



Technical Bulletin FH 2021-02

First Release:

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Prepared by:

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Applicable Standards:

FORTIFIED Home™—Hurricane

Applicable Designation Level:



Updated FORTIFIED Corrosion Protection Requirements and Best Practices

Abstract

Minimum corrosion protection requirements for metal connectors and fasteners used to construct or retrofit buildings are an important part of FORTIFIED designation requirements for homes in coastal areas. Metals exposed to salt and moisture in the air are highly susceptible to accelerated corrosion, which can undermine the structural integrity of critical connections if not addressed.

FORTIFIED corrosion protection requirements have been updated to:

- Incorporate the most current codes, standards, and research
- Identify connections required for designation vs. best practice recommendations
- Identify acceptable corrosion resistance options for different areas
- Identify acceptable equivalence testing methods for coated fasteners
- Clarify regions where corrosion resistance requirements apply (i.e., introduced definition of “saltwater shoreline”)
- Change the format for improved clarity and application to different designation levels

The updated FORTIFIED corrosion protection requirements for fasteners and connectors in coastal regions are shown in Figure 1.

To address the most common coastal regions where clarification of a *saltwater shoreline* has been requested, maps have been provided for additional visual reference in interpreting the definition, as shown in Figure 2 and Figure 3.



Corrosion-Resistant Fasteners

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FORTIFIED Home™ Corrosion Protection Requirements for Fasteners & Connectors in Coastal Regions

For all connections described in this table: if corrosion is observed at time of re-designation, designation may not be renewed.

Requirements & Best Practices for FORTIFIED Roof™ Designations			
ROOF CONNECTIONS	REQUIREMENTS		BEST PRACTICES
	Distance to saltwater shoreline ¹		Distance to brackish water shoreline
Roofing nails for shingles Concrete and clay roof tile fasteners Roof vent fasteners	0-300 ft Category A	300-3000 ft Category B (or better)	0-300 ft Category B (or better)
Metal roof system including panels and exposed fasteners, clips, etc.	Follow manufacturer's corrosion resistance guidance for coastal areas. If not provided by manufacturer, the following corrosion resistance categories may be accepted for exposed fasteners and clips Category A Category B (or better)		Category B (or better)
Fasteners used for attachment of underlayment to roof deck Roof-mounted equipment exposed connections and fasteners	Category B (or better) Category A Category B (or better)		
Requirements and Best Practices for FORTIFIED Silver™ and FORTIFIED Gold™ Designations			
EXTERIOR EXPOSED CONNECTIONS (including under soffits and elevated foundations)	REQUIREMENTS		BEST PRACTICES
	Distance to saltwater shoreline ¹		Distance to brackish water shoreline
Silver: • Soffit fasteners • Exposed attached structure connectors, anchors, fasteners	0-300 ft Category A	300-3000 ft Category B (or better)	0-300 ft Category B (or better)
Gold: Exposed CLP connectors, anchors, fasteners	Aluminum Soffits NOT Allowed	Aluminum Soffits Allowed	
INTERIOR CONNECTIONS (including enclosed in attic or within wall cavity)	BEST PRACTICES		BEST PRACTICES
	Distance to saltwater shoreline ¹		Distance to brackish water shoreline
Silver: • Gable bracing metal connectors and fasteners • Gable outlooker hangers, clips and fasteners • Chimney framing metal connectors and fasteners	Category B (or better)		0-300 ft Category C (or better)
Gold: Enclosed CLP connectors, anchors, fasteners	Category C (or better)		
Corrosion Resistance Categories ^{2,3}			
CATEGORY A - STAINLESS STEEL OR EQUIVALENT	CATEGORY B - ENHANCED GALVANIZED OR EQUIVALENT		
<u>Metal connectors:</u> • Stainless steel per ASTM A316	<u>Metal connectors:</u> • Galvanized per ASTM A653 with G185 coating • Hot-dip galvanized per ASTM A123		
<u>Fasteners:</u> • Stainless steel per ASTM A304 or A316 • Proprietary coated fasteners require documentation of equivalent corrosion protection performance to stainless steel, such as equivalence testing per ICC-ES AC257 Exposure Condition 4, or other comparative testing documentation	<u>Fasteners with diameters over 3/8 in.:</u> • Hot-dip galvanized per ASTM A153 Class C		
CATEGORY C - STANDARD GALVANIZED	<u>Fasteners with diameters up to 3/8 in. shall meet one of the following:</u> • Hot-dip galvanized per ASTM A153 Class D • Galvanized per ASTM A641 Class 3 • Per ASTM G85, Annex 5, Corrosion resistance exhibiting not more than 5% red rust after the following: — for nails: 280 hours — for roof tile fasteners: 1000 hours — for other carbon steel fasteners: 360 hours • In lieu of testing listed above, proprietary coated fasteners require documentation of equivalent or superior corrosion protection performance to the galvanization options listed above, such as equivalence testing per ICC-ES AC257 Exposure Condition 4, or other comparative testing documentation • Testing per ASTM B117 with corrosion resistance exhibiting not more than 5% red rust after 1,000 hours exposure may be accepted if no other testing is available		
<u>Metal connectors:</u> • Galvanized per ASTM A653 with G90 coating	<u>Fasteners:</u> • Galvanized per ASTM A641 Class 1		
NOTES			
1. For the purposes of FORTIFIED Home designation, "saltwater shoreline" shall be considered as the ocean or gulf coastline along the mainland United States including seaward island coastlines. This includes the Atlantic, Pacific, and Gulf of Mexico coastlines, as well as the coastline of any Bay or Sound with no land barrier separating it from being completely open to the ocean or Gulf of Mexico. Distances are measured from the closest feature of the subject building to the ocean or gulf coastline.			
2. Fastener and connector materials and coatings must be compatible with materials and coatings they come into contact with to prevent galvanic corrosion due to dissimilar materials.			
3. Fasteners in contact with chemically treated wood shall be in accordance with the requirements of the IBC/IRC or locally adopted code as applicable.			

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Figure 1. Corrosion protection requirements for coastal regions

Requirements vs. Best Practices

Roof connections, and exterior exposed connections (such as connections under soffits and elevated foundations) noted in Figure 1 that are within 3,000 ft from a saltwater shoreline are required to have the minimum corrosion protection specified documented for FORTIFIED designation. The definition of a *saltwater shoreline* is provided in the table's note 1.



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*For the purposes of FORTIFIED Home designation, **saltwater shoreline** shall be considered as the coastline along the mainland United States of America including seaward island coastlines. This includes the Atlantic, Pacific, and Gulf of Mexico coastlines, as well as the coastline of any Bay or Sound with no land barrier separating it from being completely open to the ocean or Gulf of Mexico. Distances are measured from the closest feature of the subject building to the ocean or gulf coastline.*

Roof and exterior exposed connections noted in Figure 1 that are within 300 ft from a brackish water shoreline are **recommended** to have the minimum corrosion protection noted. Additionally, interior connections (such as connections enclosed in an attic or within a wall cavity) that are within 3,000 ft from a saltwater shoreline or 300 ft from a brackish water shoreline are **recommended** to have the minimum corrosion protection noted. Corrosion resistance of interior connections are not required to be documented to meet FORTIFIED designation requirements.

Documentation Requirements

To document that roof connections and exterior exposed connections noted in Figure 1 meet the minimum corrosion protection requirements, the FORTIFIED Evaluator must obtain a combination of following for each connection type to document the installed fastener or connector and its associated level of corrosion resistance:

- Site-specific photos of product packaging and/or labels identifying both the fastener or connector information and its level of corrosion resistance
- Manufacturer data sheets or testing reports identifying the product and its level of corrosion resistance
- Site-specific photos of the installed fastener or connector taken close enough to show identifying information on the product such as stamps, engravings, embossments, etc. that identify level of corrosion resistance
- Site-specific invoices showing the product information for the fasteners or connectors ordered and delivered to the home's address that identify level of corrosion resistance.



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Maps for Common Coastal Areas

To provide additional guidance interpreting the definition of a saltwater shoreline along the Alabama Gulf coastline, maps are provided in Figure 2 and Figure 3.



Figure 2. Saltwater shoreline for Alabama – Mobile and Dauphin Island area



Figure 3. Saltwater shoreline for Alabama – Foley and Gulf Shores area



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Re-Designation Considerations

For FORTIFIED designated homes located 3,000 ft from a saltwater shoreline at the time of re-designation, the FORTIFIED Evaluator must provide photos of the visible connections noted in Figure 1. Photos should be taken from an appropriate distance to give overall perspective of the extent of corroded connections, and photos should also be taken close enough to show the corrosion on the individual fastener or connector. Corroded connections will require further action for FORTIFIED re-designation to be issued, such as inspection and assessment by a qualified corrosion specialist, along with repair or replacement of the affected connections.