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Simpson Strong-Tie Co., Inc.
12264 Holly Street
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Attn: Tim Kaucher, P. E.
(800) 999-5099

RESEARCH REPORT: RR 25800
(CSI # 06090)

BASED UPON ICC EVALUATION SERVICE
REPORT NO. ESR-2553

REEVALUATION DUE DATE:
August 1, 2014
Issued Date: May 1, 2011
Code: 2011 LABC

GENERAL APPROVAL – Reevaluation/Clerical Modification - Simpson Strong-Tie Top Flange Hangers for sawn lumber.

DETAILS

The above assemblies and/or products are approved when in compliance with the description, use, identification and findings of Report No.ESR-2553 reissued January 1, 2011, of the ICC Evaluation Service, Incorporated.

The parts of Report No.ESR-2553 which are excluded on the attached copy have been removed by the Los Angeles Building Department as not being included in this approval.

The approval is subject to the following conditions:

1. Solid blocking shall be required for all joist hangers supporting roof joists having one end twisted more than one-half degree per foot of length relative to the other end, except as specifically noted in the tables.
2. Allowable loads shall not be increased for duration of load, except as specifically noted in the tables.
3. All uplift loads in tables have been increased $\frac{1}{3}$ for earthquake and wind loading. Values must be reduced for normal duration loads.

RR 25800
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Simpson Strong-Tie Co., Inc.

Re: Simpson Strong-Tie Top Flange Hangers for sawn lumber.

4. The supported end of joist or beam shall be within ¼-inch from the supporting header.
5. Allowable loads in tables are for the wood fastening devices and its fasteners; the values do not include supporting members. The supporting members shall be checked separately for structural adequacy.
6. Approved products to be used shall be indicated on the approved set of plans.
7. Nails shall be common nails except where otherwise specified. Bolts shall conform to ASTM A307 or better
8. All products involving welding shall be fabricated in the shop of a Los Angeles City licensed fabricator.
9. Test data verifying the properties of the steel, by the mill or by an approved testing agency, shall be obtained for each shipment. The data shall be kept on file and submitted to the Department upon request.
10. All products shall be identified with “Simpson” and the device stock number
11. Except as specified herein, manufacturer’s instructions shall be followed.

Simpson Strong-Tie Co., Inc.

Re: Simpson Strong-Tie Top Flange Hangers for sawn lumber.

DISCUSSION

The clerical modification is to change the company address and telephone number.

The report is in compliance with the 2011 City of Los Angeles Building Code.

The approval is based on tests and analysis in accordance with the ICC-ES Acceptance Criteria for Joist Hangers and Similar Devices (AC13), dated October 2006 (corrected March 2007; editorially revised April 2008).

Addressee to whom this Research Report is issued is responsible for providing copies of it, complete with any attachments indicated, to architects, engineers and builders using items approved herein in design or construction which must be approved by Department of Building and Safety Engineers and Inspectors.

This general approval will remain effective provided the Evaluation Report is maintained valid and unrevised with the issuing organization. Any revisions to the report must be submitted to this Department, with appropriate fee, for review in order to continue the approval of the revised report.

This general approval of an equivalent alternate to the Code is only valid where an engineer and/or inspector of this Department has determined that all conditions of this approval have been met in the project in which it is to be used.

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Attachment: ICC ES Report No. ESR-2553 (10 Pages)

ICC-ES Evaluation Report

ESR-2553

Reissued January 1, 2011

This report is subject to re-examination in two years.

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DIVISION: 06 00 00—WOOD, PLASTIC, AND COMPOSITES
Section: 06 05 23—Wood, Plastic, and Composite Fastenings
REPORT HOLDER:
SIMPSON STRONG-TIE COMPANY, INC.
 5956 WEST LAS POSITAS BOULEVARD
 PLEASANTON, CALIFORNIA 94588
 (800) 925-5099
www.strongtie.com
EVALUATION SUBJECT:
SIMPSON STRONG-TIE TOP-FLANGE HANGERS FOR SAWN LUMBER
1.0 EVALUATION SCOPE
Compliance with the following codes:

- 2009 *International Building Code*® (2009 IBC)
- 2009 *International Residential Code*® (2009 IRC)
- 2006 *International Building Code*® (2006 IBC)
- * ■ ~~2006 *International Residential Code*® (2006 IRC)~~

Property evaluated:

Structural

2.0 USES

The Simpson Strong-Tie top-flange hangers described in this report are used as wood framing connectors in accordance with Section 2304.9.3 of the IBC. The products may also be used in structures regulated under the IRC when an engineered design is submitted in accordance with Section R301.1.3 of the IRC.

3.0 DESCRIPTION
3.1 General:

The Simpson Strong-Tie top-flange hangers described in this report are U-shaped hangers with one or two flanges that bear onto the supporting wood member or welded to a steel beam. A hanger with two flanges is fabricated from the same piece of steel that forms the U-shaped stirrup of the hanger. A hanger with one flange is fabricated from a steel angle that is factory-welded to the U-shaped stirrup of the hanger. The U-shaped stirrup of each hanger has a width and height designed to support sawn lumber joists or beams.

3.1.1 JB and LB Hanger Series: The JB series hangers are fabricated from No. 18 gage galvanized steel, and the LB hangers are fabricated from No. 14 gage galvanized steel. The top flange must be supported by a wood beam, girder, nailer or ledger. Alternatively, the top flange of the LB hangers may be welded to a steel beam. See Table 1 for hanger dimensions, fastener schedules, and allowable loads. See Figures 1a and 1b for drawings of a typical LB and JB hangers, respectively.

3.1.2 W, WNP, WNPU, HW, and HWU Hanger Series: The W hanger series consists of No. 12 gage steel angles factory-welded to No. 12 gage U-shaped steel stirrups. The WNP and WNPU hanger series consist of No. 7 gage steel angles factory-welded to No. 12 gage steel U-shaped stirrups. The HW hanger series consists of No. 3 gage steel angles factory-welded to No. 11 gage steel U-shaped stirrups. The HWU hanger series consists of No. 3 gage steel angles factory-welded to No. 10 gage steel U-shaped stirrups. See Table 2a for a hanger model numbers and seat width and hanger height dimensions. See Table 2b for fastener schedules and allowable loads based on hanger model dimensions. See Figures 2a through 2e for drawings of the W, WNP, HW, HWU, and WNPU hanger series showing top flange dimensions.

3.1.3 HUTF Hanger Series: The HUTF hanger series is formed from No. 12 gage galvanized steel. HUTF hangers have two header flanges, which extend over the top of the header, and have predrilled holes for the installation of 16d common nails as shown in Figure 3b. The hanger seat width (W) is sized for the net width of the supported member. HUTF hangers having a seat width equal to or greater than 2⁹/₁₆ inches (65 mm) are available with concealed header flanges (i.e., the portion of the hanger fastened to the carrying header) as shown in Figure 3b. See Table 3 for hanger models, hanger dimensions, fastener schedules, and allowable loads.

3.1.4 HUSTF Series Hangers: The HUSTF Series joist hangers are fabricated from No. 14 gage galvanized steel. The hanger has a U-shaped stirrup with prepunched holes for installing nails, minimum 16d common, that must be driven at a 45-degree angle through the supported wood joist and into the carrying wood member. This is described in the manufacturer's installation instructions as double shear nailing. See Table 4 for hanger models, hanger dimensions, fastener schedules, and allowable loads. See Figure 4a for a drawing of a typical HUSTF hanger, and Figure 4b for drawing of a top view of double shear nailing.

3.1.5 PF, PFD, PFA, and PFDS Hanger Series: The PF hangers support nominally 2-by-4 and 2-by-6 wood members and are fabricated from No. 18 gage galvanized

steel. The PFA, PFD and PFDS hangers support nominally 2-by-4 or 2-by-6 wood joists and are fabricated from No. 20 gage galvanized steel. The PFA hangers support a single joist member. The PFD and PFDS hangers, which are installed in a saddle configuration over the carrying wood member, support two horizontally aligned joists. The U-shaped portion of the hangers have pre-punched holes for installing nails, minimum 10d common, that must be driven at a 45-degree angle through the supported wood joist and into the carrying wood member. This is described as double shear nailing in the installation instructions. See Table 5 for hanger dimensions, fastener schedules, and allowable loads. See Figure 5a for a drawing of the PF24 and PF26 hangers; Figure 5b for a drawing of the PFD24, PFD26, and PFDS26 hangers; Figure 5c for a drawing of the PF24A and PF26A hangers; and Figure 5d for a top view of double shear nailing.

3.1.6 RR Ridge Rafter Connector: The RR ridge rafter connector supports nominally 2-inch-wide sawn wood roof rafters from a sawn wood ridge board or beam. The hanger is fabricated from No. 18 gage galvanized steel. The top flange of the RR connector is configured to interlock with an RR connector installed on the opposing face of the ridge board as shown in Figure 6. The RR connector may be used with a rafter having a maximum slope of 7:12 (30 degrees). See Table 6 for fastener schedules and allowable loads. See Figure 6 for a drawing of the RR connector and a typical connector installation detail.

3.2 Materials:

3.2.1 Steel: The galvanized hangers described in this report are manufactured from steel complying with ASTM A 653, SS designation, Grade 33. The ungalvanized hangers described in this report are fabricated from ASTM A 1011, SS designation, Grade 33. The steel used to fabricate the hangers comply with the following:

MODEL SERIES	ASTM STEEL SPECIFICATION	MINIMUM STRENGTH (ksi)		NOMINAL THICKNESS (gage)	MINIMUM BASE-METAL THICKNESS (inch)	
		Yield, Fy	Tensile, Fu			
JB	A 653	33	45	No. 18	0.0445	
LB	A 653	33	45	No. 14	0.0685	
W	U-shaped Stirrup	A 1011	33	52	No. 12	0.0955
	Flange	A 1011	33	52	No. 12	0.0955
WNP, WNPU	U-shaped Stirrup	A 1011	33	52	No. 12	0.0955
		A 1011	33	52	No. 7	0.0955
WNP, WNPU	Flange	A 1011	33	52	No. 7	0.1705
HW	U-shaped Stirrup	A 1011	33	52	No. 11	0.1105
	Flange	A 1011	33	52	No. 3	0.2285
HWU	U-shaped Stirrup	A 1011	33	52	No. 10	0.1255
	Flange	A 1011	33	52	No. 3	0.2285
HUTF	A 653	33	45	No. 12	0.0975	
HUSTF	A 653	33	45	No. 14	0.0685	
PF	A 653	33	45	No. 18	0.0445	
PFD	A 653	33	45	No. 20	0.0335	
PFDS	A 653	33	45	No. 20	0.0335	
RR	A 653	33	45	No. 18	0.0445	

For SI: 1 inch = 25.4 mm, 1 psi = 6.895 kPa.

The galvanized hangers have a minimum G90 zinc coating specification in accordance with ASTM A 653. Some models (designated with a model number ending

with Z) are available with a G185 zinc coating specification in accordance with ASTM A 653. Some models (designated with a model number ending with HDG) are available with a hot-dip galvanization, also known as “batch” galvanization, in accordance with ASTM A 123, with a minimum specified coating weight of 2.0 ounces of zinc per square foot of surface area (610 g/m²), total for both sides. Model numbers in this report do not include the Z or HDG ending, but the information shown applies. The lumber treater and the holder of this report (Simpson Strong-Tie Company) should be contacted for recommendations on the appropriate level of corrosion resistance to specify for use of the steel connectors in contact with the specific proprietary preservative treated or fire retardant treated lumber.

3.2.2 Wood: Wood members with which the connectors are used must be either sawn lumber or engineered lumber having a minimum specific gravity of 0.50 (minimum equivalent specific gravity of 0.50 for engineered lumber), and having a maximum moisture content of 19 percent (16 percent for engineered lumber) except as noted in Section 4.1. The thickness of the supporting wood member (header) must be equal to or greater than the length of the fasteners specified in the tables in this report, or as required by wood member design, whichever is greater.

Nails used for hangers described in this report must comply with the material requirements, physical properties, tolerances, workmanship, protective coating and finishes, certification, and packaging and package marking requirements specified in ASTM F 1667. The nails must have the following minimum fastener dimensions and bending yield strengths (F_{yb}):

FASTENER	SHANK DIAMETER (inch)	NAIL LENGTH (inches)	F _{yb} (psi)
10d × 1 1/2	0.148	1 1/2	90,000
10d	0.148	3	90,000
16d	0.162	3 1/2	90,000

For SI: 1 inch = 25.4 mm, 1 psi = 6.895 kPa.

Fasteners used in contact with preservative treated or fire retardant treated lumber must comply with Section 2304.9.5 of the IBC, Section R317.3 of the 2009 IRC or ~~Section R319.3 of the 2006 IRC~~, as applicable. For use with treated lumber, the lumber treater or this report holder (Simpson Strong-Tie Company), or both, should be contacted for recommendations on the appropriate level of corrosion resistance to specify for the fasteners as well as the connection capacities of fasteners used with the specific proprietary preservative treated or fire retardant treated lumber.

4.0 DESIGN AND INSTALLATION

4.1 Design:

The tabulated allowable loads shown in this report are based on allowable stress design (ASD) and include the load duration factor, C_D, corresponding with the applicable loads in accordance with the NDS.

Tabulated allowable loads apply to products connected to wood used under dry conditions and where sustained temperatures are 100°F (37.8°C) or less. When products are installed to wood having a moisture content greater than 19 percent (16 percent for engineered wood products), or where wet service is expected, the allowable loads must be adjusted by the wet service factor, C_M, specified in the NDS. When connectors are installed in wood that will experience sustained exposure to

temperatures exceeding 100°F (37.8°C), the allowable loads in this report must be adjusted by the temperature factor, C_t , specified in the NDS.

Connected wood members must be analyzed for load-carrying capacity at the connection in accordance with the NDS.

4.2 Installation:

Installation of the connectors must be in accordance with this evaluation report and the manufacturer's published installation instructions. In the event of a conflict between this report and the manufacturer's published installation instructions, this report governs.

5.0 CONDITIONS OF USE

The Simpson Strong-Tie top-flange hangers for solid-sawn lumber described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 The connectors must be manufactured, identified and installed in accordance with this report and the manufacturer's published installation instructions. A copy of the instructions must be available at the jobsite at all times during installation.
- 5.2 Calculations showing compliance with this report must be submitted to the code official. The calculations must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.3 Adjustment factors noted in Section 4.1 and the applicable codes must be considered, where applicable.

5.4 Connected wood members and fasteners must comply, respectively, with Sections 3.2.2 and 3.2.3 of this report.

5.5 Use of connectors with preservative treated or fire retardant treated lumber must be in accordance with Section 3.2.1 of this report. Use of fasteners with preservative treated or fire retardant treated lumber must be in accordance with Section 3.2.3 of this report.

5.6 Welded hangers are manufactured under a quality program with inspections by Professional Service Industries, Inc. (AA-660) or by Intertek Testing Services NA, Inc. (AA-688).

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Joist Hangers and Similar Devices (AC13), dated October 2010.

7.0 IDENTIFICATION

The products described in this report are identified with a die-stamped label indicating the name of the manufacturer (Simpson Strong-Tie), the model number, and the number of an index evaluation report (ESR-2523) that is used as an identifier for the products recognized in this report. Additionally, the factory-welded hangers manufactured in the United States are identified with the acronym of the inspection agency (PSI), and factory-welded hangers manufactured in Canada are identified with the name of the inspection agency (Intertek).

TABLE 1—ALLOWABLE LOADS FOR THE JB AND LB SERIES JOIST HANGERS

HANGERS SERIES	MODEL NO.	HANGER DIMENSIONS ¹ (inches)				COMMON NAILS (Quantity – Size)		ALLOWABLE LOADS ^{2,3,4} (lbs)	
		W	H	B	TF	Header	Joist	Uplift ⁵ where C _D =1.6	Download where C _D = 1.0, C _D = 1.15, C _D = 1.25
JB	JB26	1 ⁹ / ₁₆	5 ³ / ₈	1 ¹ / ₂	1 ⁵ / ₁₆	4–10d	—	—	1,040
	JB28	1 ⁹ / ₁₆	7 ¹ / ₄	1 ¹ / ₂	1 ⁵ / ₁₆	4–10d	—	—	1,050
	JB210	1 ⁹ / ₁₆	9 ¹ / ₄	2	1 ³ / ₁₆	4–16d	—	—	1,255
	JB212	1 ⁹ / ₁₆	11 ¹ / ₈	2	1 ³ / ₁₆	6–16d	—	—	1,540
	JB214	1 ⁹ / ₁₆	13 ¹ / ₈	2	1 ¹ / ₄	6–16d	2–10d x 1 ¹ / ₂	235	1,505
LB	LB26	1 ⁹ / ₁₆	5 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	4–16d	2–10d x 1 ¹ / ₂	240	1,380
	LB28	1 ⁹ / ₁₆	7 ¹ / ₄	1 ¹ / ₂	1 ¹ / ₂	4–16d	2–10d x 1 ¹ / ₂	240	1,270
	LB210	1 ⁹ / ₁₆	9 ¹ / ₄	2	1 ¹ / ₂	4–16d	2–10d x 1 ¹ / ₂	240	1,525
	LB212	1 ⁹ / ₁₆	11 ¹ / ₈	2	1 ¹ / ₂	4–16d	2–10d x 1 ¹ / ₂	240	1,580
	LB214	1 ⁹ / ₁₆	13 ¹ / ₈	2	1 ¹ / ₂	4–16d	2–10d x 1 ¹ / ₂	240	1,450
	LB216	1 ⁹ / ₁₆	15 ¹ / ₈	2	1 ¹ / ₂	4–16d	2–10d x 1 ¹ / ₂	240	1,425

For SI: 1 inch = 25.4 mm, 1 lbf = 4.45 N.

¹Refer to Figure 1b (this page) for definitions of hanger nomenclature (W, H, B, TF).

²Tabulated allowable loads must be selected based on duration of load as permitted by the applicable building code.

³LB Series hangers provide torsional resistance, which is defined as a moment of not less than 75 pounds (334 N) times the depth of the joist at which the lateral movement of the top or bottom of the joist with respect to the vertical position of the joist is 0.125 inch (3.2 mm).

⁴The LB hangers are permitted for welded applications to a supporting steel member provided 1/8-inch thick (throat) by 1/2-inch long fillet welds are placed along each edge (dimension “TF” in Figure 1b) of each top flange. Welds must conform to the current A.W.S. D1.3 structural welding code for sheet steel. Uplift loads do not apply for welded hangers.

⁵The uplift loads have been increased for wind or earthquake loading with no further increase allowed. The allowable uplift loads must be reduced when other load durations govern.

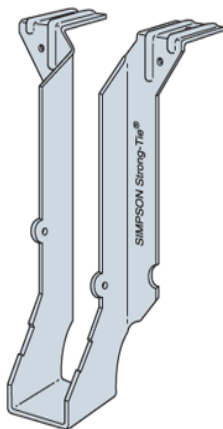


FIGURE 1a—LB HANGER

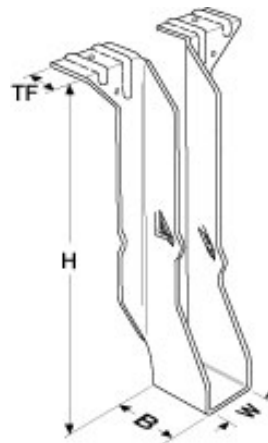


FIGURE 1b—JB HANGER

TABLE 2a—DIMENSIONS OF W, WNP, WNPU, HW, AND HWU SERIES JOIST HANGERS

HANGER SERIES	MODEL NO.	DIMENSIONS (in)	
		(W)	(H)
W	W26	1 ⁹ / ₁₆	5 ³ / ₈
	W28		7 ¹ / ₈
	W210		9 ¹ / ₈
	W212		11
	W214		13
	W216		15
	W34	2 ⁹ / ₁₆	3 ⁷ / ₁₆
	W36		5 ³ / ₈
	W38		7 ¹ / ₈
	W310	3 ⁹ / ₁₆	9 ¹ / ₈
	W44		3 ⁷ / ₁₆
	W46		5 ³ / ₈
	W48		7 ¹ / ₈
	W410		9 ¹ / ₈
WNP	WNP312	2 ⁹ / ₁₆	11
	WNP314		13
	WNP316		15
	WNP26-2	3 ¹ / ₈	5 ³ / ₈
	WNP28-2		7 ¹ / ₈
	WNP210-2		9 ¹ / ₈
	WNP212-2		11
	WNP214-2		13
	WNP216-2		15
	WNP412	3 ⁹ / ₁₆	11
	WNP414		13
	WNP416		15
	WNP66	5 ¹ / ₂	5 ³ / ₈
	WNP68		7 ¹ / ₈
WNP610	9 ¹ / ₈		
WNPU	WNPU312	2 ⁹ / ₁₆	11
	WNPU314		13
	WNPU316		15

HANGER SERIES	MODEL NO.	DIMENSIONS (in)	
		(W)	(H)
WNPU (cont.)	WNPU210-2	3 ¹ / ₈	9 ¹ / ₈
	WNPU212-2		11
	WNPU214-2		13
	WNPU216-2		15
	WNPU412	3 ⁹ / ₁₆	11
	WNPU414		13
	WNPU416		15
HW	HW3.25	3 ¹ / ₄	5 (min), 19 ¹ / ₂ (max)
	HW46	3 ⁹ / ₁₆	5 ³ / ₈
	HW48		7 ¹ / ₈
	HW410		9 ¹ / ₈
	HW412		11
	HW414		13
	HW416		15
	HW5.25	5 ¹ / ₄	5 (min), 19 ¹ / ₂ (max)
	HW66	5 ¹ / ₂	5 ³ / ₈
	HW68		7 ¹ / ₈
	HW610		9 ¹ / ₈
	HW612		11
	HW614		13
	HW616		15
	HW86	7 ¹ / ₂	5 ³ / ₈
	HW88		7 ¹ / ₈
HW810	9 ¹ / ₈		
HW812	11		
HW814	13		
HW816	15		
HWU	HWU410	3 ⁹ / ₁₆	9 ¹ / ₈
	HWU412		11
	HWU414		13
	HWU416		15

For SI: 1 inch = 25.4 mm.

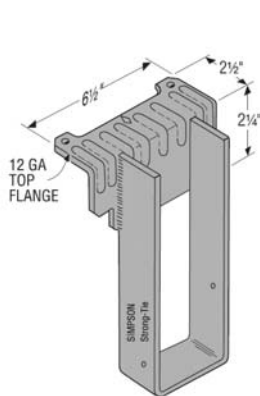


FIGURE 2a—W HANGER SERIES

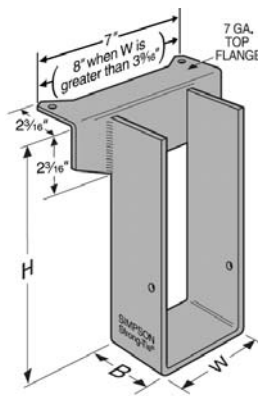


FIGURE 2b—WNP HANGER SERIES

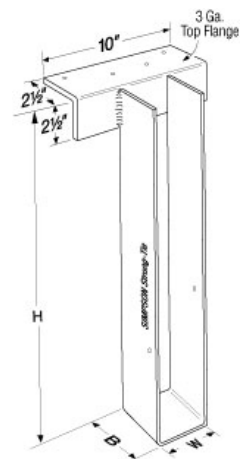


FIGURE 2c—HW AND HWU HANGER SERIES

TABLE 2b—ALLOWABLE LOADS FOR THE W, WNP, WNPU, HW, AND HWU SERIES JOIST HANGERS

HANGER SERIES	HANGER DIMENSIONS ¹ (inches)			FASTENERS (Quantity – Size)		ALLOWABLE LOAD ^{2,3} (lbs)	
	(W)	(H)	(B)	Header	Joist	Uplift ⁴ C _D =1.6	Download C _D = 1.0, C _D = 1.15, C _D = 1.25
W	1 ⁹ / ₁₆	5 ³ / ₈ (min), 15 (max)	2 ¹ / ₂	2-10d	2-10d x 1 ¹ / ₂	—	2,200
	2 ⁹ / ₁₆ (min), 3 ⁹ / ₁₆ (max)	3 ⁷ / ₁₆ (min), 9 ¹ / ₈ (max)	2	2-10d	2-10d x 1 ¹ / ₂	—	2,200
WNP	2 ⁹ / ₁₆	11 (min), 15 (max)	2 ¹ / ₂	2-10d	2-10d x 1 ¹ / ₂	—	3,255
	3 ¹ / ₈	5 ³ / ₈ (min), 15 (max)	2 ¹ / ₂	2-10d	2-10d x 1 ¹ / ₂	—	3,255
	3 ⁹ / ₁₆ (min), 5 ¹ / ₂ (max)	5 ³ / ₈ (min), 15 (max)	2 ¹ / ₂	2-10d	2-10d x 1 ¹ / ₂	—	3,255
WNPU	2 ⁹ / ₁₆	11 (min), 15 (max)	3	7-16d	6-10d x 1 ¹ / ₂	—	4,165
	3 ¹ / ₈ (min), 3 ⁹ / ₁₆ (max)	9 ¹ / ₈ (min), 15 (max)	3	7-16d	6-10d	—	4,165
HW3.25	3 ¹ / ₄	5 (min), 19 ¹ / ₂ (max)	4	4-10d	2-10d	—	5,285
HW5.25	5 ¹ / ₄	5 (min), 19 ¹ / ₂ (max)	2 ¹ / ₂	4-10d	2-10d	—	5,285
HW	3 ⁹ / ₁₆	5 ³ / ₈ (min), 15 (max)	2 ¹ / ₂	4-10d	2-10d	—	5,285
	5 ¹ / ₂ (min), 7 ¹ / ₂ (max)	5 ³ / ₈ (min), 15 (max)	2 ¹ / ₂	4-10d	2-10d	—	5,285
HWU	3 ⁹ / ₁₆	9 ¹ / ₈ (min), 15 (max)	3 ¹ / ₄	8-16d	6-10d	—	6,335

For SI: 1 inch = 25.4 mm, 1 lbs = 4.45 N.

¹Refer to Figure 2b (previous page) for definitions of hanger nomenclature (W, H, B).

²Hangers may be welded to steel headers with weld size to match hanger flange material thickness (approximate thickness shown in Section 3.2.1 of this report).

W hanger series: The throat size of the fillet weld must be 3¹/₁₆-inch thick.

WNP hanger series: The throat size of the fillet weld must be 1¹/₈-inch thick.

WNPU, HW, and HWU hanger series: The throat size of the fillet weld must be 1¹/₄-inch thick.

The length of the weld at each flange must be at least 1¹/₂ inches long. Welds must conform to the current A.W.S. D1.3 structural welding code for sheet steel, and the weld material must be E-70S.

³The connectors provide a torsional resistance up to a maximum joist depth of 16 inches for the W, WNP, and WNPU hangers and 22 inches for the HW and HWU hangers, where torsional resistance is defined as a moment of not less than 75 pounds (334 N) times the depth of the joist at which the lateral movement of the top or bottom of the joist with respect to the vertical position of the joist is 0.125 inch (3.2 mm).

⁴Uplift loads for these hangers are beyond the scope of this report.

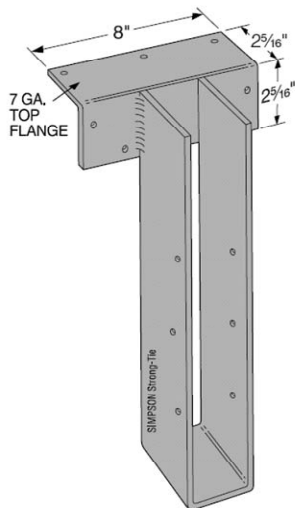


FIGURE 2d—WNPU HANGER SERIES

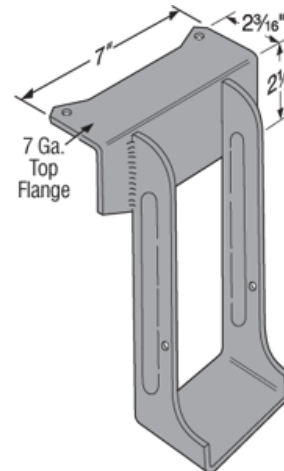


FIGURE 2e—WNP412, WNP414, and WNP416 HANGERS

TABLE 3—ALLOWABLE LOADS FOR THE HUTF SERIES JOIST HANGERS

MODEL NO.	HANGER DIMENSIONS ¹ (in)				FASTENERS (Quantity–Size)		ALLOWABLE LOADS ^{2,3,4}			
	W	H	B	TF	Header	Joist	Uplift ⁵	Download		
							C _D = 1.6	C _D = 1.0	C _D = 1.15	C _D = 1.25
HU24TF	1 ⁹ / ₁₆	3 ⁷ / ₁₆	2 ¹ / ₄	2 ¹ / ₂	6–16d	2–10d x 1 ¹ / ₂	245	2,060	2,085	2,100
HU26TF		5 ³ / ₈			10–16d	4–10d x 1 ¹ / ₂	490	2,245	2,300	2,335
HU28TF		7 ¹ / ₈			10–16d	4–10d x 1 ¹ / ₂	490	2,245	2,300	2,335
HU210TF		9 ¹ / ₈			12–16d	4–10d x 1 ¹ / ₂	490	2,245	2,300	2,335
HU212TF		11			14–16d	6–10d x 1 ¹ / ₂	735	2,335	2,335	2,335
HU214TF		13			16–16d	6–10d x 1 ¹ / ₂	735	2,425	2,510	2,565
HU216TF		15			18–16d	8–10d x 1 ¹ / ₂	980	2,610	2,720	2,795
HU34TF	2 ⁹ / ₁₆	3 ⁷ / ₁₆	2 ¹ / ₂	2 ¹ / ₂	8–16d	2–10d x 1 ¹ / ₂	245	2,600	2,600	2,600
HU36TF		5 ³ / ₈			10–16d	4–10d x 1 ¹ / ₂	490	3,495	3,550	3,585
HU38TF		7 ¹ / ₈			12–16d	4–10d x 1 ¹ / ₂	490	3,495	3,550	3,585
HU310TF		9 ¹ / ₈			14–16d	6–10d x 1 ¹ / ₂	735	3,675	3,760	3,815
HU312TF		11			16–16d	6–10d x 1 ¹ / ₂	735	3,675	3,760	3,815
HU314TF		13			18–16d	6–10d x 1 ¹ / ₂	980	4,335	4,335	4,335
HU316TF		15			20–16d	8–10d x 1 ¹ / ₂	980	3,860	3,970	4,045
HU24-2TF	3 ¹ / ₈	3 ⁷ / ₁₆	2 ¹ / ₂	2 ¹ / ₂	8–16d	2–10d	310	2,600	2,600	2,600
HU26-2TF		5 ³ / ₈			10–16d	4–16d	625	3,730	3,855	3,900
HU28-2TF		7 ¹ / ₈			12–16d	4–16d	625	3,900	3,900	3,900
HU210-2TF		9 ¹ / ₈			14–16d	6–16d	935	4,170	4,170	4,170
HU212-2TF		11			16–16d	6–16d	935	4,335	4,335	4,335
HU214-2TF		13			18–16d	8–16d	1,250	4,335	4,335	4,335
HU216-2TF		15			20–16d	8–16d	1,250	4,335	4,335	4,335
HU44TF	3 ⁹ / ₁₆	3 ⁷ / ₁₆	2 ¹ / ₂	2 ¹ / ₂	8–16d	2–10d	310	2,600	2,600	2,600
HU46TF		5 ³ / ₈			10–16d	4–16d	625	3,165	3,165	3,165
HU48TF		7 ¹ / ₈			12–16d	4–16d	625	3,500	3,500	3,500
HU410TF		9 ¹ / ₈			14–16d	6–16d	935	4,150	4,150	4,150
HU412TF		11			16–16d	6–16d	935	4,560	4,810	5,110
HU414TF		13			18–16d	8–16d	1,250	4,835	5,050	5,050
HU416TF		15			20–16d	8–16d	1,250	5,050	5,050	5,050
HU210-3TF	4 ¹¹ / ₁₆	9 ¹ / ₈	2 ¹ / ₂	2 ¹ / ₂	14–16d	6–16d	1,105	4,150	4,150	4,150
HU212-3TF		11			16–16d	6–16d	1,105	4,560	4,810	5,110
HU214-3TF		13			18–16d	8–16d	1,470	4,835	5,050	5,050
HU216-3TF		15			20–16d	8–16d	1,470	5,050	5,050	5,050
HU66TF	5 ¹ / ₂	5 ³ / ₈	2 ¹ / ₂	2 ¹ / ₂	10–16d	4–16d	735	3,165	3,165	3,165
HU68TF		7 ¹ / ₈			12–16d	4–16d	735	3,500	3,500	3,500
HU610TF		9 ¹ / ₈			14–16d	6–16d	1,105	4,150	4,150	4,150
HU612TF		11			16–16d	6–16d	1,105	4,550	4,810	5,105
HU614TF		13			18–16d	8–16d	1,470	4,830	5,125	5,450
HU616TF		15			20–16d	8–16d	1,470	5,105	5,445	5,795

For SI: 1 inch = 25.4 mm, 1 pound = 4.45 N.

¹Refer to Figure 3a (next page) for definitions of hanger nomenclature (W, H, B, TF).

²Tabulated allowable loads must be selected based on duration of load as permitted by the applicable building code.

³The minimum wood header or ledger size that can be used with HUTF hangers is 3¹/₂ inches. See Figure 3b (next page).

⁴The hanger provides a torsional resistance up to a maximum joist depth of 16¹/₂ inches, where torsional resistance is defined as a moment of not less than 75 pounds (334 N) times the depth of the joist at which the lateral movement of the top or bottom of the joist with respect to the vertical position of the joist is 0.125 inch (3.2 mm).

⁵Tabulated allowable uplift loads have been increased for wind or earthquake loading with no further increase allowed. The allowable uplift loads must be reduced when other load durations govern.

TABLE 4—ALLOWABLE LOADS FOR THE HUSTF SERIES JOIST HANGERS

MODEL NO.	DIMENSIONS ¹ (inches)				FASTENERS (Quantity – Size)		ALLOWABLE LOADS ^{2,3} (lbs)			
	W	H	B	TF	Header	Joist ⁴	Uplif ⁵	Download		
							C _D = 1.6	C _D = 1.0	C _D = 1.15	C _D = 1.25
HUS26-2TF	3 ¹ / ₈	5 ³ / ₈	2	1 ³ / ₄	6–16d	4–16d	1,080	2,820	3,000	3,000
HUS28-2TF	3 ¹ / ₈	7 ¹ / ₄	2	1 ³ / ₈	8–16d	6–16d	1,550	3,455	3,720	3,895
HUS210-2TF	3 ¹ / ₈	9 ¹ / ₄	2	1 ¹ / ₂	10–16d	8–16d	2,160	3,585	3,925	4,155
HUS212-2TF	3 ¹ / ₈	11 ¹ / ₈	2	2 ¹ / ₄	10–16d	8–16d	2,000	4,435	4,535	4,605
HUS214-2TF	3 ¹ / ₈	13 ¹ / ₈	2	2 ¹ / ₄	12–16d	8–16d	2,160	4,435	4,535	4,605
HUS46TF	3 ⁹ / ₁₆	5 ³ / ₈	2	1 ⁹ / ₁₆	6–16d	4–16d	1,080	2,700	2,890	3,000
HUS48TF	3 ⁹ / ₁₆	7 ¹ / ₄	2	1 ⁹ / ₁₆	8–16d	6–16d	1,550	3,225	3,495	3,670
HUS410TF	3 ⁹ / ₁₆	9 ¹ / ₄	2	1 ¹ / ₄	10–16d	8–16d	2,160	3,365	3,710	3,935
HUS412TF	3 ⁹ / ₁₆	11 ¹ / ₈	2	2 ¹ / ₁₆	10–16d	8–16d	2,000	4,420	4,760	4,990
HUS414TF	3 ⁹ / ₁₆	13 ¹ / ₈	2	2 ¹ / ₁₆	12–16d	8–16d	2,160	4,765	5,100	5,100

For SI: 1 lb = 4.45 N, 1 inch = 25.4 mm.

¹Refer to Figure 4a (this page) for definitions of hanger nomenclature (W, H, B, TF).

²Tabulated allowable load capacities must be selected based on duration of load as permitted by the applicable building code.

³The HUSTF Series hangers provide torsional resistance, which is defined as a moment of not less than 75 pounds (334 N) times the depth of the joist at which the lateral movement of the top or bottom of the joist with respect to the vertical position of the joist is 0.125 inch (3.2 mm).

⁴The U-shaped portion of the hangers have pre-punched holes for the installation of joist that are driven at a 45-degree angle through the joist and into the header, which is described as double shear nailing in the installation instructions. See Figure 4b (this page).

⁵The uplift loads have been increased for wind or earthquake loading with no further increase allowed. The allowable uplift loads must be reduced when other load durations govern.

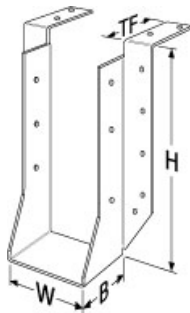


FIGURE 3a—HUTF HANGER SERIES
(See Table 3)

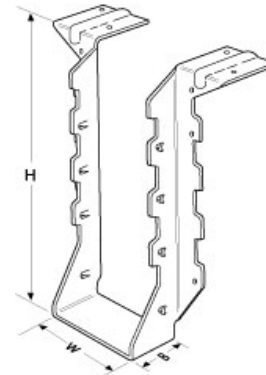


FIGURE 4a—HUSTF HANGER SERIES
(See Table 4)

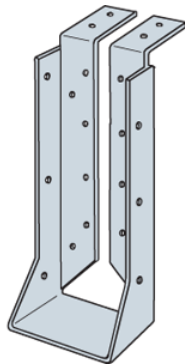


FIGURE 3b—HUTF HANGER (with concealed flanges)
(See Table 3)

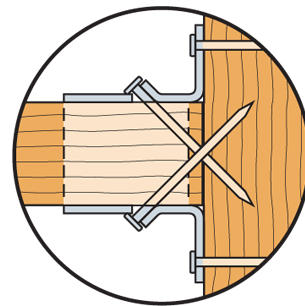


FIGURE 4b—TOP VIEW OF DOUBLE SHEAR NAILING
REQUIRED FOR HUSTF HANGERS (See Footnote 4, Table 4)

TABLE 5—ALLOWABLE LOADS FOR THE PF/PFA/PFD SERIES JOIST HANGERS

MODEL NO.	DIMENSIONS ¹ (inches)					FASTENERS (Quantity—Size)		ALLOWABLE LOADS ^{2,3} (lbs)			
	W	H	B	TF	S	Header	Joist ⁴	Uplift ⁵			
								C _D = 1.6	C _D = 1.0	C _D = 1.15	C _D = 1.25
PF24	1 ⁹ / ₁₆	5 ³ / ₈	1 ¹ / ₂	1 ¹ / ₁₆	—	2–10d	2–10d	260	955	955	955
PF26	1 ⁹ / ₁₆	5 ⁵ / ₁₆	1 ¹ / ₂	1 ¹ / ₁₆	—	2–10d	2–10d	260	955	955	955
PFD24	1 ⁹ / ₁₆	3 ¹ / ₂	1 ¹ / ₄	—	1 ⁹ / ₁₆	—	2–10d	235	910	935	955
PFD26	1 ⁹ / ₁₆	5 ¹ / ₂	1 ¹ / ₄	—	1 ⁹ / ₁₆	—	4–10d	470	1,085	1,140	1,175
PFDS26	1 ⁹ / ₁₆	5 ¹ / ₂	1 ¹ / ₄	—	3 ¹ / ₄	4–10d	4–10d	520	1,045	1,090	1,120
PF24A	1 ⁹ / ₁₆	3 ¹ / ₂	1 ¹ / ₄	1 ¹ / ₂	—	2–10d	2–10d	235	800	800	800
PF26A	1 ⁹ / ₁₆	5 ¹ / ₂	1 ¹ / ₄	1 ¹ / ₂	—	2–10d	4–10d	520	1,045	1,090	1,120

For SI: 1 inch = 25.4 mm, 1 pound = 4.45 N.

¹Refer to Figures 5a and 5c (this page) for definitions of PF and PFA hanger nomenclature (W, H, B, TF). Refer to Figures 5b (this page) for definitions of PFD hanger nomenclature (W, H, B, S).

²Tabulated allowable load capacities must be selected based on duration of load as permitted by the applicable building code.

³The connectors provide a torsional resistance up to a maximum joist depth of 5¹/₂ inches, where torsional resistance is defined as a moment of not less than 75 pounds (334 N) times the depth of the joist at which the lateral movement of the top or bottom of the joist with respect to the vertical position of the joist is 0.125 inch (3.2 mm).

⁴The U-shaped portion of the hangers have pre-punched holes for the installation of nails that are driven at a 45-degree angle through the joist and into the header, which is described as double shear nailing in the installation instructions. See Figure 5d (this page).

⁵The uplift loads have been increased for wind or earthquake loading with no further increase is allowed. The allowable uplift loads must be reduced when other load durations govern.

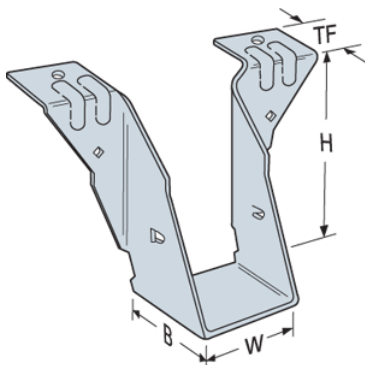


FIGURE 5a—PF24 and PF26 HANGERS

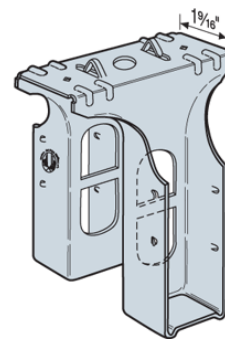


FIGURE 5b—PFD24, PFD26, and PFDS26 HANGERS

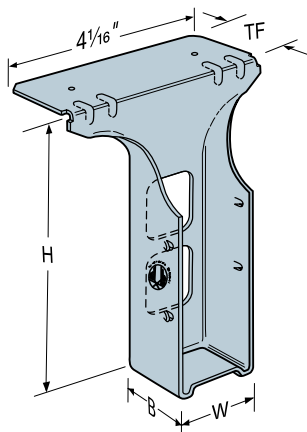


FIGURE 5c—PF24A AND PF26A HANGERS

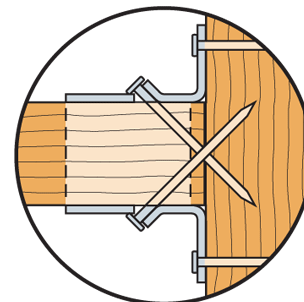


FIGURE 5d—TOP VIEW OF DOUBLE SHEAR NAILING REQUIRED FOR PF/PFA/PFD HANGERS (See Footnote 4, Table 5)

TABLE 6—ALLOWABLE LOADS FOR THE RR RIDGE RAFTER CONNECTOR

MODEL NO.	FASTENERS (Quantity – Size)		ALLOWABLE LOADS ^{1,2} (lbs)		
	Header	Joist	C _D = 1.0	C _D = 1.15	C _D = 1.25
RR	4-10d x 1 1/2	4-10d x 1 1/2	365	415	415

For SI: 1 inch = 25.4 mm, 1 pound = 4.45 N.

¹The connector may be used with a rafter slope up to 30 degrees maximum.

²RR hangers provide a torsional resistance up to a maximum joist depth of 13 1/2 inches, where torsional resistance is defined as a moment of not less than 75 pounds (334 N) times the depth of the joist at which the lateral movement of the top or bottom of the joist with respect to the vertical position of the joist is 0.125 inch (3.2 mm).

³Tabulated allowable loads must be selected based on duration of load as permitted by the applicable building code.

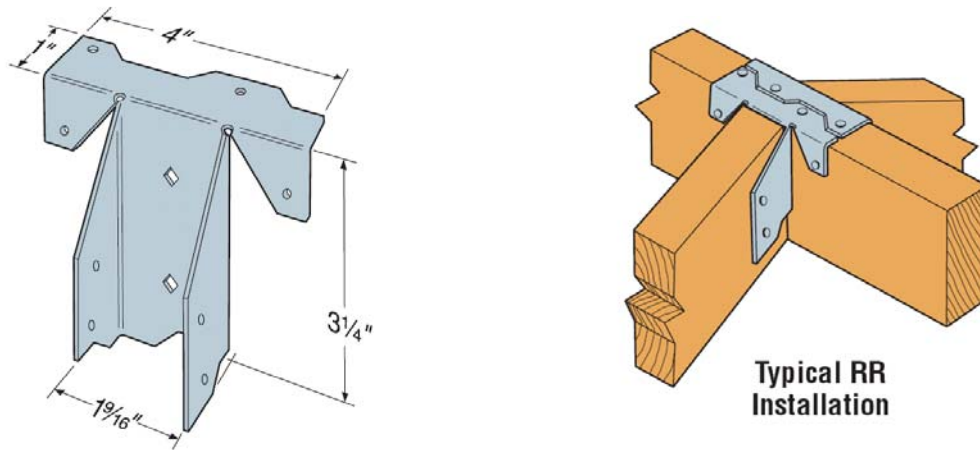


FIGURE 6—RR RIDGE RAFTER CONNECTOR