ER - 0124

Used for Florida State Wide Product Approval

FL13872

Products on this Report which are approved:

Product	FL#	Product	FL#	Product	FL#	Product	FL#
CMST12	13872.1	LSTA15	13872.5	MSTI36	13872.2	S/HTT14	13872.16
CMST14	13872.1	LSTA18	13872.5	MSTI48	13872.2	S/JCT	13872.11
CMSTC16	13872.1	LSTA21	13872.5	MSTI60	13872.2	S/LBV	13872.11
CS14	13872.1	LSTA24	13872.5	MSTI72	13872.2	S/LTT20	13872.16
CS16	13872.1	LSTA30	13872.4	MTS12	13872.1	S/MST27	13872.2
CS18	13872.1	LSTA36	13872.4	MTS16	13872.1	S/MST37	13872.2
CS20	13872.1	LSTA9	13872.5	MTS18	13872.1	S/MST48	13872.2
CS22	13872.1	LSTI49	13872.4	MTS20	13872.1	S/MST60	13872.17
DSP	13872.19	LSTI73	13872.4	MTS24C	13872.1	S/MST72	13872.17
DTC	13872.2	LTP5	13872.6	MTS30	13872.1	SP4	13872.18
FHA12	13872.2	LTS12	13872.7	MTS30C	13872.1	SP6	13872.18
FHA18	13872.2	LTS16	13872.7	S/B	13872.11	SSP	13872.19
FHA24	13872.2	LTS18	13872.7	S/BA	13872.11	ST12	13872.8
FHA30	13872.2	LTS20	13872.7	S/H1A	13872.12	ST18	13872.8
FHA6	13872.2	MSTA12	13872.4	S/HD10B	13872.14	ST2115	13872.5
FHA9	13872.2	MSTA15	13872.4	S/HD10S	13872.13	ST2122	13872.5
HRS12	13872.2	MSTA18	13872.4	S/HD10S	13872.14	ST22	13872.8
HRS6	13872.2	MSTA21	13872.4	S/HD15B	13872.14	ST2215	13872.5
HRS8	13872.2	MSTA24	13872.4	S/HD15S	13872.13	ST292	13872.5
HTS16	13872.3	MSTA30	13872.8	S/HD15S	13872.14	ST6215	13872.8
HTS20	13872.3	MSTA36	13872.8	S/HD8B	13872.14	ST6224	13872.8
HTS24	13872.3	MSTA9	13872.4	S/HD8S	13872.13	ST6236	13872.9
HTS28	13872.3	MSTC28	13872.8	S/HD8S	13872.14	ST9	13872.8
HTS30	13872.3	MSTC40	13872.8	S/HDU11	13872.15	STC	13872.2
HTS30C	13872.3	MSTC52	13872.8	S/HDU4	13872.15	TBD22	13872.21
HTT4	13872.16	MSTC66	13872.9	S/HDU6	13872.15	TJC37	13872.22
HTT5	13872.16	MSTC78	13872.9	S/HDU9	13872.15	TSP	13872.19
LSTA12	13872.5	MSTI26	13872.2	S/HJCT	13872.11		

SIMPSON Strong-Tie®

SIMPSON STRONG-TIE COMPANY, INC.

EVALUATION REPORT

Report Number: 0124
Issued: 06/2010
Expires: 06/2011
Revised: 07/08/2010

DIVISION: 05—METALS
Section: 05090—Metal 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 CONNECTORS FOR COLD-FORMED STEEL CONSTRUCTION

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

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

1.2 Evaluated in accordance with:

- ICC-ES AC 261, Acceptance Criteria for Connectors Used With Cold-Formed Steel Structural Members, approved October 2004 (Editorially revised January 2008).

Property evaluated:

Structural

2.0 USES

Simpson Strong-Tie Connectors for Cold-Formed Steel (CFS) Construction may be used as CFS framing connectors in accordance with Section 104.11 and 2210.1 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 Product Information:

3.1.1 S/HDS and S/HDB Hold-downs: S/HD series hold-downs may be used to anchor CFS or structural steel member(s) to foundations or to connect upper story to lower story CFS or structural steel member(s) (floor-to-floor ties). They may also be used as anchorage of concrete and masonry walls to CFS or structural steel member(s) to provide lateral support for the walls in accordance with IBC 1604.8.

S/HDS series hold-downs use self-tapping screws to attach to the CFS or structural steel member(s). S/HDB series hold-downs use bolts to attach to the CFS or structural steel member(s). A round steel standard plate (W) washer conforming to ASME B18.22.1, Type A, shall be installed between the framing member bolt nut and the framing member.

The hold-down body for S/HD8S, S/HD10S, S/HD8B and S/HD10B are cold formed from No. 10 gage steel. S/HD15S and S/HD15B body are cold formed from No. 7 gage steel. The base plate for all model are fabricated from 1/2 inch thick steel. Reference Figure 1, Table 1A and Table 1B for dimensions, required fasteners and allowable loads.

3.1.2 S/HDU Hold-downs: S/HDU series hold-downs may be used to anchor CFS or structural steel member(s) to foundations or to connect upper story to lower story CFS or structural steel member(s) (floor-to-floor ties). They may also be used as anchorage of concrete and masonry walls to CFS or structural steel member(s) to provide lateral support for the walls in accordance with by IBC 1604.8.

S/HDU hold-downs consist of a pre-deflected body formed from No. 10 gage galvanized steel, and a base washer fabricated from No. 3 gage steel. S/HDU series hold-downs use self-tapping screws to attach to the CFS or structural steel member(s).

Reference Figure 2 and Table 2 for dimensions, required fasteners and loads

3.1.3 S/LTT Light Tension Ties: S/LTT series light tension ties may be used to anchor CFS member(s) to foundations or to connect upper story to lower story CFS member(s) (floor-to-floor ties). They may also be used as anchorage of concrete and masonry walls to CFS member(s) to provide lateral support for the walls in accordance with IBC 1604.8.

S/LTT light tension ties consist of a steel strap component with a 90 degree angle bend at the end and a base plate component installed in the bend. The body of the S/LTT20 is formed from No.12 gage galvanized steel. The base plate component for S/LTT's is No. 3 gage galvanized steel. Reference Figure 3 and Table 3 for product dimensions, required fasteners and allowable loads.

3.1.4 S/HTT and HTT Heavy Tension Ties: S/HTT and HTT series heavy tension ties may be used to anchor CFS member(s) to foundations or to connect upper story to lower story CFS member(s) (floor-to-floor ties). They may also be used as anchorage of concrete and masonry walls to CFS member(s) to provide lateral support for the walls in accordance with IBC 1604.8.

S/HTT and HTT heavy tension ties are formed from a single piece of steel and consist of a steel strap with a four-ply formed seat element as an anchor bolt attachment. The straight strap portion has pre-punched holes for installation of self-tapping screws used to connect the S/HTT and HTT to CFS member(s). The S/HTT and HTT are die-formed from No. 11 gage galvanized steel. Reference Figure 3 and Table 3 for product dimensions, required fasteners and allowable loads.

3.1.5 S/BA Joist Hangers: S/BA series hangers may be used to support a CFS joist. The hangers are die-formed from No. 14 gage galvanized steel. The hanger shall be attached onto CFS header sections using self-tapping screws. Alternatively, the hanger shall be attached by welding each top flange to the supporting member. Reference Figure 4 and Table 4 for dimensions, required fasteners and allowable loads.

3.1.6 S/B & S/LBV Joist Hangers: S/B and S/LBV series hangers may be used to support CFS joists. The hangers are formed from No. 12 gage and No. 14 gage galvanized steel for S/B and S/LBV, respectively. The hanger shall be attached onto a CFS supporting member using self-tapping screws or may have each top flange welded to the supporting member. Reference Figure 5 and Table 5 for dimensions, required fasteners and allowable loads.

3.1.7 S/JCT & S/HJCT Joist Hangers: S/JCT and S/HJCT hangers may be used to support CFS joists. The S/JCT and S/HJCT hangers are formed from No. 14 gage and No. 12 gage galvanized steel, respectively. The hanger shall be attached onto CFS supporting member using self-tapping screws or may have each top flange welded to the supporting member. The vertical flange of the hanger is fastened to the web of the joist using self-tapping screws. Alternatively, the hangers may be installed onto a supporting wood member with nails for S/JCT model series and with Simpson Strong-Tie SDS screws for the S/HJCT model series. Reference Figure 6 and Table 6 for dimensions, required fasteners and allowable loads.

3.1.8 TJC37 Truss Jack Connector: The TJC37 truss jack connector may be used for skewed members or to connect jack trusses to girder trusses. TJC37 is formed from No. 16 gage galvanized steel. It can be skewed from 0 degrees (perpendicular to the supporting member) to 67.5 degrees from the line perpendicular to the supporting member. When installing, position the jack truss on the inside bend line with the end of the jack truss flush with the bend line. Then bend the TJC37 to the desired position. Reference Figure 7 and Table 7 for dimensions, required fasteners and allowable loads.

3.1.9 TBD Truss Brace Diagonal: The TBD22 truss brace diagonal may be used to meet the temporary truss bracing recommendations of SBCA CFSBCSI. It is a flat strap that is formed into an A-shape as it is pulled from the carton to

provide rigidity and to prevent it sagging between the CFS trusses it braces during construction. The TBD is formed from No. 22 gage galvanized steel. Reference Figure 8 and Table 8 for dimensions, required fasteners and allowable loads.

3.1.10 S/H1A Hurricane Tie: The S/H1A hurricane tie may be used to tie a CFS rafter or truss chord to a CFS top track and wall stud. The hurricane tie is formed from No. 18 gage galvanized steel. Reference Figure 9 and Table 9 for dimensions, required fasteners and allowable loads.

3.1.11 LSTA & MSTA Strap Ties: LSTA and MSTA strap ties may be used to provide a tension connection between two CFS members. They are from 9 to 36 inches long and are 1-¼ inches wide. Each strap has one row of staggered pre-punched holes. The straps are manufactured from various gages of galvanized steel. Allowable loads, fastener requirements, and steel thicknesses are shown in Table 10. Refer to Figure 10 for further information.

3.1.12 MSTC Strap Ties: MSTC strap ties may be used to provide a tension connection between two CFS members. They are from 28-¼ to 77-¾inches long and are 3 inches wide. The straps have two rows of staggered pre-punched holes. They have countersunk fastener slots for a lower fastening profile, and coined edges for safer handling. The straps are manufactured from No. 16 gage and No. 14 gage of galvanized steel. Allowable loads, fastener requirements, and steel thicknesses are shown in Table 10. Refer to Figure 10 for further information.

3.1.13 S/MST Strap Ties: S/MST strap ties may be used to provide a tension connection between two CFS members. They are from 27 to 72 inches long and are 2-$^{1}/_{16}$ inches wide. Each strap has two rows pre-punched holes. The straps are manufactured from No. 12 gage and No. 10 gage of galvanized steel. Allowable loads, fastener requirements, and steel thicknesses are shown in Table 10. Refer to Figure 10 for further information.

3.1.14 LSTI & MSTI Strap Ties: LSTI and MSTI strap ties may be used to provide a tension connection between two CFS members. The LSTI strap ties are either 49 or 73 inches long and MSTI strap ties are from 26 to 72 inches long. The LSTI models are 3-¾ inches wide and the MSTI models are 2-$^{1}/_{16}$ inches wide. The LSTI and MSTI straps are manufactured from No. 18 gage and No. 12 gage galvanized steel, respectively. Allowable loads, fastener requirements, and steel thicknesses are shown in Table 10. Refer to Figure 10 for further information.

3.1.15 ST Strap Ties: ST strap ties may be used to provide a tension connection between two CFS members. They are manufactured in various widths and lengths. The straps are manufactured from various gages of galvanized steel. Allowable loads, fastener requirements, and steel thicknesses are shown in Table 10. Refer to Figure 10 for further information.

3.1.16 FHA Strap Ties: FHA strap ties may be use used to provide a tension connection between two CFS members. They have a corrugated shape with a total width of 1-$^{7}/_{16}$ inches. The straps are manufactured from No. 12 gage galvanized steel. Allowable loads, fastener requirements, and steel thicknesses are shown in Table 10. Refer to Figure 10 for further information.

3.1.17 HRS Heavy Strap Ties: HRS strap ties may be used to provide a tension connection between two CFS members. They are 1-$^{3}/_{8}$ inches wide. The straps are manufactured from No. 12 gage galvanized steel. Allowable loads, fastener requirements, and steel thicknesses are shown in Table 10. Refer to Figure 10 for further information.

3.1.18 CS, CMST, & CMSTC Coiled Strap Ties: CS, CMST and CMSTC Coil strap ties may be used to provide a tension connection between two CFS members. They are packaged in a coil so that the length of strap needed can be cut from the coil. The CS straps are 1-¼ inches wide. The CMST and CMSTC straps are 3 inches wide. The CMSTC has coined edges for safer handling. The straps are manufactured from various gages of

galvanized steel. Allowable loads, fastener requirements, and steel thicknesses are shown in Table 11. Refer to Figure 11 for further information.

3.1.19 LTS, MTS, MTSC, HTS, & HTSC Twist Straps: LTS, MTS, MTSC, HTS, & HTSC Twist Straps ties may be used to provide a tension connection between two CFS members. LTS light twist Strap, MTS medium twist strap, and HTS heavy twist straps have a formed bend so that the ends are oriented 90 degrees from each other. They are 1-¼ inches wide and the twist is located in the center of the strap, with the exception of the 30 inch long models. The twist straps are manufactured from various gages of galvanized steel. Allowable loads, fastener requirements, and steel thicknesses are shown in Table 12. Refer to Figure 12 for further information.

3.1.20 SP4 & SP6 Stud to Track Ties: The SP stud to track ties may be used to connect wall tracks to studs. They are formed from 20 gage galvanized steel. Reference Figure 13 and Table 13 for dimensions, required fasteners and allowable loads.

3.1.21 SSP & DSP Stud to Track Ties: SSP and DSP stud to track ties may be used to connect wall tracks to studs. The SSP is 1-⅜ inches wide for fastening to a single stud, while the DSP is 2-¾ inches wide for fastening to double studs. The SSP and DSP are formed from 18 gage galvanized steel. Reference Figure 14 and Table 14 for dimensions, required fasteners and allowable loads.

3.1.22 TSP Stud to Track Tie: TSP stud to track ties may be used to connect wall tracks and studs. It has a twist so that it fastens to the side of the stud. TSP is formed from 16 gage galvanized steel. Reference Figure 14 and Table 14 for dimensions, required fasteners and allowable loads.

3.1.23 LTP5 Lateral Tie Plate: The LTP5 lateral tie plate may be used to transfer shear between the top or bottom tracks to the rim joist or blocking, or between other parallel members. The LTP5 may be installed over structural wood panel sheathing or sheet steel sheathing to connect the bottom track of a wall to the rim joist or blocking. The LTP5 lateral tie plate is manufactured from 20 gage galvanized steel with embossments along the length. Reference Figure 15 and Table 15 for dimensions, required fasteners and allowable loads.

3.1.24 DTC & STC Truss Clips: DTC and STC truss clips may be used as alignment control between a roof truss and non gravity-load-bearing walls. The 1-½ inch slot permits vertical truss chord movement. DTC and STC connectors are formed from 18 gage galvanized steel. Reference Figure 16 and Table 16 for dimensions, required fasteners and allowable loads.

3.2 Materials:

3.2.1 Steel: The galvanized steel connectors described in this report are manufactured from steel complying with ASTM A 653 SS. The non-galvanized steel connectors comply with ASTM A 36 or ASTM A 1011. The steel used to fabricate the CFS connectors shown in this report comply with Connector Material Properties table on Table 17.

Connectors fabricated from steel complying with ASTM A 653 have a minimum G90 zinc coating specification. Some models may also be available with either a G185 zinc coating (designated with a model number ending in the letter Z) or with a batch hot-dipped galvanized coating (designated with a model number ending with the letters HDG) with a minimum specified coating weight of 2.0 ounces of zinc per square foot of surface area (610 g/m^2), total for both sides, in accordance with ASTM A 123. Model numbers in this report do not list 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 appropriately preservative treated or fire retardant treated lumber.

3.2.2 Cold-Formed Steel Members and Structural Members: Structural cold-formed steel framing members that are attached to the connectors shown in this report shall be in

accordance with the American Iron and Steel Institute (AISI) North American Specification for the Design of Cold-Formed Steel Structural Members (NAS) and evaluated to the IBC in an IAPMO ES or ICC-ES evaluation report. Structural steel members that are attached to the connectors shown in this report shall be in accordance with the AISC Specification for Structural Steel Buildings (360) or evaluated to the IBC in an IAPMO ES or ICC-ES evaluation report.

At a minimum, the material specification for structural cold-formed steel framing members that are attached to the connectors shown in this report must comply with ASTM A 1003. Loads in this report are based on CFS members with a minimum yield strength, Fy, of 33 ksi and a minimum tensile strength, Fu, of 45 ksi for 43 mil (18 gage) and thinner and a minimum yield strength, Fy, of 50 ksi and a minimum tensile strength, Fu, of 60 ksi for 54 mil (16 gage) and thicker.

Use of the connectors in this report with materials not meeting the requirements of this section is outside the scope of this report.

3.2.3 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). The thickness (depth) of the wood main member must be equal to or greater than the length of the fasteners specified in the tables in this report, unless the reduced penetration effect on the load calculation per the applicable National Design Specification for Wood Construction and its Supplement (NDS) is taken into account, or as required by wood member design, whichever is greater.

3.2.4 Fasteners: At a minimum, bolts shall comply with ASTM A 36 or A 307.

SDS screws shall comply with ICC-ES ESR-2236.

Self-tapping screw fasteners for steel-to-steel connections shall be in compliance with ASTM C 1513 or evaluated to the IBC in an IAPMO ES or ICC-ES evaluation report. Self-tapping screw fasteners shall extend through the steel connection a minimum of three (3) exposed threads in accordance with AISI General Provisions. The self-tapping screw fasteners used for connectors in this report shall comply with the following tabulated nominal diameters:

FASTENER	NOMINAL DIA. (in.)
No. 8	0.164
No. 10	0.190
No. 14	0.242
¼"	0.250

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

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

FASTENER	SHANK DIA (in.)	FASTENER LENGTH (in.)	Fyb (psi)
8d x 1½	0.131	1 ½	100,000
10d	0.148	3	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, as a minimum, comply with IBC Section 2304.9.5, or 2009 IRC Section R317.3 or 2006 IRC Section R319.3, as applicable. SDS screws used in contact with preservative-treated or fire-retardant-treated lumber must comply with ICC-ES ESR-2236. The lumber treater or this report holder (Simpson Strong-Tie Company), or both, should be contacted for recommendations on the minimum corrosion resistance protection 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 loads shown in the product tables of this report for cold-formed steel (CFS) members are based on Allowable Stress Design (ASD) and

Load Resistance Factor Design (LRFD) for tables 1A, 1B, 2 and 3 performed in accordance with the 2007 and 2001 AISI North American Specification for Design of Cold-Formed Steel Structural Members including the 2004 supplement (NAS).

4.1.1 Tabulated allowable strength design (ASD) loads for the connectors in this report are based on the least value of the following criterion:

1. The average test load under which 1/8 inch deflection occurs.

2. The average ultimate test load, divided by a safety factor, Ω, determined in accordance with NAS Chapter F.

3. Allowable loads for welds and allowable lateral loads for bolts, or screws for steel to steel connections calculated in accordance with NAS Section E2, E3 and E4, respectively.

4.1.2 Tabulated Load Resistance Factor Design (LRFD) loads for the holdown connectors (Table 1A, 1B, 2 and 3) in this report are based on the least value of the following criterion:

1. The average test load under which ¼ inch deflection occurs.

2. The average ultimate test load, multiplied by the resistance factor, Φ, determined in accordance with NAS Chapter F.

3. Design strength for welds and the lateral design strength for bolts or screws for steel-to-steel connections calculated in accordance NAS Section E2, E3 and E4, respectively.

Connected cold-formed steel members must be analyzed for load carrying capacity at the connection in accordance with the NAS.

For connectors attached to wood members, the allowable loads shown in this report are based on allowable stress design and include the load duration factor, C_D, corresponding with the applicable loads in accordance with the National Design Specification for Wood Construction and its supplement (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 tension 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 NDS.

The design of wood or steel members fastened to bolt or screw hold-down devices must consider combined stresses due to axial tension and flexural bending induced by eccentricity in the connection. Stresses shall be evaluated at the critical net section.

Connections (e.g., hold-downs) of a discontinuous system (e.g., shear wall) to the supporting member (e.g., beam) shall comply with ASCE 7 Section 12.3.3.3. Additional drift may occur, depending on the type of supporting member that is used, and shall be considered by the registered design professional.

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.

4.3 Special Inspection:

4.3.1 IBC: Periodic special inspection must be provided in accordance with Section 1707.3 with the exception of those structures that qualify under Section 1704.1.

4.3.2 IRC: Special inspections are not required.

5.0 CONDITIONS OF USE

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 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 statues of the jurisdiction in which the project is to be constructed.

5.3 Adjustment factors noted in Section 4.1 and the applicable codes shall be applied to allowable loads when warranted by the service conditions.

5.4 Connected steel members, connected wood members and fasteners must comply, respectively, with Sections 3.2.2, 3.2.3 and 3.2.4 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 3.2.4 of this report.

5.6 Simpson Strong-Tie Connectors for Cold-Formed Steel (CFS) Construction shall be fabricated at Simpson Strong-Tie facilities under a quality control program that meets or exceeds the Minimum Requirements for IAPMO ES Listee's Quality Assurance System.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Connectors Used With Cold-Formed Steel Structural Members (AC261), approved October 2004 (Editorially revised January 2008). Test results are from laboratories in compliance with ISO/IEC 17025.

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 the index evaluation report (ER-102) which identifies products recognized in this report.

IAPMO ES ™

Director of Evaluation Services

TABLE 1A – TENSION LOADS AND DISPLACEMENTS FOR S/HDS AND S/HDB SERIES HOLD-DOWNS

Model	Height (in)	Fasteners		Framing Member(s)[5] No.-Mil (ga)	ASD		LRFD		Nominal Tension Load[8] (lbs)
		Anchor Bolt Dia.[1,2] (in)	Framing Fasteners		Tension Load (lbs)	Displacement at ASD Load[7] (in)	Tension Load (lbs)	Displacement at LRFD Load[7] (in)	
S/HD8S	11	7/8	17 - #14 Screws[3]	2-33 (2-20ga)	7335	0.120	11715	0.204	13720
				2-43 (2-18ga)	8750	0.086	13975	0.146	21435
				2-54 (2-16ga)	8855	0.106	14145	0.162	21700
				1-97 (1-12ga) PACO[6]	11030	0.091	17620	0.146	27025
				Steel Fixture	10840	0.053	17335	0.072	32525
S/HD10S	13½	7/8	22 - #14 Screws[3]	2-33 (2-20ga)	7400	0.122	11815	0.192	13835
				2-43 (2-18ga)	11120	0.112	17755	0.124	20795
				2-54 (2-16ga)	12220	0.096	19520	0.145	29940
				1-97 (1-12ga) PACO[6]	14840	0.085	23705	0.148	34135
				Steel Fixture	12375	0.043	19820	0.061	33535
S/HD15S	17	1	30 - #14 Screws[3]	2-43 (2-18ga)	12110	0.096	19340	0.164	22645
				2-54 (2-16ga)	13500	0.110	21565	0.130	33075
				1-97 (1-12ga) PACO[6]	16420	0.078	26230	0.135	40230
				Steel Fixture	15810	0.043	25320	0.065	42845
S/HD8B	11	7/8	2 - ¾" Dia. Bolts[4]	2-33 (2-20ga)	3895	0.081	5620	0.144	8645
				2-43 (2-18ga)	5345	0.098	7710	0.146	11865
				2-54 (2-16ga)	8950	0.082	14280	0.141	20310
				1-97 (1-12ga) PACO[6]	8090	0.088	12905	0.167	18370
				Steel Fixture	9080	0.069	14545	0.104	22975
S/HD10B	13½	7/8	3 - ¾" Dia. Bolts[4]	2-33 (2-20ga)	5840	0.070	8430	0.124	12970
				2-43 (2-18ga)	8015	0.087	11565	0.120	17795
				2-54 (2-16ga)	12090	0.125	19720	0.230	28050
				1-97 (1-12ga) PACO[6]	13385	0.912	19355	0.119	28905
				Steel Fixture	15635	0.102	24955	0.123	35495
S/HD15B	17	1	4 - ¾" Dia. Bolts[4]	2-43 (2-18ga)	10690	0.118	15425	0.179	22165
				2-54 (2-16ga)	16020	0.090	25565	0.121	36360
				1-97 (1-12ga) PACO[6]	17850	0.103	25805	0.130	39700
				Steel Fixture	18690	0.104	29825	0.139	42425

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

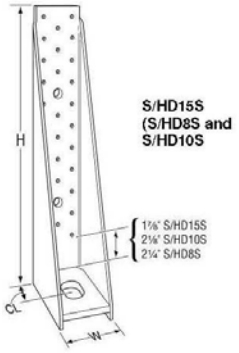
1. The Designer shall specify the foundation anchor material type, embedment and configuration. Some of the tabulated hold-down tension loads exceed the tension strength of typical ASTM A 36 or A 307 anchor bolts.
2. A foundation anchor bolt washer is not required.
3. 1/4-inch self-tapping screws may be substituted for #14 self-tapping screws.
4. A round steel standard plate washer conforming to Section 3.1.1 of this report is required to be installed between the framing member bolt nut and the framing member for the S/HDB series hold-downs.
5. The Designer shall specify and detail the connection of the back-to-back full height framing members.
6. PACO columns are manufactured by PACO Steel & Engineering Corp. See ICC-ES NER-706.
7. Hold-down displacement at tabulated ASD and LRFD loads is the difference in the displacement measured between the anchor bolt and back of the hold-down that's attached to the framing member(s) when loaded to the ASD and LRFD static test load, respectively. Deflection includes fastener slip, holdown elongation and anchor bolt elongation (L=4").
8. The Nominal Tension Load is the average ultimate (peak) load from tests in accordance with AISI NAS Chapter F. When hold-downs are used in CFS framed shear walls or diagonal strap braced walls with an R-factor greater than 3, the AISI Lateral Design Section C5 requires hold-downs in shear walls have the nominal strength to resist the lesser of the amplified seismic load or the load the system can deliver and hold-downs in diagonal strap braced walls have the nominal strength to resist the lesser of the amplified seismic load or the expected yield strength of the diagonal strap bracing member.

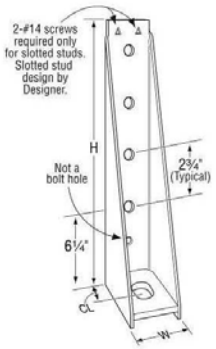
TABLE 1B – TENSION LOADS FOR S/HDS SERIES HOLD-DOWNS ATTACHED TO DIETRICH STUD[1]

Model	Height (in)	Fasteners		Dietrich Stud Thickness[2] mil (ga)	ASD		LRFD		Nominal Tension Load[8] (lbs)
		Anchor Bolt Dia. (in)	Stud Fasteners		Tension Load (lbs)	Displacement at ASD Load[7] (in)	Tension Load (lbs)	Displacement at LRFD Load[7] (in)	
S/HD8S	11	7/8	17 - #14	33 (20ga)	3080	0.075	4920	0.124	5760
				43 (18ga)	4125	0.101	6590	0.177	7720
				54 (16ga)	7285	0.098	11160	0.173	13925
				68 (14ga)	7285	0.085	11160	0.141	17855
				97 (12ga)	10065	0.100	16075	0.147	24655
S/HD10S	13½	7/8	22 - #14	43 (18ga)	5060	0.059	8085	0.100	9465
				54 (16ga)	8675	0.095	13855	0.162	16220
				68 (14ga)	8840	0.088	14120	0.147	21655
				97 (12ga)	12225	0.088	19530	0.143	29955
S/HD15S	17	1	30 - #14	68 (14ga)	13495	0.087	21550	0.147	25235
				97 (12ga)	14025	0.096	22400	0.142	34355

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

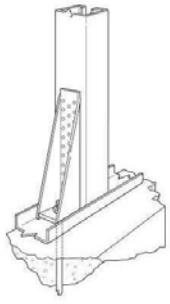
1. See footnotes under Table 1A excluding footnotes 4, 5 and 6.
2. Dietrich Stud manufactured by Dietrich Industries, Inc. See ICC-ES ESR-2374.



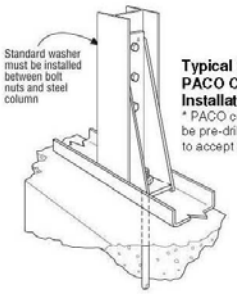


S/HD15B

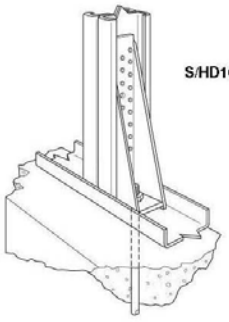
Model	W (in)	CL (in)
S/HD8S and S/HD8B	2 5/16	1½
S/HD10S and S/HD10B	2 5/16	1½
S/HD15S and S/HD15B	2 7/16	1⅜



Typical S/HDS
Dietrich Stud Installation



Typical S/HD10B
PACO Column
Installation
* PACO column can be pre-drilled ready to accept S/HDB



S/HD10S

FIGURE 1 – S/HDS AND S/HDB HOLD-DOWNS

TABLE 2 – TENSION LOADS AND DISPLACEMENTS FOR S/HDU SERIES HOLD-DOWNS

Model	Height (in.)	Fasteners		Framing Member(s)[5] No.-mil (ga)	ASD		LRFD		Nominal Tension Load[7] (lbs)
		Anchor Bolt Dia[1,2] (in)	Framing Fasteners[4]		Tension Load (lbs)	Displacement at ASD Load[6] (in)	Tension Load (lbs)	Displacement at LRFD Load[6] (in)	
S/HDU4	7 7/8	5/8	6-#14	2-33 (2-20ga)	2320	0.093	3705	0.149	5685
				2-43 (2-18ga)	3825	0.115	6105	0.190	9365
				2-54 (2-16ga)	3970	0.093	6345	0.156	9730
				Steel Fixture	4470	0.063	7165	0.103	12120
S/HDU6	10 9/8	5/8	12-#14	2-33 (2-20ga)	4895	0.125	8495	0.250	10470
				2-43 (2-18ga)	6125	0.119	9690	0.250	15460
				2-54 (2-16ga)	6125	0.108	9785	0.234	15005
				Steel Fixture	5995	0.060	9580	0.136	14695
S/HDU9	12 7/8	1	18-#14	2-33 (2-20ga)	6965	0.103	11125	0.189	13165
				2-43 (2-18ga)	9255	0.125	15485	0.250	21810
				2-54 (2-16ga)	9990	0.106	15960	0.225	24480
				Steel Fixture	12715	0.125	20510	0.177	31455
S/HDU11	16 5/8	1	27-#14	2-33 (2-20ga)	6965	0.103	11125	0.189	13165
				2-43 (2-18ga)	9595	0.096	15330	0.162	23515
				2-54 (2-16ga)	9675	0.110	15460	0.158	23710
		1 w/ heavy hex nut[3]	27-#14	2-43 (2-18ga)	11100	0.125	17500	0.250	24955
				2-54 (2-16ga)	12175	0.125	19445	0.243	29825
				Steel Fixture	12945	0.111	20680	0.163	31715

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

1. The Designer shall specify the foundation anchor material type, embedment and configuration. Some of the tabulated hold-down tension loads exceed the tension strength of typical ASTM A 36 or A 307 anchor bolts.
2. A foundation anchor bolt washer is not required.
3. A heavy hex nut for the anchor bolt is required to achieve the table loads for S/HDU11.
4. 1/4-inch self-tapping screws may be substituted for #14 self-tapping screws.
5. The Designer shall specify and detail the connection of the back-to-back full height framing members.
6. Hold-down displacement at tabulated ASD and LRFD loads is the difference in the displacement measured between the anchor bolt and back of the hold-down that's attached to the framing member(s) when loaded to the ASD and LRFD static test load, respectively. Deflection fastener slip, holdown elongation and anchor bolt elongation (L=4").
7. The Nominal Tension Load is the average ultimate (peak) load from tests in accordance with AISI NAS Chapter F. When hold-downs are used in CFS framed shear walls or diagonal strap braced walls with an R-factor greater than 3, the AISI Lateral Design Section C5 requires hold-downs in shear walls have the nominal strength to resist the lesser of the amplified seismic load or the load the system can deliver and hold-downs in diagonal strap braced walls have the nominal strength to resist the lesser of the amplified seismic load or the expected yield strength of the diagonal strap bracing member.

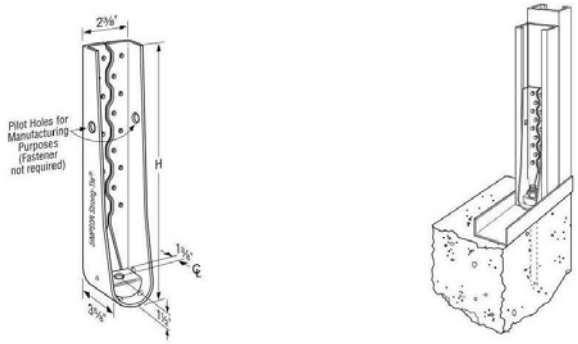


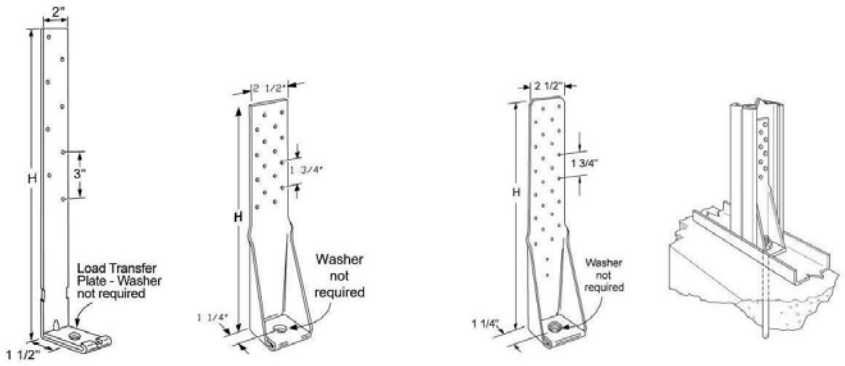
FIGURE 2 – S/HDU HOLD-DOWN

TABLE 3 – TENSION LOADS AND DISPLACEMENTS FOR S/LTT, S/HTT, AND HTT SERIES HOLD-DOWNS

Model	Height (in)	Fasteners		Framing Member(s)[3] No.-mil (ga)	ASD		LRFD		Nominal Tension Load [5] (lbs)
		Anchor Bolt Dia.[2] (in)	Framing Fasteners		Tension Load (lbs)	Displacement at ASD Load[4] (in)	Tension Load (lbs)	Displacement at LRFD Load[4] (in)	
S/LTT20	20	1/2	8 - #10	1-33 (1-20ga)	1200	0.125	1890	0.250	4625
S/HTT14	15	5/8	16 - #10	1-33 (1-20ga)	2775	0.108	4430	0.172	6800
				2-33 (2-20ga)	3850	0.125	6700	0.250	11590
HTT4	12⅜	5/8	18 - #10	1-33 (1-20ga)	3180	0.104	4770	0.187	8215
				2-33 (2-20ga)	4395	0.125	6675	0.250	11835
HTT5	16	5/8	26 - #10	1-43 (1-18ga)	4240	0.125	6505	0.250	11585
				2-43 (2-18ga)	4670	0.125	6970	0.250	12195
				1-54 (1-16ga)	4150	0.125	6425	0.250	12365

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

1. Designer shall specify the foundation anchor material type, embedment and configuration.
2. Foundation anchor bolt washer is not required.
3. The Designer shall specify and detail the connection of the back-to-back full height studs when occurs.
4. Hold-down displacement at tabulated ASD and LRFD loads is the difference in the displacement measured between the anchor bolt and back of the hold-down that's attached to the framing member(s) when loaded to the ASD and LRFD static test load, respectively. Deflection fastener slip, holdown elongation and anchor bolt elongation (L=4").
5. The Nominal Tension Load is the average ultimate (peak) load from tests in accordance with AISI NAS Chapter F. When hold-downs are used in CFS framed shear walls or diagonal strap braced walls with an R-factor greater than 3, the AISI Lateral Design Section C5 requires hold-downs in shear walls have the nominal strength to resist the lesser of the amplified seismic load or the load the system can deliver and hold-downs in diagonal strap braced walls have the nominal strength to resist the lesser of the amplified seismic load or the expected yield strength of the diagonal strap bracing member.



S/LTT20 S/HTT14 HTT5 (HTT4 Similar) Typical S/HTT14 Installation

FIGURE 3 – S/LTT AND S/HTT HOLD-DOWNS

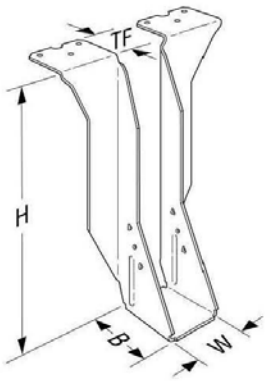
TABLE 4 – ALLOWABLE LOADS FOR THE S/LBV & S/B SERIES JOIST HANGERS

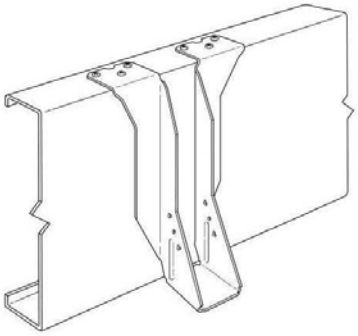
Model No.	Dimensions (in)		Fasteners		Allowable Downloads (lbs)
	B	TF	Top	Joist	
S/BA - Screw	3	2½	6 - #10 screws	1 - #10	3475
S/BA - Weld			4 - 1/8" x 2" fillet weld	1 - #10	2920

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

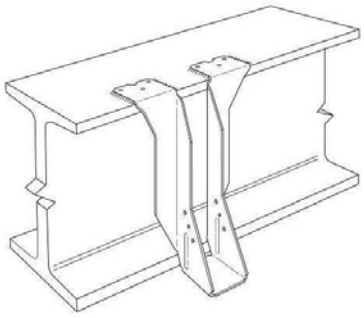
1. Designer shall insure that the joist member adequately transfers load to the hanger.
2. CFS / Steel Beam header must be braced to prevent buckling per Designer specification.
3. S/BA may be used for weld-on applications; a minimum of ⅛ inch x 2inch fillet weld on each top flange (4 welds total) is required. Distribute the weld equally on both top flanges. Consult the code for special considerations when welding galvanized steel.
4. Loads are based on the supporting member providing a minimum 2-1/2 inch bearing area for the S/BA top flange (TF) as well as a minimum CFS header and a minimum 68 mil (14ga) joist thickness.

S/BA Series Model No.	W (in)	H (in)
S/BA2.12/8	2⅛	8
S/BA2.12/10		10
S/BA2.12/12		12
S/BA2.12/14		14
S/BA4.18/8	4 3/16	8
S/BA4.18/10		10
S/BA4.18/12		12
S/BA4.18/14		14





S/BA Installation to a CFS Header



S/BA Weld-on Applications

FIGURE 4 – S/BA JOIST HANGER

TABLE 5 – ALLOWABLE LOADS FOR THE S/LBV & S/B SERIES JOIST HANGERS

Model No.	Dimensions (in)			Fasteners			Allowable Loads (lbs)		
							Uplift	Download	
	W	H	B	Top	Face	Joist	97 mil (12 ga)	97 mil (12 ga)	Welded
S/B	See Table	6 to 30	3 to 5	8-#10	4-#14	3-#14	1855	5970	-
S/B - Skew				8-#10	4-#14	3-#14	1855	4195	-
S/B - Weld				Weld	-	3-#14	-	-	5755

Model No.	Dimensions (in)			Fasteners			Allowable Loads (lbs)		
							Uplift	Download	
	W	H	B	Top	Face	Joist	68 mil (14 ga)	68 mil (14 ga)	Welded
S/LBV	See Table	6 to 20	2-1/4	4-#10	2-#10	3-#10	1010	3150	-
S/LBV - Skew				4-#10	2-#10	3-#10	1010	2220	-
S/LBV - Weld				Weld	-	3-#10	-	-	2965

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

S/B Series Model No.	S/LBV Series Model No.	Width (inch)
S/B1.56	S/LBV1.56	1 9/16
S/B1.81	S/LBV 1.81	1 13/16
S/B2.06	S/LBV 2.06	2 1/16
S/B2.37	S/LBV 2.37	2 3/8
S/B2.56	S/LBV 2.56	2 9/16
S/B2.68	S/LBV 2.68	2 11/16
S/B3.12	S/LBV 3.12	3 1/8
S/B3.56	S/LBV 3.56	3 9/16
S/B3.62	S/LBV 3.62	3 5/8
S/B4.06	S/LBV 4.06	4 1/16
S/B4.12	S/LBV 4.12	4 1/8
S/B4.28	S/LBV 4.28	4 9/32
S/B4.75	S/LBV 4.75	4 3/4
S/B5.50	S/LBV 5.50	5 1/2

1. Designer shall insure that the joist member adequately transfers load to the hanger.
2. Steel header must be braced to prevent buckling per Designer specification.
3. S/LBV and S/B may be used for weld-on applications; a minimum of ⅛ inch x 2 inch fillet weld on each top flange is required. Distribute the weld equally on both top flanges. Consult the code for special considerations when welding galvanized steel. Uplift loads do not apply.
4. S/LBV and S/B series can be skewed to a maximum of 45°.

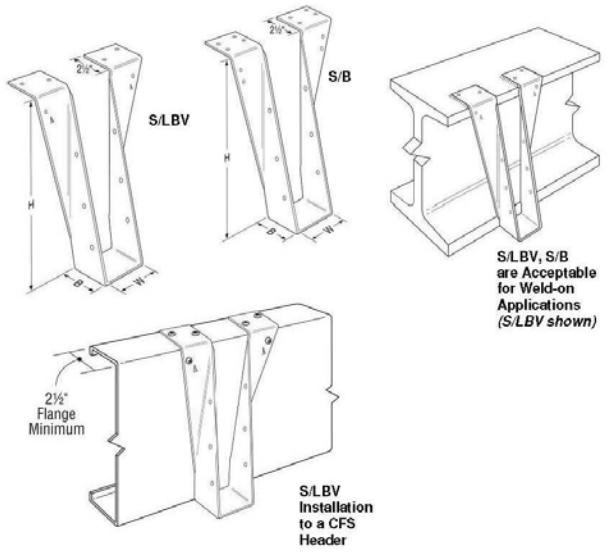


FIGURE 5 – S/LBV & S/B JOIST HANGERS

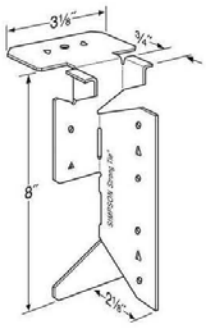
TABLE 6 – ALLOWABLE LOADS FOR THE S/HJCT & S/JCT SERIES JOIST HANGERS

Model No.	Steel Header				
	Fasteners			Allowable Load (lbs)	
	Top	Face	Joist	Uplift	Download
Straight Hanger					
S/JCT (min)	1-#10	2-#10	4-#10	940	1195
S/JCT (max)	1-#10	4-#10	6-#10	1435	2105
S/HJCT (min)	2-#10	4-#14	6-#14	1510	2920
S/HJCT (max)	2-#10	8-#14	9-#14	1670	3855
Skewed Hanger					
S/JCT (min)	1-#10	2-#10	4-#10	940	1135
S/JCT (max)	1-#10	4-#10	6-#10	940	1185
S/HJCT	2-#10	4-#10	6-#14	1510	2305
Welded Hanger [6]					
S/JCT	1/8" x 2 ½" fillet weld to each side of top flange		4-#10	-	940
S/HJCT			4-#14	-	1450
S/HJCT Skew			4-#14	-	1235

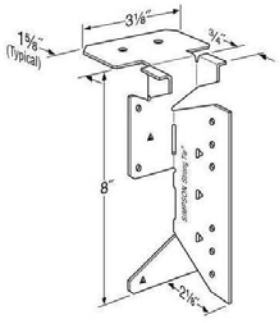
Model No.	Wood Header				
	Fasteners			Allowable Load [2] (lbs)	
	Top	Face	Joist	Uplift $C_D = 1.6$	Download $C_D = 1.0$
Straight Hanger					
S/JCT (min)	1-10d	2-10d	4-#10	565	945
S/JCT (max)	1-10d	4-10d	6-#10	960	1465
S/HJCT (min)	2-10d	4-SDS ¼ x 3	6-#14	1210	2625
S/HJCT (max)	2-10d	8-SDS ¼ x 3	9-#14	1475	2980
Skewed Hanger					
S/JCT (min)	1-10d	2-10d	4-#10	395	845
S/JCT (max)	1-10d	4-10d	6-#10	790	1300
S/HJCT	2-10d	4-SDS ¼ x 3	6-#14	1210	1935

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

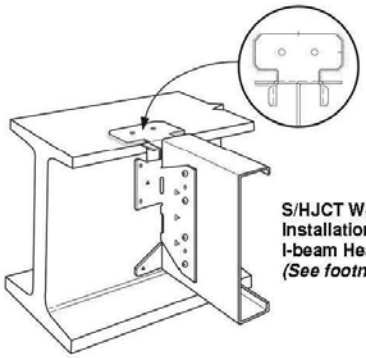
1. Allowable loads for CFS members are based on a single 54 mil (16 ga) CFS member.
2. Allowable loads for wood headers are base on a minimum 4x12 DF-L wood member.
3. CFS / Steel Beam header must be braced to prevent web buckling per Designer specification.
4. CFS joist shall be laterally braced per Designer specification.
5. Self-tapping screws shall be installed from the hanger into the joist using joist hanger holes.
6. Backing in the steel beam cavity behind the hanger is not required to obtain tabulated loads.



S/JCT

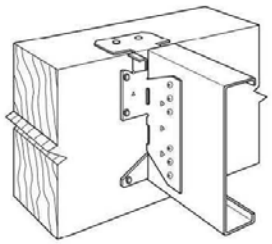


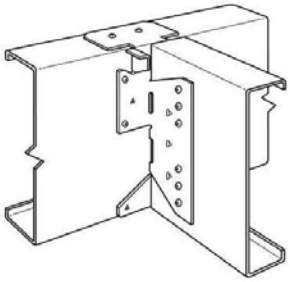
S/HJCT



S/HJCT Weld-on Installation to an I-beam Header *(See footnote #6)*

S/HJCT Installation to a 4x10 Wood Header





S/HJCT Installation to a CFS Header

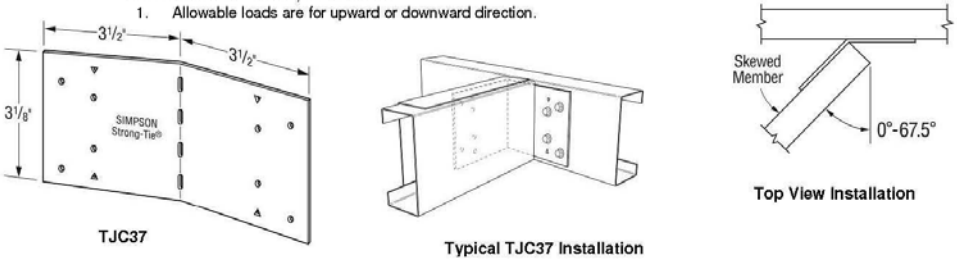
FIGURE 6 – S/HJCT & S/JCT JOIST HANGERS

TABLE 7 – ALLOWABLE LOADS FOR TJC CONNECTOR

Model No.	Fasteners		Allowable Loads (lbs) 43 mil (18ga)		
	Carrying Member	Carried Member	0° (No Skew)	1°–60° Skew	61°–67.5° Skew
TJC37 (Min)	4-#10	4-#10	660	565	475
TJC37 (Max)	6-#10	6-#10	680	630	530

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

1. Allowable loads are for upward or downward direction.



TJC37

Typical TJC37 Installation

Top View Installation

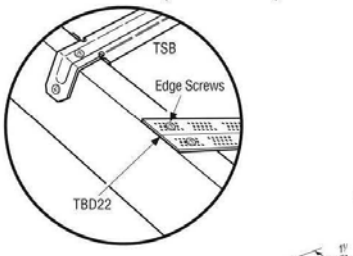
FIGURE 7 – TJC CONNECTOR

TABLE 8 – ALLOWABLE TENSION LOADS FOR TBD TRUSS BRACE DIAGONAL

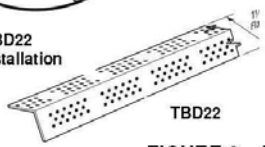
Model No.	Fasteners		Allowable Tension Loads (lbs)	
	Strap Ends	Intermediate Trusses	Framing Member Thickness mil (ga)	
			27 mil (22 ga)	33 mil (20 ga)
TBD22	2 - #10	2 - #10	380	510

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

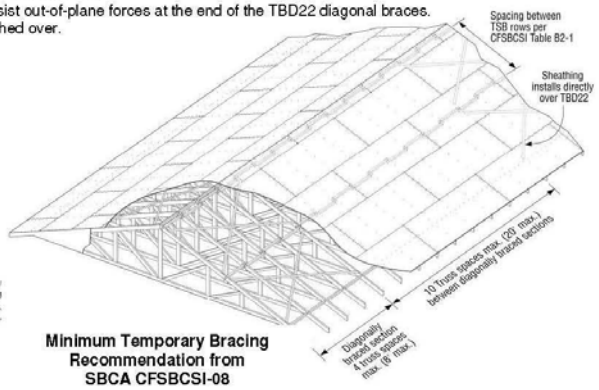
1. Load based on CFS trusses with a minimum yield strength, F_y, of 50 ksi and a minimum ultimate strength, F_u, of 65 ksi. Load shall be reduced proportionally for lower steel strength (actual strength / specified strength).
2. Screws shall be installed into the dimpled areas and placed to maintain a minimum of 1/4 inch strap edge distance and a minimum of ½" center to center and end distance. A minimum of 5/8 inch (3D) edge distance is to be maintained for the truss members.
3. TBD22 straps are to be installed at approximate 45-degree angles.
4. Straps shall be installed tight.
5. To resist construction forces, diagonal x-bracing is required at each end and every 10 truss spaces (20 ft max). Reference SBCA CFSBCSI-08 for more information.
6. Trusses shall be laterally braced to resist out-of-plane forces at the end of the TBD22 diagonal braces.
7. TBD22 diagonal braces may be sheathed over.



Typical TBD22 Top Chord Installation



TBD22



Minimum Temporary Bracing Recommendation from SBCA CFSBCSI-08

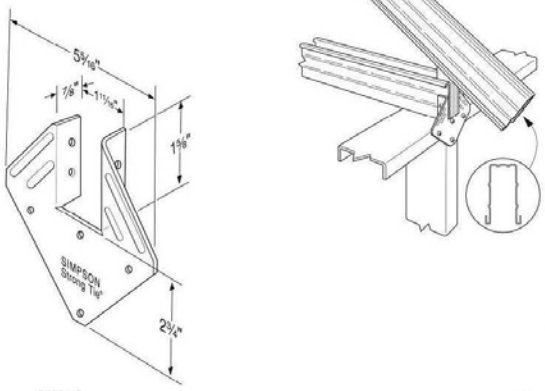
FIGURE 8 – TBD TRUSS BRACE DIAGONAL

TABLE 9 – ALLOWABLE LOADS FOR THE S/H1A HURRICANE TIE

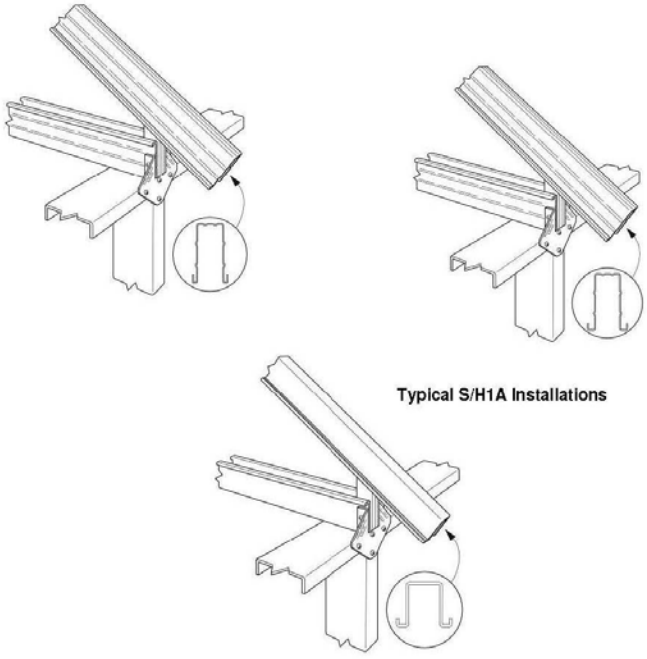
Model No.	Fasteners			Framing Member Thickness mil (ga)	Allowable Uplift Loads (lbs)		
					Track / Wall Stud Thickness		
	Truss	Track	Stud		33 mil (20 ga)	43 mil (18 ga)	54 mil (16 ga)
S/H1A	4-#10	3-#10	1-#10	27 (22 ga)	470	470	470
	4-#10	3-#10	1-#10	33 (20 ga)	510	550	690
	4-#10	3-#10	1-#10	43 (18 ga)	510	550	690
	4-#10	3-#10	1-#10	54 (16 ga)	520	675	850

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

1. S/H1A does not replace solid blocking.
2. Load based on CFS trusses with a minimum yield strength, F_y, of 50 ksi and a minimum yield strength, F_u, of 65 ksi. Load shall be reduced proportionally for lower steel strength (actual strength / specified strength).
   For example: 43 mil (18 ga) thick CFS truss with F_y=33 ksi and F_u=45 ksi and connected to a 43 mil track and wall stud. The adjusted allowable load would be 550 lbs. x minimum [$^{33}/_{50}$ or $^{45}/_{65}$] = 363 lbs.
3. Minimum 1 - #8 screw is required to attach top track to wall stud on the opposite side of S/H1A connector. This may be the typical track to stud screw connection.



S/H1A



Typical S/H1A Installations

FIGURE 9 – S/H1A HURRICANE TIE

TABLE 10 – ALLOWABLE TENSION LOADS FOR STRAPS

Model No.	Material Thick. mil (ga)	Dimensions (in)		Fasteners (Total) Framing Member Thickness			Allowable Tension Loads (lbs)		
		W	L	33 mil (20ga)	43 mil (18 ga)	54 mil (16 ga)	33 mil (20ga)	43 mil (18 ga)	54 mil (16 ga)
LSTA9	33 (20 ga)	1 ¼	9	8- #10	8 -#10	8- #10	705	1120	1190
LSTA12		1 ¼	12	10- #10	10- #10	8- #10	885	1190	1190
LSTA15		1 ¼	15	12- #10	12- #10	10 -#10	1060	1190	1190
LSTA18		1 ¼	18	14- #10	12 -#10	10- #10	1190	1190	1190
LSTA21		1 ¼	21	14- #10	12- #10	10- #10	1190	1190	1190
LSTA24		1 ¼	24	14- #10	12- #10	10- #10	1190	1190	1190
ST292		2 1/16	9 5/16	12- #10	10- #10	10- #10	1060	1240	1240
ST2122		2 1/16	12 13/16	16- #10	12- #10	10- #10	1415	1500	1500
ST2115		¾	16 5/16	8- #10	6- #10	4- #10	630	630	630
ST2215		2 1/16	16 5/16	20- #10	14- #10	10- #10	1765	1825	1825
LSTA30	43 (18 ga)	1 ¼	30	18- #10	12- #10	10- #10	1555	1555	1555
LSTA36		1 ¼	36	18- #10	16- #10	14- #10	1555	1555	1555
LSTI49		3 ¾	49	32- #10	32- #10	20- #10	2830	4050	4050
LSTI73		3 ¾	73	46- #10	32- #10	20- #10	4050	4050	4050
MSTA9		1 ¼	9	8- #10	8- #10	8- #10	705	1050	1555
MSTA12		1 ¼	12	10- #10	10- #10	8- #10	885	1315	1555
MSTA15		1 ¼	15	12- #10	12- #10	10- #10	1060	1555	1555
MSTA18		1 ¼	18	14- #10	12- #10	10- #10	1235	1555	1555
MSTA21		1 ¼	21	16- #10	12- #10	10- #10	1415	1555	1555
MSTA24		1 ¼	24	18- #10	12- #10	10- #10	1555	1555	1555
MSTA30	54 (16 ga)	1 ¼	30	22- #10	16- #10	12- #10	1945	1950	1950
MSTA36		1 ¼	36	24- #10	18- #10	16- #10	1950	1950	1950
ST6215		2 1/16	16 15/16	20- #10	16- #10	10- #10	1765	2025	2025
ST6224		2 1/16	23 5/16	28- #10	20- #10	12- #10	2455	2455	2455
ST9		1 ¼	9	8- #10	8- #10	8- #10	705	1050	1350
ST12		1 ¼	11 5/8	10- #10	10- #10	8- #10	885	1315	1350
ST18		1 ¼	17 ¾	14- #10	12- #10	12- #10	1235	1350	1350
ST22		1 ¼	21 5/8	20- #10	20- #10	20- #10	1350	1350	1350
MSTC28		3	28 ¼	36- #10	36- #10	30- #10	3180	4600	4600
MSTC40		3	40 ¼	52- #10	46- #10	46- #10	4595	4600	4600
MSTC52		3	52 ¼	54- #10	42- #10	42- #10	4600	4600	4600
MSTC66	68 (14 ga)	3	65 ¾	66- #10	46- #10	30- #10	5795	5795	5795
MSTC78		3	77 ¾	66- #10	46- #10	30- #10	5795	5795	5795
ST6236		2 1/16	33 13/16	40- #10	30- #10	18- #10	3535	3760	3760
HRS6	97 (12 ga)	1 3/8	6	6- #10	6- #10	6- #10	530	790	1600
HRS8		1 3/8	8	10- #10	10- #10	10- #10	885	1315	2670
HRS12		1 3/8	12	14- #10	14- #10	12- #10	1235	1840	2710
FHA6		1 7/16	6 3/8	8- #10	8- #10	8- #10	705	1050	2045
FHA9		1 7/16	9	8- #10	8- #10	8- #10	705	1050	2045
FHA12		1 7/16	11 5/8	8- #10	8- #10	8- #10	705	1050	2045
FHA18		1 7/16	17 ¾	8- #10	8- #10	8- #10	705	1050	2045
FHA24		1 7/16	23 7/8	8- #10	8- #10	8- #10	705	1050	2045
FHA30		1 7/16	30	8- #10	8- #10	8- #10	705	1050	2045
MSTI26		2 1/16	26	26- #10	26- #10	22- #10	2300	3420	5025
MSTI36		2 1/16	36	36- #10	36- #10	22- #10	3180	4735	5025
MSTI48		2 1/16	48	48- #10	40- #10	22- #10	4240	5025	5025
MSTI60		2 1/16	60	58- #10	40- #10	22- #10	5025	5025	5025
MSTI72		2 1/16	72	62- #10	58- #10	54- #10	5025	5025	5025
S/MST27		2 1/16	27	30- #10	30- #10	22- #10	2650	3945	5025
S/MST37		2 1/16	37 ½	42- #10	40- #10	22- #10	3710	5025	5025
S/MST48		2 1/16	48	54- #10	40- #10	24- #10	4770	5155	5155
S/MST60	118 (10 ga)	2 1/16	60	68- #10	52- #10	30- #10	6010	6650	6650
S/MST72		2 1/16	72	76- #10	52- #10	30- #10	6650	6650	6650

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

1. Use half of the fasteners in each member being connected to achieve the tabulated loads.
2. Loads are based on lesser of steel capacity and fastener calculation.

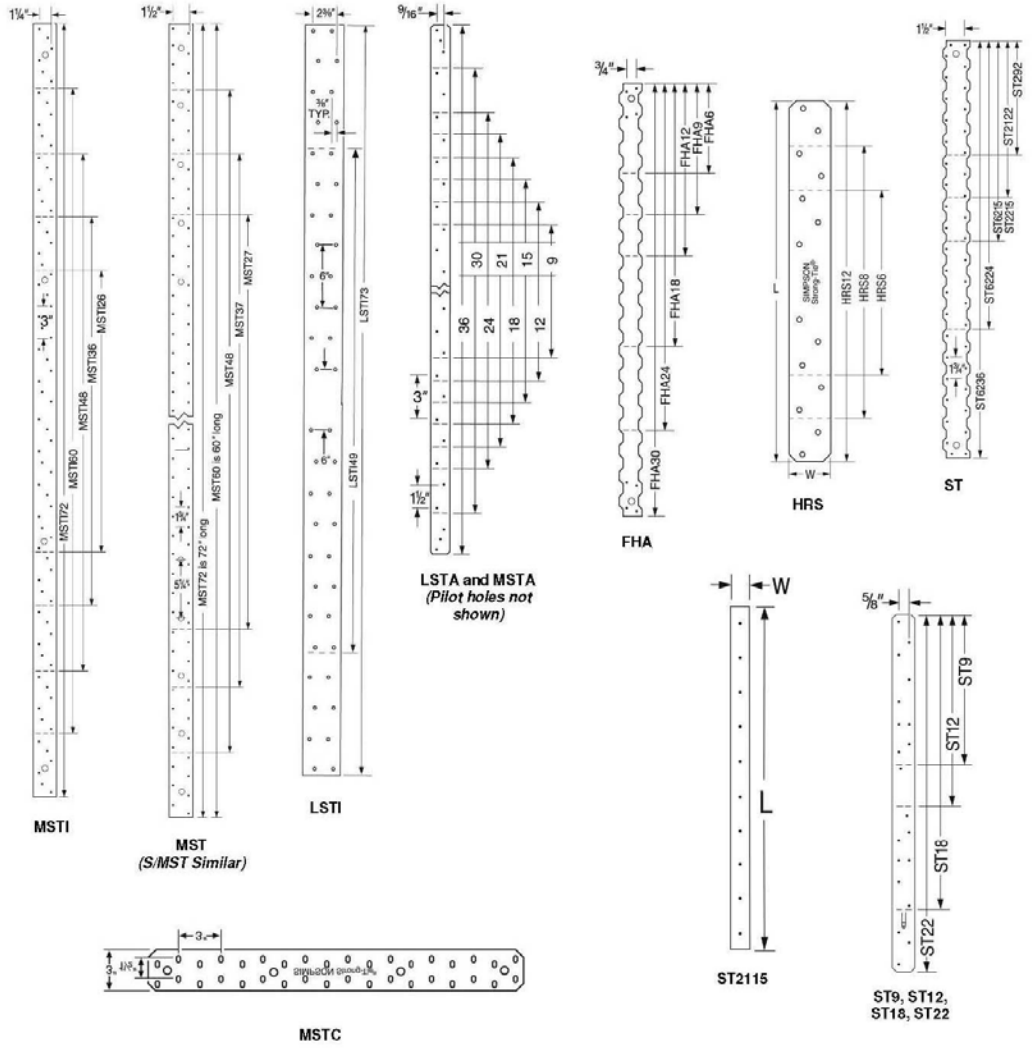


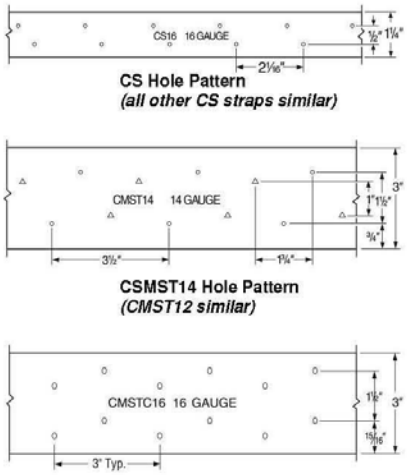
FIGURE 10 – STRAPS

TABLE 11 – ALLOWABLE TENSION LOADS FOR COILED STRAPS

Model No.	Total Length (ft)	Material Thickness mil (ga)	Fasteners (Total) Framing Member Thickness			Allowable Tension Loads (lbs)
			33 mil (20 ga)	43 mil (18 ga)	54 mil (16 ga)	33 mil (20 ga), 43 mil (18 ga), 54 mil (16 ga)
CMST12	40	97 (12 ga)	104-#10	70-#10	40-#10	9080
CMST14	52 ½	68 (14 ga)	72-#10	50-#10	28-#10	6365
CMSTC16	54	54 (16 ga)	54-#10	36-#10	30-#10	4600
CS14	100	68 (14 ga)	28-#10	18-#10	12-#10	2305
CS16	150	54 (16 ga)	18-#10	12-#10	8-#10	1550
CS18	200	43 (18 ga)	14-#10	10-#10	6-#10	1235
CS20	250	33 (20 ga)	12-#10	8-#10	6-#10	945
CS22	300	27 (22 ga)	10-#10	6-#10	6-#10	775

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

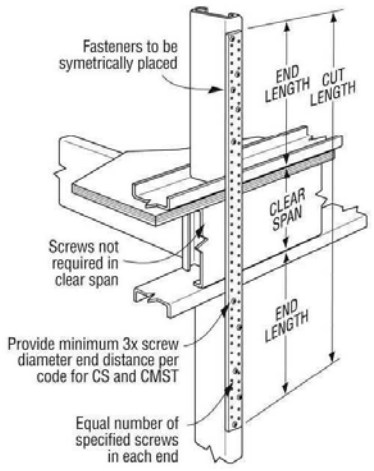
1. Use half of the fasteners in each member being connected to achieve the listed loads.
2. For CMST straps: End Length (inches) = 1/2 total fasteners x 7/8 inch + 1 inch when all holes filled. Double length if only round holes filled.
3. For CMSTC16 straps: End Length (inches) = 1/2 total fasteners x ¾ inch + 1 inch when all holes filled. Double length if only round holes filled.
4. For CS straps: End Length (inches) = 1/2 total fasteners + 1 inch.
5. Total Cut Length = End Length + Clear Span + End Length.
6. For a reduced number of self-tapping screws, allowable load = (#screws used / #screws in table) x table load.
7. Loads are based on lesser of steel strap capacity and AISI NAS fastener calculation.



CS Hole Pattern
(all other CS straps similar)

CSMST14 Hole Pattern
(CMST12 similar)

CMSTC16 Hole Pattern



Typical CS Installation As a Floor-to-Floor Tie

FIGURE 11 – COILED STRAPS

TABLE 12 – ALLOWABLE TENSION LOADS FOR TWIST STRAPS

Model No.	Material Thk. mil (ga)	L (in)	Fasteners (Total) Framing Member Thickness			Allowable Tension Loads (lbs)		
			33 mil (20 ga)	43 mil (18 ga)	54 mil (16 ga)	33 mil (20 ga)	43 mil (18 ga)	54 mil (16 ga)
LTS12	43 (18 ga)	12	10-#10	6-#10	6-#10	775	775	775
LTS16		16						
LTS18		18						
LTS20		20						
MTS12	54 (16 ga)	12	12-#10	8-#10	6-#10	995	995	995
MTS16		16						
MTS18		18						
MTS20		20						
MTS30		30						
MTS24C		24						
MTS30C		30						
HTS16	68 (14 ga)	16	16-#10	12-#10	6-#10	1415	1450	1450
HTS20		20	18-#10	12-#10	6-#10	1450	1450	1450
HTS24		24						
HTS28		28						
HTS30		30						
HTS30C		30						

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

1. Not all fastener holes need to be filled as additional fastener holes are provided.
2. Install half of the listed fasteners in each end of the strap to achieve full loads.
3. All straps except the MTS30 and HTS30 have the twist in the center of the strap.
4. Twist straps do not have to be wrapped over the truss to achieve the listed load.
5. May be installed on the inside face of the stud.
6. Loads are based on minimum steel thickness listed.

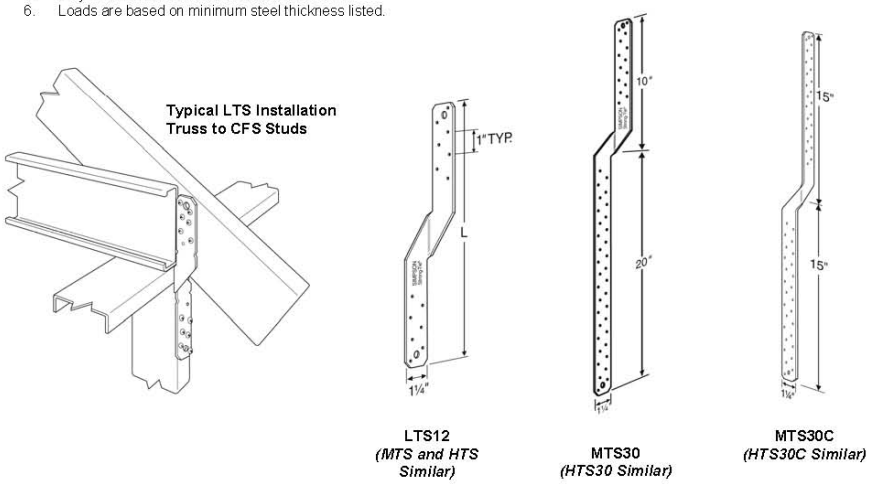


FIGURE 12 – TWIST STRAPS

TABLE 13 – ALLOWABLE LOADS FOR SP SERIES STUD PLATE (TRACK) TIES

Model No.	Dimensions (in)		Fasteners	Allowable Uplift Loads (lbs)
	W	L	Stud	33 mil (20 ga)
SP4	3 9/16	7 ¼	6 - #10	825
SP6	5 9/16	7 ¾	6 - #10	825

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

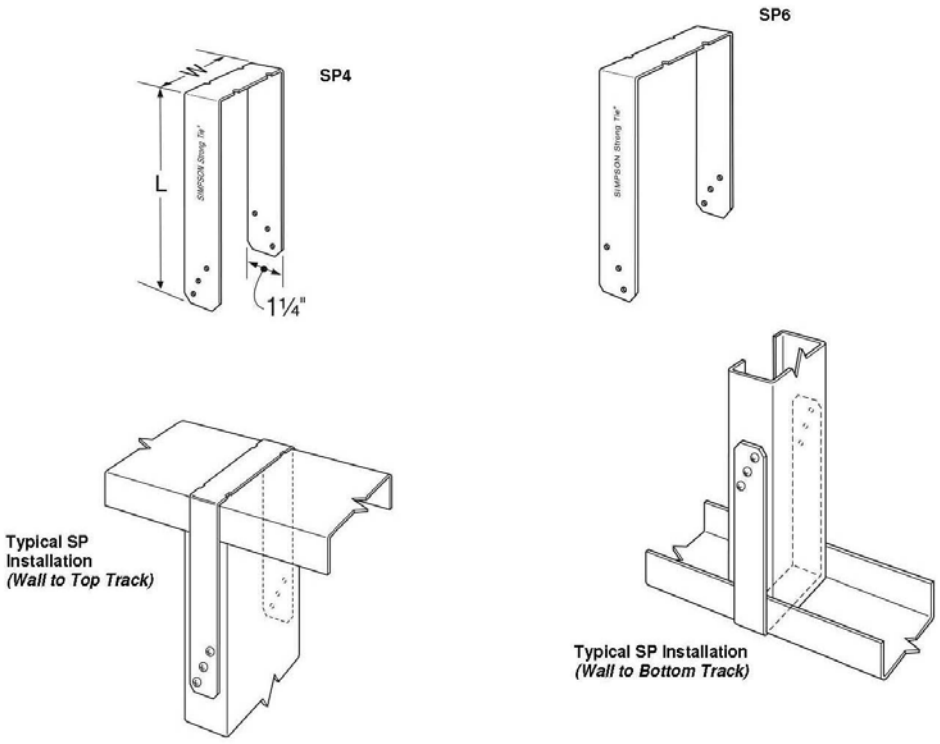


FIGURE 13 – SP STUD PLATE (TRACK) TIE

TABLE 14 – ALLOWABLE LOADS FOR SSP, DSP & TSP STUD PLATE (TRACK) TIES

Model No.	Fasteners				Allowable Uplift Loads (lbs)	
	Studs	Top Track		Bottom Track	33 mil (20 ga)	43 mil (18 ga)
	CFS	Wood	CFS	CFS		
SSP	4 - #10	—	—	2 - #10	355	625
		—	2 - #10	—	340	600
		2 - #10	1 - #10	—	405	715
		2 – 10d	1 - #10	—	480	840
DSP	8 - #10	—	—	4 - #10	430	695
		—	4 - #10	—	475	775
		4 - #10	2 - #10	—	585	955
		4 – 10d	2 - #10	—	730	1200
TSP	6 - #10	—	—	3 - #10	345	645
		—	3 - #10	—	370	700
	9 - #10	3 - #10	3 - #10	—	360	685
		3 – 10d	3 - #10	—	480	905

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

1. For wood plates, noted values only apply to DF/SP members where wood top plates are used. For SPF values, multiply by 0.86.
2. For wood plates, when cross-grain tension cannot be avoided, mechanical reinforcement to resist such forces should be considered.
3. Self-tapping screws installed into wood plates with a minimum #10x ¾ inch.

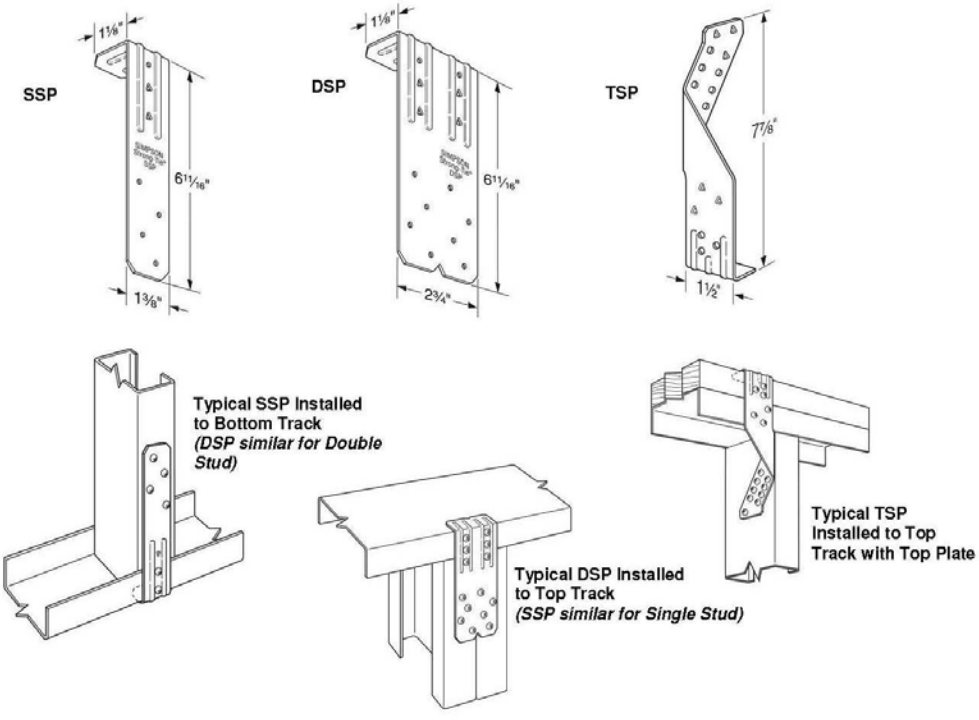


FIGURE 14 – SPP, DSP & TSP STUD PLATE (TRACK) TIE

TABLE 15 – ALLOWABLE LOADS FOR LTP5 LATERAL TIE PLATE

Model No.	Type of Connection	Direction of Load	Fasteners		Allowable Loads (lbs)
			To Rim Joist	To Tracks & Shear Wall	43 mil (18 ga)
LTP5	1	G	7-#10	7-#10	1045
	2		7-#10	7-#10	1110
	3		7 - 8d x 1½	7-#10	730[4]

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

1. Allowable loads are for one connector.
2. When anchors are installed on each side of joist, the minimum joist thickness is 3 inches.
3. Allowable loads are based on CFS (stud & sheet) of 43 mil (18 ga) minimum.
4. Allowable load for Connection 3 assumes duration increase (C_D) =1.60.

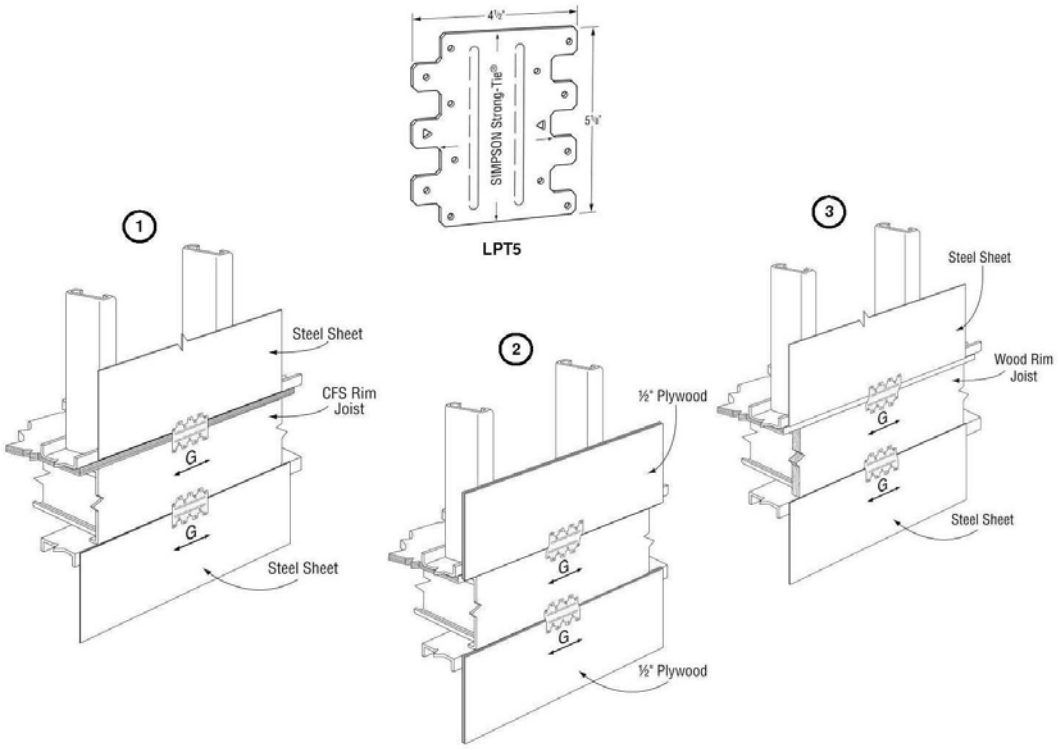


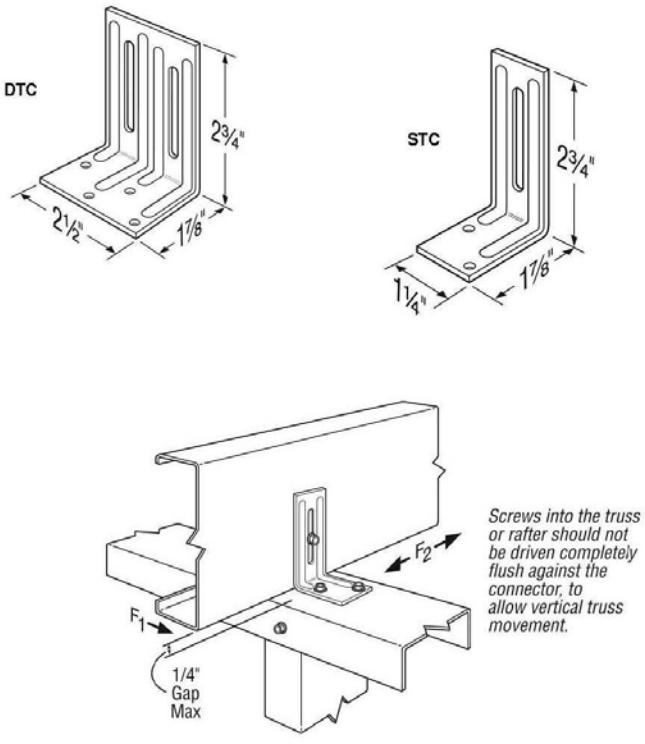
FIGURE 15 – LTP5 LATERAL TIE PLATE (TRACK)

TABLE 16 – ALLOWABLE LOADS FOR STC & DTC TRUSS CLIP

Model No.	Fasteners		Allowable Loads (lbs)					
	Base	Slot	Without Gap		With ¼" Gap		With ½" Gap	
			F_1	F_2	F_1	F_2	F_1	F_2
STC	2-#8	1-#8	185	35	135	35	75	35
DTC	4-#8	2-#8	200	160	200	160	145	160

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

1. Truss or rafter must be bearing on top plate to achieve the allowable loads under "WITHOUT GAP."
2. Clips are required on both sides of the truss to achieve F1 loads in both directions (*stagger parts to avoid screw interference*).
3. Slot screw(s) are to be installed in the middle of the slot.



Typical STC Installation

FIGURE 16 – STC AND DTC TRUSS CLIPS

Table 17- CONNECTOR MATERIAL PROPERTIES TABLE

Model No. / Model Series	ASTM Specification	Minimum Yield Strength F_y (ksi)	Minimum Tensile Strength F_u (ksi)	Nominal Thickness	Min. Base Metal Thickness (inch)
S/HDB (Base Plate)	A36	33	52	½ inch	0.485
S/HD8B & 10B (Body)	A1011 Grade 40	40	55	10 GA.	0.126
S/HD15B (Body)	A1011 Grade 40	40	55	7 GA.	0.171
S/HDS (Base Plate)	A36	33	52	½ inch	0.485
S/HD8S & 10S (Body)	A1011 Grade 40	40	55	10 GA.	0.126
S/HD15S (Body)	A1011 Grade 40	40	55	7 GA.	0.171
S/HDU (Washer)	A1011 Grade 33	33	52	3 GA.	0.229
S/HDU (Body)	A653 SS GR 33	33	45	10 GA.	0.129
S/LTT (Body)	A653 SS GR 33	33	45	12 GA.	0.099
S/LTT (Base)	A1011 Grade 33	33	52	3 GA.	0.229
S/HTT, HTT	A653 SS GR 33	33	45	11 GA.	0.112
S/BA	A653 SS GR 33	33	45	14 GA.	0.070
S/B	A 653 SS GR 33	33	45	12 GA.	0.099
S/LBV	A 653 SS GR 33	33	45	14 GA.	0.070
S/HJCT	A 653 SS GR 40	42	56	12 GA.	0.099
S/JCT	A 653 SS GR 40	40	55	14 GA.	0.070
TJC37	A 653 SS GR 33	33	45	16 GA.	0.057
TBD22	A 653 SS GR 40	40	55	22 GA.	0.029
S/H1A	A 653 SS GR 33	33	45	18 GA.	0.046
LSTA12, 15, 18, 21, 24	A 653 SS GR 50 CL1	50	65	20 GA.	0.035
LSTA30 & LSTA36	A 653 SS GR 50 CL1	50	65	18 GA.	0.046
MSTA9, 12, 15, 18, 21, 24,	A 653 SS GR 50 CL1	50	65	18 GA.	0.046
MSTA30, 36, 49	A 653 SS GR 50 CL1	50	65	16 GA.	0.057
MSTC28, 40, 52	A 653 SS GR 50 CL1	50	65	16 GA.	0.057
S/MST27, 37	A 653 SS GR 40	40	55	12 GA.	0.099
S/MST48	A 653 SS GR 40	42	56	12 GA.	0.099
S/MST60, 72	A 653 SS GR 40	42	56	10 GA.	0.129
LSTI	A 653 SS GR 40	40	55	18 GA.	0.046
MSTI	A 653 SS GR 40	40	55	12 GA.	0.099
ST9, ST12, ST18, ST22	A 653 SS GR 33	33	45	16 GA.	0.057
ST6215	A 653 SS GR 33	33	45	16 GA.	0.057
ST6224	A 653 SS GR 40	40	55	16 GA.	0.057
ST2115	A 653 SS GR 50 CL1	50	65	20 GA.	0.035
ST2122	A 653 SS GR 40	40	55	20 GA.	0.035
ST2215	A 653 SS GR 50 CL1	50	65	20 GA.	0.035
ST292	A 653 SS GR 33	33	45	20 GA.	0.035
ST6236	A 653 SS GR 50 CL1	50	65	14 GA.	0.070
FHA	A 653 SS GR 33	33	45	12 GA.	0.099
HRS	A 653 SS GR 33	33	45	12 GA.	0.099
CMST12	A 653 SS GR 50 CL1	50	65	12 GA.	0.099
CMST14	A 653 SS GR 50 CL1	50	65	14 GA.	0.070

Table 17- CONNECTOR MATERIAL PROPERTIES TABLE (CONT)

CMSTC16	A 653 SS GR 50 CL1	50	65	16 GA.	0.057
CS14	A 653 SS GR 50 CL1	50	65	14 GA.	0.070
CS16	A 653 SS GR 40	40	55	16 GA.	0.057
CS18	A 653 SS GR 40	40	55	18 GA.	0.046
CS20	A 653 SS GR 40	40	55	20 GA.	0.035
CS22	A 653 SS GR 40	40	55	22 GA.	0.029
LTS	A 653 SS GR 33	33	45	18 GA.	0.046
MTS, MTSC	A 653 SS GR 33	33	45	16 GA.	0.057
HTS, HTSC	A 653 SS GR 40	40	55	14 GA.	0.070
SP	A 653 SS GR 33	33	45	20 GA.	0.035
SSP	A 653SS GR 40	40	55	18 GA.	0.046
DSP	A 653SS GR 40	40	55	18 GA.	0.046
TSP	A 653SS GR 40	40	55	16 GA.	0.057
LTP5	A 653SS GR 40	40	55	20 GA.	0.035
DTC	A 653 SS GR 33	33	45	18 GA.	0.046
STC	A 653 SS GR 33	33	45	18 GA.	0.046

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

Report Number: 0124
Issued: 06/2010
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SUPPLEMENT

DIVISION: 05—METALS
Section: 05090—Metal 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 CONNECTORS FOR COLD-FORMED STEEL CONSTRUCTION

This supplement is issued to indicate that the Simpson Strong-Tie connectors for cold-formed steel construction, described in the master report, comply with the codes listed in Section 1.1 of this supplement when designed and installed in accordance with the master evaluation report and the amendments of the report as shown below.

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2007 Florida Building Code- Building (FBC-B)
- 2007 Florida Building Code- Residential (FBC-R)

6.0 EVIDENCE SUBMITTED

Signed and sealed test reports by Testing Engineers Inc. (shown below), along with calculations provided by Hien Nguyen, P.E., performed in accordance with the 2006 and 2009 International Building Code.

Product	Test Number	Date Tested
S/HD8S	M307, M363, Q074, Q088, Q070, Q120, Q117, Q114, P889, Q111	8/17/06, 6/13/06, 2/20/09, 3/24/09, 3/10/09 3/6/09, 3/24/09, 3/4/09, 12/2/08, 3/25/09
S/HD10S	Q083, K940, M309, L103, Q071 Q118, Q115, P890, Q112	2/27/09, 5/25/05, 5/22/06, 7/15/05, 3/10/09 3/6/09, 3/4/09, 12/2/08, 3/25/09
S/HD15S	Q079, K943, L108, Q072 P891, Q113	2/26/09, 5/19/05, 7/12/05, 3/11/09, 12/1/08, 3/25/09
S/HD8B	Q085, Q080, M628, Q089, Q073	2/26/09, 2/27/09, 9/13/06, 3/5/09, 3/11/09

S/HD10B	Q086, K941, Q077, L147, L100	2/26/09, 6/6/05, 3/2/09, 9/2/05, 4/26/05
S/HD15B	Q081, K944, L148, L110	3/2/09, 5/11/05, 9/2/05, 4/21/05
S/HDU4	N772, N771, N770, N769	5/15/07, 5/15/07, 5/15/07, 5/16/07
S/HDU6	N777, N776, N775, N774	6/6/07, 5/15/07, 5/15/07, 5/16/07
S/HDU9	M977, M392, M393, M305	2/8/07, 2/7/07, 2/8/07, 11/09/06
S/HDU11	M978, M979, N451, M980, M306	12/14/06, 2/9/07, 11/9/06, 2/9/07, 2/8/06
S/LTT20	O228	8/13/07
S/HTT14	P304, P305	7/1/08, 7/1/08
HTT4	Q495, Q496	6/15/09, 6/15/09
HTT5	Q492, Q493, Q494	7/8/09, 7/6/09, 6/15/09
S/BA	P241, P239, P240	4/14/08, 6/10/08, 9/18/08
S/B	L130, L131, L132, N573	7/20/05, 7/15/05, 7/22/05, 4/4/07
S/LBV	L125, L126, L127, N572	6/15/05, 6/6/05, 6/15/05, 4/2/07
S/JCT	K945, K946, Q210, K947, N574, N576 Q212, Q213, Q214, M631 N575, K948	4/21/05, 4/26/05, 3/27/09, 6/2/05, 4/9/07, 4/4/07 3/2/09, 2/2/09, 3/4/09, 3/13/07, 4/6/07, 4/26/05
S/HJCT	K952, M633, M632, N577, N579, L113, M647, L140, N578, N580 L123, Q215	5/25/05, 12/20/06, 12/12/06, 4/16/07, 4/5/07 2/22/05, 01/03/07, 5/15/05 4/5/07, 4/25/07, 6/30/05, 3/25/09

TJC37	N454, N455, N456, N457, N458, N459	2/15/07, 2/15/07, 2/22/07, 2/15/07, 3/1/07, 2/28/07
TBD22	Q011, Q289	4/24/09, 4/6/09
S/H1A	L142, K781, K782	8/19/05, 12/14/04, 12/14/04
SSP	N403, N404, N407, N406, N408	2/12/07, 2/9/07, 2/16/07, 2/12/07, 3/1/07
DSP	N409, N410, N411, N412, N413	2/13/07, 2/13/07, 2/14/07, 2/14/07, 3/2/07
TSP	N416, N417, N418, N419, N420	3/13/07, 2/12/07, 2/16/07, 2/16/07, 3/1/07
LTP5	L135, L136, L137,	7/8/05, 7/8/05, 7/8/05
STC	N516, N517, N518, N519, N520, N521	3/5/07, 3/6/07, 3/5/07, 3/7/07, 3/7/07, 3/7/07
DTC	N527, N528, N529, N530, N531, N532	3/5/07, 3/6/07, 3/6/07, 2/20/07, 2/23/07, 2/23/07