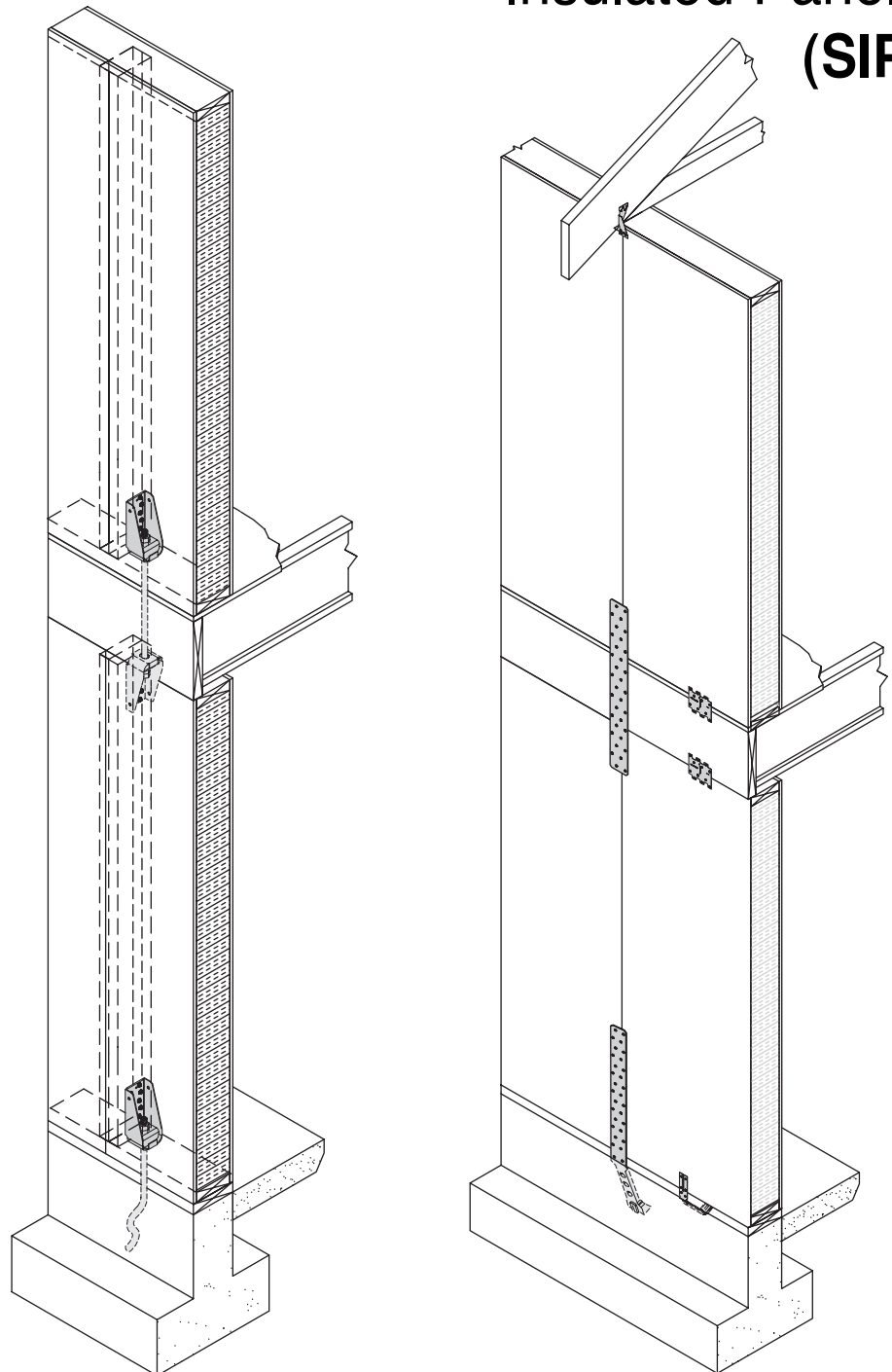


# USP SIP Connection Manual

www.USPconnectors.com

## Structural Insulated Panels (SIP)



**USP**  
Structural  
Connectors™  
A GIBRALTAR COMPANY



*USP supplies quality products to build Stronger Safer Structures*

Los Angeles • San Francisco • Minneapolis • Houston • Tampa • Charlotte • Philadelphia

# 2 Company Information

## Company History

USP Structural Connectors™ (United Steel Products Company) has been designing, manufacturing, and marketing construction hardware for 49 years. The company's experience in marketing, engineering, and service has allowed USP to be a leader in developing new connectors for a changing construction industry.

### Minneapolis Corporate Office ISO 9001:2000 certified

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Montgomery, MN 56069-1324  
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Phone: 1-507-364-7333  
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### San Francisco Office

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Livermore, CA 94551-9522  
Phone: 1-800-227-0470  
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### Tampa Office

11910 62nd Street North  
Largo, FL 33773-3705  
Phone: 1-800-443-6442  
Phone: 1-727-536-7891  
Fax: 1-727-535-8199

## USP Operations Include

- Seven strategically placed manufacturing and warehousing locations.
- In-house quality control and testing with independent, third-party plant inspection, and test witnessing.
- On staff licensed professional engineers.
- Our National Factory Technical Sales Force is ready to help with application questions.
- Ongoing regional and national code evaluations as products are developed.

## Product Questions & Answers

The Customer Service/Technical Assistance staff is ready to answer your questions and help solve your connector related problems. Our staff can assist you in developing economical solutions to your structural connection problems.

When calling for Technical Assistance, please have the following information ready:

- Which USP product are you using?
- What is connector application?
- What is the header material and application?
- What is the load requirement?

## Table of Contents

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### WARRANTY

United Steel Products Company warrants its products to be free from defects in material and workmanship. Said products are further warranted as to adequacy of design, provided products are used in strict accordance with United Steel Product Company's current published design limits and are installed in a workmanlike manner. Said warranties do not apply in the event products are cut, notched, welded, drilled or in any way altered. United Steel Products Company, Inc.'s obligations under this warranty shall be limited to the replacement or repair of those products demonstrated to be defective. Such remedy shall constitute Customer's sole and exclusive remedy and Customer hereby agrees that no other remedy (including, but not limited to claims for INCIDENTAL, CONSEQUENTIAL OR

SPECIAL DAMAGES, OR ANY CAUSE, LOSS, ACTION, CLAIM OR DAMAGE, INCLUDING LOSS OF TIME, WHATSOEVER, OR INJURY TO PERSON OR PROPERTY OR ANY OTHER CONSEQUENTIAL DAMAGE OR INCIDENTAL OR ECONOMIC LOSS) shall be available to Customer whether said claims be asserted on the basis of warranty, negligence, strict liability or otherwise. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. ALL OF SUCH OTHER WARRANTIES BEING HEREBY EXPRESSLY EXCLUDED.



San Francisco Office  
1-800-227-0470

### Customer Service/Technical Assistance

Minneapolis Corporate Office  
1-800-328-5934

Tampa Office  
1-800-443-6442

## Please Note

- *USP Structural Connectors™* reserves the right to change specifications, designs and models without notice and liability for such changes. This catalog may not be reproduced in whole or in part without the prior written approval of *USP Structural Connectors™*.
- This SIP Connection publication was designed as a general reference for the USP Product Line. See USP's *Full Line Catalog* for complete product information.
- To achieve the allowable loads presented in this catalog, all specified fasteners must be used and proper installation procedures observed. Verify that the dimensions of supporting members are sufficient to receive specified fasteners. Any product modifications void the warranty unless *prior* written permission of *USP Structural Connectors™* is obtained.
- Nails specified as 8d, 10d, 16d, and 20d are common wire nails.

- See USP's *Full Line Catalog* for testing, material, and Code information.
- This publication shows common SIP connections. Please refer to SIP manufacturers literature for complete SIP connection information.
- Allowable loads shown in this publication are based on connections to wood members. Fasteners connecting only to the panel skin have not been considered.

## NDS® Standards

The load resistance values presented in this catalog reflect the calculation criteria set forth in the 1991 Revised and 1997 National *Design Specification for Wood Construction (NDS®)* published by the American Forest and Paper Association. The values shown in this catalog supercede those previously printed.

## Douglas Fir-Larch or Hem Fir Equivalent Capacity

Unless otherwise noted, the published design loads in this catalog apply to Spruce-Pine-Fir lumber. When Douglas Fir-Larch, Southern Yellow Pine, or Hem Fir lumber is used with face mount hangers or straps, the nail shear capacity may be adjusted according to the chart to the right.

Allowable Load Adjustment Factor		
Wood Species	Specific Gravity	Adjustment Factor
Douglas Fir-Larch (DF-L)	0.50	1.16
Southern Yellow Pine (SYP)	0.55	1.16
Douglas Fir (S) Hem Fir (N)	0.46	1.02
Spruce-Pine-Fir (S-P-F)	0.42	1.00

- 1) Allowable loads must be adjusted according to the applicable wood species.
- 2) When using structural composite lumber, verify wood species and use above listed adjustment factors.

## Testing

On all structurally-rated products, USP performs full-scale testing in accordance with ASTM D 1761, the standard recognized by all domestic code agencies. All final testing is conducted by a third-party testing laboratory.

## Material

*USP Structural Connectors™* are manufactured from prime quality steel which meets ASTM A 653 requirements for galvanized steel, and ASTM A 570, or ASTM A 36 for hot-rolled steel.

## Finish

All galvanized products have a zinc coating as specified in ASTM A 653. Hot-dip galvanized parts are galvanized after fabrication per ASTM A 153 with a minimum of one ounce of zinc per square foot of surface.

Non-galvanized steel products are prime coated for corrosion protection.

## Corrosion Resistant Finishes

*USP Structural Connectors™* offers three options for improved corrosion resistance of their connectors.

**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

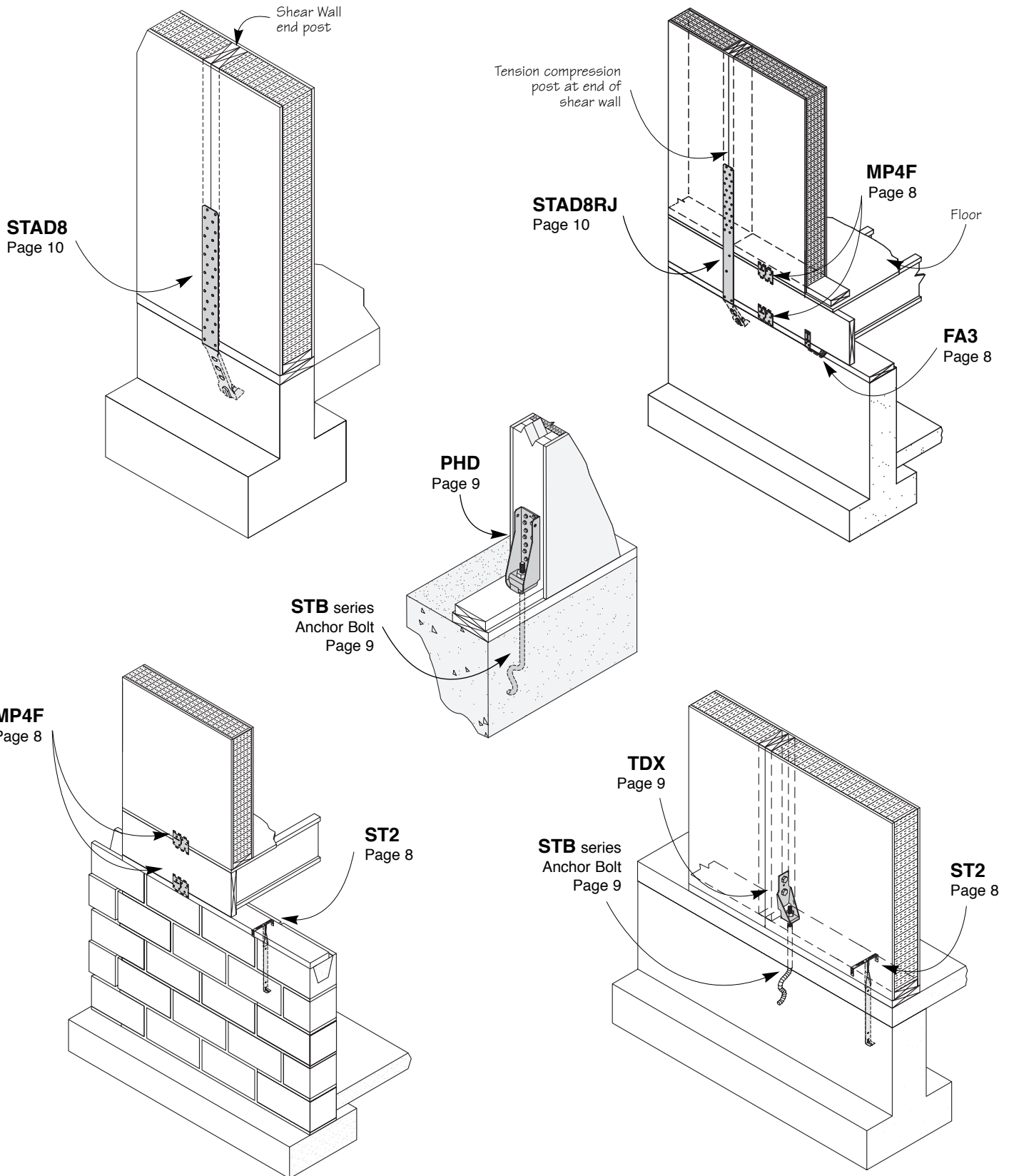
**Hot-Dip Galvanized (HDG)** – coating provides an after fabrication hot-dipped zinc coating. The coating thickness is dependent on the connector material, but generally ranges from 1.1 to 2.3 ounces of zinc per square foot of surface. Hot-dip products meet requirements set forth in ASTM A 153.

**Required Fastener:** Hot-dip galvanized fasteners

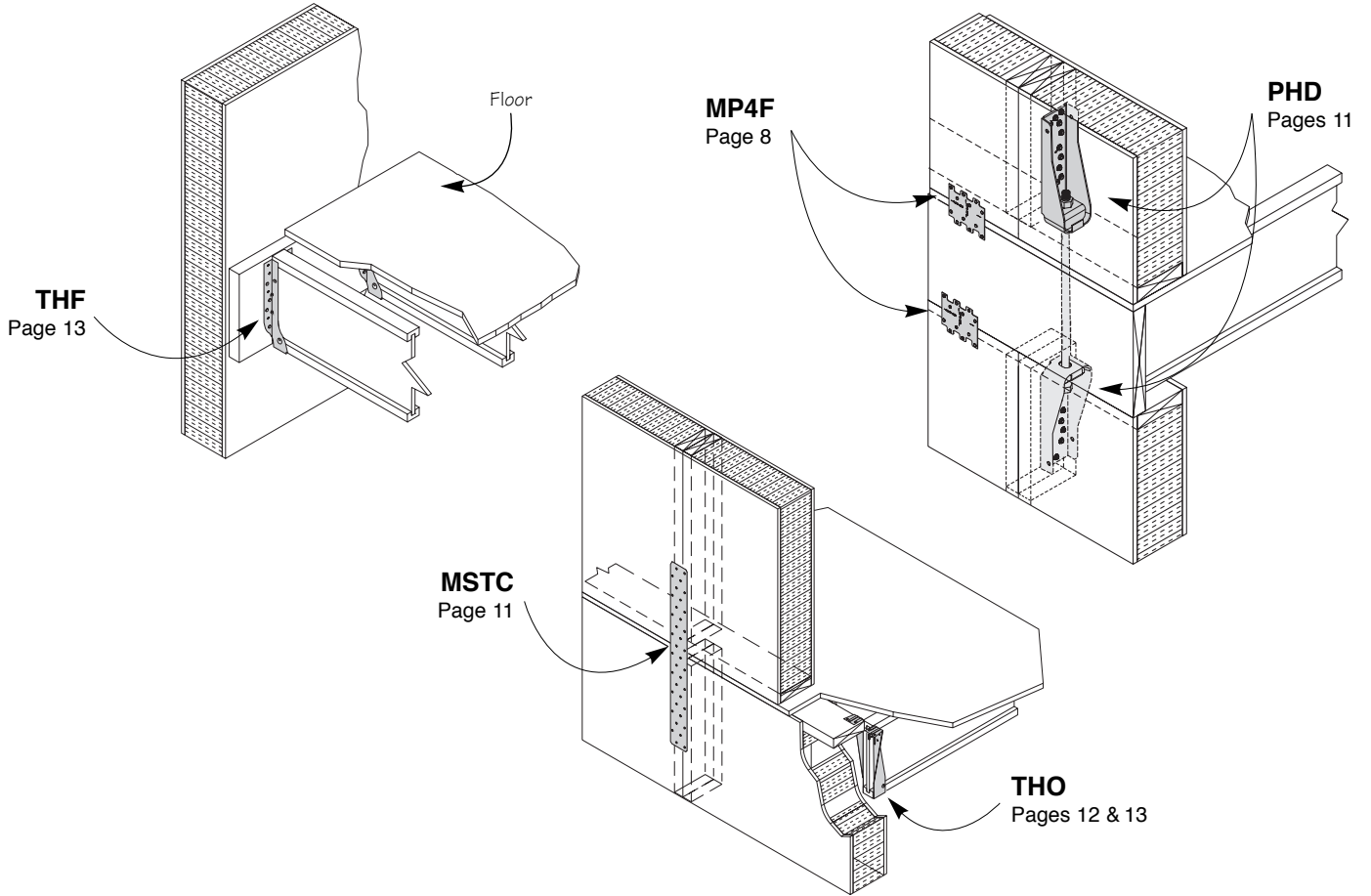
**Stainless Steel (SS)** – is the best option for corrosion protection. Quality stainless steel (316SS grade steel) is used to fabricate connectors. Although costs are higher, some applications may need the virtual corrosion proof quality of stainless steel.

**Required Fastener:** Stainless Steel fasteners

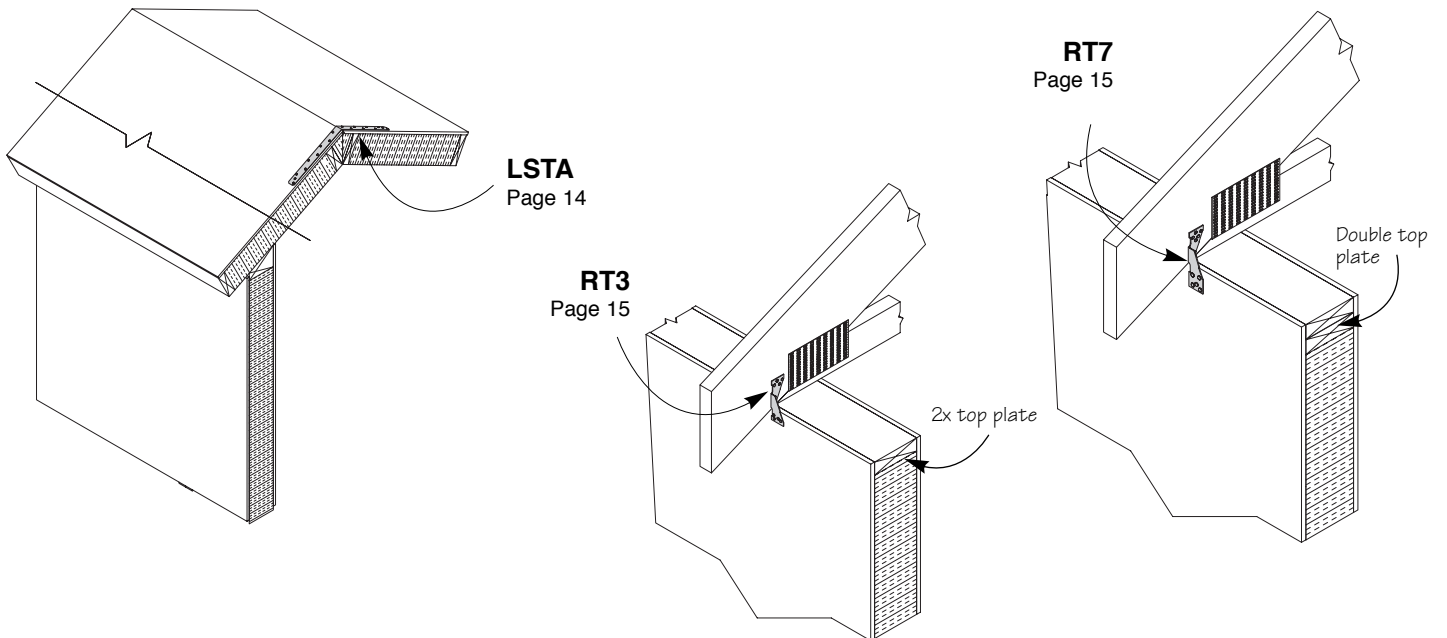
## SIP Foundation Connections



## SIP Multi-Story Connections



## SIP Rafter & Truss Connections



## Nails – NA series

### Optional Nails for Face Mount Hangers and Straight Straps load table

Catalog Nail	Replacement Fastener <sup>1</sup>	Allowable Load Adjustment Factor			
		DF-L	SYP	S-P-F	LVL
16d common	8d common	0.69	0.69	0.60	0.69
16d common	10d Box	0.67	0.67	0.58	0.67
16d common	10d common/12d common	0.84	0.84	0.72	0.84
16d common	10d x 1-1/2	0.67	0.67	0.59	0.67
16d common	10d Sinker	0.58	0.58	0.50	0.58
16d common	16d Box	0.74	0.74	0.64	0.74
16d common	16d Sinker	0.84	0.84	0.72	0.84
16d common	16d x 2-1/2	1.00	1.00	0.86	1.00
16d common	No. 8 x 1-1/2 Wood Screw	0.90	1.00	0.82	0.84
10d common	8d Box	0.65	0.65	0.56	0.65
10d common	10d Sinker	0.70	0.70	0.60	0.70
10d common	8d common	0.83	0.83	0.71	0.83
10d common	10d Box	0.80	0.80	0.69	0.80
10d common	8d x 1-1/4	0.66	0.66	0.56	0.66
10d common	No. 8 x 1-1/2 Wood Screw	1.00	1.00	1.00	1.00
10d common/12d common	10d x 1-1/2	0.80	0.80	0.68	0.79
10d common/12d common	16d Sinker	1.00	1.00	0.87	1.00
10d common/12d common	No. 8 x 1-1/2 Wood Screw	1.00	1.00	1.00	1.00
8d common	8d Box	0.77	0.77	0.66	0.77
8d common	8d x 1-1/4	0.80	0.80	0.68	0.80
8d common	No. 8 x 1-1/2 Wood Screw	1.00	1.00	1.00	1.00
8d x 1-1/2	8d x 1-1/4	0.86	0.86	0.74	0.86
8d x 1-1/2	No. 8 x 1-1/2 Wood Screw	1.00	1.00	1.00	1.00
10d x 1-1/2	8d x 1-1/2	0.93	0.93	0.80	0.93
10d x 1-1/2	No. 8 x 1-1/2 Wood Screw	1.00	1.00	1.00	1.00

1) No. 8 x 1-1/2 Wood Screw has a shank diameter of 0.164" and shall conform to ANSI/ASME Standard B18.6.1-19

#### How to Use:

The base value is the catalog listed nail in Douglas Fir-Larch and the adjustment factor is the multiplier for the applicable replacement nail and wood combination.

- Adjustment factors may vary with some custom hangers or steel thicker than 10 gauge. Contact USP for exceptions.
- Roofing nails shall not be substituted for any nail size or type.

#### Nail Specification table

USP Stock No.	Ref. No.	Description	Finish <sup>4</sup>	Wire Gauge	Nail Diameter	Length	Withdrawal Load	Nails Per Lb.	Allowable Shear per Nail (Lbs.) <sup>1,2,3</sup>										
									Steel Gauge										
									3	7	10	12	13	14	16	18	20	22	
NA11	N8	8d x 1-1/2	HDG	--	0.131	1-1/2	48	152	---	---	---	---	---	---	86	86	86	86	
NA11SS	SSN8	8d x 1-1/2	SS	--	0.131	1-1/2	48	143	---	---	---	---	---	---	86	86	86	86	
--	--	8d Common	Bright	10-1/4 ga.	0.131	2-1/2	80	126	---	---	---	99	97	95	93	93	92	92	
NA9D	N10	10d x 1-1/2	HDG	--	0.148	1-1/2	54	100	---	---	---	94	92	92	92	92	92	92	
NA9DSS	SSN10	10d x 1-1/2	SS	--	0.148	1-1/2	54	112	---	---	---	94	92	92	92	92	92	92	
--	--	10d Common	Bright	9 ga.	0.148	3	108	70	158	139	126	119	116	114	113	112	112	112	
--	--	16d Common	Bright	8 ga.	0.162	3-1/2	138	48	187	160	147	140	138	136	135	134	134	134	

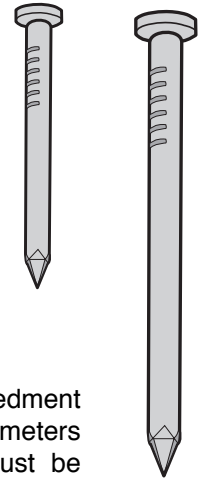
1) Loads are calculated according to specifications of Part 12 of the National Design Specifications for Wood Construction (NDS®), 1997 Edition.

2) Loads apply to Douglas Fir-Larch (G=0.50) and Southern Yellow Pine (G=0.55). For Spruce-Pine-Fir (G=0.42) multiply above values by 0.86, for other wood types refer to NDS® or consult USP.

3) Value assumes full penetration of at least 12 nail diameters.

4) HDG = Hot-Dip Galvanized; SS = Stainless Steel; Bright = No Finish.

### NA9D NA16D



Proper fasteners are a critical component in a sound wood frame structure. To ensure successful installations of its connectors, USP offers a full range of structurally-rated nails. All galvanized nails are finished using the Hot-dip method to assure total anti-corrosion coverage. Stainless steel nails are available on a stock basis in two sizes: 8d x 1 1/2" and 10d x 1 1/2" (see product chart).

**Finish:** See chart

#### Installation:

- Allowable shear values assume nail embedment into the wood of the entire nail or 12 nail diameters (whichever is less). Otherwise, the nail must be embedded at least 6 nail diameters, with the load reduced using the following equation:

$$\text{Reduced Load} = \frac{\text{Published Load} \times \text{Actual Penetration}}{\text{Nail Diameter} \times 12}$$

- Load reductions may occur if nails are used other than those specified. See the chart Optional Nails for Face Mount Hangers and Straight Straps for load reduction factors regarding nail substitutions.

#### Minimum Fastener penetration

Nail Penny	Wire Gauge	Shank Diameter (inches)	Minimum Penetration (inches)
6d	11-1/2 ga.	.113	1.37
8d	10-1/4 ga.	.131	1.57
10d/16d Sinker	9 ga.	.148	1.78
12d	9 ga.	.148	1.78
16d	8 ga.	.162	1.94
20d	6 ga.	.192	2.30

1) Less than the specified nail penetration shall be multiplied by the applicable adjustment factor.

## Wood Screws – WS series

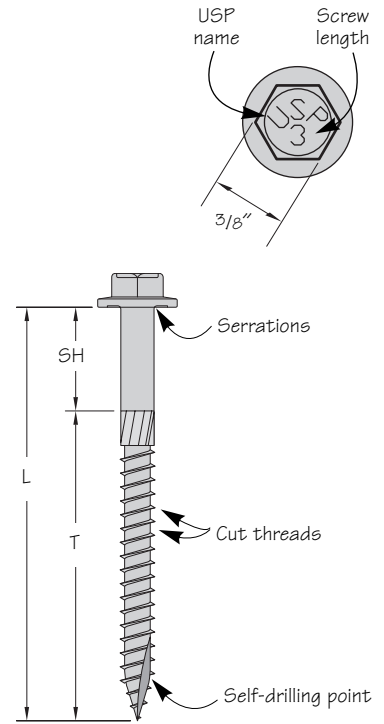
The WS Wood Screw is a self-drilling screw used for numerous framing applications. This screw features a reverse locking serration on the bottom of the screw head to prevent over tightening against a steel plate which could cause the screw head to shear off. The USP head stamp identifies screws for easy inspection.

Screw shear capacities are based on a diameter of 0.242" when the shear plane is on the screw shank (SH) and 0.185" when the shear plane is on the knurl or threads (T). USP WS Wood Screws have a bending yield strength of 217,000 psi. For conditions not charted here, screw loads may be calculated as shown in the current NDS® and increased for duration of load.

- Materials:** 1/4" diameter Grade 5 steel
- Finish:** Yellow zinc dichromate
- Codes:** ICBO 5634, L.A.City RR 25433

### Installation:

- Screws are self-drilling.
- Install using a low speed clutch drill with 3/8" hex head driver. The washer head should be flat to the surface and the serrations will oppose turning and release the clutch. Do not over-tighten the screws.



USP Stock No.	Ref. No.	Description	Dimensions				Finish <sup>1</sup>	DF-L / SYP <sup>2,4</sup>					S-P-F <sup>2,4</sup>			
			L	SH	T	Wood to Wood		Steel to Wood				Wood to Wood	Steel to Wood			
								12 Gauge	10 Gauge	7 Gauge	3 Gauge		12 Gauge	10 Gauge	7 Gauge	3 Gauge
WS3	SDS1/4x3	1/4" x 3"	3"	3/4"	2-1/4"	Zinc	(DF-L to DF-L) 229	Shear (100) 304	Shear (100) 306	Shear (100) 313	Shear (100) 327	(S-P-F to S-P-F) 177	Shear (100) 262	Shear (100) 264	Shear (100) 271	Shear (100) 284

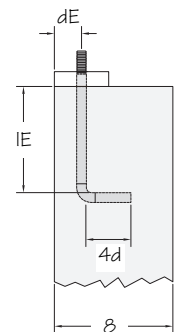
1) Zinc = Yellow zinc dichromate.  
 2) Allowable loads are based on the 1997 NDS®. Light Gauge or 3 Gauge loads given assume use with metal side plates, Fes = 45 ksi.  
 3) Wood-to-wood loads are based on 1-1/2" thick wood side members.  
 4) Loads are for 100% duration of load factors, and may be increased for other duration factors in accordance with the NDS.

## Additional Anchor Designs

Anchor types shown are made by others and used with USP holdowns. The design engineer may specify an alternate anchorage system, provided the anchor diameter is the same. See the *Strength Design of Anchorage in Concrete* by R.A. Cook, published by the Portland Cement Association and the 1997 Uniform Building Code.

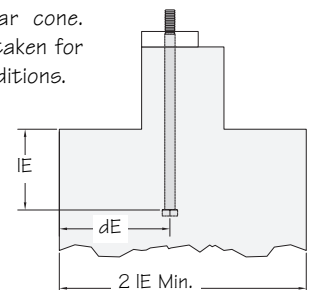
### Anchor Type A L-bolt:

Bend without cracking the outside of the bend portion. Place #4 rebar 3" to 5" from the top center of the foundation.



### Anchor Type B Hex-head bolt:

Design loads for Anchor Type B are calculated using a full shear cone. Multiple reductions must be taken for corner and edge distance conditions.

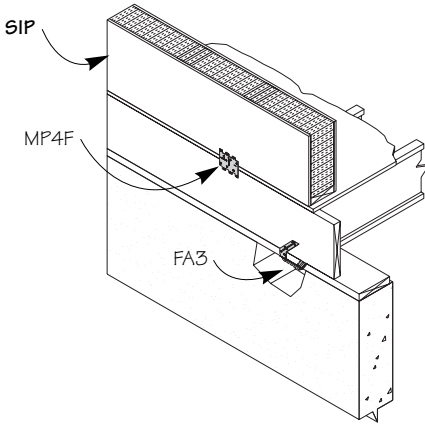


Anchor Type <sup>2</sup>	Dimensions				Min Concrete Strength (psi)	Allowable Tension Loads (Lbs) <sup>4,5</sup>
	Bolt Dia.	Min IE <sup>1,3</sup>	dE	Min End Distance		
A	1	36	2-3/4	5	2500	9135
A	1-1/4	36	2-3/4	5	2500	9135
B	1, 1-1/4	8	8	8	3000	13635

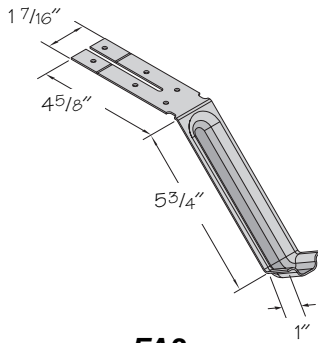
1) Anchor embedment length is based on a single-pour concrete foundation. Double pour foundations systems, masonry walls and masonry footings must be evaluated by the designer.  
 2) Anchor bolt B must be ASTM A 307; anchor bolt A must be A36 steel or better.  
 3) Spacing between anchors is 2IE minimum for anchors in tension at the same time.  
 4) "A" bolt minimum end distance is for corner with 12" return only. Otherwise, the minimum end distance is IE for the full table load.  
 5) Load values are for concrete without cracking.

# 8 Foundation Anchors

## Foundation Anchors – FA3

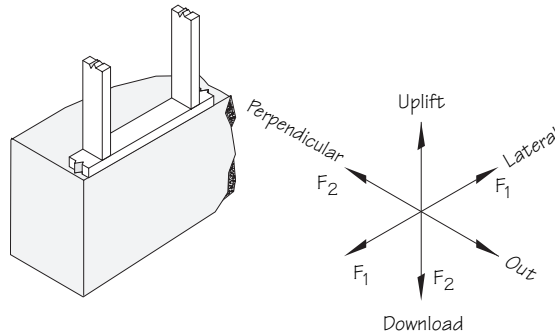


**FA3 installation**

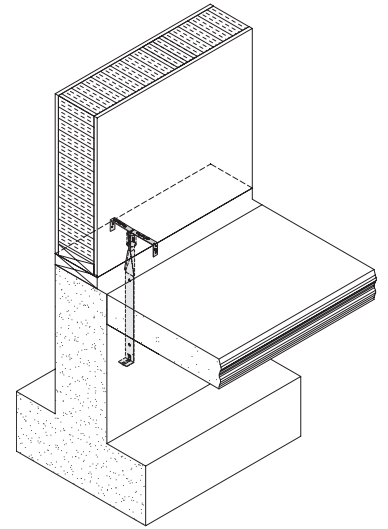


**FA3**

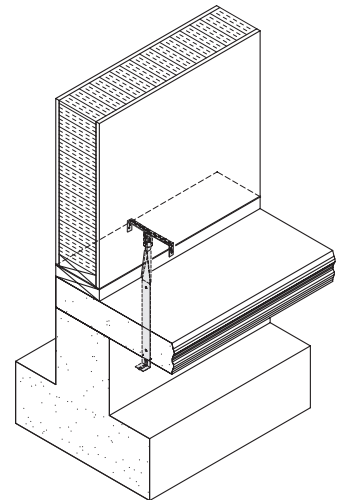
### Load Direction Conventions



## Foundation Anchors – ST2



**ST2 installation**



**ST2 Double pour installation**

### ST2 & FA3 Capacity

USP Stock No.	Fasteners Total	Min. Embed. (E)	Max. Spacing <sup>2</sup> (Feet)	S-P-F Allowable Loads (Lbs.) <sup>1,2</sup>		
				F1	F2	Uplift
ST2	(8) 8d x 1-1/2	16-1/2"	5-1/2	565	650	785
FA3	(8) 10d x 1-1/2	4"	5-1/2	435	375	600

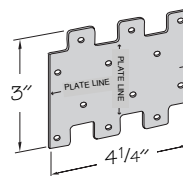
- 1) Allowable loads have been increased 33-1/3% for wind or seismic loads; no further increase shall be permitted.
- 2) Loads are for S-P-F (G=0.42). For Douglas Fir-Larch (G=0.50) multiply allowable loads by 1.16.

### MP4F Capacity

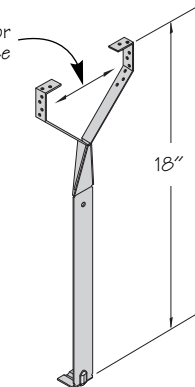
USP Stock No.	Fasteners Total	Direction of Load	S-P-F Allowable Loads (Lbs.) <sup>1,2</sup>
			133%
MP4F	(12) 8d x 1-1/2	V	595
		H	595

- 1) Allowable loads have been increased 33-1/3% or 60% for wind or seismic loads; no further increase shall be permitted.
- 2) Loads are for S-P-F (G=0.42). For Douglas Fir-Larch (G=0.50) multiply allowable loads by 1.16.

Spread sill flanges to sill width prior to insertion into wet concrete



**MP4F**



**ST2**

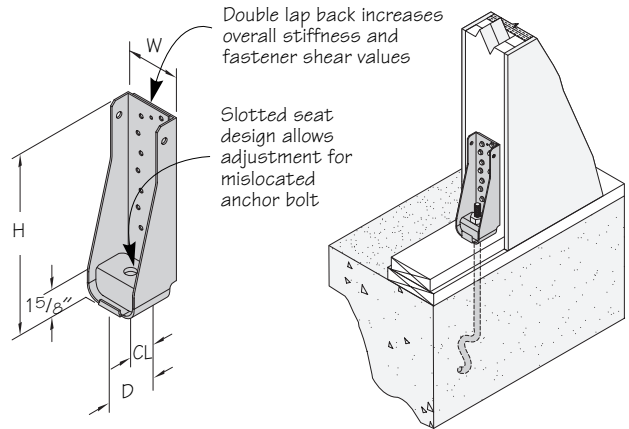


## Holdowns – PHD & TDX series

### PHD Capacity

USP Stock No.	Dimensions				Fasteners Total			S-P-F Allowable Loads (Lbs.) <sup>1,3,5,7</sup>	
	W	H	D	CL	Anchor Bolts <sup>2</sup>	Wood Screws	Nails	Uplift	
								133%	
PHD2	3-1/4	7-1/2	3	1-3/8	(1) 5/8	(10) WS3	--	3670	
PHD5	3-1/4	10-7/8	3	1-3/8	(1) 5/8	(14) WS3	--	5135	
PHD6	3-1/4	13-1/16	3	1-3/8	(1) 7/8	(18) WS3	--	6605	
PHD8	3-1/4	16-1/2	3	1-3/8	(1) 7/8	(24) WS3	--	8295	
PHDN16	3-1/4	16-1/2	3	1-3/8	(1) 7/8	--	(36) 10d	6275	

- 1) Allowable loads have been increased 33-1/3% for wind and seismic loads; no further increase shall be permitted.
- 2) The designer must specify anchor bolt type, length, and embedment.
- 3) The designer shall consider the effect of compression, bearing, tension, and combined bending due to device eccentricity when applicable.
- 4) The PHD/PHDN may be elevated off the sill.
- 5) Minimum post thickness is 3". Consult USP for installations less than 3".
- 6) Loads are for S-P-F (G=0.42). For Douglas Fir-Larch (G=0.50) multiply allowable loads by 1.16.



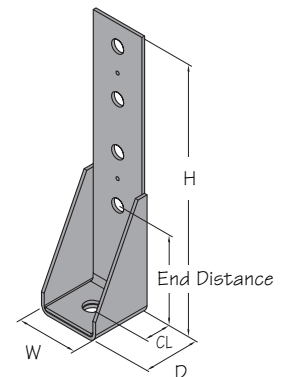
PHD

PHD, STB, & TDX installation

### TDX Capacity

USP Stock No.	Dimensions				Fasteners Total		Minimum Required Bolt End Distance <sup>5</sup>	S-P-F Allowable Loads (Lbs.) <sup>1,2,3,7</sup>			
	W	H	D	CL	Bolts	Anchor Bolts <sup>4</sup>		Length of Bolt in Vertical Member			
								1-1/2"	3"	3-1/2"	5-1/2"
TDX14	3-1/2	20-1/2	3-5/8	2-1/8	(4) 1	(1) 1	7	3680	7660	9100	12910
TDX20	4-3/4	20-3/4	4-1/4	2-3/8	(4) 1	(1) 1-1/4	7	4015	8035	9475	12960

- 1) Allowable loads shown are for single shear connections and may be doubled for back-to-back installations. The designer must verify post and anchor bolt capacities.
- 2) Allowable loads have been increased 33-1/3% for wind or seismic loads; no further increase shall be permitted.
- 3) The designer must specify stud or post to resist published load values.
- 4) The designer must specify anchor bolt type, length, and embedment.
- 5) All models may be installed with greater than the required anchor end distance with no chart load reduction.
- 6) The designer shall consider the effect of compression, bearing, tension, and combined bending due to device eccentricity when applicable.
- 7) Loads are for S-P-F (G=0.42). For Douglas Fir-Larch (G=0.50) multiply allowable loads by 1.16.



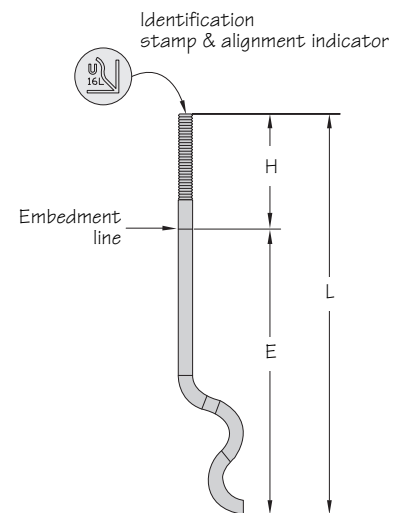
TDX

## Anchor Bolts – STB series

### STB Bolt Capacity

USP Stock No.	Bolt Dia.	Dimensions			S-P-F Allowable Tension Load <sup>1,2,3,9</sup>			
		L	H	Min. Embed. (E)	Concrete <sup>5</sup>		Concrete Block <sup>8</sup>	
					Minimum End Distance <sup>6</sup>		Minimum End Distance <sup>6</sup>	
					5" from end	24" from end	5" from end	11" or > from end
					Wind / Seismic	Wind / Seismic	Wind / Seismic	Wind / Seismic
STB16	5/8	17-13/16	5	12-13/16	5215	5215	1850	4315
STB20	5/8	21-13/16	5	16-13/16	5215	5215	1850	4315
STB24	5/8	25-13/16	5	20-13/16	5215	5215	1850	4315
STB28	7/8	31	5	26	9335	10425	--	--
STB34	7/8	36	6	30	9335	10425	--	--
STB36	7/8	38	8	30	9335	10425	--	--

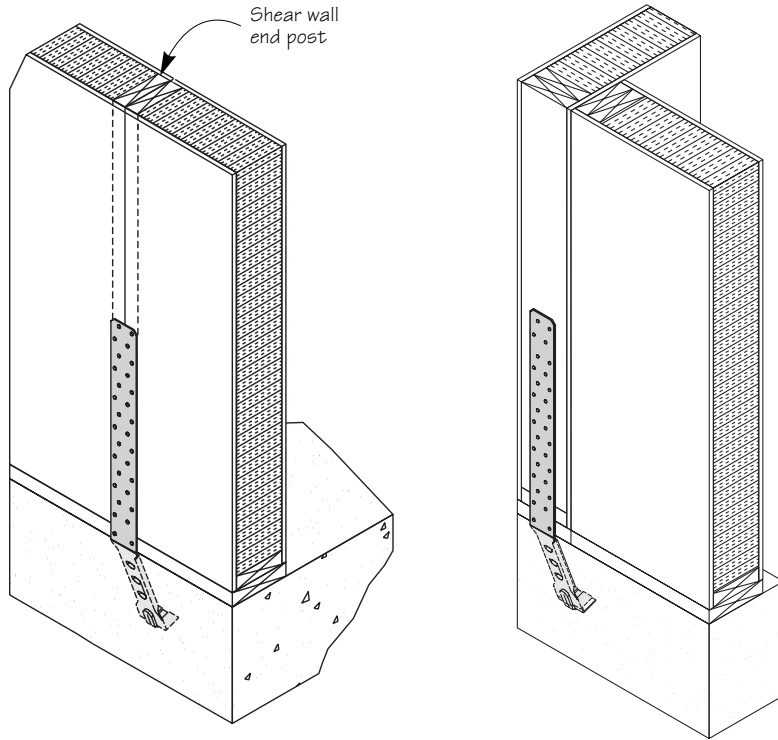
- 1) Design loads are based on the average ultimate, from a series of five tests, with a safety factor of three.
- 2) Loads may not be increased for short term loading. Loads apply to wind and seismic loading per 1997 U.B.C.
- 3) Minimum center to center spacing between bolts is 2(E) for anchors acting in tension.
- 4) Minimum edge distance is 1-3/4".
- 5) Concrete stemwall shall be a minimum of 6" thick for 5/8" anchor bolts and 8" for 7/8" anchor bolts.
- 6) End distance shall be no less than 5".
- 7) Connection is limited by lowest of bolt or holdown capacity.
- 8) Concrete block shall be minimum 10" block.
- 9) Loads are for S-P-F (G=0.42). For Douglas Fir-Larch (G=0.50) multiply allowable loads by 1.16.



STB

# 10 Foundation Straps

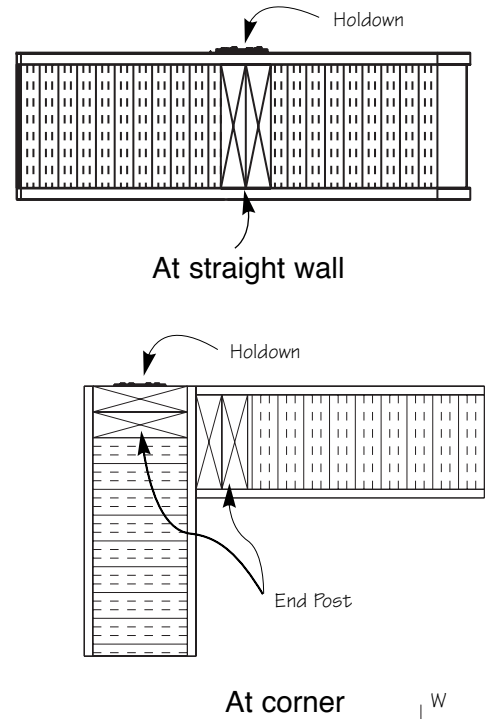
## Foundation Strap – STAD series



STAD edge installation

STAD corner installation

## Plan View installations

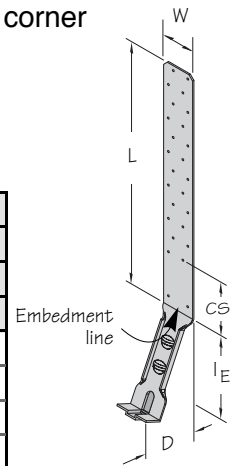


At straight wall

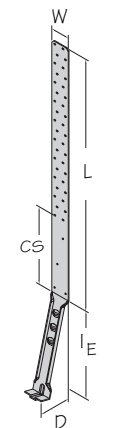
At corner

## STAD Capacity

USP Stock No. <sup>4</sup>	Dimensions					Fastener Schedule <sup>1,2</sup>	Min. Stemwall	S-P-F Allowable Uplift Loads <sup>7</sup>								
	W	L	I <sub>E</sub>	D	CS			Edge Distance - Concrete								
								2000 psi			2500 psi			3000 psi		
						1/2"	1-1/2"	I <sub>E</sub>	1/2"	1-1/2"	I <sub>E</sub>	1/2"	1-1/2"	I <sub>E</sub>		
STAD8	3	21-5/8	8	5	4-5/8	(24) 16d Sinker	6	3270	3270	3270	3270	3270	3270	3270	3270	
							8	3270	3270	3270	3270	3270	3270	3270	3270	3270
STAD8RJ	3	35-1/8	8	5	18-1/8	(24) 16d Sinker	6	3270	3270	3270	3270	3270	3270	3270	3270	
							8	3270	3270	3270	3270	3270	3270	3270	3270	3270
STAD10	3	21-5/8	10	5	1-5/8	(28) 16d Sinker	6	3270	3270	3625	3270	3270	3625	3270	3270	
							8	3270	3270	3885	3270	3270	3885	3270	3270	3885
STAD10RJ	3	36	10	5	16-1/8	(28) 16d Sinker	6	3270	3270	3625	3270	3270	3625	3270	3270	
							8	3270	3270	3885	3270	3270	3885	3270	3270	3885
STAD14	3	32-1/8	14	5	4-5/8	(38) 16d Sinker	6	4960	4960	4960	4960	4960	4960	4960	4960	
							8	4960	4960	5520	4960	4960	5520	4960	4960	5520
STAD14RJ <sup>6</sup>	3	39-5/8	14	5	12-1/8	(38) 16d Sinker	6	4960	4960	4960	4960	4960	4960	4960	4960	
							8	4960	4960	5520	4960	4960	5520	4960	4960	5520



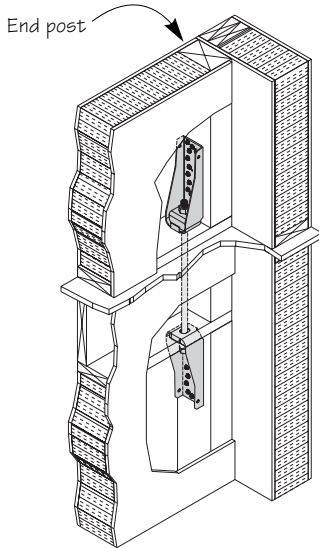
STAD



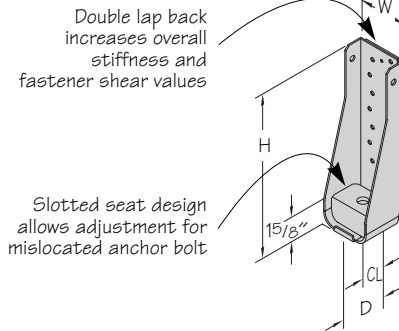
STADRJ

- 1) Specified nails are 16d sinker nails. 10d common nails may be substituted with no load reduction.
- 2) Wood thickness shall be no less than 2".
- 3) Uplift loads have been increased 33-1/3% for wind or seismic loads; no further increase shall be permitted.
- 4) RJ after the model indicates STADs for rim joist applications as in STAD8RJ.
- 5) Interpolate allowable loads for edge distances between those listed. Nail quantities may be reduced for less than I<sub>E</sub> corner distance design loads- use the code allowable loads for fasteners in shear.
- 6) STAD14RJ with 17" clear span, use (30) 16d sinker nails for a maximum (I<sub>E</sub>) load of 4360 lbs.
- 7) Where fewer fasteners are used in the structural wood member, reduce loads according to the code.
- 8) For two pour with 4" slab or less, install STAD14 and use STAD10 loads.
- 7) Loads are for S-P-F (G=0.42). For Douglas Fir-Larch (G=0.50) multiply allowable loads by 1.16.

## Holdowns – PHD & TDX series

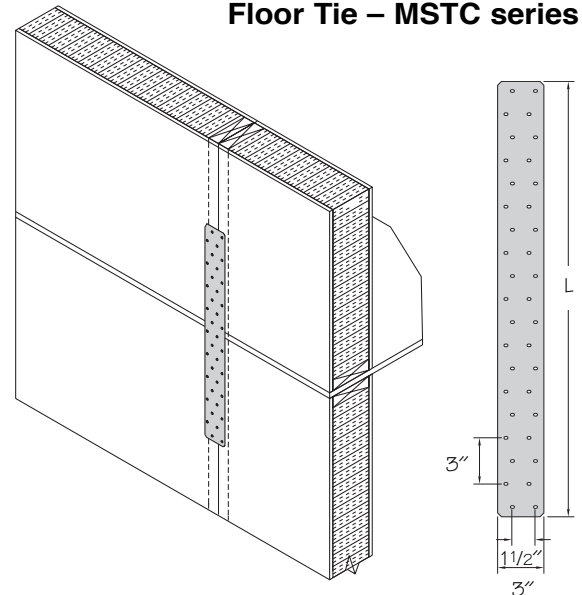


**PHD installation**



**PHD**

## Floor Tie – MSTC series



**MSTC installation**

**MSTC**

### PHD Capacity

USP Stock No.	Dimensions				Fasteners Total			S-P-F Allowable Loads (Lbs.) <sup>1,3,5,7</sup>	
	W	H	D	CL	Anchor Bolts <sup>2</sup>	Wood Screws	Nails	Uplift	
								133%	
PHD2	3-1/4	7-1/2	3	1-3/8	(1) 5/8	(10) WS3	--	3670	
PHD5	3-1/4	10-7/8	3	1-3/8	(1) 5/8	(14) WS3	--	5135	
PHD6	3-1/4	13-1/16	3	1-3/8	(1) 7/8	(18) WS3	--	6605	
PHD8	3-1/4	16-1/2	3	1-3/8	(1) 7/8	(24) WS3	--	8295	
PHDN16	3-1/4	16-1/2	3	1-3/8	(1) 7/8	--	(36) 10d	6275	

- 1) Allowable loads have been increased 33-1/3% for wind and seismic loads; no further increase shall be permitted.
- 2) The designer must specify anchor bolt type, length, and embedment.
- 3) The designer shall consider the effect of compression, bearing, tension, and combined bending due to device eccentricity when applicable
- 4) The PHD/PHDN may be elevated off the sill.
- 5) Minimum post thickness is 3". Consult USP for installations less than 3".
- 6) Loads are for S-P-F (G=0.42). For Douglas Fir-Larch (G=0.50) multiply allowable loads by 1.16.

### MSTC Capacity

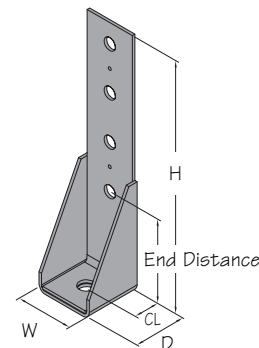
USP Stock No.	Dimensions		Fastener Schedule		S-P-F Allowable Loads (Lbs.) <sup>1,2</sup>
	W	L	Total Qty <sup>3</sup>	Min Qty <sup>4,5</sup>	Uplift
					133%
MSTC28	3	28-1/4	38	(38) 10d	2110
MSTC40	3	40-1/4	54	(54) 10d	3170
MSTC52	3	52-1/4	70	(68) 10d	4090
MSTC66	3	65-3/4	88	(82) 10d	5115
MSTC78	3	77-3/4	104	(82) 10d	5115

- 1) Allowable loads have been increased 33-1/3% for wind or seismic loads; no further increase shall be permitted.
- 2) Loads are for S-P-F (G=0.42). For Douglas Fir-Larch (G=0.50) multiply allowable loads by 1.16.
- 3) Total number of nail and/or bolt holes provided in the strap.
- 4) Minimum quantity of fasteners to be installed with equal fasteners at each end of the connection.
- 5) 16d sinker nails may be substituted for 10d nails with no reduction in load.

### TDX Capacity

USP Stock No.	Dimensions				Fasteners Total		Minimum Required Bolt End Distance <sup>5</sup>	S-P-F Allowable Loads (Lbs.) <sup>1,2,3,7</sup>			
	W	H	D	CL	Bolts	Anchor Bolts <sup>4</sup>		Length of Bolt in Vertical Member			
								1-1/2"	3"	3-1/2"	5-1/2"
TDX14	3-1/2	20-1/2	3-5/8	2-1/8	(4) 1	(1) 1	7	3680	7660	9100	12910
TDX20	4-3/4	20-3/4	4-1/4	2-3/8	(4) 1	(1) 1-1/4	7	4015	8035	9475	12960

- 1) Allowable loads shown are for single shear connections and may be doubled for back-to-back installations. The designer must verify post and anchor bolt capacities.
- 2) Allowable loads have been increased 33-1/3% for wind or seismic loads; no further increase shall be permitted.
- 3) The designer must specify stud or post to resist published load values.
- 4) The designer must specify anchor bolt type, length, and embedment.
- 5) All models may be installed with greater than the required anchor end distance with no chart load reduction.
- 6) The designer shall consider the effect of compression, bearing, tension, and combined bending due to device eccentricity when applicable.
- 7) Loads are for S-P-F (G=0.42). For Douglas Fir-Larch (G=0.50) multiply allowable loads by 1.16.

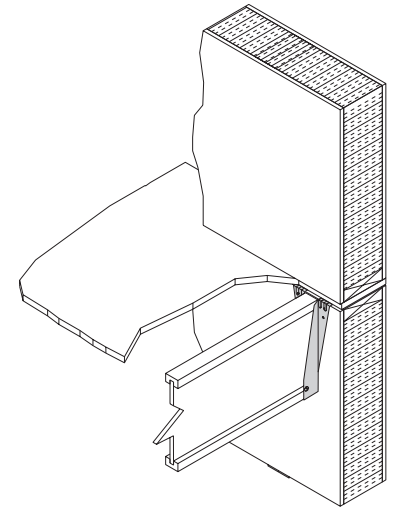


**TDX**

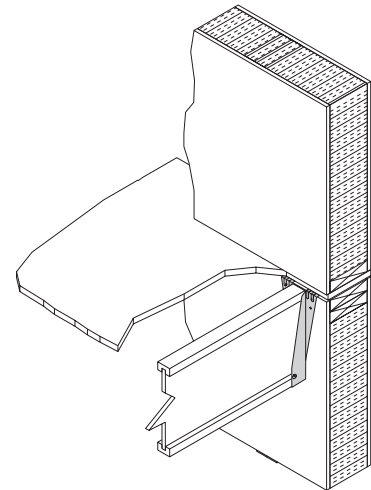
# 12 Joist Hangers

## Top Mount Joist Hanger – THO series

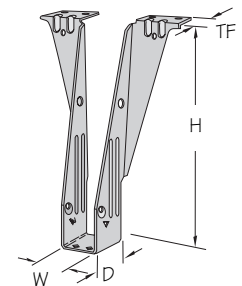
Joist Size	USP Stock No.	Dimensions				Top Plate/ Nailer Size	Fasteners Total		S-P-F Allowable Loads (Lbs.) <sup>2</sup>	
		W	H	D	TF		Header	Joist	Uplift <sup>1</sup>	
									100%	133%
1-1/2" x 9-1/2"	THO15950	1-1/2	9-1/2	2	1-1/2	2X	(6) 10d x 1-1/2	(2) 10d x 1-1/2	1000	210
						(2) 2X	(6) 10d	(2) 10d x 1-1/2	1145	210
1-1/2" x 11-7/8"	THO15118	1-1/2	11-7/8	2	1-9/16	2X	(6) 10d x 1-1/2	(2) 10d x 1-1/2	1000	210
						(2) 2X	(6) 10d	(2) 10d x 1-1/2	1145	210
1-3/4" x 9-1/2"	THO17950	1-3/4	9-1/2	2	1-1/2	2X	(6) 10d x 1-1/2	(2) 10d x 1-1/2	1000	210
						(2) 2X	(6) 10d	(2) 10d x 1-1/2	1145	210
1-3/4" x 11-7/8"	THO17118	1-3/4	11-7/8	2	1-9/16	2X	(6) 10d x 1-1/2	(2) 10d x 1-1/2	1000	210
						(2) 2X	(6) 10d	(2) 10d x 1-1/2	1145	210
1-3/4" x 14"	THO17140	1-13/16	14	3	1-3/4	2X	(6) 10d x 1-1/2	(2) 10d x 1-1/2	1000	210
						(2) 2X	(6) 10d	(2) 10d x 1-1/2	1145	210
1-3/4" x 16"	THO17160	1-13/16	16	3	1-5/8	2X	(6) 10d x 1-1/2	(2) 10d x 1-1/2	1000	210
						(2) 2X	(6) 10d	(2) 10d x 1-1/2	1145	210
2" x 9-1/2"	THO20950	2-1/8	9-1/2	2	2	2X	(6) 10d x 1-1/2	(2) 10d x 1-1/2	1000	210
						(2) 2X	(6) 10d	(2) 10d x 1-1/2	1145	210
2" x 11-7/8"	THO20118	2-1/8	11-7/8	2	2	2X	(6) 10d x 1-1/2	(2) 10d x 1-1/2	1000	210
						(2) 2X	(6) 10d	(2) 10d x 1-1/2	1145	210
2" x 14"	THO20140	2-1/8	14	2-1/8	2	2X	(6) 10d x 1-1/2	(2) 10d x 1-1/2	1000	210
						(2) 2X	(6) 10d	(2) 10d x 1-1/2	1145	210
2" x 16"	THO20160	2-1/8	16	2-1/8	2	2X	(6) 10d x 1-1/2	(2) 10d x 1-1/2	1000	210
						(2) 2X	(6) 10d	(2) 10d x 1-1/2	1145	210
2-5/16" x 11-7/8"	THO23118	2-3/8	11-7/8	2-3/8	1-7/8	2X	(6) 10d x 1-1/2	(2) 10d x 1-1/2	1000	210
						(2) 2X	(6) 10d	(2) 10d x 1-1/2	1145	210
2-5/16" x 14"	THO23140	2-3/8	14	2-3/8	2	2X	(6) 10d x 1-1/2	(2) 10d x 1-1/2	1000	210
						(2) 2X	(6) 10d	(2) 10d x 1-1/2	1145	210
2-5/16" x 16"	THO23160	2-3/8	16	2-3/8	2	2X	(6) 10d x 1-1/2	(2) 10d x 1-1/2	1000	210
						(2) 2X	(6) 10d	(2) 10d x 1-1/2	1145	210
(2) 1-1/2" x 9-1/2"	THO15950-2	3-1/16	9-1/2	2-3/8	1-1/2	2X	(6) 10d x 1-1/2	(6) 10d	1225	210
						(2) 2X	(10) 10d	(6) 10d	1995	500
(2) 1-1/2" x 11-7/8"	THO15118-2	3-1/16	11-7/8	2-3/8	1-1/2	2X	(6) 10d x 1-1/2	(6) 10d	1225	210
						(2) 2X	(10) 10d	(6) 10d	1995	500
3-1/2" x 9-1/2"	THO35950	3-9/16	9-1/2	2-3/8	2-7/16	2X	(6) 10d x 1-1/2	(2) 10d x 1-1/2	1000	210
						(2) 2X	(6) 10d	(2) 10d x 1-1/2	1145	210
3-1/2" x 11-7/8"	THO35118	3-9/16	11-7/8	2-3/8	2-1/2	2X	(6) 10d x 1-1/2	(2) 10d x 1-1/2	1000	210
						(2) 2X	(6) 10d	(2) 10d x 1-1/2	1145	210
(2) 1-3/4" x 11-7/8"	THO17118-2	3-9/16	11-7/8	2-3/8	1-9/16	2X	(6) 10d x 1-1/2	(6) 10d	1225	210
						(2) 2X	(10) 10d	(6) 10d	1995	500
3-1/2" x 14"	THO35140	3-9/16	14	2-3/8	2-1/2	2X	(6) 10d x 1-1/2	(2) 10d x 1-1/2	1000	210
						(2) 2X	(6) 10d	(2) 10d x 1-1/2	1145	210
3-1/2" x 16"	THO35160	3-9/16	16	2-3/8	2-1/2	2X	(6) 10d x 1-1/2	(2) 10d x 1-1/2	1000	210
						(2) 2X	(6) 10d	(2) 10d x 1-1/2	1145	210
(2) 2" x 9-1/2"	THO20950-2	4-3/16	9-1/2	3	2-1/16	2X	(6) 10d x 1-1/2	(6) 10d	1225	210
						(2) 2X	(10) 10d	(6) 10d	1995	500
(2) 2" x 11-7/8"	THO20118-2	4-3/16	11-7/8	3	2-1/16	2X	(6) 10d x 1-1/2	(6) 10d	1225	210
						(2) 2X	(10) 10d	(6) 10d	1995	500
(2) 2-5/16" x 11-7/8"	THO23118-2	4-3/4	11-7/8	3	2-1/8	2X	(6) 10d x 1-1/2	(6) 10d	1225	210
						(2) 2X	(10) 10d	(6) 10d	1995	500



**THO with 2x top plate installation**



**THO with double top plate installation**



**THO**

continued on next page

## THO series continued

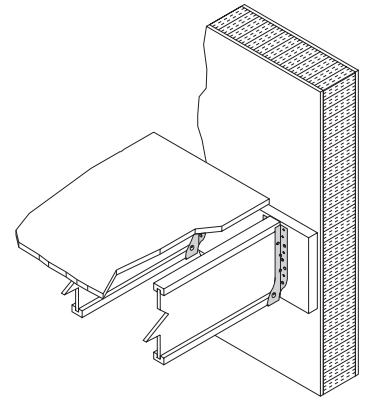
Joist Size	USP Stock No.	Dimensions				Top Plate/ Nailer Size	Fasteners Total		S-P-F Allowable Loads (Lbs.) <sup>2</sup>	
		W	H	D	TF		Header	Joist	100%	Uplift <sup>1</sup>
										133%
(2) 2-5/16" x 14"	THO23140-2	4-3/4	14	3	2-1/8	2X	(6) 10d x 1-1/2	(6) 10d	1225	210
						(2) 2X	(10) 10d	(6) 10d	1995	500
(2) 2-5/16" x 16"	THO23160-2	4-3/4	16	3	2-1/8	2X	(6) 10d x 1-1/2	(6) 10d	1225	210
						(2) 2X	(10) 10d	(6) 10d	1995	500

1) Uplift loads have been increased 33-1/3% or 60% for wind or seismic loads; no further increase shall be permitted  
 2) Loads are for S-P-F (G=0.42). For Douglas Fir-Larch (G=0.50) multiply allowable loads by 1.16.

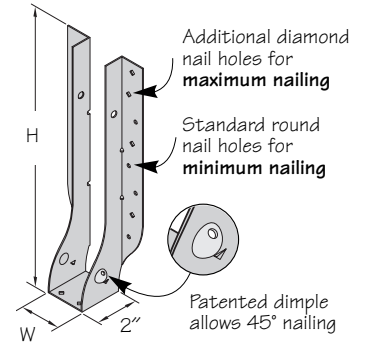
## Face Mount I-Joist Hanger – THF series

Joist Size	USP Stock No.	Dimensions			Fasteners Total		S-P-F Allowable Loads (Lbs.)	
		W	H	D	Header	Joist	100%	Uplift <sup>1</sup>
								133%
1-1/2" x 9-1/4" - 9-1/2"	THF15925 Min	1-1/2	9-1/16	2	(8) 10d x 1-1/2	(2) 10d x 1-1/2	630	245
	THF15925 Max				(12) 10d x 1-1/2	(2) 10d x 1-1/2	950	245
1-1/2" x 11-1/4" - 11-7/8"	THF15112 Min	1-1/2	11-1/16	2	(8) 10d x 1-1/2	(2) 10d x 1-1/2	630	245
	THF15112 Max				(16) 10d x 1-1/2	(2) 10d x 1-1/2	1265	245
1-3/4" x 9-1/4" - 9-1/2"	THF17925 Min	1-3/4	8-15/16	2	(8) 10d x 1-1/2	(2) 10d x 1-1/2	630	245
	THF17925 Max				(12) 10d x 1-1/2	(2) 10d x 1-1/2	950	245
1-3/4" x 11-1/4" - 11-7/8"	THF17112 Min	1-3/4	10-15/16	2	(8) 10d x 1-1/2	(2) 10d x 1-1/2	630	245
	THF17112 Max				(16) 10d x 1-1/2	(2) 10d x 1-1/2	1265	245
1-3/4" x 14"	THF17140 Min	1-3/4	13-3/8	2	(12) 10d x 1-1/2	(2) 10d x 1-1/2	950	245
	THF17140 Max				(20) 10d x 1-1/2	(2) 10d x 1-1/2	1580	245
1-3/4" x 16"	THF17157	1-13/16	15-3/4	3-1/2	(24) 10d x 1-1/2	(2) 10d x 1-1/2	1895	245
2" x 9-1/4" - 9-1/2"	THF20925 Min	2-1/8	8-7/8	2	(8) 10d x 1-1/2	(2) 10d x 1-1/2	630	245
	THF20925 Max				(12) 10d x 1-1/2	(2) 10d x 1-1/2	950	245
2" x 11-1/4" - 11-7/8"	THF20112 Min	2-1/8	10-7/8	2	(8) 10d x 1-1/2	(2) 10d x 1-1/2	630	245
	THF20112 Max				(16) 10d x 1-1/2	(2) 10d x 1-1/2	1265	245
2" x 14"	THF20140 Min	2-1/8	13-1/4	2	(12) 10d x 1-1/2	(2) 10d x 1-1/2	950	245
	THF20140 Max				(20) 10d x 1-1/2	(2) 10d x 1-1/2	1580	245
2-5/16" x 11-1/4" - 12"	THF23118	2-5/16	11-3/16	2-1/2	(14) 10d x 1-1/2	(2) 10d x 1-1/2	1105	175
2-5/16" x 14"	THF23140	2-5/16	13-1/2	2-1/2	(18) 10d x 1-1/2	(2) 10d x 1-1/2	1420	175
2-5/16" x 16"	THF23160	2-5/16	15-5/8	2-1/2	(22) 10d x 1-1/2	(2) 10d x 1-1/2	1740	175
(2) 1-1/2" x 9-1/4" - 9-1/2"	THF15925-2	3-1/8	9-3/16	2-1/2	(12) 10d x 1-1/2	(6) 10d	950	900
(2) 1-1/2" x 11-1/4" - 11-7/8"	THF15112-2	3-1/8	10-13/16	2-1/2	(14) 10d x 1-1/2	(6) 10d	1105	900
3-1/2" x 9-1/4" - 9-1/2"	THF35925	3-1/2	8-5/8	2-1/2	(12) 10d x 1-1/2	(2) 10d x 1-1/2	950	245
3-1/2" x 11-1/4" - 12"	THF35112	3-1/2	10-5/8	2-1/2	(16) 10d x 1-1/2	(2) 10d x 1-1/2	1265	245
3-1/2" x 14"	THF35140	3-1/2	12-15/16	2-1/2	(20) 10d x 1-1/2	(2) 10d x 1-1/2	1580	245
3-1/2" x 15-3/4" - 16"	THF35157	3-1/2	15	2-1/2	(22) 10d x 1-1/2	(2) 10d x 1-1/2	1740	245
(2) 2" x 9-1/4" - 9-1/2"	THF20925-2	4-3/16	8-11/16	2-1/2	(12) 10d x 1-1/2	(6) 10d	950	900
(2) 2" x 11-1/4" - 11-7/8"	THF20112-2	4-3/16	11	2-1/2	(16) 10d x 1-1/2	(6) 10d	1265	900
(2) 2" x 14"	THF20140-2	4-3/16	13-5/8	2-1/2	(20) 10d x 1-1/2	(6) 10d	1580	900
(2) 2-5/16" x 11-7/8"	THF23118-2	4-3/4	10-11/16	2-1/2	(16) 10d x 1-1/2	(6) 10d	1265	900
(2) 2-5/16" x 14"	THF23140-2	4-3/4	13-5/16	2-1/2	(20) 10d x 1-1/2	(6) 10d	1580	950
(2) 2-5/16" x 16"	THF23160-2	4-3/4	15-15/16	2-1/2	(24) 10d x 1-1/2	(6) 10d	1895	950

1) Uplift loads have been increased 33-1/3% or 60% for wind or seismic loads; no further increase shall be permitted.  
 2) Loads are for S-P-F (G=0.42). For Douglas Fir-Larch (G=0.50) multiply allowable loads by 1.16.



THF installation



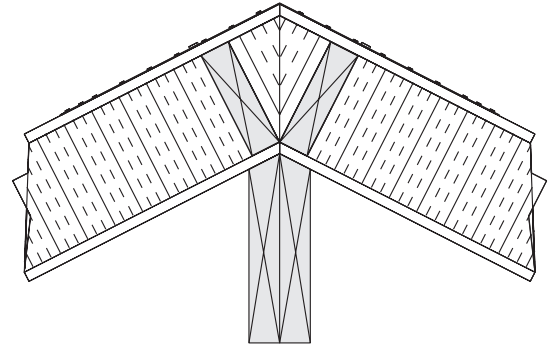
THF

Some model designs may vary from illustration shown

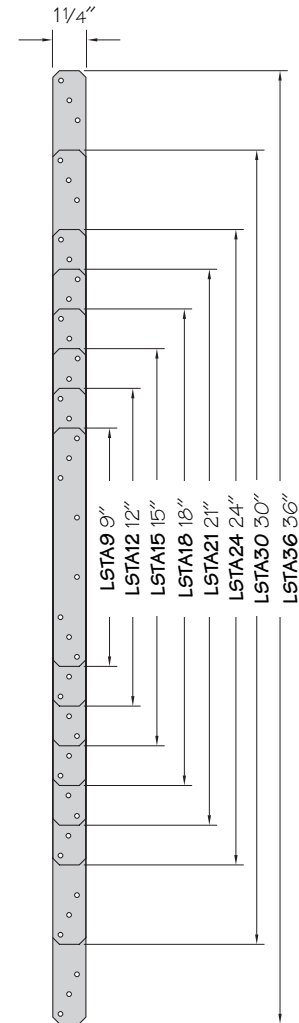
# 14 Ridge Ties

## Ridge Tie – LSTA series

USP Stock No.	Steel Gauge	Dimensions		Fastener Schedule <sup>3,5,6,7</sup>	S-P-F Allowable Loads (Lbs.) <sup>1,2,7</sup>			
		W	L		Total Qty <sup>4</sup>	Min Qty <sup>5</sup>	Uplift	
							133%	160%
LSTA9	20	1-1/4	9	8	(8) 10d x 1-1/2	425	510	
					(8) 10d	515	620	
LSTA12	20	1-1/4	12	10	(10) 10d x 1-1/2	535	640	
					(10) 10d	645	775	
LSTA15	20	1-1/4	15	12	(12) 10d x 1-1/2	640	770	
					(12) 10d	775	930	
LSTA18	20	1-1/4	18	14	(14) 10d x 1-1/2	745	895	
					(14) 10d	905	1085	
					<b>(14) 10d</b>	<b>905</b>	<b>980</b>	
LSTA21	20	1-1/4	21	16	(16) 10d x 1-1/2	855	1025	
					<b>(16) 10d x 1-1/2</b>	<b>855</b>	<b>980</b>	
					(16) 10d	1035	1240	
					<b>(14) 10d</b>	<b>980</b>	<b>980</b>	
LSTA24	20	1-1/4	24	18	(18) 10d x 1-1/2	960	1150	
					<b>(16) 10d x 1-1/2</b>	<b>960</b>	<b>980</b>	
					(18) 10d	1165	1305	
					<b>(14) 10d</b>	<b>980</b>	<b>980</b>	
LSTA30	18	1-1/4	30	22	(22) 10d x 1-1/2	1175	1410	
					<b>(22) 10d x 1-1/2</b>	<b>1175</b>	<b>1305</b>	
					(22) 10d	1435	1725	
					<b>(20) 10d</b>	<b>1305</b>	<b>1305</b>	
LSTA36	18	1-1/4	36	26	(26) 10d x 1-1/2	1385	1665	
					<b>(26) 10d x 1-1/2</b>	<b>1305</b>	<b>1305</b>	
					(26) 10d	1700	1740	
					<b>(20) 10d</b>	<b>1305</b>	<b>1305</b>	



LSTA Ridge Tie installation

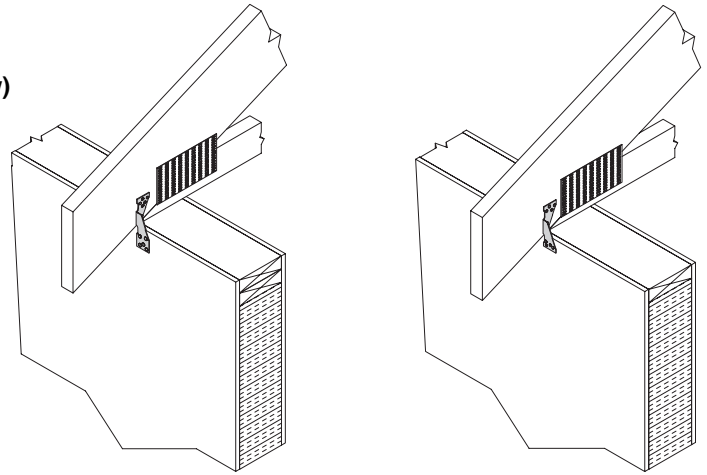
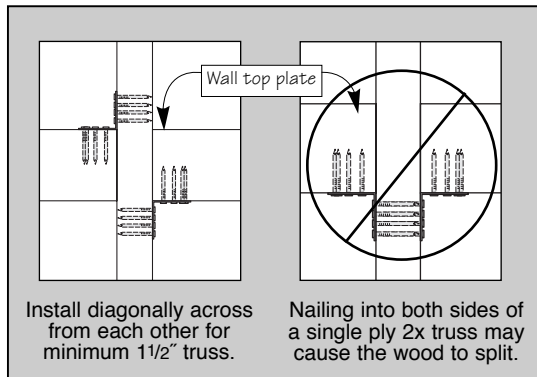


LSTA

- 1) Allowable loads have been increased 33-1/3% or 60% for wind or seismic loads; no further increase shall be permitted.
  - 2) Loads are for S-P-F (G=0.42). For Douglas Fir-Larch (G=0.50) multiply allowable loads by 1.16.
  - 3) Minimum nail embedment shall be 1-15/16" for 16d nails and 1-3/4" for 10d nails.
  - 4) Total number of nail and/or bolt holes provided in the strap.
  - 5) Minimum quantity of fasteners to be installed with equal fasteners at each end of the connection.
  - 6) 10d x 1-1/2 nails are 9 gauge (0.148" diameter) by 1-1/2" long.
  - 7) **Products listed without an additional shaded row are not governed by steel stress.**
- Values represent loads which do not include a stress increase on the steel calculations.  
See USP's Full Line Catalog or web site for additional information.

## Tiedowns – RT3 & RT7

### Hurricane Tie installations to achieve twice the load (Top View)

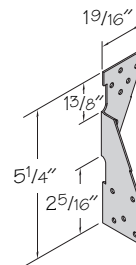


RT7 installation

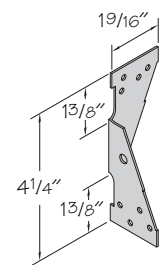
RT3 installation

USP Stock No.	Fasteners Total		S-P-F Allowable Loads (Lbs.) <sup>1,2</sup>		
	Rafter/Truss	Plate	F1	F2	Uplift
RT3	(4) 8d	(4) 8d	130	130	425
RT3 (2)	(8) 10d	(8) 10d	260	260	950
RT7	(5) 8d	(5) 8d	150	150	535
RT7 (2)	(10) 10d	(10) 10d	300	300	1070

- 1) Allowable loads have been increased 33-1/3% for wind or seismic loads; no further increase shall be permitted.
- 2) Loads are for S-P-F (G=0.42). For Douglas Fir-Larch (G=0.50) multiply allowable loads by 1.16.



RT7

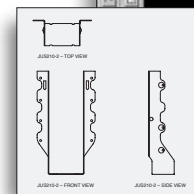
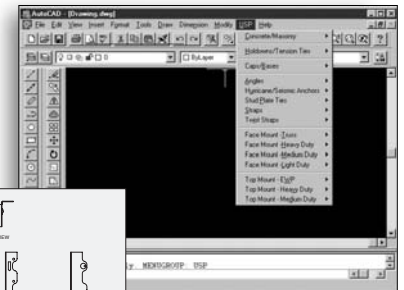


RT3

## Specification Tools

## Comprehensive Web Site

- Contains all USP literature in a printable .pdf format.
- **CAD Menu Program** and **Drawing Library** downloads.
- **Quick and Easy** literature ordering.
- Register on-line at **Web Site Watch**. **Registration** and automatically receive product updates through your e-mail.



**THDH28-2**  
Heavy-Duty Face Mount Truss Hanger  
Ref.# HGUS28-2

Code Listing:  
100 100 80-1000  
LA CITY RR 1000

U.S. PAT. #5,217,317

Fasteners:  
Supporting Member (SM) 1/2" Holes  
Supporting Member (SM) 1/2" Holes

USP Structural Connectors™  
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## CAD Library

- CAD Library contains over 350 illustrations in .DXF and .DWG formats
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- High Wind Illustrations are also available

## CAD Menu Program

- Install a new **USP Drop Down Menu** in your AutoCAD menu bar (AutoCAD r14, AutoCAD 2000, 2000i, 2002, 2004).
- Import scalable USP product drawings directly into your details or section drawings **Available in 3-view format; top, front, and side, where applicable.**

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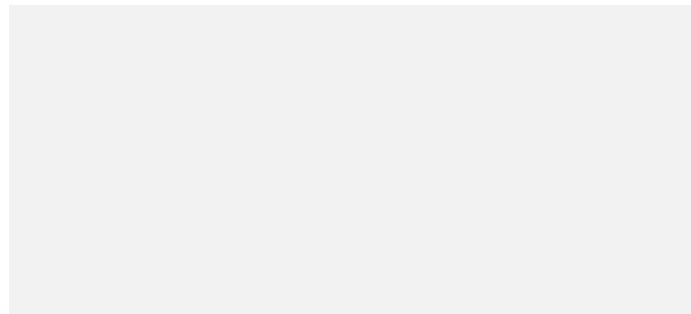
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