

Shutter Alternatives



FEMA



HOME BUILDER'S GUIDE TO COASTAL CONSTRUCTION FEMA 499/August 2005 Technical Fact Sheet No. 26

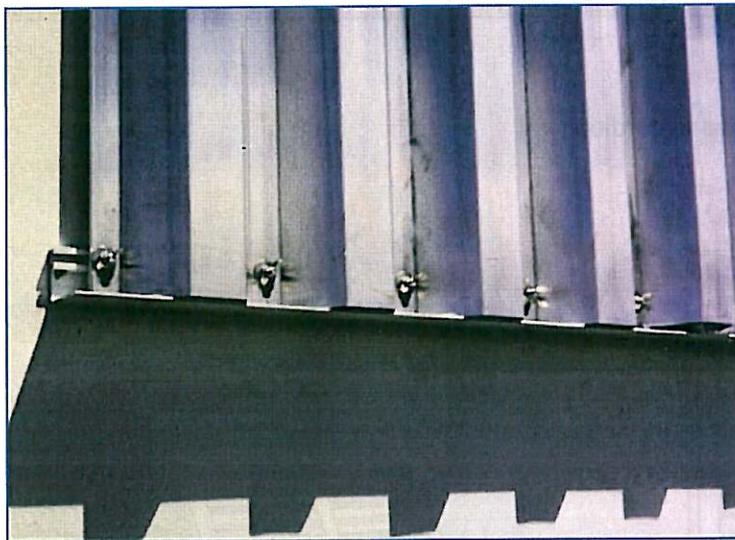
Purpose: To provide general information about the installation and use of storm shutters in coastal areas.

Why Are Storm Shutters Needed?

Shutters are an important part of a hurricane-resistant or storm-resistant home. They provide protection for glass doors and windows against windborne debris, which is often present in coastal storms. Keeping the building envelope intact (i.e., no window or door breakage) during a major windstorm is vital to the structural integrity of a home. If the envelope is breached, sudden pressurization of the interior can cause major structural damage (e.g., roof loss) and will lead to significant interior and contents damage from wind-driven rain.



Plywood panels are a cost-effective means of protection.



Temporary, manufactured metal panel shutter. The shutter is installed in a track permanently mounted above and below the window frame. The shutter is placed in the track and secured with wing nuts to studs mounted on the track. This type of shutter is effective and quickly installed, and the wing nut and stud system provides a secure anchoring method.

Where Are Storm Shutters Required and Recommended?

Model building codes, which incorporate wind provisions from ASCE 7 (1998 edition and later), **require** that buildings within the most hazardous portion of the **hurricane-prone region**, called the **windborne debris region** (see page 4 of this fact sheet), either (1) be equipped with shutters or impact-resistant glazing and designed as enclosed structures, or (2) be designed as partially enclosed structures (as if the windows and doors are broken out). Designing a partially enclosed structure typically requires upgrading structural components and connections, but will not provide protection to the interior of the building. Designers and owners should assume that a total loss of the building interior and contents will occur in partially enclosed structures.

Using opening protection (e.g., shutters or laminated glass) is recommended in

Note: Many coastal homes have large and unusually shaped windows, which will require expensive, custom shutters. Alternatively, such windows can be fabricated with laminated (impact-resistant) glass.

windborne debris regions, as opposed to designing a partially enclosed structure. The *Home Builder's Guide to Coastal Construction* also recommends giving strong consideration to the use of opening protection in all hurricane-prone areas where the basic wind speed is 100 mph (3-second peak gust) or greater, even though the model building codes do not require it. Designers should check with the jurisdiction to determine whether state or local requirements for opening protection exceed those of the model code.

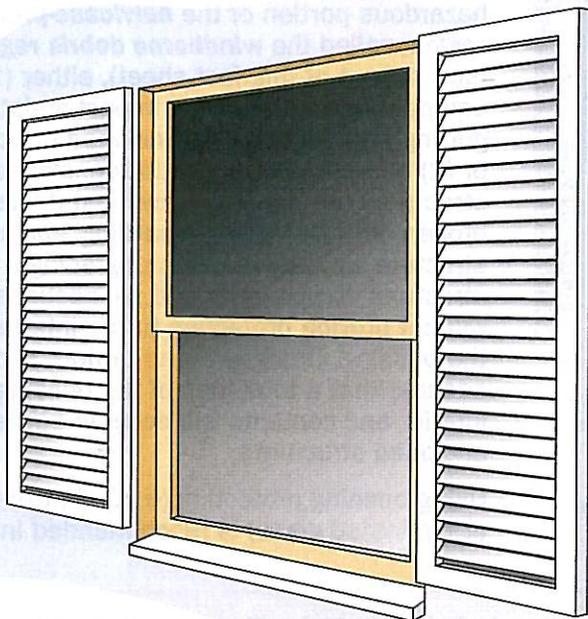
What Types of Shutters Are Available?

A wide variety of shutter types are available, from the very expensive motor-driven, roll-up type, to the less expensive temporary plywood panels (see photograph on page 1 of this fact sheet). Designers can refer to Miami-Dade County, Florida, which has established a product approval mechanism for shutters and other building materials to ensure they are rated for particular wind and windborne debris loads (see Additional Resources on page 5 of this fact sheet).

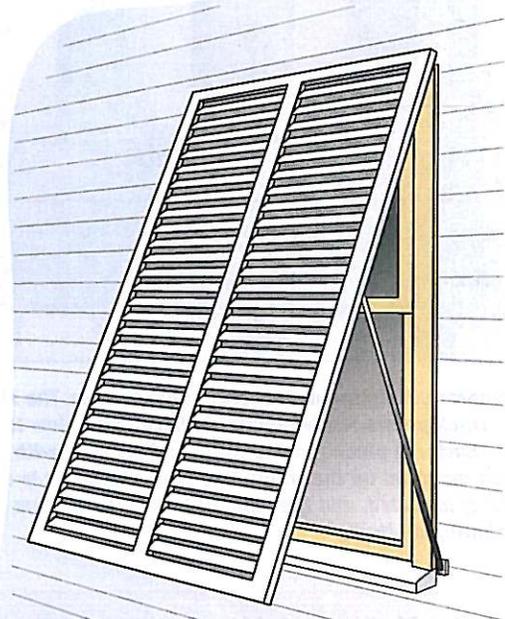
Shutter Type	Cost	Advantages	Disadvantages
Temporary plywood panels	Low	Inexpensive	Must be installed and taken down every time they are needed; must be adequately anchored to prevent blow-off; difficult to install on upper levels
Temporary manufactured panels	Low/Medium	Easily installed on lower levels	Must be installed and taken down every time they are needed; difficult to install on upper levels
Permanent, manual-closing	Medium/High	Always in place Ready to be closed	Must be closed manually from the outside; difficult to access on upper levels
Permanent, motor-driven	High	Easily opened and closed from the inside	Expensive

Shutter Styles

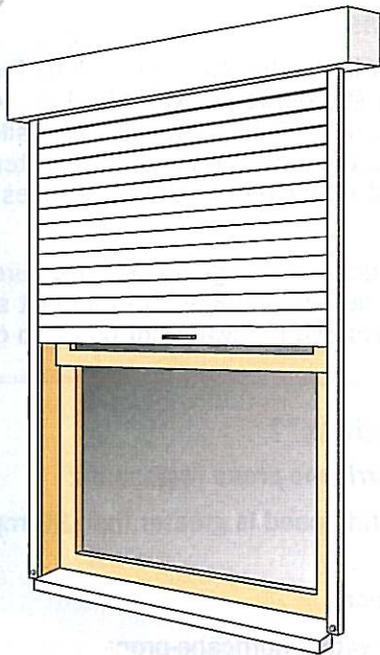
Shutter styles include colonial, Bahama, roll-up, and accordion.



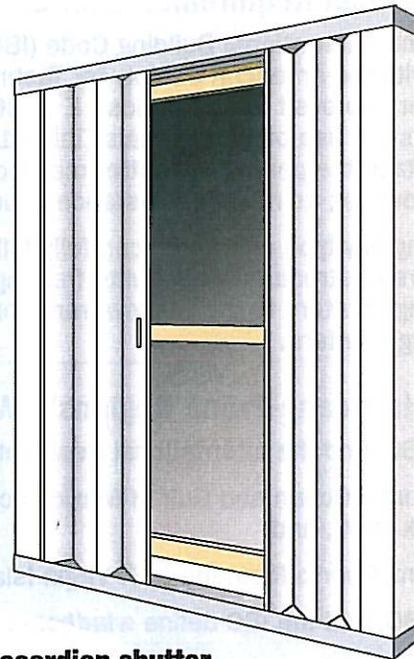
Colonial shutters



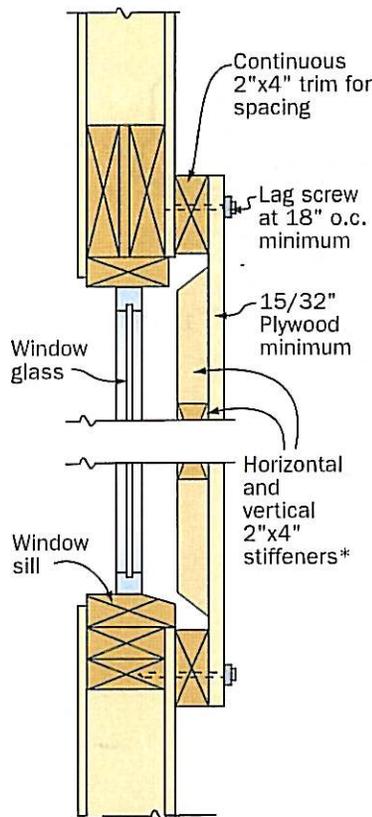
Bahama shutter



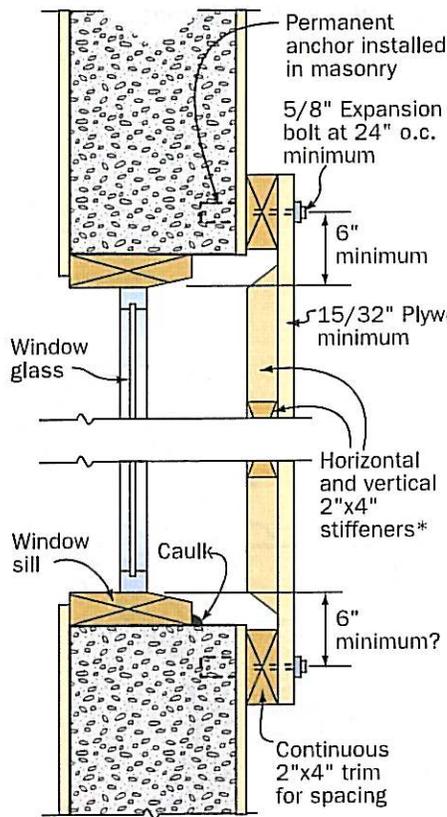
Roll-up shutter



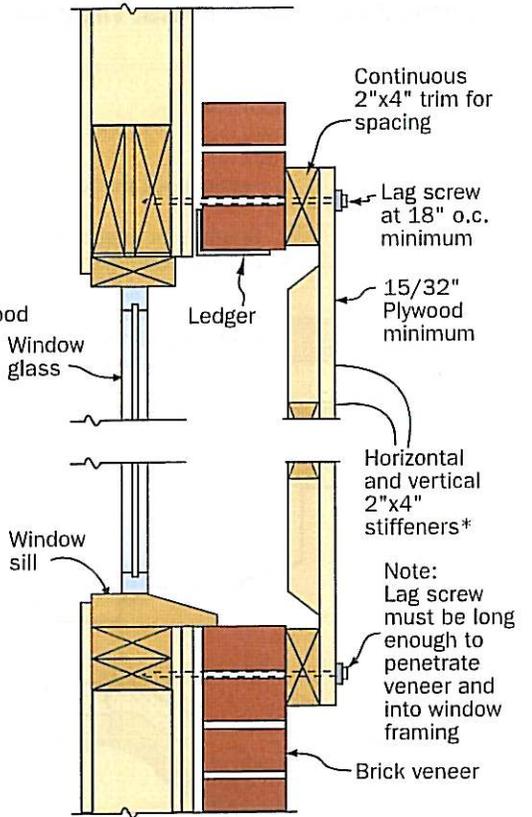
Accordion shutter



Wood Stud Wall



Masonry Wall



Wood Stud Wall With Brick Veneer

*Stiffener can be on either side, although for inside location, adequate space between windowpane and stiffener must be provided.

Common methods for plywood shutter attachment to wood-frame and masonry walls. (For actual shutter design, refer to design drawings or see the Engineered Wood Association guidelines for constructing plywood shutters.)

Are There Special Requirements for Shutters in Coastal Areas?

ASCE 7 and the International Building Code (IBC) state that shutters (or laminated glazing) shall be tested in accordance with the American Society for Testing and Materials (ASTM) standards ASTM E 1886 and ASTM E 1996 (or other approved test methods). E 1886 specifies the test procedure; E 1996 specifies missile loads. The IBC allows the use of wood panels (Table 1609.1.4) and prescribes the type and number of fasteners to be used to attach the panels. A shutter may look like it is capable of withstanding windborne missiles; unless it is tested, however, its missile resistance is unknown.

When installing any type of shutter, carefully follow manufacturer's instructions and guidelines. Be sure to attach shutters to structurally adequate framing members (see shutter details on page 3 of this fact sheet). Avoid attaching shutters to the window frame or brick veneer face. Always use hardware not prone to corrosion when installing shutters.

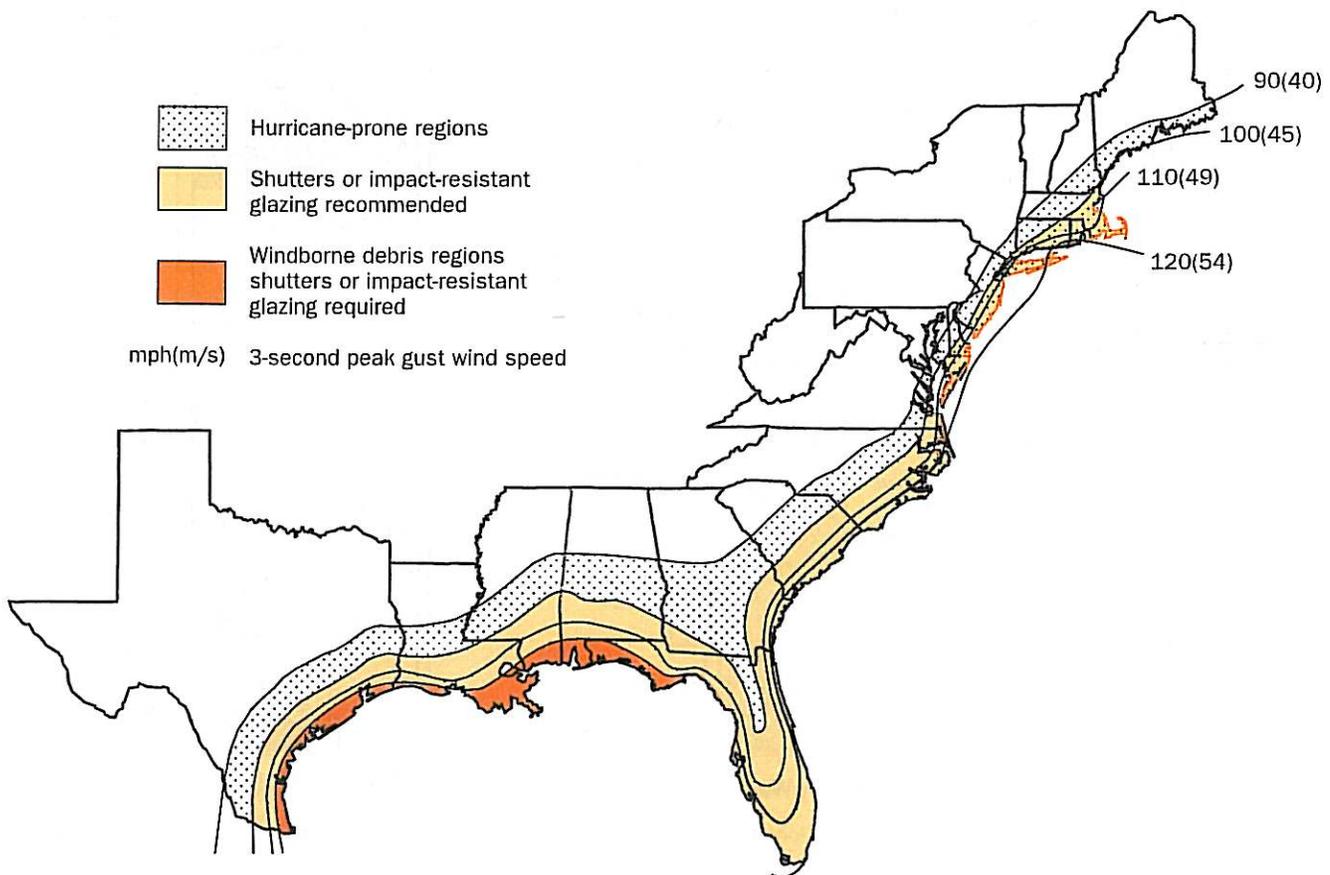
What Are "Hurricane-Prone Regions" "Windborne Debris Regions"?

ASCE 7, the IBC, and the International Residential Code (IRC) define **hurricane-prone regions** as:

- the U.S. Atlantic Ocean and Gulf of Mexico coasts where the basic wind speed is greater than 90 mph (3-second peak gust), and
- Hawaii, Guam, Puerto Rico, the U.S. Virgin Islands, and American Samoa.

ASCE 7, the IBC, and the IRC define **windborne debris regions** as areas within hurricane-prone regions located:

- within 1 mile of the coast where the basic wind speed is equal to or greater than 110 mph (3-second peak gust) and in Hawaii, or
- in all areas where the basic wind speed is equal to or greater than 120 mph (3-second peak gust), including Guam, Puerto Rico, the U.S. Virgin Islands, and American Samoa.



Additional Resources

American Society of Civil Engineers. *Minimum Design Loads for Buildings and Other Structures*, ASCE 7. (<http://www.asce.org>)

International Code Council. *International Building Code*. 2003. (<http://www.iccsafe.org>)

International Code Council. *International Residential Code*. 2003. (<http://www.iccsafe.org>)

The Engineered Wood Association. *Hurricane Shutter Designs Set 5 of 5. Hurricane shutter designs for wood-frame and masonry buildings*. (<http://www.apawood.org>)

Miami-Dade County, Florida, product testing and approval process – information available at http://www.miamidade.gov/buildingcode/pc_home.asp

