

# 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

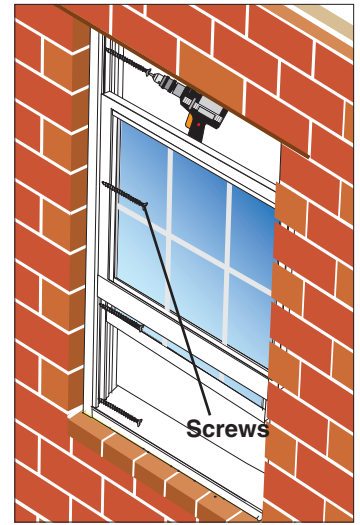
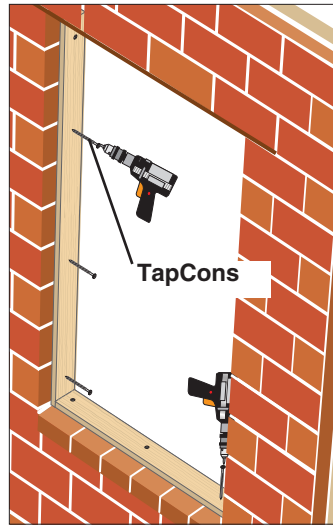
Windows must meet a "design pressure" requirement that's determined by a number of factors, the most important of which is the geographic wind speed zone the house is in.

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. 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 areas might get an additional break because of the shelter provided by tall buildings. Local codes will usually be specific.

Anchoring in the home must match the mounting in the lab to duplicate the lab performance in the home and meet code requirements. Design pressure calculations can get extremely complex.



**Wood Bucks must be anchored to openings with the same spacing as used in laboratory tests. Window anchors, direct to the opening or to an installed buck must also match the spacing used in laboratory tests.**

Most manufacturers are happy to provide help in determining qualifications of their products for certain applications.

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)**

## Proper Anchor Spacing

The window manufacturer should provide guidance for the proper spacing as required in the ICC Code stated above. However, 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")(0.0001)/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. psf structural test pressure.

For reference. 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