



Cold-Formed Steel Connectors

For Residential and
Mid-Rise Construction

C-CFS08

(800) 999-5099
www.strongtie.com



A History of Testing, Innovation and Performance

Since Barclay Simpson made his first connector more than 50 years ago, Simpson Strong-Tie has worked with the engineering and building communities to develop products that have significantly improved the structural integrity of homes and buildings. Our team of engineers and product managers continue to look for new ways to solve everyday issues and use our lab facilities to develop and test new products.

Product Innovation

Simpson was the first connector company to develop products specifically for steel framing. Today, the company manufactures a variety of connectors, fasteners and steel shearwalls for residential, mid-rise and commercial construction. Our engineers continue to research and test product performance as well as serve on industry committees to help further cold-formed steel technology.

On-Site Field Support

Our ability to develop new products has a lot to do with the feedback we receive from the field. Our customers often come to us with either a product request or a problem that needs to be solved. Our engineering team is often able to respond and provide the field support needed to keep a project moving. It's these field experiences along with our in-house testing facilities that keep us in the forefront of structural systems technology.

Unparalleled Testing

Our testing and research capabilities increased significantly when we opened our Tyrell Gilb Research Laboratory in 2003. Our state-of-the-art lab allows us to perform full-scale tests on wall sections so we can measure the performance of our products and simulate real-world conditions, such as seismic ground motion, and uplift and lateral force from high winds.

In addition, our engineers have embarked on three-dimensional testing of full-scale buildings. This testing is helping clarify issues regarding allowable resistances of bracing methods under various load conditions.

We know our customers count on us to provide them with the most accurate test results, code listings, high load values, ease of installation and design versatility—which is why we continue to invest in testing and product development. Because of this, when our customers see the Simpson Strong-Tie brand they don't just think of us as a manufacturer, but also as a research leader with the products and people they can rely on.

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HOW TO USE THIS CATALOG

NEW PRODUCTS

New products are shown with the **NEW** symbol. There are also new sizes within existing model series.

EXTRA CORROSION PROTECTION

This icon identifies products that are available with additional corrosion protection (*ZMAX*®, *Hot-Dip Galvanized* or *Stainless Steel*). Check with factory for availability. The end of the product name will indicate what type of extra corrosion protection is provided (*Z = ZMAX, HDG = Hot-Dip Galvanized* or *SS = Stainless Steel*). See page 12-13 for information on corrosion. Visit our website www.strongtie.com/info for more technical information on this topic.

HOW WE DETERMINE ALLOWABLE LOADS

Allowable loads in this catalog are determined using calculations and/or one or more of the following methods:

- a minimum of 3 static load tests in CFS assemblies;
- a minimum of 3 static load tests in structural steel jigs;
- a minimum of 3 static load tests of products embedded in concrete or masonry.

Some tests include only portions of a product such as purlin anchor tests—only the embedded hook is tested, not the screwed or bolted section of the strap, which is calculated. Testing to determine allowable loads in this catalog is not done on connection systems in buildings. Testing is conducted under the supervision of an independent laboratory. **Typically the allowable load is limited to an average test load at 1/8" deflection, an average or lowest test value (nominal load) divided by a safety factor or the calculation value. The safety factor is prescribed by Section F1 of the 2001 AISI NAS.**

For detailed information regarding how Simpson tests specific products, contact Simpson.

Dimensions: This shows the product dimensions (*material thickness, length and width in this case*). The product drawing includes these callouts as a cross-reference.

Allowable Design Loads: The maximum load imposed on a connection during the life of a structure. There may be multiple design loads acting in different directions (*up, down, lateral, perpendicular, etc.*) imposed on a connection.

Model No.: This is the Simpson product name.

Fasteners: This shows the fastener quantity and type required to achieve the table loads.

Thickness: CFS supporting member thickness to which the product is attached. Allowable Load is based on this CFS supporting member thickness.

Code Ref: See page 8 for the Code Listing Key Chart, to determine which code reports include this product.

Model No.	Material Thk. mil (ga)	L	W	Fasteners						Code Ref.		
				Rafter/Stud/Joist Thickness			Allowable Tension Load					
				33 mil (20 ga)	43 mil (18 ga)	54 mil (16 ga)	33 mil (20 ga) (100)	43 mil (18 ga) (133)	54 mil (16 ga) (100)		43 mil (18 ga) (133)	
PA18	97 (12 ga)	18½	2½	16- #10	15- #10	10- #10	2830	3685	3685	3685	3685	151
PA23		23¾		21- #10	18- #10	16- #10	3685	3685	3685	3685	3685	
PA28		32½		23- #10	22- #10	21- #10	3685	3685	3685	3685	3685	
PA35		35		30- #10	29- #10	28- #10	3685	3685	3685	3685	3685	
HPA28	118	21½	28- #10	26- #10	25- #10	4845	4845	4845	4845	4845		
HPA35	110	38½	32- #10	30- #10	27- #10	5420	5420	5420	5420	5420	4845	

OTHER CATALOG DEFINITIONS:

Deflection: The distance a point moves when a load is applied.

Nominal Tension Load (Strength): The capacity of a structure or component to resist the effects of loads, as determined in accordance with 2001 AISI NAS using specified material strengths and dimensions. Typically taken as the average value of at least 3 tests.

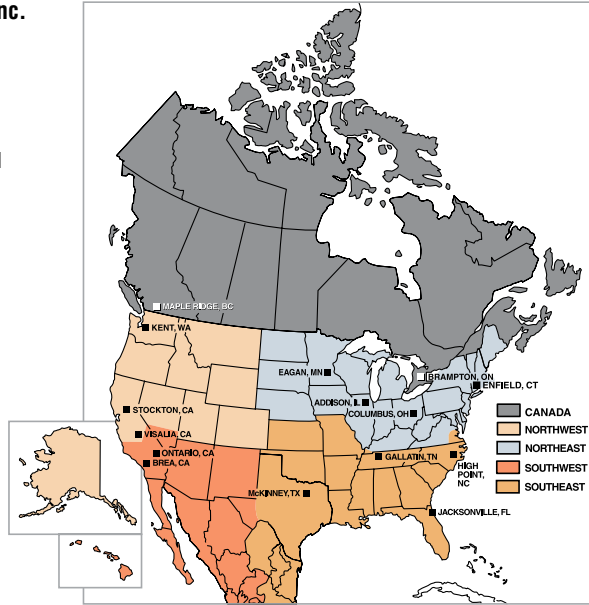
The Nominal Tension Load should not be compared against design loads (ASD, LRFD), but used only where the AISI Lateral Design Standard requires the holdown to have nominal tension load (strength) to resist lesser or amplified seismic load or what the system can deliver.

COMPANY PROFILE

The Simpson Strong-Tie Company was founded in Oakland, California and has been manufacturing wood-to-wood and wood-to-concrete connectors since 1956. Since then, Simpson Strong-Tie Company Inc. has grown to be the world's largest manufacturer of construction connectors. In recent years the company's growth has included expanding its product offering to include pre-manufactured shearwalls, anchor systems for concrete and masonry and collated fastening systems, and steel-to-steel connectors since 1994.

The Simpson Strong-Tie Company Inc. "NO EQUAL" program includes:

- Quality products value-engineered for the lowest installed cost at the highest rated performance levels.
- Most thoroughly tested and evaluated products in the industry.
- Strategically-located manufacturing and/or warehouse facilities.
- National Code Agency listings.
- Largest number of patented connectors in the industry.
- International sales team.
- In-house R & D, and tool and die professionals.
- In-house product testing and quality control engineers.
- Member of AITC, ASTM, ASCE, CSI, NBMDA, NLBMDA, SETMA, STAFDA, NFBA, WTCA, Steel Framing Alliance (SFA), Cold Formed Steel Engineer's Institute (CFSEI), Hawaii Pacific Steel Framing Alliance (HSA), Mid-Atlantic Steel Framing Alliance (MASFA), California Steel Framing Alliance (CASFA), American Iron and Steel Institute (AISI's) Committee on Framing Standards, and local organizations.



CONNECTOR SELECTION KEY

Products are divided into ten general categories, identified by tabs along the page's outer edge.

Fasteners

14-15 ▶

Concrete Connectors

16-18 ▶

Anchors

19-33 ▶

Shearwall

34-43 ▶

Hangers

44-46 ▶

Truss Connectors

47-49 ▶

Straps & Ties

49-56 ▶

Masonry Connectors

57 ▶

Miscellaneous

58-59 ▶

SIMPSON'S QUALITY POLICY

We help people build safer structures economically. We do this by designing, engineering and manufacturing "No Equal" structural connectors and other related products that meet or exceed our customers' needs and expectations. Everyone is responsible for product quality and is committed to ensuring the effectiveness of the Quality Management System.

Tom Fitzmyers
Chief Executive Officer

Terry Kingsfather
President

GETTING FAST TECHNICAL SUPPORT

When you call for engineering technical support, we can help you quickly if you have the following information at hand. This will help us to serve you promptly and efficiently.

- Which Simpson catalog are you using? (See the front cover for the form number).
- Which Simpson product are you using?
- What is your load requirement?
- What is the carried member's thickness, width and height?
- What is the supporting member's thickness, width and height?
- What is the carried and supporting members' material and application?

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WE ARE ISO 9001-2000 REGISTERED



Simpson Strong-Tie is an ISO 9001-2000 registered company. ISO 9001-2000 is an internationally-recognized quality assurance system which lets our domestic and international customers know that they can count on the consistent quality of Simpson Strong-Tie's products and services.



S/HDU Predeflected Holdown

The S/HDU series of holdowns combines performance with ease of installation. The pre-deflected geometry virtually eliminates material stretch, resulting in low deflection under load. Installation using self-drilling screws into the studs reduces installation time and saves labor cost.

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ICFVL Ledger Connector for Insulated Concrete Form Walls

The ICFVL Ledger Connector System is engineered to solve the challenges of mounting steel ledgers to insulated concrete form (ICF) walls. The ICFVL is designed to resist both vertical and lateral, in-plane loads. In most cases the ICFVL allows for wider spacing than typical anchor bolts and is faster to install.

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TJC37 Jack Truss Connector

A versatile connector for skewed members, the TJC37 adjusts from 0 to 67.5 degrees. Screw holes are positioned for easy access during installation.

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S/GTC Girder Truss Connector

The S/GTC truss connector is designed to connect a carried truss to a girder truss vertical member.

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NEW PRODUCTS FOR 2008



STC and DTC Truss Clips

The STC and DTC single and double truss clips provide alignment control between the roof truss and non-bearing walls. The 1½" slot allows for vertical truss displacement when loads are applied.

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S/PSPN58 and S/PSPN516 Repair and Protection Plates

The S/PSPN58 shield plate helps prevent penetration of fasteners into wiring or piping at the top and bottom track. As required by the building code, it is made of 16 gauge steel and protrudes at least 2" above/below single or double plates. The S/PSPN516 combines a shield plate with a repair plate that restores tensile strength to top or bottom tracks drilled or cut during construction.

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SSP, DSP and TSP Stud Plate Ties

Stud plate ties provide an easy to install connection between stud and top or bottom track. Each can be used for either top or bottom track applications.

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IMPORTANT INFORMATION & GENERAL NOTES

Codes

Code Reference Column in Load Tables

The "Code Reference" column that appears in load tables throughout this catalog is intended to identify products listed in evaluation agency reports, typically called "code reports", and the specific reports that cover them.

The Code reference column, used in conjunction with the chart at right, indicates which code listing applies to a product. The reference numbers also clearly identify:

- Products to be submitted for evaluation report listing (160)
- Products with no evaluation report listing (170)
- Products not submitted because they have no load rating and an evaluation report listing is not necessary (180)
- Products that meet prescriptive or conventional construction code requirements (190)

Where a model has been submitted for listing (160) or does not have an evaluation report listing (170), Simpson can supply complete test data to support our published loads. Please contact us for a copy of our product test documentation at (800) 925-5099. Product acceptance may be obtained through the Alternate Methods and Materials section of the applicable building code.

Some loads and applications may not be covered in the code report and specific reductions and restrictions may be required by other product evaluation agencies. Visit www.strongtie.com or visit the product evaluation agencies' web sites for the current evaluation reports.

Simpson Strong-Tie connectors are recognized by most product evaluation agencies. Agencies that recognize some or all of our products include ICC-ES (formerly ICBO, BOCA, SBCCI); the City of Los Angeles, California; and State of Florida.

Multiple types of ICC-ES evaluation reports are shown in the Code Reference Key Chart. ICC NER, ICC ER, and ICC ES reports are referred to as Legacy Reports and have been obtained over the years to verify that Simpson products are in compliance with the code. These Legacy reports were evaluated under the 1997 UBC and/or the 2000 IBC codes. In order to obtain evaluation for the 2003 or 2006 I-codes, manufacturers must submit for ICC ESR reports.

Simpson has many ESR reports, but currently not all products have been evaluated per the latest codes. This does not mean that the information in those reports is inaccurate. Indeed, the new building code is typically less conservative for most connector products than the current codes. Simpson has re-submitted our Legacy Reports to ICC-ES to obtain product evaluation service reports (ESR's) evaluated using the 2006 IBC/IRC, but due to the large number of reports to evaluate, ICC-ES has not been able to process the reports in time for this catalog.

It is anticipated that during the first and second quarter of 2008, most reports will be converted. To help understand which of our stamped and welded connector products are listed in an ESR report, we have obtained an ICC-ES index evaluation services report, ICC ESR-2523, for these products. This report is a reference document to other ESR reports held by Simpson and will be updated frequently by ICC-ES as new stamped and welded connector evaluation services reports are issued or converted. Please visit www.strongtie.com for the latest information or contact ICC Evaluation Services at www.icc-es.org.

In August 2004 the Department of State Architecture, California, issued a revised IR 23-1. The Revised Interpretation of Regulation addresses and clarifies issues relating to Pre-fabricated Wood Construction Connectors. IR 23-1 defines the Purpose and Scope and clarifies Listing Requirements, Acceptable Load Capacities, Design Requirements, Installation Requirements and Connector Fabrication which addresses corrosion-resistant material and/or coatings. Please contact the DSA at www.dsa.dgs.ca.gov/Publications/default.htm for more information.

On October 1, 2003, the State of Florida's Statewide Product Approval System became effective. The purpose of this system is to provide a single product evaluation and approval system that applies statewide to operate in coordination with the Florida Building Code. This Florida product evaluation and approval system is governed by Florida Statutes, Chapter 553, Section 553.842. Since this law specifies that the product approval system is to apply statewide, Notice of Acceptance are no longer necessary where a product has a statewide approval that is applicable in the High Velocity Hurricane Zone (HVHZ) and is installed in accordance with its conditions of use.

CODE LISTING KEY CHART

AGENCY	CODE LISTING	CODE REF.	AGENCY	CODE LISTING	CODE REF.
ICC-NER (OLD NES)	209	1	City of Los Angeles, California	RR 22086	80
	393	2		RR 24682	81
	413	3		RR 24818	82
	421	4		RR 24947	83
	422	5		RR 24949	84
	432	6		RR 25064	85
	443	7		RR 25074	86
	469	8		RR 25076	87
	499	9		RR 25119	88
	694	10		RR 25120	89
ICC-ER (OLD ICBO)	1211	20	RR 25149	90	
	3631	21	RR 25158	91	
	4546	22	RR 25185	92	
	4935	23	RR 25236	93	
	4945	24	RR 25248	94	
	5090	25	RR 25279	95	
	5117	26	RR 25281	96	
	5268	27	RR 25293	97	
	5275	28	RR 25300	98	
	5313	30	RR 25318	99	
	5328	31	RR 25427	101	
	5349	32	RR 25459	102	
	5357	33	RR 25469	103	
	5485	34	RR 25489	104	
	5537	35	RR 25528	105	
	5655	36	RR 25540	106	
	5656	37	RR 25552	107	
	5672	39	RR 25568	108	
	5708	40	RR 25560	109	
5709	41	RR 25625	110		
5791	42	State of Florida	FL474	121	
5824	44		FL503	122	
5938	45		FL538	123	
5952	46		FL1423	125	
6119	47		FL1463	126	
6119	47		FL1725	127	
5053	49		FL1901	128	
ICC-ESR	1056		19	FL2304	130
	1679		50	FL2355	131
	1772		48	FL3750	133
ICC-ES (OLD SBCCI)	2207	60	FL4432	137	
	9603C	62	FL5113	139	
Submitted for Listing	Call us for Status and Test Data	160*	FL5415	141	
	No Code Listing	Call us for Test Data	FL5805	142	
FL5806			143		
No Load Rating	—	180	FL5808	144	
			FL6477	145	
Prescriptive Code	—	190	FL6482	146	
			FL7089	147	
CA DSA	PA-110	150	FL5550	148	
			FL9601	151	
State of Wisconsin	200043-N	140	State of Wisconsin	200043-N	140

* As of the printing of this catalog, products coded 160 have been submitted and are awaiting issuance from the respective code agency. Because code reports can be issued throughout the year, we encourage the user to visit www.strongtie.com, www.icc-es.org, www.ladbs.org, www.dsa.dgs.ca.gov, and www.floridabuilding.org for the most current information, call Simpson at 800-999-5099, or contact the code agency directly.

Note: Some code listings shown in the Code Listing Key Chart apply only to connectors for wood construction.

IMPORTANT INFORMATION & GENERAL NOTES

WARNING

Simpson Strong-Tie Company Inc. structural connectors, anchors, and other products are designed and tested to provide specified design loads. To obtain optimal performance from Simpson Strong-Tie Company Inc. products and achieve maximum allowable design load, the products must be properly installed and used in accordance with the installation instructions and design limits provided by Simpson Strong-Tie Company Inc. To ensure proper installation and use, designers and installers must carefully read the following General Notes, General Instructions For The Installer and General Instructions For The Designer, as well as consult the applicable catalog pages for specific product installation instructions and notes. Proper product installation requires careful attention to all notes and instructions, including these basic rules:

1. Be familiar with the application and correct use of the connector.
2. Follow all installation instructions provided in the applicable catalog, website, Pocket Installers Guide or any other Simpson publications.
3. Install all required fasteners per installation instructions provided by Strong-Tie Company Inc.: a) use proper fastener type; b) use proper fastener quantity; c) fill all fastener holes; d) do not overdrive or underdrive nails, including when using gun nailers; and e) ensure screws are completely driven.
4. Only bend products that are specifically designed to be bent. For those products that required bending, do not bend more than once.
5. Cut joists to the correct length, do not "short-cut". The gap between the end of the joist and the header material should be no greater than $\frac{1}{8}$ " unless otherwise noted.

In addition to following the basic rules provided above as well as all notes, warnings and instructions provided in the catalog, installers, designers, engineers and consumers should consult the Simpson Strong-Tie Company Inc. website at www.strongtie.com to obtain additional design and installation information, including:

- Instructional builder/contractor training kits containing an instructional video, an instructor guide and a student guide in both English and Spanish;

- Installer's Pocket Guide (*form S-INSTALL, contact Simpson Strong-Tie for more information*) which is designed specifically for installers and uses detailed graphics and minimal text in both English and Spanish to explain visually how to install many key products;
- Information on workshops Simpson conducts at various training centers throughout the country;
- Product specific installation videos;
- Specialty catalogs;
- Code reports;
- Technical fliers and bulletins;
- Master format specifications;
- Material safety data sheets;
- Corrosion information;
- Connector selection guides for engineered wood products (*by manufacturer*);
- Simpson connector selector software;
- Simpson Autocad menu;
- Simpson Strong-Wall® Selector software;
- Simpson Anchor Tiedown System Selector and anchor related software; and
- Answers to frequently asked questions and technical topics.

Failure to follow fully all of the notes and instructions provided by Simpson Strong-Tie Company Inc. may result in improper installation of products. Improperly installed products may not perform to the specifications set forth in this catalog and may reduce a structure's ability to resist the movement, stress, and loading that occurs from gravity loads as well as impact events such as earthquakes and high velocity winds. Simpson Strong-Tie Company Inc. does not guarantee the performance or safety of products that are modified, improperly installed or not used in accordance with the design and load limits set forth in this catalog.

These notes are provided to ensure proper installation of Simpson Strong-Tie® products and must be followed fully.

- a. Simpson Strong-Tie Company Inc. reserves the right to change specifications, designs, and models without notice or liability for such changes.
- b. Steel used for each Simpson product is individually selected based on the product's steel specifications, including strength, thickness, formability, finish, and weldability. Contact factory for steel information on specific products.
- c. Unless otherwise noted, dimensions are in inches, loads are in pounds.
- d. Unless otherwise noted, welds, bolts, screws and nails may not be combined to achieve highest load value.
- e. Catalog loads are based on cold-formed steel members having a minimum yield strength of $F_y=33$ ksi and tensile strength of $F_u=45$ ksi for 43 mils (18 ga) and thinner, and a minimum yield strength of $F_y=50$ ksi and $F_u=65$ ksi for 54 mils (16 ga) and thicker.
- f. Simpson Strong-Tie Company Inc. will manufacture non-catalog products provided prior approval is obtained and an engineering drawing is included with the order. Steel specified on the drawings as $\frac{1}{8}$ ", $\frac{3}{16}$ ", and $\frac{1}{4}$ " will be 11 gauge (0.120"), 7 gauge (0.179"), and 3 gauge (0.239"), respectively. The minimum yield and tensile strengths are 33 ksi and 52 ksi, respectively.
- g. RFB is A307, Grade C; STB is ASTM A36.
- h. Unless otherwise noted, bending steel in the field may cause fractures at the bend line. Fractured steel will not carry load and must be replaced.
- i. Top flange hangers may cause unevenness. Possible remedies should be evaluated by a professional and include using a face mount hanger or cutting the subfloor to accommodate the top flange thickness.
- j. Built-up members (*multiple members*) must be fastened together to act as one unit to resist the applied load (*excluding the connector fasteners*). This must be determined by the Designer/Engineer of Record.
- k. Do Not Overload. Do not exceed catalog allowable loads, which would jeopardize the connection.
- l. Some model configurations may differ from those shown in this catalog. Contact factory for details.
- m. Some combinations of hanger options are not available. In some cases, combinations of these options may not be installable. Horizontal loads induced by sloped joists must be resisted by other members in the structural system. A qualified designer must always evaluate each connection, including carried and carrying member limitations, before specifying the product. Fill all fastener holes with fastener types specified in the tables, unless otherwise noted. Hanger configurations, height, and fastener schedules may vary from the tables depending on joist size, skew and slope. See the allowable table load for the non-modified hanger, and adjust as indicated. Material thickness may vary from that specified depending on the manufacturing process used. W hangers normally have single stirrups; occasionally, the seat may be welded. S/B, S/LBV, W and WP hangers for sloped seat installations are assumed backed.
- n. Simpson will calculate the net height for a sloped seat. The customer must provide the H1 joist height before slope.
- o. Do not weld products listed in this catalog unless this publication specifically identifies a product as acceptable for welding, or unless specific approval for welding is provided in writing by Simpson. Some steels have poor weldability and a tendency to crack when welded. Cracked steel will not carry load and must be replaced.
- p. Steel for the framing members must meet ICC Acceptance Criteria. Material specification must comply with ASTM A 1003 Grade 33 minimum.
- q. Screws and screw connections have been tested per AISI Standard Test Method TS-04. The tabulated allowable loads are based on the lower of the screw strength itself or the strength of the screw in the connected members per 2001 AISI NAS & 2004 NAS Supplement section E4. The screw strength is determined from the test value divided by the lesser of a safety factor of 3.0 or the safety factor determined from NAS section F multiplied by 1.25 as per the 2004 AISI NAS Supplement section E4.3.3. The strength of the screw in the connected members is determined from the test value divided by the lesser of a safety factor of 3.0 or the safety factor determined from NAS section F as per the 2001 AISI NAS section E4.3.3.
- r. Consideration should be given to the screw head specified as this may affect the attached materials.
- s. Do not add fastener holes or otherwise modify Simpson Strong-Tie Company Inc. products. The performance of modified products may be substantially weakened. Simpson will not warrant or guarantee the performance of such modified products.

Instructions to the Installer

- a. All specified fasteners must be installed according to the instructions in this catalog. Incorrect fastener quantity, size, type, material, or finish may cause the connection to fail.
- b. Holes for $\frac{1}{2}$ " diameter or greater bolts shall be no more than a maximum of $\frac{1}{16}$ " larger than the bolt diameter per 2001 American Iron and Steel Institute North American Specification for the Design of Cold-Formed Steel Structural Members, (AISI NAS) Section E3a.
- c. Install all specified fasteners before loading the connection.
- d. Some hardened fasteners may have premature failure if exposed to moisture. The fasteners are recommended to be used in dry interior applications.
- e. Use proper safety equipment.
- f. When installing a joist into a connector with a seat, the joist shall bear completely on the seat, if the connector has a seat. The gap between the end of the joist and the connector or header shall not exceed $\frac{1}{8}$ " per ICC-ES AC 261 and ASTM D1761 test standards.
- g. For holdowns, anchor bolt nuts should be finger-tight plus $\frac{1}{8}$ to $\frac{1}{2}$ turn with a hand wrench. Care should be taken to not over-torque the nut, impact wrenches should not be used. This may preload the holdown.
- h. All screws shall be installed in accordance with the screw manufacturer's recommendations. All screws shall penetrate and protrude through the attached materials a minimum of 3 full exposed threads per AISI Standard for Cold-Formed Steel Framing - General Provisions section D1.3.
- i. Welding galvanized steel may produce harmful fumes; follow proper welding procedures and safety precautions. Welding should be in accordance with A.W.S. Standards. Unless otherwise noted Simpson connectors cannot be welded.
- j. Temporary lateral support for members may be required during installation.

IMPORTANT INFORMATION & GENERAL NOTES

Instructions to the Designer

- The allowable load is limited to an average test load at $\frac{1}{8}$ " deflection, an average or lowest test value (*nominal load*) divided by a safety factor or the calculation value. The safety factor is prescribed by Section F1 of the 2001 AISI NAS.
- Allowable simultaneous loads in more than one direction on a single connector must be evaluated as follows:
Design Uplift/Allowable Uplift + Design Lateral Parallel to Track/Allowable Lateral Parallel to Track + Design Lateral Perpendicular to Track/Allowable Lateral Perpendicular to Track ≤ 1.0 . The three terms in the unity equation are due to the three possible directions that exist to generate force on a hurricane tie. The number of terms that must be considered for simultaneous loading is at the sole discretion of the Designer and is dependant on their method of calculating wind forces and the utilization of the connector within the structural system.
- Loads are based on the 2001 AISI Standard – North American Specification for the Design of Cold-Formed Steel Structural Members (NAS), unless otherwise specified. Other code agencies may use different allowable loads.
- The term "Designer" used throughout this catalog is intended to mean a licensed/certified building design professional, a licensed professional engineer, or a licensed architect.
- All connected members and related elements shall be designed by the Designer.
- Unless otherwise noted, member strength is not considered in the loads given and, therefore, reduce allowable loads when member strength is limiting.
- The average ultimate breaking strength for some models is listed under "nominal tension load".
- Simpson strongly recommends the following addition to construction drawings and specifications: "Simpson Strong-Tie connectors and fasteners are specifically required to meet the structural calculations of plan. Before substituting another brand, confirm load capacity based on reliable published testing data or calculations. The Engineer/Designer of Record should evaluate and give written approval for substitution prior to installation."
- Verify that the dimensions of the supporting member are sufficient to receive the specified fasteners, and develop the top flange bearing length.
- Simpson will provide, upon request, code testing data on all products that have been code tested.
- The allowable loads published in this catalog are for use when utilizing the traditional Allowable Stress Design (ASD) methodology. A method for using Load and Resistance Factor Design (LRFD) for cold-formed steel is also included in the 2001 AISI NAS. When designing with LRFD, the nominal connector strength multiplied by the resistance factor must be used. Contact Simpson for the LRFD values of products listed in this catalog.
- All screws must comply with SAE (Society of Automotive Engineers) Standard J 78, Steel Self Drilling Tapping Screws, and must have a Type II coating in accordance with ASTM B 633, Electrodeposited Coatings of Zinc on Iron and Steel.
- Screw strength shall be calculated in accordance to 2001 AISI NAS Section E4 or shall be based upon manufacturers design capacity determined from testing.
- Simpson recommends that hanger height be at least 60% of joist height for stability.
- Local and/or regional building codes may require meeting special conditions. Building codes often require special inspection of anchors installed in concrete and masonry. For compliance with these requirements, it is necessary to contact the local and/or regional building authority. Except where mandated by code, Simpson's products do not require special inspection.

Additional Important Information & General Notes for Hybrid (Steel-to-Wood) Connections

These notes are in addition to the previous notes for steel to steel connections and are provided to ensure proper installation of Simpson Strong-Tie® Company Inc. products and must be followed fully.

- Unless otherwise noted, allowable loads are for Douglas Fir-Larch under continuously dry conditions. Allowable loads for other species or conditions must be adjusted according to the code. In many cases, Simpson code reports will indicate loads derived from Doug Fir header material only. However under ICC-ES AC13, loads for Douglas Fir are the same as LVL, LSL, PSL, Glulam's and Southern Pine, since the specific gravity of these wood species fall within the specific gravity range of the AC13 criteria. The chart below gives specific gravity for the different wood species as listed by NDS (National Design Specifications). For your convenience we have placed the section from the AC13 criteria indicating the range of specific gravity. 4.2.3 The species of lumber used shall have a specific gravity of 0.49 or greater, such as Douglas fir, but not greater than 0.55 as determined in accordance with the NDS.
- For face-mount hangers & straight straps, use 0.86 of table loads for Spruce-Pine-Fir.
- A fastener that splits the wood will not take the design load. Evaluate splits to determine if the connection will perform as required. Dry wood may split more easily and should be evaluated as required. If wood tends to split, consider pre-boring holes with diameters not exceeding .75 of the nail diameter (2001 NDS 11.1.5.3).
- Wood shrinks and expands as it loses and gains moisture, particularly perpendicular to its grain. Take wood shrinkage into account when designing and installing connections. Simpson manufactures products to fit common dry lumber dimensions. If you need a connector with dimensions other than those listed in this catalog, Simpson may be able to vary connector dimensions; contact the factory. The effects of wood shrinkage are increased in multiple lumber connections, such as floor-to-floor installations. This may result in the vertical rod nuts becoming loose, requiring post-installation tightening.
- Top flange hangers may cause unevenness. Possible remedies should be evaluated by a professional and include using a face mount hanger, and routing the beam or cutting the subfloor to accommodate the top flange thickness.
- Built-up lumber (*multiple members*) must be fastened together to act as one unit to resist the applied load (*excluding the connector fasteners*). This must be determined by the Designer/Engineer of Record.

Species	Fc⊥	Specific Gravity
Douglas Fir-Larch (DFL)	625 psi	0.50
Southern Pine (SP)	565 psi	0.55
Spruce-Pine-Fir (SPF)	425 psi	0.42
Hem Fir (HF)	405 psi	0.43
Glulam	560 psi	0.50
LVL (DF/SP)	750 psi	0.50
TimberStrand® LSL (E=1.3x106)	680 psi	0.50
TimberStrand® LSL (E>1.5x106)	880 psi	0.50
Parallam® PSL	750 psi	0.50

Additional Instructions for the Installer for Hybrid (Steel-to-Wood) Connections

- Bolt holes into wood members shall be at least a minimum of $\frac{1}{32}$ " and no more than a maximum of $\frac{1}{16}$ " larger than the bolt diameter (per the 2001 NDS 11.1.2).
- Joist shall bear completely on the connector seat, and the gap between the joist end and the header shall not exceed $\frac{1}{8}$ " per ICC-ES AC 13 and ASTM D1761 test standards.
- For holdowns, anchor bolt nuts should be finger-tight plus $\frac{1}{8}$ to $\frac{1}{2}$ turn with a hand wrench, with consideration given to possible future wood shrinkage. Care should be taken to not over-torque the nut, impact wrenches should not be used. This may preload the holddown.

Additional Instructions for the Designer for Hybrid (Steel-to-Wood) Connections

- Loads are based on the 2001 AISI Standard - North American Specification for the Design of Cold-Formed Steel Structural Members (NAS) and the 2001 National Design Specifications (NDS), unless otherwise specified. Other code agencies may use different allowable loads.
- Duration of load adjustments for fasteners into wood as specified by the code are as follows:
"FLOOR" and "DOWN" (100) — no increase for duration of load.
"SNOW" (115) — 115% of design load for 2 month duration of load.
"ROOF LOAD" (125) — 125% of design load for 7 day duration of load.
"EARTHQUAKE/WIND" (133 and 160) — 133% and 160% of design load for earthquake/wind loading.
- Some catalog illustrations show connections that could cause cross-grain tension or bending of the wood during loading if not sufficiently reinforced. In this case, mechanical reinforcement should be considered.
- The allowable loads published in this catalog are for use when utilizing the traditional Allowable Stress Design (ASD) methodology. A method for cold-formed steel has been published in 2001 AISI NAS, and using Load and Resistance Factor Design (LRFD) for wood has been published in AF&PA/ASCE 16-95. When designing with LRFD, reference lateral resistances must be used. Contact Simpson for reference lateral resistances of products listed in this catalog. For more information, refer to the American Forest and Paper Association "Guideline to Pre-engineered Metal Connectors" and ASCE 16-95. The "Guideline" contains a soft conversion procedure that can be used to derive reference lateral resistances for wood.
- Simpson recommends that hanger height be at least 60% of joist height for stability.
- Pneumatic or powder-actuated fasteners may deflect and injure the operator or others. Powder-actuated fasteners should not be used to install connectors. Pneumatic nail tools may be used to install connectors, provided the correct quantity and type of fasteners are properly installed in the fastener holes. Tools with fastener hole-locating mechanisms should be used. Follow the manufacturer's instructions and use the appropriate safety equipment. Over driving fasteners may reduce allowable loads. Contact Simpson.

IMPORTANT INFORMATION & GENERAL NOTES

Limited Warranty

Simpson Strong-Tie Company Inc. warrants catalog products to be free from defects in material or manufacturing. Simpson Strong-Tie Company Inc. products are further warranted for adequacy of design when used in accordance with design limits in this catalog, and properly specified and installed. This warranty does not apply to uses not in compliance with specific applications and installation procedures set forth in this catalog, or to non-catalog or modified products, or to deterioration due to environmental conditions.

Simpson Strong-Tie® connectors are designed to enable structures to resist the movement, stress, and loading that results from natural events such as earthquakes and high velocity winds. Properly-installed Simpson Strong-Tie connectors will perform in accordance with the specifications set forth in the applicable Simpson catalog. Additional performance limitations for specific products may be listed on the applicable catalog pages.

Due to the particular characteristics of the natural event, the specific design and location of the structure, the building materials used, the quality of construction,

and the condition of the soils involved, damage may nonetheless result to a structure and its contents even if the loads resulting from the natural event do not exceed Simpson catalog specifications and Simpson Strong-Tie connectors are properly installed in accordance with applicable building codes.

All warranty obligations of Simpson Strong-Tie Company Inc. shall be limited, at the discretion of Simpson Strong-Tie Company Inc., to repair or replacement of the defective part. These remedies shall constitute Simpson Strong-Tie Company Inc.'s sole obligation and sole remedy of purchaser under this warranty. In no event will Simpson Strong-Tie Company Inc. be responsible for incidental, consequential, or special loss or damage, however caused.

This warranty is expressly in lieu of all other warranties, expressed or implied, including warranties of merchantability or fitness for a particular purpose, all such other warranties being hereby expressly excluded. This warranty may change periodically—consult our website www.strongtie.com for current information.

This catalog reflects changes in the allowable loads and configurations of some Simpson Strong-Tie Company Inc. products. This catalog is effective until December 31, 2009, and supersedes all information in all earlier publications, including catalogs, brochures, fliers, technical bulletins, etc. Use this edition as a current reference. Information on allowable loads and configurations may be updated periodically (see www.strongtie.com for the latest information). After December 31, 2009, contact Simpson Strong-Tie for current product information.

Allowable loads in this catalog are for the described specific applications of properly-installed products. Product modifications, improper loading or installation procedures, or deviations from recommended applications will affect connector allowable load-carrying capacities. Connectors are steel and will corrode and lose load-carrying capacity if exposed to ocean salt air, corrosive fire-retardant chemicals, fertilizers, pressure treated lumber, or other substances or environments that adversely affect steel.

Terms & Conditions of Sale

PRODUCT USE

Products in this catalog are designed and manufactured for the specific purposes shown, and should not be used with other connectors not approved by a qualified designer. Modifications to products or changes in installation procedures should only be made by a qualified designer. The performance of such modified products or altered installation procedures is the sole responsibility of the designer.

INDEMNITY

Customers or designers modifying products or installation procedures, or designing non-catalog products for fabrication by Simpson Strong-Tie Company Inc. shall, regardless of specific instructions to the user, indemnify, defend, and hold harmless Simpson Strong-Tie Company Inc. for any and all claimed loss or damage occasioned in whole or in part by non-catalog or modified products.

NON-CATALOG AND MODIFIED PRODUCTS

Consult Simpson Strong-Tie Company Inc. for applications for which there is no catalog product, or for connectors for use in hostile environments, with excessive wood shrinkage, or with abnormal loading or erection requirements.

Non-catalog products must be designed by the customer and will be fabricated by Simpson Strong-Tie in accordance with customer specifications.

Simpson Strong-Tie cannot and does not make any representations regarding the suitability of use or load-carrying capacities of non-catalog products. Simpson Strong-Tie provides no warranty, express or implied, on non-catalog products. F.O.B. Shipping Point unless otherwise specified.

CONVERSION CHARTS

US Standard Steel Gauge Equivalents in Nominal Dimensions

Min. Thkn's ³ mils	Design Thkn's in	Ref. Ga ²	Thickness of Steel Sheets ⁴ (in)		
			Uncoated Steel	Galvanized Steel (G90)	ZMAX® (G185)
229 ⁵	0.2405	3	0.239	—	—
171 ⁵	0.1795	7	0.179	0.186	—
118	0.1240	10	0.134	0.138	0.140
111 ⁵	0.1163	11	0.120	0.123	0.125
97	0.1017	12	0.105	0.108	0.110
68	0.0713	14	0.075	0.078	0.080
54	0.0566	16	0.060	0.063	0.065
43	0.0451	18	0.048	0.052	0.054
33	0.0346	20	0.036	0.040	0.042
27	0.0283	22	0.030	0.033	0.035

- Steel thickness may vary according to industry mill standards.
- Gauge numbers shown are for reference only.
- Minimum allowed base metal thickness delivered to the job site in mils (0.001"). Example: 33 mils = 0.0329". Represents 95% of the design thickness.
- Approximate thickness.
- Thickness based on Simpson's specifications. Others are based on AISI General Provisions Standard.

Roof Slope Conversion

Rise/Run	Slope
1/12	5°
2/12	10°
3/12	14°
4/12	18°
5/12	23°
6/12	27°
7/12	30°
8/12	34°
9/12	37°
10/12	40°
11/12	42°
12/12	45°

Bolt Diameter

in	mm
3/8	9.5
1/2	12.7
5/8	15.9
3/4	19.1
7/8	22.2
1	25.4

Metric Conversion

Imperial	Metric
1 in	25.40 mm
1 ft	0.3048 m
1 lb	4.448N
1 Kip	4.448 kN
1 psi	6895 Pa

mm = millimeter
m = meter
N = newton
kN = kilonewton
Pa = pascal

STEEL STRESS INCREASE

Recent changes in building codes and standards have affected the way allowable loads on some connectors are determined when using Allowable Stress Design. Building codes and material standards have traditionally allowed designers and manufacturers to take a one-third stress increase on the calculated design capacities of some building materials and components when designing for forces generated from wind and seismic events. Specifically, the codes allowed Simpson Strong-Tie to take a one-third stress increase on the calculated tensile capacity of steel connectors.

Newer codes and standards only allow steel stress increase when using an alternate set of load combinations. For example, the International Building Code and Uniform Building Code do not allow a stress increase when designing with the Basic load combinations of Allowable Stress Design. However, these codes do allow the use of a stress increase when using the Alternate (or *Alternative*) basic load combinations, as long as the referenced material standard/section permits it. The ASCE7 Standards do not have Alternate basic load combinations, so stress increases are not permitted.

Simpson Strong-Tie determines allowable loads in accordance with building codes and steel design standards (*AISI and AISC*). In the past, these steel standards have permitted the use of a one-third stress increase when designing for wind and seismic forces. However, the latest editions of these standards have discontinued that practice.

Because of these changes, Simpson Strong-Tie re-evaluated its entire product line to determine which loads were governed by calculated steel strength and included an allowable stress increase on the steel. The majority of the Simpson Strong-Tie® product line was not affected, since the allowable loads are governed by a tested value, not a calculated value. Those products which were affected are shown with their revised capacities with no steel stress increase.

In this catalog, load values shown under (100) column do not include a steel stress increase. Load values shown under (133) column include a 1/3 stress increase on the steel and should only be used where permitted by code.

Additionally, it must be clarified that the load duration factors for wood permitted by the National Design Specification for Wood Construction are separate and distinct from the one-third stress increase. Load duration factors for wood are permitted to be used in design calculations for all load combinations in the codes and standards covered by this catalog. For that reason there will be loads listed that include a load duration increase for wood or fasteners in wood, such as 1.33 or 1.6 for wind or seismic loading, with no further 1/3 stress increase permitted.

The table below summarizes when stress increases are permitted.

Code	Load Combination	C _d (Wood) Allowed	1/3 Stress Increase (Steel) Allowed
ASCE 7-05, ASCE7-02	Basic	Yes	No
1997 Uniform Building Code	Basic	Yes	No
	Alternate	Yes	Yes
2000 International Building Code	Basic	Yes	No
	Alternate	Yes	Yes
2003/2006 International Building Code	Basic	Yes	No
	Alternate	Yes	No
Florida Building Code 2004	Basic	Yes	No
	Alternate	Yes	No

CORROSION INFORMATION

Understanding the Issues

Metal connectors, anchors, and fasteners will corrode and may lose load-carrying capacity when installed in corrosive environments or exposed to corrosive materials. There are many environments and materials which may cause corrosion including ocean salt air, fire-retardants, fumes, fertilizers, preservative-treated wood, dissimilar metals, and other corrosive elements.

The many variables present in a single building environment make it impossible to accurately predict if, or when, significant corrosion will begin or reach a critical level. This relative uncertainty makes it crucial that specifiers and users be knowledgeable of the potential risks and select a product coating or metal suitable for the intended use. It is also important that regular maintenance and periodic inspections are performed, especially for outdoor applications.

It is common to see some corrosion on connectors especially in outdoor applications. Even Stainless Steel can corrode. The presence of some corrosion does not mean that load capacity has necessarily been affected or that a failure will occur. If significant corrosion is apparent or suspected, then the wood, fasteners and connectors should be inspected by a professional engineer or general contractor and may need to be replaced.

In the last several years, pressure treated wood formulations have changed significantly. Many of the new formulations are more corrosive to steel connectors and fasteners than the traditionally used formulation of CCA-C. Simpson testing has shown that ACQ-C, ACQ-D (Carbonate), CBA-A and CA-B treated woods are approximately 2 times more corrosive than CCA-C, while SBX-DOT (Sodium Borate) treated woods were shown to be less corrosive

than CCA-C. Refer to technical bulletin T-PTWOOD for more information.

Due to the many different pressure treatment formulations, fluctuating retention levels, moisture content, and because the formulations may vary regionally, or change without warning, understanding which connectors and fasteners to use with these materials has become a complex task. We have attempted to provide basic knowledge on the subject here, but it is important to fully educate yourself by reviewing our technical bulletins on the topic, and also by viewing information and literature provided by others. Additionally, because the issue is evolving, it is important to get the very latest connector information on the topic by visiting our website at www.strongtie.com/info.

Stainless Steel is always the most effective solution to corrosion risk. However, it is also more expensive and sometimes more difficult to obtain. To best serve our customers, Simpson is evaluating the options to identify the safest and most cost-effective solutions. Based on our testing and experience there are some specific applications that are appropriate for ZMAX®/HDG or G90 connectors (see chart on page 13.)

Because increased corrosion from some newer pressure-treated wood is a new issue with little historical data, we have to base our recommendations on the testing and experience we have to date. It is possible that as we learn more, our recommendations may change, but these recommendations are based on the best information we have at this time.

See www.strongtie.com/info for additional critical information.

CORROSION INFORMATION

General Simpson Recommendations

- Outdoor environments are generally more corrosive to steel. If you choose to use ZMAX or HDG on an outdoor project (*i.e. deck, patio cover*), you should periodically inspect your connectors and fasteners or have a professional inspection performed. Regular maintenance including water-proofing of the wood used in your outdoor project is also a good practice.
- For wood with actual retention levels greater than 0.40 pcf for ACQ and MCQ, 0.41 pcf for CBA-A, or 0.21 pcf for CA-B (*Ground Contact*), Stainless Steel connectors and fasteners are recommended. Verify actual retention level with the wood treater.
- When using Stainless Steel connectors, use Stainless Steel fasteners. When using ZMAX/HDG galvanized connectors, use fasteners that meet the specifications of ASTM A153.

- Testing indicates wood installed dry reduces potential corrosion. If dry wood is used, see our website for additional information.
- Using a barrier membrane can provide additional corrosion protection, see Technical Bulletin T-PTBARRIER.

Due to the many variables involved, Simpson cannot provide estimates on service life of connectors, anchors or fasteners. We suggest that all users and specifiers also obtain recommendations for HDG, ZMAX (G185), mechanically galvanized, or other coatings from the treated wood supplier for the type of wood used. However, as long as Simpson's recommendations are followed, Simpson stands behind its product performance and our standard warranty (*page 11*) applies.

Guidelines for Selecting the Proper Connector

1 Evaluate the Application.

Consider the type of structure and how it will be used. These recommendations may not apply to non-structural applications such as fences.

2 Evaluate the Environment.

Testing and experience indicate that indoor dry environments are less corrosive than outdoor environments. Determining the type of environment where a connector or fastener will be used is an important factor in selecting the most appropriate material and finish for use on the connectors and fasteners. To help in your decision making, consider the following general exposure information:

Interior Dry Use: Includes wall and ceiling cavities, and raised floor applications of enclosed buildings that have been designed to ensure that condensation and other sources of moisture do not develop.

Exterior – Dry: Includes outdoor installations in low rainfall environments and no regular exposure to moisture.

Exterior – Wet: Includes outdoor installations in higher moisture and rainfall environments.

Higher Exposure Use: Includes exposure to ocean salt air, fire retardants, large bodies of water, fumes, fertilizers, soil, some preservative treated woods, industrial zones, acid rain, and other corrosive elements.

3 Evaluate and select a suitable pressure-treated wood for the intended application and environment.

The treated wood supplier should provide all the information needed regarding the wood being used. This information should include: the specific type of wood treatment used, if ammonia was used in the treatment, and the chemical retention level. If the needed information is not provided then Simpson would recommend the use of Stainless Steel connectors and fasteners. You should also ask the treated wood supplier for a connector coating or material recommendation.

4 Use the chart on the right, which was created based on Simpson's testing and experience to select the connector finish or material.

If a pressure treated wood product is not identified on the chart, Simpson has not evaluated test results regarding such product and therefore cannot make any recommendation other than the use of Stainless Steel with that product. Manufacturers may independently provide test results or other product use information; Simpson expresses no opinion regarding any such information.

5 Compare the treated wood supplier's recommendation with the Simpson recommendation.

If these recommendations are different, Simpson recommends that the most conservative recommendation be followed.

Low = Use Simpson standard painted and G90 galvanized connectors as a minimum.

Med = Use ZMAX/HDG galvanized connectors as a minimum. Use fasteners which meet the specifications of ASTM A153 or SDS screws with double-barrier coating.

High = Use Type 303, 304, 305 or 316 Stainless Steel connectors and fasteners.




CONNECTOR COATING RECOMMENDATION – STRUCTURAL APPLICATIONS

Environment	Untreated Wood	SBX/ DOT & Zinc Borate	MCQ	ACQ-C, ACQ-D (Carbonate), CA-B & CBA-A			ACZA	Other or Uncertain
				No Ammonia	With Ammonia	Higher Chemical Content ¹		
Interior – Dry	Low	Low	Low	Med ⁵	Med	High	High	High
Exterior – Dry	Low	N/A ²	Med	Med	High	High	High	High
Exterior – Wet	Med	N/A ²	Med ^{3,4}	Med ^{3,4}	High	High	High	High
Higher Exposure	High	N/A ²	High	High	High	High	High	High
Uncertain	High	N/A ²	High	High	High	High	High	High

- Woods with actual retention levels greater than 0.40 pcf for ACQ and MCQ, 0.41 pcf for CBA-A, or 0.21 pcf for CA-B (*Ground Contact level*).
- Borate treated woods are not appropriate for outdoor use.
- Test results indicate that ZMAX/HDG and the SDS double-barrier coating will perform adequately, subject to regular maintenance and periodic inspection. However, the nationally-approved test method used, AWPA E12-94, is an accelerated test, so data over an extended period of time is not available. If uncertain, use Stainless Steel.
- Some treated wood may have excess surface chemicals making it potentially more corrosive. If you suspect this or are uncertain, use Stainless Steel.
- Where noted in the table, applications where the wood is dry (*moisture content less than 19%*) when installed and will remain dry in-service may use a minimum coating recommendation of "Low".

COATINGS AVAILABLE

Not all products are available in all finishes. Contact Simpson for product availability, ordering information and lead times.

Finish	Description	Level of Corrosion Resistance
Gray Paint	Water-based paint intended to protect the product while it is warehoused and in transit to the jobsite.	Low
Powder Coating	Baked on paint finish that is more durable than our standard paint and produces a better looking finished product.	Low
Standard G90 Zinc Coating	Zinc galvanized finish containing 0.90 oz. of zinc per square foot of surface area (total both sides).	Low
	Galvanized (G185) 1.85 oz. of zinc per square foot of surface area (<i>hot-dip galvanized per ASTM A653 total both sides</i>). These products require hot-dip galvanized fasteners (<i>fasteners which meet the specifications of ASTM A153</i>).	Medium
	Products are hot-dip galvanized after fabrication (14 ga. and thicker). The coating weight increases with material thickness. The minimum specified coating weight is 2.0 oz./ft ² (<i>per ASTM A123 total both sides</i>). These products require hot-dip galvanized fasteners (<i>fasteners which meet the specifications of ASTM A153</i>).	Medium
Double-Barrier Coating (SDS Screws)	SDS screws that are manufactured with two different finishes that provide a level of corrosion protection that exceeds that provided by the previous HDG finish.	Medium
	Products manufactured from Type 316L stainless steel, and provide greater durability against corrosion. Stainless steel nails are required with stainless steel products, and are available from Simpson.	High

See Corrosion Information for more specific performance and application information on these finishes.

QUIK DRIVE® Auto-Feed Screw Driving Systems

Quik Drive auto-feed screw driving systems offer a labor saving method for installing specialty fasteners engineered for a wide range of commercial and residential construction applications.

The systems offer several easy-to-use attachments that bring speed and reliability to applications that require the fastening power of screws.

Featuring patented collation technology, Quik Drive fasteners are designed to meet or exceed industry standards for strength and longevity while offering easy-to-load strips for efficient performance in auto-feed systems.

Some applications include:

- Subflooring, sheathing, wallplates and stairtreads
- Decks and docks
- Drywall
- Fiber cement siding and backerboard
- Composite or wood underlayment
- Metal roofing and siding
- Tile roofing
- Steel to steel

See www.strongtie.com or *Quik Drive®* catalog C-QD08 for more detailed information.

Quik Drive® Screws Shear and Tension Loads

QUIK DRIVE SCREWS		Allowable Load (100)	
MODEL NO.	SCREW SIZE	Shear	Tensile
X1S1016	#10 x 1"	612	962
X1S1214	#12 x 1"	828	1348
X78S1224	#12 x 7/8"	975	1606
TRSD34S1012	#10 x 3/4"	579	632
TRSD34S1016	#10 x 3/4"	629	706
PHSD34S	#8 x 3/4"	498	603
DWF158PS	#6 x 1 1/8"	419	525
DWF114PS	#6 x 1 1/4"	419	525
DWFSD158PS	#6 x 1 1/8"	420	573
DWFSD114PS	#6 x 1 1/4"	420	573
CB3BLG134S	#10 x 1 3/4"	513	677
CB3BLG112S	#10 x 1 1/2"	505	681
PPSD11516S	#8 x 2"	522	719



1. Screws have been tested per AISI Standard Test Method TS-04 using a 0.175" thick steel plate. The tabulated allowable loads are based on the screw strength itself with a factor of safety determined per 2001 AISI NAS & 2004 NAS Supplement section E4.
2. Reference Quik Drive table on page 15 for the allowable #8, #10, and #12 screw values based on lesser of Quik Drive screw strength, as shown in the table above, or strength of the screw in the connected members per 2001 AISI NAS and 2004 NAS Supplement section E4.
3. The tabulated values may be increased by 1/3 for seismic or wind loading as applicable per page 12 "Steel Stress Increase" section.

Screws for Cold-Formed Steel**XS HEX Series**

#12 and #10 hex head screws, 5/16" drive, drill point, clear zinc.



X1S1016
10 x 1" (25mm)
#2 drill point
16 tpi

X1S1214
12 x 1" (25mm)
#3 drill point
14 tpi

XS HEX Washer Head Steel Decking Screw

#12 hex head screw, 5/16" drive, #4 drill point, Climaseal® corrosion protection, 24 tpi.



X78S1224
12 x 7/8" (21mm)

TRSD Series

#10 steel screw, fine thread, #2 drill point, truss head, clear zinc coating.



TRSD34S1012
3/4" (19mm)

TRSD34S1016
3/4" (19mm)

PHSD Series

#8 steel screw, fine thread, #2 drill point, pan head, clear zinc coating.



PHSD34S
3/4" (19mm)

Screws for Other Applications**DWF Series**

#6 drywall screw, fine thread, sharp point, bugle head, gray phosphate finish.



DWF158PS
1 1/8" (41mm)

DWF114PS
1 1/4" (32mm)

CB3BLG Series

#10 fiber cement board screw, coarse thread, type 17 point, bugle head, C3 mechanical galvanized corrosion protection.



CB3BLG134S
1 3/4" (45mm)

CB3BLG112S
1 1/2" (38mm)

DWF and CB3BLG Series for application attaching to CFS with thickness of 33-18 mil (20-25 ga).

DWFSD Series

#6 drywall screw, fine thread, #2 drill point, bugle head, yellow zinc coating.



DWFSD158PS
1 1/8" (41mm)

**DWFSD114PS /
DWFZSD114PS**
(clear zinc coating)
1 1/4" (32mm)

PPSD Series

#8 wood to steel screw, #2 drill point, flat head, yellow zinc coating.



PPSD11516
1 1/2" (49mm)

DWFSD and PPSD Series for application attaching to CFS with thickness of 54-43 mil (16-18 ga).



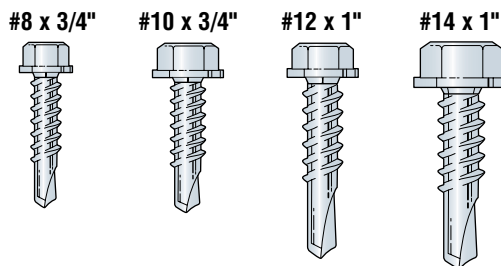
QUIK DRIVE® Auto-Feed Screw Driving Systems

QUIK DRIVE SCREW ALLOWABLE LOADS (100)																	
Model No.	Size	Dia.	SHEAR					TENSION: PULL-OVER					TENSION: PULL-OUT				
			Steel Thickness: mil (ga) ³					Steel Thickness: mil (ga) ³					Steel Thickness: mil (ga) ³				
			33-33 (20-20)	43-43 (18-18)	54-54 (16-16)	68-68 (14-14)	97-97 (12-12)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)
			PAN HEAD SCREW														
PHSD34S	#8 x 3/4"	0.164	235	307	474	477	422	—	—	—	—	—	125	133	214	247	—
HEX HEAD SCREW																	
X1S1014	#10 x 1"	0.190	290	410	612	612	612	712	760	962	962	962	145	145	247	288	604
X1S1214	#12 x 1"	0.216	291	397	723	828	828	453	680	999	1029	1348	136	146	221	246	544
X78S1224	#12 x 7/8"	0.216	279	394	721	975	975	—	—	—	—	—	70	121	187	217	—
TRUSS HEAD SCREW																	
TRSD34S1012	#10 x 3/4"	0.190	305	438	579	579	579	—	—	—	—	—	70	121	187	217	—
TRSD34S1016	#10 x 3/4"	0.190	293	398	545	629	629	—	—	—	—	—	70	121	187	217	—

1. Values based on lesser of Quik Drive® screw strength (see table on page 14) or strength of the screw in the connected members.
2. Screws and screw connections have been tested per AISI Standard Test Method TS-05. The tabulated allowable loads are based on the lower of the screw strength itself or the strength of the screw in the connected members per 2001 AISI NAS & 2004 NAS Supplement section E4.
3. Values are based on cold-formed steel (CFS) members with a minimum yield strength of Fy = 33 ksi and tensile strength of Fu = 45 ksi for 43 mil (18 ga) and thinner and a minimum yield strength of Fy = 50 ksi and Fu = 65 ksi for 54 mils (16 ga) and thicker.
4. Minimum thickness represents 95% of the design thickness and is the minimum acceptable base metal thickness based on 2001 AISI NAS section A2.4. Design thickness for the steel sheets are: 33 mil = 0.0346", 43 mil = 0.0451", 54 mil = 0.0566", 68 mil = 0.0713", and 97 mil = 0.1017".
5. Screw diameters per 2001 AISI NAS Commentary Table G-E4-1.
6. Minimum required screw length is the lesser of 3/4" or the minimum length required for the screw to extend through the steel connection a minimum of (3) exposed threads per AISI General Provisions Standard section D1.3.
7. Larger of screw head or washer diameter, dw, for #10 and #12 screws is 0.375".
8. The tabulated values may be increased by 1/3 for seismic or wind loading as applicable per page 12 "Steel Stress Increase" section.

Screws

The values for the connectors in this catalog are based upon using Quik Drive screws as shown above or the calculated minimum screw allowable load value shown in the table below.



Actual Size Shown

SCREW ALLOWABLE LOADS CALCULATED FROM AISI NASPEC (100)																
SIZE	DIAMETER ⁶	SHEAR					TENSION: PULL-OVER					TENSION: PULL-OUT				
		Steel Thickness: mil (ga) ⁴					Steel Thickness: mil (ga) ⁴					Steel Thickness: mil (ga) ⁴				
		33-33 (20-20)	43-43 (18-18)	54-54 (16-16)	68-68 (14-14)	97-97 (12-12)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)
		#8	0.164	164	244	496	684	976	247	322	584	736	1049	72	94	171
#10	0.190	177	263	534	755	1130	247	322	584	736	1049	84	109	198	249	356
#12	0.216	188	280	569	805	1285	247	322	584	736	1049	95	124	225	284	405
#14 ⁸	0.242	199	297	603	852	1440	389	507	920	1159	1653	107	139	252	318	453
1/4" ⁸	0.250	203	302	613	866	1476	389	507	920	1159	1653	110	144	261	328	468

1. Values based on the calculated strength of the screw in the connected members per 2001 AISI NAS section E4.3.
2. The Designer must verify that the screws used for the connectors shown in this catalog have equal or greater allowable load values, as determined from 2001 AISI NAS with the 2004 Supplement section E4, than those in the table directly above if using other than Quik Drive screws shown in the table at the top of this page.
3. Values are based on cold-formed steel (CFS) members with a minimum yield strength of Fy = 33 ksi and tensile strength of Fu = 45 ksi for 43 mil (18 ga) and thinner and a minimum yield strength of Fy = 50 ksi and Fu = 65 ksi for 54 mils (16 ga) and thicker.
4. Minimum thickness represents 95% of the design thickness and is the minimum acceptable base metal thickness based on 2001 AISI NAS section A2.4. Design thickness for the steel sheets are: 33 mil = 0.0346", 43 mil = 0.0451", 54 mil = 0.0566", 68 mil = 0.0713", and 97 mil = 0.1017".
5. Screw diameters per 2001 AISI NAS Commentary Table G-E4-1.
6. Minimum required screw length is the lesser of 3/4" or the minimum length required for the screw to extend through the steel connection a minimum of (3) exposed threads per AISI General Provisions Standard section D1.3.
7. Larger of screw head or washer diameter, dw, for #10 and #12 screws is 0.375".
8. Larger of screw head or washer diameter, dw, for #14 and 1/4" hex head screw is 0.50".
9. The tabulated values may be increased by 1/3 for seismic or wind loading as applicable per page 12 "Steel Stress Increase" section.

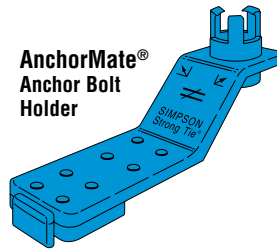
ANCHORMATE® Anchor Bolt Holders

Designed to hold the anchor in place before the concrete pour, as required in some jurisdictions.

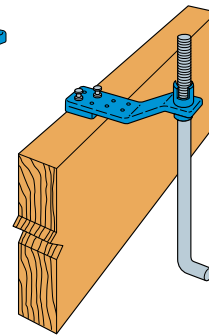
- Built-in 2x4 and 2x6 stops eliminate measuring.
- Elevated bolt grippers allow easy trowel finishing.
- Color-coded for easy size identification.
- Lightweight, durable and easy to use.
- Reusable yet cost-efficient for single application.
- Threaded grippers hold each bolt in the exact same location and height. They secure the bolt in place without a nut for quicker set-up and tear-down, and protect threads from splashing concrete.
- Use the 5/8" and 7/8" AnchorMate to secure the SSTB to the formboard before the concrete pour. Alignment arrows (left or right) match the SSTB bolt head arrow.
- Available in cartons of 100 parts or bags of 10 parts.

MATERIAL: Nylon

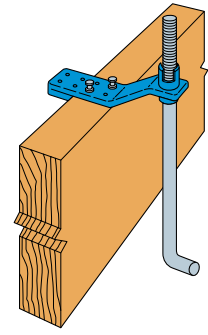
CODES: See page 8 for Code Listing Key Chart.



AnchorMate®
Anchor Bolt
Holder



Typical AnchorMate
Installation for a
2x6 Mudsill



Typical AnchorMate
Installation for a
2x4 Mudsill

Model No.	Dia.	Color	Code Ref.
AM1/2	1/2	Yellow	180
AM5/8	5/8	Blue	
AM3/4	3/4	Red	
AM7/8	7/8	Green	

ABS Anchor Bolt Stabilizer

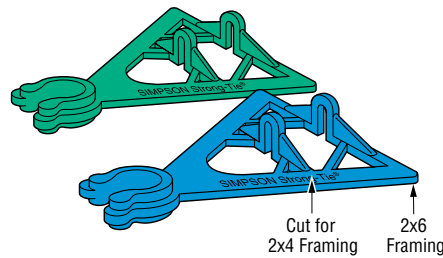
The ABS stabilizes the anchor bolt to prevent it from being pushed against the form during the concrete pour.

FEATURES:

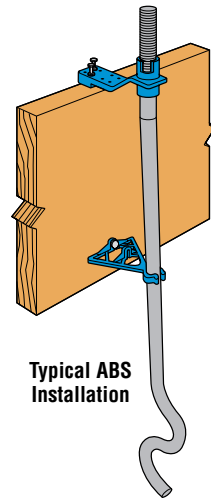
- Supports the bolt approx. 8" below the top of the concrete.
- Model ABS5/8 is for the 5/8" SSTB and ABS7/8 is for the 7/8" SSTB.
- Thin section limits the effect of a cold joint.
- Sized for 2x4 and 2x6 mudsills.

MATERIAL: Engineered Composite Plastic.

CODES: See page 8 for Code Listing Key Chart.



ABS Anchor Bolt
Stabilizer



Typical ABS
Installation

Model No.	Diameter	Color	Code Ref.
ABS5/8	5/8	Blue	180
ABS7/8	7/8	Green	

STRAPMATE® Strap Holder

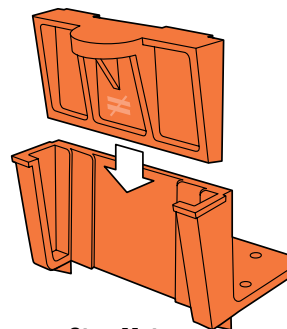
The StrapMate is designed to keep the STHD, LSTHD, HPAHD and PAHD straps vertically aligned during the concrete pour to minimize possibility of spalling. The friction fit allows for quick and easy installation.

- The StrapMate is reusable.
- Works with STHD, S/HPAD, S/PAHD.

MATERIAL: Engineered Composite Plastic

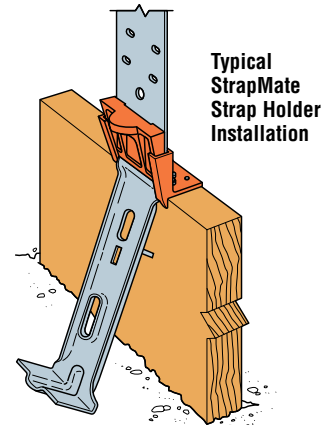
- Designed to fit 3/4" plywood forms up to 1 3/4" LVL forms and larger.
- The strap is positioned off the front edge of the form board.

CODES: See page 8 for Code Listing Key Chart.



StrapMate
Strap Holder

U.S. Patent 6,796,099



Typical
StrapMate
Strap Holder
Installation

Model No.	Nails	Code Ref.
SM1	2-8d Duplex	180

BP/LBP Bearing Plates

Bearing Plates give greater bearing surface than standard cut washers, and help distribute the load at these critical connections.

The BP $\frac{1}{2}$ -3 and BP $\frac{5}{8}$ -3 are available uncoated or with a hot-dip galvanized (HDG) finish.

MATERIAL: See table

FINISH: LBP, LBPS & BP $\frac{5}{8}$ S—Galvanized; BP $\frac{7}{8}$ -2—Zinc Plated;

BPS, BP—None. BP's may be ordered HDG; LBP and LBPS products may be ordered ZMAX[®]; check factory. Refer to page 12–13 for Corrosion Information.

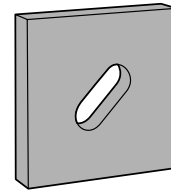
INSTALLATION: See General Notes.

CODES: See page 8 for Code Listing Key Chart. IRC R602.11.1, IBC 2305.3.11

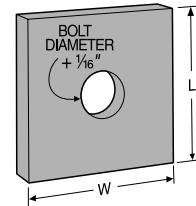
These products are available with additional corrosion protection. Additional products on this page may also be available with this option, check with Simpson for details.

Model No.	Thickness	Dimensions		Bolt Dia.	Code Ref.
		W	L		
LBP $\frac{1}{2}$	$\frac{9}{64}$	2	2	$\frac{1}{2}$	180
LBP $\frac{5}{8}$	$\frac{9}{64}$	2	2	$\frac{5}{8}$	
LBPS $\frac{1}{2}$	$\frac{9}{64}$	3	3	$\frac{1}{2}$	190
LBPS $\frac{5}{8}$	$\frac{9}{64}$	3	3	$\frac{5}{8}$	
BPS $\frac{1}{2}$ -3	$\frac{1}{4}$	3	3	$\frac{1}{2}$	180
BPS $\frac{5}{8}$ -3	$\frac{1}{4}$	3	3	$\frac{5}{8}$	
BP $\frac{1}{2}$	$\frac{3}{16}$	2	2	$\frac{1}{2}$	97, 190
BP $\frac{1}{2}$ -3	$\frac{1}{4}$	3	3	$\frac{1}{2}$	
BP $\frac{5}{8}$ -2	$\frac{3}{16}$	2	2	$\frac{5}{8}$	97
BP $\frac{5}{8}$	$\frac{1}{4}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	$\frac{5}{8}$	
BP $\frac{5}{8}$ -3	$\frac{1}{4}$	3	3	$\frac{5}{8}$	190
BP $\frac{3}{4}$	$\frac{5}{16}$	2 $\frac{3}{4}$	2 $\frac{3}{4}$	$\frac{3}{4}$	97
BP $\frac{7}{8}$ -2	$\frac{3}{8}$	1 $\frac{15}{16}$	2 $\frac{1}{4}$	$\frac{7}{8}$	180
BP $\frac{7}{8}$	$\frac{5}{16}$	3	3	$\frac{7}{8}$	97
BP1	$\frac{3}{8}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	1	

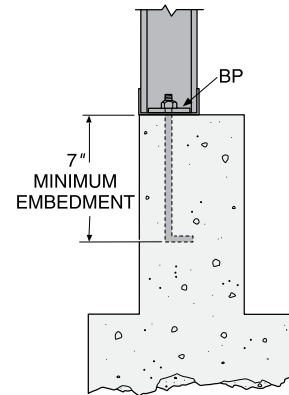
1. Standard cut washer required with BPS $\frac{1}{2}$ -3 and BPS $\frac{5}{8}$ -3 (not provided).



BPS
(LPBS similar)



BP
(LBP similar)



Typical BP Installed with a Bottom Track Anchor Bolt

Concrete Connectors

CNW Coupler Nuts

Simpson coupler nuts are a tested and load rated method to join threaded rod and anchor bolts. "Witness" holes in the nut provide a means to verify when rods are properly installed. The holes are aligned to allow inspection of both rods from one viewpoint. The positive stop feature helps ensure even threading into each end of the nut. CNW's meet and exceed the capacity of corresponding ASTM A36 bolts and threaded rod. HSCNW's meet and exceed the capacity of corresponding ASTM A449 Grade B7 bolts and threaded rod. Contact factory for other coupler nut sizes.

FINISH: Zinc Plated

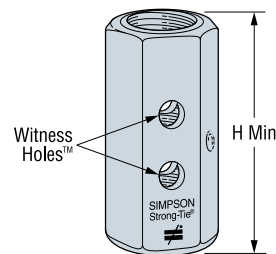
INSTALLATION:

- Tighten the two rods until each all-thread rod is visible in the witness hole.
- For non-hot dipped galvanized all-thread rod only.
- $\frac{5}{8}$ " and $\frac{7}{8}$ " diameter couplers available with oversized threads for installation to galvanized bolts (order CNW $\frac{5}{8}$ - $\frac{5}{8}$ OST and CNW $\frac{7}{8}$ - $\frac{7}{8}$ OST).

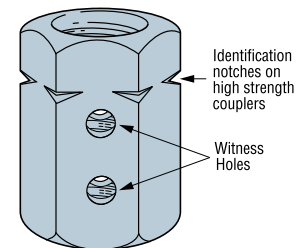
CODES: See page 8 for Code Listing Key Chart.

Model No.	Rod Diameter	H Min	Allowable Tension Load (lbs.)	Code Ref.	
			(100)		
CNW $\frac{1}{2}$	0.500	1 $\frac{1}{2}$	3750	145	
CNW $\frac{5}{8}$	0.625	1 $\frac{7}{8}$	5875		
CNW $\frac{3}{4}$	0.750	2 $\frac{1}{4}$	8460		
CNW $\frac{7}{8}$	0.875	2 $\frac{1}{2}$	11500		
CNW1	1.000	2 $\frac{3}{4}$	15035		
CNW1 $\frac{1}{4}$	1.250	3	23490		
HSCNW $\frac{3}{4}$	0.750	2 $\frac{1}{4}$	17495		
HSCNW1	1.000	2 $\frac{3}{4}$	31100		
Transition Couplers					
CNW $\frac{5}{8}$ - $\frac{1}{2}$	0.625 to 0.500	1 $\frac{1}{2}$	3750		
CNW $\frac{3}{4}$ - $\frac{5}{8}$	0.750 to 0.625	1 $\frac{3}{4}$	5875		
CNW $\frac{7}{8}$ - $\frac{5}{8}$	0.875 to 0.625	2	5875		
CNW1- $\frac{7}{8}$	1.000 to 0.875	2 $\frac{1}{4}$	11500		

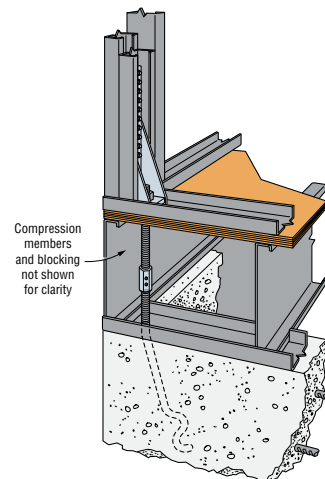
1. Allowable loads may be increased as permitted by the applicable building code as shown on page 12.
2. Allowable loads shown are based on threaded rod allowable load.



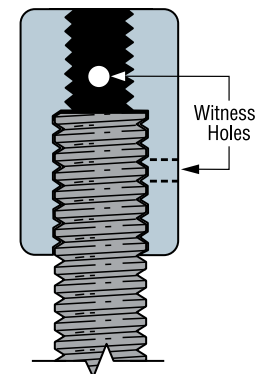
CNW allows fast visual check for correct all thread rod installation



HSCNW High Strength Coupler Nut



Typical CNW Rim Joist Installation



CNW Transition Coupler Nut

MAS Mud sill Anchor

A fast, low installed cost mudsill anchor. Fast for the finisher—Install before pouring concrete by nailing into form, or insert into concrete after pour. Finish up to edge of slab—no anchor bolts to hand-trowel around, no nuts or washers to lose. For slab or stemwall construction.

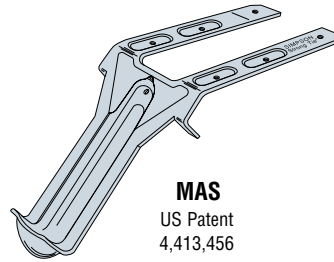
MATERIAL: 54 mil (16 ga)

FINISH: Galvanized. Available with ZMAX® coating; see Corrosion Information, page 12-13.

INSTALLATION: • Use all specified fasteners.

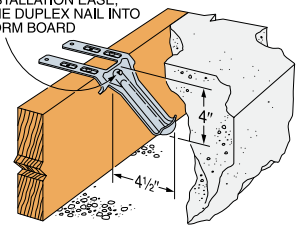
- Not for use where (a) a horizontal cold joint exists between the slab and foundation wall or footing beneath, unless provisions are made to transfer the load, or (b) anchors are installed in slabs poured over foundation walls formed of concrete block.
- Recommended to use low profile head screws when sheathing installed over MAS.
- Channel section must be attached to the inside of the track for correct MAS installation.
- Minimum concrete compressive strength f'c, 2500 psi.

CODE: See page 8 for Code Listing Key Chart.

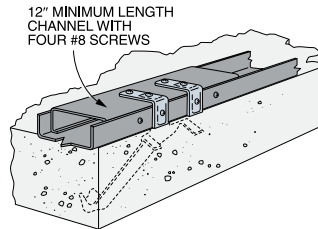


MAS
US Patent
4,413,456

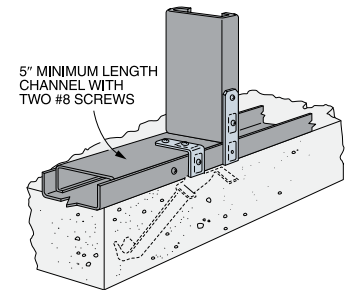
FOR INSTALLATION EASE,
NAIL ONE DUPLEX NAIL INTO
SIDE FORM BOARD



Typical MAS Installation



Typical MAS Installation



**MAS Installation with
1-Leg Attached to Stud**

Alternate MAS installation allows for MAS to be installed on the other side of bottom track and may be used for panelized wall construction. See *Wood Construction Connector* catalog or www.strongtie.com for details.

Available with additional corrosion protection. Check with factory.

Model No.	Fasteners		Allowable Loads ¹ (100) 33 mil (20 ga)			Code Ref.
	Sides Total	Top	Uplift	Parallel to Track	Perp. to Track	
MAS	2- #10	4- #10	700	800	300	28

1. Tabulated loads are governed by tests and may not be increased. Refer to page 12 for additional information.
2. MAS installed with 1 leg attached to stud has loads of 435 lbs. (uplift), 465 lbs. (parallel to track) and 235 lbs. (perpendicular to track).

LCB Column Bases

LCB uses screws, which allows for fast installation, reduced reveal and high capacity, while maintaining the net section of the column.

FINISH: LCB - galvanized.

MATERIAL: See table

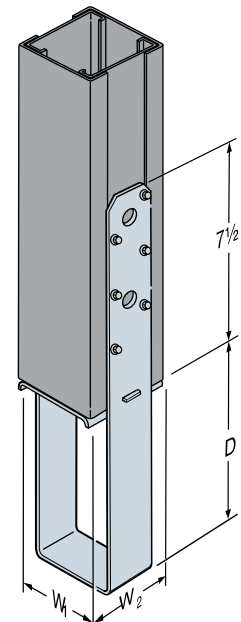
INSTALLATION: • Use all specified fasteners. See General Notes.

- For full loads, minimum side cover required is 2" for LCB.
- Install all models with bottom of base plate flush with concrete.
- Post bases do not provide adequate resistance to prevent members from rotating about the base and therefore are not recommended for non top-supported installations (such as fences or unbraced carports).

OPTIONS: • The LCB may be shipped unassembled; specify "Disassembled".

CODES: See page 8 for Code Listing Key Chart.

Installation for cold-formed steel built-up column.
Note: The engineer of record is responsible for design of column member.



LCB44
(LCB46, LCB66 similar)

Model No.	Column Size	Material Thickness mil (ga)		Dimensions			Column Fasteners	Allowable Uplift Loads				Code Ref.
		Strap	Base	W ₁	W ₂	D		Screws	43 mil (18 ga)		54 mil (16 ga)	
							(100)		(133)	(100)	(133)	
LCB44	3.5 x 3.5	97 (12 ga) x 2"	54 (16 ga)	3 3/16	3 1/2	6 1/2	12- #10	3155	4210	5760	5760	151
LCB46	3.5 x 5.5	97 (12 ga) x 2"	54 (16 ga)	3 3/16	5 1/2	6 1/2	12- #10	3155	4210	5760	5760	
LCB66	5.5 x 5.5	97 (12 ga) x 2"	54 (16 ga)	5 1/2	5 1/2	5 1/2	12- #10	3155	4210	5760	5760	

1. Tabulated loads shown at (100) do not include steel stress increase. Tabulated loads shown at (133) include a 1/2 stress increase on the steel. Refer to page 12 for additional information.
2. Sizes indicate nominal dimensions.
3. Designer is responsible for concrete design.

ANCHOR SYSTEMS – GENERAL INFORMATION

SIMPSON

Strong-Tie
ANCHOR SYSTEMS

Simpson Strong-Tie® Anchor Systems manufactures a full line of anchoring and fastening products for concrete and masonry. The product line includes adhesives for anchoring and crack injection, mechanical anchors, powder actuated fasteners and drill bits. Anchor Systems products offer unique solutions to applications in the light framed construction market when used with, and without, Simpson connectors.

For complete information on product performance, installation requirements and appropriate code listings for Anchor Systems products please refer to the Anchor Systems catalog (*form C-SAS*) or visit www.simpsonanchors.com.

Anchors

Adhesive Anchor Solutions

ACRYLIC-TIE® HIGH STRENGTH, ALL TEMPERATURE ADHESIVE

Acrylic-Tie® is a two-component, 10:1 ratio acrylic based adhesive for use as a high strength, anchor grouting material. Formulated for use in all types of weather, AT is designed to dispense easily and cure at temperatures down to 0°F. Resin and initiator are dispensed and mixed simultaneously through the mixing nozzle.

CODES: ICC-ER 5791; City of L.A. RR 25459; FL 2304.1



AT13

SET HIGH STRENGTH EPOXY

Epoxy-Tie® SET epoxy is a two-component, low odor, 1:1 ratio, 100% solids epoxy-based adhesive for use as a high strength, non-shrink anchor grouting material. SET is ideal for high load applications where strength is the main concern. Resin and hardener are dispensed and mixed simultaneously through the mixing nozzle.

CODES: ICC ESR-1772; City of L.A. RR 25279; FL 5550.3



SET22

ET EPOXY-TIE ADHESIVE

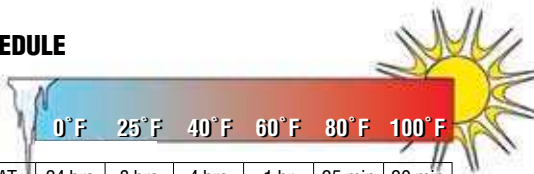
Epoxy-Tie® ET is a two-component, low odor, 1:1 ratio, 100% solids epoxy-based system for use as a high strength, non-shrink anchor grouting material. ET offers an economical solution for general anchoring applications. Resin and hardener are dispensed and mixed simultaneously through the mixing nozzle.

CODES: ICC ER-4945; City of L.A. RR 25185 & RR 25120; FL 5550.1



ET22

CURE SCHEDULE



Base Material	AT	24 hrs	8 hrs	4 hrs	1 hr	25 min	20 min
Temp	SET	—	—	72 hrs	24 hrs	20 hrs	16 hrs
	ET	—	—	72 hrs	24 hrs	24 hrs	12 hrs

Refer to C-SAS for other Adhesive Solutions

Mechanical Anchor Solutions

These products are available with additional corrosion protection. Additional products on this page may also be available with this option, check with Simpson for details.

TITEN HD®

The Titen HD is a patented, high-strength screw anchor for concrete and masonry. The self-undercutting, non-expansion characteristics of the Titen HD makes it the ideal anchor for structural applications, even at minimum edge distances and under reduced spacing conditions. The proprietary cutting teeth enable the Titen HD to be installed in one eighth of the time when compared to traditional expansion anchors, and at significantly reduced installation torques. This heat-treated anchor undercuts the concrete to create a strong mechanical interlock over the entire length of the anchor. The anchor can be installed with a standard ANSI tolerance drill bit and is removable. **WARNING:** Recommended for permanent dry, interior, non-corrosive environments or temporary outdoor applications. Contact Simpson for more information.

CODES: ICC ESR-1056; City of L.A. RR 25560; FL 2304.2



Titen HD

U.S. Patent 5,674,035 & 6,623,228

WEDGE-ALL®

The Wedge-All is a non-bottom bearing, wedge style expansion anchor for use in solid concrete or grout filled masonry. A one-piece clip ensures uniform holding capacity that increases as tension is applied. The threaded stud version is available in nine diameters and multiple lengths. A single size tie-wire version is available for wire supported fixtures. Threaded studs are set by tightening the nut. Tie-wire anchors are set with the claw end of a hammer.

CODES: ICC ER-3631; City of L.A. RR 24682; FL 5415.3



Wedge-All

Refer to C-SAS for other Mechanical Anchor Solutions

ANCHOR SYSTEMS *Holdown and Post Base Anchor Solutions*

Simpson Anchor Systems products offer several post-installed anchorage solutions for holdowns and bases. Often times these products are used when cast-in-place anchors are omitted or mislocated, or in retrofit applications. The following design values provide solutions to common applications encountered in the light frame construction market.

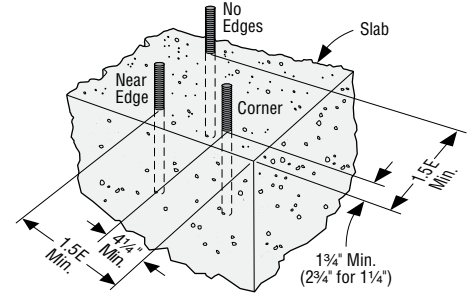
For a more complete solution guide refer to the *Anchoring Solutions for Simpson Strong-Tie® Connectors* technical bulletin (T-ANCHORSPEC). For complete information on product performance, installation requirements and appropriate code listings for Anchor Systems products please refer to the Anchor Systems catalog (*form C-SAS*) or visit www.simpsonanchors.com. Also refer to page 10 for Important Instructions to Designer.

For Corrosion Information, see pages 12-13.

ADHESIVE SOLUTIONS

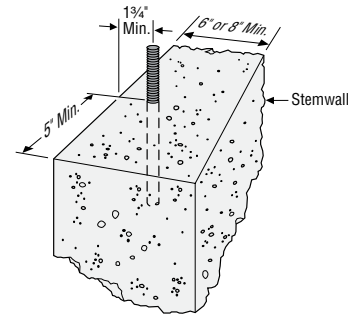
Tension Loads for Threaded Rod in Concrete Slab

Anchor Dia.	Drill Bit Diameter (in)		Embed. Depth E	Tension Load Based on Bond Strength (100)						Tension Load Based on Steel Strength (100)
	AT	SET		No Edge		Near Edge		Corner		
				AT	SET	AT	SET	AT	SET	
1/2	9/16	5/8	2 1/8	1315	1805	660	1175	660	1175	3750
			4 1/4	4165	4425	2085	2875	1605	2415	
			6	4795	4640	3115	2740	2400	2000	
5/8	1 1/16	3/4	2 1/2	2125	1695	1065	815	1065	815	5875
			5 1/2	6505	6680	3255	3205	2340	2245	
			9 3/8	7920	8350	4830	5345	3335	3820	
3/4	1 3/16	7/8	3 3/8	3250	3865	1625	1855	1430	1615	8460
			6 3/4	9405	10525	4705	5050	3035	3235	
			11 1/4	10595	11910	5935	6790	3740	4345	
7/8	1	1	3 3/8	3550	4780	1740	2295	1390	1835	11500
			7 3/4	10710	12290	5250	5900	3255	3600	
			13 1/8	13785	16670	7170	8670	4205	5085	
1	1 1/16	1 1/8	4 1/2	5200	5020	2290	2410	1600	1785	15025
			9	15125	15015	6655	7205	3725	4250	
			15	20630	20600	8045	9680	3750	5190	
1 1/4	1 5/16	1 3/8	5 5/8	8090	8965	3800	5200	2320	3590	23490
			11 1/4	18090	19260	8500	11170	4505	7010	
			18 3/4	3162	30670	13600	15640	6325	8365	



Tension Loads for Threaded Rod in Concrete Stemwall

Anchor Dia.	Drill Bit Dia. (in)		Embed. Depth, E	Allowable Tension Load	
	AT	SET		AT	SET
5/8	1 1/16	3/4	10	3230	3410
7/8	1	1	15	5460	5665



- The allowable loads listed under bond strength are based on a safety factor of 4.0.
- Allowable bond strength loads may be increased 33 1/3% for short term loading due to wind or seismic forces where permitted by code.
- The allowable tension load is the lesser of the allowable load based on bond strength and the allowable load based on steel strength (A36 rod shown).
- Minimum f'c = 2000 psi.
- Anchors are not permitted for use in conjunction with fire-resistive construction. Exceptions are:
 - Anchors designed to resist wind or seismic loading only,
 - For other than wind or seismic loading, special consideration is given to fire exposure conditions.
- Anchors are not permitted to resist tension forces in overhead or wall installations unless proper consideration is given to fire-exposure and elevated temperature conditions.

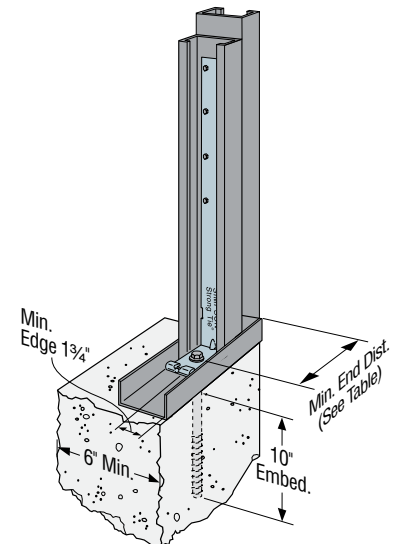
TITEN HD® SOLUTIONS

NEW longer 1/2" diameter Titen HD anchors achieve sufficient embedment depth to yield tension loads equal to certain Simpson holdowns. Now instead of using cast-in-place bolts or adhesive anchors, the Titen HD can be used as a time saving alternative. Reference flier F-SAS-THD4HD for more information.

Tension Loads in Normal Weight Concrete Stemwall

Size (in)	Drill Bit Dia. (in)	Min. Embed. Depth (in)	Min. Stemwall Width (in)	Min. Edge Distance (in)	Min. End Distance (in)	Allowable Tension Load (100)	
						f'c ≥ 2500 psi Concrete	f'c ≥ 4500 psi Concrete
1/2	1/2	10	6	1 3/4	4 3/8	3570	4760
					8	3855	5075


- The allowable loads listed are based on a safety factor of 4.0.
- Allowable loads may be increased 33 1/3% for short term loading due to wind or seismic forces where permitted by code.
- The minimum anchor spacing is 15 inches.
- The minimum concrete thickness is 12 inches.
- Allowable loads may be interpolated for compressive strengths between 2,500 and 4,500 psi.
- Titen HD available in 12", 13", 14" and 15" for this application.



ANCHOR SYSTEMS - TITEN HD® Threaded Anchor for Concrete & Masonry

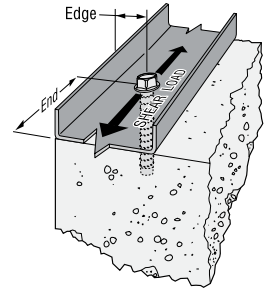
The Titen HD is a patented, high-strength threaded anchor for concrete and masonry. The self-undercutting, non-expansion characteristics of the Titen HD makes it the ideal anchor for structural applications, even at minimum edge distances and under reduced spacing conditions. The proprietary cutting teeth enable the Titen HD to be installed in significantly less time than traditional expansion anchors, and at significantly reduced installation torques. This heat-treated anchor undercuts the concrete to form a strong mechanical interlock over the entire length of the anchor. The anchor can be installed with a standard ANSI masonry drill bit and is removable. The Titen HD is recommended for permanent dry, non-corrosive applications or temporary outdoor applications.

FEATURES:

- **Higher load capacity and vibration resistance:** Threads along the length of the anchor efficiently transfer the load to the base material.
- **Less spacing and edge distance required:** The anchor does not exert expansion forces on the base material.
- **No special drill bit needed:** Designed to install using standard sized drill bits.
- **Installs with 50% less torque:** Testing shows that when compared with a major competitor, the Titen HD requires 50% less torque to be installed in concrete.
- **Less installation time:** No secondary setting or torquing is required.
- **Stamped Hex-washer head:** Requires no separate washer and provides a clean installed appearance. The head is stamped with the Simpson  sign and the anchor length in inches for easy inspection. (Some local building jurisdictions may require a separate washer.)
- **Removable:** Ideal for temporary anchoring (e.g. formwork, bracing) or applications where fixtures may need to be moved.
- Mechanical galvanized coating is available. Refer to www.strongtie.com/info for corrosion information.

CODES: ICC ESR-1056; City of L.A. RR25560; Florida FL 2304.2; Factory Mutal 3017082; 3/4" dia. Meadow-Burke approved for tilt-up wall bracing.

For complete technical information please refer to our Anchor Systems Catalog.



Edge and end distances for Titen HD in concrete slab corner condition

U.S. Patent 5,674,035

Anchors

For information on installing Simpson connectors with Anchor Systems products, request T-ANCHORSPEC.

SHEAR LOADS IN NORMAL-WEIGHT CONCRETE

Anchor Callout (Dia. x L)	Minimum Embedment Depth ¹ (E)	Minimum Edge	End Distance	Anchor Spacing	Allowable Shear Load (100)				
					Concrete ³ (f'c ≥ 2500 psi) (lbs/ft)	Cold Formed Steel			
						68 mils (14 ga) ⁴ (lbs/ft)	54 mils (16 ga) ⁴ (lbs/ft)	43 mils (18 ga) ⁴ (lbs/ft)	33 mils (20 ga) ⁴ (lbs/ft)
3/8" x 3" Titen HD ²	2 3/4"	4 1/2"	6"	0' - 6"	3,250	3,125	2,485	1,370	1,020
				1' - 0"	1,625	1,565	1,240	685	510
				2' - 0"	810	780	620	340	255
				3' - 0"	540	520	415	230	170
				4' - 0"	405	390	310	170	130
				5' - 0"	325	315	250	135	100
				6' - 0"	270	260	205	115	85
1/2" x 4" Titen HD	3 1/2"	1 3/4"	8"	0' - 8"	2,565	3,125	2,485	1,320	895
				1' - 0"	1,710	2,085	1,655	880	595
				2' - 0"	855	1,040	830	440	300
				3' - 0"	570	695	550	295	200
				4' - 0"	425	520	415	220	150
				5' - 0"	340	415	330	175	120
				6' - 0"	285	345	275	145	100
5/8" x 4" Titen HD	3 1/2"	1 3/4"	10"	0' - 10"	2,115	3,125	2,400	1,190	770
				1' - 0"	1,765	2,606	2,000	995	640
				2' - 0"	880	1,305	1,000	495	320
				3' - 0"	585	870	665	330	215
				4' - 0"	440	650	500	250	160
				5' - 0"	350	520	400	200	130
				6' - 0"	290	435	335	165	105

1. Washer and CFS member thickness to be considered by Designer.
2. Refer to ICC ESR-1056 reduction factors for edge distance less than 4 1/2".
3. Shear parallel to the edge of slab (except shear can be applied in any direction for 3/8" Titen HD). Allowable loads may be increased 1/3 for short-term loading due to seismic or wind forces where permitted by code (See page 12).
4. 2001 AISI NAS, Eq. E3.3.1-1, Ω = 2.5. See page 11 for CFS thickness standards and General Notes (e) on page 9 for CFS properties.
5. Allowable loads must be the lesser of the concrete or CFS strength.

TENSION LOADS IN NORMAL-WEIGHT CONCRETE

Dia. (D) (in)	Embed. Depth (in)	Min. Edge	Allowable Tension Load (100)				
			Concrete (f'c ≥ 2500 psi ^{1,2,3}) (lbs)	Cold Formed Steel (Pull-Over)			
				68 mils (14 ga) ³ (lbs)	54 mils (16 ga) ³ (lbs)	43 mils (18 ga) ³ (lbs)	33 mils (20 ga) ³ (lbs)
3/8"	2 3/4"	1 3/4"	990	580	460	255	195
1/2" & 5/8"	2 3/4"	1 3/4"	855				

1. Use interaction formula for combined tension/shear (Ps/Pt)^{3/5} + (Vs/Vt)^{3/5} ≤ 1.0.
2. Critical spacing distance = 16D. Critical end distance = 8D.
3. 2001 AISI NAS, Eq. E4.4.2-1 divided by 2.0 (one-sided loading), Ω = 3.0, d_w = 0.5". See page 6 for CFS thickness standards and General Notes (e), on page 9 for CFS properties.
4. Allowable loads must be the lesser of the concrete or CFS strength.
5. Allowable loads may be increased 1/3 for short-term loading due to seismic or wind forces where permitted by code (see page 12).

Get the rest of the information on Simpson Strong-Tie® Anchor Systems

The information in this catalog is an introduction to Simpson Anchor Systems. You can get the rest of the technical information four ways:

- Call Simpson Strong-Tie at (800) 999-5099 and request the current Simpson Anchor Systems Catalog.
- For a full Simpson Anchor Systems Technical Manual/Binder, call Simpson and ask to speak with your local Technical Sales Representative or Field Engineer. This binder features the Anchor Systems catalog in easy-to-use tabular format, as well as code reports, MSDS sheets and more!
- Visit Simpson Anchor Systems at www.simpsonanchors.com. You can access technical and product application information, code reports, new product information and much more. E-Mail The Simpson Anchor Man for answers to your questions or check our Frequently Asked Questions section for the information you are looking for.
- Call Simpson and request an Anchor Systems CD-ROM which contains all of the information you need for your anchoring and fastening needs. In addition to complete product information and the Anchor Designer, Drill Bit Selector and Adhesive Estimator programs, the CD also contains product code reports, MSDS sheets and product fliers.

POWDER-ACTUATED FASTENERS

Powder actuated fasteners provide a quick and economical method for fastening cold-formed steel to concrete or steel base materials.

CODES: ICC-ES 4546; City of LA RR 25469

In Normal Weight Concrete

PDP-Series Fasteners

PDP*	PDPW*	PDPWL*
PDP-125	PDPW-125	PDPWL-125
PDP-150	PDPW-150	PDPWL-150
PDP-175	PDPW-175	PDPWL-175
PDP-200	PDPW-200	PDPWL-200
PDP-225	—	—
PDP-250	PDPW-250	PDPWL-250
PDP-300	PDPW-300	PDPWL-300
*Including stainless steel models.		PDPWL-400

PHN-Series Fasteners

PHN	PHNW	PHSN	PHSNA
PHN-27	PHNW-27	PHSN-27	PHSNA-27
PHN-32	PHNW-32	PHSN-32	PHSNA-32
PHN-37	PHNW-37	PHSN-37	PHSNA-37
PHN-42	PHNW-42	PHSN-42	PHSNA-42
PHN-47	PHNW-47	PHSN-47	PHSNA-47
PHN-52	PHNW-52	PHSN-52	PHSNA-52
PHN-57	PHNW-57	PHSN-57	PHSNA-57
PHN-62	PHNW-62	PHSN-62	PHSNA-62
PHN-72	PHNW-72	PHSN-72	PHSNA-72

In Steel

PDP-Series Fasteners

PDP	PDPW	PDPWL
PDP-100	PDPW-100	PDPWL-100
PDP-125	PDPW-125	PDPWL-125
PDP-150	PDPW-150	PDPWL-150
PDP-175	PDPW-175	PDPWL-175
PDP-200	PDPW-200	PDPWL-200
PDP-225	—	—
PDP-250	PDPW-250	PDPWL-250
PDP-300	PDPW-300	PDPWL-300

PHN-Series Fasteners

PHN	PHNW	PHSN	PHSNA
PHN-27	PHNW-27	PHSN-27	PHSNA-27
PHN-32	PHNW-32	PHSN-32	PHSNA-32
PHN-37	PHNW-37	PHSN-37	PHSNA-37
PHN-42	PHNW-42	PHSN-42	PHSNA-42
PHN-47	PHNW-47	PHSN-47	PHSNA-47
PHN-52	PHNW-52	PHSN-52	PHSNA-52
PHN-57	PHNW-57	PHSN-57	PHSNA-57
PHN-62	PHNW-62	PHSN-62	PHSNA-62
PHN-72	PHNW-72	PHSN-72	PHSNA-72

PRODUCT NOMENCLATURE

EXAMPLE:

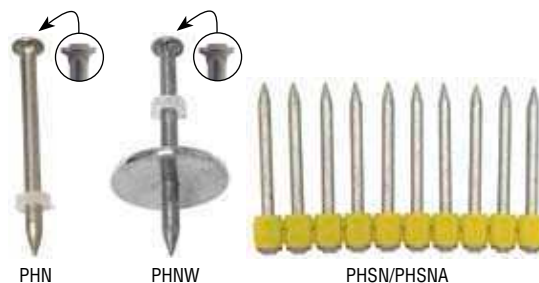
PDP-175 = 0.145 Dia. PIN
x 1 3/4" length
(no washer)

PHN-52 = 0.145 Dia. PIN
x 52mm length
(no washer)

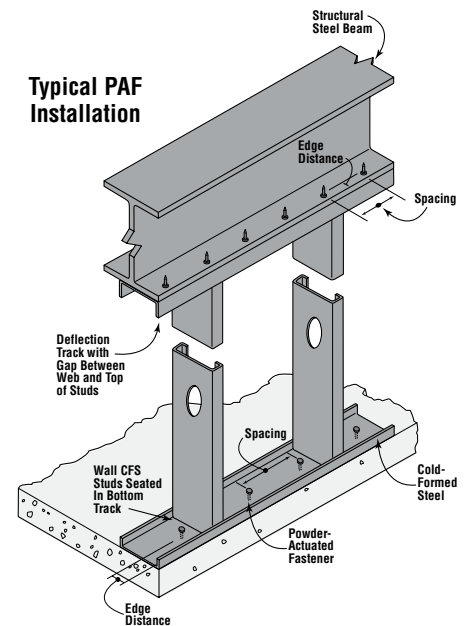
W = 3/4" Dia. metal washer (PDP)
1" Dia. metal washer (PHN)

WL = 1" Dia. metal washer (PDP)

Refer to latest Simpson Strong-Tie® Anchor Systems Catalog for further information on Powder Actuated Fasteners



Typical PAF Installation



POWDER-ACTUATED FASTENERS

PAF Shear Loads in Concrete and Steel

0.145" Dia. Pin Spacing	Allowable Shear Load (100)					
	Base Material ¹			Cold Formed Steel		
	Concrete (f' _c ≥ 2500 psi) ²		Steel ^{3,4}			
	1" emb. (lbs/ft)	1.25" emb. (lbs/ft)	Min. thickness 3/16" (lbs/ft)	54 mils (16 GA) ⁵ (lbs/ft)	43 mils (18 GA) ⁵ (lbs/ft)	33 mils (20 GA) ⁵ (lbs/ft)
0' - 4"	425	795	1185	1440	795	610
0' - 6"	285	530	790	960	530	405
0' - 8"	215	400	595	720	400	305
1' - 0"	145	265	395	480	265	205
1' - 6"	95	175	265	320	175	135
2' - 0"	70	130	200	240	135	100
2' - 6"	55	105	160	192	105	80
3' - 0"	50	90	130	160	90	70
4' - 0"	35	65	100	120	65	50

1. Load values based on 0.145" dia. pins in 2500 psi nm. wt. concrete or steel having a minimum F_y = 36 ksi (see Simpson ER-4546).
2. Edge distance of pins shall be no less than 3". Spacing distance of pins shall be no less than 4"
3. The entire pointed portion of the fastener must penetrate the steel.
4. Edge distance of pins shall be no less than 1/2". Spacing distance of pins shall be no less than 1 1/2".
5. 2001 AISI NAS, Eq. E4.3.1-2, Ω = 3.0, d = 0.145". See page 11 for CFS thickness standards and General Notes (e) on page 9 for CFS properties.
6. Allowable loads must be the lesser of the base material or CFS strength.

PAF Tension Loads in Concrete and Steel

Allowable Tension Load (100)					
Base Material ^{1,2}			Cold Formed Steel (Pull-Over)		
Concrete (f' _c ≥ 2500 psi) ³		Steel ^{4,5}			
1" emb. (lbs)	1.25" emb. (lbs)	Min. thickness 3/16" (lbs)	54 mils (16 GA) ⁶ (lbs)	43 mils (18 GA) ⁶ (lbs)	33 mils (20 GA) ⁶ (lbs)
70	195	155	275	150	115

1. Load values based on 0.145" dia. pins in 2500 psi nm. wt. concrete or steel having a minimum F_y = 36 ksi (see Simpson ER-4546).
2. Use interaction formula for combined tension/shear (P_s/P_t) + (V_s/V_t) ≤ 1.0.
3. Edge distance of pins shall be no less than 3". Spacing distance of pins shall be no less than 4"
4. The entire pointed portion of the fastener must penetrate the steel.
5. Edge distance of pins shall be no less than 1/2". Spacing distance of pins shall be no less than 1 1/2".
6. 2001 AISI NAS, Eq. E4.4.2-1 divided by 2.0 (one-sided loading), Ω = 3.0, d_w = 0.3". See page 11 for CFS thickness standards and General Notes (e) on page 9 for CFS properties.
7. Allowable loads must be the lesser of the base material or CFS strength.

Anchors

TITEN[®] Screw Anchor

Titen screws are 3/16" and 1/4" diameter masonry screws for attaching all types of components to concrete and masonry. Available in hex and phillips head designs in blue, white or silver colors. Use with appropriately sized Titen drill bits included with each box.

CODES: FL 2355

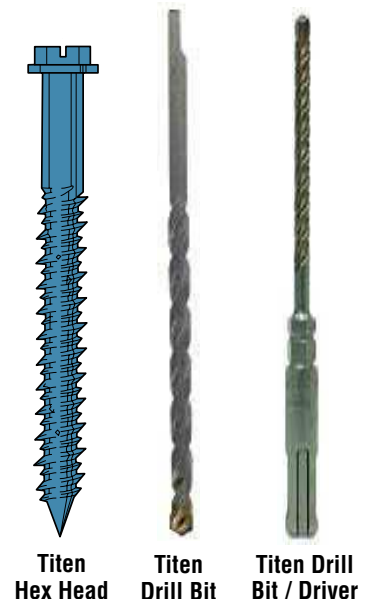
Titen Installation Sequence



WARNING: Industry studies show that hardened fasteners can experience performance problems in wet environments. Accordingly, use this product in dry, interior applications only.

Shear Loads for Titen Screw Anchors

Anchor Callout (Dia. x L)	Min. Embed. Depth	Min. Edge	Anchor Spacing	Allowable Shear Load (100)			
				Concrete (f' _c ≥ 2000 psi) (lbs/ft)	CMU (hollow or grout-filled) (lbs/ft)	Cold Formed Steel	
						43 mils (18 GA) ¹ (lbs/ft)	33 mils (20 GA) ¹ (lbs/ft)
3/16" x 1 1/4" Titen	1"	1 1/8"	0' - 2.25"	1360	1200	1815	1410
			0' - 6"	510	450	680	530
			1' - 0"	255	225	340	265
			1' - 6"	170	150	225	175
			2' - 0"	125	110	170	135
			3' - 0"	85	75	115	90
1/4" x 1 3/4" Titen	1 1/2"	1 1/2"	0' - 3"	1600	1240	1820	1400
			0' - 6"	800	620	910	700
			1' - 0"	400	310	455	350
			1' - 6"	265	205	305	235
			2' - 0"	200	155	230	175
			3' - 0"	135	105	150	115
4' - 0"	100	80	115	90			



Titen Hex Head Titen Drill Bit Titen Drill Bit / Driver

1. 2001 AISI NAS, Eq. E4.3.1-2, Ω = 3.0. See page 11 for CFS thickness standards and General Notes (e) on page 9 for CFS properties.
2. Allowable loads must be the lesser of the concrete, CMU or CFS strength.

Tension Loads for Titen Screw Anchors

Dia. (in)	Embed. Depth (in)	Allowable Tension Load (100)					
		Concrete ¹		Cold Formed Steel (Pull-Over)			
		(f' _c ≥ 2500 psi) (lbs)	Hollow or Grout-filled (lbs)	68 mils (14 GA) ⁴ (lbs)	54 mils (16 GA) ⁴ (lbs)	43 mils (18 GA) ⁴ (lbs)	33 mils (20 GA) ⁴ (lbs)
3/16 ²	1	135	135	360	290	160	120
1/4 ³	1 1/2	400	185	435	345	190	145



Special hex adapter on the bit allows the Titen Installation Tool to slide over the bit and lock in, ready to drive screws.

1. Use interaction formula for combined tension and shear (P_s/P_t) + (V_s/V_t) ≤ 1.0.
2. Critical spacing = 2 1/4" and critical edge distance = 1 1/8".
3. Critical spacing = 3" and critical edge distance = 1 1/2".
4. 2001 AISI NAS, Eq. E4.4.2-1 divided by 2.0 (one-sided loading), Ω = 3.0, d_w = 3/16" (3/16" Titen) and d_w = 3/8" (1/4" Titen). See page 11 for CFS thickness standards and General Notes (e) on page 9 for CFS properties.
5. Allowable loads must be the lesser of the concrete, CMU or CFS strength.

SSTB Anchor Bolts

The SSTB is designed for maximum performance as an anchor bolt for holdowns and Strong-Wall® shearwalls. Extensive SSTB testing has been done to determine the design load capacity at a common application, the garage stem wall. Design loads are based on a series of five tests, with a three-times reduction factor. SSTB14 is a 5/8" diameter anchor bolt designed and tested specifically for shallow foundation installations.

SPECIAL FEATURES: • Rolled threads for higher tensile capacity.

- Offset angle reduces side-bursting, provides more concrete cover.
- Stamped embedment line aids installation.
- Configuration results in minimum rebar interference.

MATERIAL: ASTM A36

FINISH: None. May be ordered HDG; check factory

INSTALLATION: • SSTB is used for monolithic and two-pour installations.

- Nuts and washers are not supplied with the SSTB; install standard nuts, couplers and/or washers as required. On HDG SSTB anchors, chase the threads to use standard nuts or couplers or use overtapped products in accordance with ASTM A563 (*Simpson NUT5/8-OST, NUT7/8-OST, CNW5/8-5/8OST, CNW7/8-7/8OST*).

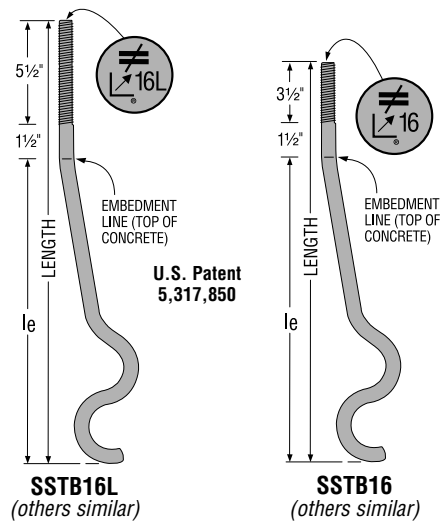
REINFORCED CONCRETE FOUNDATION

- Install SSTB before the concrete pour using AnchorMates (see page 16). Install the SSTB per plan view detail shown on page 25. Install one #4 rebar 3' to 5" (may be foundation rebar not post-tension cable) from the top of the foundation.
- The SSTB does not need to be tied to the rebar.
- Minimum concrete compression strength is 2500 psi. Unless noted otherwise, no special inspection is required for foundation concrete when the structural design is based on concrete no greater than 2500 psi (*UBC Section 1701.5.1 and IBC Section 1704.4*).
- Unless otherwise noted, do NOT install where: (a) a horizontal cold joint exists within the embedment depth between the slab and foundation wall or footing beneath, unless provisions are made to transfer the load, or the slab is designed to resist the load imposed by the anchor; or (b) slabs are poured over concrete block foundation walls.

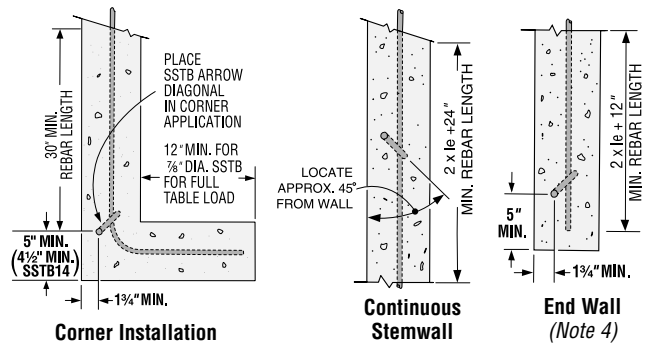
REINFORCED CONCRETE BLOCK

- Before concrete grout is poured, install diagonally at approx. 45° in the cell per plan view detail shown on next page.
- Horizontal #4 rebar (minimum 56" long centered about the anchor bolt)—approximately one rebar 12" from the top and two rebars approximately 28" from the top. Vertical #4 rebar (minimum 24" long)—install with maximum 24" o.c. spacing.
- Grout all cells with minimum 2000 psi concrete. Vibrate the grout per the 1997 Uniform Building Code, Section 2104.6.2, International Building Code, Section 2104.1.

CODES: See page 8 for Code Listing Key Chart.



Identification on the bolt head showing embedment angle and model.



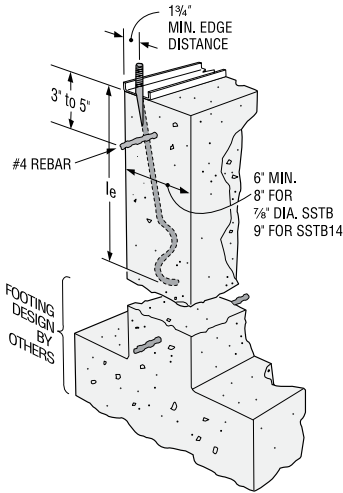
TYPICAL PLAN VIEWS OF REBAR INSTALLATION

These products are available with additional corrosion protection. Additional products on this page may also be available with this option, check with Simpson for details.

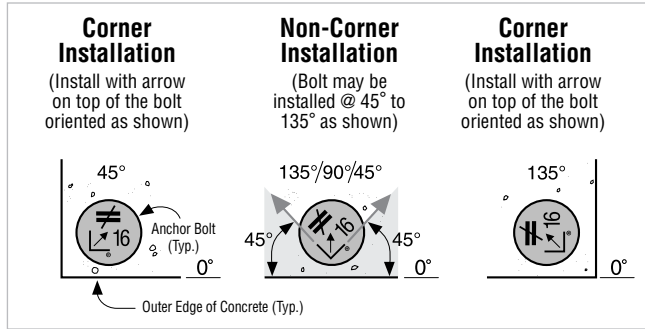
Model ¹ No.	Stemwall Width	Dia.	Length	Min. Embed. <i>l_e</i>	Allowable Tension Load ^{1,2} (100)			Code Ref.
					Concrete ⁴ <i>f'c</i> = 2500 psi	Concrete ¹² 8" CMU Block	Concrete 8" CMU Block End	
SSTB14	9	5/8"	15 3/8"	11"	3835 ¹¹	—	—	146
SSTB16	6	5/8"	17 5/8" (SSTB16L = 19 5/8")	12 5/8"	4420	4780	1850	23, 94
SSTB20	6	5/8"	21 5/8" (SSTB20L = 24 5/8")	16 5/8"	4600	4780	1850	
SSTB24	6	5/8"	25 5/8" (SSTB24L = 28 1/8")	20 5/8"	5175	4780	1850	
SSTB28	8	7/8"	29 7/8" (SSTB28L = 32 7/8")	24 7/8"	10100	6385	4815	
SSTB34	8	7/8"	34 7/8"	28 7/8"	10100	6385	4815	23, 94
SSTB36	8	7/8"	36 7/8"	28 7/8"	10100	6385	4815	

1. Tabulated loads are governed by tests and may not be increased. Refer to page 12 for additional information.
2. Minimum anchor center-to-center spacing is 2*l_e* for anchors acting in tension at the same time for full load.
3. The SSTB was tested in a stem wall with a minimum amount of concrete cover.
4. Use full table load when installed 24" from the end or installed in a corner condition (see illustrations).
When used 5" from the end of a concrete foundation (see end wall graphic above), the maximum allowable load is 9045 lbs. for SSTB28, 9585 lbs. for SSTB34 and 36 bolts, and table loads for all other models (these loads are not Code listed – contact Simpson for test data).
5. Connection is limited by the lowest of bolt or holdown capacity.
6. Order the SSTBL models for longer thread length (5 1/2") ex. SSTB24L. SSTBL and SSTB loads are the same. Not available on SSTB14.
7. SSTB34 has 4 1/2" of thread and SSTB36 has 6 1/2". These two models are not available in SSTBL versions.
8. Use 90% of the table load for 2000 psi concrete.
9. See page 26 for Additional Anchor Design information.
10. Allowable load for SSTB14 is 5020 lbs. when *f'c* = 3000 psi. See technical bulletin T-SSTB for additional information.
11. Minimum end distance required to achieve table loads is *l_e*.

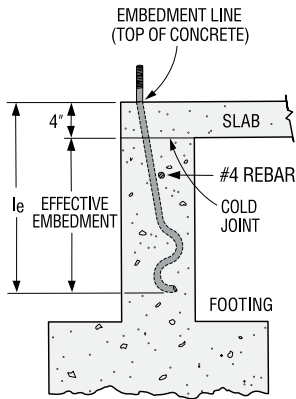
SSTB Anchor Bolts



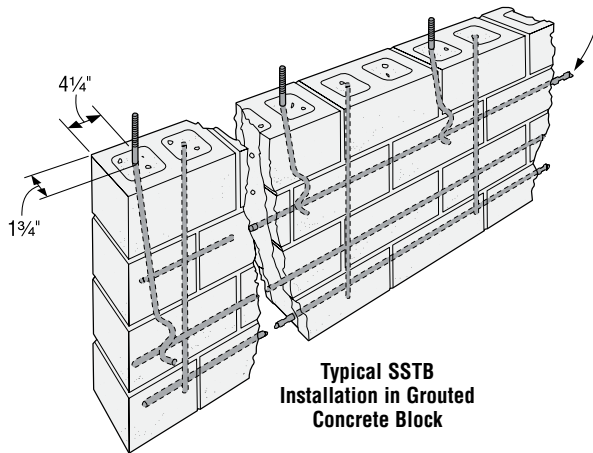
Typical SSTB Installation
Maintain minimum rebar cover, per ACI-318 concrete code requirements



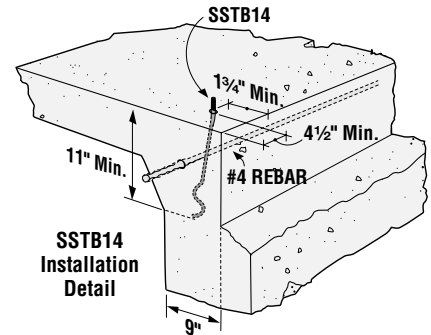
Plan View of SSTB Placement in Concrete Stemwall



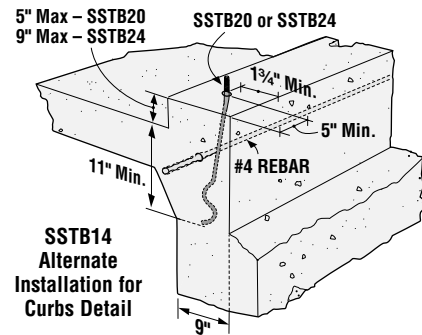
Two Pour Installation (SSTB20, 24 and 34)



Typical SSTB Installation in Grouted Concrete Block



SSTB14 Installation Detail



SSTB14 Alternate Installation for Curbs Detail

RFB Retrofit Bolts

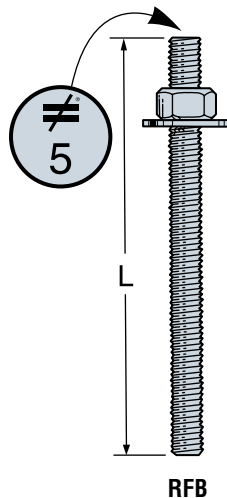
RFBs are pre-cut threaded rod, supplied with nut and washer. For use with Simpson Strong-Tie® Adhesives. May be ordered in bulk without the nut and washer. Use with Simpson Adhesives to anchor into existing concrete and masonry. Offers a complete engineered anchoring system when used with Simpson anchoring adhesives. Inspection is easy; each end of the threaded rod is stamped with rod length in inches and "No-Equal" symbol for identification after installation.

MATERIAL: A307, Grade C

FINISH: Zinc-Plated, Hot-Dip Galvanized (per ASTM 153). Stainless Steel (RFB#5/8x8SS)

INSTALLATION:

- Request the current *Anchoring and Fastening Systems for Concrete and Masonry* catalog for more information.



RFB

These products feature additional corrosion protection. Additional products on this page may also be available with this option, check with Simpson for details.

Description	Zinc Plated Model No.	Hot-Dip Galvanized Model No.	Ctn Qty	Bulk Qty	Retail ² Pack
1/2" x 4"	RFB#4x4	RFB#4x4HDG	50	50	—
1/2" x 5"	RFB#4x5	RFB#4x5HDG	50	50	10
1/2" x 6"	RFB#4x6	RFB#4x6HDG	50	50	10
1/2" x 7"	RFB#4x7	RFB#4x7HDG	50	50	10
1/2" x 8"	—	RFB#4x8HDG	—	—	10
1/2" x 10"	RFB#4x10	RFB#4x10HDG	25	—	10
5/8" x 5"	RFB#5x5	RFB#5x5HDG	50	50	10
5/8" x 8"	RFB#5x8	RFB#5x8HDG	50	—	10
5/8" x 10"	RFB#5x10	RFB#5x10HDG	50	—	10
5/8" x 12"	—	RFB#5x12HDG	—	—	10
5/8" x 16"	RFB#5x16	RFB#5x16HDG	25	25	10
3/4" x 10 1/2"	RFB#6x10.5	RFB#6x10.5HDG	25	25	—

- Bulk quantities do not include the nut and washer and must be ordered with a "-B" suffix (example: RFB#4x5-B). Hot dip galvanized RFB's not available in bulk.
- Retail Packs must be ordered with a "-R" suffix (example: RFB#5x12HDG-R).

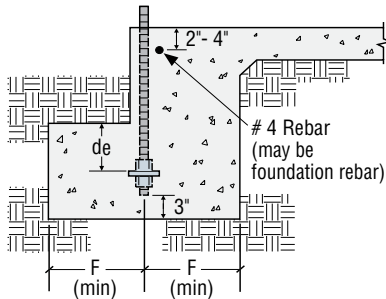
ADDITIONAL ANCHOR DESIGN

These additional anchorage solutions will resist the higher tension load demands of the S/HDS, and S/HDB holdowns and are based on the concrete anchorage provisions of the 1997 UBC, the 2000 IBC, 2003 IBC and 2006 IBC as shown. The designer may specify alternate anchorage solutions using the anchor bolt diameter as specified for the holddown.

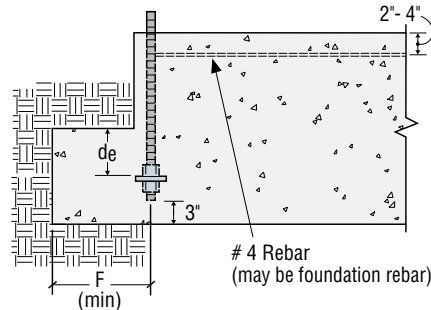
Anchors

Model	Dia.	de	F	Plate Washer
1997 UBC				
phi = 0.65 reinforcement not provided per section 1923.3.2				
S/HD10S&B	7/8"	10	10	—
S/HD15S&B	1"	11	11	—
phi = 0.85 reinforcement provided per section 1923.3.2				
S/HD10S&B	7/8"	9	9	—
S/HD15S&B	1"	10	10	—
2000, 2003 & 2006 IBC				
SDC A & B or Wind				
S/HD10S&B	7/8"	8	12	1/4" x 1 3/4" x 1 3/4"
S/HD15S&B	1"	10	15	3/8" x 2" x 2"
SDC C through F				
S/HD10S&B	7/8" HS	10	15	3/8" x 3" x 3"
S/HD15S&B	1" HS	12	18	5/16" x 3.5" x 3.5"

1. Anchor embedment length is based on a single-pour concrete foundation with a minimum $f'c=2500$ psi. The required embedment depth, de , pour foundation systems. Masonry walls and masonry footings must be evaluated by the designer.
2. UBC anchorage assumes no special inspection and a multiplier of 2 (*anchor not embedded in tension zone of member*) per Section 1923.3.2 IBC anchorage assumes cracked concrete.
3. Typical anchor bolt shall be ASTM A36 or A307 or equivalent and may be either a hex head bolt or threaded rod with a hex nut fixed in place. High strength anchor bolt is denoted as HS and shall be A449 or equivalent and have the plate washer secured with a nut top and bottom.
4. When a plate washer is required, it must be secured with a nut top and bottom. Nuts shall be hex style meeting the requirements of ASTM A563 Grade DH or heavy hex style meeting the requirements of ASTM A563 Grade DH for high strength bolts.
5. When plate washer required, nuts shall be installed top and bottom of plate washer and shall be Heavy Hex ASTM A653 Grade DH.
6. Spacing between anchors in tension at the same time shall be a minimum of the F dimension.
7. Where justified by analysis, Engineer of Record may specify alternate embedment or bolt grade.
8. Footing dimensions are for anchorage only.
9. Actual anchor bolt length to be determined by designer so as to not interfere with holddown stud fasteners.

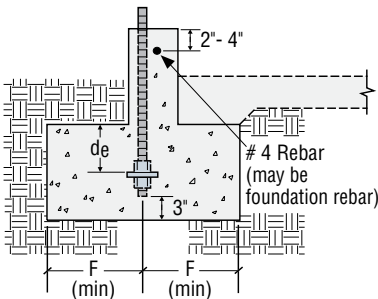


Section at Slab

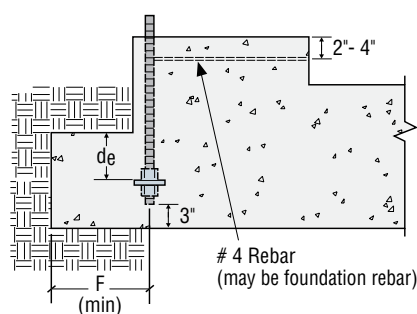


Elevation at Slab

Foundation design (size and reinforcement) by others.



Section at Curb



Elevation at Curb

S/HDU Holdowns

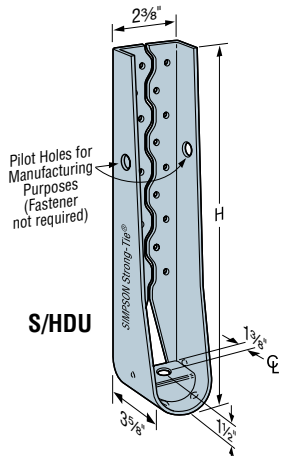
The S/HDU series of holdowns combines performance with ease of installation. The pre-deflected geometry virtually eliminates material stretch, resulting in low deflection under load. Installation using self-drilling screws into the studs reduces installation time and saves labor cost.

MATERIAL: 118 mil (10 ga)

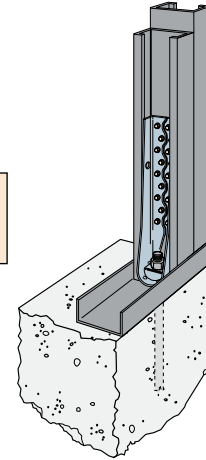
FINISH: Galvanized

- INSTALLATION:**
- Use all specified fasteners. See General Notes.
 - Use #14 screws to fasten to studs
 - For the S/HDU11 use heavy hex nuts on the anchor bolt.

CODES: See page 8 for Code Listing Key Chart.



Available
1st Quarter
2008



Typical
S/HDU
Installation

Model	Height	Fasteners		Stud Member Type mil (ga)	ASD			LRFD		Nominal Tension Load	Code Ref.
		Fdn Anchor Diameter	Stud Fasteners		Tension Load (100)	Tension Load (133)	Deflection at ASD Load	Tension Load	Deflection at LRFD Load		
S/HDU4	7 7/8"	5/8"	6 - #14	2-33 (2-20ga)	2320	2320	0.093	3705	0.149	5685	151
				2-43 (2-18ga)	3825	3825	0.115	6105	0.190	9365	
				2-54 (2-16ga)	3970	3970	0.093	6345	0.156	9730	
				Steel Fixture	3970	3970	0.038	6345	0.061	12120	
S/HDU6	10 3/8"	5/8"	12 - #14	2-33 (2-20ga)	4895	4895	0.125	8850	0.271	10470	
				2-43 (2-18ga)	5875	6125	0.119	9785	0.258	15460	
				2-54 (2-16ga)	5875	6125	0.108	9785	0.234	15005	
				Steel Fixture	5875	6125	0.061	9785	0.157	14695	
S/HDU9	12 7/8"	7/8"	18 - #14	2-33 (2-20ga)	6965	6965	0.103	11125	0.189	13165	
				2-43 (2-18ga)	9255	9255	0.125	15960	0.262	21810	
				2-54 (2-16ga)	9990	9990	0.106	15960	0.225	24480	
				Steel Fixture	9990	9990	0.059	15960	0.075	31455	
S/HDU11 ^{1,2}	16 5/8"	7/8"	27 - #14	2-33 (2-20ga)	6965	6965	0.103	11125	0.189	13165	
				2-43 (2-18ga)	11100	11100	0.125	19610	0.262	24955	
				2-54 (2-16ga)	11500	12175	0.125	19445	0.243	29825	
				Steel Fixture	11500	12175	0.107	19445	0.153	31715	

1. Heavy hex nut is required to achieve the table loads for S/HDU11.
2. Allowable tension loads for S/HDU11 with regular hex nut for 2-43 mil is 9595 lb. and for 2-54 mil is 9675 lb.
3. The Designer shall specify the anchor embedment and configuration. See SSTB Anchor Bolts.
4. Back-to-back stud members are required unless otherwise specified.
5. 1/4" self-drilling screws can be substituted for #14.
6. See page 20 and 21 for anchor bolt retrofit.
7. Tabulated loads shown at (100) do not include steel stress increase. Tabulated loads shown at (133) include a 1/3 stress increase on the steel. Refer to page 12 for additional information.
8. Deflection Load: The deflection of a holdown measured between the anchor bolt and the strap portion of the holdown when loaded to the highest load listed in the table above. This movement is strictly due to the holdown deformation under a static load test with attached to members listed in the table above.
9. Nominal Tension Load is based on the average peak load from tests. AISI Lateral Design standard requires holdown to have nominal strength to resist lesser of amplified seismic load or what the system can deliver.

S/LTT & S/HTT Tension Ties

The S/HTT14 is a single-piece formed tension tie—no rivets, and a 4-ply formed seat. No washers are required.

The S/LTT and S/HTT Tension Ties are ideal for retrofit or new construction projects. They provide high strength, post-pour, concrete-to-steel connections.

MATERIAL: See table

FINISH: Galvanized

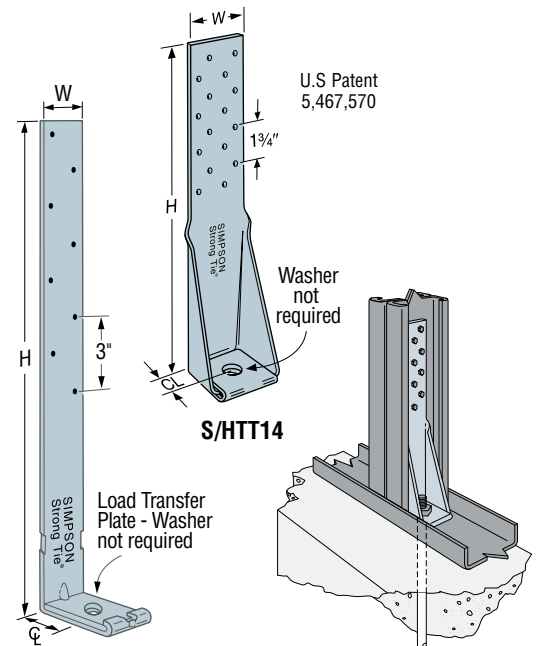
INSTALLATION:

- Use all specified fasteners.
- Use the specified number and type of screws to attach the strap portion to the steel stud. Bolt the base to the wall or foundation with a suitable anchor; see table for the required bolt diameter.
- Do not install S/LTT20 raised off of the bottom track.
- Refer to technical bulletin T-ANCHORSPEC for post-installed anchorage solutions.

CODE: See page 6 for Code Listing Key Chart.

Model No.	Material mil (ga)		Dimensions			Fasteners		Allowable Tension Loads		Holdown ⁶ Deflection at Highest Allowable Design Load	Nominal Tension Load	Code Ref.
	Strap	Plate	W	H	CL	Anchor Bolts	Screws	(100)	(133)			
S/LTT20	97 (12 ga)	229 (3 ga)	2	20	1 1/2	1/2	8- #10	1415	1600	0.183	4870	28, 104,
S/HTT14	111 (11 ga)	-	2 1/2	15	1 1/4	5/8	14- #10	4325	4325	0.142	10595	151

1. The Designer shall specify the anchor embedment and configuration. See SSTB Anchor Bolts.
2. Tabulated loads shown at (100) do not include steel stress increase. Tabulated loads shown at (133) include a 1/3 stress increase on the steel. Refer to page 12 for additional information.
3. Back-to-back stud members are required unless otherwise specified. The design of the studs is the responsibility of the building designer.
4. The allowable tension load of the S/HTT14 is 2475 lbs. when connected to a single 33 mil (20 ga.) stud.
5. S/LTT and S/HTT allowable tension loads at 1/8" deflection are 1200 lb and 3715 lb respectively.
6. See S/HDU notes regarding deflection at highest allowable design load.



U.S. Patent
5,467,570

Washer
not
required

S/LTT20

Typical S/HTT14 Installation
as a Holdown

S/HDS & S/HDB Holdowns

The S/HD series of holdowns is designed for installation with either screws or bolts into the studs or column. The S/HDS series installs with #14 screws and has been designed to utilize fewer fasteners to reduce installation time. The S/HDB series is ideal for bolt-on applications where the cold-formed stud manufacturer can pre-punch the bolt holes.

MATERIAL: See table

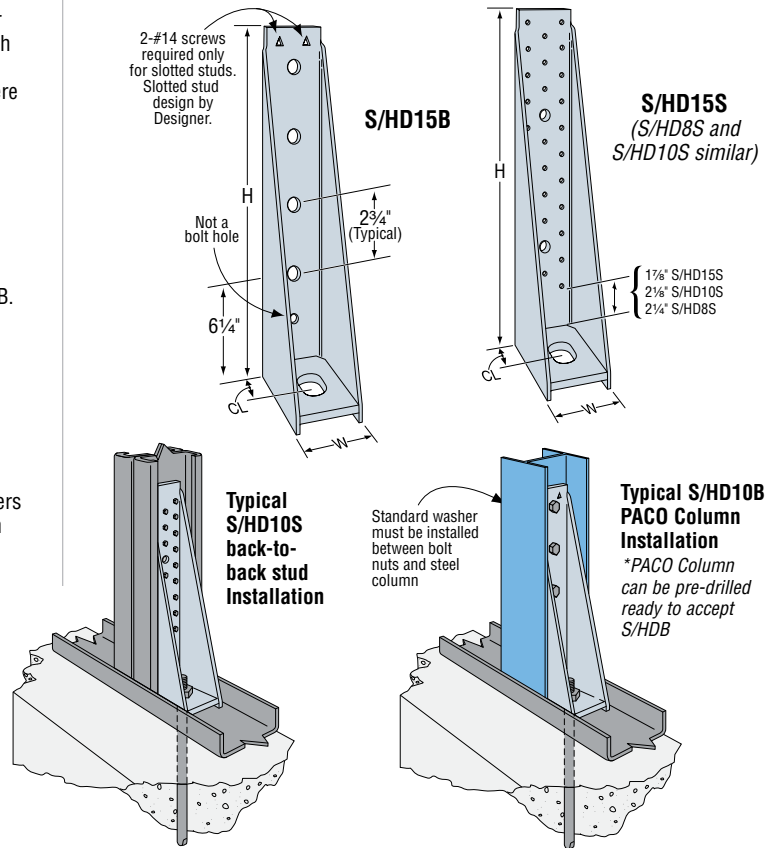
FINISH: Simpson gray paint. Hot-dip galvanized is available; see Corrosion-Information, page 12–13.

INSTALLATION: • Use all specified fasteners; some models have extra fastener holes. See General Notes.

- Anchor bolt washer is not required.
- Standard washers are required on stud bolt nuts for model S/HDB.
- Thin wall socket (OD=2" maximum) is required for S/HD15 to tighten the 1" anchor bolt.
- Stud bolts – use A307.
- Refer to technical bulletin T-ANCHORSPEC for post-installed anchorage solutions.
- Boundary members (*back-to-back studs*) design shall be by Designer.
- Welded connections used for cold-formed steel structural members in which the thickness of the thinnest connected part is 0.18 inch or less shall comply to 2001 AISI NAS Specification Section E2. S/HDS and S/HDB holdowns can be welded per Designer's recommendation and specification. To tie back-to-back stud members together, the Designer must determine the fasteners required to bind members to act as one unit. Welders and welding procedures shall be qualified as specified in AWS D1.3.

CODE: See page 8 for Code Listing Key Chart.

Anchors

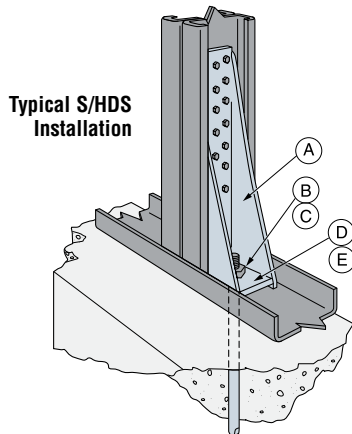


Available with additional corrosion protection. Check with factory.

Model No.	Material Thickness		Dimensions			Fasteners		Nominal Tension Load	Allowable Tension Loads								Holdown ⁶ Deflection at Highest Allowable Design Load	Code Ref.
	Body mil (ga)	Base inch	W	H	CL	Fdn Anchor Dia	Stud Fasteners		2- 33 mil (2-20ga) back-to-back stud		2- 43 mil (2-18ga) back-to-back stud		2- 54 mil (2-16ga) back-to-back stud		1- 97 mil minimum (1-12 ga) Single PACO Column			
									(100)	(133)	(100)	(133)	(100)	(133)	(100)	(133)		
S/HD8S	126 (10 ga)	1/2	2 5/16	11	1 1/2	7/8	17- #14	36570	8580	8580	11070	11070	11070	11070	11470	11470	0.0695	151
S/HD10S	126 (10 ga)	1/2	2 5/16	13 1/2	1 1/2	7/8	22- #14	41115	8580	8580	11120	11120	12200	12200	14840	14840	0.0960	
S/HD15S	171 (7 ga)	1/2	2 7/16	17	1 3/8	1	30- #14	49143	8580	8580	11120	11120	13500	13500	16420	16420	0.0970	
S/HD8B	126 (10 ga)	1/2	2 5/16	11	1 1/2	7/8	2- 3/4 Dia	—	3895	5195	5345	7125	8925	10215	8925	11900	0.0742	
S/HD10B	126 (10 ga)	1/2	2 5/16	13 1/2	1 1/2	7/8	3- 3/4 Dia	41115	5840	7790	8015	10690	13385	15320	13385	15635	0.1018	
S/HD15B	171 (7 ga)	1/2	2 7/16	17	1 3/8	1	4- 3/4 Dia	49143	7790	7865	10690	11510	17560	18295	17850	18295	0.1038	

- The Designer shall specify the anchor embedment and configuration. See SSTB Anchor Bolts and Additional Anchor Design.
- Back-to-back stud members are required unless otherwise specified.
- Nominal tension loads are based on static load test conducted on structural steel fixture.
- 1/4" self-drilling screws can be substituted for #14.
- See page 20 and 21 for anchor bolt retrofit.
- Deflection at Highest Allowable Design Load: The deflection of a holdown measured between the anchor bolt and the strap portion of the holdown when loaded to the highest allowable load listed in the catalog table. This movement is strictly due to the holdown deformation under a static load test conducted on a steel fixture.
- Tabulated loads shown at (100) do not include steel stress increase. Tabulated loads shown at (133) include a 1/3 stress increase on the steel. Refer to page 12 for additional information.

Sources of Deflection at the Shearwall Holdown Connections



- Eccentricity in the Stud**—when a holdown is installed on only one side of the stud, an eccentricity exists during loading which can cause additional movement in the shearwall system.
- Nut Spin**—unrestrained anchor bolt nuts can spin loose during cyclic loading; the use of steel nylon locking nuts or thread adhesive may prevent nut spin.
- Lack of Nut Tightening**—additional movement can occur when nuts are not tightened sufficiently.
- Deflection of the Holdown**—deflection can occur in the holdown under load caused by stresses due to earthquake or high wind.
- Vertical Deflection at the Holdown Seat Caused by Stud Rotation**—lateral displacement at the top of the wall rotates the stud around its base causing the holdown base plate to displace vertically.

STHD Strap Tie Holddown

The STHD is an embedded strap tie holddown with high load capacity and designed to reduce spalling.

- FEATURES:**
- A slot below the embedment line allows for increased front to back concrete bond and reduced spalling.
 - Rim joist models accommodate up to a 17" clear span without any loss of strap fastening. Diamond holes for optional attachment to rim joist.

MATERIAL: 68 mil (12 ga) **FINISH:** Galvanized

INSTALLATION: • Use all specified fasteners. See General Notes.

- Install before concrete pour with a StrapMate, or other holding device.
- Screw strap from the bottom up. Strap may be bent one full cycle.
- Bending the strap 90° to aid wall placement may cause spalling behind the strap. If the spall is 1" or less, measured from the embedment line to the bottom of the spall, full loads apply. For spalls between 1" and 4" (see illustration), the allowable load is 0.90 of the table loads. Any portion of the strap left exposed should be protected against corrosion.
- Where fewer fasteners are used in the structural member, reduce loads according to the code.
- Unless otherwise noted, do NOT install where: (a) a horizontal cold joint exists within the embedment depth between the slab and foundation wall or footing beneath, unless provisions are made to transfer the load, or the slab is designed to resist the load imposed by the anchor; or (b) slabs are poured over concrete block foundation walls.
- To get the full table load, the minimum center-to-center spacing is twice the embedment depth when resisting tension loads at the same time.
- There may be an increase in the amount of deflection if the strap is installed on the outside of the shear panel versus under the shear panel directly to the framing.

FOUNDATION CORNERS: Screw quantities may be reduced for less than l_e corner distance design loads—use the code allowable loads for fasteners in shear.

- To tie multiple stud members together, the Designer must determine the fasteners required to bind members to act as one unit.
- Additional studs attached to the shearwall studs or post may be required by the Designer for wall sheathing fastener.
- 1- #4 rebar must be installed in the shear cone

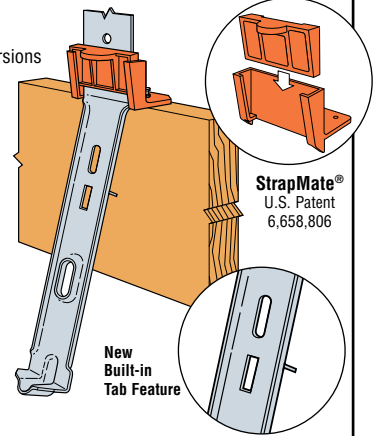
CODES: See page 8 for Code Listing Key Chart

NEW FEATURES ON THE STHD STRAP TIE HOLDDOWNS

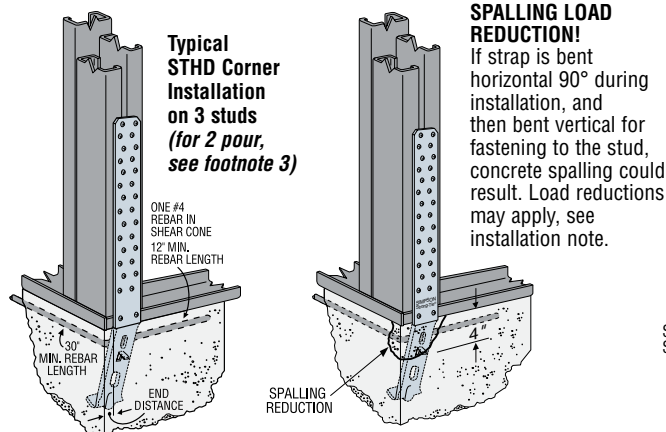
- Built-in tab StrapMate®
- Additional diamond hole in RJ versions

BENEFITS

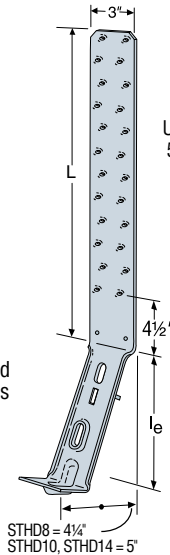
- Built-in Tab:**
 - Reduces spalling and costly retrofits
 - No additional labor to install
 - Hold STHD away from form board
- StrapMate Locator Line:**
 - Easy inspection to ensure proper location
 - Allows adjustment without removing STHD
- Additional Diamond Hole:**
 - One more fastener to help prevent the STHD RJ models from bowing out at the rim joist section



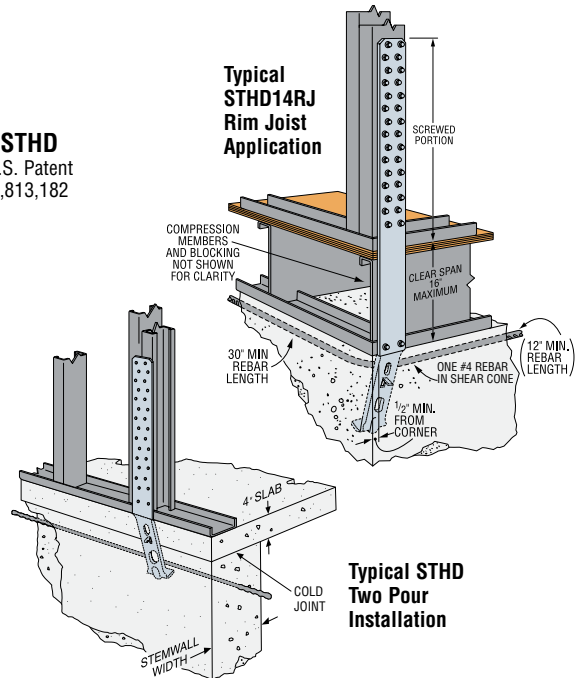
Anchors



SPALLING LOAD REDUCTION!
If strap is bent horizontal 90° during installation, and then bent vertical for fastening to the stud, concrete spalling could result. Load reductions may apply, see installation note.

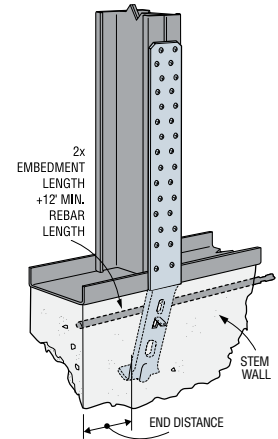


STHD
U.S. Patent 5,813,182



Typical STHD Two Pour Installation

Model No. Standard / Rim Joist	Min Stem Wall Width	Strap Length (L)		l_e	Screws	Allowable Loads (100)												Code Ref
		Std Model	Rim Joist Model			End Distance												
						1/2"	1 1/2"	l_e	1/2"	1 1/2"	l_e	1/2"	1 1/2"	l_e				
STHD8 / STHD8RJ	6	21%	35%	8	18-#10	1760	2050	2345	1950	2210	2345	2135	2425	2425	28, 151			
STHD10 / STHD10RJ	6	23%	36%	10	22-#10	2035	2575	3295	3730	3730	3730	3730	3730	3730				
STHD14 / STHD14RJ	6	31%	39%	14	30-#10	3235	4220	4805	5025	5025	5025	5025	5025	5025				
STHD8 / STHD8RJ	8	21%	35%	8	18-#10	2170	2170	3180	2370	2370	3180	2370	2370	3180				
STHD10 / STHD10RJ	8	23%	36%	10	22-#10	2745	2745	3725	3730	3730	3730	3730	3730	3730				
STHD14 / STHD14RJ	8	31%	39%	14	34-#10	3885	4430	5785	5025	5025	5785	5025	5025	5785				

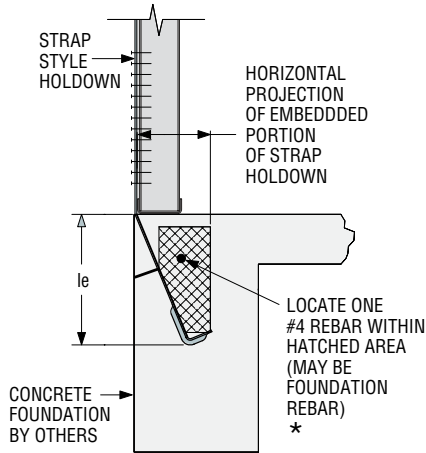


Typical STHD End Installation (see footnote 7)

1. 'RJ' after the model indicates STHDs for rim joist applications, e.g. STHD8RJ.
2. STHD14RJ requires 22-#10 screws, with the (l_e) load at 133% of 4960 lbs.
3. For two pour with 4" slab or less. The STHD14 load at 1/2" edge 2000 psi is 3235 lbs. The STHD10 at the same condition is 2035 lbs.
4. Tabulated loads are governed by tests and may not be increased. Refer to page 12 for additional information.
5. Not all fastener holes need to be filled as additional fastener holes provided. Install fasteners symmetrically.
6. Loads are based on the attachment of the STHD to a minimum of a 33 mil (20 ga) member.
7. Table loads apply to end installation applications provided there is a minimum end distance of l_e .

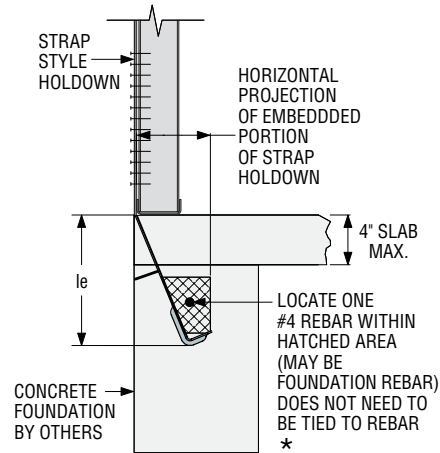
STHD Strap Tie Holdown

Anchors



Single Pour Rebar Installation

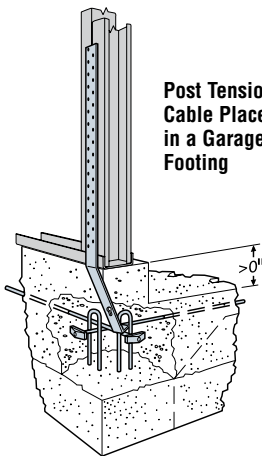
*Maintain minimum rebar cover, per ACI-318 concrete code requirements.



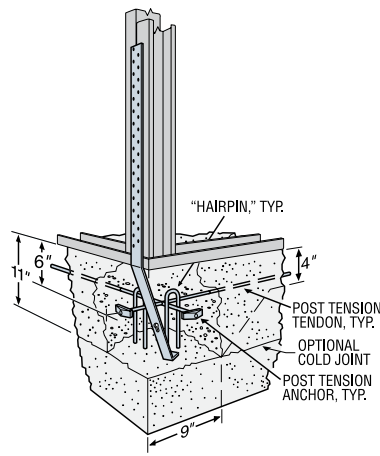
Two Pour Rebar Installation

*Maintain minimum rebar cover, per ACI-318 concrete code requirements.

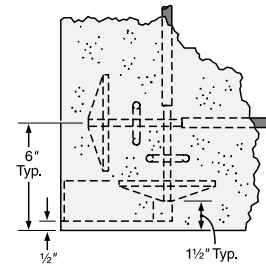
POST-TENSION INFORMATION



DETAIL 1
When installed on a raised curb, use Stemwall installation and loads (see pages 29-31) (rebar required)



DETAIL 2
Post Tension Cable Placement Corner Installation (no rebar required)



Top View of Post Tension Cable Placement

Model No.	Distance from Corner	Fasteners			Allowable Tension Loads (100 & 133)	Code Ref.
		33 mil (20 ga)	43 mil (18 ga)	54 mil (16 ga)		
S/HPAHD22	½" Min	16- #10	11- #10	6- #10	2705	170
	8" Min	25- #10 ⁶	23- #10	23- #10	4740 ⁶	
STHD8/ STHD8RJ	½" Min	12- #10	8- #10	4- #10	2055	
	8" Min	16- #10	11- #10	6- #10	2780	
STHD10/ STHD10RJ	½" Min	12- #10	8- #10	4- #10	2055	
	10" Min	19- #10	13- #10	7- #10	3240	

1. Minimum concrete strength is 2500 psi.
2. Post-tension steel is minimum ½" diameter, 7-wire, low-relaxation strand in accordance with ASTM A416, Grade 270 ksi, with a guaranteed ultimate strength of 41.3 k.
3. Anchorage is monostrand-type anchor system with current ICC approval using a ductile iron casting of at least 2.25" x 4.5" of bearing and reusable pocket formers on all stressing ends.
4. It is the designer's responsibility to provide reinforcement to tie cold-joints and to resist bending stresses in the foundation due to anchor uplift.
5. Tabulated loads are governed by tests and may not be increased. Refer to page 12 for additional information.
6. Load at (100) for S/HPAHD attaching to 33 mil (20 ga) CFS the allowable load is 4420 lbs.

S/PAHD & S/HPAHD Strap Tie Holdowns

A variety of steel-to-concrete connectors that satisfy engineering and code requirements. Allowable loads include a tested three-times safety factor in concrete with a one-piece design and no separate anchors required.

MATERIAL: S/HPAHD—118mil (10 ga) x 2¹/₁₆"; S/PAHD—97 mil (12 ga) x 2¹/₁₆".

FINISH: Galvanized; see Corrosion Information, page 12–13.

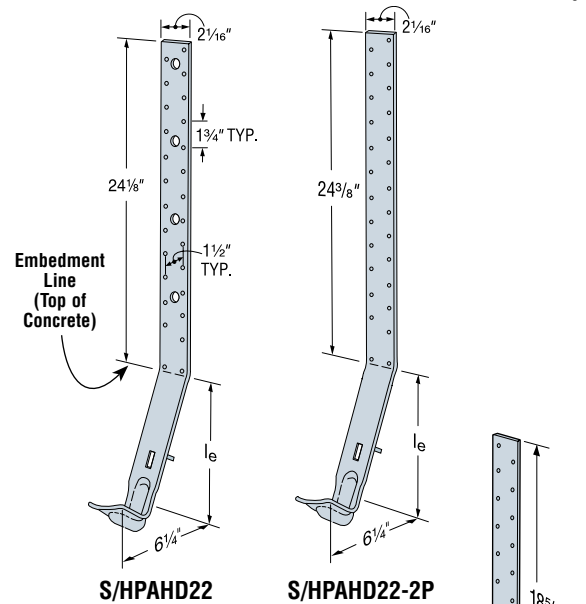
INSTALLATION: • Use all specified fasteners.

- Unless otherwise noted, do NOT install where:
 - (a) a horizontal cold joint exists within the embedment depth between the slab and foundation wall or footing beneath, unless provisions are made to transfer the load, or the slab is designed to resist the load imposed by the anchor; or
 - (b) slabs are poured over concrete block foundation walls.
- To get the full table load, the minimum center-to-center spacing is twice the embedment depth when resisting tension loads at the same time.
- **FOUNDATION CORNERS:** Screw quantities have been reduced when the load is limited by tested concrete pullout strength. Additional screw holes need not be filled.

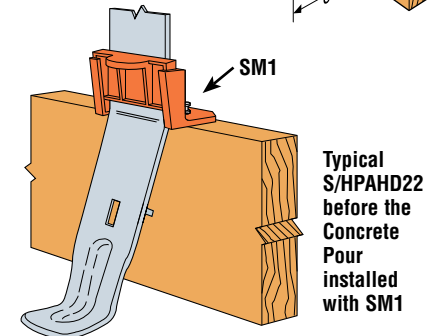
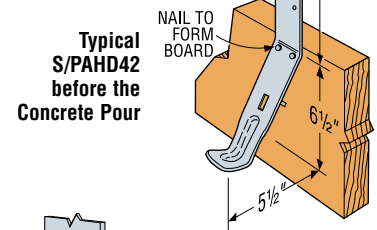
FEATURES: Designed to be installed at the edge of concrete. Tests determined the pullout strength with one horizontal #4 rebar in the shear cone. Install before concrete pour with a StrapMate[®], or other holding device. Pre-bent to control the embedment at the required angle; field-bending is not necessary. Installation holes allow nailing to the form, resulting in 1" deeper embedment; see illustration.

OPTIONS: See also S/HD Holdowns, S/LTT and S/HTT Tension Ties.

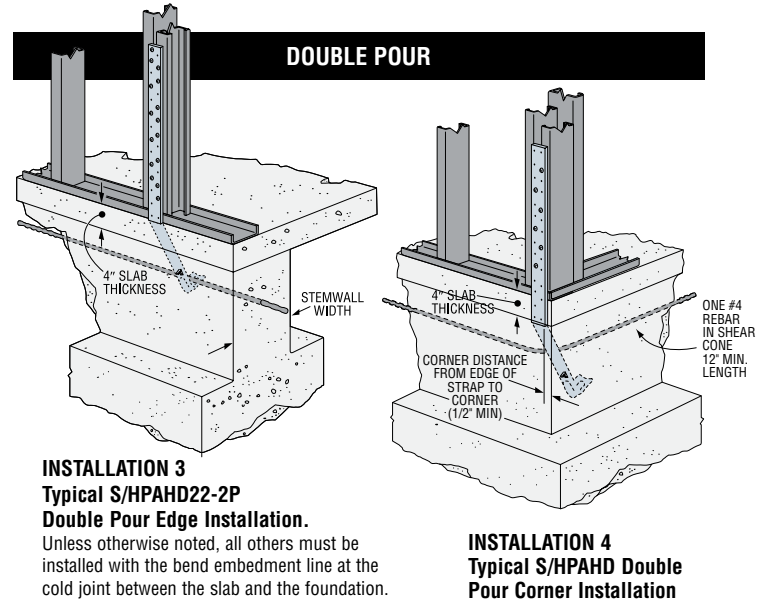
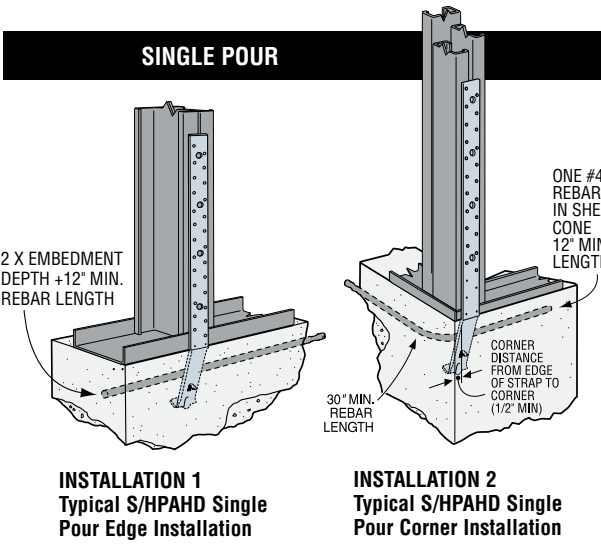
CODE: See page 8 for Code Listing Key Chart.



Model No.	Minimum Stemwall Width	Embed. Depth l_e	Screws	Allowable Loads (100)	Model No.	Minimum Stemwall Width	Embed. Depth l_e	Screws	Allowable Loads (100)	Code Ref.	
Edge Installation – 2500 psi Concrete					Corner Installation – 2500 psi Concrete						
Single Pour – see installation 1 (8" min from corner)					Single Pour – see installation 2 (1/2" min from corner)						
S/PAHD42	6	6 1/2"	10- #10	1765	S/PAHD42	6	6 1/2"	4- #10	1225	28, 151	
	8		13- #10	2300		5- #10		1400			
S/HPAHD22	6	10"	14- #10	3335	S/HPAHD22	6	10"	7- #10	1750		
	8		22- #10	4595		9- #10		2120			
Double Pour – see installation 3 (8" min from corner)					Double Pour – see installation 4 (1/2" min from corner)						
S/PAHD42	6	6 1/2"	10- #10	1765	S/PAHD42	6	6 1/2"	4- #10	1225		
	8		13- #10	2300		5- #10		1400			
S/HPAHD22	6	10"	14- #10	3335	S/HPAHD22	6	10"	7- #10	1750		
	8		22- #10	4595		9- #10		2120			
S/HPAHD22-2P	6	14 7/16"	14- #10	4595	HPAHD22-2P	6	14 7/16"	7- #10	1730		
	8		22- #10	4595		9- #10		2120			



1. S/HPAHD22 may be embedded 4" into the slab and 6" into the 8" stemwall beneath for a maximum load of 2810 lbs. at 8" minimum from the closest corner, and 1400 lbs. at 1/2" from the closest corner. See Installation 4.
2. Tabulated loads are governed by tests and may not be increased. Refer to page 12 for additional information.
3. Calculate the loads using straight line interpolation for corner distances between 1/2" and 8".
4. Loads are based on attachment of CFS double stud members having a minimum thickness of 33 mil (20 ga).
5. Not all fastener holes need to be filled as additional fastener holes provided. Install fasteners symmetrically.
6. Strap may be bent one full cycle. (Bent horizontal 90° then bent vertical.)



C-CFS08 ©2008 SIMPSON STRONG-TIE COMPANY INC.

Anchors

PA/HPA Strap Tie Holdowns

Cold Formed Steel-to-concrete and concrete block connectors that satisfy code requirements.

The PA's Dual Embedment Line allows installation in concrete or concrete block.

MATERIAL: See table

FINISH: Galvanized. PA's available HDG or ZMAX®.

See Corrosion Information page 12-13.

INSTALLATION: • Minimum concrete strength is 2000 psi.

- Use all specified fasteners; some models have extra fastener holes. See General Notes.
- Purlin Anchor must hook around rebar.

EDGE DISTANCE—Minimum concrete edge distance is 5".

Minimum concrete block left-to-right edge distance is 20".

CONCRETE BLOCK WALL—The masonry embedment line on the PA allows for 4" of grout embedment in a standard 8" concrete masonry unit. The minimum wall specifications are:

- A** One #4 vertical rebar, 32" long, 16" each side of anchor;
- B** Two courses of grout filled block above and below the anchor (*no cold joints allowed*);
- C** A horizontal bond beam with two #4 rebars, 40" long, a maximum of two courses above or below the anchor.

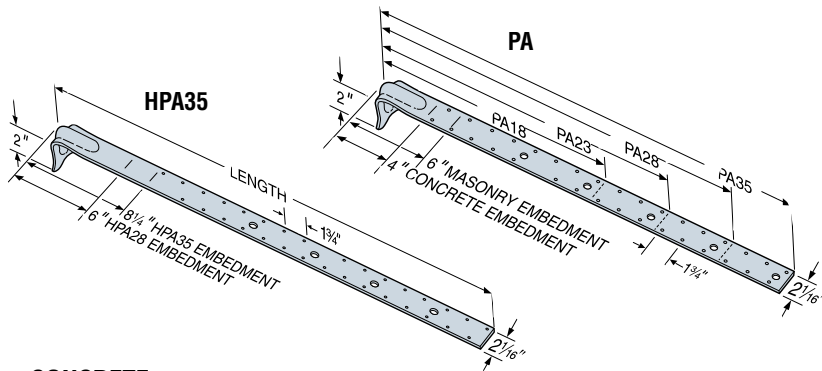
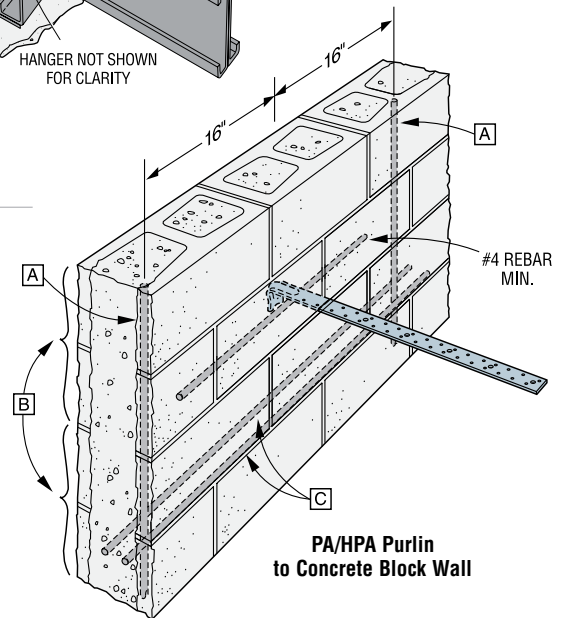
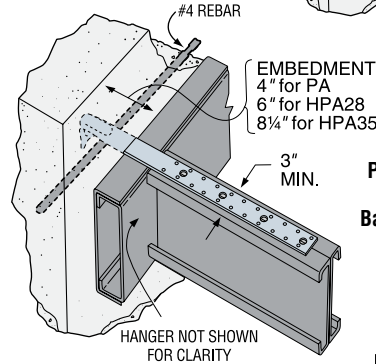
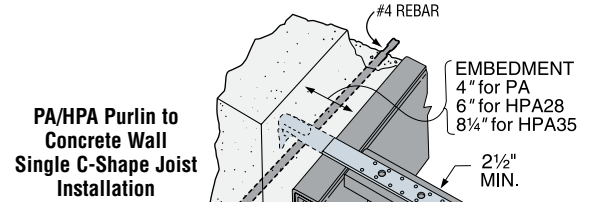
All cells grouted with 2000 psi 3/8" aggregate grout. Grout shall be vibrated per the Code. Rebar quantities, sizes and lengths are minimum requirements and may be increased per any additional wall design requirements.

OPTIONS: See S/LTT and S/HTT Tension Ties.

CODES: See page 8 for Code Listing Key Chart.

The UBC Section 1633.2.8 and IBC 1620.2.1 state:

... Diaphragm to wall anchorage using embedded straps shall have the straps attached to or hooked around the reinforcing steel, or otherwise terminated to effectively transfer forces to the reinforcing steel.



CONCRETE

Available with additional corrosion protection. Check with factory.

Model No.	Material Thk. mil (ga)	L	W	Fasteners			Allowable Tension Load					Code Ref.	
				Rafter/Stud/Joist Thickness									
				33 mil (20 ga)	43 mil (18 ga)	54 mil (16 ga)	33 mil (20 ga) (100) (133)	43 mil (18 ga) (100) (133)	54 mil (16 ga) (100) (133)	33 mil (20 ga) (100) (133)	43 mil (18 ga) (100) (133)		54 mil (16 ga) (100) (133)
PA18	97 (12 ga)	18 1/2	2 1/16	16- #10	15- #10	10- #10	2830	3685	3685	3685	3685	3685	151
PA23		23 3/4		21- #10	18- #10	16- #10	3685	3685	3685	3685	3685	3685	
PA28		32 1/2		23- #10	22- #10	21- #10	3685	3685	3685	3685	3685	3685	
PA35		35		30- #10	29- #10	28- #10	3685	3685	3685	3685	3685	3685	
HPA28	118 (10 ga)	21 1/2	28- #10	26- #10	25- #10	4845	4845	4845	4845	4845	4845		
HPA35	38 1/2	32- #10	30- #10	27- #10	5420	5420	5420	5420	5420	5420	5420		

MASONRY

Model No.	Material Thk. mil (ga)	L	W	Fasteners			Allowable Tension Load					Code Ref.	
				Rafter/Stud/Joist Thickness									
				33 mil (20 ga)	43 mil (18 ga)	54 mil (16 ga)	33 mil (20 ga) (100) (133)	43 mil (18 ga) (100) (133)	54 mil (16 ga) (100) (133)	33 mil (20 ga) (100) (133)	43 mil (18 ga) (100) (133)		54 mil (16 ga) (100) (133)
PA18	97 (12 ga)	18 1/2	2 1/16	14- #10	11- #10	9- #10	2475	2815	2815	2815	2815	2815	151
PA23		23 3/4		16- #10	15- #10	15- #10	2815	2815	2815	2815	2815	2815	
PA28		32 1/2		16- #10	11- #10	6- #10	2815	2815	2815	2815	2815	2815	
PA35		35		16- #10	11- #10	6- #10	2815	2815	2815	2815	2815	2815	

1. Allowable loads are for a horizontal installation into the side of a concrete or masonry wall.
2. Tabulated loads shown at (100) do not include steel stress increase. Tabulated loads shown at (133) include a 1/3 stress increase on the steel. Refer to page 12 for additional information.
3. The designer shall verify that the screw strength is adequate to resist the tabulated load.
4. Not all fastener holes need to be filled as additional fastener holes provided. Install fasteners symmetrically.

ICFVL Ledger Connector System

The ICFVL Ledger Connector System is engineered to solve the challenges of mounting CFS ledgers to insulated concrete form (ICF) walls. The ICFVL is designed to provide both vertical and lateral, in-plane performance. There are many benefits over traditional anchor bolting, including better on center spacing in most cases, faster installation and no protrusions.

The embedded legs of the ICFVL are embossed for additional stiffness and the hole allows for concrete to flow through and around the connector. The exposed flange on the face of the ICF provides a structural surface for mounting a CFS ledger.

MATERIAL: ICFVL—68 mil (14 ga)

FINISH: Galvanized

INSTALLATION: ICFVL in ICF

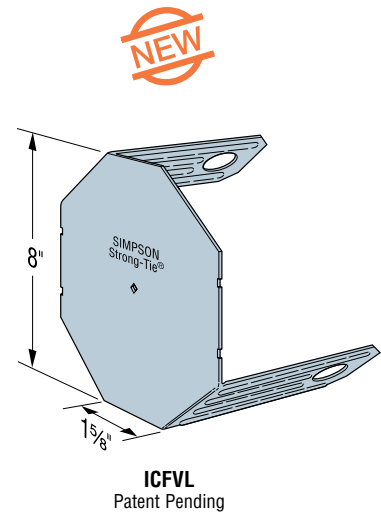
- Snap a chalk line for the bottom of the ledger.
- Mark required on center spacing.
- Use ICFVL to mark kerfs locations.
- Cut kerfs as marked.
- Insert ICFVL flush to the face of the ICF.
- Pour concrete.

CFS Ledger Attachment

- Position the ledger level to the chalk line and against the ICFVL.
- Attach with four #14 x 3/4", #3 drill point screws (*not provided*).
- All screws should be located at least 1/2" from the edge of the ICFVL.
- Space screws evenly.

CODES: See page 8 for Code Listing Key Chart.

WARNING:
Industry studies show that hardened fasteners can experience performance problems in wet environments. Accordingly, use this product in dry environments only.



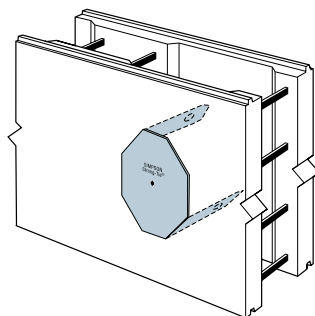
Model No.	Fasteners	Allowable Loads (lbs) (100)	
		Download	Lateral F ₁
ICFVL	4-#14 x 3/4"	1660	1525

1. Fasteners for CFS ledger are not provided.
2. Loads apply to ICF foam thicknesses of 2 3/4" or less. Contact Simpson for allowable loads on thicker walls.
3. Alternately, 1/4" x 3/4" fastener may be used.
4. Tabulated loads are governed by tests and may not be increased. Refer to page 12 for additional information.
5. Concrete f'c = 2500 psi minimum.
6. When combining download and lateral loads, Designer shall evaluate as follows:
Design Download/Allowable Download + Design Lateral Load/Allowable Lateral Load ≤ 1.

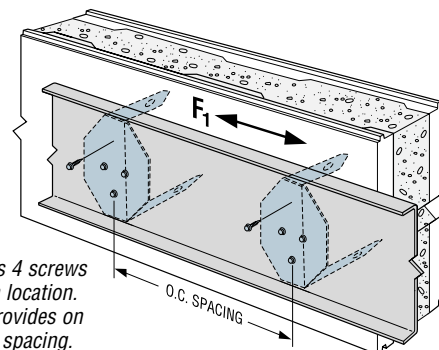
These tables address vertical load applications only.

Ledger Material Thickness mil (ga)	Connector Type	ICFVL SPACING TO REPLACE ANCHOR BOLTS (in) ^{1,2,3}								Code Ref.
		1/2" Dia. Anchors at				5/8" Dia. Anchors at				
		12" o.c.	24" o.c.	36" o.c.	48" o.c.	12" o.c.	24" o.c.	36" o.c.	48" o.c.	
68 (14 ga)	ICFVL	11	22	33	44	9	18	27	36	146
54 (16 ga)	ICFVL	15	30	45	48	12	24	36	48	

1. The Designer may specify different spacing based on the load requirements.
2. See flier F-ICFVL for additional connection details.
3. CFS ledger values are based on steel Fu = 65 ksi.



ICFVL



Typical CFS Ledger Installation with ICFVL (minimum 54 mil)

STEEL STRONG-WALL® Cold-Formed Steel on Concrete Foundations

The Steel Strong-Wall panel provides high capacity, narrow wall solutions for cold-formed steel framing. The wall installs easily in cold-formed steel framing, and new pre-attached steel studs allow easy attachment of interior and exterior finishes.

MATERIAL: Vertical Panel—118 mil (10 ga)

FINISH: Vertical Panel—Galvanized
Top and Base Plates—Simpson gray paint
(cold galvanizing available, contact Simpson)

NOTES:

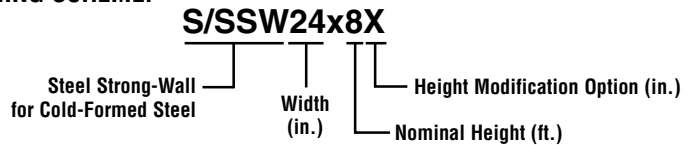
- For top of wall attachment, use #14 self-drilling screws (not provided) extended through the connection with 3 exposed threads minimum. Fill all screw holes.
- Maximum height H is the maximum height allowed for the allowable shear loads.

CODES: ICC-ES ESR-1679; City of L.A. RR 25625; State of Florida FL5113

⚠ Load tables list values based upon results from the most recent testing and/or calculations and may not match those in current code reports. Where code jurisdictions apply, consult the current reports for applicable load values.

Shearwall

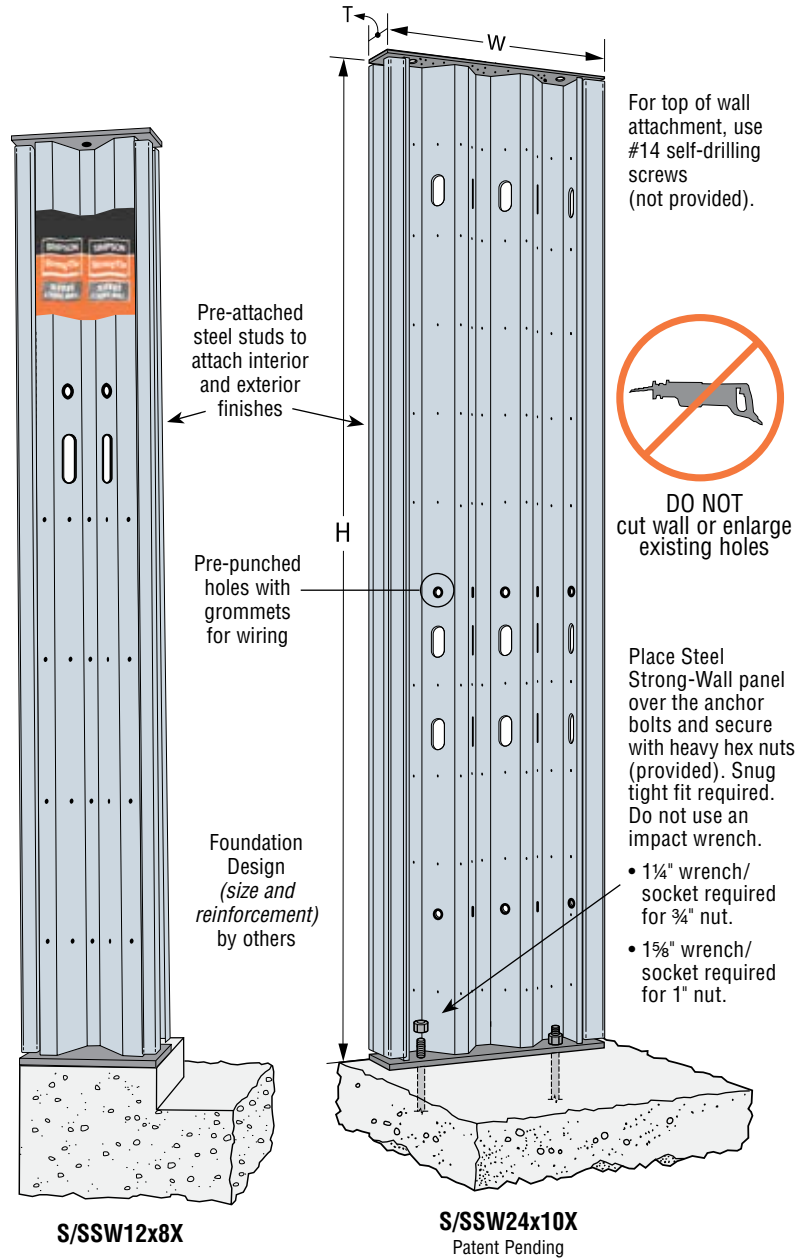
NAMING SCHEME:



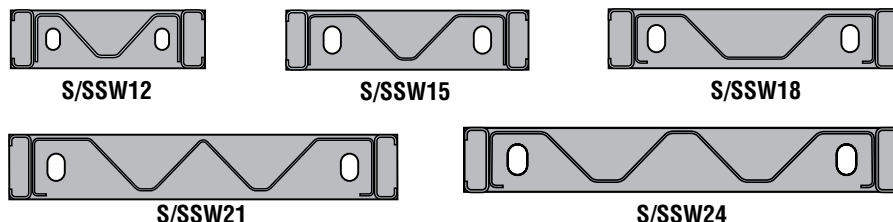
STEEL STRONG-WALL FOR COLD-FORMED STEEL PRODUCT DATA

Model No.	W (in)	Max. H ¹ (in)	T (in)	Anchor Bolts		Number of Screws in Top of Wall
				Qty.	Dia.	
S/SSW12x7	12	80	3½	2	¾"	4
S/SSW15x7	15	80	3½	2	1"	6
S/SSW18x7	18	80	3½	2	1"	9
S/SSW21x7	21	80	3½	2	1"	12
S/SSW24x7	24	80	3½	2	1"	14
S/SSW12x8X	12	97	3½	2	¾"	4
S/SSW15x8X	15	97	3½	2	1"	6
S/SSW18x8X	18	97	3½	2	1"	9
S/SSW21x8X	21	97	3½	2	1"	12
S/SSW24x8X	24	97	3½	2	1"	14
S/SSW12x9X	12	109	3½	2	¾"	4
S/SSW15x9X	15	109	3½	2	1"	6
S/SSW18x9X	18	109	3½	2	1"	9
S/SSW21x9X	21	109	3½	2	1"	12
S/SSW24x9X	24	109	3½	2	1"	14
S/SSW15x10X	15	121	3½	2	1"	6
S/SSW18x10X	18	121	3½	2	1"	9
S/SSW21x10X	21	121	3½	2	1"	12
S/SSW24x10X	24	121	3½	2	1"	14

1. Specify height when ordering "X" models (example: S/SSW12x8X, H = 95").



WALL PROFILES



STEEL STRONG-WALL® Cold-Formed Steel on Concrete Foundations

1997 UNIFORM BUILDING CODE

Model No.	Max. H (in.)	Axial Load (lbs)	Seismic ²				Wind ³			
			2500 psi concrete		3000 psi concrete		2500 psi concrete		3000 psi concrete	
			Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in.)	Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in.)	Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in.)	Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in.)
S/SSW12x7	80	1000	1175	0.31	1175	0.31	1465	0.39	1465	0.39
		4000	1175	0.31	1175	0.31	1345	0.35	1465	0.39
		7500	1045	0.28	1045	0.28	1195	0.31	1305	0.34
S/SSW15x7	80	1000	1720	0.22	1720	0.22	2155	0.27	2155	0.27
		4000	1720	0.22	1720	0.22	2155	0.27	2155	0.27
		7500	1650	0.21	1650	0.21	2060	0.26	2060	0.26
S/SSW18x7	80	1000	3300	0.22	3300	0.22	3815	0.25	4125	0.27
		4000	3300	0.22	3300	0.22	3585	0.24	4125	0.27
		7500	3300	0.22	3300	0.22	3320	0.22	4095	0.27
S/SSW21x7	80	1000	4340	0.18	4340	0.18	5425	0.22	5425	0.22
		4000	4340	0.18	4340	0.18	5210	0.22	5425	0.22
		7500	4340	0.18	4340	0.18	4875	0.20	5425	0.22
S/SSW24x7	80	1000	5035	0.14	5035	0.14	6290	0.17	6290	0.17
		4000	5035	0.14	5035	0.14	6290	0.17	6290	0.17
		7500	5035	0.14	5035	0.14	6290	0.17	6290	0.17
S/SSW12x8X	97	1000	940	0.44	940	0.44	1175	0.55	1175	0.55
		4000	820	0.38	820	0.38	1030	0.48	1030	0.48
		7500	690	0.32	690	0.32	860	0.40	860	0.40
S/SSW15x8X	97	1000	1395	0.32	1395	0.32	1745	0.40	1745	0.40
		4000	1315	0.30	1315	0.30	1645	0.37	1645	0.37
		7500	1170	0.27	1170	0.27	1465	0.33	1465	0.33
S/SSW18x8X	97	1000	2720	0.32	2720	0.32	3160	0.37	3405	0.40
		4000	2720	0.32	2720	0.32	2965	0.35	3405	0.40
		7500	2710	0.32	2710	0.32	2745	0.33	3370	0.40
S/SSW21x8X	97	1000	3540	0.26	3540	0.26	4420	0.33	4420	0.33
		4000	3540	0.26	3540	0.26	4310	0.32	4420	0.33
		7500	3490	0.26	3490	0.26	4030	0.30	4360	0.32
S/SSW24x8X	97	1000	4175	0.21	4175	0.21	5215	0.26	5215	0.26
		4000	4175	0.21	4175	0.21	5215	0.26	5215	0.26
		7500	4175	0.21	4175	0.21	5215	0.26	5215	0.26
S/SSW12x9X	109	1000	765	0.51	765	0.51	955	0.63	955	0.63
		4000	650	0.43	650	0.43	810	0.54	810	0.54
		7500	515	0.34	515	0.34	645	0.42	645	0.42
S/SSW15x9X	109	1000	1210	0.39	1210	0.39	1515	0.49	1515	0.49
		4000	1090	0.35	1090	0.35	1355	0.44	1355	0.44
		7500	945	0.30	945	0.30	1180	0.38	1180	0.38
S/SSW18x9X	109	1000	2385	0.40	2385	0.40	2810	0.47	2980	0.50
		4000	2385	0.40	2385	0.40	2640	0.44	2980	0.50
		7500	2295	0.38	2295	0.38	2440	0.41	2865	0.48
S/SSW21x9X	109	1000	3115	0.33	3115	0.33	3890	0.41	3890	0.41
		4000	3050	0.32	3050	0.32	3760	0.39	3815	0.40
		7500	2875	0.30	2875	0.30	3495	0.37	3595	0.38
S/SSW24x9X	109	1000	3730	0.27	3730	0.27	4660	0.33	4660	0.33
		4000	3730	0.27	3730	0.27	4660	0.33	4660	0.33
		7500	3655	0.26	3655	0.26	4570	0.32	4570	0.32
S/SSW15x10X	121	1000	1015	0.45	1015	0.45	1270	0.56	1270	0.56
		4000	895	0.39	895	0.39	1115	0.49	1115	0.49
		7500	750	0.33	750	0.33	940	0.41	940	0.41
S/SSW18x10X	121	1000	2095	0.48	2095	0.48	2530	0.58	2620	0.60
		4000	2040	0.47	2040	0.47	2370	0.55	2550	0.58
		7500	1845	0.42	1845	0.42	2170	0.50	2305	0.53
S/SSW21x10X	121	1000	2670	0.38	2670	0.38	3335	0.48	3335	0.48
		4000	2475	0.35	2475	0.35	3095	0.44	3095	0.44
		7500	2250	0.32	2250	0.32	2810	0.40	2810	0.40
S/SSW24x10X	121	1000	3300	0.32	3300	0.32	4125	0.40	4125	0.40
		4000	3235	0.31	3235	0.31	4045	0.39	4045	0.39
		7500	2995	0.29	2995	0.29	3745	0.36	3745	0.36

NOTE:

For models with an "X" suffix, specify height when ordering (example: S/SSW12x8X, h = 95").

1. Top of wall screws for the S/SSW panel shall be ICC approved #14 self-drilling screws with a minimum shear capacity of 375 lbs. attaching to a minimum 43 mils (18 gauge) steel member.
2. For designs using R = 5.5.
3. May also be used for Seismic designs using R = 4.4.
4. Allowable shear and drift values in tables may be interpolated for intermediate height or axial loads. See example on page 38.
5. Axial load denotes the total maximum gravity load permitted on the entire panel acting in combination with the shear load.
6. Loads applicable to designs using the alternate basic load combinations in Section 1612.3.2 of the UBC. For designs per the basic load combinations in Section 1612.3.1 of the UBC, use 2003/2006 IBC tables (page 37).
7. High strength anchor bolts required unless lower grade justified by Engineer. See pages 39-41 for SSWAB anchor bolt information and anchorage solutions.
8. For anchorage uplift loads at design shear values, refer to the equations on page 42.

STEEL STRONG-WALL® Cold-Formed Steel on Concrete Foundations

2000 INTERNATIONAL BUILDING CODE

Shearwall

Model No.	Max. H (in.)	Axial Load (lbs)	Seismic ²				Wind			
			2500 psi concrete		3000 psi concrete		2500 psi concrete		3000 psi concrete	
			Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in.)	Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in.)	Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in.)	Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in.)
S/SSW12x7	80	1000	1175	0.31	1175	0.31	1465	0.39	1465	0.39
		4000	1175	0.31	1175	0.31	1345	0.35	1465	0.39
		7500	1045	0.28	1045	0.28	1195	0.31	1305	0.34
S/SSW15x7	80	1000	1720	0.22	1720	0.22	2155	0.27	2155	0.27
		4000	1720	0.22	1720	0.22	2155	0.27	2155	0.27
		7500	1650	0.21	1650	0.21	2060	0.26	2060	0.26
S/SSW18x7	80	1000	3300	0.22	3300	0.22	3815	0.25	4125	0.27
		4000	3300	0.22	3300	0.22	3585	0.24	4125	0.27
		7500	3300	0.22	3300	0.22	3320	0.22	4095	0.27
S/SSW21x7	80	1000	4340	0.18	4340	0.18	5425	0.22	5425	0.22
		4000	4340	0.18	4340	0.18	5210	0.22	5425	0.22
		7500	4340	0.18	4340	0.18	4875	0.20	5425	0.22
S/SSW24x7	80	1000	5035	0.14	5035	0.14	6290	0.17	6290	0.17
		4000	5035	0.14	5035	0.14	6290	0.17	6290	0.17
		7500	5035	0.14	5035	0.14	6290	0.17	6290	0.17
S/SSW12x8X	97	1000	935	0.43	935	0.43	1175	0.55	1175	0.55
		4000	820	0.38	820	0.38	1030	0.48	1030	0.48
		7500	690	0.32	690	0.32	860	0.40	860	0.40
S/SSW15x8X	97	1000	1395	0.32	1395	0.32	1745	0.40	1745	0.40
		4000	1315	0.30	1315	0.30	1645	0.37	1645	0.37
		7500	1170	0.27	1170	0.27	1465	0.33	1465	0.33
S/SSW18x8X	97	1000	2720	0.32	2720	0.32	3160	0.37	3405	0.40
		4000	2720	0.32	2720	0.32	2965	0.35	3405	0.40
		7500	2710	0.32	2710	0.32	2745	0.33	3370	0.40
S/SSW21x8X	97	1000	3540	0.26	3540	0.26	4420	0.33	4420	0.33
		4000	3540	0.26	3540	0.26	4310	0.32	4420	0.33
		7500	3490	0.26	3490	0.26	4030	0.30	4360	0.32
S/SSW24x8X	97	1000	4175	0.21	4175	0.21	5215	0.26	5215	0.26
		4000	4175	0.21	4175	0.21	5215	0.26	5215	0.26
		7500	4175	0.21	4175	0.21	5215	0.26	5215	0.26
S/SSW12x9X	109	1000	735	0.49	735	0.49	955	0.63	955	0.63
		4000	650	0.43	650	0.43	810	0.54	810	0.54
		7500	515	0.34	515	0.34	645	0.42	645	0.42
S/SSW15x9X	109	1000	1210	0.39	1210	0.39	1515	0.49	1515	0.49
		4000	1090	0.35	1090	0.35	1355	0.44	1355	0.44
		7500	945	0.30	945	0.30	1180	0.38	1180	0.38
S/SSW18x9X	109	1000	2385	0.40	2385	0.40	2810	0.47	2980	0.50
		4000	2385	0.40	2385	0.40	2640	0.44	2980	0.50
		7500	2295	0.38	2295	0.38	2440	0.41	2865	0.48
S/SSW21x9X	109	1000	3115	0.33	3115	0.33	3890	0.41	3890	0.41
		4000	3050	0.32	3050	0.32	3760	0.39	3815	0.40
		7500	2875	0.30	2875	0.30	3495	0.37	3595	0.38
S/SSW24x9X	109	1000	3730	0.27	3730	0.27	4660	0.33	4660	0.33
		4000	3730	0.27	3730	0.27	4660	0.33	4660	0.33
		7500	3655	0.26	3655	0.26	4570	0.32	4570	0.32
S/SSW15x10X	121	1000	1015	0.45	1015	0.45	1270	0.56	1270	0.56
		4000	895	0.39	895	0.39	1115	0.49	1115	0.49
		7500	750	0.33	750	0.33	940	0.41	940	0.41
S/SSW18x10X	121	1000	2095	0.48	2095	0.48	2530	0.58	2620	0.60
		4000	2040	0.47	2040	0.47	2370	0.55	2550	0.58
		7500	1845	0.42	1845	0.42	2170	0.50	2305	0.53
S/SSW21x10X	121	1000	2670	0.38	2670	0.38	3335	0.48	3335	0.48
		4000	2475	0.35	2475	0.35	3095	0.44	3095	0.44
		7500	2250	0.32	2250	0.32	2810	0.40	2810	0.40
S/SSW24x10X	121	1000	3300	0.32	3300	0.32	4125	0.40	4125	0.40
		4000	3235	0.31	3235	0.31	4045	0.39	4045	0.39
		7500	2995	0.29	2995	0.29	3745	0.36	3745	0.36

NOTE:

For models with an "X" suffix, specify height when ordering (example: S/SSW12x8X, h = 95").

1. Top of wall screws for the S/SSW panel shall be ICC approved #14 self-drilling screws with a minimum shear capacity of 375 lbs. attaching to a minimum 43 mils (18 gauge) steel member.
2. For designs using R = 6.0.
3. Allowable shear and drift values in tables may be interpolated for intermediate height or axial loads. See example on page 38.
4. Axial load denotes the total maximum gravity load permitted on the entire panel acting in combination with the shear load.
5. Loads applicable to designs using the alternate basic load combinations in Section 1605.3.2 of the IBC. For designs per the basic load combinations in Section 1605.3.1 of the IBC, use 2003/2006 IBC tables, page 37.
6. High strength anchor bolts required unless lower grade justified by Engineer. See pages 39-41 for SSWAB anchor bolt information and anchorage solutions.
7. For anchorage uplift loads at design shear values, refer to the equations on page 42.

2003 AND 2006 INTERNATIONAL BUILDING CODE

Model No.	Max. H (in.)	Axial Load (lbs)	Seismic ²				Wind ⁶			
			2500 psi concrete		3000 psi concrete		2500 psi concrete		3000 psi concrete	
			Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in.)	Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in.)	Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in.)	Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in.)
S/SSW12x7	80	1000	975	0.26	975	0.26	1095	0.29	1220	0.32
		4000	850	0.22	850	0.22	965	0.25	1060	0.28
		7500	710	0.19	710	0.19	815	0.21	885	0.23
S/SSW15x7	80	1000	1450	0.18	1450	0.18	1810	0.23	1810	0.23
		4000	1310	0.17	1310	0.17	1640	0.21	1640	0.21
		7500	1150	0.15	1150	0.15	1440	0.18	1440	0.18
S/SSW18x7	80	1000	2700	0.18	2700	0.18	2845	0.19	3375	0.22
		4000	2615	0.17	2700	0.18	2615	0.17	3195	0.21
		7500	2345	0.16	2700	0.18	2345	0.16	2930	0.19
S/SSW21x7	80	1000	3550	0.15	3550	0.15	4095	0.17	4440	0.18
		4000	3550	0.15	3550	0.15	3810	0.16	4440	0.18
		7500	3475	0.14	3550	0.15	3475	0.14	4315	0.18
S/SSW24x7	80	1000	4200	0.12	4200	0.12	5250	0.15	5250	0.15
		4000	4200	0.12	4200	0.12	5240	0.15	5250	0.15
		7500	4200	0.12	4200	0.12	4840	0.13	5250	0.15
S/SSW12x8X	97	1000	700	0.33	700	0.33	870	0.41	870	0.41
		4000	580	0.27	580	0.27	720	0.34	720	0.34
		7500	450	0.21	450	0.21	560	0.26	560	0.26
S/SSW15x8X	97	1000	1070	0.24	1070	0.24	1340	0.31	1340	0.31
		4000	945	0.22	945	0.22	1180	0.27	1180	0.27
		7500	800	0.18	800	0.18	1000	0.23	1000	0.23
S/SSW18x8X	97	1000	2335	0.28	2380	0.28	2355	0.28	2835	0.34
		4000	2140	0.25	2215	0.26	2160	0.26	2635	0.31
		7500	1920	0.23	2010	0.24	1940	0.23	2400	0.28
S/SSW21x8X	97	1000	2945	0.22	2945	0.22	3390	0.25	3685	0.27
		4000	2825	0.21	2825	0.21	3155	0.23	3535	0.26
		7500	2590	0.19	2590	0.19	2880	0.21	3235	0.24
S/SSW24x8X	97	1000	3800	0.19	3800	0.19	4595	0.23	4745	0.24
		4000	3675	0.18	3675	0.18	4325	0.22	4595	0.23
		7500	3415	0.17	3415	0.17	3990	0.20	4265	0.21
S/SSW12x9X	109	1000	570	0.38	570	0.38	710	0.47	710	0.47
		4000	450	0.30	450	0.30	560	0.37	560	0.37
		7500	320	0.21	320	0.21	400	0.27	400	0.27
S/SSW15x9X	109	1000	895	0.29	895	0.29	1120	0.36	1120	0.36
		4000	775	0.25	775	0.25	965	0.31	965	0.31
		7500	635	0.21	635	0.21	790	0.26	790	0.26
S/SSW18x9X	109	1000	1990	0.34	1990	0.34	2090	0.35	2470	0.42
		4000	1815	0.31	1815	0.31	1925	0.32	2265	0.38
		7500	1610	0.27	1610	0.27	1725	0.29	2015	0.34
S/SSW21x9X	109	1000	2465	0.26	2465	0.26	2970	0.31	3080	0.32
		4000	2265	0.24	2265	0.24	2740	0.29	2830	0.30
		7500	2035	0.21	2035	0.21	2480	0.26	2545	0.27
S/SSW24x9X	109	1000	3175	0.23	3175	0.23	3970	0.28	3970	0.28
		4000	2965	0.21	2965	0.21	3705	0.26	3705	0.26
		7500	2710	0.19	2710	0.19	3390	0.24	3390	0.24
S/SSW15x10X	121	1000	750	0.33	750	0.33	940	0.42	940	0.42
		4000	630	0.28	630	0.28	785	0.35	785	0.35
		7500	490	0.22	490	0.22	615	0.27	615	0.27
S/SSW18x10X	121	1000	1645	0.38	1645	0.38	1885	0.44	2055	0.47
		4000	1475	0.34	1475	0.34	1720	0.40	1840	0.42
		7500	1275	0.29	1275	0.29	1520	0.35	1600	0.37
S/SSW21x10X	121	1000	1985	0.29	1985	0.29	2485	0.36	2485	0.36
		4000	1790	0.26	1790	0.26	2240	0.32	2240	0.32
		7500	1565	0.23	1565	0.23	1960	0.28	1960	0.28
S/SSW24x10X	121	1000	2570	0.25	2570	0.25	3210	0.31	3210	0.31
		4000	2360	0.23	2360	0.23	2950	0.29	2950	0.29
		7500	2120	0.21	2120	0.21	2645	0.26	2645	0.26

NOTE:

For models with an "X" suffix, specify height when ordering (example: S/SSW12x8X, h = 95").

1. Top of wall screws for the S/SSW panel shall be ICC approved #14 self-drilling screws with a minimum shear capacity of 375 lbs. attaching to a minimum 43 mils (18 gauge) steel member.
2. For designs using R = 6.5.
3. Allowable shear and drift values in tables may be interpolated for intermediate height or axial loads. See example on page 38.
4. Axial load denotes the total maximum gravity load permitted on the entire panel acting in combination with the shear load.
5. Loads applicable to designs using the ASD basic (Section 1605.3.1) or the alternate basic (Section 1605.3.2) load combinations.
6. Wind loads comply with FL5113.
7. High strength anchor bolts required unless lower grade justified by Engineer. See pages 39-41 for SSWAB anchor bolt information and anchorage solutions.
8. For anchorage uplift loads at design shear values, refer to the equations on page 42.

STEEL STRONG-WALL® Cold-Formed Steel on Concrete Foundations**ALLOWABLE OUT OF PLANE LOADS (PSF)^{1,3}**

Model Width	Axial Load (lbs) ^{2,4}	Nominal Height of Panel (feet)		
		8	9	10
12" wide	1000	195	140	100
	4000	145	100	70
	7500	85	50	25
15" wide	1000	160	125	100
	4000	130	95	70
	7500	90	65	45
18" wide	7500	300	210	155
21" wide	7500	255	180	130
24" wide	7500	265	190	135

1. Loads shown are at ASD level in pounds per square foot (psf) of wall with no further increase in load and are applicable to either the ASD Basic or Alternate Basic load combinations.
2. Axial load denotes maximum gravity load permitted on entire panel acting in combination with the out-of-plane load.
3. Load considers a deflection limit of $h/240$.
4. Allowable out-of-plane loads for the 12 and 15 inch walls may be linearly interpolated between the axial loads shown.

AXIAL CAPACITIES ON CONCRETE

Model Width	Compression Capacity (lbs) with No Lateral Load ^{1,2,3}			
	Nominal Height of Panel (feet)			
	7	8	9	10
12" wide	20200	16300	13700	11100
15" wide	25300	21800	19200	16600
18" wide	42500	36000	31400	27000
21" wide	43700	35800	30300	25100
24" wide	51600	42900	36900	31100

1. Compression capacity is lesser of wall buckling capacity or 2500 psi uniform concrete bearing.
2. Compression capacity of wall assumes concentric loading with no lateral loads present. See allowable in-plane or out-of-plane shear load tables for combined lateral and axial loading conditions.
3. Capacities do not include the 1/3 steel stress increase and therefore are applicable to either the ASD Basic or Alternate Basic load combinations.

Shearwall

S/SSW SHEAR LOAD INTERPOLATION EXAMPLE**Given:**

1997 UBC, Seismic, 2500 psi Concrete

Shear Load = 2500 lbs.

Axial = 4000 lbs.

S/SSW Wall Height Required: $8'-6" = 102"$ **Interpolate (See table on page 35):**S/SSW18x8X $V_1 = 2720$ lbs., $h_1 = 97"$ S/SSW18x9X $V_2 = 2385$ lbs., $h_2 = 109"$

$$\text{Equation: } V_{\text{allow}} = \left(\frac{V_1 - V_2}{h_1 - h_2} \right) (h_{\text{required}} - h_1) + V_1$$

$$V_{\text{allow}} = \left(\frac{2720 \text{ lbs.} - 2385 \text{ lbs.}}{97" - 109"} \right) (102" - 97") + 2720 \text{ lbs.} = 2580 \text{ lbs. @ } 102"$$

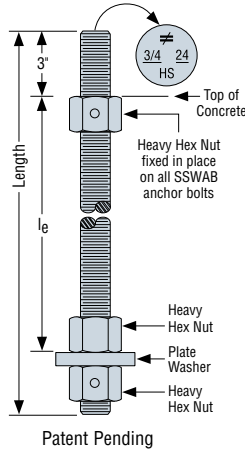
 $V_{\text{allow}} = 2580$ lbs. > 2500 lbs. **OK****>>> Use S/SSW18x9X H = 102"**

SSWAB ANCHOR BOLTS

SSWAB anchor bolts in 3/4" and 1" diameters offer flexibility to meet specific project demands. Inspection is easy; the head is stamped with a "No Equal" symbol for identification, bolt length, bolt diameter, and optional "HS" for High Strength if specified.

MATERIAL: ASTM A36; High Strength (HS) ASTM A449

An additional nut for template installation is provided with each SSWAB. May also be used for S/SSW installation.

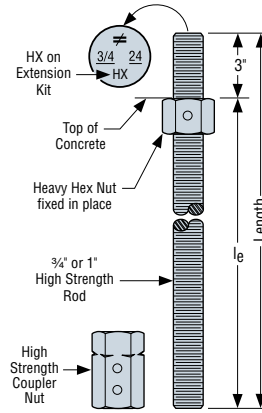


Patent Pending

Steel Strong-Wall Width (in)	Model No.	Dia. (in)	Total Length (in)	le (in)
12" Model	SSWAB3/4x24	3/4	24	19
	SSWAB3/4x24HS	3/4	24	19
	SSWAB3/4x30	3/4	30	25
	SSWAB3/4x30HS	3/4	30	25
	SSWAB3/4x36HS	3/4	36	31
15", 18", 21", 24" Models	SSWAB1x24	1	24	19
	SSWAB1x24HS	1	24	19
	SSWAB1x30	1	30	25
	SSWAB1x30HS	1	30	25
	SSWAB1x36HS	1	36	31

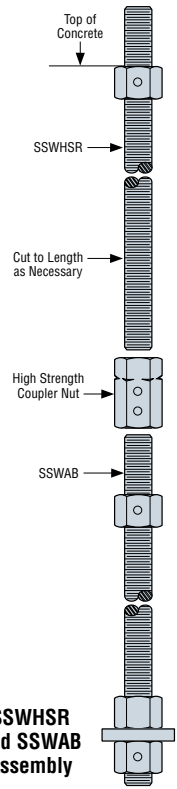
SSWHSR EXTENSION KIT

SSWHSR allows for anchorage in tall stem wall applications where full embedment of an SSWAB into the footing is required. The head is stamped for identification like an SSWAB. Kit includes ASTM A-449 high strength rod with heavy hex nut fixed in place and high strength coupler nut. Do not use in place of SSWAB.



SSWHSR_KT
Patent Pending

Steel Strong-Wall Width (in)	Model No.	Dia. (in)	Total Length (in)	le (in)
12" Model	SSWHSR3/4-2KT	3/4	24	21
	SSWHSR3/4-3KT	3/4	36	33
15", 18", 21", 24" Models	SSWHSR1-2KT	1	24	21
	SSWHSR1-3KT	1	36	33



SSWHSR and SSWAB Assembly

Shearwall

SLAB ON GRADE / 10" CURB INSTALLATIONS AT CORNER

Anchorage Solutions for 1997 UBC Loads^{1,2,3,5}

Steel Strong-Wall Width (in)	2500 psi		3000 psi		4500 psi	
	Wind	Seismic ⁴	Wind	Seismic ⁴	Wind	Seismic ⁴
	W / W ₁	W / W ₁	W / W ₁	W / W ₁	W / W ₁	W / W ₁
12" Wall	15 / 3	14 / 3	12 / 3	12 / 3	12 / 3	12 / 3
15" Wall	21 / 3	15 / 3	12 / 3	12 / 3	12 / 3	12 / 3
18" Wall	24 / 6	22 / 6	18 / 4	12 / 3	12 / 3	12 / 3
21" Wall	26 / 8	22 / 6	18 / 4	13 / 3	12 / 3	12 / 3
24" Wall	28 / 10	22 / 6	18 / 4	13 / 3	13 / 3	13 / 3

Anchorage Solutions for 2000 IBC Loads^{1,4}

Steel Strong-Wall Width (in)	2500 psi		3000 psi		4500 psi	
	Wind ²	Seismic ³	Wind ²	Seismic ³	Wind ²	Seismic ³
	W / W ₁	W / W ₁	W / W ₁	W / W ₁	W / W ₁	W / W ₁
12" Wall	30 / 13	34 / 14	30 / 13	32 / 13	24 / 10	28 / 12
15" Wall	35 / 15	46 / 21	32 / 13	45 / 20	25 / 10	40 / 18
18" Wall	40 / 18	46 / 21	42 / 19	45 / 20	33 / 14	40 / 18
21" Wall	44 / 20	46 / 21	42 / 19	45 / 20	34 / 15	40 / 18
24" Wall	46 / 21	46 / 21	42 / 19	45 / 20	34 / 15	40 / 18

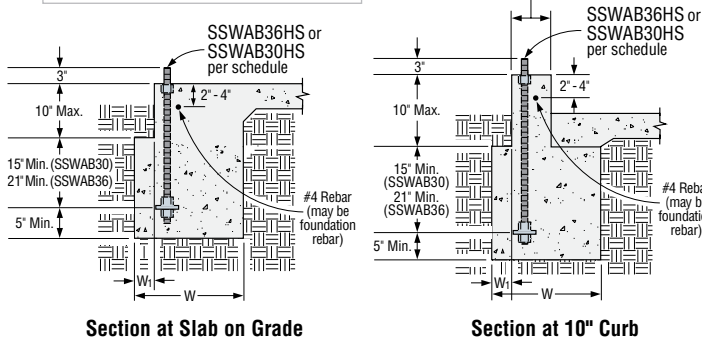
Anchorage Solutions for 2003 and 2006 IBC Loads^{1,4}

Steel Strong-Wall Width (in)	2500 psi		3000 psi		4500 psi	
	Wind ²	Seismic ³	Wind ²	Seismic ³	Wind ²	Seismic ³
	W / W ₁	W / W ₁	W / W ₁	W / W ₁	W / W ₁	W / W ₁
12" Wall	24 / 10	33 / 14	25 / 10	32 / 13	20 / 8	28 / 12
15" Wall	29 / 12	46 / 21	26 / 11	45 / 20	20 / 8	40 / 18
18" Wall	34 / 14	46 / 21	36 / 15	45 / 20	27 / 12	40 / 18
21" Wall	38 / 16	46 / 21	39 / 17	45 / 20	31 / 13	40 / 18
24" Wall	41 / 18	46 / 21	39 / 17	45 / 20	31 / 14	40 / 18

- 2500 psi concrete assumes no special inspection and a multiplier of 2 on the concrete per Section 1923.3.2.
- 3000 and 4500 psi concrete assume special inspection.
- Assumes phi = 0.65 (reinforcement not provided per Section 1923.3.2).
- Seismic applies to designs using R = 5.5. For designs using R = 4.4, use the wind values.
- Shaded values denote where SSWAB30HS anchor bolt may be used in place of SSWAB36HS.

- Assumes cracked concrete with no supplementary reinforcement per ACI 318.
- Wind includes Seismic Design Category A and B.
- Seismic denotes Seismic Design Category C through F. Detached 1 and 2 family dwellings in SDC C may use wind solutions.
- Shaded values denote where SSWAB30HS anchor bolt may be used in place of SSWAB36HS.

Foundation design (size and reinforcement) by others.

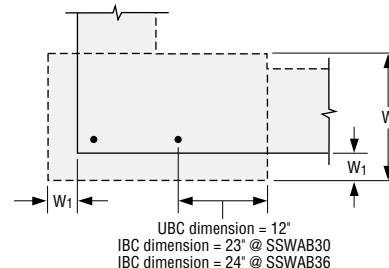


Section at Slab on Grade

Section at 10" Curb

Anchorage Solutions General Notes

- Anchorage solutions based on high strength SSWAB anchor bolts.
- The Engineer of Record may specify alternate embedment, footing size or bolt grade.
- Footing dimensions and rebar requirements are for anchorage only.



Slab on Grade / 10" Curb Footing Plan at Corner

STEEL STRONG-WALL® Anchorage Solutions

SLAB ON GRADE / 10" CURB INSTALLATIONS AWAY FROM CORNER

Anchorage Solutions for 1997 UBC Loads^{1,2,3,5}

Steel Strong-Wall Width (in)	2500 psi		3000 psi		4500 psi	
	Wind	Seismic ⁴	Wind	Seismic ⁴	Wind	Seismic ⁴
	W / W ₁	W / W ₁	W / W ₁	W / W ₁	W / W ₁	W / W ₁
12" Wall	15 / 3	12 / 3	12 / 3	12 / 3	12 / 3	12 / 3
15" Wall	13 / 3	13 / 3	12 / 3	12 / 3	12 / 3	12 / 3
18" Wall	16 / 3	15 / 3	17 / 3	12 / 3	12 / 3	12 / 3
21" Wall	20 / 3	15 / 3	17 / 3	12 / 3	12 / 3	12 / 3
24" Wall	22 / 3	15 / 3	17 / 3	12 / 3	12 / 3	12 / 3

- 2500 psi concrete assumes no special inspection and a multiplier of 2 on the concrete per Section 1923.3.2.
- 3000 and 4500 psi concrete assume special inspection.
- Assumes $\phi = 0.65$ (reinforcement not provided per Section 1923.3.2).
- Seismic applies to designs using $R = 5.5$. For designs using $R = 4.4$, use the wind values.
- Shaded values denote where SSWAB30HS anchor bolt may be used in place of SSWAB36HS.

Anchorage Solutions for 2000 IBC Loads^{1,4}

Steel Strong-Wall Width (in)	2500 psi		3000 psi		4500 psi	
	Wind ²	Seismic ³	Wind ²	Seismic ³	Wind ²	Seismic ³
	W / W ₁	W / W ₁	W / W ₁	W / W ₁	W / W ₁	W / W ₁
12" Wall	26 / 11	30 / 12	28 / 9	28 / 11	20 / 5	24 / 8
15" Wall	34 / 14	43 / 16	28 / 12	45 / 20	21 / 8	38 / 16
18" Wall	40 / 16	43 / 16	42 / 18	45 / 20	30 / 12	38 / 16
21" Wall	41 / 14	43 / 16	42 / 18	45 / 20	32 / 12	38 / 16
24" Wall	43 / 16	43 / 16	42 / 18	45 / 20	32 / 12	38 / 16

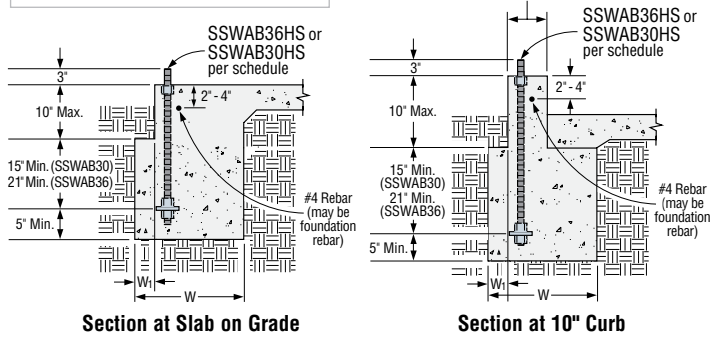
Anchorage Solutions for 2003 and 2006 IBC Loads^{1,4}

Steel Strong-Wall Width (in)	2500 psi		3000 psi		4500 psi	
	Wind ²	Seismic ³	Wind ²	Seismic ³	Wind ²	Seismic ³
	W / W ₁	W / W ₁	W / W ₁	W / W ₁	W / W ₁	W / W ₁
12" Wall	20 / 8	30 / 12	21 / 7	28 / 11	15 / 4	24 / 8
15" Wall	26 / 9	43 / 16	22 / 8	45 / 20	16 / 6	38 / 16
18" Wall	31 / 12	43 / 16	34 / 13	45 / 20	24 / 8	38 / 16
21" Wall	36 / 15	43 / 16	38 / 15	45 / 20	27 / 11	38 / 16
24" Wall	41 / 17	43 / 16	38 / 15	45 / 20	28 / 12	38 / 16

- Assumes cracked concrete with no supplementary reinforcement per ACI 318.
- Wind includes Seismic Design Category A and B.
- Seismic denotes Seismic Design Category C through F. Detached 1 and 2 family dwellings in SDC C may use wind solutions.
- Shaded values denote where SSWAB30HS anchor bolt may be used in place of SSWAB36HS.

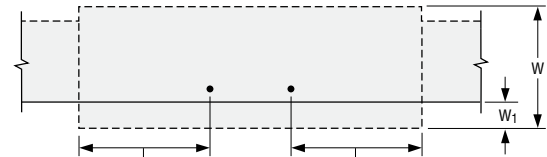
Shearwall

Foundation design (size and reinforcement) by others.



Anchorage Solutions General Notes

- Anchorage solutions based on high strength SSWAB anchor bolts.
- The Engineer of Record may specify alternate embedment, footing size or bolt grade.
- Footing dimensions and rebar requirements are for anchorage only.



UBC dimension = 15" / IBC dimension = 23" @ SSWAB30
 UBC dimension = 21" / IBC dimension = 32" @ SSWAB36

Slab on Grade / 10" Curb Footing Plan Away From Corner

SLAB ON GRADE / INTERIOR WALL INSTALLATIONS

Anchorage Solutions for 1997 UBC Loads^{1,2,3}

Steel Strong-Wall Width (in)	2500 psi		3000 psi		4500 psi	
	Wind	Seismic ⁴	Wind	Seismic ⁴	Wind	Seismic ⁴
	W	W	W	W	W	W
12" Wall	12	12	12	12	12	12
15" Wall	14	12	12	12	12	12
18" Wall	18	16	13	12	12	12
21" Wall	22	16	13	12	12	12
24" Wall	24	16	13	12	12	12

- 2500 psi concrete assumes no special inspection and a multiplier of 2 on the concrete per Section 1923.3.2.
- 3000 and 4500 psi concrete assume special inspection.
- Assumes $\phi = 0.65$ (reinforcement not provided per Section 1923.3.2).
- Seismic applies to designs using $R = 5.5$. For designs using $R = 4.4$, use the wind values.

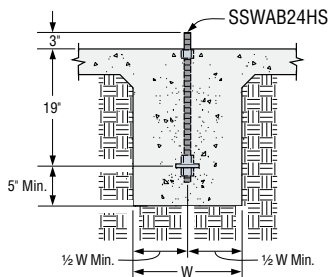
Anchorage Solutions for 2000 IBC Loads¹

Steel Strong-Wall Width (in)	2500 psi		3000 psi		4500 psi	
	Wind ²	Seismic ³	Wind ²	Seismic ³	Wind ²	Seismic ³
	W	W	W	W	W	W
12" Wall	23	27	24	25	17	21
15" Wall	29	44	25	40	19	34
18" Wall	35	44	37	40	27	34
21" Wall	41	44	37	40	28	34
24" Wall	44	44	37	40	28	34

Anchorage Solutions for 2003 and 2006 IBC Loads¹

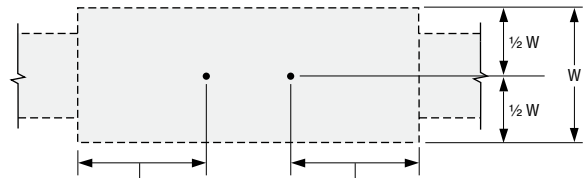
Steel Strong-Wall Width (in)	2500 psi		3000 psi		4500 psi	
	Wind ²	Seismic ³	Wind ²	Seismic ³	Wind ²	Seismic ³
	W	W	W	W	W	W
12" Wall	18	27	19	25	13	21
15" Wall	23	44	20	40	14	34
18" Wall	28	44	30	40	21	34
21" Wall	32	44	34	40	24	34
24" Wall	36	44	34	40	25	34

- Assumes cracked concrete with no supplementary reinforcement per ACI 318.
- Wind includes Seismic Design Category A and B.
- Seismic denotes Seismic Design Category C through F. Detached 1 and 2 family dwellings in SDC C may use wind solutions.



Foundation design (size and reinforcement) by others.

Section at Interior Wall



UBC dimension = 19"
 IBC dimension = 29"

Interior Wall Footing Plan

Anchorage Solutions General Notes

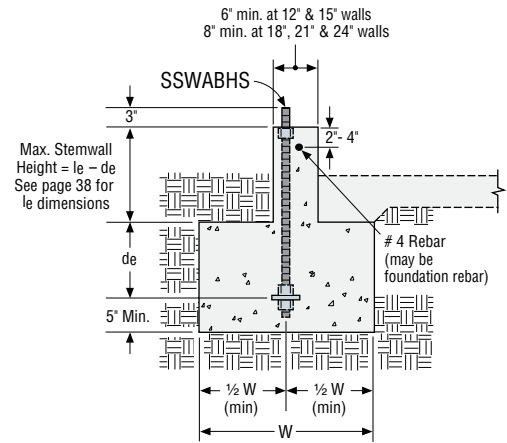
- Anchorage solutions based on high strength SSWAB anchor bolts.
- The Engineer of Record may specify alternate embedment, footing size or bolt grade.
- Footing dimensions and rebar requirements are for anchorage only.

STEMWALL INSTALLATIONS

Anchorage Solutions for 1997 UBC Loads^{1,2}

Steel Strong-Wall Width (in)	d _e	2500 psi		3000 psi		4500 psi	
		Wind	Seismic ³	Wind	Seismic ³	Wind	Seismic ³
		W	W	W	W	W	W
φ = 0.65 (reinforcement not provided per Section 1923.3.2)							
12" Wall	½ W dimension	24	22	19	16	15	13
15" Wall		26	22	19	16	16	14
18" Wall		30	28	24	20	20	17
21" Wall		32	28	24	21	20	18
24" Wall		32	28	24	21	20	18
φ = 0.85 (reinforcement provided per Section 1923.3.2)							
12" Wall	½ W dimension	20	20	16	14	13	12
15" Wall		22	20	17	14	14	12
18" Wall		26	24	21	18	17	15
21" Wall		28	24	21	18	18	16
24" Wall		28	24	21	18	18	16

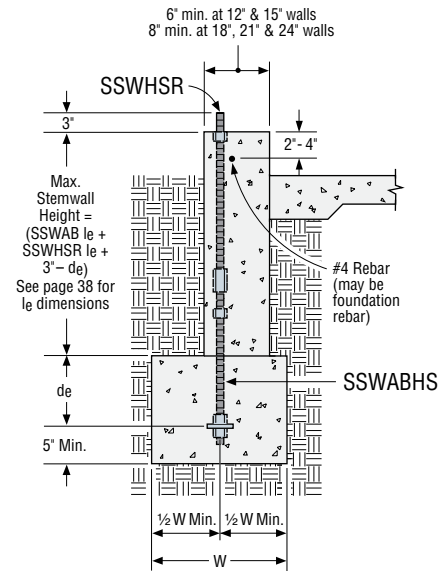
1. 2500 psi concrete assumes no special inspection and a multiplier of 2 on the concrete per Section 1923.3.2.
2. 3000 and 4500 psi concrete assume special inspection.
3. Seismic applies to designs using R = 5.5. For designs using R = 4.4, use the wind values.



Section at Stemwall

Anchorage Solutions for 2000 IBC Loads¹

Steel Strong-Wall Width (in)	2500 psi		3000 psi		4500 psi			
	Wind ²	Seismic ³	Wind ²	Seismic ³	Wind ²	Seismic ³		
	W	d _e	W	d _e	W	d _e		
12" Wall	30	10	33	11	24	8	27	9
15" Wall	36	12	48	16	27	9	42	14
18" Wall	42	14	48	16	33	11	42	14
21" Wall	45	15	48	16	36	12	42	14
24" Wall	48	16	48	16	36	12	42	14



Section at Stemwall SSWAB and SSWHSR Extension Application

Anchorage Solutions for 2003 and 2006 IBC Loads¹

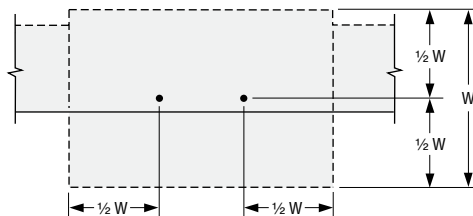
Steel Strong-Wall Width (in)	2500 psi		3000 psi		4500 psi			
	Wind ²	Seismic ³	Wind ²	Seismic ³	Wind ²	Seismic ³		
	W	d _e	W	d _e	W	d _e		
12" Wall	24	8	33	11	21	7	27	9
15" Wall	30	10	48	16	27	9	42	14
18" Wall	36	12	48	16	36	12	42	14
21" Wall	39	13	48	16	39	13	42	14
24" Wall	42	14	48	16	39	13	42	14

1. Assumes cracked concrete with no supplementary reinforcement per ACI 318.
2. Wind includes Seismic Design Category A and B.
3. Seismic denotes Seismic Design Category C through F. Detached 1 and 2 family dwellings in SDC C may use wind solutions.

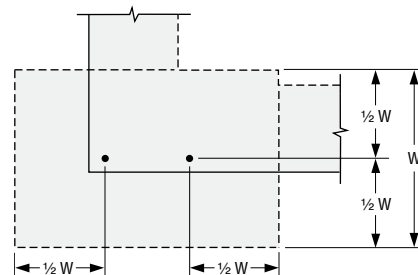
Anchorage Solutions General Notes

1. Anchorage solutions based on high strength SSWAB anchor bolts.
2. The Engineer of Record may specify alternate embedment, footing size or bolt grade.
3. Footing dimensions and rebar requirements are for anchorage only.

Foundation and stemwall design (size and reinforcement) by others.



Stemwall Footing Plan Away From Corner



Stemwall Footing Plan at Corner

STEEL STRONG-WALL® Uplift Equations**EQUATIONS FOR CALCULATING UPLIFT FORCES***(Based on limiting concrete bearing on a 3½" wide base plate at the edge of the concrete)*

These equations may be used to calculate uplift forces at the base of the wall to aid designers in developing anchorage solutions other than those shown on previous pages.

1997 UBC and 2000 IBC**2.5 ksi concrete**

$$12 \text{ in. wall } T = [28.9 - 1.5 \sqrt{371 - 2.72 (3.4P + Vh)}] - P$$

$$15 \text{ in. wall } T = [37.1 - 1.5 \sqrt{613 - 2.72 (4.6P + Vh)}] - P$$

$$18 \text{ in. wall } T = [46.3 - 1.5 \sqrt{954 - 2.72 (6.1P + Vh)}] - P$$

$$21 \text{ in. wall } T = [55.5 - 1.5 \sqrt{1369 - 2.72 (7.6P + Vh)}] - P$$

$$24 \text{ in. wall } T = [64.7 - 1.5 \sqrt{1860 - 2.72 (9.1P + Vh)}] - P$$

3.0 ksi concrete

$$12 \text{ in. wall } T = [34.7 - 1.5 \sqrt{535 - 3.27 (3.4P + Vh)}] - P$$

$$15 \text{ in. wall } T = [44.6 - 1.5 \sqrt{882 - 3.27 (4.6P + Vh)}] - P$$

$$18 \text{ in. wall } T = [55.6 - 1.5 \sqrt{1373 - 3.27 (6.1P + Vh)}] - P$$

$$21 \text{ in. wall } T = [66.6 - 1.5 \sqrt{1972 - 3.27 (7.6P + Vh)}] - P$$

$$24 \text{ in. wall } T = [77.6 - 1.5 \sqrt{2679 - 3.27 (9.1P + Vh)}] - P$$

4.5 ksi concrete

$$12 \text{ in. wall } T = [52.0 - 1.5 \sqrt{1203 - 4.90 (3.4P + Vh)}] - P$$

$$15 \text{ in. wall } T = [66.8 - 1.5 \sqrt{1986 - 4.90 (4.6P + Vh)}] - P$$

$$18 \text{ in. wall } T = [83.4 - 1.5 \sqrt{3090 - 4.90 (6.1P + Vh)}] - P$$

$$21 \text{ in. wall } T = [99.9 - 1.5 \sqrt{4437 - 4.90 (7.6P + Vh)}] - P$$

$$24 \text{ in. wall } T = [116.5 - 1.5 \sqrt{6027 - 4.90 (9.1P + Vh)}] - P$$

2003 and 2006 IBC**2.5 ksi concrete**

$$12 \text{ in. wall } T = [21.7 - 1.5 \sqrt{209 - 2.04 (3.4P + Vh)}] - P$$

$$15 \text{ in. wall } T = [27.9 - 1.5 \sqrt{345 - 2.04 (4.6P + Vh)}] - P$$

$$18 \text{ in. wall } T = [34.7 - 1.5 \sqrt{536 - 2.04 (6.1P + Vh)}] - P$$

$$21 \text{ in. wall } T = [41.6 - 1.5 \sqrt{770 - 2.04 (7.6P + Vh)}] - P$$

$$24 \text{ in. wall } T = [48.5 - 1.5 \sqrt{1046 - 2.04 (9.1P + Vh)}] - P$$

3.0 ksi concrete

$$12 \text{ in. wall } T = [26.0 - 1.5 \sqrt{301 - 2.45 (3.4P + Vh)}] - P$$

$$15 \text{ in. wall } T = [33.4 - 1.5 \sqrt{496 - 2.45 (4.6P + Vh)}] - P$$

$$18 \text{ in. wall } T = [41.7 - 1.5 \sqrt{772 - 2.45 (6.1P + Vh)}] - P$$

$$21 \text{ in. wall } T = [50.0 - 1.5 \sqrt{1109 - 2.45 (7.6P + Vh)}] - P$$

$$24 \text{ in. wall } T = [58.2 - 1.5 \sqrt{1507 - 2.45 (9.1P + Vh)}] - P$$

4.5 ksi concrete

$$12 \text{ in. wall } T = [39.0 - 1.5 \sqrt{677 - 3.68 (3.4P + Vh)}] - P$$

$$15 \text{ in. wall } T = [50.1 - 1.5 \sqrt{1117 - 3.68 (4.6P + Vh)}] - P$$

$$18 \text{ in. wall } T = [62.5 - 1.5 \sqrt{1738 - 3.68 (6.1P + Vh)}] - P$$

$$21 \text{ in. wall } T = [74.9 - 1.5 \sqrt{2496 - 3.68 (7.6P + Vh)}] - P$$

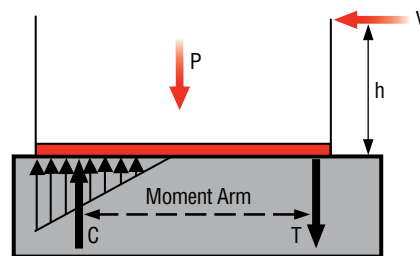
$$24 \text{ in. wall } T = [87.3 - 1.5 \sqrt{3390 - 3.68 (9.1P + Vh)}] - P$$

Shearwall

V = Design shear (kips)

P = Total vertical load (kips) – Use negative value for net uplift

h = Wall height (inches)

**FORCES AT BASE OF WALL****EXAMPLE:**

Given:

- S/SSW18x9X wall on 2.5 ksi concrete
- 1997 Uniform Building Code, R = 5.5
- Design Shear (V) = 2.2 kips < 2.39 kips ($V_{allowable}$)
- P (Vertical Load) = 1.0 kip
- h = Wall Height = 109"

$$T = [46.3 - 1.5 \sqrt{954 - 2.72 (6.1P + Vh)}] - P$$

$$T = [46.3 - 1.5 \sqrt{954 - 2.72 (6.1 \times 1.0 + 2.2 \times 109)}] - 1.0 = \underline{\underline{20 \text{ kips}}}$$

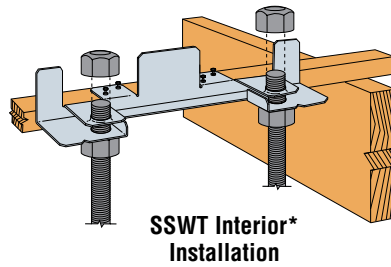
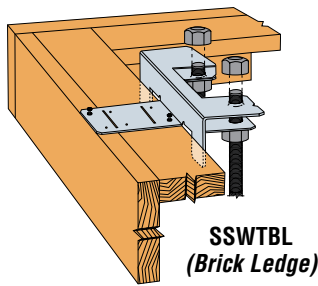
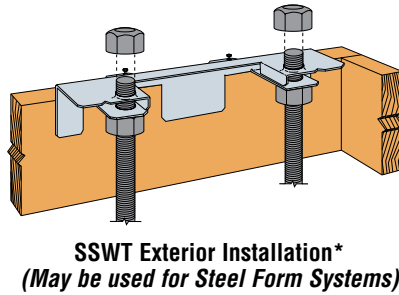
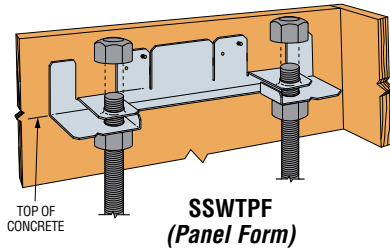
STEEL STRONG-WALL® Anchor Bolt Templates

STEEL STRONG-WALL ANCHOR BOLT TEMPLATES

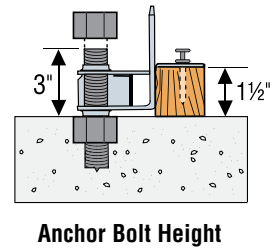
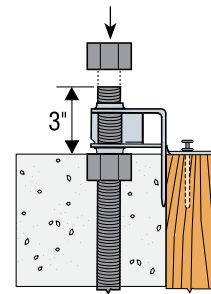
Steel Strong-Wall Model	Width (in)	Steel Strong-Wall Template Model		
		Reversible	Panel Form	Brick Ledge
S/SSW12	12	SSWT12	SSWTPF12	SSWTBL12
S/SSW15	15	SSWT15	SSWTPF15	SSWTBL15
S/SSW18	18	SSWT18	SSWTPF18	SSWTBL18
S/SSW21	21	SSWT21	SSWTPF21	SSWTBL21
S/SSW24	24	SSWT24	SSWTPF24	SSWTBL24

1. The height of the garage curb above the garage slab is critical for rough header opening at garage return walls.
3. Templates are recommended and are required in some jurisdictions.
4. Foundation design by others.
5. Templates are the same for 4" or 6" thick walls.

*SSWT templates are reversible. Use the same template for interior or exterior applications. Template and nut configuration patent pending.



An additional nut for template installation is provided with each SSWAB. May also be used for S/SSW installation.

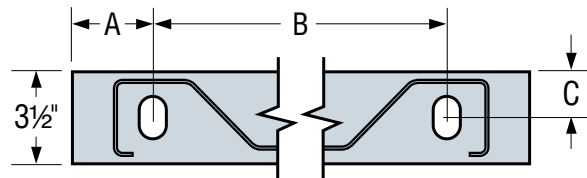


Shearwall

STEEL STRONG-WALL® Anchorage Solutions

STEEL STRONG-WALL ANCHOR BOLT LAYOUT

Wall Model	Distance From End of Wall to Center of SSWAB's (A)	Distance From Center to Center of SSWAB's (B)	Distance From Exterior Face of Wall to Center of All SSWAB's (C)
S/SSW12	2 ⁹ / ₁₆ "	6 ⁷ / ₈ "	2"
S/SSW15	2 ⁷ / ₈ "	9 ¹ / ₄ "	1 ⁷ / ₈ "
S/SSW18	2 ⁷ / ₈ "	12 ¹ / ₄ "	1 ⁷ / ₈ "
S/SSW21	2 ⁷ / ₈ "	15 ¹ / ₄ "	1 ⁷ / ₈ "
S/SSW24	2 ⁷ / ₈ "	18 ¹ / ₄ "	1 ⁷ / ₈ "



S/JCT & S/HJCT Steel Joist Hangers

New improved higher load capacity joist hangers. Additional fasteners in the new S/JCT and the increased thickness of the S/HJCT increase the allowable load capacity for use with C-Joists. Joist can be attached from either side or doubled up. This hanger can be used with either steel or wood headers.

MATERIAL: S/JCT- 68 mil (14 ga); S/HJCT- 97 mil (12 ga)

FINISH: Galvanized

INSTALLATION: • Attach hanger with specified fasteners.

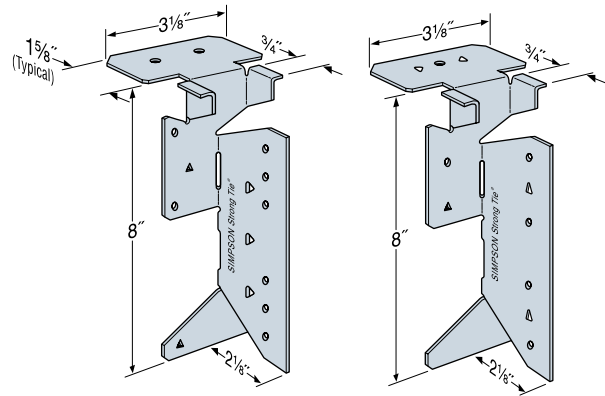
Use round holes for minimum load, use round and triangle holes for maximum load.

- May be used for weld-on applications. The minimum required weld to the top flange is 1/8" x 2 1/2" fillet weld to each side of top flange. Consult the code for special considerations when welding galvanized steel.

FEATURES: • Uni-directional: Joist can be attached from left or right

- One size fits joists 8" through 14" deep.
- Optional holes for additional load capacity.
- Simplicity of design.
- Quick and easy installation.
- Field skewable up to 45° left or right.

CODES: See page 8 for Code Listing Key Chart.



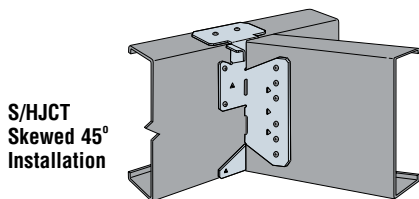
S/HJCT
U.S. Patent 6,230,467

S/JCT

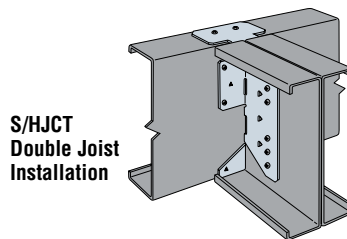
Hangers

Model No.	Fasteners			Allowable Load ^{1,2}		Fasteners			Allowable Load ^{1,2}			Code Ref
	Steel Header		Joist	Uplift	Down	Wood Header		Joist	Uplift	Down		
	Top	Face				Top	Face				(133)	
Steel Header: Straight Hanger												
S/JCT (min)	1 - #10	2 - #10	4 - #10	940	1195	1 - 10d	2 - 10d	4 - #10	475	565	880	
S/JCT (max)	1 - #10	4 - #10	6 - #10	1435	2105	1 - 10d	4 - 10d	6 - #10	816	960	1280	
S/HJCT (min)	2 - #10	4 - #14	6 - #14	1510	2920	2 - 10d	4 - SDS 1/4x3	6 - #14	1210	1210	2625	
S/HJCT (max)	2 - #10	8 - #14	9 - #14	1670	3855	2 - 10d	8 - SDS 1/4x3	9 - #14	1475	1475	2980	
Steel Header: Skewed Hanger												151
S/JCT (min)	1 - #10	2 - #10	4 - #10	940	965	1 - 10d	2 - 10d	4 - #10	335	395	840	
S/JCT (max)	1 - #10	4 - #10	6 - #10	940	1185	1 - 10d	4 - 10d	6 - #10	670	790	1300	
S/HJCT (min)	2 - #10	4 - #14	6 - #14	1510	2305	2 - 10d	4 - SDS 1/4x3	6 - #14	1210	1210	1935	
Welded to Steel Beam - Straight Hanger												
S/JCT (min)	1/8" x 2 1/2" fillet weld to each side of top flange		4 - #10	—	940							
S/HJCT (min)			4 - #14	—	1450							
Attached to Masonry - Straight Hanger												
S/HJCT (min)	2 - 1/4" x 2 1/4" Titen	4 - 1/4" x 2 1/4" Titen	6 - #14	710	1785							

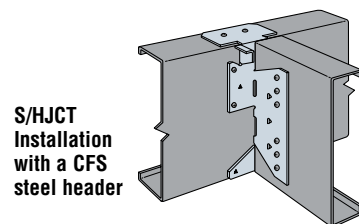
1. Allowable loads for CFS headers are based on a single 54 mil (16 ga) steel.
2. Allowable loads for wood headers are based on 4x10 minimum DFL, specific gravity = 0.50.
3. Steel header must be braced to prevent web buckling per Designer specification.
4. Steel joist shall be laterally braced per Designer specification.
5. Screws shall be installed using joist hanger holes screwing through the hanger into the joist.
6. Tabulated loads are governed by tests and may not be increased. Refer to page 12 for additional information.
7. For joists with up to a 0.50" gap (short cut) use an adjustment factor of 0.87.
8. For joists with a 0.50" to 0.90" gap (short cut) use an adjustment factor of 0.75.
9. Backing in the steel beam cavity is not required behind the hanger for loads listed.



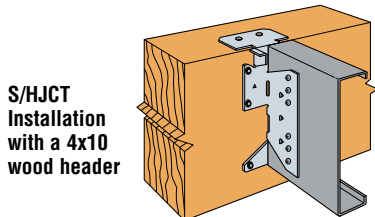
S/HJCT Skewed 45° Installation



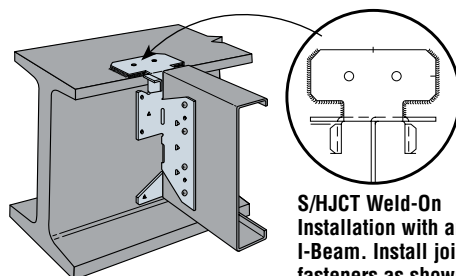
S/HJCT Double Joist Installation



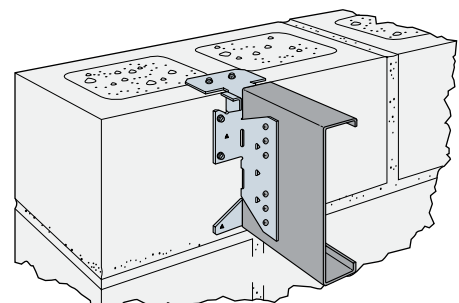
S/HJCT Installation with a CFS steel header



S/HJCT Installation with a 4x10 wood header



S/HJCT Weld-On Installation with an I-Beam. Install joist's fasteners as shown (see footnote 9)



S/HJCT Installation on masonry header

W/WP Hangers

This series of purlin hangers offer the greatest design flexibility and versatility.

MATERIAL: Stirrup—97 mil (12 ga)

FINISH: Simpson gray paint. Some models available hot-dip galvanized; specify HDG, see Corrosion Information on page 12–13.

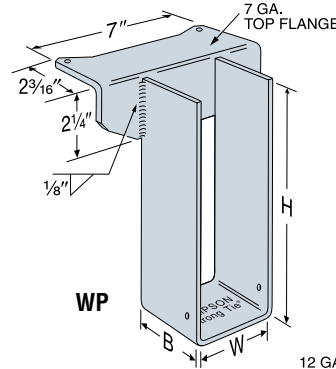
INSTALLATION: Hangers may be welded to steel headers with 1/8" for W and 3/16" for WP by 1/2" fillet welds located at each end of the top flange.

OPTIONS: • W and H dimensions are modifiable.

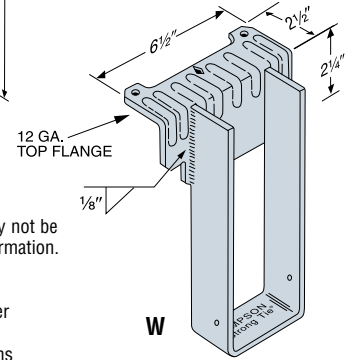
SLOPED AND/OR SKEWED SEAT

- W/WP series may be skewed to a maximum of 84° and/or sloped to a maximum of 45°.
- For slope only, skew only, or slope and skew combinations, the allowable load is 100% of the table load.
- Specify the slope up or down in degrees from the horizontal plane and/or the skew right or left in degrees from the perpendicular vertical plane. Specify whether low side, high side or center of joist will be flush with the top of the header.

CODE: See page 8 for Code Listing Key Chart.



Some model configurations may differ from those shown. Call factory for details.



Model No.	Dimensions			Fasteners		Allowable Down Loads (100)	Code Ref.
	W	H	B	Header	Joist		
W	1 1/2 - 4	4" - 30	2 1/2 - 5	Weld	1- #10	2335	170
WP	1 1/4 - 7 1/2	4" - 30	2 1/2 - 5	Weld	1- #10	3650	

1. Tabulated loads are governed by tests and may not be increased. Refer to page 12 for additional information.
2. For hanger heights exceeding the joist height the allowable load is 0.50 of the table value.
3. The Designer shall insure that the joist member adequately transfers load to the hanger.
4. Not all combinations of W, H, and B dimensions are available. Contact factory.

Hangers

S/LBV & S/B Hangers

Precision forming with manufacturing quality control provides dimensional accuracy and helps ensure proper bearing area and connection.

S/LBV and S/B flanges encapsulate the top flange of the joist.

MATERIAL: S/LBV—68 mil (14 ga);

S/B—97 mil (12 ga)

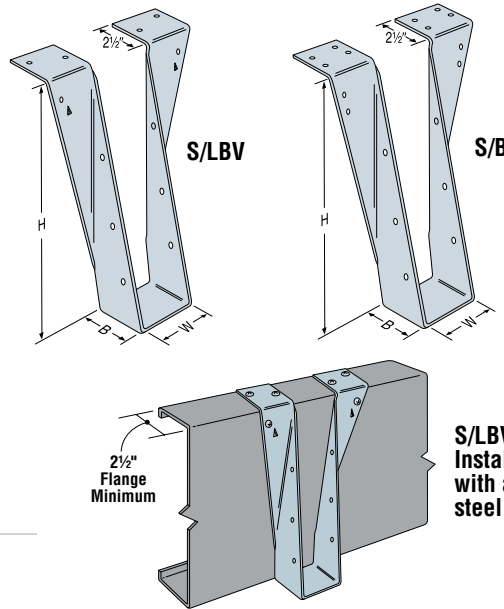
FINISH: Galvanized

INSTALLATION:

- S/LBV and S/B may be used for weld-on applications; a minimum of 1/8" x 2" 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.

OPTIONS: Skew only: S/LBV and S/B series can be skewed to a maximum of 45°.

CODE: See page 8 for Code Listing Key Chart.



S/LBV, S/B, are acceptable for weld-on applications (S/LBV shown)

S/LBV Installation with a CFS steel header

S/B Series Model No.	S/LBV Series Model No.	Width (in)
S/B1.56	S/LBV1.56	1 1/16
S/B1.81	S/LBV1.81	1 13/16
S/B2.06	S/LBV2.06	2 1/16
S/B2.37	S/LBV2.37	2 3/8
S/B2.56	S/LBV2.56	2 9/16
S/B2.68	S/LBV2.68	2 11/16
S/B3.12	S/LBV3.12	3 1/8
S/B3.56	S/LBV3.56	3 9/16
S/B3.62	S/LBV3.62	3 5/8
S/B4.06	S/LBV4.06	4 1/16
S/B4.12	S/LBV4.12	4 1/8
S/B4.28	S/LBV4.28	4 9/32
S/B4.75	S/LBV4.75	4 3/4
S/B5.50	S/LBV5.50	5 1/2

Model No.	Dimensions			Fasteners			Allowable Loads (100)			Code Ref.
	W	H	B	Top	Face	Joist	Uplift		Down Welded	
							68 mil. (14 ga)	68 mil. (14 ga)		
S/LBV	See Table	6 to 20	2 1/4	4- #10	2- #10	3- #10	1010	2870	—	151
S/LBV - Skew				4- #10	2- #10	3- #10	—	2025	—	
S/LBV - Weld				Weld	—	3- #10	—	—	2865	

Model No.	Dimensions			Fasteners			Allowable Loads (100)			Code Ref.
	W	H	B	Top	Face	Joist	Uplift		Down Welded	
							97 mil. (12 ga)	97 mil. (12 ga)		
S/B	See Table	6 to 30	3-5	8- #10	4- #14	3- #14	1855	5460	—	151
S/B - Skew				8- #10	4- #14	3- #14	—	3840	—	
S/B - Weld				Weld	—	3- #14	—	—	5575	

1. Tabulated loads are governed by tests and may not be increased. Refer to page 12 for additional information.
2. Designer shall insure that the joist member adequately transfers load to the hanger.
3. Steel header must be braced to prevent buckling per Designer specification.

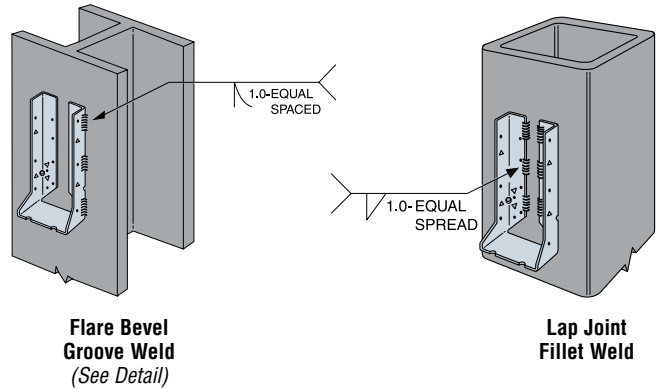
HU/HUC Hangers

MATERIAL: 68 mil (14 ga)

FINISH: Galvanized

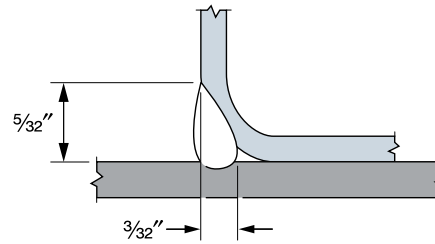
INSTALLATION: HU series hangers may be welded to supporting structural steel members.

- Use 1" weld segments equally spaced top to bottom, with half the segments on each side of hanger.
- Welds may be either Lap Joint (*on outside edge of flanges*) or Flare Bevel Groove (*on flange bend line*).



Use	Max Allowable Down Load (100)
4-1" segments	3280
6-1" segments	4855

1. Design loads must not exceed catalog capacity for specific hanger used.
2. Loads assume an E-70S-6 (60 ksi) filler rod.
3. CAUTION: Welding galvanized steel may produce harmful fumes; follow proper welding procedures and safety precautions. Welding should be in accordance with A.W.S. standards.
4. Welds must conform to the current A.W.S. D1.3 structural welding code for sheet steel.
5. This connection involves welding 68 mil (14 ga) to heavy structural steel. It should only be performed by A.W.S. certified welders for each joint type.
6. All joist fasteners must be installed. Webs are required at side flanges of the hangers for installation of the joist fasteners.
7. Allowable loads shall not exceed the calculated capacity of the fasteners or welds and shall not exceed the allowable load shown in the latest edition of the *Wood Construction Connectors* catalog.
8. The Designer shall insure that the joist member adequately transfers load to the hanger.
8. Tabulated loads are governed by tests and may not be increased. Refer to page 12 for additional information.



Flare Bevel Groove Weld Detail

Truss Connectors

Truss Connectors

TB/LTB Bridging

TB and LTB bridging are a cost effective way to provide bracing between floor joists when compared with field fabricated blocking and clip angles with multiple fasteners.

TB—Tension-type bridging with maximum fastener flexibility. Use two #10 screws of the seven screw holes at each end.

LTB—Staggered fastener pattern accommodates 6" to 12" web height. Use two #10 Screw of the holes at each end.

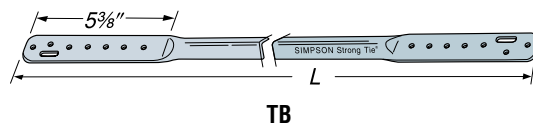
MATERIAL: LTB—27 mil (22 ga); TB—33 mil (20 ga)

FINISH: Galvanized

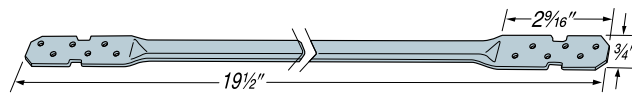
INSTALLATION:

- Bridging will fit flange widths from 1 5/8" to 3".
- Reference section R505.3.3 of the International Residential Code (IRC).

CODE: See page 8 for Code Listing Key Chart.

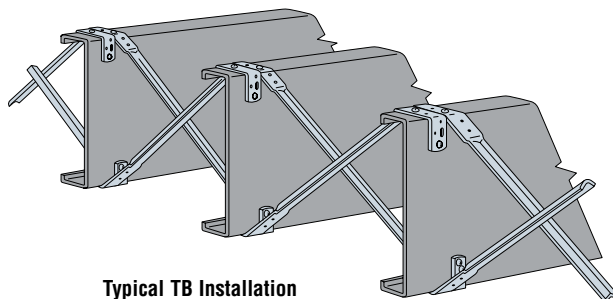


TB



LTB20

Web Height	Spacing	TB		LTB		Code Ref.
		Model No.	L	Model No.		
6"	12" o.c.	TB20	20	LTB20		28, 104
8"	12" o.c.	TB20	20	LTB20		
10"	12" o.c.	TB20	20			
12"	12" o.c.	TB27	27	—		
6"	16" o.c.	TB27	27	—		
8"	16" o.c.	TB27	27	—		
10"	16" o.c.	TB27	27	—		
12"	16" o.c.	TB27	27	—		
10"	24" o.c.	TB36	36	—		
12"	24" o.c.	TB36	36	—		



Typical TB Installation

TJC37 Jack Truss Connector

TJC37 is a versatile connector for skewed members. Adjustable from 0 to 67.5 degrees (*shipped with 67.5 degree bend*). Screw hole locations allow for easy installation.

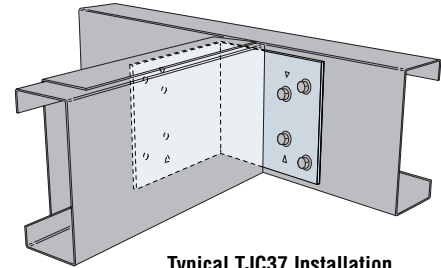
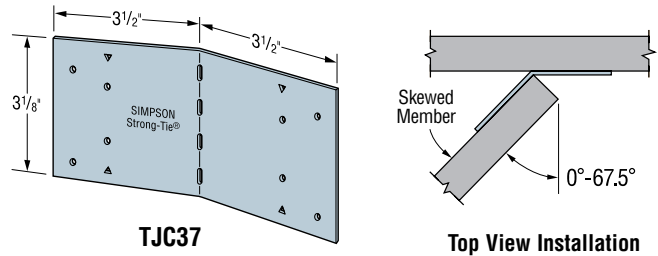
MATERIAL: 54 mil (16 ga)

FINISH: Galvanized

INSTALLATION: • Use all specified fasteners; see General Notes.

- Can be installed filling round holes only, or filling round and triangle holes for maximum values.
- Position the skewed member on the inside of the bend line with the end of the member flush with the bend line.
- Bend the TJC37 to the desired position (*one bend cycle only*).

CODE: See page 8 for Code Listing Key Chart



Typical TJC37 Installation

Model No.	Fasteners		Allowable Loads (100)			Code Ref.
	Carrying Member	Carried Member	43 mil (18 ga)			
			0°	1°-60°	61°-67.5°	
TJC37 (Min)	4-#10	4-#10	660	565	475	151
TJC37 (Max)	6-#10	6-#10	680	630	530	

1. Tabulated loads are governed by tests and may not be increased. Refer to page 12 for additional information.
2. Allowable loads are for upward or downward direction.

S/DSC Drag Strut Connector

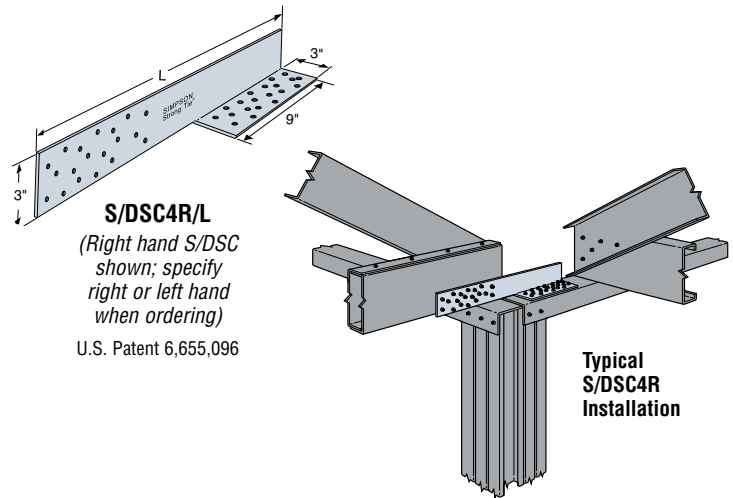
The S/DSC is used as a drag strut to transfer loads from roof framing to the wall plates below.

MATERIAL: 229 mil (3 ga)

FINISH: Galvanized

INSTALLATION: • Use all specified fasteners; see General Notes.

CODES: See page 8 for Code Listing Key Chart.



S/DSC4R/L
(Right hand S/DSC shown; specify right or left hand when ordering)
U.S. Patent 6,655,096

Model No.	L	Fasteners	Allowable Load (100)		Code Ref.
			43 mil (18 ga)		
			Compression	Tension	
S/DSC4R/L	22	40- #10	3220	4025	151

1. Tabulated loads are governed by tests and may not be increased. Refer to page 12 for additional information.
2. Loads are based on a minimum of a 43 mil (18 ga) thick member.

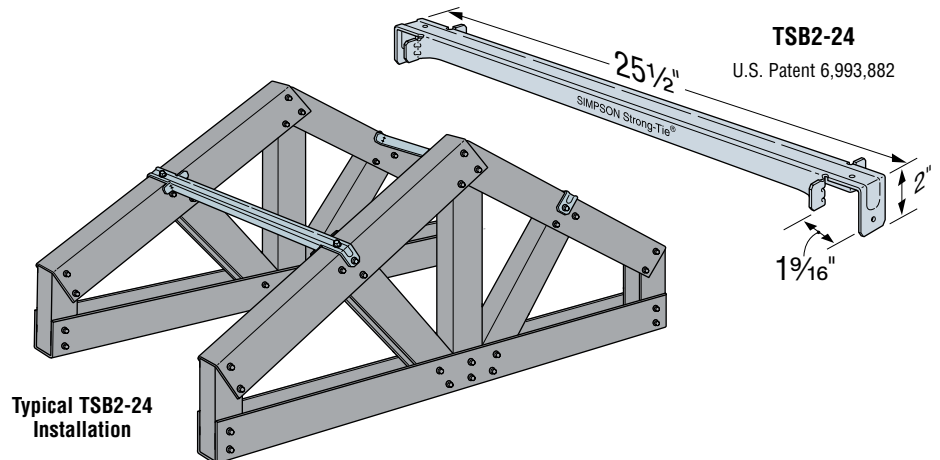
TSB Truss Spacer Bracer

TSB "captures" the on-center spacing of trusses (*available for 24" on center*) and laterally braces the truss members, allowing quicker, easier, safer installation. Its tube shape provides strength in both compression and tension. TSB has a low profile that can be sheathed over, eliminating the need to remove bracing prior to applying the roof sheathing or decking.

MATERIAL: 27 mil (22 ga)

FINISH: Galvanized

INSTALLATION: • Use 4- #10 screws; see General Notes.



Typical TSB2-24 Installation

TSB2-24
U.S. Patent 6,993,882

STC/STCT/DTC Roof Truss Clips

For alignment control between a roof truss and nonbearing walls; the 1½" slot permits vertical truss chord movement when loads are applied.

MATERIAL: 43 mil (18 ga)

FINISH: Galvanized

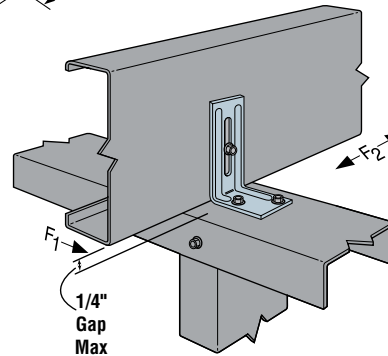
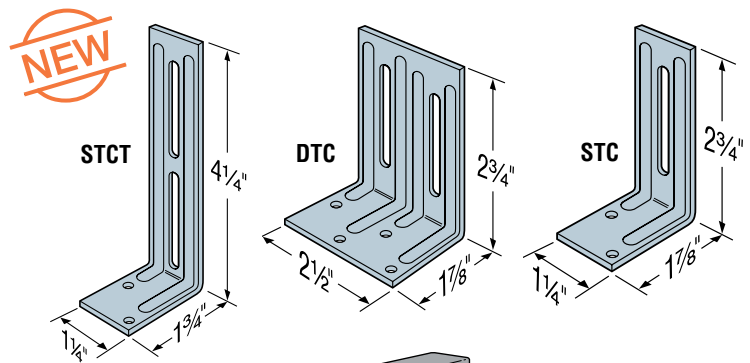
INSTALLATION: • Use all specified fasteners; see General Notes.

- Use STC or DTC depending on required loads.
- STC / STCT / DTC may be used with proprietary material sections. Contact material supplier for specific installation details.
- Use STCT where truss or rafter is separated from the top plate of the nonbearing wall.
- Install slot screws in the middle of the slot.

CODE: See page 8 for Code Listing Key Chart

Model No.	Fasteners		Allowable Loads (100)						Code Ref.
	Base	Slot	Without Gap		¼" Max. Gap		¼" < Gap ≤ ½"		
			F ₁	F ₂	F ₁	F ₂	F ₁	F ₂	
STC	2-#8	1-#8	185	35	135	35	75	35	151
STCT	2-#8	1-#8	—	—	—	—	—	—	170
DTC	4-#8	2-#8	200	160	200	160	145	160	151

1. Tabulated loads are governed by tests and may not be increased. Refer to page 12 for additional information.
2. Truss or rafter must be bearing on top plate to achieve the allowable loads under "WITHOUT GAP."
3. Clips are required on both sides of the truss to achieve F₁ loads in both directions (stagger parts to avoid screw interferences).



Screws into the truss or rafter should not be driven completely flush against the connector, to allow vertical truss movement.

Typical STC Installation

Truss Connectors

S/GTC Girder Truss Connector

The S/GTC truss connector is designed to connect a carried truss to a girder truss vertical member.

MATERIAL: 33 mil (20 ga)

FINISH: Galvanized

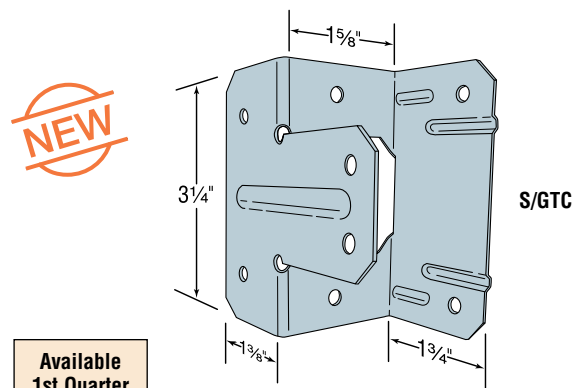
INSTALLATION: • Use all specified fasteners; see General Notes.

- Install the connector onto the girder truss member first.
- May be used with proprietary material sections with web material dimensions from 1⅜" to 1⅝". Contact material supplier for product specific installation details.

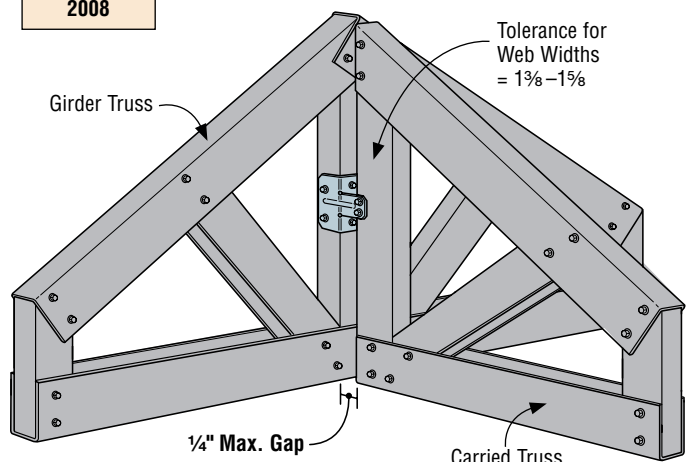
CODE: See page 8 for Code Listing Key Chart

Model No.	Fasteners		Trusses Material Thickness mil (ga)	Allowable Loads (100)	Code Ref.
	Carried Member	Carrying Member			
S/GTC	4-#10	4-#10	27 (22)	355	170
	4-#10	4-#10	33 (20)	425	
	4-#10	4-#10	43 (18)	450	
	4-#10	4-#10	54 (16)	485	

1. Tabulated loads are governed by tests and may not be increased. Refer to page 12 for additional information.
2. Trusses shall be laterally braced per Designer specification.



Available 1st Quarter 2008



Typical S/GTC Installation

The S/GTC works for many proprietary truss shapes including Alpine, Amkey, Nucon, Nutruss and Steelcon.

S/HTC Heavy Truss Clips

S/HTC provides a slotted connection from the truss or joist to the top track when isolation of two members is required.

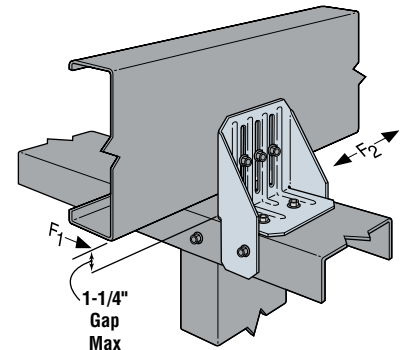
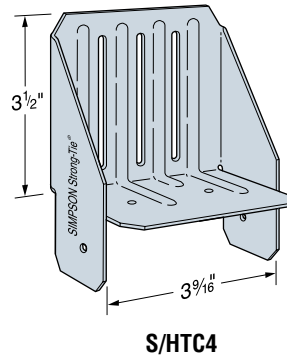
MATERIAL: 43 mil (18 ga)

FINISH: Galvanized

INSTALLATION: • Use all specified fasteners.

- Screws shall not be driven completely flush against the connector when vertical movement is desired

CODES: See page 8 for Code Listing Key Chart.



Typical S/HTC4 Installation

Model No.	Fasteners		Allowable Loads ¹ (100)				Code Ref.
	Top Track	Truss	Without Gap ²		With 1 1/4" Gap ³		
			F ₁	F ₂	F ₁	F ₂	
S/HTC4	4 - #8	3 - #8	320	460	85	175	151

1. Tabulated loads are governed by tests and may not be increased. Refer to page 12 for additional information.
2. Truss or rafter must be bearing on top plate to achieve the allowable loads under "WITHOUT GAP."
3. Installed with maximum 1 1/4" space between rafter or truss and top plate under "WITH 1 1/4" GAP." Where loads are not required, space is not limited to 1 1/4".
4. Loads are based on steel with 43 mil (18 ga) minimum.

Straps & Ties

LTS/MTS/HTS Twist Straps

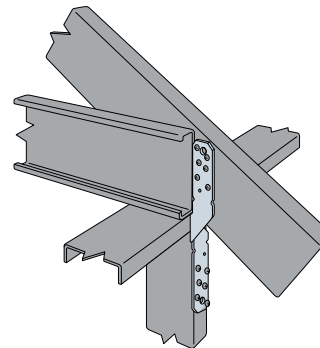
Twist straps provide a tension connection between two members. They resist uplift at the heel of a truss economically. The 3" bend section eliminates interference at the transition points between steel members.

MATERIAL: See table

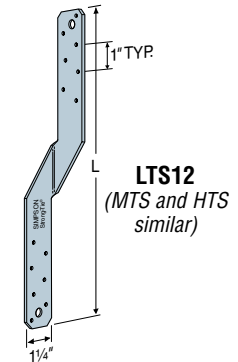
FINISH: Galvanized. Some products available in stainless steel and ZMAX[®]; see Corrosion Information, page 12–13.

INSTALLATION: Use all specified fasteners. See General Notes.

CODES: See page 8 for Code Listing Key Chart.



Typical LTS Installation Truss to Steel Studs

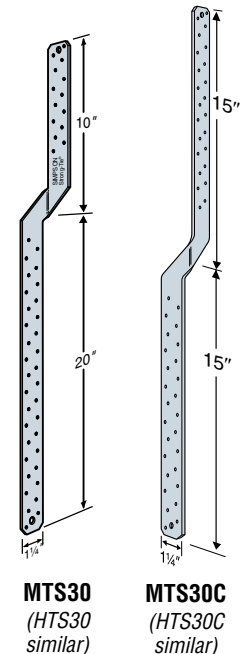


LTS12 (MTS and HTS similar)

Available with additional corrosion protection. Check with factory.

Model No.	Material Thickness mil (ga)	L	Fasteners (Total)			Allowable Tension Loads (100)		Code Ref.
			Rafter/Stud/Joist Thickness			33 mil (20 ga)	43 mil (18 ga) ⁷	
			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	28, 104, 151
LTS16		16	10-#10	6-#10	6-#10	775	775	151
LTS18		18	10-#10	6-#10	6-#10	775	775	
LTS20		20	10-#10	6-#10	6-#10	775	775	
MTS12	54 (16 ga)	12	12-#10	8-#10	6-#10	995	995	28, 104, 151
MTS16		16	12-#10	8-#10	6-#10	995	995	151
MTS18		18	12-#10	8-#10	6-#10	995	995	
MTS20		20	12-#10	8-#10	6-#10	995	995	
MTS30		30	12-#10	8-#10	6-#10	995	995	
MTS24C		24	12-#10	8-#10	6-#10	995	995	
MTS30C	30	12-#10	8-#10	6-#10	995	995		
HTS16	68 (14 ga)	16	16-#10	12-#10	6-#10	1415	1450	151
HTS20		20	18-#10	12-#10	6-#10	1450	1450	
HTS24		24	18-#10	12-#10	6-#10	1450	1450	
HTS28		28	18-#10	12-#10	6-#10	1450	1450	
HTS30		30	18-#10	12-#10	6-#10	1450	1450	
HTS30C		30	18-#10	12-#10	6-#10	1450	1450	

1. Not all fastener holes need to be filled as additional fastener holes are provided. Install fasteners symmetrically.
2. Install half of the fasteners on each end of strap to achieve full loads.
3. Tabulated loads are governed by tests and may not be increased. Refer to page 12 for additional information.
4. All straps except the MTS30 and HTS30 have the twist in the center of the strap.
5. Twist straps do not have to be wrapped over the truss to achieve the load.
6. May be installed on the inside face of the stud.
7. Loads are based on steel with 43 mil (18 ga) minimum.



MTS30 (HTS30 similar)

MTS30C (HTS30C similar)

HRS/ST/FHA/PS/LSTA/LSTI/S/MST/MSTA/MSTC/MSTI Strap Ties

Straps are load rated and provide the correct thickness and number of fasteners the specifier is looking for compared with field fabricated straps.

Install Strap Ties where top or bottom plates are cut, at wall intersections, and as ridge ties. Reduce the allowable load based on the size and quantity of fasteners used.

Refer to applicable code for minimum edge and end distances.

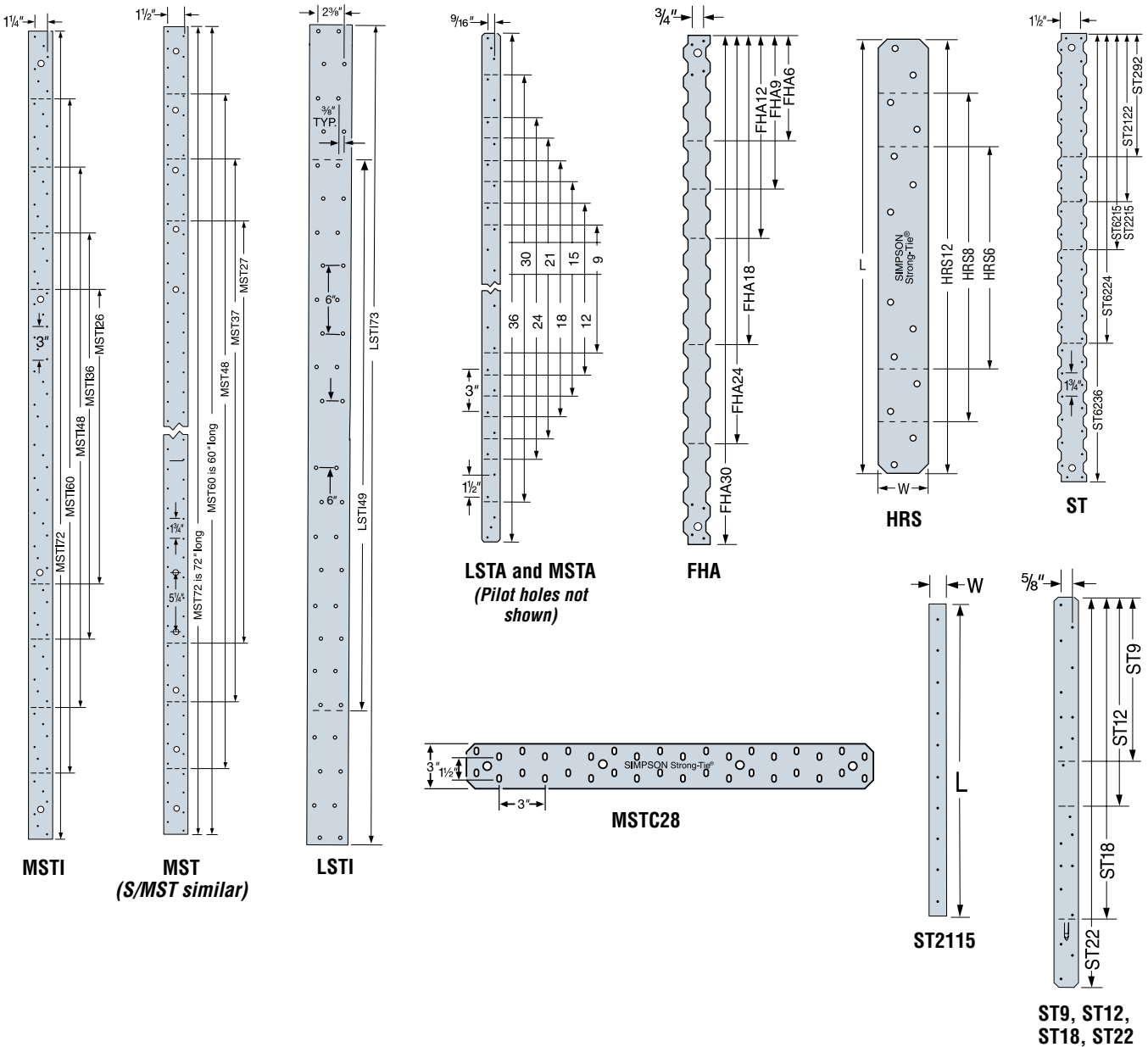
FINISH: PS—HDG; all others—galvanized.

Some products are available in stainless steel or ZMAX®; see Corrosion Information, page 12–13.

INSTALLATION: Use all specified fasteners. See General Notes.

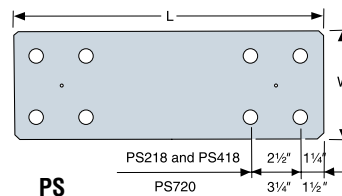
CODES: See page 8 for Code Listing Key Chart.

Straps & Ties



Model No.	Material Thickness mil (ga)	Dimensions		Bolts		Code Ref.
		W	L	Qty	Dia	
PS218 ⁴	171 mil (7 ga)	2	18	4	5/8	180
PS418 ⁴		4	18	4	5/8	
PS720 ⁴		6 3/4	20	8	1/2	

- PS strap design loads must be determined by the Designer for each illustration. Hole diameter in the part may be oversized to accommodate the HDG. Designer must determine if the oversize creates an unacceptable installation.



HRS/ST/FHA/PSLSTA/LSTI/S/MST/MSTA/MSTC/MSTI Strap Ties

CODES: See page 7 for Code Listing Key Chart.

Available with additional corrosion protection. Check with factory.

Model No.	Material Thick. mil (ga)	Dimensions		Fasteners (Total)			Allowable Tension Loads						Code Ref.
				Rafter/Stud/Joist Thickness			33 mil (20 ga)		43 mil (18 ga)		54 mil (16 ga)		
		W	L	33 mil (20 ga)	43 mil (18 ga)	54 mil (16 ga)	(100)	(133)	(100)	(133)	(100)	(133)	
LSTA9	33 (20 ga)	1¼	9	8- #10	8- #10	8- #10	705	945	1120	1495	1190	1590	151
LSTA12		1¼	12	10- #10	10- #10	8- #10	885	1180	1190	1590	1190	1590	
LSTA15		1¼	15	12- #10	12- #10	10- #10	1060	1415	1190	1590	1190	1590	
LSTA18		1¼	18	14- #10	12- #10	10- #10	1190	1590	1190	1590	1190	1590	
LSTA21		1¼	21	14- #10	12- #10	10- #10	1190	1590	1190	1590	1190	1590	
LSTA24		1¼	24	14- #10	12- #10	10- #10	1190	1590	1190	1590	1190	1590	
ST292		2½/16	9¾/16	12- #10	10- #10	10- #10	1060	1415	1240	1650	1240	1650	
ST2122	2½/16	12¼/16	16- #10	12- #10	10- #10	1415	1885	1502	2005	1502	2005		
ST2115	¾	16¾/16	8- #10	6- #10	4- #10	630	840	630	840	630	840		
ST2215	2½/16	16¾/16	20- #10	14- #10	10- #10	1765	2355	1825	2435	1825	2435		
LSTA30	43 (18 ga)	1¼	30	18- #10	12- #10	10- #10	1555	2070	1555	2070	1555	2070	151
LSTA36		1¼	36	18- #10	16- #10	14- #10	1555	2070	1555	2070	1555	2070	
LSTI49		3¾	49	32- #10	32- #10	20- #10	2830	3770	4050	5400	4050	5400	
LSTI73		3¾	73	46- #10	32- #10	20- #10	4050	5400	4050	5400	4050	5400	
MSTA9		1¼	9	8- #10	8- #10	8- #10	705	945	1050	1405	1555	2070	
MSTA12		1¼	12	10- #10	10- #10	8- #10	885	1180	1315	1755	1555	2070	
MSTA15		1¼	15	12- #10	12- #10	10- #10	1060	1415	1555	2070	1555	2070	
MSTA18	1¼	18	14- #10	12- #10	10- #10	1235	1650	1555	2070	1555	2070		
MSTA21	1¼	21	16- #10	12- #10	10- #10	1415	1885	1555	2070	1555	2070		
MSTA24	1¼	24	18- #10	12- #10	10- #10	1555	2070	1555	2070	1555	2070		
MSTA30	54 (16 ga)	1¼	30	22- #10	16- #10	12- #10	1945	2590	1950	2600	1950	2600	151
MSTA36		1¼	36	24- #10	18- #10	16- #10	1950	2600	1950	2600	1950	2600	
ST6215		2½/16	16¾/16	20- #10	16- #10	10- #10	1765	2355	2025	2705	2025	2705	
ST6224		2½/16	23¾/16	28- #10	20- #10	12- #10	2455	3275	2455	3275	2455	3275	
ST9		1¼	9	8- #10	8- #10	8- #10	705	945	1050	1405	1350	1800	
ST12		1¼	11½	10- #10	10- #10	8- #10	885	1180	1315	1755	1350	1800	
ST18		1¼	17¾	14- #10	12- #10	12- #10	1235	1650	1350	1800	1350	1800	
ST22	1¼	21½	20- #10	20- #10	20- #10	1350	1800	1350	1800	1350	1800		
MSTC28	3	28¼	36- #10	36- #10	30- #10	3180	4240	4600	6130	4600	6130		
MSTC40	3	40¼	52- #10	46- #10	46- #10	4595	6125	4600	6130	4600	6130		
MSTC52	3	52¼	54- #10	42- #10	42- #10	4600	6130	4600	6130	4600	6130		
MSTC66	3	65¾	66- #10	46- #10	30- #10	5795	7725	5795	7725	5795	7725		
MSTC78	3	77¾	66- #10	46- #10	30- #10	5795	7725	5795	7725	5795	7725		
ST6236	2½/16	33¼/16	40- #10	30- #10	18- #10	3535	4715	3760	5015	3760	5015		
HRS6	97 (12 ga)	1½	6	6- #10	6- #10	6- #10	530	705	790	1050	1600	1835	151
HRS8		1½	8	10- #10	10- #10	10- #10	885	1180	1315	1755	2670	3060	
HRS12		1½	12	14- #10	14- #10	12- #10	1235	1650	1840	2455	2710	3615	
FHA6		1⅞	6¾	8- #10	8- #10	8- #10	705	945	1050	1405	2045	2450	
FHA9		1⅞	9	8- #10	8- #10	8- #10	705	945	1050	1405	2045	2450	
FHA12		1⅞	11½	8- #10	8- #10	8- #10	705	945	1050	1405	2045	2450	
FHA18		1⅞	17¾	8- #10	8- #10	8- #10	705	945	1050	1405	2045	2450	
FHA24		1⅞	23¾	8- #10	8- #10	8- #10	705	945	1050	1405	2045	2450	
FHA30		1⅞	30	8- #10	8- #10	8- #10	705	945	1050	1405	2045	2450	
MSTI26		2½/16	26	26- #10	26- #10	22- #10	2300	3065	3420	4560	5025	6700	
MSTI36		2½/16	36	36- #10	36- #10	22- #10	3180	4240	4735	6310	5025	6700	
MSTI48		2½/16	48	48- #10	40- #10	22- #10	4240	5655	5025	6700	5025	6700	
MSTI60		2½/16	60	58- #10	40- #10	22- #10	5025	6700	5025	6700	5025	6700	
MSTI72		2½/16	72	62- #10	58- #10	54- #10	5025	6700	5025	6700	5025	6700	
S/MST27		2½/16	27	30- #10	30- #10	22- #10	2650	3535	3945	5260	5025	6700	
S/MST37		2½/16	37	42- #10	40- #10	22- #10	3710	4950	5025	6700	5025	6700	
S/MST48		2½/16	48	54- #10	40- #10	24- #10	4770	6365	5155	6870	5155	6870	
S/MST60	118 (10 ga)	2½/16	60	68- #10	52- #10	30- #10	6010	8010	6650	8865	6650	8865	
S/MST72		2½/16	72	76- #10	52- #10	30- #10	6650	8865	6650	8865	6650	8865	

1. Use half of the fasteners in each member being connected to achieve the listed loads.
2. Loads are based on lesser of steel capacity or fastener calculation.
3. Tabulated loads shown at (100) do not include steel stress increase. Tabulated loads shown at (133) include a ½ stress increase on the steel. Refer to page 12 for additional information.

CS/CMST Coiled Straps

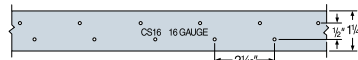
CMSTC provides fastener slots for easy installation and coined edges. CS, CMST and CMSTC are continuous utility straps which can be cut to length on the job site. Packaged in lightweight (about 40 pounds) cartons.

FINISH: Galvanized. Some products available in ZMAX® coating; see Corrosion Information, page 12-13.

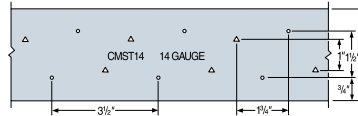
INSTALLATION: • Use all specified fasteners. See General Notes.

- Refer to the applicable code for minimum edge and end distances.
- The table shows the maximum allowable loads and the screws required to obtain them. See footnote #1. Fewer screws may be used; reduce the allowable load by the code lateral load for each fastener subtracted from each end.

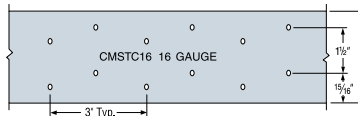
CODES: See page 8 for Code Listing Key Chart.



CS16 Hole Pattern
(all other CS straps similar)

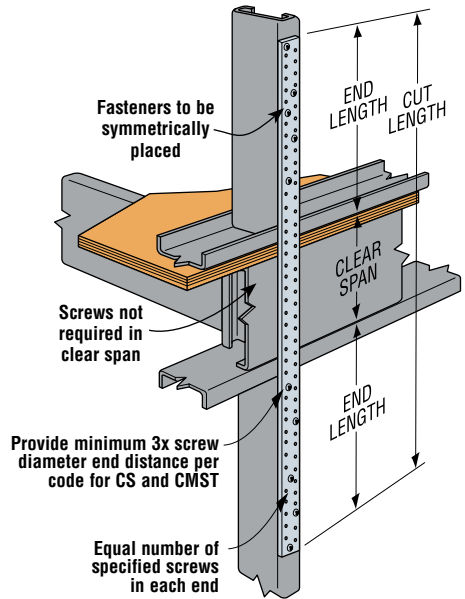


CMST14 Hole Pattern
(CMST12 similar)



CMSTC16 Hole Pattern

Gauge stamped on part for easy identification



Typical CS Installation
as a Floor-to-Floor Tie

Available with additional corrosion protection. Check with factory.

Model No.	Total length	Material Thickness mil (ga)	Width	Fasteners (Total)			Allowable Tension Loads		Code Ref.
				Rafter/Stud/Joist Thickness			33 mil (20 ga), 43 mil (18 ga) & 54 mil (16 ga)		
				33 mil (20 ga)	43 mil (18 ga)	54 mil (16 ga)	(100)	(133)	
CMST12 ²	40'-3"	97 (12 ga)	3	104- #10	70- #10	40- #10	9080	12110	28, 104
CMST14 ²	52 1/2'	68 (14 ga)	3	72- #10	50- #10	28- #10	6365	8485	151
CMSTC16 ³	54'	54 (16 ga)	3	54- #10	36- #10	30- #10	4600	6100	151
CS14	100'	68 (14 ga)	1 1/4	28- #10	18- #10	12- #10	2305	3075	28, 104 151
CS16	150'	54 (16 ga)	1 1/4	18- #10	12- #10	8- #10	1550	2065	
CS18S	100'	43 (18 ga)	1 1/4	14- #10	10- #10	6- #10	1235	1645	
CS18	200'		1 1/4	14- #10	10- #10	6- #10	1235	1645	
CS20	250'	33 (20 ga)	1 1/4	12- #10	8- #10	6- #10	945	1260	
CS22	300'	27 (22 ga)	1 1/4	10- #10	6- #10	6- #10	775	1030	

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" + 1" when all holes filled. Double length if only round holes filled.
3. For CMSTC16 straps: End Length (inches) = 1/2 total fasteners x 3/4" + 1" when all holes filled. Double length if only round holes filled.
4. For CS straps: End Length (inches) = 1/2 total fasteners + 1".
5. Total Cut Length = End Length + Clear Span + End Length.
6. For a reduced number of screws, allowable load = (#screws used/#screws in table) x table load.
7. Loads are based on lesser of steel strap capacity and 2001 AISI NAS fastener calculation.
8. Tabulated loads shown at (100) do not include steel stress increase. Tabulated loads shown at (133) include a 1/3 stress increase on the steel. Refer to page 12 for additional information.

SSP/DSP/TSP Stud Plate Ties

The SSP and DSP single and double stud plate ties connect single and double studs to top and bottom track. Each can be used for either top or bottom track applications.

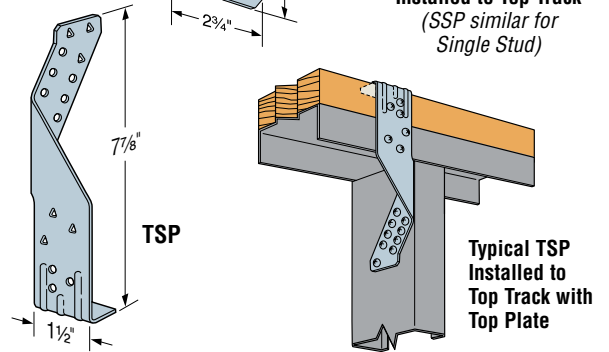
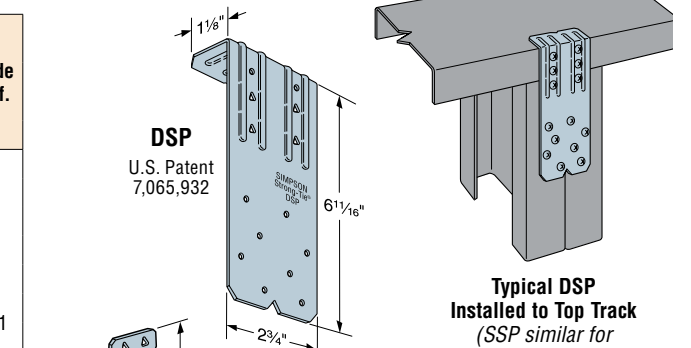
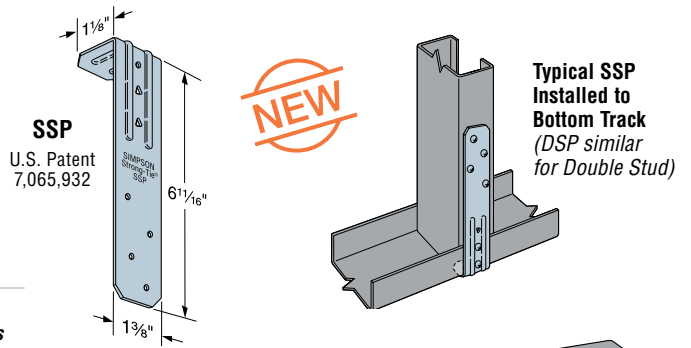
MATERIAL: SSP/DSP—43 mil (18 ga); TSP—54 mil (16 ga)

FINISH: Galvanized. Some products available in ZMAX®; see Corrosion Information, page 12–13.

INSTALLATION: • Use all specified fasteners; see General Notes.

• DSP/SSP—top track installation—fill all round and triangle holes

CODES: See page 8 for Code Listing Key Chart.



These products are available with additional corrosion protection. Additional products on this page may also be available with this option, check with Simpson for details.

Model No.	Fasteners				Allowable Uplift Loads		Code Ref.
	Studs	Top Track		Bottom Track	33 mil (20ga)	43 mil (18ga)	
		CFS	Wood		CFS	(100)	
SSP	4 - #10	—	—	2 - #10	355	625	151
		—	2 - #10	—	340	600	
		2 - #10 ⁴	1 - #10	—	405 ³	715 ³	
		2 - 10d	1 - #10	—	480 ³	840 ³	
DSP	8 - #10	—	—	4 - #10	430	695	
		—	4 - #10	—	475	775	
		4 - #10 ⁴	2 - #10	—	585 ³	955 ³	
		4 - 10d	2 - #10	—	730 ³	1200 ³	
TSP	6 - #10	—	—	3 - #10	345	645	
		—	3 - #10	—	370	700	
	9 - #10	3 - #10 ⁴	3 - #10	—	360 ³	685 ³	
		3 - 10d	3 - #10	—	480 ³	905 ³	

1. Tabulated loads are governed by tests and may not be increased. Refer to page 12 for additional information.
2. For wood plates, noted values only apply to DF/SP members where wood top plates are used. For SPF values, multiply by 0.86.
3. For wood plates, when cross-grain tension cannot be avoided, mechanical reinforcement to resist such forces should be considered.
4. Screws installed into wood plates with a minimum #10x3/4".

Straps & Ties

SP Stud Plate Ties

The SP Stud Plate Tie is a plate-to-stud connection providing uplift resistance.

MATERIAL: 33 mil (20 ga)

FINISH: Galvanized. Available with ZMAX® coating; see Corrosion Information, page 12–13.

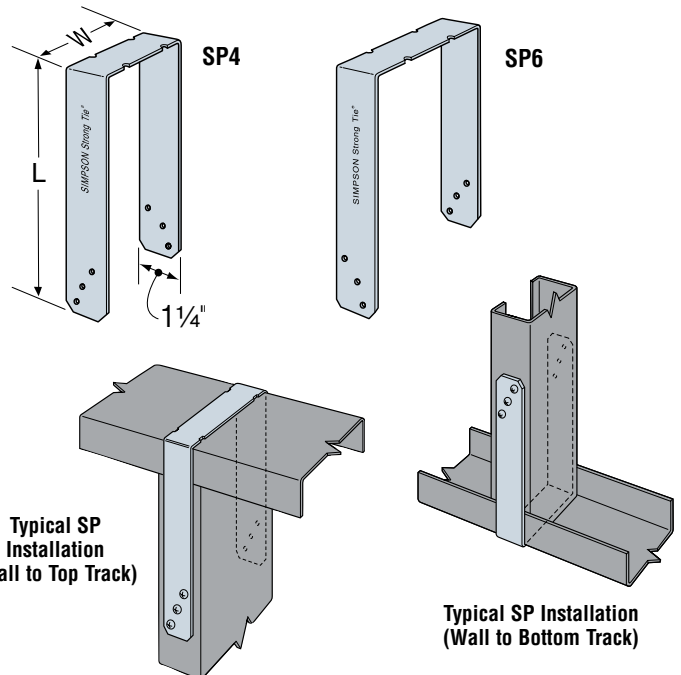
INSTALLATION: • Use all specified fasteners.

CODES: See page 8 for Code Listing Key Chart.

Available with additional corrosion protection. Check with factory.

Model No.	Dimensions		Fasteners	Allowable Uplift Loads				Code Ref.
	W	L		Stud	33 mil (20 ga)	43 mil (18 ga)	(100)	
SP4	3 3/16	7 1/4	6 - #10	825	1100	825	1100	151
SP6	5 5/16	7 3/4	6 - #10	825	1100	825	1100	

1. Tabulated loads shown at (100) do not include steel stress increase. Tabulated loads shown at (133) include a 1/3 stress increase on the steel. Refer to page 12 for additional information.



S/H & H Seismic & Hurricane Ties

Designed to provide seismic and wind ties for trusses or joists, this versatile line may be used for general tie purposes, strongback attachments, and as all-purpose ties where one member crosses another.

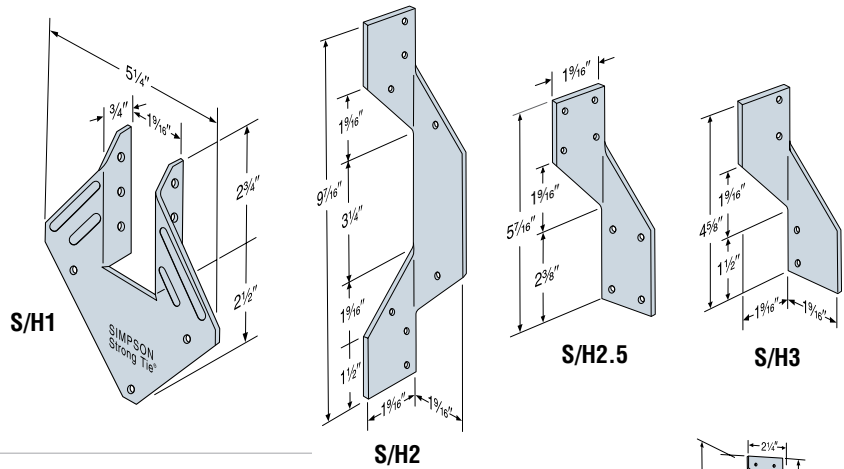
MATERIAL: See table

FINISH: Galvanized. Available with ZMAX® coating; see Corrosion Information Connectors, page 12-13.

INSTALLATION: • Use all specified fasteners.

- The S/H1 can be installed with flanges facing outwards (*reverse of illustration 1*) when installed inside a wall for truss applications.
- Hurricane Ties do not replace solid blocking.
- S/H2.5, S/H3 and H6 ties are only shipped in equal quantities of rights and lefts.

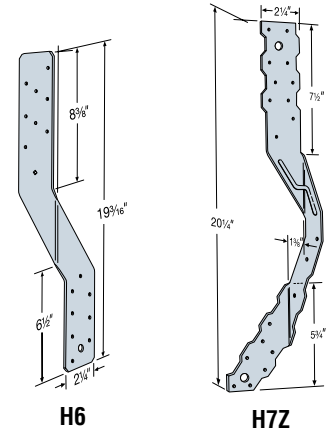
CODE: See page 8 for Code Listing Key Chart.



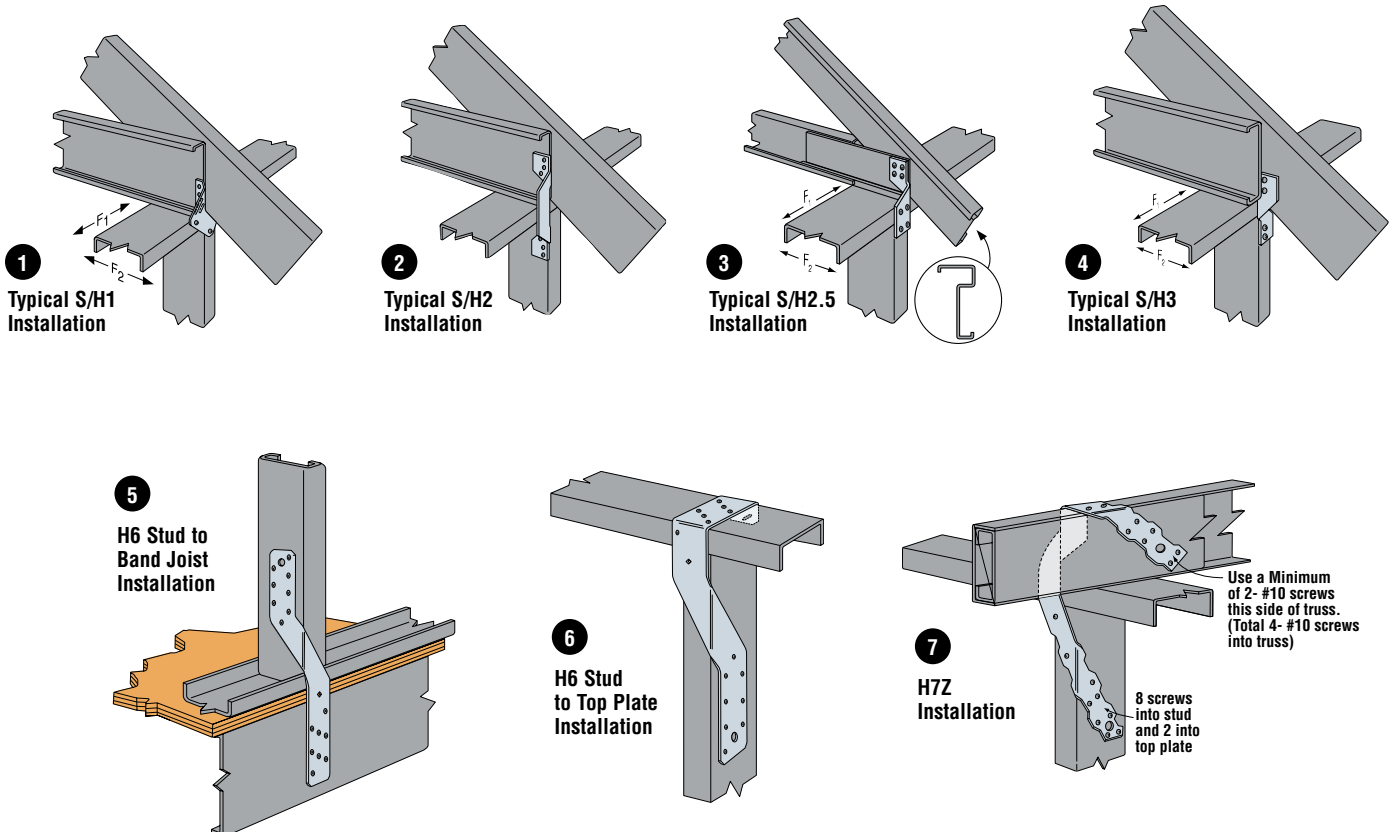
Available with additional corrosion protection. Check with factory.

Model No.	Thickness mil (ga)	Fasteners			Allowable Loads (100)			Code Ref.
		To Rafters / Truss	To Top Track	To Studs	Uplift	Lateral		
						F1	F2	
S/H1	43 (18 ga)	3- #10	2- #10	1- #10	265	100	115	28, 104, 151
S/H2	43 (18 ga)	3- #10	—	3- #10	315	—	—	
S/H2.5	43 (18 ga)	4- #10	—	4- #10	415	150	150	
S/H3	43 (18 ga)	2- #10	2- #10	—	335	90	125	
H6	54 (16 ga)	—	8- #10	8- #10	950	—	—	170
H7Z	54 (16 ga)	4- #10	2- #10	8- #10	985	—	—	

1. Tabulated loads are governed by tests and may not be increased. Refer to page 12 for additional information.
2. Loads are based on attachment of cold-formed steel members having a minimum thickness of 33 mil (20 ga).
3. Hurricane Ties are shown installed on the outside of wall for clarity. Installation inside of wall is acceptable. For Continuous Load Path, connections in the same area must be on same side of wall.



Straps & Ties



S/H1A Seismic & Hurricane Ties

S/H1A is designed to fit within several proprietary truss chords to provide uplift resistance.

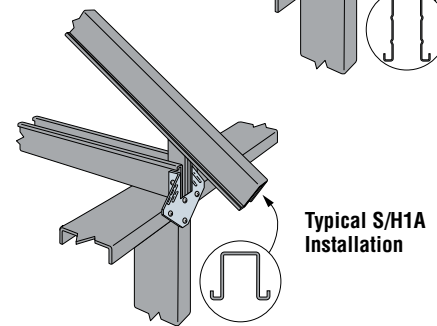
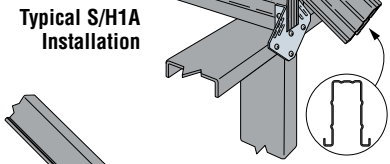
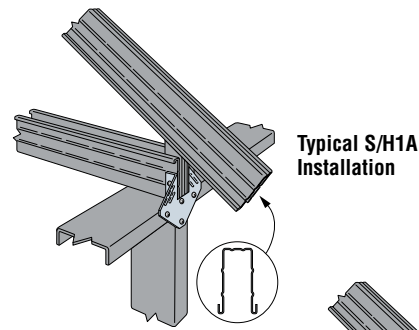
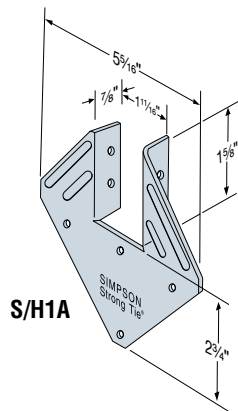
MATERIAL: 43 mil (18 ga)

FINISH: Galvanized

INSTALLATION: • Use all specified fasteners.

- S/H1A can be installed with flanges facing outwards, reverse of illustration, when installed inside a wall for truss applications.
- S/H1A does not replace solid blocking.
- S/H1A may be used with proprietary material sections. Contact material supplier for specific installation details.

CODE: See page 8 for Code Listing Key Chart.



Model No.	Fasteners			Truss Thickness ² mil (ga)	Allowable Uplift Loads (100)			Code Ref.
	Truss	Top Track	Stud		Plate / Wall Stud Thickness mil (ga)			
					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	151
	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 (16ga)	590	675	850	

1. Tabulated loads are governed by tests and may not be increased. Refer to page 12 for additional information.
2. Load based on truss steel properties of Fy=50 ksi and Fu=65 ksi. Reduce load direct proportionally for lower steel strength. For example: Truss with 43 mil (18 ga) thickness has a steel properties of Fy=33 ksi, Fu=45 ksi and is connected to 43 mil plate and wall stud. The adjusted allowable load = 550 lbs. x minimum [^{33/50} or ^{45/65}] = 363 lbs.

Straps & Ties

S/PSPN Protecting Shield Plate

S/PSPN58 and S/PSPN516 Protecting Shield Plate Fastener Stoppers meet IRC, IBC and the International Plumbing Code. S/PSPN516 meets the code plumbing protection requirements as well as having additional fasteners if the Designer chooses to use it as a track splice strap.

MATERIAL: 54 mil (16 ga)

FINISH: Galvanized, available in ZMAX®

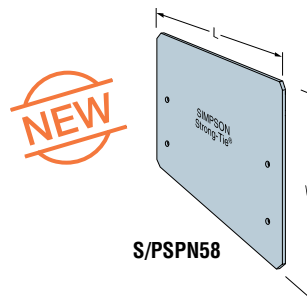
INSTALLATION: S/PSPN - #10 screws.

CODES: See page 8 for Code Listing Key Chart.

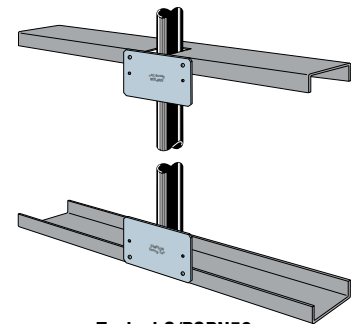
S/PSPN516 at top plates

- International Residential Code®- 2000/2003/2006 P2603.2.1
- International Plumbing Code - 2000/2003/2006 305.8 S/PSPN516 at bottom plate.
- International Plumbing Code - 2000/2003/2006 305.8 S/PSPN58 at top plates and bottom plate.
- International Plumbing Code - 2000/2003/2006 305.8
- International Residential Code®- 2000/2003/2006 P2603.2.1

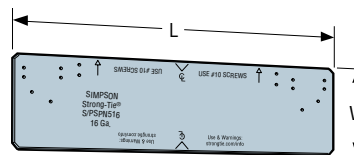
Note that the IBC section 2308.9.8 and the IRC section 602.6.1 require a 54 mil (16 ga.) strap with 6-16d nails and 8-16d nails respectively each side at a hole or notch in a wood top, sill or sole plate. The Designer or local building jurisdiction may permit an equivalent fastener strength (i.e. screws in lieu of nails) to be used for the same condition in a CFS top or bottom track.



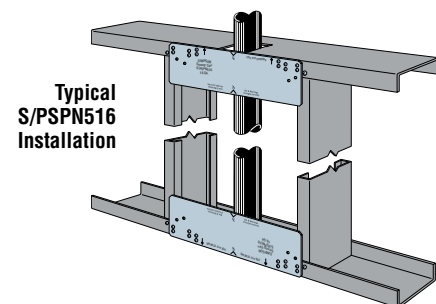
S/PSPN58



Typical S/PSPN58 Installation



S/PSPN516



Typical S/PSPN516 Installation

C-CFS08 ©2008 SIMPSON STRONG-TIE COMPANY INC.

These products are available with additional corrosion protection. Additional products on this page may also be available with this option, check with Simpson for details.

Model No.	W	L	Code Ref.
S/PSPN58	5	8	190
S/PSPN516	5	16 5/16	

1. #10 self-tapping screws may be used to attach S/PSPN to CFS framing with quantity determined by Designer.

H Hybrid Connectors *Seismic & Hurricane Ties for Wood Truss or Joist-to-CFS Wall*

Designed to provide seismic and wind ties for wood trusses or joists-to-CFS walls, this versatile line may be used for general purposes, strongback attachments, and as all-purpose ties where one member crosses another. HS24 attaches the bottom chord of a truss or rafter at pitches from 0:12 to 4:12 to steel top plates.

Material: See table

Finish: Galvanized. Selected products available in stainless steel or ZMAX® coating. See Corrosion Information, page 12-13.

Installation: • Use all specified fasteners. See General Notes

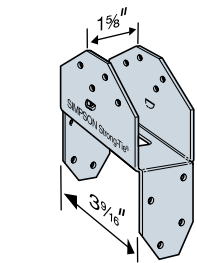
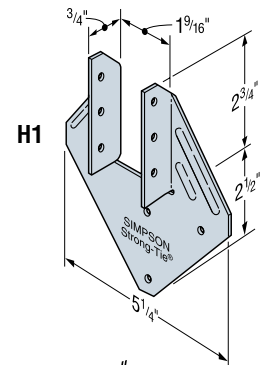
- H1 can be installed with flanges facing inward (*reverse of illustration 1*).
- Hurricane Ties do not replace solid blocking.
- H2.5, H3, and H6 ties are only shipped in equal quantities of rights and lefts.

Codes: See page 8 for Code Listing Key Chart.

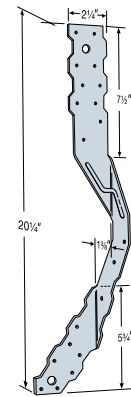
Available with additional corrosion protection. Check with factory.

Model No.	Thickness mil (ga)	Fasteners			Allowable Uplift Loads				Code Ref.
		To Rafters / Truss	To Plates / Top Track	To Studs	DF/SP (133) (160)		SPF/HF (133) (160)		
H1	43 mil (18)	6- 8dx1½"	3- #10	1- #10	490	585	400	400	151
H2	43 mil (18)	5- 8d	—	5- #10	335	335	230	230	
H2.5	43 mil (18)	5- 8d	3- #10	2- #10	415	415	365	365	
H3	43 mil (18)	4- 8d	4- #10	—	400	400	280	280	
H6	54 mil (16)	—	8- 8d	8- #10	915	950	785	820	170
H7Z	54 mil (16)	4- 8dx1½"	2- #10	8- #10	930	985	800	845	
HS24	43 mil (18)	8- 8dx1½"	4- #10	4- #10	625	625	520	520	

1. Tabulated loads under the 133 and 160 columns have been increased by the wood load duration factor, CD, for seismic and wind loading and may not be increased. They must be reduced when other loads govern. Tabulated loads do not include the 1/3 stress increase.
2. Loads are based on attachment of cold-formed steel members having a minimum thickness of 33 mil (20 ga).
3. Hurricane Ties are shown installed on the outside of wall for clarity. Installation inside of wall is acceptable. For Continuous Load Path, connections must be on same side of wall.
4. When cross-grain bending or cross grain tension cannot be avoided mechanical reinforcement to resist such force should be considered.

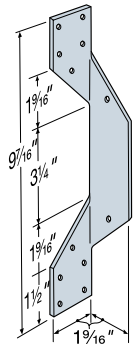


HS24
U. S. Patents
5,603,580

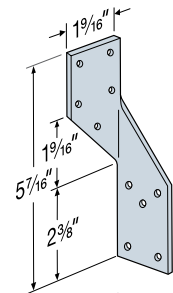


H7Z

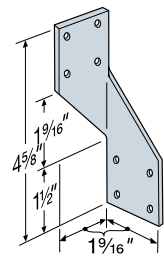
Straps & Ties



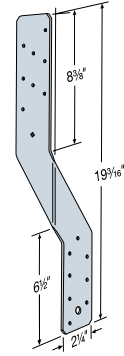
H2



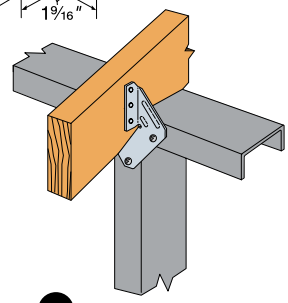
H2.5



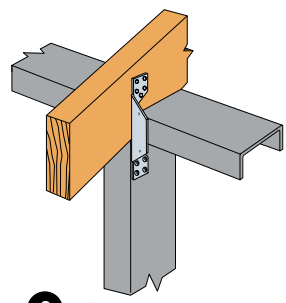
H3



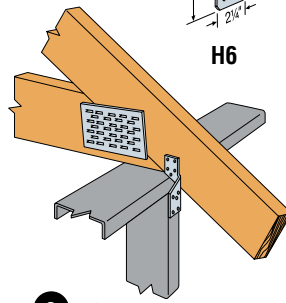
H6



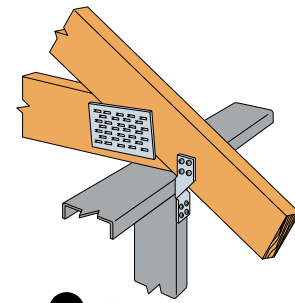
1 H1 Installation



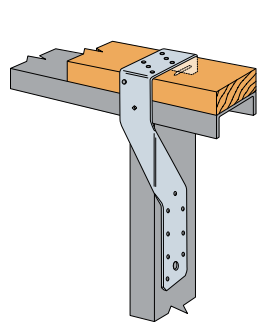
2 H2 Installation



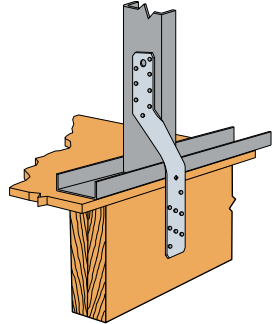
3 H2.5 Installation



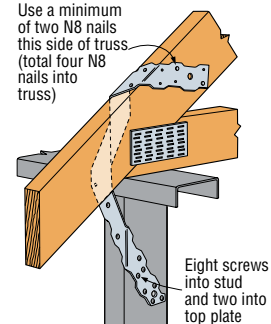
4 H3 Installation



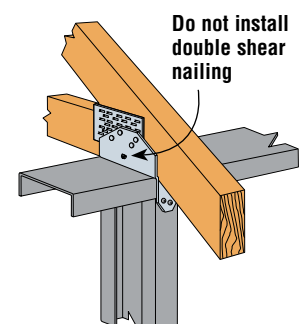
5 H6 Stud to Top Plate Installation



6 H6 Stud to Band Joist Installation



7 H7Z Installation



8 HS24 Installation

MTSM/HTSM *Twist Straps*

The MTSM and HTSM offer high strength truss to masonry connections.

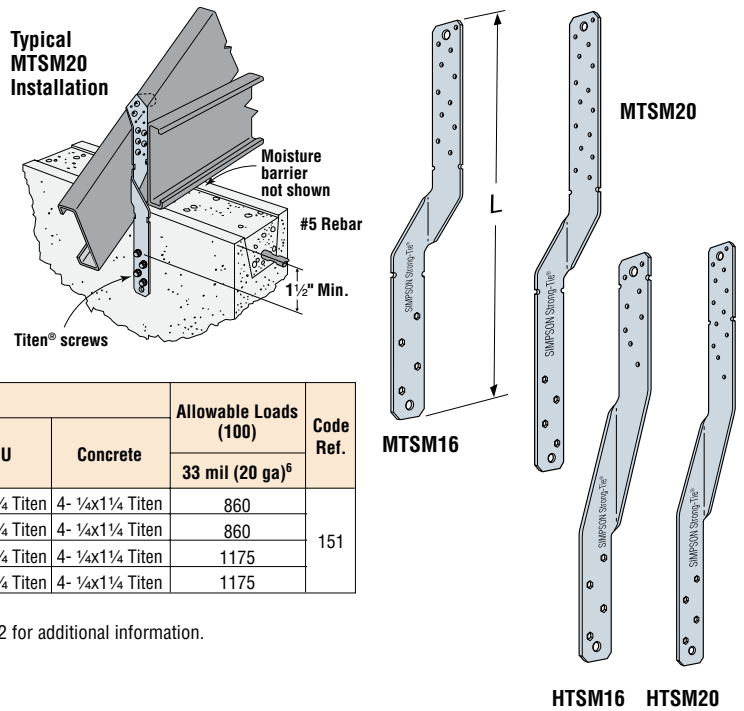
MATERIAL: See table

FINISH: Galvanized. Some products available in stainless steel and ZMAX®; see Corrosion Information, page 12-13.

INSTALLATION: • Use all specified fasteners. See General Notes.

- May be attached to either side of a grouted block wall.
- A minimum of one #5 horizontal rebar shall be installed in the top course of this wall.
- Grout minimum $f'_c = 2500$ psi and maximum aggregate to be $\frac{3}{8}$ ".

CODES: See page 8 for Code Listing Key Chart.



Model No.	Material Thk. mil (ga)	L	Fasteners					Allowable Loads (100)		Code Ref.
			Rafter/Stud/Joist Thickness			CMU	Concrete	33 mil (20 ga) ⁶		
			33 mil (20 ga)	43 mil (18 ga)	54 mil (16 ga)			33 mil (20 ga) ⁶	33 mil (20 ga) ⁶	
MTSM16	54 (16 ga)	16	5- #10	4- #10	3- #10	4- 1/4x2 1/4 Titen	4- 1/4x1 1/4 Titen	860	151	
MTSM20		20	5- #10	4- #10	3- #10	4- 1/4x2 1/4 Titen	4- 1/4x1 1/4 Titen	860		
HTSM16	68 (14 ga)	16	7- #10	5- #10	3- #10	4- 1/4x2 1/4 Titen	4- 1/4x1 1/4 Titen	1175		
HTSM20		20	7- #10	5- #10	3- #10	4- 1/4x2 1/4 Titen	4- 1/4x1 1/4 Titen	1175		

1. All straps have additional fastener holes.
2. Tabulated loads are governed by tests and may not be increased. Refer to page 12 for additional information.
3. Twist straps do not have to be wrapped over the truss to achieve the wall.
4. Minimum edge distance in concrete block for Titen screw is 1 1/2".
5. May be installed on the inside face of the wall.
6. Loads are based on steel with 33 mil (20 ga) minimum.

LTA1 & S/HGAM10 *Seismic & Hurricane Ties*

The LTA1 develops high uplift at a minimum heel height. Great in areas where a strap over the heel is not required. The side tab acts as a locator in the masonry grout.

The S/HGAM10 attaches to trusses and provides good uplift resistance.

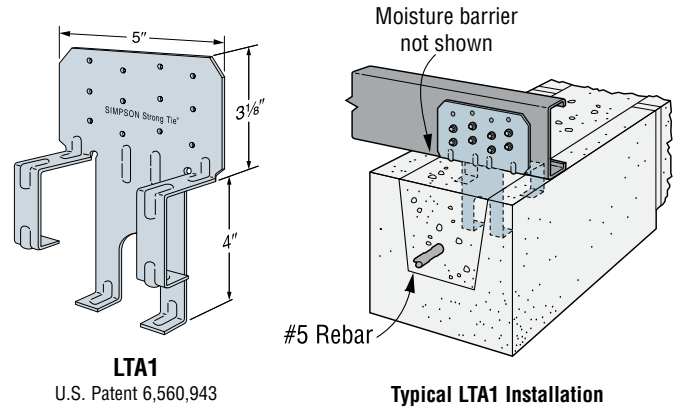
MATERIAL: See table

FINISH: Galvanized

INSTALLATION: • Use all specified fasteners. See General Notes.

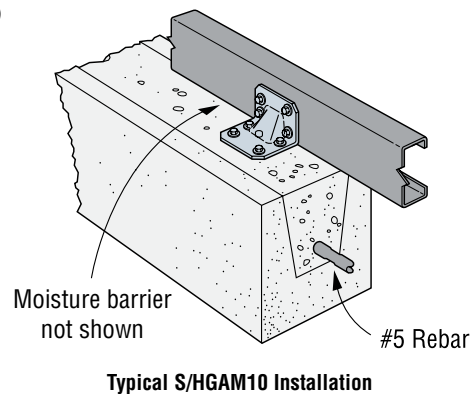
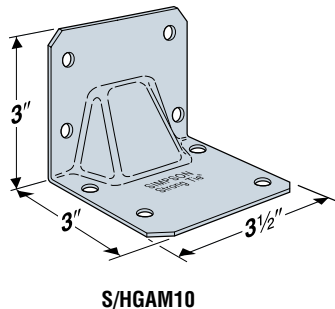
- S/HGAM10 can be installed into grouted concrete block.
- Titen® screws are provided.
- Hurricane Ties do not replace solid blocking.
- Attached to grouted concrete block with a minimum one #5 rebar horizontal in the top lintel block.

CODES: See page 8 for Code Listing Key Chart



Model No.	Material Thickness mil (ga)	Fasteners			Allowable Uplift Loads				Code Ref.
		To Rafter / Truss	To CMU	To Concrete	33 mil (20 ga)		43 mil (18 ga)		
LTA1	43 (18 ga)	8- #10	—	—	1415 (100)	1420 (133)	1420 (100)	1420 (133)	170
S/HGAM10KT	68 (14 ga)	4- #14	4- 1/4" x 2 3/4" Titen	4- 1/4" x 1 3/4" Titen	810 (100)	850 (133)	850 (100)	850 (133)	151

1. Allowable loads are based on a minimum of 2500 psi grout strength.
2. Tabulated loads shown at (100) do not include steel stress increase. Tabulated loads shown at (133) includes a 1/3 stress increase on the steel. Refer to page 12 for additional information.
3. Minimum edge distance 1 1/2" using Titen screws.



LTP5 Framing Anchor

The LTP5 spans subfloor at the top of the blocking or rim joist. The embossments enhance performance and allows for design flexibility.

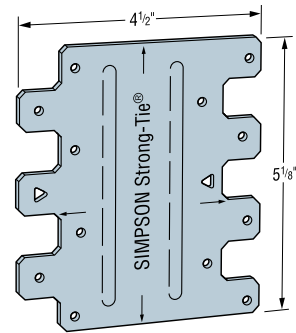
MATERIAL: LTP5-33 mil (20 ga)

FINISH: Galvanized

INSTALLATION:

- Use all specified fasteners. See General Notes.

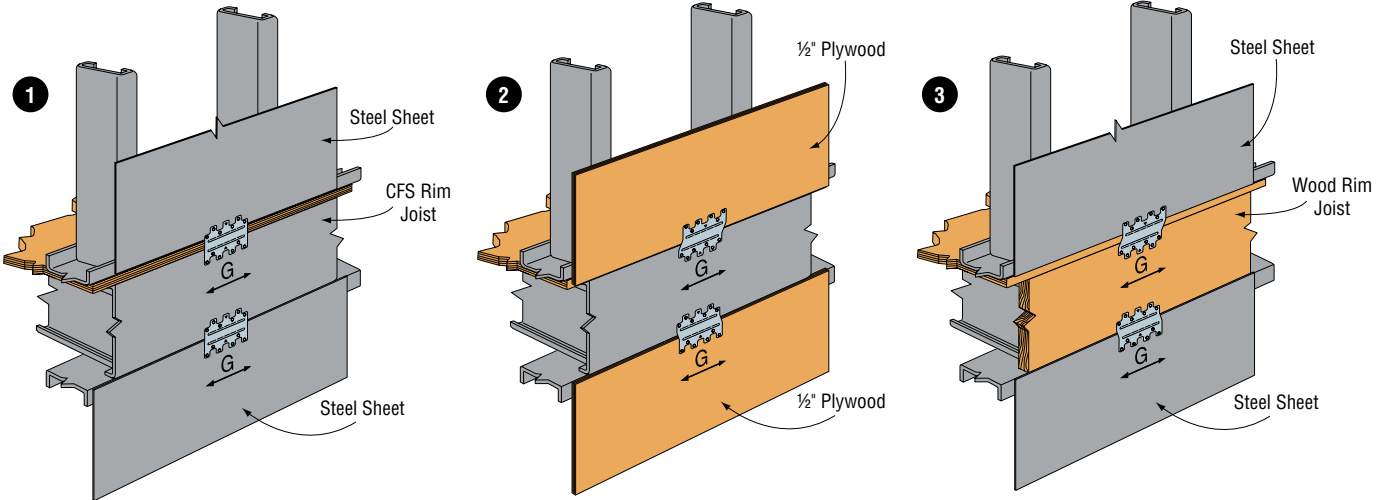
CODES: See page 8 for Code Listing Key Chart.



LTP5

Model No.	Type of Connection	Direction of Load	Fasteners		Allowable Loads 43 mil (18 ga)		Code Ref.
			To Rim Joist	To Tracks & Shearwall	(100)	(133)	
LTP5	1	G	7- #10	7- #10	1045	1045	151
	2		7- #10	7- #10	1110	1110	
	3		7-8d x 1 1/2	7- #10	625	730	

1. Tabulated loads shown at (100) do not include steel stress increase. Tabulated loads shown at (133) include a 1/3 stress increase on the steel. Refer to page 12 for additional information.
2. Allowable loads are for one anchor.
3. When anchors are installed on each side of joist, the minimum joist thickness is 3".
4. Allowable loads are based on steel (stud & sheet) of 43 mil (18 ga) minimum.



Note: When attaching an LTP5 over sheathing, the screws must penetrate and engage the steel framing. A minimum of 3 threads shall penetrate past the steel.

L & S/LS Reinforcing & Skewable Angles

L and S/LS angles are load rated and provide the correct thickness and number of fasteners the specifier is looking for compared with field fabricated clip angles.

General utility reinforcing angles with multiple uses.

S/LS—Field-adjustable angles attach members intersecting at angles.

MATERIAL: L—54 mil (16 ga); S/LS—43 mil (18 ga)

FINISH: Galvanized. Some products available in stainless steel or ZMAX®; see Corrosion Information, page 12–13.

INSTALLATION: • Use all specified fasteners.

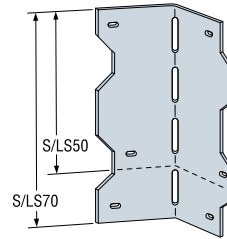
- S/LS—field-skewable; bend one time only.
- Joist must be constrained against rotation when using a single S/LS per connection.

CODE: See page 8 for Code Listing Key Chart.

Available with additional corrosion protection. Check with factory.

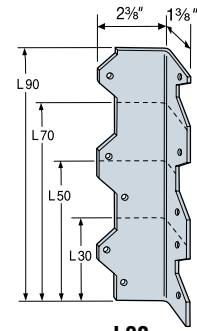
Model No.	Length	Fasteners	Allowable Loads (100)					Code Ref.
			33 mil (20 ga)		43 mil (18 ga)	54 mil (16 ga)		
			F ₁	F ₂	F ₁	F ₁	F ₂	
L30	3	4- #10	200	60	420	610	—	28, 104, 151
L50	5	6- #10	475	—	630	750	110	
L70	7	8- #10	705	—	840	1100	100	
L90	9	10- #10	795	—	1050	1740	—	
S/LS50	4 ⁷ / ₈	4- #10	200	—	420	500	—	28, 104, 151
S/LS70	6 ³ / ₈	6- #10	465	—	630	715	—	

1. Tabulated loads are governed by tests and may not be increased. Refer to page 12 for additional information.
2. Loads are for one part only.
3. Code approval is limited for specific steel thickness. Refer to Code Report for additional information.

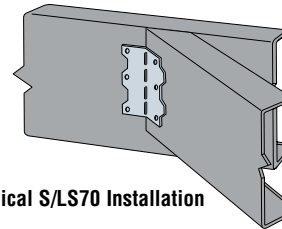


S/LS

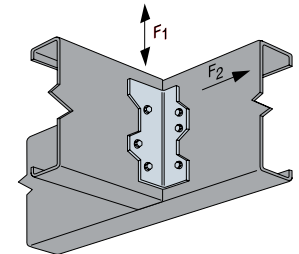
U.S. Patent No. 4,230,416



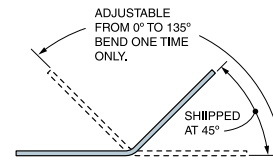
L90



Typical S/LS70 Installation



Typical L50 Installation



S/LS Top View

PSCL Panel Sheathing Clip

Steel panel sheathing clips include model sizes PSCL³/₈, PSCL⁷/₁₆, PSCL¹⁵/₃₂, PSCL¹/₂, PSCL⁹/₁₆; PSCL¹⁹/₃₂, PSCL³/₄

MATERIAL: 33 mil (20 ga)

FINISH: Galvanized

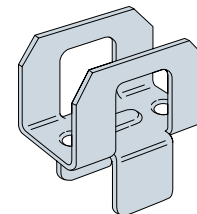
INSTALLATION:

- Use the same size sheathing clip as the wood panel thickness.
- Spans may be reduced for low slopes (per the APA Residential Design/Construction Guide).

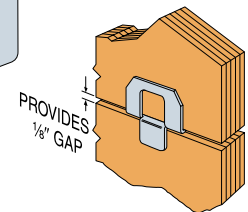
CODES: See page 8 for Code Listing Key Chart.

Span Rating	Wood Panel Thickness	Maximum Roof Span		PSCLs Per Span	Code Ref.
		With PSCL	Without PSCL		
24/0	3/8	24	20	1	180
24/16	7/16	24	24	1	
32/16	1 ⁵ / ₃₂ , 1/2	32	28	1	
40/20	5/8, 1 ⁹ / ₃₂	40	32	1	
48/24	3/4	48	36	2	

1. Reference 1997 UBC Table 23-11-E-1 and 2000/2003 IBC table for span rating.



PSCL



Typical PSCL Installation

TP/TPA Tie Plates

TPs are screw-on tie plates. TPAs are flanged for added support.

MATERIAL: 33 mil (20 ga)

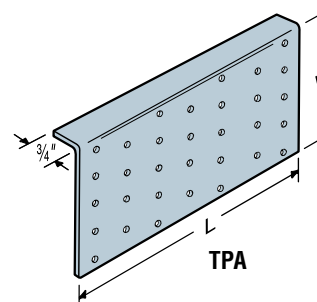
FINISH: Galvanized

INSTALLATION:

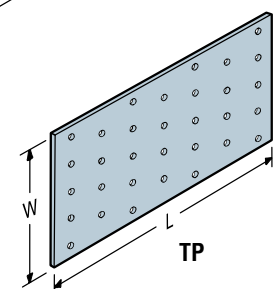
- Holes are sized for #8 or #10 screw.

CODES: See page 8 for Code Listing Key Chart.

Model No.	Dimensions		Number of Nail Holes	Code Ref.
	W	L		
TP15	1 ¹³ / ₁₆	5	13	180
TPA37	3 ¹ / ₂	7	32	
TPA39	3 ¹ / ₂	9	41	
TP35	3 ¹ / ₈	5	23	
TP37	3 ¹ / ₈	7	32	
TP39	3 ¹ / ₈	9	41	
TP311	3 ¹ / ₈	11	50	
TP45	4 ¹ / ₈	5	30	
TP47	4 ¹ / ₈	7	42	
TP49	4 ¹ / ₈	9	54	
TP411	4 ¹ / ₈	11	66	
TP57	5 ³ / ₄	7	60	
TPA57	5	7	49	



TPA



TP

1. Connectors are not load rated.

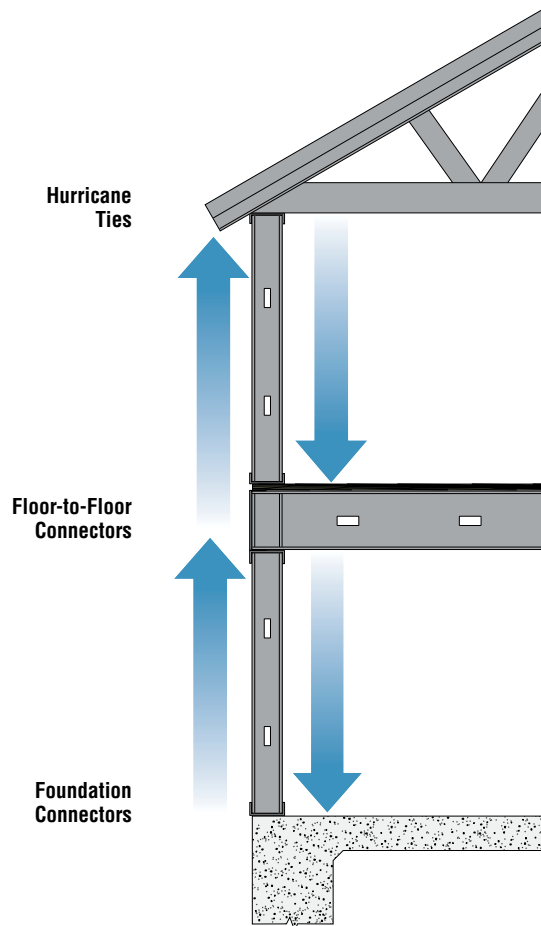
CONTINUOUS LOAD PATH CONSIDERATIONS

Modern design and construction practices use structural connectors to form a **continuous load path** that can effectively resist wind and seismic forces by reinforcing the structure from the roof to the foundation.

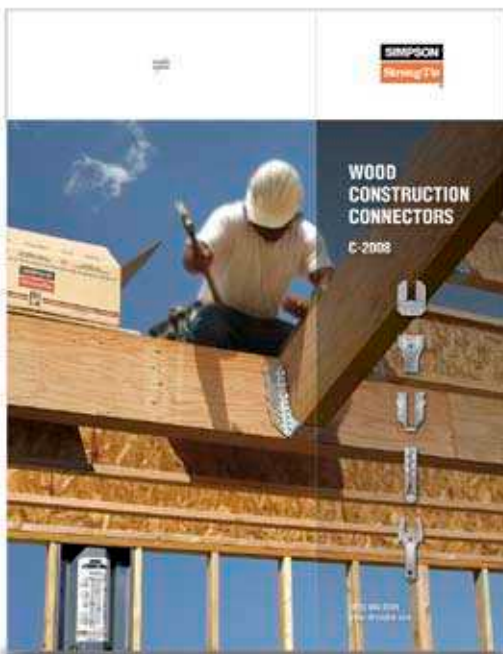
Simpson Strong-Tie® connectors are designed to enable structures to resist the movement, stress, and loading that results from natural events such as earthquakes and high velocity winds. When properly installed, our connectors will perform in accordance with the specifications set forth in this catalog, given the correct fastener is used, in the provided holes, into the recommended base material.

In cold-formed steel framing, connectors such as holdowns, straps, angles and hurricane ties are often field-fabricated. However, field-fabricated connectors in general have not been designed and tested to determine their ultimate and allowable load capacity and are typically not code listed. Field-fabricated connectors consume valuable man-hours on the jobsite and typically do not have prepunched holes. Because of this, the installer may not be properly locating the fasteners to achieve the intended design load.

Simpson Strong-Tie connectors are the most thoroughly tested and evaluated products in the industry, value engineered for the lowest installed cost at the highest rated performance levels. Our connectors save the contractor time in the field, and when properly specified and installed, provide an easier installation, at a lower installed cost, and are warranted for accuracy of design. This should be taken in consideration when considering field-fabricated connectors.



This shows a continuous load transfer path from the trusses to the foundation. A qualified Designer should ensure that correct quantities, fasteners and installation methods are used to achieve full design values.



The Designer can also refer to our current *Wood Construction Connector* catalog. Many of the connectors listed there may be used for cold-formed steel construction, using the screw values found in this catalog.

*This catalog reflects changes in the allowable loads and configurations of some Simpson Strong-Tie Company Inc. products. **This catalog is effective until December 31, 2009,** and supersedes all information in all earlier publications, including catalogs, brochures, fliers, technical bulletins, etc. Use this edition as a current printed reference. Information on allowable loads and configurations is updated annually.*

We post our catalogs on www.strongtie.com. Please visit our site, and sign up for any information updates. Allowable loads in this catalog are for the described specific applications of properly-installed products. Product modifications, improper loading or installation procedures, or deviations from recommended applications will affect connector allowable load-carrying capacities.

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NOTES



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Every day we work hard to earn your business, blending the talents of our people with the quality of our products and services to exceed your expectations. This is our pledge to you.



Wood Construction Connectors

Includes specifications and installation instructions on wood-to-wood and wood-to-concrete structural connectors. Includes load tables and material specifications.

Anchoring and Fastening Systems for Concrete and Masonry

Includes application information, specifications and load values for adhesive and mechanical anchors, P.A.T. and carbide drill bits. A binder version is also available.

Quik Drive® Systems Catalog

A complete line of labor-saving auto-feed systems and specialty fasteners for a wide range of commercial and residential construction applications.

Strong-Wall® Shearwalls

All the information on our Strong-Wall shearwalls is now in one easy to use catalog: technical data, installation information, structural details and more. The catalog also features new solutions for two-story and balloon frame applications as well as an extensive section on braced frame requirements under the various building codes.

Anchor Tiedown Systems

This system is designed to provide the over-turning holdown capacity for multi-story commercial buildings. This holdown application is easy to specify, install and inspect.

High Wind Framing Connection Guide

Developed for designers and engineers as a companion to the AF&PA Wood Frame Construction Manual.

Code Compliant Repair and Protection Guide

Developed for building professionals to help explain products and techniques related to the installation of utilities in wood frame construction.

Anchoring Solutions for Simpson Strong-Tie® Connectors

Simpson Strong-Tie® Anchor Systems specifications with our connector line. It should be used in conjunction with the current connector and anchor systems catalogs.

Simpson's Free CD-ROM

Our CD-ROM features our latest catalogs, fliers, technical bulletins, code reports, product list prices, UPC information, and the Simpson Connector Selector program. It also includes the Drawing Library.



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