

ICC-ES Evaluation Report

ESR-1866*

Reissued April 1, 2009

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

www.icc-es.org | (800) 423-6587 | (562) 699-0543

A Subsidiary of the International Code Council®

DIVISION: 06—WOOD AND PLASTICS
Section: 06090—Wood and Plastic Fastenings
REPORT HOLDER:
SIMPSON STRONG-TIE COMPANY, INC.
 5956 WEST LAS POSITAS BOULEVARD
 PLEASANTON, CALIFORNIA 94588
 (925) 560-9000
www.strongtie.com
EVALUATION SUBJECT:
**LBV, B, HB AND BA SERIES HANGERS FOR
 PREFABRICATED WOOD I-JOISTS, STRUCTURAL
 COMPOSITE LUMBER, AND SAWN TIMBER**
1.0 EVALUATION SCOPE
Compliance with the following codes:

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

Property evaluated:

Structural

2.0 USES

The Simpson Strong-Tie LBV, B, HB, and BA series top-flange hangers described in this report are used as wood framing connectors to support single or double prefabricated wood I-joists; structural composite lumber, such as laminated veneer lumber (LVL), parallel strand lumber (PSL), and laminated strand lumber (LSL); glulam beams; and sawn timber in accordance with Section 2304.9.3 of the IBC. The hangers 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 hangers are formed from a single constant-width piece of steel, into a joist hanger with triangular-shaped sides that bend over the header with rectangular top flanges. The joist hangers are formed from Nos. 14, 12, or 10 gage galvanized steel, as noted in this report, with a G90 zinc coating, into seat-type hangers that are nailed to the top and side of the header and to the sides of the joists.

3.1.1 LBV Series Hangers: The LBV series joist hanger is designed to support single or double I-joists and structural composite lumber that is 1.50 inches (38 mm) wide or wider. The joist hangers are formed from No. 14

gage galvanized steel. See Tables 1a and 1b for hanger seat width range, hanger height range, fastener schedules, and allowable loads.

3.1.2 B Series Hangers: The B series joist hanger is designed to support single or double I-joists and common structural composite lumber that is 1.75 inches (44 mm) wide and wider. The joist hangers are formed from No. 12 gage galvanized steel. See Tables 1a and 1b for hanger seat width range, hanger height range, fastener schedules, and allowable loads.

3.1.3 HB Series Hangers: The HB series joist hanger is designed to support single or double I-joists and common structural composite lumber that is 1.75 inches (44 mm) wide and wider. The joist hangers are formed from No. 10 gage galvanized steel. See Tables 1a and 1b for hanger seat width range, hanger height range, fastener schedules, and allowable loads.

3.1.4 BA Series Hangers: The BA series joist hanger is designed to support single or double I-joists and common structural composite lumber that is 1.50 inches (38 mm) wide and wider. The joist hangers are formed from No. 14 gage galvanized steel. See Tables 2a and 2b for hanger seat width range, hanger height range, fastener schedules, and allowable loads.

3.2 Materials:

3.2.1 Steel: The hangers described in this report are manufactured from galvanized sheet 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). Minimum base-metal thicknesses, exclusive of the corrosion protection material, for the hangers in this report are as follows:

NOMINAL THICKNESS (gage)	BASE-METAL THICKNESS (inch)
No. 10	0.1275
No. 12	0.0975
No. 14	0.0685

For SI: 1 inch = 25.4 mm.

The 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

*Revised June 2009

minimum specified coating weight of 2.0 ounces of zinc per square foot of surface area (600 g/m^2), total for both sides. Model numbers in this report do not include the Z or HDG ending, but the information shown applies. See Section 3.2.4 for issues related to steel hangers in contact with treated wood/ lumber.

3.2.2 Wood: Wood members with which the connectors are used must be either structural composite lumber (engineered lumber) or prefabricated wood I-joists with sawn lumber flanges or structural composite lumber flanges having a minimum flange thickness of $1\frac{1}{2}$ inches (38.1 mm), or sawn timber. Structural composite lumber must have a minimum equivalent specific gravity of 0.50 (minimum specific gravity of 0.50 for sawn lumber), and have a maximum moisture content of 16 percent (19 percent for sawn lumber) except as noted in Section 4.1. The thickness of the supporting wood member (header, beam, or ledger) 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. For installations in structural composite lumber, minimum allowable nail spacing and end distance as specified in the ICC-ES evaluation report for the applicable structural composite lumber must be met. Refer to Section 3.2.4 for issues related to treated wood.

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

COMMON NAIL SIZE	SHANK DIAMETER (inch)	LENGTH (inches)	F_{yb} (psi)
10d x $1\frac{1}{2}$	0.148	$1\frac{1}{2}$	90,000
10d	0.148	3	90,000
16d x $2\frac{1}{2}$	0.162	$2\frac{1}{2}$	90,000
16d	0.162	$3\frac{1}{2}$	90,000

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

3.2.4 Use with Treated Wood/Lumber: Connectors and fasteners used in contact with preservative-treated or fire-retardant-treated wood/lumber must comply with IBC Section 2304.9.5 or IRC Section R319.3, as applicable. The lumber treater or the holder of this report (Simpson Strong-Tie Company), or both, should be contacted for recommendations on the appropriate level of corrosion resistance to specify for the hangers and 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 sawn lumber 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® LBV, B, HB, and BA series hangers 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:

- 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.
- 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.
- Adjustment factors noted in Section 4.1 and the applicable codes must be considered, where applicable.
- Connected wood members and fasteners must comply, respectively, with Sections 3.2.2 and 3.2.3 of this report.
- Use of hangers and fasteners with preservative-treated or fire-retardant-treated lumber must be in accordance with Section 3.2.4 of this report.

6.0 EVIDENCE SUBMITTED

Data in accordance with applicable portions of the ICC-ES Acceptance Criteria for Joist Hangers and Similar Devices (AC13), dated October 2006 (corrected March 2007; editorially revised April 2008).

7.0 IDENTIFICATION

The products described in this report are identified with a stamp or label indicating the name of the manufacturer (Simpson Strong-Tie), the model number, and the number of the index evaluation report ([ESR-2523](#)) that is used as an identifier for products such as those recognized in this report.

TABLE 1a—ALLOWABLE DOWNLOADS FOR LBV, B, AND HB SERIES JOIST HANGERS

MODEL SERIES	HANGER DIMENSIONS (in.)			FASTENERS (Qty–Type)			ALLOWABLE DOWNLOAD ^{1,2} (lbs)		
	Joist Seat Width (W)	Height (H) Range	Top Flange Depth (TF)	Header		Joist ³	C _D = 1.0	C _D = 1.15	C _D = 1.25
				Top	Face				
LBV (min joist nails)	$1\frac{9}{16}'' \leq W < 2\frac{9}{16}''$	7"-30"	2½"	6-16d	4-16d	2-10d x 1½"	2,590	2,590	2,590
	$2\frac{9}{16}'' \leq W < 5\frac{1}{2}''$						2,590	2,590	2,590
	$W \geq 5\frac{1}{2}''$						2,460	2,460	2,460
LBV (max joist nails)	$1\frac{9}{16}'' \leq W < 2\frac{9}{16}''$	7"-30"	2½"	6-16d	4-16d	6-10d x 1½"	2,590	2,590	2,590
	$2\frac{9}{16}'' \leq W < 5\frac{1}{2}''$						2,590	2,590	2,590
	$W \geq 5\frac{1}{2}''$						2,460	2,460	2,460
B	$1\frac{9}{16}'' \leq W < 2\frac{9}{16}''$	7"-30"	2½"	6-16d	8-16d	6-10d x 1½"	3,640	3,640	3,640
	$2\frac{9}{16}'' \leq W < 7\frac{1}{8}''$					6-16d x 2½"	3,890	3,890	3,890
	$W \geq 7\frac{1}{8}''$					3,890	3,890	3,890	
HB	$1\frac{9}{16}'' \leq W < 2\frac{9}{16}''$	7"-30"	3	6-16d	16-16d	10-10d x 1½"	5,300	5,300	5,300
	$2\frac{9}{16}'' \leq W < 3\frac{9}{16}''$					10-16d x 2½"	5,735	5,735	5,735
	$W \geq 3\frac{9}{16}''$					10-16d	5,650	5,650	5,650

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

¹This table assumes supported joists have a minimum reference perpendicular-to-grain design value, F_{c⊥}, of 625 psi.

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

³Web stiffeners are required when more than two joist nails are used.

TABLE 1b—ALLOWABLE UPLIFT LOADS FOR LBV, B, AND HB SERIES JOIST HANGERS

MODEL SERIES	HANGER DIMENSIONS (in.)		FASTENERS (Qty–Type)			ALLOWABLE UPLIFT ¹ (lbs) C _D = 1.6
	Joist Seat Width (W)	Height (H) Range	Header		Joist	
			Top	Face		
LBV (min joist nails)	$W \geq 1\frac{9}{16}''$	7"-30"	6-16d	4-16d	2-10d x 1½"	265
LBV (max joist nails)	$W \geq 1\frac{9}{16}''$				6-10d x 1½"	895
B	$1\frac{9}{16}'' \leq W < 2\frac{9}{16}''$	7"-30"	6-16d	8-16d	6-10d x 1½"	990
	$W \geq 2\frac{9}{16}''$				6-16d x 2½"	1,010
HB	$1\frac{9}{16}'' \leq W < 2\frac{9}{16}''$	7"-30"	6-16d	16-16d	10-10d x 1½"	1,745
	$2\frac{9}{16}'' \leq W < 3\frac{9}{16}''$				10-16d x 2½"	2,610
	$W \geq 3\frac{9}{16}''$				10-16d	2,610

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

¹The uplift loads have been increased for wind or earthquake loading with no further increase is allowed. Reduce loads when other load durations govern.

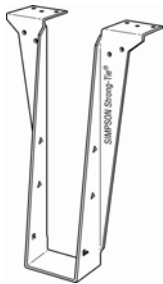


FIGURE 1a—LBV SERIES HANGER

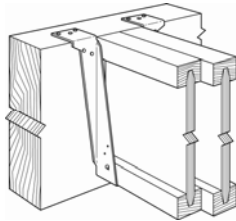


FIGURE 1b—TYPICAL LBV SERIES HANGER INSTALLATION

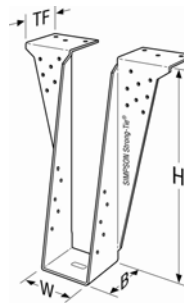


FIGURE 2—HB SERIES HANGER (B SERIES SIMILAR)



FIGURE 3—POSITIVE ANGLE NAILING (PAN) FOR LBV AND BA SERIES HANGERS

TABLE 2a—ALLOWABLE DOWNLOADS FOR BA SERIES JOIST HANGERS

MODEL SERIES	HANGER DIMENSIONS (in.)			FASTENERS (Qty–Type)			ALLOWABLE DOWNLOAD ^{1,2} (lbs)		
	Joist Seat Width (W) Range	Height (H) Range	Top Flange Depth (TF)	Header		Joist	C _D = 1.0	C _D = 1.15	C _D = 1.25
				Top	Face				
BA (min joist nails)	$1^{9/16} \leq W < 1^{13/16}$	7"-30"	2 1/2	6-16d	10-16d	2-10d x 1 1/2"	3,000	3,000	3,000
	$1^{13/16} \leq W \leq 5^{1/2}$						3,435	3,435	3,435
BA (max joist nails)	$1^{9/16} \leq W < 1^{13/16}$	7"-30"	2 1/2	6-16d	10-16d	8-10d x 1 1/2"	3,605	3,625	3,625
	$1^{13/16} \leq W \leq 5^{1/2}$						3,800	3,800	3,800

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

¹This table assumes supported joists have a minimum reference perpendicular-to-grain design value, F_{c⊥}, of 625 psi.

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

TABLE 2b—ALLOWABLE UPLIFT LOADS FOR BA SERIES JOIST HANGERS

MODEL SERIES	HANGER DIMENSIONS (in.)		FASTENERS (Qty–Type)			ALLOWABLE UPLIFT ¹ (lbs) C _D = 1.6
	Joist Seat Width (W)	Height (H) Range	Header		Joist	
			Top	Face		
BA (min joist nails)	$1^{9/16} \leq W \leq 5^{1/2}$	7"-30"	6-16d	10-16d	2-10d x 1 1/2"	265
BA (max joist nails)	$1^{9/16} \leq W \leq 5^{1/2}$				8-10d x 1 1/2"	1,170

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

¹The uplift loads have been increased for wind or earthquake loading with no further increase is allowed. Reduce loads when other load durations govern.

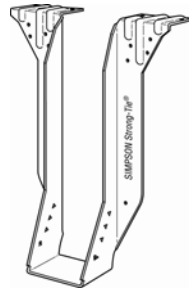


FIGURE 4a—BA SERIES HANGER

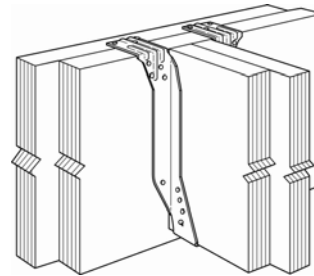


FIGURE 4b—TYPICAL BA SERIES HANGER INSTALLATION