will depend on the size of the window and the project site's required wind pressure psf. This information can be obtained from the building designer, code official, or directly from the building code.

The clips will be supplied by the window manufacturer and will specifically fit their frame profile either by "snapping in" or screwing into the window frame directly. Wood window and uPVC window can effectively use clips.

To accommodate various wall configurations, clips can come in more than one size. Common are 6" - 7" (short) and 10" to 12" (long).

Common factory clip schedules are based upon 20 psf wind pressure. This can be a concern when a product has a rating greater than 20 psf and the project site's required wind pressure is greater than 20 psf. Therefore, it's important to determine if the furnished number of is sufficient or additional clips are needed.

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## Guide to Determine Number of Clips

**1.No. of clips per side = P x W x H**

Most windows are rectangles. For example an individual double hung unit with the frame size of 36" W x 60" H. Assume the example project site requires 40 psf wind pressure.

No. of clips = (P x W x H)(.0001)/4 figures to be (40psf x 36" x 60")(.0001)/4 = 2.16 clips

3. Round up to the next higher number, thus budget 3 clips equally spaced along each long side.

4. Calculate the spacing between clips along each long side. Select a distance from corner of no less than 8" and not greater than 24".

5. Attach clips to short sides (head and sill) at about the same spacing. In this example use 2 clips on the head and 2 clips on the sill. If in doubt reduce the number of clips so that they are not closer than 8" from corner. Thus, 3+3+1+1 = 8 clips total.

6. For Curved or angled units, substitute a rectangle of the same overall width and height. Attach clips at the calculated on center spacing to the curved and straight sides.

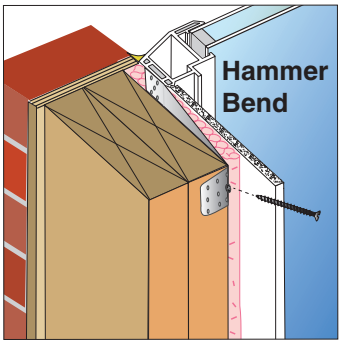
7. Double hung units are often tested and rated without clips along the sill because the sill is sloped. If the sill is determined to need a clip and it is sloped, a wood wedge may be glued to the underside to attach the clip to the window.

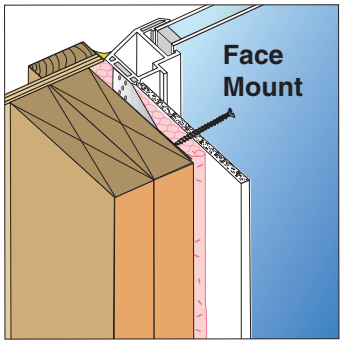
8. For assemblies of several individual units mulled together, calculate clips and spacing for each individual unit and attach clips to the available outside perimeter sides. At the end of mulls, additional fastening might be required. Confirm with project engineer or architect/engineer or manufacturer.

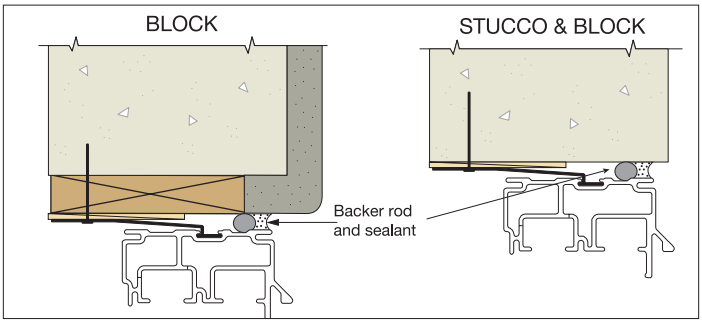
## Fastening Clips

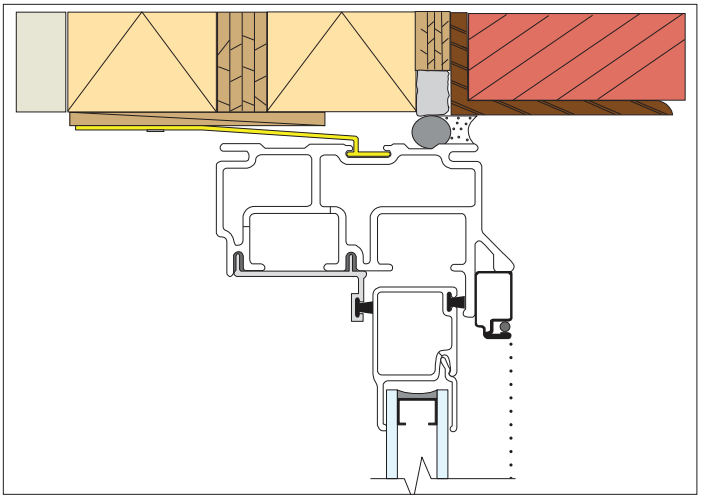
Clips may be attached to the window unit either being rotated into place within a groove designed to accept the clip (uPVC) or screwed into the frame (wood). The clip, depending on the length may be face anchored to the rough opening one #8 x 1-1/14" Sheet Metal Screws screw into face of wood buck.

If the clip is longer so it projects out beyond the wood buck or rough opening, then it can be bent to be flush with the interior surface of the buck or rough opening. Use two #8 x 1-3/4" Flat Head Sheet Metal Screws.



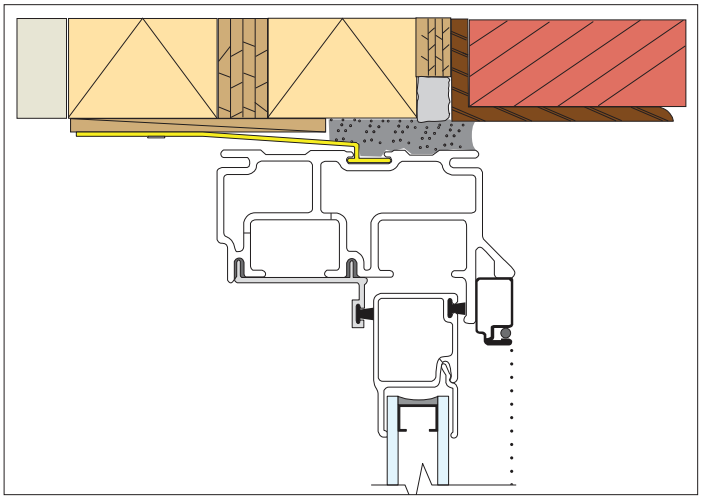



1. Insert Closed Cell Foam Backer Rod into space around the window leaving 1/4" space between backer rod and exterior face of thewindow

2. Apply bead of quality sealant around entire perimeter

3. Tool and shape and clean excess sealant.



1. Insert Slow Expansion foam tape (Hanno or equal) between the window and the old opening with sufficient room to allow expansion and conformity to the irregularities of the opening.

Sealant may not be required.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# Anchoring Windows & Doors to Meet Design Pressure Requirements

**Design Pressure ratings**
Windows and doors are usually selected for their structural performance characteristics based on local or state building code requirements. The requirement changes based on what floor it's installed on, what type of building it's installed in, and what the weather characteristics are in the particular geographic area it is put into service.

Obviously commercial grade windows, hurricane resistant windows and other higher structural requirement conditions will designate a stronger window.

The storm resistant window requirement headed north when the new International Residential Code began mandating them all the way up the eastern seaboard, but not all areas need the same windows as South Florida.

**Codes demand field installation to match lab conditions**
Windows must meet a "design pressure" requirement that's determined by a number of factors, the most important of which is the geographic wind speed zone the house is in.

Design pressure is the determining factor, and the wind zones dictate that pressure. Higher DP Ratings are important in many areas of the country, not just South Florida..

Structures right along the U.S. coast have the toughest requirements because they bear the brunt of any storm. Homes a few miles inland generally have a lower design pressure, because the code assumes that surrounding structures will provide some shelter from the wind.

Downtown urban areas might get an additional break because of the shelter provided by tall buildings. The heights of the structure and the surrounding structures also come into play, as does the size of the opening. Buildings that are critical to the community, such as fire stations and hospitals, have tougher requirements than other structures in a particular zone. Local codes will usually be specific.

Design pressure calculations can get extremely complex. Most manufacturers are happy to provide help in determining qualifications of their products for certain applications. However, you should confirm the product's performance ratings with the local building department to make sure they meet the local building code requirements.

Residential Replacement codes specify certain Design Pressure (DP) Ratings. DP ratings are established by testing the window to pressures equal to 1.5 times the DP requirement. In other words, if a window is required to meet DP40, then it is actually tested to 60psf. If a window is required to meet DP20, then it is tested to 30psf.

All building Codes demand that the window or door unit use *"Fastener size and spacing be provided in instructions and that they shall be calculated based on maximum loads and spacing used in tests."* (ICC Code 1405.13.1)

**Performance Grade**
Performance is designated by a number that follows the type and class designation. For example, Double-Hung Residential window may be designated DP15. The number establishes the design pressure, in this case 15 psf. The structural test pressure for all windows and doors is 50% higher than the design pressure which, for the example DP15 window, would have been successfully tested at 22.5 psf structural test pressure.

Minimum design pressure, structural test pressure, and water resistance test pressures for the five classes in pounds per square foot are shown here.

| Window and Door Classes | Design Pressure | Structural Test Pressure | Water Resistance Test Pressure |
|---|---|---|---|
| Residential | 15 | 22.5 | 2.86 |
| Light Commercial | 25 | 37.5 | 3.75 |
| Commercial | 30 | 45.0 | 4.50 |
| Heavy Commercial | 40 | 60.0 | 6.00 |
| Architectural | 40 | 60.0 | 8.00 |


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Anchoring in the home must match the mounting in the lab to duplicate the lab performance in the home and meet code requirements.

There is a formula that can be used to deliver acceptable spacing for residential installation. Number of fasteners per side = Test Pressure x Width x Height x .0001/4

A 36” x 60” window for a required 40 psf wind pressure: No. of fasteners = (P x W x H)(.0001)/4  figures to be (40psf x 36” x 60”)(.0001)/4 = 2.16 clips

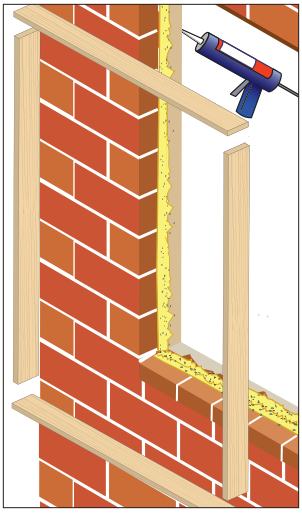
Rounded up to the next higher number, install 3 fasteners starting 4”-6”” from top and bottom and no more than 16” between - or as specified in the test results.

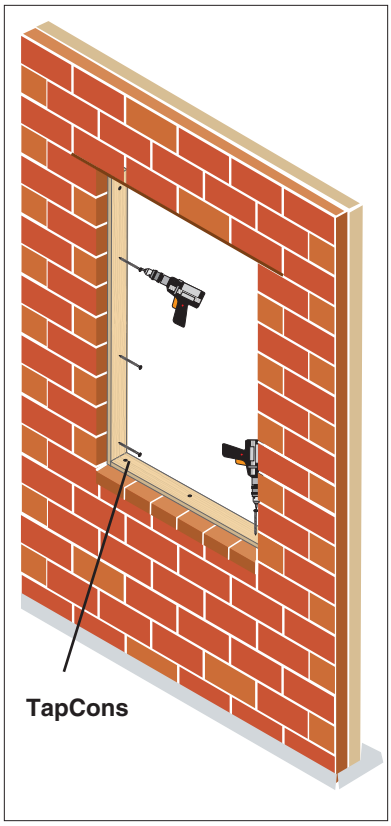
## Mounting New Windows in Masonry

If the old window is mounted in a masonry opening or an opening with a masonry or brick veneer, and the old window is completely removed, frame and all, it is critical to allow the proper anchoring of the new window to match the required spacing and fastener length.

## Bucking the Opening

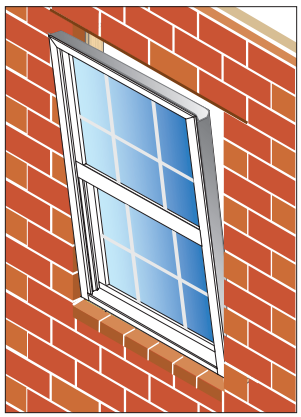
It is best to install a wood buck to cover the old joint. Use Tapcons of sufficient length to penetrate the masonry 1-3/8 “ properly spaced matching the test.

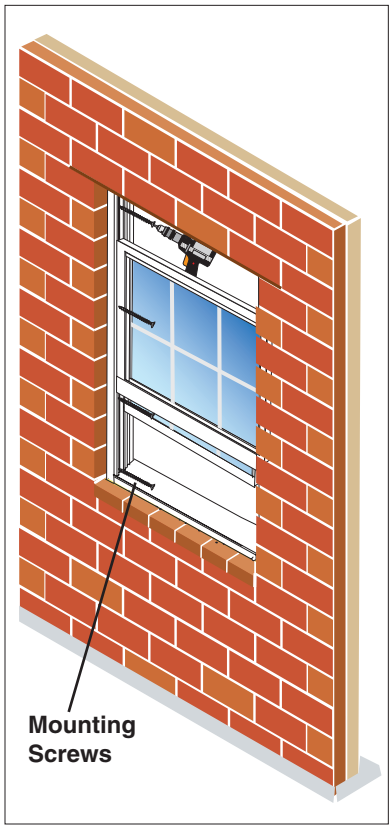





## Mounting the New Window

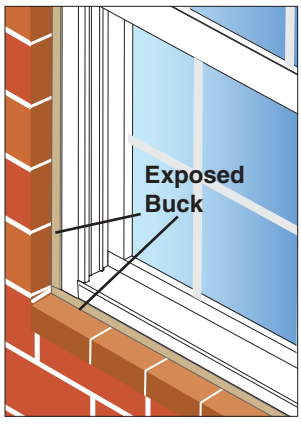
Foam wrap the new window and insert into the opening. Use Screw fasteners of sufficient length to penetrate the wood buck 1-3/8” properly spaced to match the test. It is best to avoid penetrating the sill

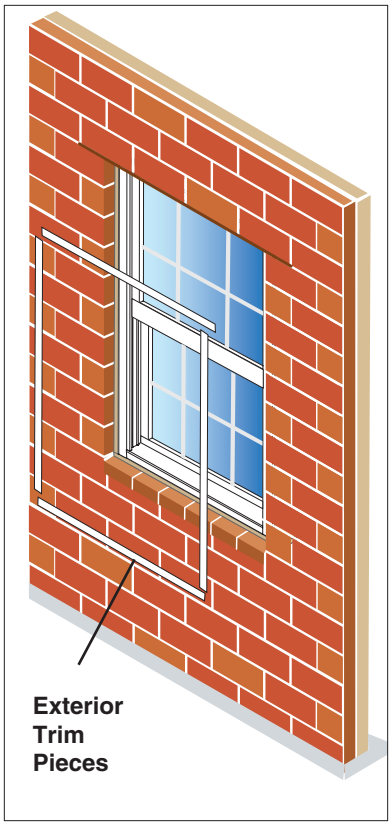





## Finish Sealing

Mounting to the wood buck will leave the outside face of the buck exposed. Use finish capping (aluminum or pre-fab trim) to seal the exterior to the weather. Allow adequate sill drainage.



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