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Simpson Strong-Tie Co., Inc.  
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Attn: Tim Kaucher, P. E.  
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RESEARCH REPORT: RR 25804  
(CSI #06090)

BASED UPON ICC EVALUATION SERVICE  
REPORT NO. ESR- 2551

REEVALUATION DUE

DATE: August 1, 2010

Issued Date: August 1, 2009

Code: 2008 LABC

**GENERAL APPROVAL** - Adjustable Hangers for Wood Framming.

**DETAILS**

The above assemblies and/or products are approved when in compliance with the description, use, identification and findings of Evaluation Report No. ESR-2551, dated February 1, 2008, revised June 2009 of the ICC Evaluation Service, Incorporated. The report, in its entirety, is attached and made part of this general approval.

The parts of Evaluation Report No. ESR-2551 marked by an asterisk are modified or deleted by the Los Angeles City Building Department from this approval.

**The approval is subject to the following conditions:**

1. Various allowable load values in Simpson Catalog Tables have been modified. Revised tables are as modified in the ICC Evaluation Report.
2. 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.
3. Allowable loads shall not be increased for duration of load, except as specifically noted in the tables.
4. All uplift loads in tables have been increased for earthquake and wind loading. Values must be reduced for normal duration loads.
5. The supported end of joist or beam shall be within ¼-inch from the supporting header.

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Simpson Strong-Tie Co., Inc.

RE: Adjustable Hangers for Wood Framing.

6. Allowable loads in tables are for the wood fastening devices and its fasteners and does not include supporting members. The supporting members shall be checked separately for structural adequacy.
7. Approved products to be used shall be indicated on the approved set of plans.
8. Nails shall be common nails except where otherwise specified.
9. All products involving welding shall be fabricated in the shop of a Los Angeles City licensed fabricator.
10. 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.

## **DISCUSSION**

The report is in compliance with the 2008 Los Angeles City Building Code.

The approval was based on tests in accordance with ICC-ES Acceptance Criteria for Joist Hangers and Similar Devices (AC13).

Products included in this research report were previously included with research reports 24949, 25074, 25076, and 25158.

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.

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 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.

Simpson Strong-Tie Co., Inc.  
RE: Adjustable Hangers for Wood Framing.

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WS:ws  
RR25804/Word.2003  
R07/24/09  
5D1/5D2/2303.5

Attachments: ICC-ES Evaluation Report No. ESR-2551 (9-pages).

# ICC-ES Evaluation Report

**ESR-2551\***

Issued February 1, 2008

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

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**DIVISION: 06—WOOD AND PLASTICS**  
**Section: 06090—Wood and Plastics Fastenings**
**REPORT HOLDER:**
**SIMPSON STRONG-TIE COMPANY, INC.**  
 5956 WEST LAS POSITAS BOULEVARD  
 PLEASANTON, CALIFORNIA 94588  
 (800) 925-5099  
[www.strongtie.com](http://www.strongtie.com)
**EVALUATION SUBJECT:**
**SIMPSON STRONG-TIE ADJUSTABLE HANGERS AND HIP CONNECTORS FOR WOOD FRAMING**
**1.0 EVALUATION SCOPE**
**Compliance with the following codes:**

- 2006 *International Building Code*® (IBC)
- \* ~~▪ 2006 *International Residential Code*® (IRC)~~
- ~~▪ Other Codes (see Section 6.0)~~

**Property evaluated:**

Structural

**2.0 USES**

- The Simpson Strong-Tie adjustable hangers and hip connectors described in this report are used as wood framing connectors in accordance with Section 2304.9.3 of the IBC. ~~The connectors 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 connectors described in this report have a general attribute of field adjustability to form specific connections for one or more roof framing members that intersect at different angles and slopes or to form specified connections for wood trusses, beams, and prefabricated wood I-joists.

- \* ~~**3.1.1 HCP Hip Corner Plate.** The HCP hip corner plate connects a hip roof rafter or beam to the double top plates of two intersecting walls at a 45-degree angle. The connectors are die formed from No. 18 gage galvanized steel. See Table 1 for the connector plate models, connector dimensions, required fasteners, and allowable loads. See Figure 1a for a drawing of the HCP connector and Figure 1b for a drawing a typical installation where the HCP connector is nailed to a roof hip member and the outside corner of the intersecting double top plates.~~

- \* ~~**3.1.2 HRC Hip Ridge Connector Plate.** The HRC hip ridge connector attaches two 45-degree skewed roof hip members to the end of a ridge member or the flat side of a truss. The U-shaped stirrups of the HRC connectors support the roof hip members, and may be field-adjusted up to 45 degrees from the horizontal without adversely affecting the load-carrying capacity of the connector. The HRC22, HRC1.81, and HRC42 connectors are fabricated from No. 16 gage galvanized steel. The HRC44 is fabricated from No. 14 gage galvanized steel. See Table 2 for the HRC connector models, connector dimensions, required fasteners, and allowable loads. See Figure 2 for drawings of the HRC connectors and a typical installation.~~

**3.1.3 LSU, LSSU, and LSSUI Sloped and Skewed Hangers:**

The LSU, LSSU, and LSSUI hanger series are used to attach wood joists or rafters to wood headers, and may be sloped up or down and skewed left or right, up to 45 degrees. The LSU26, LSSU28, LSSU210, LSSUI25, and LSSUI35 are fabricated from No. 18 gage galvanized steel. The LSSU210-2 and LSSU410 are fabricated from No. 16 gage galvanized steel. See Table 3 for the hanger model numbers, hanger dimensions, required fasteners, and allowable loads. See Figure 3 for drawings of a LSU26 hanger and a typical LSSU/LSSUI and a typical LSSU sloped installation.

**3.1.4 THA and THAC Adjustable Truss Hangers:**

THA and THAC adjustable truss hangers are U-shaped hangers designed for use with wood trusses and wood beams or headers. The hangers have long straight straps that can be field-formed to adjust the location of the truss or beam relative to the carrying member. The THA29, THA213, THA218, and THA418 hangers are formed from No. 18 gage galvanized steel. The THA218-2, THA222-2, THA418, THAC418, and THA422 hangers are formed from No. 16 gage galvanized steel. See Table 4 for hanger model numbers, hanger dimensions, required fasteners, and allowable loads. Two different installation methods may be used:

- (1) Minimum nailing schedule, which requires for the THA29 the use of double-shear (slant) nailing for the joist (carried member), and the hanger straps to be field-formed (bent) over the header a minimum of 2 1/2 inches (63.5 mm) and nailed according to the requirements shown in Table 4. The minimum nailing schedule for other hangers requires the hanger straps to be bent over the top of the header (carrying member) a minimum of 1 1/2 inches (38.1 mm) for the THA213 and THA413 hangers, and a minimum of 2 inches (51 mm) for all THA/THAC hangers, and nailed according to the requirements shown in Table 4; or

\*Revised June 2009

- (2) Maximum nailing schedule, which requires all nails to be installed into the face of the carrying member in accordance with Table 4, and nails used for the joist attachment to be driven at a 45-degree angle so that they penetrate through the corner of the joist into the header, i. e., double shear nailing.

See Figure 4 for drawings of typical THA and THAC hangers, and the THA29 hanger, and a typical installation of a THA hanger supporting a nominally 4-by-2 floor truss where the hanger straps are field-bent and nailed to the supporting wood member, and a detail of double shear (slant) nailing.

**3.1.5 THAI Adjustable I-Joist Hanger:** The THAI adjustable I-joist hangers have long straight straps that can be field-formed to ensure the top flange of the supported prefabricated wood I-joist is level relative to the supporting wood member. The hangers are formed from No. 18 gage galvanized steel. See Table 5A for hanger model numbers, hanger dimensions, and the width and depth of I-joists intended for use with each model. See Table 5B for fastener schedules and allowable loads. See Figure 5 for drawings of a typical THAI hanger and a typical installation.

~~**3.1.6 THAL/R422 Adjustable Truss Hangers:** The THAL422 and THAR422 adjustable truss hangers have a standard skew of 45 degrees and support nominally 4-by-2 floor trusses and nominally 4-inch-wide wood beams. The hangers have long straps that must be bent over the top of the supporting wood member and nailed to the face and top of the carrying member according to the fastener schedule requirements shown in Table 6. The hangers are formed from No. 16 gage galvanized steel. The THAR and THAL are mirror image identical hangers skewed at 45 degrees right and left, respectively. See Table 6 for the hanger dimensions, required fasteners, and allowable loads. Two different installation methods may be used:~~

- (1) Minimum nailing schedule, which requires the hanger straps to be field-formed (bent) over the header a minimum of 2 1/2 inches (63.5 mm) and nailed into the face of the carrying member with two nails as specified in Table 6; or
- (2) Maximum nailing schedule, which requires the hanger straps to be field-formed (bent) over the header a minimum of 2 1/2 inches (63.5 mm) and nailed into the face of the carrying member with twelve nails as specified in Table 6.

See Figure 6 for a drawing of a THAL/R422 hanger.

~~**3.1.7 VPA Variable Pitch Connectors:** VPA variable pitch connectors are field- formed and are used to connect wood roof rafters to wall top plates. The connector can be field-bent to accommodate rafter slopes between 3:12 (14 degrees) and 12:12 (45 degrees). The U-shaped portion of the VPA connector provides a seat for the roof rafter, and the top flange (Flange A) and face flange (Flange B) of the connector are bent and nailed to the wall top plate, as shown in Figure 7. The connectors are formed from No. 18 gage galvanized steel. See Table 7 for connector model numbers, the width of the U-shaped rafter seat, required fasteners, and allowable loads. See Figure 7 for drawings of a VPA connector and a typical installation detail.~~

**3.2 Materials:**

- \* **3.2.1 Steel:** With the exception of the THAL/R hangers, all of the hangers and connectors described in this report are manufactured from galvanized steel complying with ASTM A 653, SS designation, Grade 33, with a minimum

yield strength,  $F_y$ , of 33,000 psi (227 MPa) and a minimum tensile strength,  $F_u$ , of 45,000 psi (310 MPa). The THAL/R hangers are made with ASTM A 653, SS designation, Grade 40, galvanized steel with a minimum yield strength of 40,000 psi (267 MPa) and a minimum tensile strength of 55,000 psi (379 MPa). The minimum base metal thicknesses for the hangers and connectors in this report are as follows:

NOMINAL THICKNESS (gage)	MINIMUM BASE-METAL THICKNESS (inch)
No. 14	0.0685
No. 16	0.0555
No. 18	0.0445

For SI: 1 inch = 25.4 mm.

The hangers and connectors 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 (600 g/m<sup>2</sup>), 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 or holder of this report (Simpson Strong-Tie Company) should be contacted for recommendations on minimum corrosion resistance of 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.

**3.2.3 Fasteners:** Nails used for connectors described in this report must comply with ASTM F 1667 and have the following minimum fastener dimensions and bending yield strengths ( $F_{yb}$ ):

FASTENER	SHANK DIAMETER (inch)	LENGTH (inches)	$F_{yb}$ (psi)
10d x 1 1/2 common	0.148	1 1/2	90,000
10d common	0.148	3	90,000
16d sinker	0.148	3 1/4	90,000
16d x 2 1/2 common	0.162	2 1/2	90,000
16d common	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 IBC Section 2304.9.5 or IRC Section R319.3, as applicable. The lumber treater or this report holder (Simpson Strong-Tie Company) should be contacted for recommendations on minimum corrosion resistance of fasteners and 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 adjustable hangers and hip connectors 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.

## 6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Joist Hangers and Similar Devices (AC13), dated October 2006 (corrected March 2007).

## 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.

## 8.0 OTHER CODES

### 8.1 Evaluation Scope:

In addition to the codes referenced in Section 1.0, the products in this report were evaluated for compliance with the requirements of the following codes:

- 2003 *International Building Code*® (2003 IBC)
- 2003 *International Residential Code*® (2003 IRC)
- 2000 *International Building Code*® (2000 IBC)
- 2000 *International Residential Code*® (2000 IRC)
- 1997 *Uniform Building Code*™ (UBC)

The products described in this report comply with, or are suitable alternatives to what is specified in, the codes listed above, subject to the provisions of Sections 8.2 through 8.7.

### 8.2 Uses:

**8.2.1 2003 IBC, 2003 IRC, 2000 IBC, and 2000 IRC:** See Section 2.0 of this report.

**8.2.2 UBC:** Replace the information in Section 2.0 with the following: Simpson Strong-Tie adjustable hangers and hip connectors are used as wood framing connectors in accordance with Section 2318.4.8 of the UBC.

### 8.3 Description:

**8.3.1 2003 IBC and 2003 IRC:** See Section 3.0 of this report.

**8.3.2 2000 IBC and 2000 IRC:** See Section 3.0 of this report, except modify Section 3.2.3 to reference Section R323.3 of the IRC.

**8.3.3 UBC:** See Section 3.0 of this report, except modify the first sentence in the last paragraph of Section 3.2.3 as follows: Fasteners used in contact with preservative treated or fire retardant treated lumber must, as a minimum, comply with UBC Section 2304.3.

### 8.4 Design and Installation: 2003 IBC, 2003 IRC, 2000 IBC, 2000 IRC, and UBC:

See Section 4.0 of his report.

### 8.5 Conditions of Use:

**8.5.1 2003 IBC, 2003 IRC 2000 IEC, and 2000 IRC:** The Simpson Strong-Tie products described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 8.0, subject to the same conditions of use indicated in Section 5.0 of this report.

**8.5.2 UBC:** The Simpson Strong-Tie products described in this report comply with, or are suitable alternatives to what is specified in, the UBC, subject to the same conditions of use indicated in Section 5.0 of this report, except the last sentence of Section 5.5 is replaced with the following: Fasteners used in contact with preservative treated or fire retardant treated lumber must, as a minimum, comply with UBC Section 2304.3.

### 8.6 Evidence Submitted: 2003 IBC, 2003 IRC 2000 IBC, 2000 IRC, and UBC:

See Section 6.0 of this report.

### 8.7 Identification: 2003 IBC, 2003 IRC 2000 IBC, 2000 IRC, and UBC:

See Section 7.0 of this report.

\* TABLE 1—HCP HIP CORNER PLATE CONNECTORS

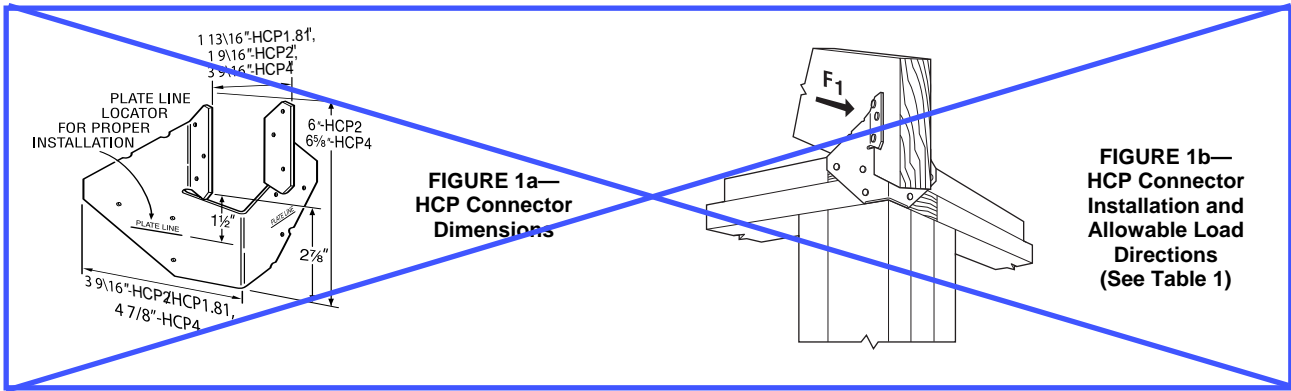
MODEL NO.	JOIST/RAFTER SIZE	FASTENERS <sup>1</sup> (Quantity – Type)		ALLOWABLE LOADS <sup>2,3</sup> (lbs)	
		Rafter	Top Plates	Uplift C <sub>D</sub> = 1.33 or = 1.6	Lateral F <sub>1</sub> C <sub>D</sub> = 1.33 or = 1.6
HCP2	2x	8-10d x 1 1/2	8-10d x 1 1/2	645	300
HCP1.81	1 3/4"	8-10d x 1 1/2	8-10d x 1 1/2	645	300
HCP4	4x	8-10d	8-10d	1,000	285

For SI: 1 inch = 25.4 mm, 1 lbf = 4.5 N.

<sup>1</sup>Refer to Figure 1b for typical HCP connector installation and location of required fasteners.

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

<sup>3</sup>The 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 2—HRC SERIES HIP/RIDGE CONNECTOR

MODEL NO.	RIDGE SIZE	HIP SIZE	FASTENERS (Quantity – Type)		ALLOWABLE LOADS <sup>1,2,3</sup> (lbs)			
			Ridge (Carrying Member)	Hip <sup>4</sup> (Carried Member)	Uplift	Download		
					C <sub>D</sub> = 1.33 or = 1.6	C <sub>D</sub> = 1.0	C <sub>D</sub> = 1.15	C <sub>D</sub> = 1.25
HRC22	2x or 1 3/4"	2x	16-10d x 1 1/2	2-10d x 1 1/2	240	1,440	1,660	1,800
HRC1.81	2x or 1 3/4"	1 3/4"	16-10d x 1 1/2	2-10d x 1 1/2	240	1,440	1,660	1,800
HRC42	4x	2x	16-10d	2-10d x 1 1/2	240	2,100	2,100	2,100
HRC44	4x	4x	24-10d	8-10d	480	3,215	3,550	3,550

For SI: 1 inch = 25.4 mm, 1 lbf = 4.5 N.

<sup>1</sup>Tabulated allowable loads must be selected based on duration of load as permitted by the applicable building code.

<sup>2</sup>The 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.

<sup>3</sup>Total load carried by connector is shown. Allowable load for each hip is one half of the tabulated value.

<sup>4</sup>Number of fasteners shown is for each hip carried. Total number of fasteners to hips is double the tabulated quantity.

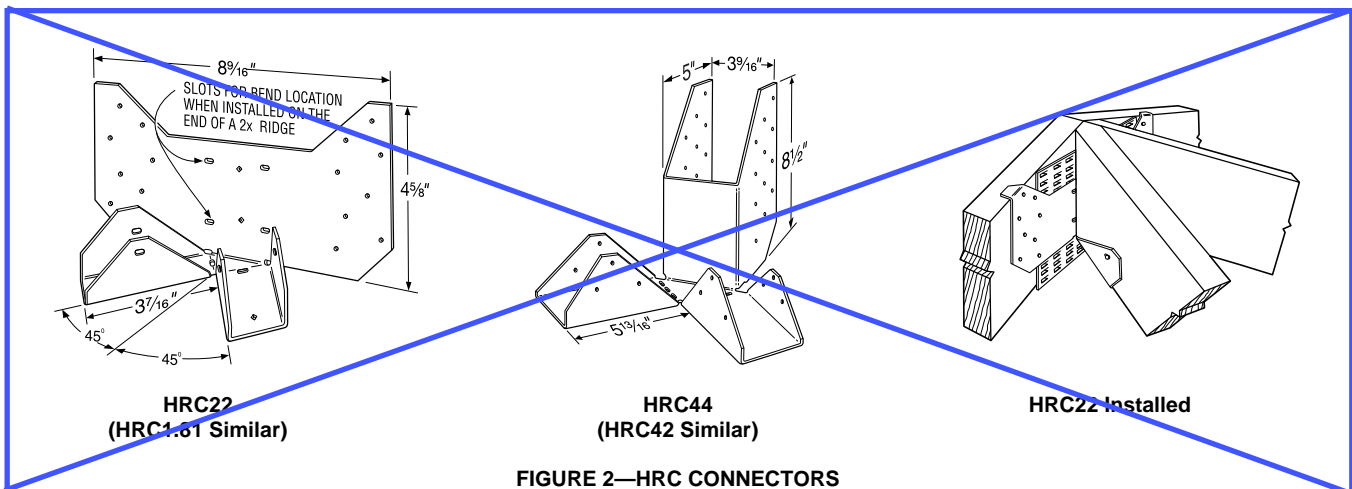


TABLE 3—LSU/LSSU/LSSUI SKEWED AND SLOPED HANGERS

MODEL NO.	HANGER <sup>1</sup> DIMENSIONS (inches)			FASTENERS (Quantity – Type)			ALLOWABLE LOAD <sup>2</sup> (lbs)							
							Header		Joist	Uplift <sup>3</sup>		Download		
	W	H	A	Sloped Only <sup>4</sup>	Skewed or Skewed & Sloped <sup>5</sup>	Sloped Only		Skewed						
						C <sub>D</sub> = 1.33	C <sub>D</sub> = 1.6	C <sub>D</sub> = 1.0	C <sub>D</sub> = 1.15	C <sub>D</sub> = 1.25	C <sub>D</sub> = 1.0	C <sub>D</sub> = 1.15	C <sub>D</sub> = 1.25	
LSU26	1 <sup>9</sup> / <sub>16</sub>	4 <sup>7</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>2</sub>	6–10d	6–10d	5-10d x 1 <sup>1</sup> / <sub>2</sub>	485	535	665	<del>765</del>	800	665	<del>765</del>	800
LSSU28	1 <sup>9</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>2</sub>	10–10d	9–10d	5-10d x 1 <sup>1</sup> / <sub>2</sub>	485	535	1,110	<del>1,275</del>	1,390	990	<del>990</del>	990
LSSU210	1 <sup>9</sup> / <sub>16</sub>	8 <sup>1</sup> / <sub>2</sub>	1 <sup>5</sup> / <sub>8</sub>	10–10d	9–10d	7-10d x 1 <sup>1</sup> / <sub>2</sub>	730	785	1,110	<del>1,275</del>	1,390	1,000	<del>1,145</del>	1,205
LSSUI25	1 <sup>13</sup> / <sub>16</sub>	8 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	10–10d	9–10d	7-10d x 1 <sup>1</sup> / <sub>2</sub>	730	785	1,110	<del>1,275</del>	1,390	1,000	<del>1,145</del>	1,205
LSSUI35	2 <sup>5</sup> / <sub>16</sub>	8 <sup>1</sup> / <sub>2</sub>	1 <sup>5</sup> / <sub>8</sub>	10–10d	9–10d	7-10d x 1 <sup>1</sup> / <sub>2</sub>	730	785	1,110	<del>1,275</del>	1,390	1,000	<del>1,145</del>	1,205
LSSU210-2	3 <sup>1</sup> / <sub>8</sub>	8 <sup>1</sup> / <sub>2</sub>	2 <sup>7</sup> / <sub>8</sub>	18–16d	14–16d	12-10d x 1 <sup>1</sup> / <sub>2</sub>	1,150	1,150	2,000	2,795	2,500	1,290	1,625	1,615
LSSU410	3 <sup>9</sup> / <sub>16</sub>	8 <sup>1</sup> / <sub>2</sub>	2 <sup>5</sup> / <sub>8</sub>	18–16d	14–16d	12-10d x 1 <sup>1</sup> / <sub>2</sub>	1,150	1,150	2,395	2,795	2,990	1,610	1,625	1,625

For SI: 1 inch = 25.4 mm, 1 lbf = 4.5 N.

<sup>1</sup>Refer to Figure 3 for definitions of hanger dimension nomenclature (W, H, A).

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

<sup>3</sup>The 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.

<sup>4</sup>Maximum slope up or down is 45 degrees.

<sup>5</sup>The hanger may be skewed only or skewed and sloped. Maximum skew left or right is 45 degrees.

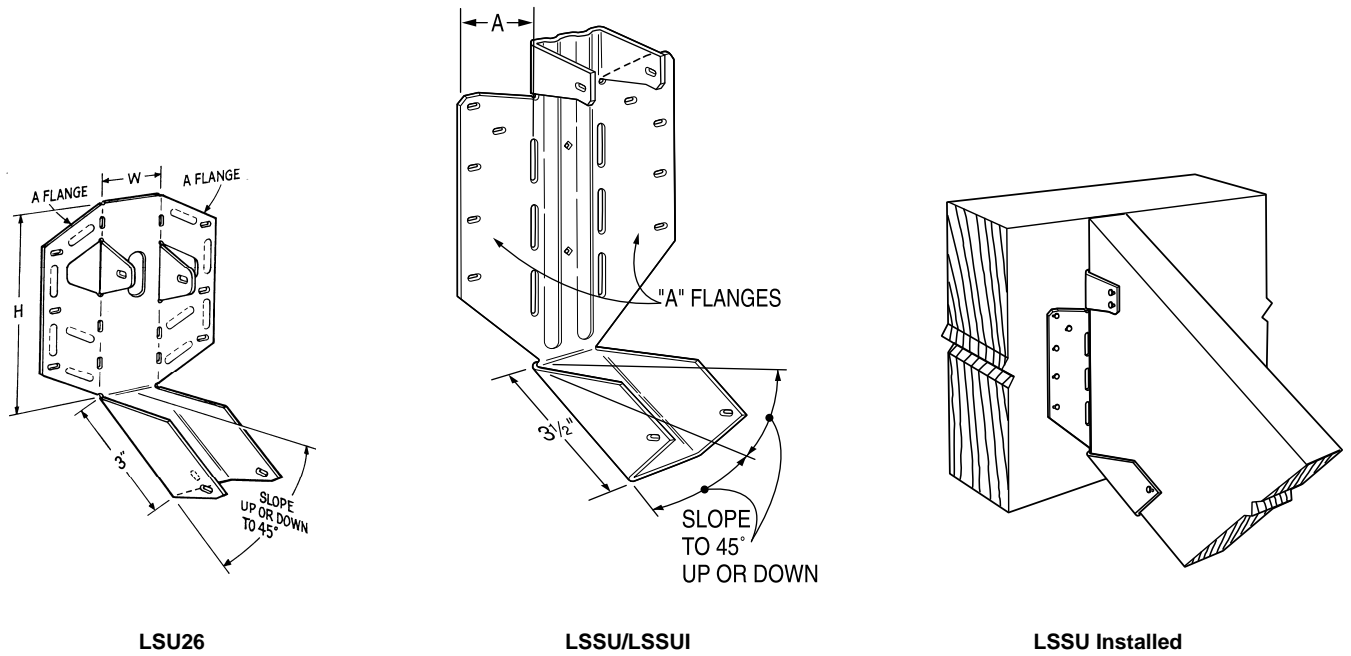


FIGURE 3—LSU/LSSU/LSSUI SKEWED AND SLOPED HANGERS

TABLE 4—THA SERIES TRUSS HANGERS ADJUSTABLE

MODEL NO.	DIMENSIONS <sup>1</sup> (inches)			FASTENERS <sup>2</sup> (Quantity – Type)				ALLOWABLE LOADS <sup>3,4</sup> (lbs)			
	W	H	C	Carrying Member		Carried Member		Uplift <sup>4</sup>	Download		
				Top	Face	Straight <sup>5</sup>	Slant <sup>6</sup>	C <sub>D</sub> = 1.33 or = 1.6	C <sub>D</sub> = 1.0	C <sub>D</sub> = 1.15	C <sub>D</sub> = 1.25
<b>Minimum Nailing Schedule</b>											
THA29	1 <sup>5</sup> / <sub>8</sub>	9 <sup>11</sup> / <sub>16</sub>	5 <sup>1</sup> / <sub>8</sub>	4-10d	4-10d	—	4-10d	560	2,260	2,310	2,350
THA213	1 <sup>5</sup> / <sub>8</sub>	13 <sup>5</sup> / <sub>16</sub>	5 <sup>1</sup> / <sub>2</sub>	4-10d	2-10d	4-10d x 1 <sup>1</sup> / <sub>2</sub>	—	—	1,615	1,615	1,615
THA218	1 <sup>5</sup> / <sub>8</sub>	17 <sup>3</sup> / <sub>16</sub>	5 <sup>1</sup> / <sub>2</sub>	4-10d	2-10d	4-10d x 1 <sup>1</sup> / <sub>2</sub>	—	—	1,615	1,615	1,615
THA218-2	3 <sup>1</sup> / <sub>8</sub>	17 <sup>11</sup> / <sub>16</sub>	8	4-16d	2-16d	6-16d x 2 <sup>1</sup> / <sub>2</sub>	—	—	1,635	1,635	1,635
THA222-2	3 <sup>1</sup> / <sub>8</sub>	22 <sup>3</sup> / <sub>16</sub>	8	4-16d	2-16d	6-16d x 2 <sup>1</sup> / <sub>2</sub>	—	—	1,635	1,635	1,635
THA413	3 <sup>5</sup> / <sub>8</sub>	13 <sup>5</sup> / <sub>16</sub>	4 <sup>1</sup> / <sub>2</sub>	4-10d	2-10d	4-10d	—	—	1,615	1,615	1,615
THA418	3 <sup>5</sup> / <sub>8</sub>	17 <sup>1</sup> / <sub>2</sub>	7 <sup>7</sup> / <sub>8</sub>	4-16d	2-16d	6-16d	—	—	1,635	1,635	1,635
THAC418	3 <sup>5</sup> / <sub>8</sub>	17 <sup>1</sup> / <sub>2</sub>	7 <sup>7</sup> / <sub>8</sub>	4-16d	2-16d	6-16d	—	—	1,635	1,635	1,635
THA422	3 <sup>5</sup> / <sub>8</sub>	22	7 <sup>7</sup> / <sub>8</sub>	4-16d	2-16d	6-16d	—	—	1,635	1,635	1,635
<b>Maximum Nailing Schedule<sup>7</sup></b>											
THA29	1 <sup>5</sup> / <sub>8</sub>	9 <sup>11</sup> / <sub>16</sub>	5 <sup>1</sup> / <sub>8</sub>	—	16-10d	—	4-10d	560	2,125	2,310	2,350
THA213	1 <sup>5</sup> / <sub>8</sub>	13 <sup>5</sup> / <sub>16</sub>	5 <sup>1</sup> / <sub>2</sub>	—	14-10d	—	4-10d	930	1,795	1,840	1,870
THA218	1 <sup>5</sup> / <sub>8</sub>	17 <sup>3</sup> / <sub>16</sub>	5 <sup>1</sup> / <sub>2</sub>	—	18-10d	—	4-10d	930	1,795	1,840	1,870
THA218-2	3 <sup>1</sup> / <sub>8</sub>	17 <sup>11</sup> / <sub>16</sub>	8	—	16-16d	—	6-16d	1,550	2,830	3,050	3,050
THA222-2	3 <sup>1</sup> / <sub>8</sub>	22 <sup>3</sup> / <sub>16</sub>	8	—	22-16d	—	6-16d	1,550	3,510	3,595	3,650
THA413	3 <sup>5</sup> / <sub>8</sub>	13 <sup>5</sup> / <sub>16</sub>	4 <sup>1</sup> / <sub>2</sub>	—	14-10d	—	4-10d	930	1,940	2,235	2,400
THA418	3 <sup>5</sup> / <sub>8</sub>	17 <sup>1</sup> / <sub>2</sub>	7 <sup>7</sup> / <sub>8</sub>	—	16-16d	—	6-16d	1,550	2,830	3,050	3,050
THAC418	3 <sup>5</sup> / <sub>8</sub>	17 <sup>1</sup> / <sub>2</sub>	7 <sup>7</sup> / <sub>8</sub>	—	16-16d	—	6-16d	1,550	2,830	3,050	3,050
THA422	3 <sup>5</sup> / <sub>8</sub>	22	7 <sup>7</sup> / <sub>8</sub>	—	22-16d	—	6-16d	1,550	3,630	4,090	4,145

For SI: 1 inch = 25.4 mm, 1 lbf = 4.5 N.

<sup>1</sup>Refer to Figure 4 for definitions of hanger dimension nomenclature (W, H, C).

<sup>2</sup>There are two nailing configurations:

- a. Minimum Nailing Schedule: The hanger straps must be field formed (bent) over the top of the carrying member as described in Section 3.1.4 of this report and nailed as specified in the table.
- b. Maximum Nailing Schedule: The hanger straps may be bent over the top of the header or straight up the face of the header and nailed as specified in the table.

<sup>3</sup>Tabulated allowable load capacities must be selected based on duration of load as permitted by the applicable building code.

<sup>4</sup>The 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.

<sup>5</sup>Straight nailing must use nails driven straight (perpendicular) into the joist or truss.

<sup>6</sup>Slant nailing is where nails 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 and shown in Figure 4.

<sup>7</sup>For maximum nailing the 16d sinker nails are permitted to be used to replace the 16d common, provided the design loads noted in the table are multiplied by a factor of 0.85.

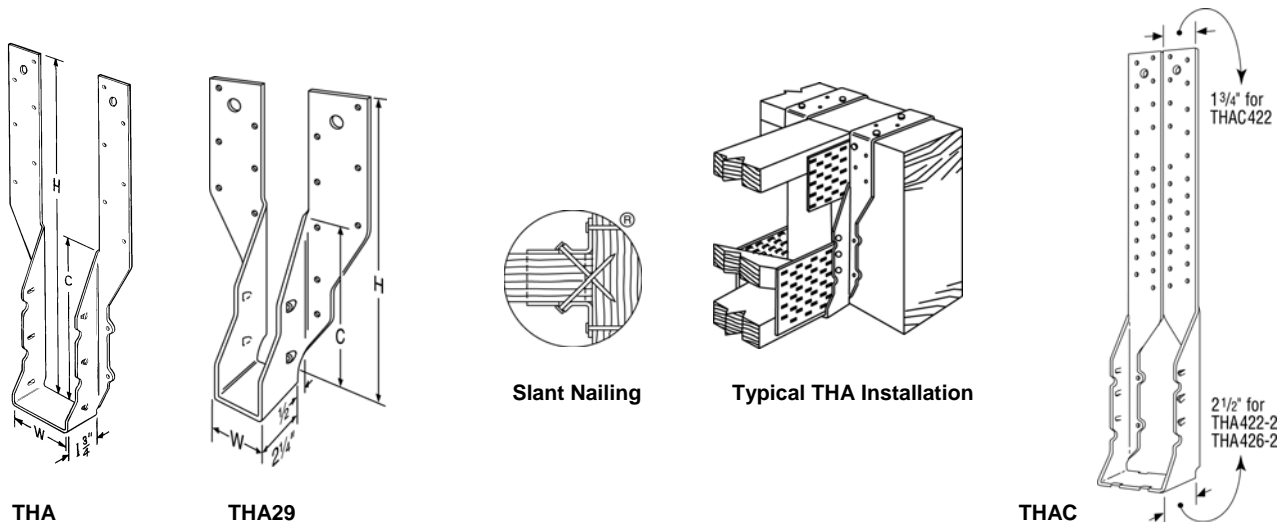


FIGURE 4—THA SERIES TRUSS HANGERS ADJUSTABLE

TABLE 5A—THAI ADJUSTABLE I-JOIST HANGER DIMENSIONS

MODEL NO.	JOIST DIMENSIONS (inches)			HANGER DIMENSIONS <sup>1</sup> (inches)		
	Width	Depth		W	H	C
		Minimum	Maximum			
THAI222	1 1/2	9 1/4	14	1 9/16	22 7/8	9 3/8
THAI1.81/22	1 3/4	9 1/4	14	1 13/16	22 3/4	9 1/4
THAI2.06/22	2	9 1/4	14	2 1/16	22 5/8	9 1/8
THAI2.1/22	2 1/16	9 1/4	14	2 1/8	22 9/16	9 1/8
THAI3522	2 1/4 (min), 2 5/16 (max)	9 1/4	14	2 5/16	22 1/2	9
THAI322	2 1/2	9 1/4	14	2 9/16	22 3/8	8 7/8
THAI422	3 1/2	9 1/4	14	3 9/16	21 7/8	8 3/8

For SI: 1 inch = 25.4 mm.

<sup>1</sup>Refer to Figure 5 (this page) for definitions of hanger nomenclature (W, H, C).

TABLE 5B—THAI ADJUSTABLE I-JOIST HANGER FASTENER SCHEDULE AND ALLOWABLE LOADS<sup>1</sup>

MODEL NO.	NAILING CONFIGURATION	FASTENERS <sup>2</sup> (Quantity – Type)			ALLOWABLE LOAD <sup>3</sup> (lbs)			
		Header		Joist	Uplift <sup>4,5</sup> C <sub>D</sub> = 1.33 or = 1.6	Download		
		Top	Face			C <sub>D</sub> = 1.0	C <sub>D</sub> = 1.15	C <sub>D</sub> = 1.25
THAI	Minimum <sup>6</sup>	4-10d	2-10d	2-10d x 1 1/2	—	1,835	1,835	1,835
		4-10d x 1 1/2	2-10d x 1 1/2	2-10d x 1 1/2	—	1,400	1,400	1,400
	Maximum <sup>7</sup>	—	20-10d	2-10d x 1 1/2	215	2,200	2,200	2,200

For SI: 1 inch = 25.4 mm, 1 lbf = 4.5 N.

<sup>1</sup>The hangers must be used with prefabricated wood I-joists with web stiffeners. The lesser allowed load values of the THAI connector values in the table or the allowable capacity of the value of the prefabricated wood I-joist listed in the applicable [Los Angeles City Research Report](#) must govern. \*\*

<sup>2</sup>16d sinkers (0.148-inch shank diameter by 3 1/4 inches long) are permitted to replace 10d common nails (0.148-inch shank diameter by 3 inches long).

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

<sup>4</sup>The 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.

<sup>5</sup>To achieve the tabulated allowable uplift load, a minimum of two 10d nails must be installed into the face of the carrying member.

<sup>6</sup>The minimum nailing configuration is shown in Figure 5a for top nailing installations. The strap must be field-formed over the top of the header by a minimum of 2 1/2 inches.

<sup>7</sup>The maximum nailing configuration requires the carrying beam/header to have a minimum depth of 16 inches and all 20-10d nails installed into the face of the carrying beam/header. The allowable download must be reduced by the allowable nail shear capacity for each nail less than maximum.

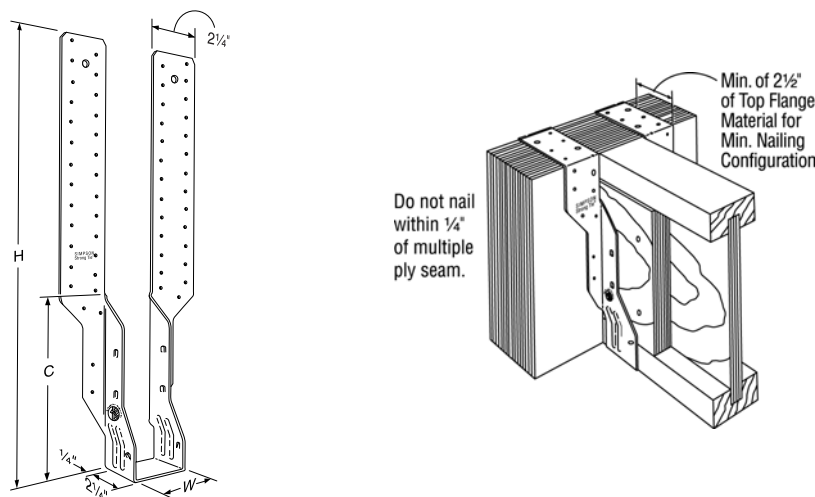


FIGURE 5—THAI ADJUSTABLE I-JOIST HANGER

~~\* TABLE 6—THAL/R422 (FACTORY-SKEWED 45°) ADJUSTABLE TRUSS HANGER~~

MODEL NO.	HANGER DIMENSIONS (inches)			FASTENERS (Quantity – Type)				ALLOWABLE LOADS <sup>1</sup> (lbs)			
				Carrying Member		Carried Member		Uplift <sup>2</sup>	Download <sup>3</sup>		
	Seat Width (W)	Hanger Height (H)	Joist Nailing Height (C)	Top	Face	Straight	Slant <sup>4</sup>	C <sub>D</sub> =1.33 or = 1.6	C <sub>D</sub> = 1.0	C <sub>D</sub> =1.15	C <sub>D</sub> =1.25
<del>THAL422 and THAR422</del>	<del>3<sup>5</sup>/<sub>8</sub></del>	<del>22<sup>5</sup>/<sub>8</sub></del>	<del>8</del>	<del>4–10d</del>	<del>2–10d</del>	<del>1–10d</del>	<del>2–10d × 1<sup>1</sup>/<sub>2</sub></del>	<del>---</del>	<del>1,090</del>	<del>1,090</del>	<del>1,090</del>
				1–10d	12–10d	1–10d	2–10d × 1 <sup>1</sup> / <sub>2</sub>	310	1,075	1,075	1,075

For SI: 1 inch = 25.4 mm, 1 lbf = 4.5 N.

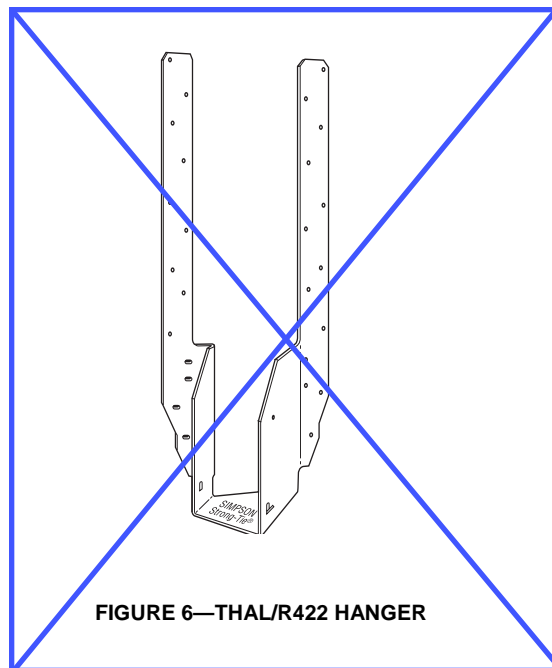
<sup>1</sup>Tabulated allowable loads must be selected based on duration of load as permitted by the applicable building code.

<sup>2</sup>The 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.

<sup>3</sup>There are two different installation methods. The minimum nailing installation has 10 fewer face nails than the maximum nailing installation. For each method the straps are field formed over the top of the carrying member a minimum of 2<sup>1</sup>/<sub>2</sub> inches (4 mm) and nailed to the top and face of the carrying member with the quantity of 10d common nails shown in the table.

<sup>4</sup>Slant nailing are nails driven at a 45-degree angle through the joist and into the header, which is described as double shear nailing in the installation instructions and shown in Figure 4 of this report.

~~\*~~



~~FIGURE 6—THAL/R422 HANGER~~

~~\* TABLE 7—VPA VARIABLE PITCH CONNECTORS~~

MODEL NO.	CONNECTOR WIDTH (W) (inches)	FASTENERS (Quantity – Type)		ALLOWABLE LOAD <sup>1</sup> (lbs)				
		Plates	Joist	Uplift <sup>2</sup>		Download		
				C <sub>D</sub> = 1.33	C <sub>D</sub> = 1.6	C <sub>D</sub> = 1.0	C <sub>D</sub> = 1.15	C <sub>D</sub> = 1.25
<del>VPA2</del>	<del>1<sup>9</sup>/<sub>16</sub></del>	<del>8–10d</del>	<del>4–10d x 1<sup>1</sup>/<sub>2</sub></del>	<del>245</del>	<del>295</del>	<del>1,050</del>	<del>1,050</del>	<del>1,050</del>
<del>VPA25</del>	<del>1<sup>13</sup>/<sub>16</sub></del>	<del>8–10d</del>	<del>4–10d x 1<sup>1</sup>/<sub>2</sub></del>	<del>245</del>	<del>295</del>	<del>1,050</del>	<del>1,050</del>	<del>1,050</del>
<del>VPA3</del>	<del>2<sup>9</sup>/<sub>16</sub></del>	<del>9–10d</del>	<del>4–10d x 1<sup>1</sup>/<sub>2</sub></del>	<del>245</del>	<del>295</del>	<del>1,200</del>	<del>1,200</del>	<del>1,200</del>
<del>VPA35</del>	<del>2<sup>5</sup>/<sub>16</sub></del>	<del>9–10d</del>	<del>4–10d x 1<sup>1</sup>/<sub>2</sub></del>	<del>245</del>	<del>295</del>	<del>1,200</del>	<del>1,200</del>	<del>1,200</del>
<del>VPA4</del>	<del>3<sup>9</sup>/<sub>16</sub></del>	<del>11–10d</del>	<del>4–10d x 1<sup>1</sup>/<sub>2</sub></del>	<del>245</del>	<del>295</del>	<del>1,200</del>	<del>1,200</del>	<del>1,200</del>

For SI: 1 inch = 25.4 mm, 1 lbf = 4.5 N.

<sup>1</sup>Tabulated allowable loads must be selected based on duration of load as permitted by the applicable building code.

<sup>2</sup>The 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.

<sup>3</sup>Connectors must not be substituted for blocking to provide lateral stability or prevent rotation.

