



2020 STANDARD

FORTIFIED Roof™
Designation Requirements

WEATHER HAZARDS



Hurricane



High Wind



Hail

LEVELS



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1 Program Overview

1.1 Designations

The FORTIFIED Home™ program was developed to reduce avoidable suffering and financial loss caused by hurricanes, high winds, and hail. The program requirements provide a systems-based, multi-tiered approach for improving the resistance of homes and their contents to damage caused by wind, wind-driven rain, and hail.

Achieving a “designation” means a home meets all requirements of a level of the FORTIFIED Home Program, required documentation of materials and installation has been submitted by an authorized third party and reviewed by IBHS, and a certificate of compliance for the property has been issued by IBHS.

Available Designations

There are 8 available FORTIFIED Roof™ designations based on the applicable weather hazard and roof category (new or existing).

STANDARDS	DESIGNATION LEVEL	
	FORTIFIED Roof™	
	NEW ROOF	EXISTING ROOF
FORTIFIED Home™–Hurricane		
FORTIFIED Home™–High Wind		
+ HAIL SUPPLEMENT		
FORTIFIED Home™–Hurricane & Hail		
FORTIFIED Home™–High Wind & Hail		

Designation Levels

There are three designation levels—FORTIFIED Roof™, FORTIFIED Silver™, and FORTIFIED Gold™—that build on each other and address different systems of the home. FORTIFIED Roof is the first level. To attain FORTIFIED Silver (the second level), the FORTIFIED Roof designation requirements must first be met. To attain FORTIFIED Gold (the third level), both the FORTIFIED Roof and FORTIFIED Silver designation requirements must first be met. This document only addresses the FORTIFIED Roof level of the 2020 FORTIFIED Home Standard. Refer to the complete [2020 FORTIFIED Home Standard](#) for information on FORTIFIED Gold and FORTIFIED Silver designation requirements.

Weather Hazard

The location of the home will determine which standard must be followed (FORTIFIED Home™–Hurricane or FORTIFIED Home™–High Wind). The optional FORTIFIED Home™–Hail Supplement may be used in conjunction with either standard (if all requirements are met) and will result in a FORTIFIED Home™–Hurricane & Hail or FORTIFIED Home™–High Wind & Hail designation.

Roof Category

Whether the roof is new or existing will also determine which program requirements must be followed.

New Roof designations are only appropriate for new construction or re-roofing projects where all roof sheathing, sealed roof deck, and roof covering systems are newly installed (less than 5 years old) and installation in compliance with FORTIFIED Home requirements is verifiable at the time of designation.

Existing Roof designations are appropriate for existing homes that have a roof and roof covering with greater than 5 useful years of life remaining that do not show visible signs of damage or deterioration. FORTIFIED homes seeking re-designation without re-roofing are only eligible for an Existing Roof designation. Similarly, newly installed roofs where the roof sheathing, sealed roof deck, and/or roof cover installation or wind rating cannot be verified are only eligible for an Existing Roof designation.

If a home qualifies for a FORTIFIED Roof – Existing Roof designation, then any higher-level designation (FORTIFIED Silver or FORTIFIED Gold) will also be indicated as “Existing Roof.” If the home qualifies for a FORTIFIED Roof – New Roof designation, then any higher-level designation (FORTIFIED Silver or FORTIFIED Gold) will also be indicated as “New Roof.”

Goals of FORTIFIED Roof Designation Level

	FORTIFIED Home™–Hurricane Build or retrofit home to minimize roof damage, attic water intrusion and associated damage by providing prescriptive roof sheathing and attachment, sealed roof deck, code-compliant roof covering, and approved roof and gable end vents/covers.
	FORTIFIED Home™–High Wind Build or retrofit home to minimize roof damage, attic water intrusion and associated damage by providing prescriptive roof sheathing and attachment, sealed roof deck, and code-compliant roof covering.
(Optional) Additional Requirements	FORTIFIED Home™–Hail Supplement Build or retrofit roof to minimize impact damage due to hail by providing properly impact-rated roof covering, skylights, and PV systems.

1.2 Designation Term Limit and Re-Designations

All designations are valid for 5 years. Designations expire on the fifth anniversary of designation date shown on the designation certificate. Homes may be re-designated for additional 5-year terms by having a re-designation inspection at the end of each term. The re-designation inspection focuses on the roof covering and any substantive changes to systems covered under the FORTIFIED program. FORTIFIED homes seeking re-designation without re-roofing are only eligible for FORTIFIED Home – Existing Roof designation.

1.3 Scope of FORTIFIED Requirements

The FORTIFIED Home program is a **voluntary program** that only addresses wind and wind-driven rain aspects of risk. The requirements of the High Wind designation are intended to reduce risk due to severe thunderstorms, straight-line wind events, and high winds at the outer-most edges of tornadoes, while the requirements of the Hurricane designation are intended to reduce risk primarily due to tropical storms and hurricanes.

2.5 Qualifying Roof Structural Members

FORTIFIED Home specifications are applicable for wood framed roof structural members (i.e., wood trusses or rafters) with minimum 2 in. nominal thickness (1½ in. actual thickness), spaced at 24 in. O.C. maximum with wood structural panel sheathing (i.e., plywood or OSB). For wood roof framing outside of these parameters, a signed and sealed letter from a professional engineer (refer to [Appendix D](#) for definition) will be required to verify the sheathing is adequately rated for the span and applicable design wind pressures, and that the attachment of the sheathing to the roof framing members is adequate and in compliance with [Appendix B1](#).

- Other construction materials and types of roof framing/sheathing shall be evaluated on a case-by-case basis. Materials, design, and installation must at minimum comply with local building code requirements, manufacturer specifications, and the design parameters listed below.

Roof framing must be designed (by others) to support all gravity and wind loads corresponding to the site design wind speed, roof height, exposure category, and location on the building and all required load combinations in accordance with the applicable edition of ASCE 7 with the following minimum requirements:

2.6 Qualifying Ring-Shank Nails

Use minimum 8d (0.113-in. diameter) x 2 -in. long roof sheathing ring-shank nails for connection of sheathing unless otherwise noted in FORTIFIED Home specifications.

Ring-shank nails accepted by the FORTIFIED program shall comply with ASTM F1667. Only full round head ring-shank nails are acceptable. Off-center ring-shank nails with full round heads are acceptable. Clipped-head ring-shank nails are not acceptable for attachment of structural wood roof sheathing panels.

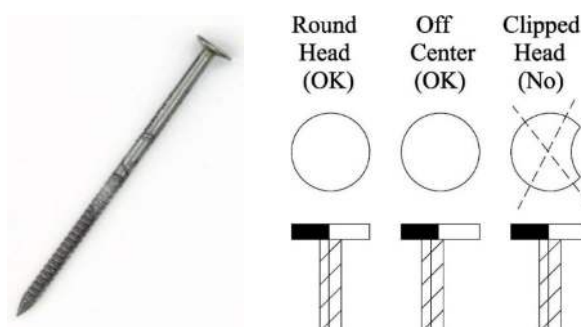


Figure 2.8. Ring-shank nail

3 Designation Requirements for FORTIFIED Roof – Existing Roof

The FORTIFIED Roof – Existing Roof designation provides prescriptive methods to create a qualified roof without requiring roof covering replacement on an existing home. From [section 1.1](#):

Existing Roof designations are appropriate for existing homes that have a roof and roof covering with greater than 5 useful years of life remaining that do not show visible signs of damage or deterioration. FORTIFIED homes seeking re-designation without re-roofing are only eligible for an Existing Roof designation. Similarly, newly installed roofs where the roof sheathing, sealed roof deck, and/or roof cover installation or wind rating cannot be verified are only eligible for an Existing Roof designation.

This approach may be used when roof covering replacement is determined to be unnecessary if ALL the following requirements of this section are met. If one or more of the following requirements are not met, then re-roofing in accordance with [section 4](#) is required.

3.1 Roof Deck and Roof Cover

Roof structural members must meet the requirements of [section 2.5](#).

Roof sheathing must meet the following minimum thickness requirements:

For Hurricane Designations

Table 3.1. Roof Sheathing Minimum Thickness Requirements for FORTIFIED Home–Hurricane

Max. Roof Member Spacing	ASCE 7-10	ASCE 7-16
24" O.C.	7/16"	15/32"

For High Wind Designations

Table 3.2. Roof Sheathing Minimum Thickness Requirements for FORTIFIED Home–High Wind (Roof Level)

Max. Roof Member Spacing	ASCE 7-10	ASCE 7-16
16" O.C.	3/8"	3/8"
24" O.C.	7/16"	15/32"

Note: Refer to complete [2020 FORTIFIED Home Standard](#) for minimum sheathing thickness requirements for Silver and Gold levels.

NOTE: Local building code requirements for roof sheathing thickness may be more stringent based on site conditions. Refer to [section 2.9](#) for additional information regarding ASCE 7 editions referenced by different model building codes.

The existing roof cover does not show visible signs of damage or deterioration.

There is only one layer of roof covering.

- **NOTE:** Although some jurisdictions allow a new roof to be installed over an existing roof, FORTIFIED requires existing roof covering be removed to the deck before installing a new roof cover system.

Existing roof covering is estimated to have at least 5 years of useful life remaining

There is adequate access to the attic to allow application of closed-cell spray urethane-based foam adhesives along joints between sheathing and roof framing members as well as along all seams between the roof sheathing panels.

Drip edge is installed.

For FORTIFIED Hail Supplement requirements, refer to [section 7.2 or 7.3](#) as applicable.

3.2 Sealing and Strengthening of Roof Deck

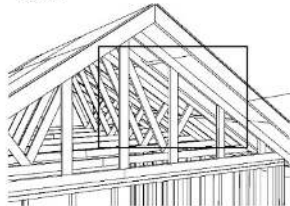
Apply ASTM or TAS tested 2-part, spray polyurethane foam adhesive to the underside of the roof deck in accordance with FORTIFIED Standard Detail [F-SRD-1](#) “Roof Deck Attachment and Sealed Roof Deck from Within Using Spray Foam” (refer to Appendix A).



Figure 3.1. Closed-cell polyurethane foam adhesive applied to underside of roof sheathing



MINIMUM REQUIREMENTS FOR SPRAY ADHESIVE: 1. PRODUCT MUST BE TESTED AND EVALUATED IN ACCORDANCE WITH EITHER ASTM E330, STANDARD TEST METHOD FOR STRUCTURAL PERFORMANCE OF EXTERIOR WINDOWS, DOORS, SKYLIGHTS AND CURTAIN WALLS BY UNIFORM STATIC AIR PRESSURE DIFFERENCE (APPLIED TO ROOF SHEATHING ON TAS 202-94), CRITERIA FOR TESTING IMPACT AND NON-IMPACT RESISTANT BUILDING ENVELOPE COMPONENTS USING UNIFORM STATIC AIR PRESSURE. THE MINIMUM ALLOWABLE DESIGN UPLIFT PRESSURE MUST BE GREATER THAN OR EQUAL TO 110 PSF AND THE PROOF TEST PRESSURE ACHIEVED WITHOUT FAILURE OR STRUCTURAL DISTRESS MUST BE GREATER THAN OR EQUAL TO 165 PSF. 2. ADHESIVE MUST BE A TWO-COMPONENT SPRAY POLYURETHANE FOAM SYSTEM WITH A MINIMUM CORE DENSITY OF 1.5 PCF IN ACCORDANCE WITH ASTM D1622, STANDARD TEST METHOD FOR APPARENT DENSITY OF RIGID CELLULAR PLASTICS. 3. SPRAY POLYURETHANE FOAM ADHESIVE SYSTEM MUST BE INSTALLED BY A PROPERLY TRAINED AND QUALIFIED APPLICATOR IN ACCORDANCE WITH THE MANUFACTURER'S MAINTENANCE AND INSTALLATION GUIDELINES. DOCUMENTATION FROM THE INSTALLING CONTRACTOR, ON COMPANY LETTERHEAD, IDENTIFYING THE MANUFACTURER AND PRODUCT USED FOR THE IMPROVED ROOF SHEATHING ATTACHMENT/SEALED ROOF DECK MUST BE PROVIDED TO THE CERTIFIED FORTIFIED EVALUATOR TO BE INCLUDED WITH FINAL DESIGNATION CHECKLIST. DOCUMENTATION SHOULD ALSO STATE THAT THE INSTALLATION MEETS THE MANUFACTURER'S REQUIREMENTS FOR AN ALLOWABLE DESIGN UPLIFT PRESSURE OF AT LEAST 110 PSF (PROOF TEST OF AT LEAST 165 PSF). 4. USE THE MINIMUM DESIGN UPLIFT PRESSURE ON THE SHEATHING OF 110 PSF FOR HURRICANE OR 90 PSF FOR HIGH WIND.	GENERAL NOTES: 1. REFER TO ANY LOCAL FORTIFIED HOME STANDARDS FOR ADDITIONAL INFORMATION. 2. EXISTING SHEATHING REQUIREMENTS: CELLULOSIC FIBER THICKNESS REQUIRED WITH ROOF MEMBERS IS 24" O.C. MAX. FOR HIGH WIND, THE MIN. THICKNESS IS REQUIRED FOR GOLF DESIGNATION. FOR RESILIENT DESIGNATION, 38" MIN. THICKNESS IS PERMITTED WHEN ROOF MEMBERS ARE 16" O.C. MAX. 3. FORTIFIED HOME DIAGRAMS ARE TO BE ADDED IN CONJUNCTION WITH FEDERAL, STATE AND LOCAL CODES, ORDINANCES AND REGULATIONS IN ADDITION TO THE STRUCTURAL DESIGN WHICH IS BY OTHERS. IN CASE OF A CONFLICT BETWEEN A PROVISIONAL USE WHICH IS MORE STRINGENT.
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	APPLICABLE STANDARDS: FORTIFIED HURRICANE 110 PSF DESIGN PRESSURE FORTIFIED HOME HIGH WIND 90 PSF DESIGN PRESSURE	DESCRIPTION: STEEP SLOPE ROOF DECK ATTACHMENT AND SEALED ROOF DECK FROM WITHIN USING SPRAY FOAM	DRAWING #: F-SRD-1 DATE: 1/10/2020
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F-SRD-1

Closed-Cell Polyurethane Foam Adhesive Minimum Requirements

Product must be tested and evaluated in accordance with either ASTM E330, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference (applied to roof sheathing), or TAS 202-94, Criteria for Testing Impact and Non-Impact Resistant Building Envelope Components Using Uniform Static Air Pressure. The minimum allowable design uplift pressure must be greater than or equal to 110 psf and the proof test pressure achieved without failure or structural distress must be greater than or equal to 165 psf.

Adhesive must be a two-component spray polyurethane foam system with a minimum core density of 1.5–3.0 pcf in accordance with ASTM D1622, Standard Test Method for Apparent Density of Rigid Cellular Plastics.

Spray polyurethane foam adhesive system must be installed by a properly trained and qualified applicator in accordance with the manufacturer's maintenance and installation guidelines.

Documentation from the installing contractor, on company letterhead, identifying the manufacturer and product used for the improved roof sheathing attachment/sealed roof deck must be provided to the certified FORTIFIED Evaluator to be included with final designation checklist. Documentation should also state that the installation meets the manufacturer's requirements for an allowable design uplift pressure of at least 110 psf (proof test of at least 165 psf).

Closed-Cell Polyurethane Foam Adhesive Installation

To provide enhanced roof sheathing attachment and to seal the roof deck, apply a 1.5- to 3-in. fillet of 2-part spray-applied polyurethane foam adhesive to:

- All joints between sheathing
- All intersections between roof sheathing and roof framing members
- All valleys

Spray adhesive application shall comply with the manufacturer's installation requirements and the density shall not be less than that required by the manufacturer to meet a minimum design uplift pressure on the sheathing of the following:

For Hurricane designation: 110 psf

For High Wind designation: 80 psf

EXCEPTION: If it can be demonstrated through inspection and documentation that the roof sheathing attachment meets or exceeds one of the following requirements AND that a qualified sealed roof deck system is installed, then the installation of closed-cell foam is not required:

1. Wood board roof deck must meet or exceed the requirements of FORTIFIED Standard Detail [F-RS-1](#) "Roof Deck Attachment – Sawn Lumber or Wood Board Roof Deck with No Gaps" (refer to Appendix A).
2. Structural wood panel sheathing must meet or exceed the requirements of:

For Hurricane designation: FORTIFIED Standard Detail [F-RS-2](#) "Hurricane – New Construction Roof Deck Attachment – Structural Wood Panels" (refer to Appendix A)

For High Wind designation: FORTIFIED Standard Detail [F-RS-3](#) "High Wind – New Construction Roof Deck Attachment – Structural Wood Panels" (refer to Appendix A)

3. Roof sheathing attachment meets or exceeds the requirements outlined in [Appendix B1](#).



3.3 Attic Vents and Covers (Hurricane Designation Only)

Ridge and off-ridge vents must be TAS 100(A) rated and anchored to the roof in compliance with manufacturer recommended installation for high winds.

Gable end vents must have removable shutters in accordance with FORTIFIED Standard Detail **F-GS-1** "Gable Vent Shuttering" (refer to Appendix A), and homeowner must be made aware that installation of shutters is temporary and that shutters must be removed once the hurricane threat has passed.



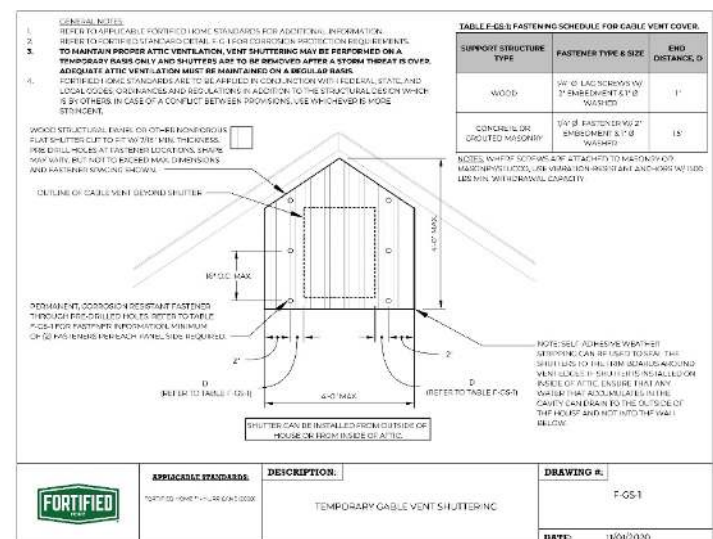
Figure 3.2. Example of a gable end vent



Figure 3.3. Outside shuttering of a gable end vent with Plywood



Figure 3.4. Shuttering of gable end vent from inside attic



F-GS-1

4 Designation Requirements for FORTIFIED Roof – New Roof

The FORTIFIED Roof – New Roof designation provides prescriptive methods for installing a roof on a new home or re-roofing an existing home. Re-roofing is required when one or more of the requirements outlined in [section 3](#) are not met. From [section 1.1](#):

New Roof designations are only appropriate for new construction or re-roofing projects where all roof sheathing, sealed roof deck, and roof covering systems are newly installed (less than 5 years old) and installation in compliance with FORTIFIED Home requirements is verifiable at the time of designation ... newly installed roofs where the roof sheathing, sealed roof deck, and/or roof cover installation or wind rating cannot be verified are only eligible for an Existing Roof designation.

4.1 Roof Deck Minimum Thickness Requirements

Roof structural members must meet the requirements of [section 2.5](#).
Roof sheathing must meet the following minimum thickness requirements:

For All Hurricane Designations

Table 4.1. Roof Sheathing Minimum Thickness Requirements for FORTIFIED Home–Hurricane

Max. Roof Member Spacing	ASCE 7-10	ASCE 7-16
24" O.C.	7/16"	15/32"

For High Wind Designations

Table 4.2. Roof Sheathing Minimum Thickness Requirements for FORTIFIED Home–High Wind (Roof Level)

Max. Roof Member Spacing	ASCE 7-10	ASCE 7-16
16" O.C.	3/8"	3/8"
24" O.C.	7/16"	15/32"

Note: Refer to complete [2020 FORTIFIED Home Standard](#) for minimum sheathing thickness requirements for Silver and Gold levels.



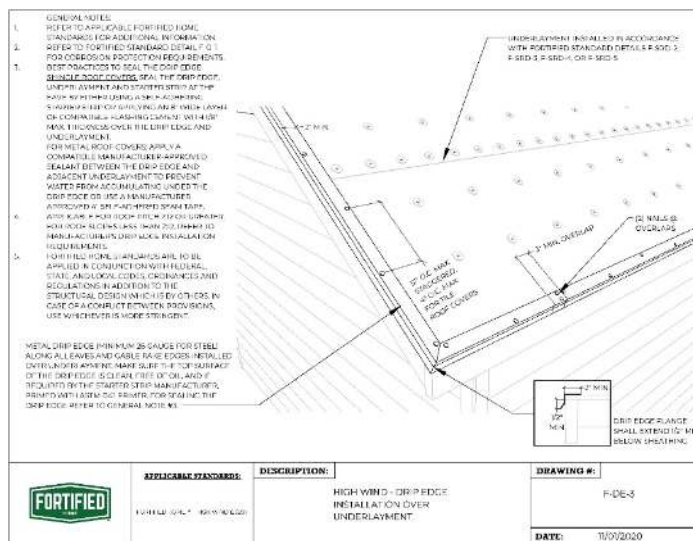
- **EXCEPTION:** for new clay or concrete tile roofs, roof sheathing must have minimum thickness of $\frac{15}{32}$ in. per the FRSA/TRI Florida High Wind Concrete and Clay Tile Installation Manual, Revised 5th Edition (for ASCE 7-10) or 6th Edition (for ASCE 7-16) requirements or greater thickness if required by tile manufacturer. For metal roof covers, verify manufacturer's sheathing thickness requirements are met.
- **NOTE:** Local building code requirements for roof sheathing thickness may be more stringent based on-site conditions.
- Refer to [section 2.9](#) for additional information regarding ASCE 7 editions referenced by different model building codes.

Sawn lumber or wood board roof decking members must have $\frac{5}{8}$ in. minimum thickness.

Roof sheathing must be designed to resist the applicable loads and load combinations specified in ASCE 7 per either engineering analysis or prescriptive method.

- FORTIFIED Home requirements are based on minimums of $V_{ult} = 130$ mph and Exposure C. For conditions that exceed these minimums, refer to WFCM Table 3.12A (2015 Edition for ASCE 7-10 or 2018 Edition for ASCE 7-16) for prescriptive guidance.
- **BEST PRACTICE:** IBHS recommends using plywood for roof sheathing in lieu of oriented strand board (OSB).

For High Wind designation: **F-DE-3** “High Wind – Drip Edge Installation Over Underlayment”



F-DE-3

Installation and Attachment

Drip edges shall be installed OVER the underlayment along gable rake edges and at eaves. Overlap drip edge a minimum of 3 in. at joints. Drip edge flange shall extend 1/2 in. below the bottom of the sheathing and extend back on the roof a minimum of 2 in.

Install (2) fasteners installed in each overlap joint. Mechanical fasteners should be applied in an alternating (staggered) pattern along the length of the drip edge with adjacent fasteners placed near opposite edges of the leg/flange of drip edge on the roof. Drip edges must be mechanically fastened to the roof deck at the following maximum spacing:

For Hurricane designation: 4 in O.C.

For High Wind designation: 12 in. O.C. (EXCEPTION: 4 in. O.C. max. for tile roof covers)

Sealing the Drip Edge

For shingle roof covers: The top surface of the drip edge shall be clean, free of oil, and if required by the starter strip manufacturer, primed with ASTM D41 primer. Seal the drip edge, underlayment and starter strip at the eave by either using a self-adhering starter strip or applying an 8-in.-wide layer of compatible flashing cement with 1/8 in. maximum thickness over the drip edge and underlayment.

For metal roof covers: The top surface of the drip edge shall be clean, free of oil, and if required, primed with manufacturer-approved primer. Apply a compatible manufacturer-



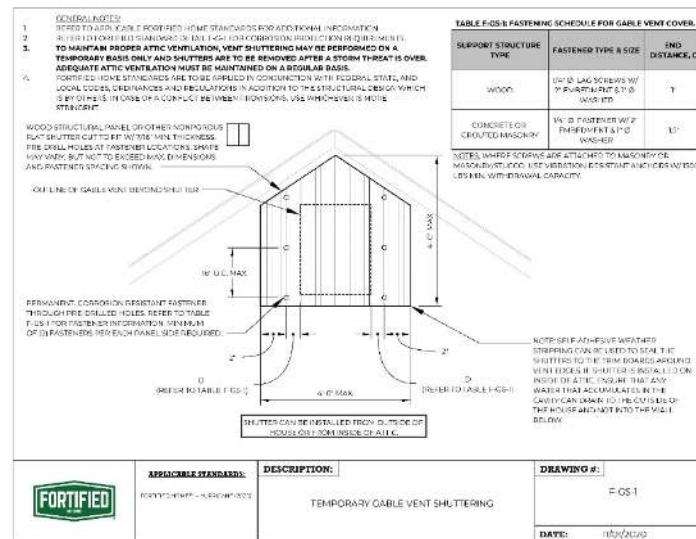
4.9 Attic Vents and Covers (Hurricane Designation Only)

For Hurricane designation only, ridge and off-ridge vents must be TAS 100(A) rated and anchored to the roof in compliance with manufacturer recommended installation for high winds. For Hurricane designation only, if off-ridge vents or ventilators require modification/mitigation actions such as removing part of the device and capping the hole when a hurricane threatens, the homeowner must be made aware of this requirement.

- **BEST PRACTICE:** IBHS recommends against using ventilation system components that require roof access to remove it or prepare it when a hurricane threatens.

For Hurricane designation only, gable end vents must either be TAS 100(A) rated or have removable shutters in accordance with FORTIFIED Standard Detail [F-GS-1](#) “Gable Vent Shuttering” (refer to Appendix A), and homeowner must be made aware that installation of shutters is temporary and that shutters must be removed once the hurricane threat has passed.

- **BEST PRACTICE:** IBHS recommends against including gable end vents in new homes built in hurricane-prone regions if there are other adequate means to allow proper ventilation of the roof space.



F-GS-1