

1) Factored resistances for more than one direction for a single connection cannot be added together. A design load which can be divided into components in the directions given must be evaluated as follows:

$$\text{Factored tensile force/factored tensile resistance} + \text{Factored shear force/factored shear resistance} \leq 1.0$$

2) Connector ratings may exceed the tensile strength or other aspects of the wood members involved in the connection. A qualified designer should verify wood member capacities when specifying connectors.

3) Verify that the size of the supporting member can accommodate the connector's specified fasteners.

4) Some illustrations in this catalogue may not reflect additional mechanical reinforcements which may be required to reduce cross grain tension or wood member bending under loading. The design professional is responsible for determining if additional mechanical reinforcement is required.

5) USP recommends the hanger height be 60% of the joist height for stability.

Limit States Design

The factored resistance values presented in this catalogue are for Limit States Design (LSD) in accordance with the 2005 National Building Code of Canada (NBCC). The values have been developed by a combination of testing to CSA O86-01, and soft conversion from working stress design. These procedures are summarized as follows:

(a) Testing to CSA O86

Products that have been evaluated to the CSA Standard are listed under the Codes heading in each product series section if applicable. Visit USP's Web Site, <<http://www.USPconnectors.com/>>, or specific code agencies web site for current listing. Code evaluation numbers listed in this catalog may not apply to all stock numbers or product series listed.

Standard term resistance values have been established by testing to ASTM D1761 and the CCMC technical guide using the following criteria:

- Lowest ultimate load multiplied by 0.91 and a resistance factor of 0.6.
- The average load at 1/8 deflection multiplied by 2.42 and a resistance factor of 0.6.

(b) Soft Conversion from Working Stress Design

The soft converted values use the allowable working loads developed in the United States using the 2001 National Design Specification and the ICBO "Acceptance criteria for Joist Hangers and Similar Devices." These allowable working loads are based on testing to ASTM D1761 and calculations on the fasteners and wood bearing using the NDS. They were soft converted by multiplying the floor load case ($K_D=1.0$) by 1.44 to obtain a standard term load resistance in Limit States Design.

The soft converted value of each bolted connector was also compared to the calculated resistance of the bolts as given in CSA O86-01. The lower of the two values is given in the tables.

Material

USP selects steel for its various products in accordance with application needs and steel properties, including tensile strength, ductility, corrosion resistance, gauge, and weldability. See specific code evaluations or consult USP for steel information on specific products. USP Structural Connectors® are manufactured from steel which meets ASTM A 653, ASTM A 1011, or ASTM A 36.

Product Design Loads

Factored resistance values in this catalogue are given for Standard term loading and/or short term loading as described below:

(a) Standard term loading

This includes the effects of dead loads plus loads due to snow or use and occupancy in which the duration of load factor (K_D) in CSA O86 is equal to 1.0. Therefore, connectors carrying roof or floor members should be selected using the standard term load resistance. In many tables this is designated as "vertical (100%)" or "bearing (100%)". The 100% indicates that no duration of load increase is included.

(b) Short term loading

This case refers to loading that will not exceed 7 days throughout the life of the structure and includes wind and earthquake loads. Short term loading has a duration of load factor (K_D) of 1.15 included. In the tables short term loading resistance is also designated as "uplift (115%)".

In some cases the strength of the steel governs the resistance values and therefore no increase for short term loading is included.

