Commercial Series

WINDOWS, WIND & WINDBORNE DEBRIS:
HOW TO PROTECT YOUR BUSINESS FROM HURRICANES

During a hurricane, the failure of any opening can allow wind and water to enter a building and wreak havoc. That's why all windows and glass in doors should be protected well in advance of a storm. Learn how to identify and select the right window protection system for your building to reduce risks from hurricanes and other high-wind events.

It's important to protect windows during high winds in order to reduce costly damage and interruptions.

TYPES OF WINDOWS

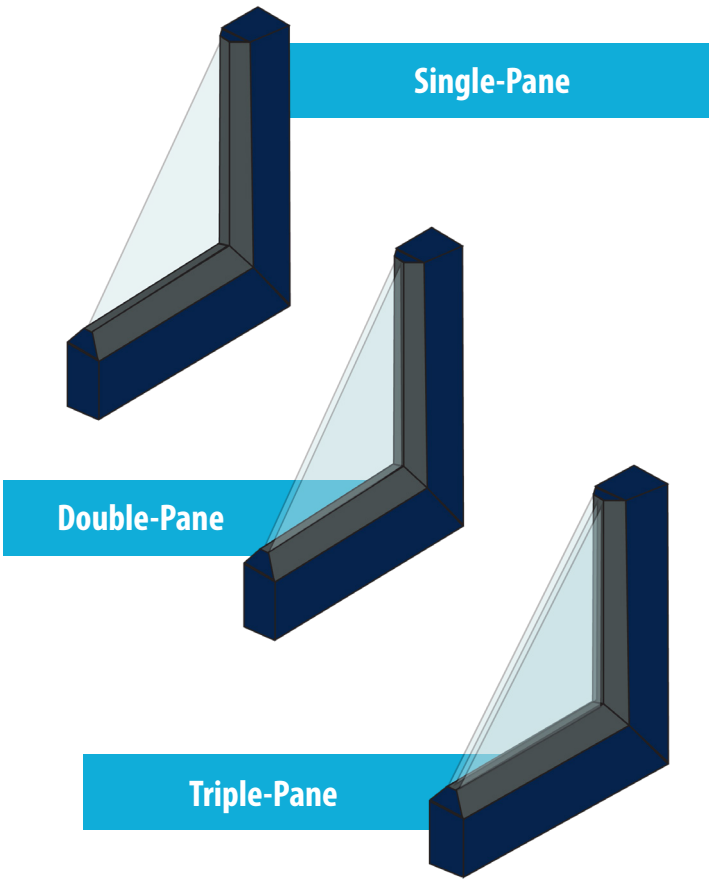
- **Single-pane windows** are easily identifiable because there is only one piece of glass in the frame. While these windows may be found in many older buildings, they generally are being phased out in favor of more thermally efficient double-pane windows.

- **Double-pane windows** include two pieces of glass with an air gap in between. Advantages include better insulation, noise reduction, and UV control. However, double-pane windows are not designed to withstand windborne debris and should be protected just like single-pane glass when a hurricane threatens.

- **Laminated glass windows** consist of two pieces of glass sandwiching a sheet of clear polyvinyl butyral (PVB) plastic laminate. Although glass layers may break if subjected to significant force, they remain bonded to the laminate and thus are unlikely to shatter, which reduces the likelihood of injury. However, laminated glass alone is not rated to provide protection against windborne debris that may occur during a hurricane.

- **Impact-rated laminated window systems** are a combination of laminated glass and reinforced window frames. They are the only window systems tested and designed to protect against wind pressure and windborne debris. It is important to note that all impact-rated windows are laminated glass systems, but not all laminated glass systems are impact-rated. When a product is labeled "laminated," it does not mean it has passed the large and/or small missile impact tests necessary for an impact rating.

- **Triple-pane impact-rated laminated window systems** have entered the market as building owners have looked for energy efficiency along with windborne debris impact protection. These systems usually include a third pane of glass on the outside surface of the window and an impact-rated laminated glass panel on the inside with an air space between the outer pane and the laminated inner panel. Recently, blinds have been incorporated into these systems by being placed in between the panes of glass.



BEST WINDOWS FOR HURRICANE PROTECTION

In hurricane-prone regions, the most important factors in selecting windows include pressure rating and how they will be protected from windborne debris. While many products provide windborne debris impact protection, only impact-rated window systems are designed and certified to protect your building from both windborne debris and wind pressure without an additional exterior protection system such as shutters. Another key advantage of impact-rated windows is they are in place 24/7. They do not need to be activated when you are busy with other storm preparations and they also provide protection against unexpected weather events.

There are practical limitations to the performance of any typical commercial window system or window protection system. While systems are tested and rated, there is a relatively low probability they will fail in extreme wind events.

COMMERCIAL WINDOW TESTING STANDARDS

For a window protection system to be impact-rated, it must meet testing standards established by the American Society for Testing and Materials (ASTM). Although a window's impact rating is not etched on the glass, reputable window manufacturers and dealers should be able to provide appropriate documentation and labels that can be applied to window frames. The documentation will indicate the window is consistent with one of the following standards:

- ASTM E1886, E1996
- AAMA 506
- Florida Building Code TAS 201, 202, 203
- Miami-Dade County Product Control Approved and NOA number per TAS 201, 202, 203

Meeting any of the above test standards for the building-specific wind pressures should provide adequate protection in most high-wind situations. The International Building Code (IBC) references only the ASTM standards listed above. Contact a local window manufacturer or installer, or a design professional to assist with meeting the site-specific requirements and to ensure local municipal requirements are being met.

IDENTIFYING IMPACT-RATED WINDOWS

Unfortunately, because of the similar appearance among different window systems, many building owners confuse the protections of double-pane, laminated, and impact-rated window systems, especially if they have been told they meet a "high wind speed." Regardless of verbal assurances, only windows certified as impact-rated can be expected to protect your interior from wind and windborne debris.

The major defining feature of a laminated impact-rated glass panel is the two panes of glass with a relatively thick membrane between the panes. When you tap on a laminated glass, it will sound solid as compared to single panes of glass separated by a ½-inch air barrier. However, the easiest way to identify how many layers of glass are in the window and how far apart they are is to shine a laser pointer through the window at a slight angle to the surface. You should be able to identify a reflection from each surface of each glass pane. Because glass panes are rarely more than ¼ inch thick, you can usually identify whether the panes are close together or separated by a ½-inch air space.

LOCATION, LOCATION, LOCATION

Window damage related to hurricanes is most frequently attributed to windborne debris. The IBC requires window protection for new construction in windborne debris regions within hurricane-prone areas. While not required by the IBC, non-impact-rated windows on existing buildings in these locations should be protected as well (e.g., with shutters). For best practices, IBHS recommends impact-rated window protection systems be installed for buildings located in all hurricane-prone regions.

Additionally, consider protecting windows of buildings located in inland hurricane-prone areas where there is little tree cover and buildings in the surrounding area have roof gravel, shingles, signage, or other building components that may become windborne debris and potentially hit your building during a hurricane.

ADDITIONAL CONSIDERATIONS FOR IMPACT-RATED WINDOWS

- Before replacing existing windows with an impact-rated window system, walls should be analyzed to ensure they meet the demands of additional frame securement.
- Impact-rated windows cannot protect your property if they are left open during a storm. It is a myth that windows should be left open so that air pressure doesn't explode the building. Open windows allow wind and water to enter the building without any protective shield.

PROTECTING EXISTING, NON-IMPACT-RATED WINDOWS

If installing impact-rated windows is not feasible, there are several practical and economical options for protecting the windows of commercial buildings located in windborne debris regions. Remember, when it comes to windborne debris, all windows and glass in doors must be protected for the safety of the entire structure.

- **Taping glass does nothing** to address the main point of protection, which is to keep the glass intact, in its frame, and securely attached to the structure.

- Roll-down or accordion shutters are the easiest to activate since they are always in place. However, they are also more expensive than some other options. Since roll-down shutters require a "rectangular box" above the window and accordions require the "stack" to fold up on the side of the window, aesthetics should be included in the decision-making.

- Other options requiring installation prior to a storm include metal or polycarbonate panel shutters, various fabric and screen panels, and plywood (which should only be used as a last-minute alternative). To be effective, these protective layers must be cut to fit the window openings and be firmly attached to the building.

Plywood (top) should only be used as a last-minute alternative, while roll-down shutters (bottom) are the easiest to activate.

To determine the best option for your facility, consider the following questions regarding advanced deployment:

- Is sufficient staff available and capable of installing shutters, plywood, or panels within 24 hours of an impending storm?

- Is extra equipment such as a ladder or man lift needed to access windows?

- Is the building's construction compatible with installing pre-mounted anchors and bolts?

- Is there enough storage space for shutters or plywood? (Corrugated shutters should be pre-labeled and stored flat or properly secured to a wall to prevent them from falling over. Plywood should be pre-labeled, pre-drilled, and stored lying flat.)

- When is it practical to conduct a dry run/installation exercise?

For additional assistance in choosing the right protection, see the IBHS Selection Guide for Shutters & Other Protective Barriers. This guide compares important variables of window protection options including pros and cons, advance deployment time needed, water resistance and operation methods, as well as costs associated with do-it-yourself versus professional installation.

PLAN, PREPARE & ACT

Window protection is a key aspect of hurricane readiness and business owners must do their planning, purchasing, and initial preparations well in advance of a storm. Equally important is to apply these protections to all glass windows and doors that link the inside of your business to the outside world. Finally, remember that the only effective window protection is one that is used—this includes activation of shutters, panels and plywood, and the complete closing of all windows and doors.