



Home

Roofs

Openings

Features & Equip.

Leaks

Structural

Survey & Decisions

[Home](#) > [Openings](#) > [Window Protection](#)

[PDF Version](#) [Questions](#)

## Window Protection

There are **three** things you need to consider when you think about increasing the hurricane protection of your home by protecting windows. They are:

- Preventing broken glass
- Improving the window frame anchorage
- Reducing the potential for water intrusion

### Glass Breakage

Windows that get broken by debris will let a huge amount of water and strong winds into your house. A house exposed to hurricane Charley had a bedroom window that measured 3' by 3' broken by a shingle from a nearby house. The wall opposite the window was completely wet from floor to ceiling and there was grass debris plastered on that same area. You can imagine how much water entered that room and flowed into other rooms ruining carpets, bedding, furniture, clothing, and drywall. If that house had not gotten dried out within the next day or so, the repairs would have been extensive and the house would likely have been uninhabitable for some time because of mold and odors and then the subsequent repairs. This is not an isolated incident. It makes it quite clear that protecting windows from getting broken is extremely important.



**Note all of the small debris on the windows in addition to the broken window - when a window is broken, the water and debris gets blown into your house.**

(click image for larger version)

The two solutions for window protection are debris resistant windows or storm panels. Debris resistant windows are made of special glass that though it may get broken (cracked) the glass will not fall out of the frame and let water pour into the house. The comforting thing about such windows is that they are always in place to protect your home. Unfortunately they are not inexpensive, but when replacing windows for other reasons the extra cost may not be that great, particularly if you are

planning on installing a mid- to upper-range window product anyway. While impact rated windows can cost 3 times the least expensive window that has the pressure rating needed for your location, it may only cost 30% more than the premium window from the same manufacturer. The alternative is to install storm panels on the outside of your home, in front of windows, that will absorb the shock of debris without breaking and without allowing the window glass behind it to break.

The least expensive way to protect your existing windows and more importantly your home from damage in hurricanes is to install tested and approved impact-resistant shutters over all windows. Not only do they protect windows from most common wind-borne objects, but they can reduce the chances of damage caused by pressurization of your home if a window or door is broken. The easiest retrofits are those that simply cover the opening with an approved structural panel.

In past hurricanes, many homeowners, upon returning, have noticed that their temporary shutters blew off. The reason is that they were not adequately fastened. Consequently, it is important to select an adequate protective system as well as providing strong permanent anchors for the system.

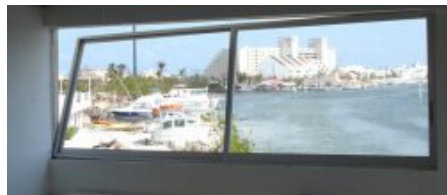
There are a number of do-it-yourself (DIY) ways to protect your windows including a number of kit systems available at home improvement stores. There are also a tremendous number of commercial products that you can have professionally installed. You can review a reasonably complete matrix of the types of window protection systems, both DIY and for professional installation, in the following document:

[HRG\\_Shutter\\_Matrix.pdf](#)

More specific information on DIY systems is available by clicking on [Do-It-Yourself Shutters](#) and more specific information on commercial shutter systems is available by clicking on [Commercial Shutters](#).

### **Keeping a window in place:**

A common problem in older homes is that the window frames are frequently not well enough attached to the house to withstand very strong winds. A 50 mph wind only pushes on a window or door with about 5 to 7 pounds of force per square foot of area, whereas a 100 mph wind applies 20 to 28 pounds per square foot, and a 130 mph wind applies 34 to 47 pounds per square foot. These forces are applied on every square foot of a window. This means that a bedroom window that is say 3' wide by 5' long, when subjected to a 100 mph wind, has between 300 to 420 pounds of force applied to the window and the frame. Think about having 2 men or 3 women sitting on the window. Most windows simply are not designed for those kinds of weights and traditionally have not been installed to withstand them either. The good news is that most window frames lend themselves to being more securely attached to a house.



**Poorly attached frames can break loose in high winds - this one was pushed out to relieve internal pressures.**

(click image for larger version)



**This window and frame was pushed in by the wind**

(click image for larger version)

Unless a shutter is pretty well sealed to the house, it will not significantly reduce the wind pressures on the window. Research has shown that it doesn't take much of an air gap around the edges of the shutters for pressures on the outside of the shutter or wall next to the shutter to be applied to the window. At even the highest wind speeds in a hurricane, air is basically incompressible (you have to get close to the speed of sound before you compress air very much) so unless the windows are very leaky, it will not take much air flow into the space behind the shutter before the pressure builds up on the window. Consequently, you should stay away from windows even if they are shuttered and **if you notice that windows are starting to bow inward** because of wind pressure, **get out of the room - do not try to help by pushing back on the windows!**

Strengthening the installation of a window in a frame wall - Screws or nails can be installed through the jamb of the window and if the screws are long enough they can penetrate house framing well enough to provide good anchorage. Bear in mind that screws have to be long enough to get a bite into the framing of the building after they have penetrated the spacing gap that has traditionally been left between the window and the wall so that the window could be shimmed to make it vertical even if the framing is not quite perfect. A gap of 1/2" to 1" on each side is pretty typical. When you tighten the screw, be sure you do not distort the window frame (jamb) so that the window does not operate properly or smoothly.

Strengthening the installation of windows in block walls - Tapcons can be installed through the jamb of the window. They have to be long enough to penetrate the jamb of the window, the shim space, and perhaps a 3/4" thick wood buck strip, plus get a 1 1/2" bite into the masonry wall. Be sure the head of the Tapcon does not interfere with the operation of the window. A bevel head may be best. Note that you will have to pre-drill a hole for each screw. You can drill through the window jamb and the wood using a normal high-speed drill bit but you will need to drill into the masonry with a masonry drill bit of the correct diameter for the particular Tapcon screw you intend to use. When you tighten the screw, be sure you do not distort the window frame (jamb) so that the window does not operate properly or smoothly.



**Screw, nails and Tapcons.** The length of the fastener will be determined by the considerations already discussed. Wood screws should be #10. Nails should be 8 or 10 penny. Tapcons can be 3/16" diameter. Finish nails will be the least visually apparent. Counter sinking nails just a little below the surface and then filling the shallow hole with caulk will make them nearly invisible. If you are sure you are getting a good bite into the structure of the house, then space the first fastener within 6" of the end of the jamb (one fastener at the top and one at the bottom of each side) and then no farther apart than 12". When you install fasteners you can probably feel how well they are biting into the building. If they are absolutely loose, you may have to use a longer fastener. If they are just somewhat infirm the wood of the house may be rotted because of water damage or termites. Or the fastener may be missing the structure. This is sometimes the case when the window on a frame house is located near the outside face of the wall.

You should discount the value of any existing nails or screws holding the window in place because in the past not much attention was paid to how many or more importantly how far they penetrated into the structure.



**Caulk.** You can use a good quality caulk such as a urethane caulk to help secure a window. A good bead of caulk around a window that is wedged to the surface of the house and the window can provide a lot of strength and secondarily provide a barrier to water entry. Regular silicone caulks are not recommended. If you use white caulk select one formulated to be UV resistant so it does not turn yellow. The bead of caulk should not be left so the shape is concave because this does not leave the caulk thick enough to be very effective. Further it is likely to crack because of temperature changes. Most of us find it difficult not to make the caulk look pretty by running our finger along the joint, but it does substantially reduce the effectiveness of the caulk. With this said, it can be beneficial to assure adhesion of caulk by pressing it into the two surfaces to form a concave shape. If you do this, you will need to go back and add a continuous bead of caulk to this first layer so that

there is enough thickness for the caulk to react to temperature changes without cracking.

### Leaks at windows:

You may well have noticed that water has accumulated on windowsills in thunderstorms. The water is probably rain that got blown by the thunderstorm between parts of the window frame (sash) that holds the glass and the overall frame of the window assembly. Because this is such an occasional event, it usually does not do any or much damage to the house other than cause paint to peel. If the paint around a window is blistered, especially on the lower end of the window, then the window may be quite prone to let a lot of water in the house if a hurricane blows through.

Tape between a window sash and the frame applied from the inside will be almost completely ineffective at keeping water out. The wind will just loosen the tape to let water pass. Tape on the outside would be more effective if the tape is water resistant enough to stay adhered.



**Leaks around windows.** The gap between the frame of the window and the sash (movable part of a window assembly) can be made to be pretty air tight under normal conditions. Hurricanes are not normal conditions. In order for a sash to move in the frame over a range of temperatures the manufacture has to provide a gap. Even if the gap is only as large as the thickness of a couple of sheets of paper it can cumulatively result in a much larger area than you might think. For example if we consider a bedroom egress window sash it is likely on the order of 36" wide by about 36" high so it has a perimeter of 36" times its 4 sides. So the total crack is 72" long. The area of the crack accumulates to be equivalent in area to a square hole with 1 inch sides. In a hurricane this could be like someone standing outside with a garden hose squirting it through your window. You can imagine how much water can come through. So you should not be surprised that in a hurricane a window will allow a lot of water to enter; more water than you can mop up with bath towels. Besides if you are prudent you will not be in that upwind room during a hurricane.

Window manufacturers are working on designs that are less likely to leak, but most of the high performance windows currently available are for commercial buildings and cost considerably more, are rarely operable, and look a lot different than

windows for homes.

Although there are no hard numbers to back up the extra protection against water intrusion afforded by shutters, there is evidence that they can help. This is particularly true if the shutters help keep down the amount of water that builds up on the window and thus is available to be driven through cracks. One row in the shutter matrix gives some preliminary thoughts about how various systems may perform in reducing water intrusion.

### **Duct tape may be no joke!**

#### **Water Intrusion Preventative Measures At Doors And Windows**

Although it is unproven, it seems that suitable tape applied to the outside of your windows to cover the cracks between the frame and the sash or parts of the sash where windows overlap might reduce the amount of water getting driven into your house. The tape must be sticky enough to stay on and must be water resistant enough to maintain its effectiveness. Two types of tape might offer such features. One would be a good quality cloth duct tape. Unfortunately there are a lot of inferior quality duct tapes. Aluminum foil type taped used by AC duct installers is more reliable. The aluminum tape about 2½" wide has paper applied to the sticky side that one removes when applying the tape. Some brands of this tape have printed instruction for installation. The most important installation hint is to use a semi-rigid squeegee to rub over the tape to press the adhesive to the substrate. When using any tape, the surface must be dust and grease free. Unfortunately nearly all tapes have to be applied to dry surfaces. So plan ahead.

#### **Taking Action:**

Providing window protection is regarded by experts who have studied the effects of hurricanes to be the second most important issue to address (roofs are the first) to protect a building. Debris resistant windows solve the issue of window breakage quite handily. Storm panels are a good option as well. However, you should also take action to strengthen the anchorage of your window frames and seek to reduce the chances that water will be blown into your home when a hurricane strikes.

[Do-It-Yourself Shutters](#)

[Commercial Shutters](#)

[Protecting Entry Doors](#)

[Protecting Sliding Glass Doors](#)

[Back to Main Openings Page](#)

[PDF Version](#)

---