

# RETROFIT Improvements

Making Homes Safer & More Resilient in Disaster-Prone Areas

## Garage Door Reinforcement



### SCOPE

This document provides homeowners with an overview of garage door reinforcement techniques in hurricane-prone or other high-wind areas.

### PURPOSE

A strong garage door can help to minimize the risk of wind damage and water intrusion during hurricanes and windstorm.

### BENEFITS

- Minimizes the risk of structural damage to the house during a hurricane or high-wind event.
- Minimizes the associated risk of water damage during a storm.
- Helps protect occupants and household contents.

### RETROFIT OPPORTUNITY

Can be installed anytime.

### HAZARD AND RISK

During a hurricane or other high-wind event, a garage door can be damaged by wind or windborne debris. High winds can cause a garage door to fail by pushing it inward or pulling it outward until the door buckles or the door hardware fails. If a garage door fails during a storm, the entire house may be susceptible to wind and water intrusion that could cause extensive damage and even building failure.

### SOLUTION

A garage door that is not rated to resist the local wind-load requirements can be reinforced, braced, or replaced. Aftermarket reinforcement kits are available to strengthen existing garage doors. These kits generally provide horizontal metal struts that are attached to the inside of individual garage door panels and replacement hardware including heavy duty hinges, rollers, brackets, and fasteners.

Alternatively, aftermarket bracing kits are available that provide vertical 2x4 wood or metal braces installed on the inside of the garage door before a storm (see Figure 3). Unlike a reinforced door, the garage door cannot be opened with the braces in place, so they are removed after the storm. The intent of the brace is to prevent wind from pushing the door inward, and, when the brace is attached to the door, pulling it outward. The brace is attached to permanently installed hardware including an anchor in the floor, a bracket in the wall above the door, and brackets at each door hinge. Generally, one vertical brace is used for a one-car garage door, and two or three braces are used for two-car garage doors.

A replacement garage door should be selected to meet local wind-resistance and impact-resistance requirements. New garage doors are required to have a permanent label showing at a minimum the manufacturer and the door model number, positive and negative wind design pressure ratings, applicable test standards, and a reference to the manufacturer's installation drawings. Labels for impact-resistant doors will include performance characteristics such as the wind zone or size of test missiles. Where a state requires specific product approvals (e.g., Florida) the label should also list such approvals.

#### Wind Region Terminology

**Hurricane-Prone Regions:** Areas along the Atlantic and Gulf coasts where  $V > 115\text{mph}$ , and Hawaii, Puerto Rico, Guam, Virgin Islands, and American Samoa.

**High-Wind Areas (not code defined):** Generally where  $V > 115\text{mph}$  including portions of Alaska.

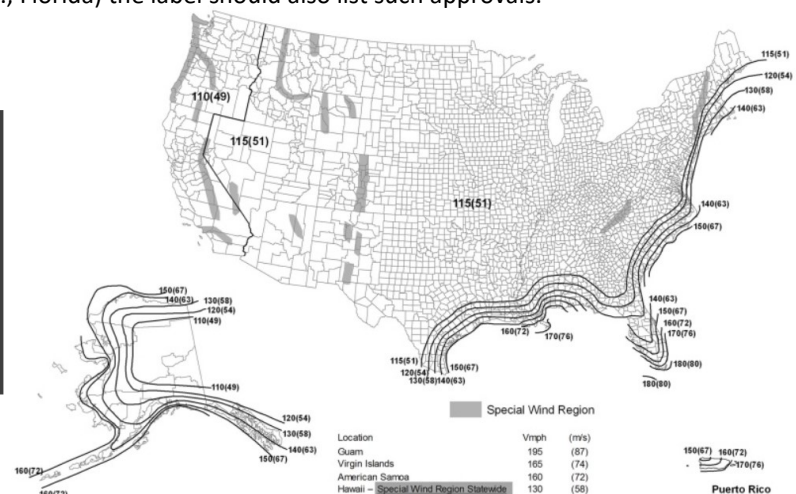


FIGURE 1. Wind Regions. Source: Figure R301.2(5)A Excerpted from the 2018 International Residential Code; Copyright 2017; Washington, D.C.: International Code Council. Reproduced with permission. All rights reserved. www.ICCSAFE.org

## TIPS

- It is recommended that aftermarket reinforcement kits and replacement garage doors be installed by a professional to ensure that products and attachments will withstand a storm.
- When installing a reinforcement or bracing kit, it is imperative to follow all manufacturer's installation instructions.
- Confirm that a replacement garage door meets all local applicable codes and requirements.
- Reinforced garage doors may reduce your home insurance premium.
- A hurricane shutter to protect the garage door is an alternative to garage door reinforcement.

## COST

The cost of a garage door bracing kit including one metal vertical brace is about \$200-300 not including installation (generally, a 1-car garage door requires 1 kit, and a 2-car garage door requires 2 or 3 kits). A hardware-only kit that utilizes customer provided 2x4 lumber bracing will cost less.

The cost of a reinforcement kit or a replacement garage door varies widely depending on the style, size, and wind-load capability. Contact a professional garage door installation company for pricing.

**Does my garage door need reinforcement?** This retrofit is recommended for houses located in hurricane-prone regions and other high-wind areas (see Figure 1) where existing garage doors do not meet the current wind load requirements. Houses located in windborne debris regions may also require garage doors and glazing in garage doors that are impact-rated.

**Code Considerations.** The International Residential Code (IRC) requires exterior building components and their attachments to be capable of resisting design wind pressures. The IRC requires new garage doors be tested in accordance with ASTM 330 or ANSI/DASMA 108 and meet the pass/fail criteria of ANSI/DASMA 108 (R609.4). In windborne debris regions, glazing in garage doors must be impact resistant glass or be protected by hurricane shutters (R609.6; R301.2.1.2). Local jurisdictions may also require specific product approvals for wind and impact resistance, e.g., Florida Standard TAS 202. Ask the local building department if your house is in a high-wind or hurricane-prone region or if local retrofit requirements exceed those of the national code.

**Best Practices.** It is important to install reinforcement kits, bracing kits, and replacement garage doors in accordance with all manufacturer instructions. A brace will strengthen the door against inward wind pressures, but a brace should also be attached to the garage door to resist outward wind pressures. A bracing kit may also require additional stop molding on the inside or outside of the garage door. A reinforcement kit will add weight to the garage door that may require adjusting the tension springs for proper operation. Making this adjustment can be dangerous and should be done by a professional installer.

A bracing kit cannot compensate entirely for a garage door that is in poor condition. Further, installing a reinforcement kit or bracing kit does not ensure that the garage door assembly meets all applicable codes. If replacing a garage door, confirm that the new door meets or exceeds all applicable requirements for wind-resistance, impact resistance, test standards, and local approvals.

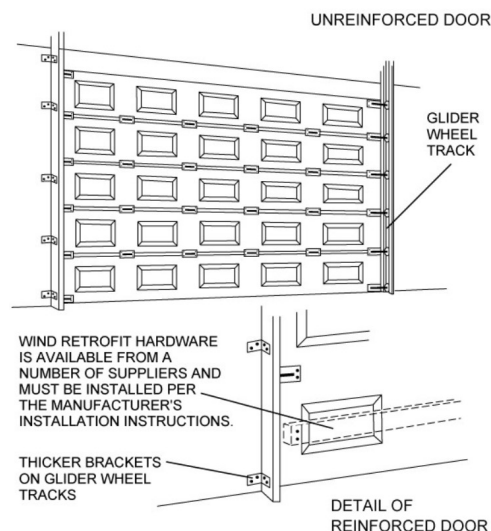


FIGURE 2.

Garage Door Reinforcement.

Source: *Avoiding Hurricane Damage (FEMA)*.



FIGURE 3.

Example Vertical Post Brace.

Source: *securedoorbraces.com*.

## ADDITIONAL RESOURCES

- [1] [Wind Retrofit Guide for Residential Buildings](#) (FEMA P-804)
- [2] [Avoiding Hurricane Damage](#) (FEMA)
- [3] [Protecting Doors: Garage Doors](#) (FEMA.ORG)
- [4] [How to Install Garage Door Storm Braces](#) (Lowe's.com)

