Code Evaluations

Most USP structural products listed in this catalog have been evaluated or are in the submittal stage for evaluation from one or more of the following code authorities. With the consolidation of former evaluation services (ICBO ES, NES, SBCCI PST & ESI, and BOCAI evaluation services) into ICC Evaluation Service, Inc. (ICC-ES), many of our evaluation reports now have the status of ICC-ES "Legacy Reports". The ICC-ES Web Site provides additional information, and may be accessed at http://www.icc-es.org.

ICC-ES- ICC Evaluation Service, Inc. ESR-1178, 1702

NES Legacy Reports. (Formerly NES) -
NER-478, 505, 510, 530, 532, 564, 568, 608

UBC Legacy Reports. (Formerly ICBO ES) -
ER-2039, 2725, 3613, 5125, 5321, 5356, 5531, 5634

SBC Legacy Reports. (Formerly SBCCI PST & ESI) -
2031C

State of Florida Product Approvals - FL565-R1, FL569-R1, FL572-R1, FL576-R1, FL815, FL816, FL817, FL818, FL819, FL820-R1, FL821, FL822, FL859-R1, FL1247, FL1777, FL2033, FL2620, FL2621-R1, FL3923R-1, FL4928, FL5631, **FL6223**

METRO - Dade County, Florida, 01-0912.05, 02-0102.05, 02-1113.05, 03-0206.03, 03-0219.02, 03-0508.04, 03-0508.05, 03-0611.05, 04-0427.03, **04-1122.03, 05-0105.05, 05-0701.02, 06-0601.03, 06-0605.10, 06-0831.04, 06-1011.02, 06-1026.07**

LA CITY - City of Los Angeles, California RR23888, **25029,** 25104, **25113,** 25283, 25303, 25325, 25327, 25332, 25337, 25357, 25433, **25592**

DSA - Division of State Architect, California. Please reference the Interpretation of Regulation, IR23-1 Pre-Fabricated Wood Construction Connectors, for clarification of listing requirements, acceptable load capacities, design and installation requirements, and connector fabrication used on projects under Division of State Architect (DSA) jurisdiction at **http://www.dsa.dgs.ca.gov./Publications/default.htm**.

Other code agencies may require specific reductions and limitations and may have different load values than those presented in this catalog. USP recommends consulting specific code evaluation or product acceptance criteria reports that govern in the applicable area. Any questions about current code listings should be directed to the Technical Assistance staff. USP continuously updates code reports to reflect new standards and requirements. Visit USP's Web Site, **www.USPconnectors.com/codereports.htm**, or specific code agencies web sites for current listings. Code evaluation reports referenced in this catalog may not apply to all stock numbers or product series listed.

Code Watch

"Code Watch" items are included to highlight some sections of the model building codes that discuss the use of products contained in this catalog. The user is strongly encouraged to consult with a qualified design professional to review the exact requirements of the relevant code references. Please note that not all code sections relating to the use of products contained in this catalog are included. In addition, some states and local municipalities have developed amendments to the referenced code section. Shown references are for the 2003 International Residential Code (IRC), 2003 International Building Code (IBC), and 1997 Uniform Building Code (UBC).

Corrosion Resistant Finishes

USP Structural Connectors® offers three options for improved corrosion resistance:

Gold Coat (GC) – gold coat is a proprietary multi-layer protection system. It is comprised of an organic top coat barrier layer and a zinc layer placed over a steel substrate.

Required Fastener: Gold Coat fasteners

Triple Zinc (TZ) – galvanizing provides a prefabrication coating of 1.85 (G-185) ounces of zinc per square foot of surface area measured in accordance with ASTM A 653.

Required Fastener: Hot-dip galvanized fasteners

Hot-Dip Galvanized (HDG) – coating provides an after-fabrication hot-dipped zinc coating. The coating thickness is dependent on the connector material, but generally ranges from 1.1 to 2.3 ounces of zinc per square foot of surface. Hot-dip products meet requirements set forth in ASTM A 123.

Required Fastener: Hot-dip galvanized fasteners

Stainless Steel (SS) – is the best option for corrosion protection. Quality stainless steel (316SS grade steel) is used to fabricate connectors. Although costs are higher, some applications may need the virtual corrosion proof quality of stainless steel.

Required Fastener: Stainless Steel fasteners

Connector Use with Preservative Treated Wood
In cooperation with the Environmental Protection Agency, chemical producers in the treated wood industry agreed to discontinue the use of Chromated Copper Arsenate (CCA) for most residential applications at the end of 2003. In place of CCA, treated wood suppliers use copper based alternative treatment chemicals such as Amine/Ammoniacal Copper Quat (ACQ, ACQ-D), and Copper Azole (CBA-A, CA-B). Sodium Borate (SBX, DOT) is also used primarily in sill plate applications. Testing conducted by USP and others in the industry have concluded that ACQ and Copper Azole wood treatments are more corrosive to metals while Sodium Borate treatments are less corrosive to metals than traditionally used CCA treatments are. A key factor in this increased corrosion is the amount of copper used in the treatment chemical. The ACQ and Copper Azole treatments contain roughly three times the amount of copper and leach more copper than the traditionally used CCA treatment does.

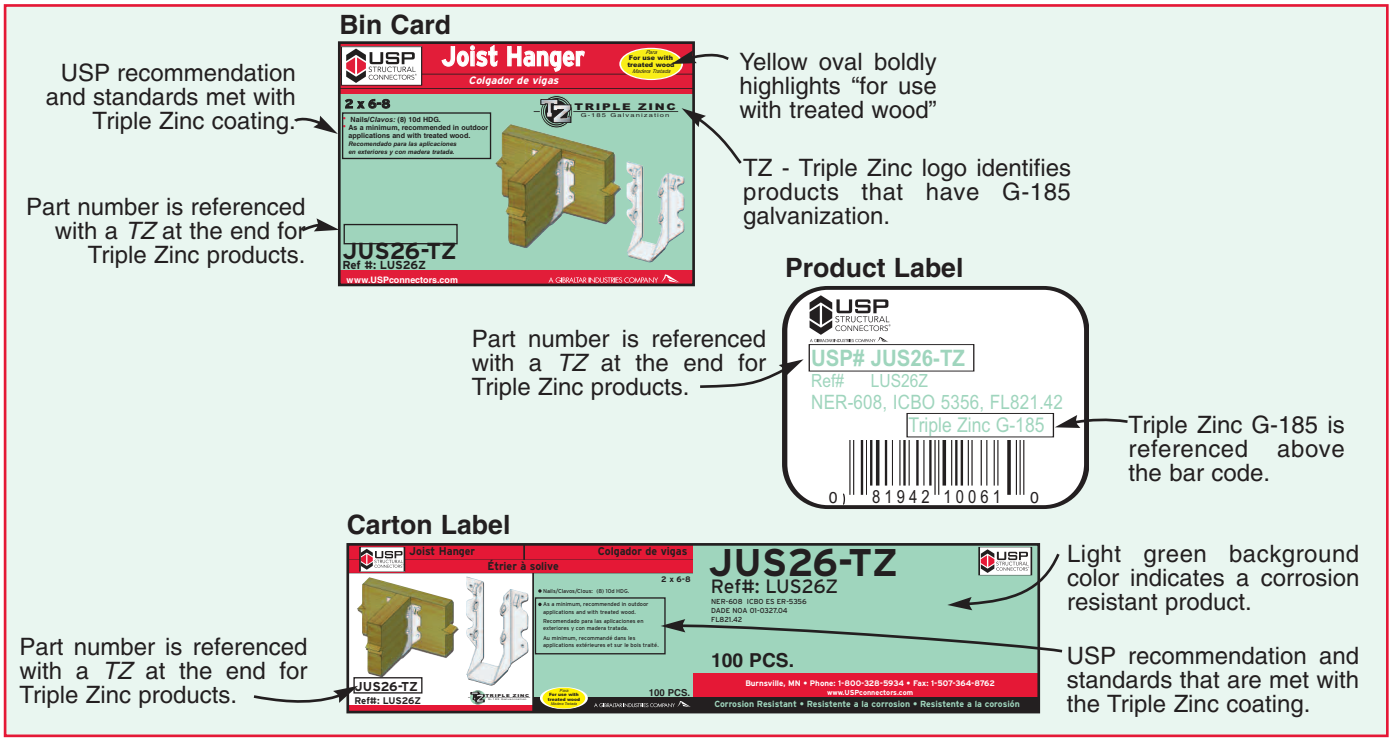
Corrosion Basics
Corrosion may result when a metal comes in contact with a variety of substances including air, acids, bases, salts, oils, solid or liquid chemicals, and gas vapors. If an electrolyte is present, such as water, a metal will form an electric circuit with a dissimilar metal and galvanic corrosion can take place. Zinc is the metal used in the hot-dip galvanizing process due to its ability to sacrifice itself while protecting the base steel underneath. When zinc and copper are in electrical contact with each other the copper will have a tendency to extract electrons from the highly reactive zinc at a greater rate, therefore corrosion will take place at a greater rate.

Our new Gold Coat finish provides barrier protection. Simply the barrier prevents a reaction from occurring between the connector and its environment. This specially designed organic polymer coating and its concealing color is also an attractive option for exposed exterior construction projects.

Corrosion Resistant Finishes
USP provides three different corrosion resistant finishes to cover a range of corrosion performance. Triple Zinc G185 connectors are available as an economical alternative for exterior applications which will provide a minimum level of protection. USP recommends that for the highest corrosion protection available, stainless steel connectors are the best option. As an economical alternative to stainless steel our new Gold Coat connectors are specifically designed for exterior application when in contact with preservative treated wood. For recommended finishes to be used in specific applications, please refer to our website.

Corrosion Protection Guidelines:
- Ask for and follow recommendations of the preservative wood supplier for use of connectors and fasteners in contact with their brand of treated wood product.
- However as an economical alternative to stainless steel, USP recommends the use of Triple Zinc G-185 when in contact with alternative treated woods as a minimum level of protection. Gold Coat is specifically designed for improved corrosion resistance in exterior environments when in contact with preservative treated wood.
- The use of the correct fastener with the connector is critical. Stainless steel connectors require stainless steel fasteners. For exterior applications, hot-dip galvanized fasteners (HDG) must be used with both Triple Zinc G-185 and hot-dip galvanized (HDG) finishes.
- USP's Zinc dichromate WS Wood Screws are not recommended for use with preservative or fire-retardant treated wood.
- For any questions contact USP Technical Assistance or visit our web site at www.USPconnectors.com <http://www.uspconnectors.com/> .
- Gold Coat connectors will be distinguishable from other connectors because of their concealing color. For additional information on the Gold Coat product line, please visit the Gold Coat section of our website.
- USP clearly differentiates our Triple Zinc products from our standard G90 products. USP's TZ product identification is embossed on all Triple Zinc products. Following are examples of our carton labels, bin cards for retail displays, and individual product labels.

Bin Card



U.S. Standard Steel Gauge Equivalents in Nominal Dimensions

Gauge	Approximate Dimensions		Decimals (inches)		
	Inches	Millimeters	Uncoated Steel	Galvanized Steel (G90)	Triple Zinc
3	1/4	6.0	0.239	-- --	-- --
7	3/16	4.5	0.179	0.186	-- --
10	9/64	3.4	0.134	0.138	0.140
11	1/8	3.0	0.120	0.123	0.125
12	7/64	2.7	0.105	0.108	0.110
14	5/64	2.0	0.075	0.078	0.080
16	1/16	1.5	0.060	0.063	0.065
18	3/64	1.2	0.048	0.052	0.054
20	1/32	1.0	0.036	0.040	0.042
22	1/32	0.8	0.030	0.033	0.036

*Actual steel dimensions will vary from nominal dimensions according to industry tolerances.

Maximum Shear Capacity of Joist or Rafter

The table below indicates the calculated shear capacity of different dimensional lumber sizes for various wood species.

Wood Species	Allowable Shear on Bending Member[1,2,3]											
	Joist or Rafter											
	2 x 4			2 x 6			2 x 8			2 x 10		
	100%	115%	125%	100%	115%	125%	100%	115%	125%	100%	115%	125%
DF-L	630	725	788	990	1139	1238	1305	1501	1631	1665	1915	2081
SP	613	704	766	963	1107	1203	1269	1459	1586	1619	1862	2023
S-P-F	473	544	590	743	854	928	979	1126	1223	1249	1436	1561
Hem Fir	525	604	656	825	949	1031	1088	1251	1359	1388	1596	1734

1) Applies to nominally dimensioned joists as listed, where moisture content < 19% and temperature <100° F.
2) Loads apply to:
DF-L: Douglas Fir-Larch (G=0.50), Fv=180 psi;
SP: Southern Pine (G=0.55), Fv=175psi;
S-P-F: Spruce-Pine-Fir (G=0.42), Fv=135psi;
Hem Fir (G=0.43), Fv=150psi.
3) 115% and 125% loads are increased for short-term loading in accordance to the code.

Roof Pitch

If common Rafter Roof Pitch is . . .		Then Hip/Valley Rafter Roof Pitch becomes . . .	
Rise / Run (inches)	Slope (degrees)	Rise / Run (inches)	Slope (degrees)
1/12	5	1/17	3
2/12	10	2/17	7
3/12	14	3/17	10
4/12	18	4/17	13
5/12	23	5/17	16
6/12	27	6/17	19
7/12	30	7/17	22
8/12	34	8/17	25
9/12	37	9/17	28
10/12	40	10/17	30
11/12	42	11/17	33
12/12	45	12/17	35

1) Use this conversion table only for hip/valley rafters that are skewed 45° right or left. All other skews or dual pitch roofs will cause the slope to change from that listed above.

Slope Conversion Table

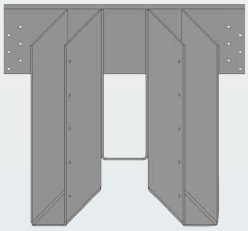
Rise / Run (inches)	Slope (degrees)
0/12	Flat
1/12	5
2/12	10
3/12	14
4/12	18
5/12	23
6/12	27
7/12	30
8/12	34
9/12	37
10/12	40
11/12	42
12/12	45

Non-Catalog Products

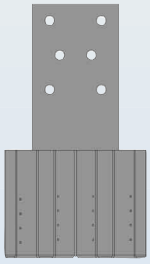
USP manufactures a connector product line second to none in scope and diversity. However, unusual framing needs may require the use of a non-catalog product.

Non-catalog product details must be provided by the customer and will be manufactured by USP Structural Connectors® in accordance to customer specifications. Consult USP's Technical Assistance Department for more information.

A full range of shipping options are available, from regular freight to overnight delivery.



HLBH 3



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Load Direction Conventions