

# DOE Zero Energy Ready Home

## Tech Training Webinar Series

U.S. DEPARTMENT OF  
**ENERGY**

Energy Efficiency &  
Renewable Energy



Going Green and Building  
Strong: Building a FORTIFIED  
Home – Part II



# The Home of the Future....Today

U.S. DEPARTMENT OF  
**ENERGY**

Energy Efficiency &  
Renewable Energy



# DOE Zero Energy Ready Home Resources

U.S. DEPARTMENT OF  
**ENERGY** | Energy Efficiency & Renewable Energy

## Website

- [www.buildings.energy.gov/zero/](http://www.buildings.energy.gov/zero/)
- Events:
  - Upcoming in-person ZERH Trainings
  - Technical Training webinars
  - Conference Presentations
- Partner Locator
- Program Specifications
- Webinar Recordings



## Building America Solution Center

- <http://basc.pnnl.gov/>

# Thank You



**For More Information:**

[www.buildings.energy.gov/zero](http://www.buildings.energy.gov/zero)

**Email:**

[zero@newportpartnersllc.com](mailto:zero@newportpartnersllc.com)





# Going Green and Building Strong: Building a FORTIFIED Home™ Part 2

Fred Malik, Director of FORTIFIED  
Programs

June 5, 2014



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# DOE Challenge Home Value

U.S. DEPARTMENT OF  
**ENERGY**

Energy Efficiency &  
Renewable Energy

> Energy Prices

> Energy Efficiency

> Builder Risk

< Health Concerns

< Renewable Cost

> Water Crisis

< Water Flow

> Extreme Weather

> Disaster Risk

> Innovation

> Informed Buyers

> Hsg. Stock Age

## Lives Better

Engineered  
Comfort

Healthier  
Living

Solar  
Ready

Long-Term  
Warranty

## Works Better

Ultra-Low  
Utility Bills

Advanced  
Technology

Water  
Efficient

Black-Out  
Power

## Lasts Better

Quality  
Construction

More  
Durability

Disaster  
Resistant

Lower Cost  
Insur./Mort.

# Building a FORTIFIED Home™ :

## Part 1 - Why build FORTIFIED

- Who is IBHS?
- Definitions
- Why FORTIFIED?
- Building and Wind Interactions



# Building a FORTIFIED Home™ :

## Part 2 – How to build FORTIFIED

- **Technical Requirements Overview**

- Most Vulnerable Systems
- Different Standards for Different Risks
  - Hurricane - Coastal
  - High Wind – Inland
  - High Wind & Hail – Inland
- FORTIFIED Home™ Upgrades
- Keys to Success

- **Recognition**





# FORTIFIED Home™



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# Designation Basics

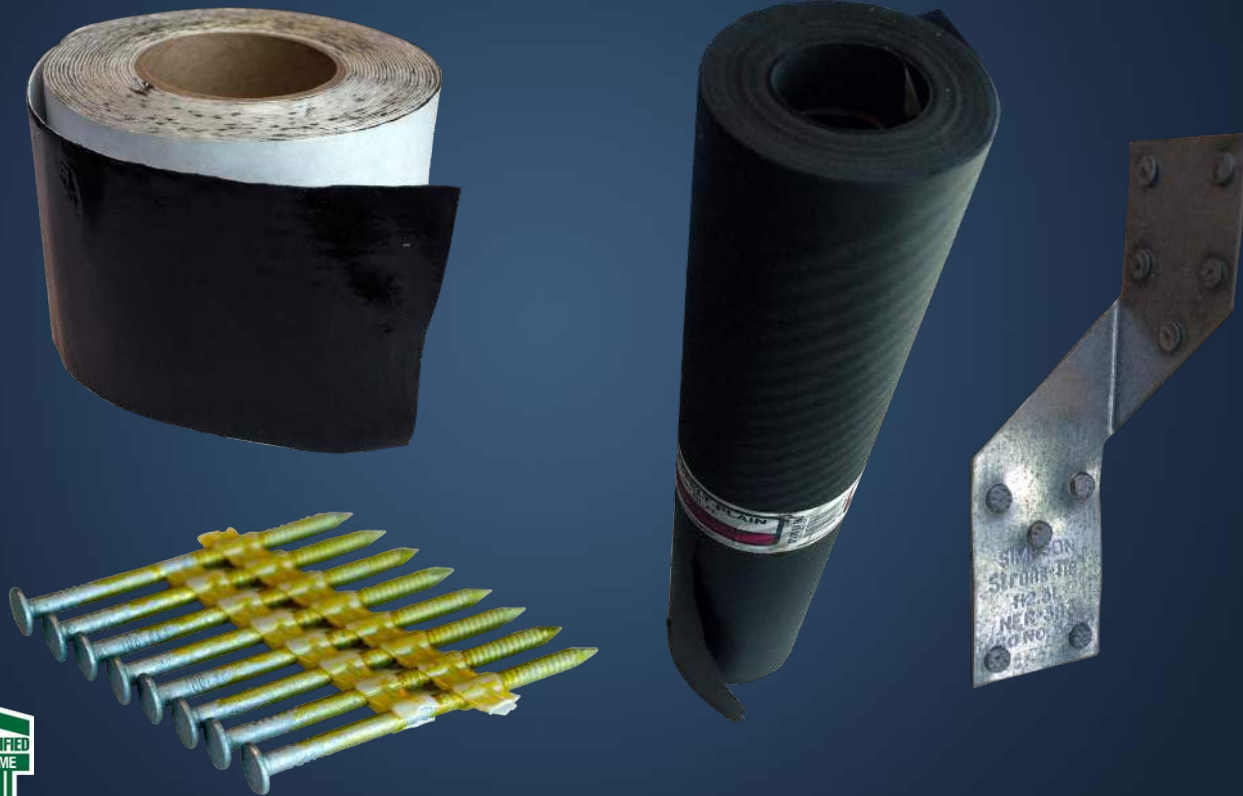
- Independent Verification is Required
  - Certified FORTIFIED Home Evaluator
- Designations valid for 5-years (driven by roof covering condition)
- Automatic reminders sent to registered owner prior to expiration
- Re-designation focuses on the roof, requires evaluation by certified FORTIFIED Home Evaluator



# Why FORTIFIED?



# ...Because Little Things Matter



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# Water Intrusion Highlights





# Sealed Roof Deck Demonstration:



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**Sealed roof deck  
damage estimate**

**\$5,408<sup>.59</sup>**

**Unsealed roof deck  
damage estimate**

**\$16,935<sup>.23</sup>**



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Choosing different materials, doesn't guarantee resilience; installation is an important factor as well

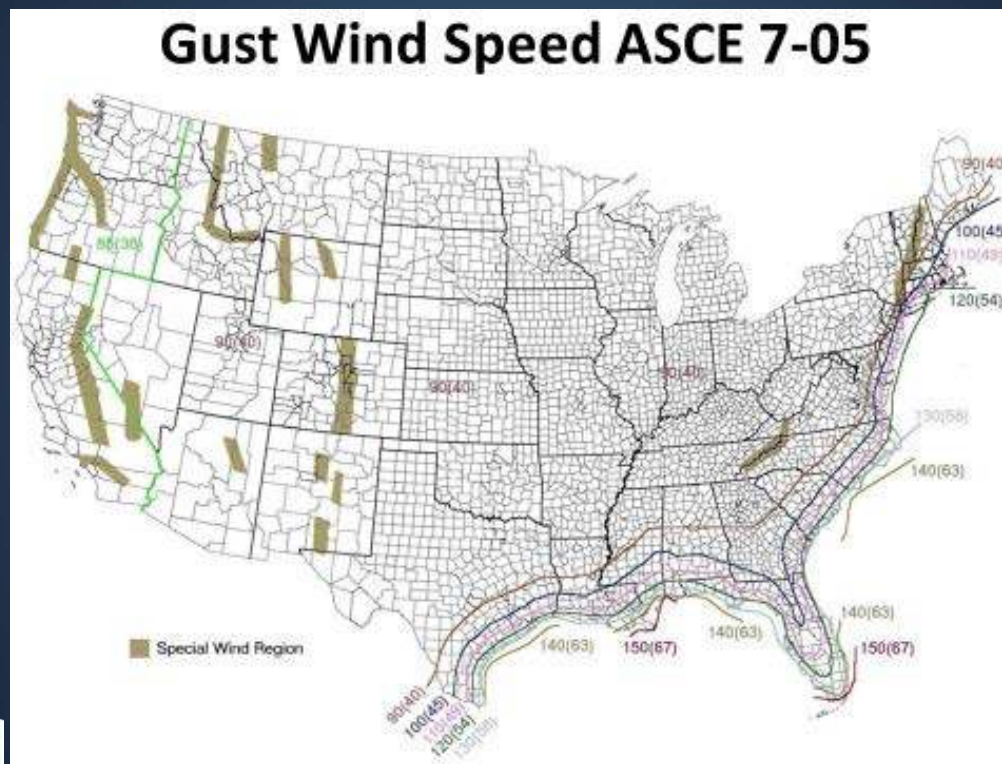


# Why FORTIFIED? - Builders

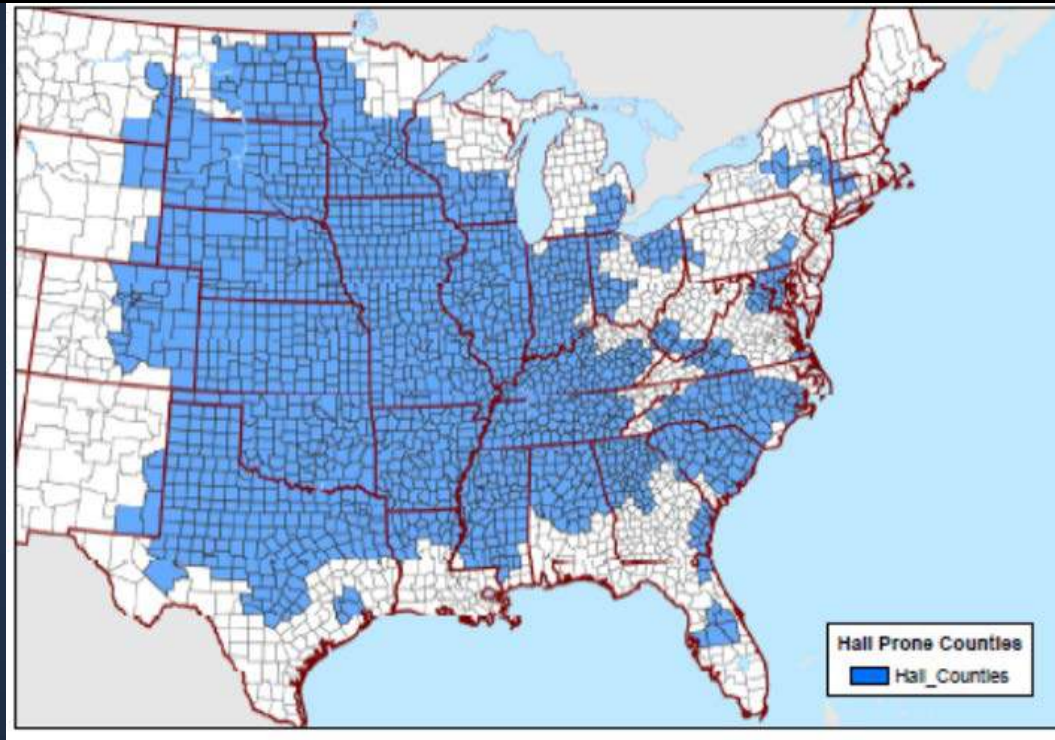
- **Build trust with customers**
- **Offer Protection for What is Priceless**
- **Differentiation and Recognition**
- **Use the FORTIFIED Home™ mark**
- **Point of Sale Collateral**
- **Control the process**
- **Growing Demand**



# Design Wind Speed Determines FORTIFIED Home Standard to Use



# Hail Prone Counties (Inland)





# Hail Research



# Designation Level Basics

## Hurricane



FORTIFY Roof and Attic Ventilation System



FORTIFY Openings



FORTIFY Structure



## High Wind and Hail



FORTIFY Roof

FORTIFY Gables, Porches, Carports and Chimneys

FORTIFY Garage Doors and Structure (CLP)

# FORTIFIED Roof System



Bronze



# FORTIFIED Roof

## Roof Deck Thickness



- Minimum 7/16" OSB/Plywood;
- 19/32" is **recommended**



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# FORTIFIED Roof

## Roof Deck Attachment



**New Roofs:** 8d ring shank nails at 6-in on center over the entire roof (closer spacing may be required at corners)

**Existing Roofs:** If staples or 6d nails, re-nail with 8d ring shank

If 6-in on edges, 12-in. in the field, add an 8d ring shank nail in between existing fasteners.





# FORTIFIED Roof

## Roof Deck Attachment



**New Roofs:** 8d ring shank nails at 6-in on center over the entire roof (closer spacing may be required at corners)

**Existing Roofs:** If staples or 6d nails, re-nail with 8d ring shank >6-in at edges or >12-in in field, add nail

**If 8d common or better at 6-in on center over entire roof, OK.**



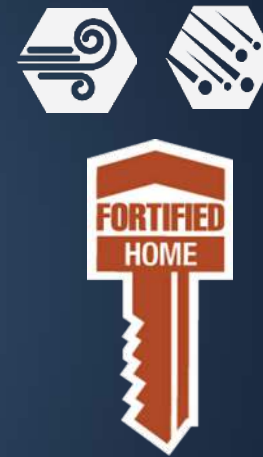
# Sealed Roof Deck



Mandatory for all  
roofs



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Mandatory ONLY  
when installing new  
roofing

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# Sealed Roof Deck (full membrane option)



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Sealed Roof Deck (synthetic underlayment;  
install for **high wind** and **prolonged exposure**)



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# Sealed Roof Deck (**closed-cell**, 2-part polyurethane foam **adhesive**)



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# FORTIFIED Roof - Roof Coverings



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# Hurricane - Shingles

ASCE 7-05 Wind Speed ( $V_{asd}$ )	ASCE 7-10 Wind Speed ( $V_{ult}$ )	Shingle Wind Testing Standard/Classification
100 MPH	129 MPH	ASTM D3161 (Class F) or ASTM D 7158 (Class G or H) <sup>1</sup>
110 MPH	142 MPH	ASTM D3161 (Class F) or ASTM D 7158 (Class G or H) <sup>1</sup>
120 MPH	155 MPH	ASTM D 7158 (Class G or H) <sup>1</sup>
130 MPH	168 MPH	ASTM D 7158 (Class H) <sup>1</sup>
140 MPH	180 MPH	
150 MPH	194 MPH	

<sup>1</sup> **Note:** When used in Exposure D locations, shingles must pass both ASTM D3161 Class F **and** ASTM D7158 Class H testing standard.



# High Wind and Hail - Shingles



TABLE B-03: WIND SPEED AND IMPACT RESISTANCE CLASSIFICATIONS FOR SHINGLES TO BE USED IN FORTIFIED HIGH WIND AND HAIL DESIGNATED HOMES

Design Wind Speed	Shingle Wind Testing Standard/ Classification	UL 2218 Impact Resistance Classification/ Hail Risk
110 mph	ASTM D3161 (Class F) or ASTM D7158 Class G or H	Class 4



# Design Wind Speed Resource



**Home**   **About This Site**   **Lat/Long Finder**   **Related Resources**   **Sponsors**   **About ATC**   **Contact**

The purpose of the "Wind Speed Web Site" is to provide users with a site specific wind speed using the GPS coordinate system. On this website, users can retrieve wind speeds from ASCE 7-10, ASCE 7-05 and ASCE 7-93. Wind speeds are also provided for serviceability purposes for 10, 25, 50 and 100-year return periods.

The reason this utility is needed is that the spatial resolution of the wind speed maps that are displayed in ASCE 7 are not sufficient to determine a site specific wind speed. There are no reference city or town locations on the ASCE 7 maps and while county boundaries are shown, the resolution is affected when the maps are expanded large enough to distinguish the boundaries and approximate the city locations.

**To find the windspeed for a specific area, select one of the following methods:**

1. Click the radio button for decimals and enter latitude and longitude in the spaces in decimal form and select "Get Windspeed" or
2. Click the radio button for address and enter the desired address; Select "Find" to auto-populate the latitude and longitude and select "Get Windspeed" or
3. Find the site on the map, right click the mouse and the latitude and longitude will be displayed in decimals. The coordinates auto-populate in the decimal location. Select "Get Windspeed" or

☒ Decimal (Enter Decimal Value)

Latitude	Longitude
<input type="text" value="28.0543255"/>	<input type="text" value="-82.4050646"/>

☐ Address (Enter Complete Address Below)

☐ US Virgin Islands

☐ Guam

☐ American Samoa

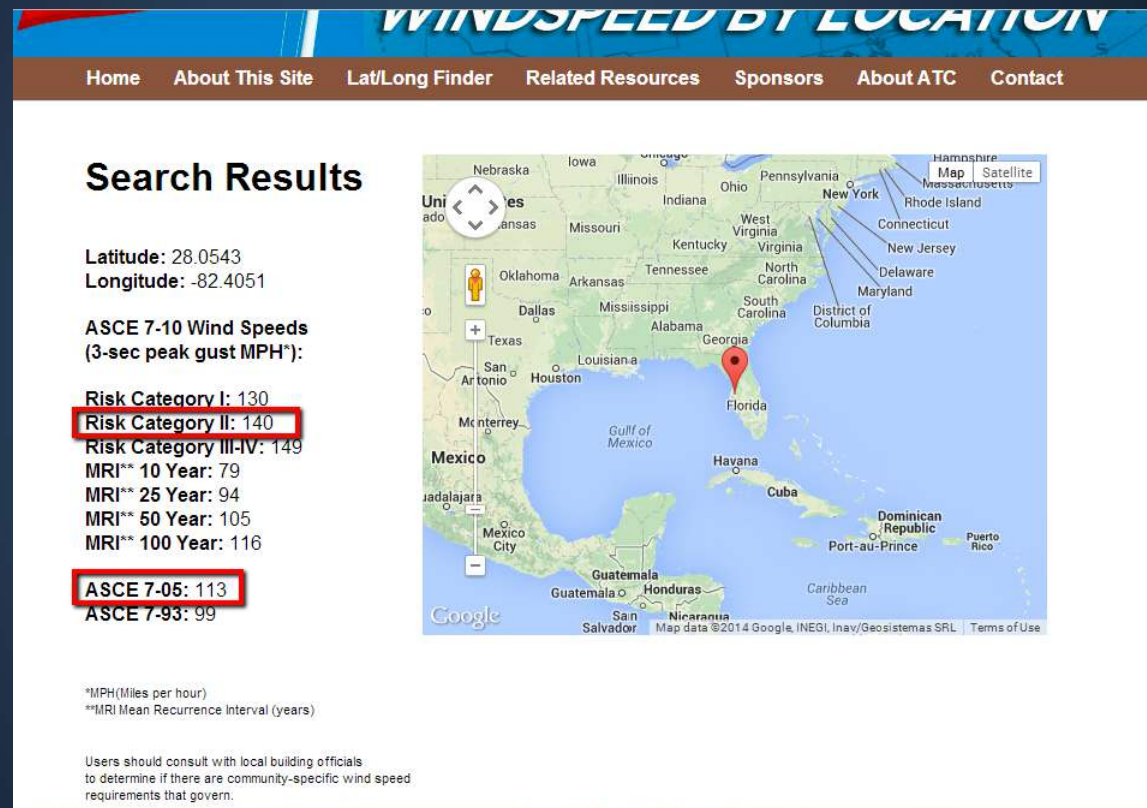
☐ Hawaii

Visit Our Partners

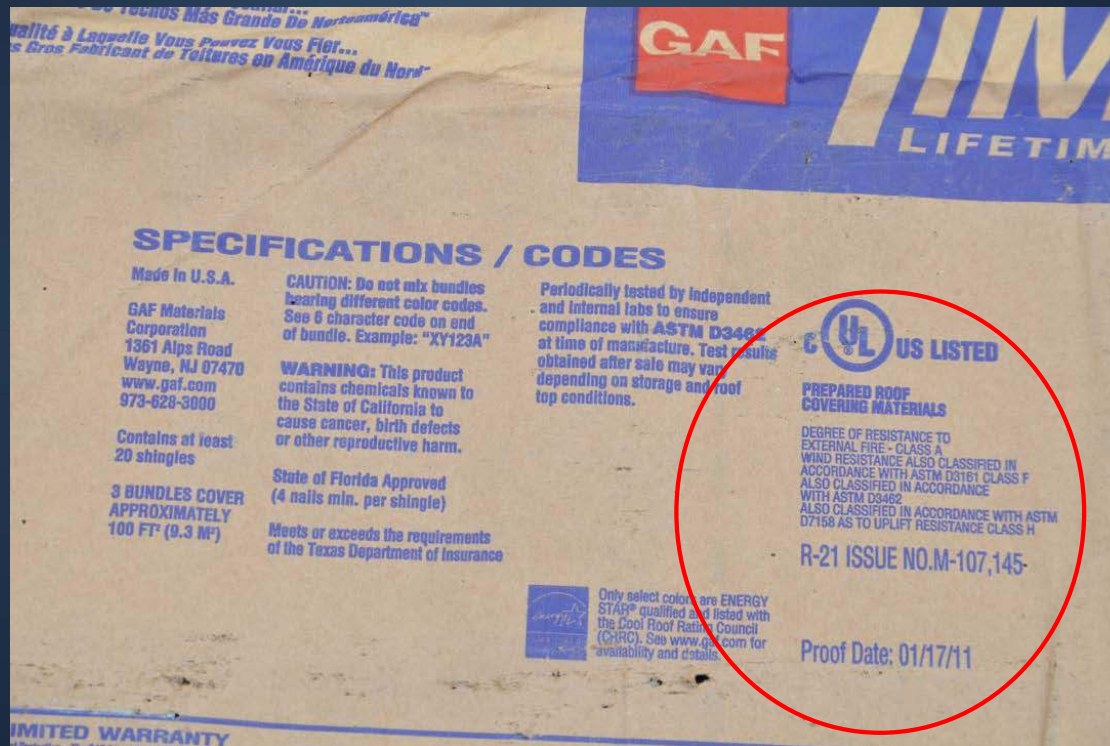




# Design Wind Speed Resource

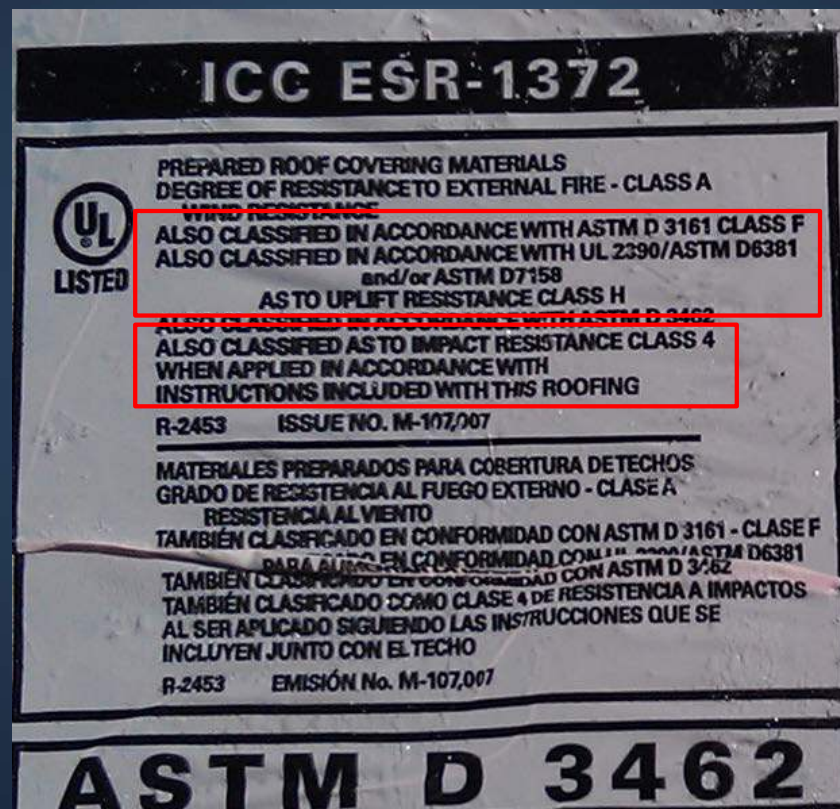


# FORTIFIED Roof – Roof Covering Shingles





# FORTIFIED Roof – Roof Covering Shingles



# FORTIFIED Roof – Shingles: Drip Edge



# Hurricane - Metal



# FORTIFIED Roof – Metal Roof Example

## 26 GA. 3/4" RIB ROOF PANEL LOAD TABLE OVER 15/32 PLYWOOD

BAKER METAL  
WORKS

Buildings having a Roof Mean Height  $\leq 20'-0"$ ; Roof Slope: 2"/12" -6"/12" Gable or Hip Roof  
Wind Speeds 150-180 mph, Exp C, Risk Category II, Enclosed Bldg. based on FLORIDA BUILDING CODE 2010

26 GA. 3/4" RIB PANEL FASTENER SPACING						
ZONE	FASTENER	SUBSTRATE	WIND SPEED ZONE			
			150	160	170	180
			ON CENTER SPACING	ON CENTER SPACING	ON CENTER SPACING	ON CENTER SPACING
ZONE 1	#9-15-1-1/2"	15/32" PLYWOOD	24" TYPE 1	24" TYPE 1	24" TYPE 1	24" TYPE 1
ZONE 2	#9-15-1-1/2"	15/32" PLYWOOD	24" TYPE 1	24" TYPE 1	24" TYPE 1	12" TYPE 2
ZONE 3	#9-15-1-1/2"	15/32" PLYWOOD	12" TYPE 2	12" TYPE 2	12" TYPE 2	12" TYPE 2



# FORTIFIED Roof – Tile & Metal High Wind & Hail



TABLE B-04: DESIGN WIND SPEED /TILE  
IMPACT RESISTANT CLASSIFICATION

Design Wind Speed	FM 4473 Impact Resistance Classification/ Hail Risk
110 mph	Class 4 or Class 3



TABLE B-05: DESIGN WIND SPEED /METAL  
ROOF IMPACT RESISTANT CLASSIFICATION

Design Wind Speed	UL 2218 Impact Resistance
110 mph or less	Class 4





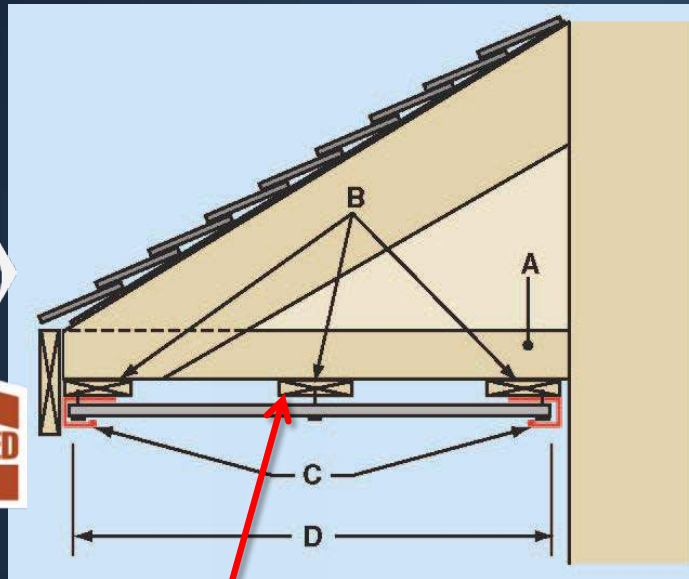
# FORTIFIED Roof - Attic Ventilation

Ridge vents with a “lip” on the roof surface side are more resistant to water intrusion





# FORTIFIED Soffits



Intermediate  
nailing strip.

- A. Horizontal wood support
- B. Nailing strip for soffit attachment
- C. Continuous J-channel or F-channel to cover the ends of soffit panels
- D. Soffit Depth exceeding 12" must have intermediate nailing strip.

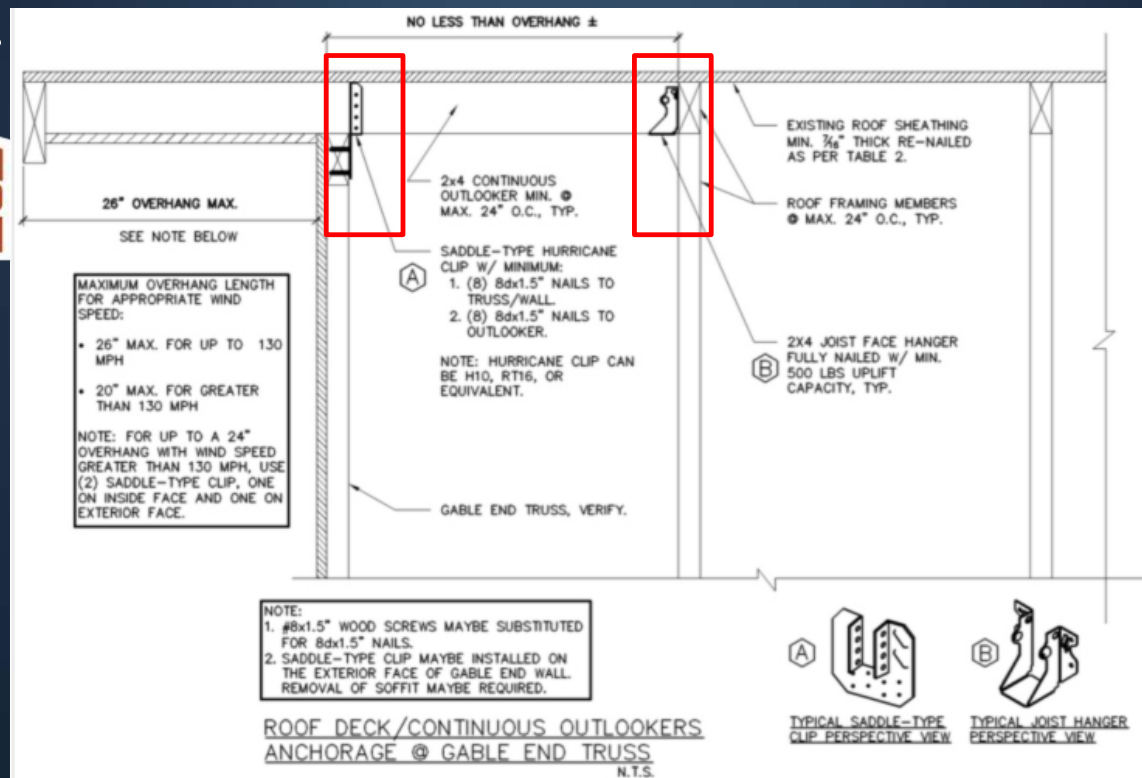


# FORTIFIED Soffits



# FORTIFIED Roof : Gables w/Outlookers

Do this



Home Safety

# FORTIFIED Roof : Gables w/Outlookers

To avoid this



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# FORTIFIED Roof – Attic Ventilation





# FORTIFIED Gable End Walls – Structural Sheathing

Meets standards





# Roof Compliance Form (RCF1)



# Search for FORTIFIED Home Compliant Product Documentation

approvalzoom.com/find/products?autostart\_fortified

APPROVALZOOM Corporate Account

Search Products & Companies 24 results (0.005 seconds)

[Go to FORTIFIED Search](#)

Agency Name  
FL Product Approval 19  
Texas Approval 1

Company Name  
Company Name

Approval Status  
Approved 19  
Superseded 3  
Not Approved 2

Category  
Doors 3  
Impact Protection Devices 21

Certification Methods  
Evaluation Report from a Registered

Search Product, Company

Share Search Results Clear Search

Current Filters  
Is Fortified: Yes

View results as: Tiles List Sort by: Listing Relevance

**FL12856.2-R3**  
FLORIDA BUILDING COMMISSION  
Safety Edge™ Storm Panels, 28ga (0.018") Steel, 0.022" Alum (Perf and Non-Perf), Clear  
By Town & Country Industries

**FL11398.3-R2**  
"2" X 12" ALUMINUM STORM PANEL"  
By Town & Country Industries



# FORTIFIED Openings, Attached Structures and Gable Ends

## SILVER



# FORTIFIED – Opening protection



# FORTIFIED - Garage Doors

## Pressure Rating





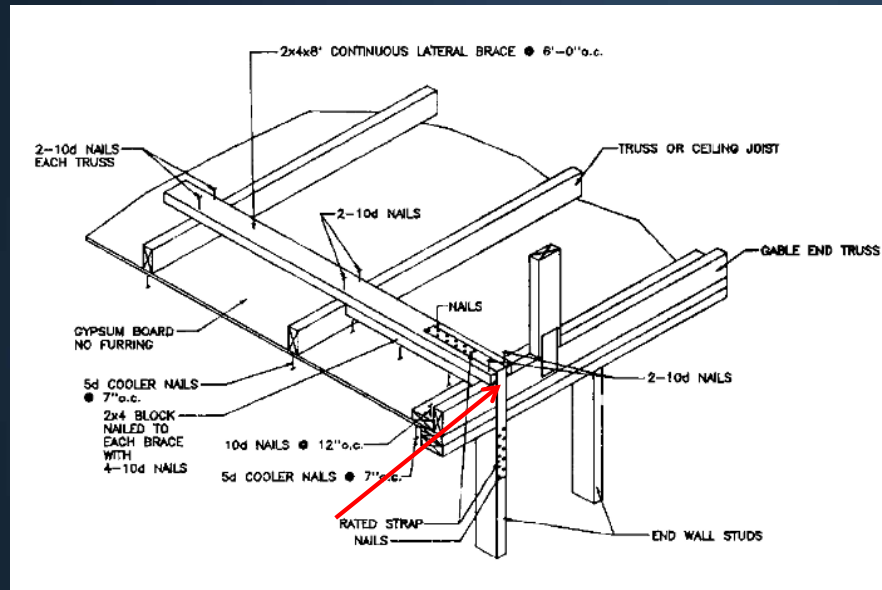
# FORTIFIED - Garage Doors

## Impact Rating

Applies to  
Glazed  
Doors ONLY



# FORTIFIED – Gable end bracing

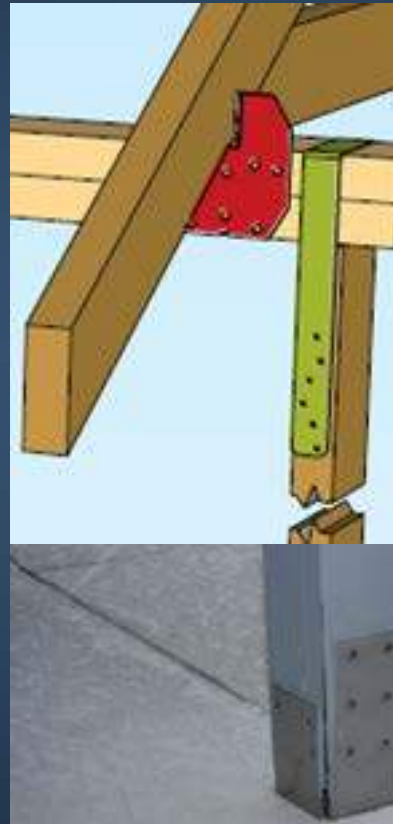


**Note Metal Strap**  
8 foot 2x4 on TOP of bottom chords



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# FORTIFIED – Attached structures



# FORTIFIED Continuous Load Path and Opening Design Pressures



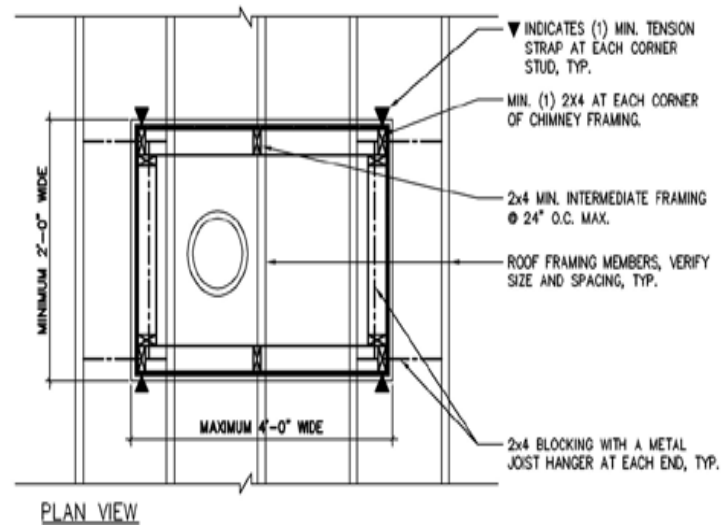
# FORTIFIED – Openings (Design Pressure Ratings)





# FORTIFIED - Chimneys

Do this



# FORTIFIED - Chimneys

So this  
doesn't  
happen

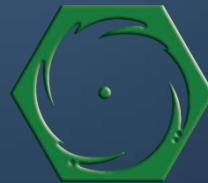


# FORTIFIED - Continuous load path



# FORTIFIED Home: Hurricane™

## Methods of Verifying Compliance



# Inspection Based



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# FORTIFIED Home™

## Creating a Documentation File



# Documentation

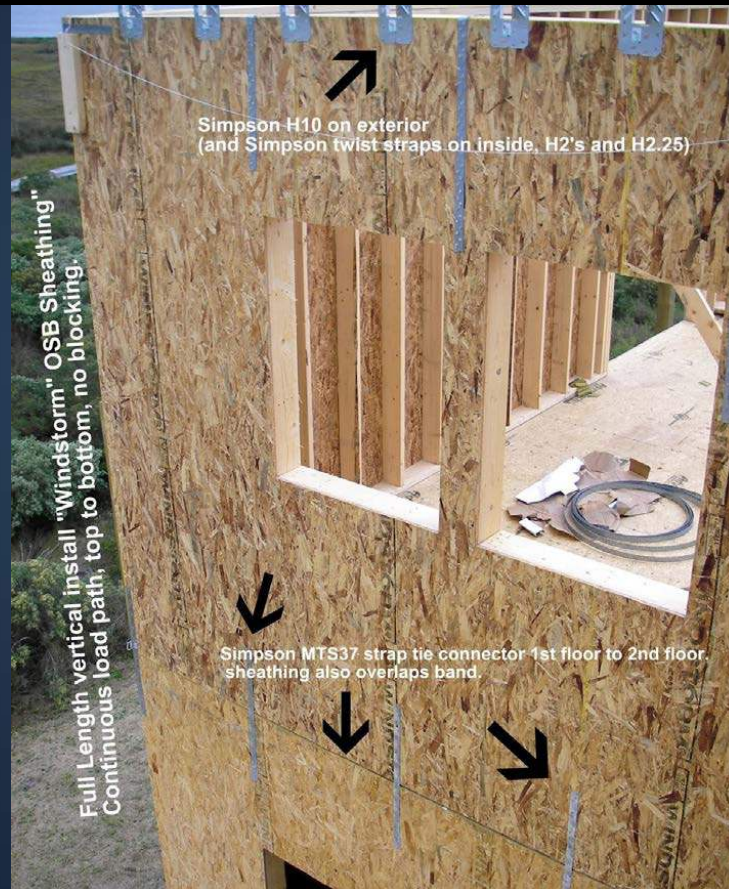




# Documentation



# Documentation



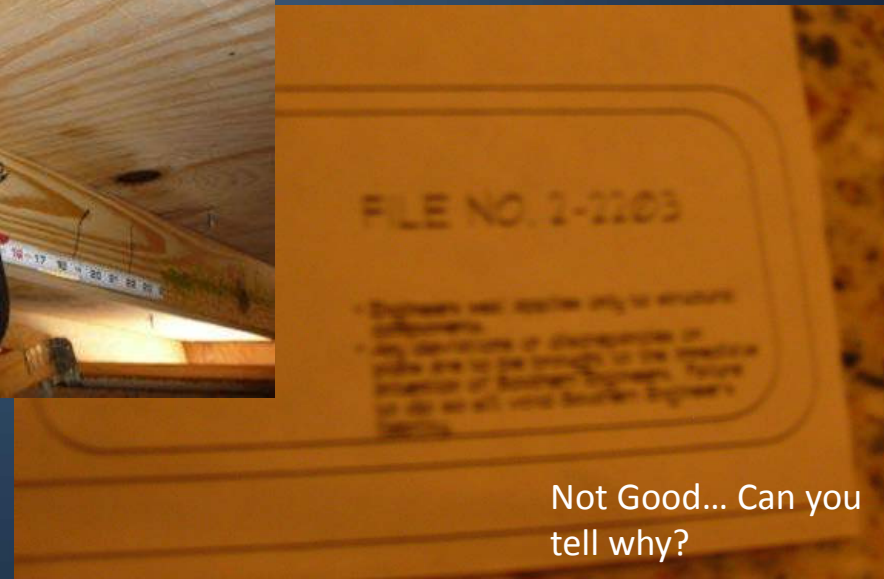
Exceptional!



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# Documentation



# How Do Insurers and Other Stakeholders Verify that a Home is FORTIFIED?

- Certificates issued by IBHS



# Bronze Certs

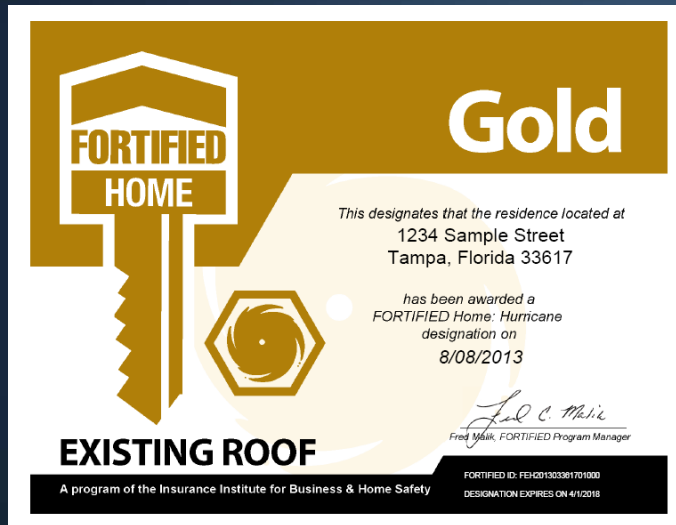




# Silver Certs



# Gold Certs



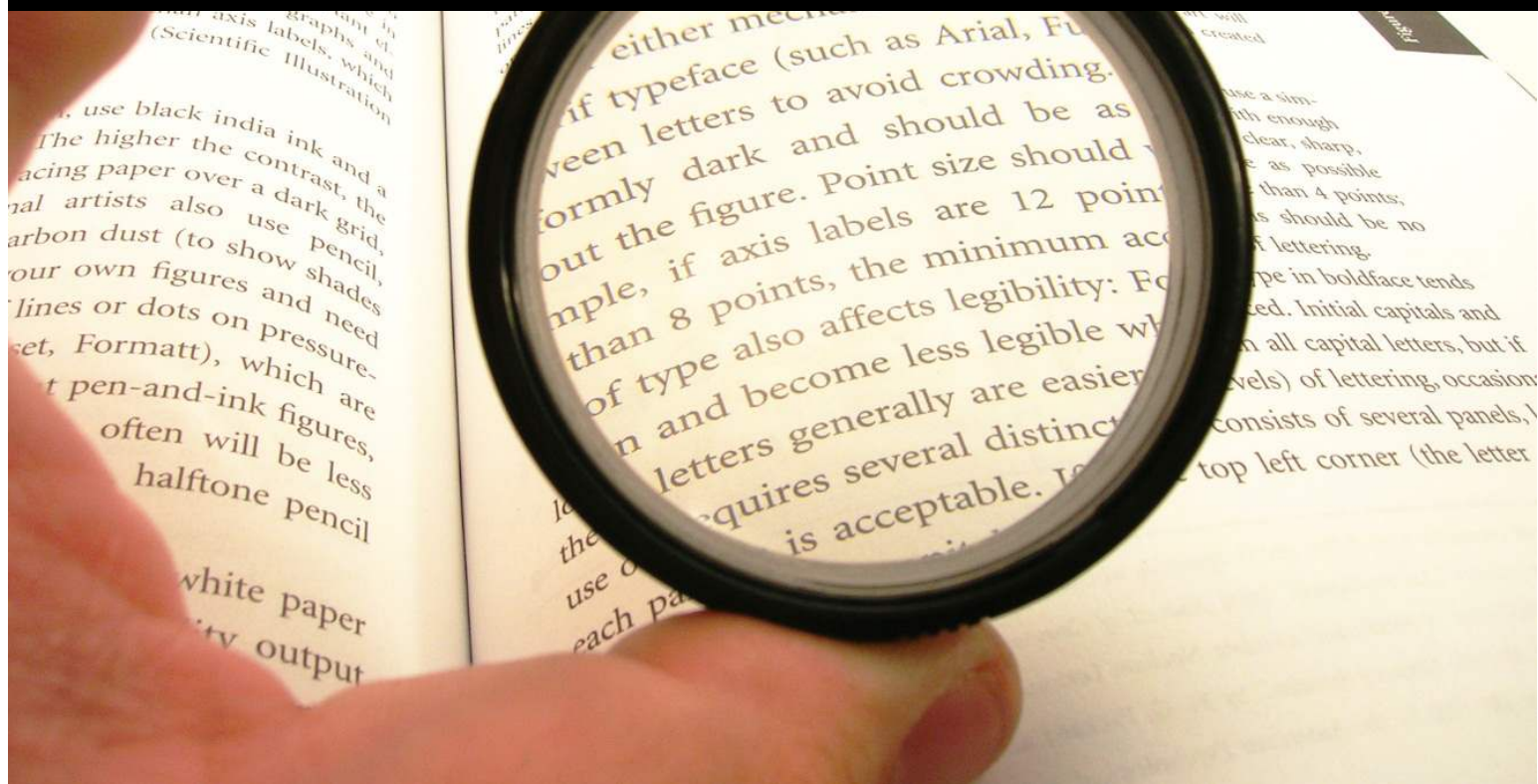
# How Can You Become Involved?



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# Help Bring Clarity and Focus to the Resilience Movement



# What can you do, now?

Commit to building FORTIFIED

Download standards, guides and fact sheets for FREE at

[www.disastersafety.org/fortified/home](http://www.disastersafety.org/fortified/home)



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# Get Trained

## Evaluator Training

## Contractor/Builder Training

Coming this Fall ...

Become a  
**FORTIFIED-Wise**  
Contractor



The screenshot shows the IBHS website header with the logo and tagline "Where building safety research leads to real-world solutions." Below the header is a navigation bar with links: Risks, FORTIFIED, Commercial, Public Policy, Research, Media Center, Blog, Videos, and Members-only. The main content area is titled "FORTIFIED Home™ Evaluator Training" and includes a link "CLICK HERE FOR TRAINING REGISTRATION DETAILS". It describes the FORTIFIED Home program as a high wind and hurricane mitigation program. A sidebar on the right features a "BECOME A FORTIFIED EVALUATOR" graphic with a photo of a man, a search bar for "Search DisasterSafety.org...", and a "SHARE THIS" section with social media icons and a map of the United States. The main text also lists "Next Training Dates: 2014" and "Evaluator Certification" with specific dates and locations. A "Train the Trainer" section is also present. At the bottom, it states "SEATS ARE LIMITED".

Insurance Institute for Business & Home Safety  
Where building safety research leads to real-world solutions.

Risks FORTIFIED Commercial Public Policy Research Media Center Blog Videos Members-only

FORTIFIED Home™ Evaluator Training

CLICK HERE FOR TRAINING REGISTRATION DETAILS

FORTIFIED Home™ Hurricane is a high wind and hurricane mitigation program developed by the Insurance Institute for Business & Home Safety (IBHS). This innovative program is recognized as the premier standard for retrofitting existing and building new homes to reduce or repair damage caused by hurricanes.

IBHS has made a substantial investment in new technology that streamlines the program's evaluation and designation processes, among other things. Starting this fall, evaluations can be completed on your mobile device and no special tools are required.

Program Handbook

Next Training Dates:

2014

Evaluator Certification

- June 18 - IBHS Research Center, Richburg, SC
- August (Date to be announced) - Gulf Coast (Location to be determined)
- October 9 - IBHS Research Center, Richburg, SC

Train the Trainer

- June (Dates to be announced) - IBHS Research Center, Richburg, SC

SEATS ARE LIMITED

BECOME A FORTIFIED EVALUATOR

Search DisasterSafety.org...

SHARE THIS

Enter your ZIP Code below to discover the risks you face.

Search



# Links & URLs

- Homeowner Application
  - <https://secure.fortifiedhome-ibhs.com/HomeOwner/>
  - Evaluator Training
  - How To Become An Evaluator
    - <http://www.disastersafety.org/disastersafety/fortified-home-evaluator-training/>
  - Registration Details
    - <https://fortified.archtest.com/>



# Links & URLs (continued)

- FORTIFIED Home™ Fact Sheets
  - <http://www.disastersafety.org/fortified/home/fortified-home-fact-sheets/>
- FORTIFIED Home™ Standards, Summaries and Guides
  - <http://www.disastersafety.org/fortified/fortified-home-standards/>
- FAQs
  - <http://www.disastersafety.org/fortified/home/home-property-insurance-professionals/fortified-home-frequently-asked-questions-2/>



Thank You

[disastersafety.org/fortified](https://disastersafety.org/fortified)  
[facebook.com/buildfortified](https://facebook.com/buildfortified)

