

# CORROSION INFORMATION

## General Simpson Strong-Tie Recommendations

- Outdoor environments are generally more corrosive to steel. If you choose to use ZMAX or HDG on an outdoor project (*i.e. deck, patio cover*), you should periodically inspect your connectors and fasteners or have a professional inspection performed. Regular maintenance including water-proofing of the wood used in your outdoor project is also a good practice.
  - For wood with actual retention levels greater than 0.40 pcf for ACQ and MCQ, 0.41 pcf for CBA-A, or 0.21 pcf for CA-B (*Ground Contact*), Stainless Steel connectors and fasteners are recommended. Verify actual retention level with the wood treater.
  - When using Stainless Steel connectors, use Stainless Steel fasteners. When using ZMAX/HDG galvanized connectors, use fasteners that meet the specifications of ASTM A153.
  - Testing indicates wood installed dry reduces potential corrosion. If dry wood is used, see our website for additional information.
  - Using a barrier membrane can provide additional corrosion protection, see Technical Bulletin T-PTBARRIER.
- Due to the many variables involved, Simpson Strong-Tie cannot provide estimates on service life of connectors, anchors or fasteners. We suggest that all users and specifiers also obtain recommendations for HDG, ZMAX (G185), mechanically galvanized, or other coatings from the treated wood supplier for the type of wood used. However, as long as the Simpson Strong-Tie recommendations are followed, Simpson Strong-Tie stands behind its product performance and our standard warranty (*page 11*) applies.

## Guidelines for Selecting the Proper Connector

### 1 Evaluate the Application.

Consider the type of structure and how it will be used. These recommendations may not apply to non-structural applications such as fences.

### 2 Evaluate the Environment.

Testing and experience indicate that indoor dry environments are less corrosive than outdoor environments. Determining the type of environment where a connector or fastener will be used is an important factor in selecting the most appropriate material and finish for use on the connectors and fasteners. To help in your decision making, consider the following general exposure information:

**Interior Dry Use:** Includes wall and ceiling cavities, and raised floor applications of enclosed buildings that have been designed to ensure that condensation and other sources of moisture do not develop.

**Exterior – Dry:** Includes outdoor installations in low rainfall environments and no regular exposure to moisture.

**Exterior – Wet:** Includes outdoor installations in higher moisture and rainfall environments.

**Higher Exposure Use:** Includes exposure to ocean salt air, fire retardants, large bodies of water, fumes, fertilizers, soil, some preservative treated woods, industrial zones, acid rain, and other corrosive elements.

### 3 Evaluate and select a suitable pressure-treated wood for the intended application and environment.

The treated wood supplier should provide all the information needed regarding the wood being used. This information should include: the specific type of wood treatment used, if ammonia was used in the treatment, and the chemical retention level. If the needed information is not provided then Simpson Strong-Tie would recommend the use of Stainless Steel connectors and fasteners. You should also ask the treated wood supplier for a connector coating or material recommendation.

### 4 Use the chart on the right, which was created based on Simpson Strong-Tie testing and experience to select the connector finish or material.

If a pressure treated wood product is not identified on the chart, Simpson Strong-Tie has not evaluated test results regarding such product and therefore cannot make any recommendation other than the use of Stainless Steel with that product. Manufacturers may independently provide test results or other product use information; Simpson Strong-Tie expresses no opinion regarding any such information.

### 5 Compare the treated wood supplier's recommendation with the Simpson Strong-Tie recommendation.

If these recommendations are different, Simpson Strong-Tie recommends that the most conservative recommendation be followed.

**Low** = Use Simpson Strong-Tie standard painted and G90 galvanized connectors as a minimum.

**Med** = Use ZMAX/HDG galvanized connectors as a minimum. Use fasteners which meet the specifications of ASTM A153 or SDS screws with double-barrier coating.

**High** = Use Type 303, 304, 305 or 316 Stainless Steel connectors and fasteners.

#### CONNECTOR COATING RECOMMENDATION – STRUCTURAL APPLICATIONS

Environment	Untreated Wood	SBX/ DOT & Zinc Borate	MCQ	ACQ-C, ACQ-D (Carbonate), CA-B & CBA-A			ACZA	Other or Uncertain
				No Ammonia	With Ammonia	Higher Chemical Content <sup>1</sup>		
Interior – Dry	Low	Low	Low <sup>5</sup>	Med <sup>5</sup>	Med	High	High	High
Exterior – Dry	Low	N/A <sup>2</sup>	Med	Med	High	High	High	High
Exterior – Wet	Med	N/A <sup>2</sup>	Med <sup>3,4</sup>	Med <sup>3,4</sup>	High	High	High	High
Higher Exposure	High	N/A <sup>2</sup>	High	High	High	High	High	High
Uncertain	High	N/A <sup>2</sup>	High	High	High	High	High	High

- Woods with actual retention levels greater than 0.40 pcf for ACQ and MCQ, 0.41 pcf for CBA-A, or 0.21 pcf for CA-B (*Ground Contact* level).
- Borate treated woods are not appropriate for outdoor use.
- Test results indicate that ZMAX/HDG and the SDS double-barrier coating will perform adequately, subject to regular maintenance and periodic inspection. However, the nationally-approved test method used, AWPA E12-94, is an accelerated test, so data over an extended period of time is not available. If uncertain, use stainless steel.
- Some treated wood may have excess surface chemicals making it potentially more corrosive. If you suspect this or are uncertain, use stainless steel.
- Where noted in the table, applications where the wood is dry (moisture content less than 19%) when installed and will remain dry in-service may use a minimum coating recommendation of "Low".
- Type 316 stainless-steel connectors and fasteners are the minimum recommendation for ocean-salt air and other chloride environments.

## COATINGS AVAILABLE Not all products are available in all finishes. Contact Simpson Strong-Tie for product availability, ordering information and lead times.

Finish	Description	Level of Corrosion Resistance
Gray Paint	Water-based paint intended to protect the product while it is warehoused and in transit to the jobsite.	Low
Powder Coating	Baked on paint finish that is more durable than our standard paint and produces a better looking finished product.	Low
Standard G90 Zinc Coating	Zinc galvanized finish containing 0.90 oz. of zinc per square foot of surface area (total both sides).	Low
ZMAX G185	Galvanized (G185) 1.85 oz. of zinc per square foot of surface area ( <i>hot-dip galvanized per ASTM A653 total both sides</i> ). These products require hot-dip galvanized fasteners ( <i>fasteners which meet the specifications of ASTM A153</i> ).	Medium
HOT-DIP HDG GALVANIZED	Products are hot-dip galvanized after fabrication 68 MIL (14 ga.) and thicker. The coating weight increases with material thickness. The minimum specified coating weight is 2.0 oz./ft <sup>2</sup> ( <i>per ASTM A123 total both sides</i> ). These products require hot-dip galvanized fasteners ( <i>fasteners which meet the specifications of ASTM A153</i> ).	Medium
Double-Barrier Coating (SDS Screws)	SDS screws that are manufactured with two different finishes that provide a level of corrosion protection that is equivalent to that provided by the previous HDG finish.	Medium
SS316 STAINLESS STEEL	Products manufactured from Type 316L stainless steel, and provide greater durability against corrosion. Stainless steel nails are required with stainless steel products, and are available from Simpson Strong-Tie.	High

See Corrosion Information for more specific performance and application information on these finishes.