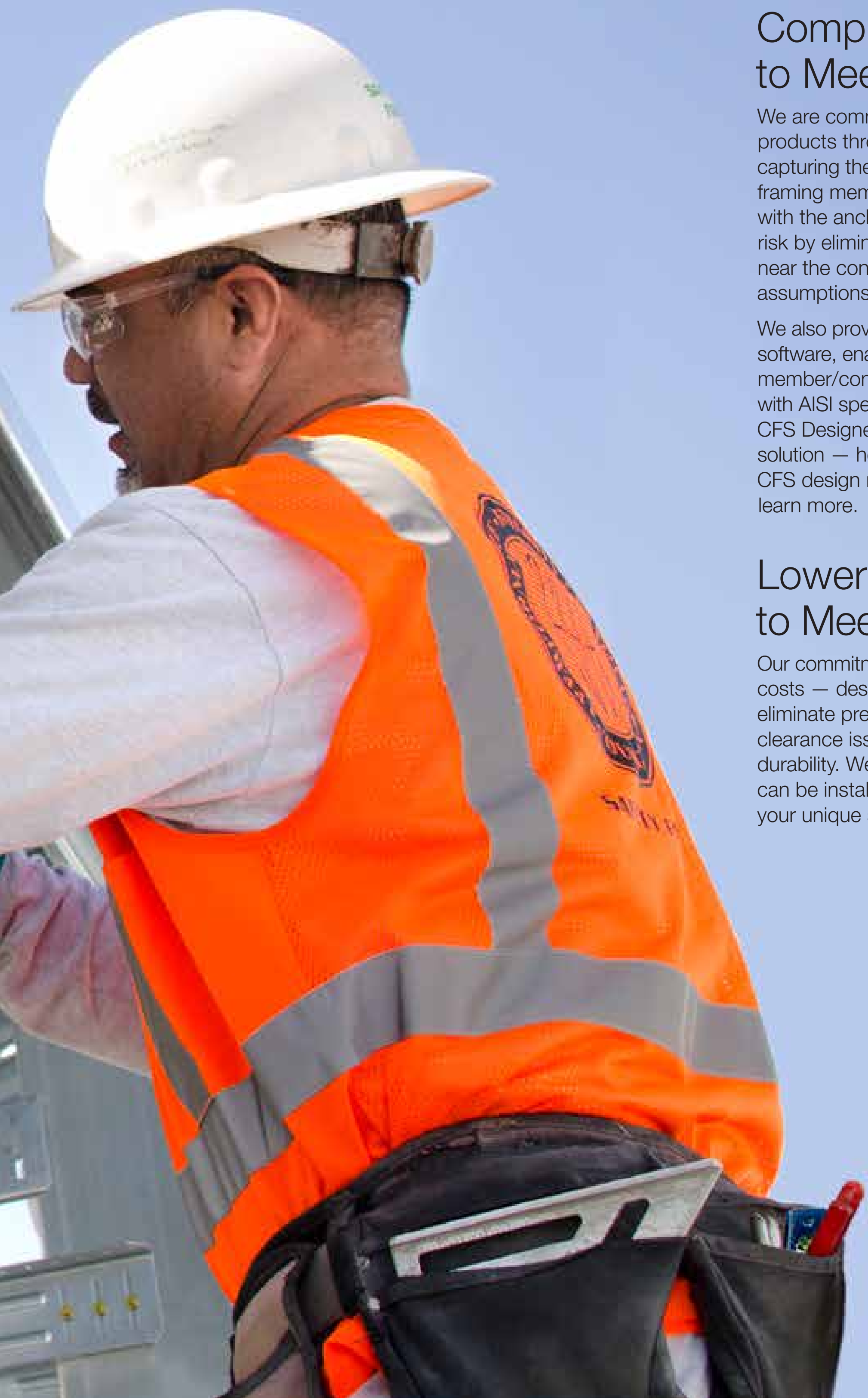
Connectors
for Cold-Formed Steel Construction

C-CF-2017 | (800) 999-5099 | strongtie.com

SIMPSON Strong-Tie®

Innovation to make CFS jobs faster and easier

At Simpson Strong-Tie, we are committed to being your valued partner and total solutions provider for cold-formed steel (CFS) commercial curtain-wall, mid-rise and residential construction. Our products are manufactured with quality that our customers can rely on — with precision engineering, thorough lab testing and design software that automates AISI design calculations. The result is, we deliver innovative and lower installed-cost solutions for CFS applications.



Complete, Tested Solutions to Meet Specifier Needs

We are committed to developing fully engineered products through extensive assembly testing — capturing the interaction of the connector with the framing member and the interaction of the connector with the anchorage. Assembly testing mitigates design risk by eliminating member behavior assumptions near the connector, and eccentricity and prying action assumptions for fasteners and anchors.

We also provide our specifiers with state-of-the-art software, enabling powerful, efficient and accurate member/connector analysis and design in accordance with AISI specifications. Our Simpson Strong-Tie® CFS Designer™ software is an affordable, easy-to-use solution — helping you expedite most of your day-to-day CFS design needs. Visit **strongtie.com/software** to learn more.

Lower Installed Costs to Meet Contractor Budgets

Our commitment extends to reducing your installed costs — designing products to minimize screw count, eliminate predrilling the connector and minimize tool clearance issues without compromising strength or durability. We field-test our products to ensure they can be installed accurately and efficiently following your unique specifications.

Alphabetical Index

SIMPSON Strong-Tie®

VALUE ENGINEERED

This icon indicates a product that is preferable to similar connectors because of a) easier installation, b) higher loads, c) lower installed cost, or a combination of these features.

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Alphabetical Index

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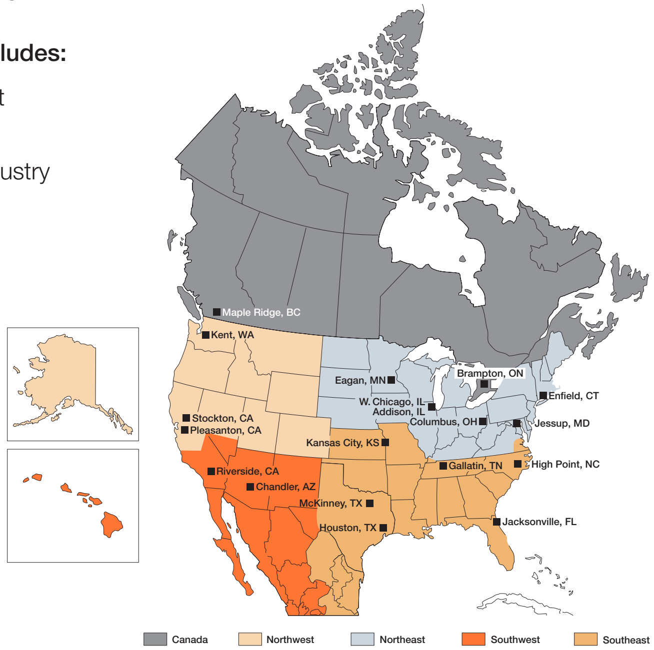
Introduction

For more than 60 years, Simpson Strong-Tie has focused on creating structural products that help people build safer and stronger homes and buildings. A leader in structural systems research and technology, Simpson Strong-Tie is one of the largest suppliers of structural building products in the world. The Simpson Strong-Tie commitment to product development, engineering, testing and training is evident in the consistent quality and delivery of its products and services.

For more information, visit the company's website at **strongtie.com**.

The Simpson Strong-Tie Company Inc. No-Equal pledge includes:

- Quality products value-engineered for the lowest installed cost at the highest-rated performance levels
- The most thoroughly tested and evaluated products in the industry
- Strategically located manufacturing and warehouse facilities
- National code agency listings
- The largest number of patented connectors in the industry
- Global locations with an international sales team
- In-house R&D and tool and die professionals
- In-house product testing and quality control engineers
- Support of industry groups including AISI, AITC, ASTM, ASCE, AWC, AWPA, ACI, AISC, CSI, CFSEI, ICFA, NBMDA, NLBMDA, SDI, SETMA, SFA, SFIA, STAFDA, SREA, NFBA, TPI, WDSC, WIJMA, WTCA and local engineering groups



The Simpson Strong-Tie 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.

Karen Colonias
Chief Executive Officer

Getting Fast Technical Support

When you call for engineering technical support, having the following information on hand will help us to serve you promptly and efficiently:

- Which Simpson Strong-Tie® catalog are you using? *(See the front cover for the catalog number.)*
- Which Simpson Strong-Tie product are you using?
- What are your application and load requirement?
- What are the carried and/or supporting members' size, gauge and strength?

We Are ISO 9001-2008 Registered

Simpson Strong-Tie is an ISO 9001-2008 registered company. ISO 9001-2008 is an internationally-recognized quality assurance system that lets our domestic and international customers know that they can count on the consistent quality of Simpson Strong-Tie® products and services.

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New Products for 2017

Version V2.0

Simpson Strong-Tie® CFS Designer™ Software

Simpson Strong-Tie CFS Designer gives cold-formed steel (CFS) Designers the ability to design CFS beam-column members according to AISI specifications as well as analyze complex beam loading and span conditions. Intuitive design tools automate common CFS systems such as wall openings, compression posts for shearwalls and floor joists with unbalanced live-load combinations.

Version V2.0 is now equipped with a powerful tool to automate the design of load-bearing wall systems up to eight stories in height.

See p. 23 for more information.

RCKW Kneewall Connectors

The Simpson Strong-Tie® RCKW rigid connectors have been developed to resist overturning moment at the base of exterior kneewalls and parapets as well as interior partial-height walls. These connectors offer a unique anchor-hole pattern that permits anchorage to both concrete and structural steel.

See pp. 100–111 for more information.

SCHA Slide-Clip Connectors for Horizontal Anchorage

The SCHA slide-clip connector is an ideal solution for panelized or stick-frame construction where cold-formed steel bypass framing anchors to the top of a floor slab or the bottom flange of a steel beam. The connector features a wide anchorage leg that minimizes connection eccentricity and accommodates several different anchorage methods to concrete and steel. The included SCVS slider provides superior rotational support to the vertical leg of the SCHA connector, helping to improve the buckling performance of the anchored leg.

See pp. 39–41 for more information.

DBR SBR

SBR and DBR Spacer Bracers

Specify the only bridging connectors on the market with load ratings based on assembly testing. The new Simpson Strong-Tie® SBR and DBR spacer bracers come with load data based on assembly testing so you can mitigate risk and maximize design confidence. The tabulated design values and precision-engineered slots make it easier to provide a value-engineered solution to your customers.

See pp. 125–132 for more information.

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New Products for 2017

FC Bypass Framing Fixed-Clip Connectors

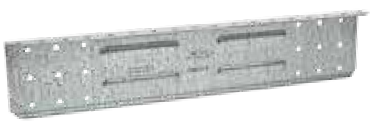
Ideal for high-seismic areas, Simpson Strong-Tie® FC connectors are the optimal solution for fixed-clip bypass framing. FC clips are often welded to the structure in high-seismic zones, but they also feature anchorage holes so that concrete screws or powder-actuated fasteners can be used to attach the clip to the structure. In addition to its anchorage versatility, the FC clip features prepunched screw holes for the framing attachment, eliminating the need for predrilling holes or worrying that fastener placement doesn't match the Designer specifications. FC connectors are manufactured using heavy-duty 10- and 12-gauge steel to provide exceptional resistance to in-plane seismic load.

See pp. 57–60 for more information.

SC Bypass Framing Slide-Clip Connectors

Ideal for high-seismic areas, Simpson Strong-Tie® SC connectors are the optimal solution for slide-clip bypass framing. SC clips are often welded to the structure in high-seismic zones, but they also feature anchorage holes so that concrete screws or powder-actuated fasteners can be used to attach the clip to the structure. SC connectors are manufactured using heavy-duty 10- and 12-gauge steel to provide exceptional resistance to in-plane seismic load.

See pp. 29–32 for more information.



FSB Bypass Framing Fixed-Clip Strut Connector

The FSB connector is the fixed-clip version of our popular SSB slide-clip strut connector. The FSB is commonly used at the bottom flange of a steel beam to accommodate large stand-off distances for bypass curtain-wall studs. The connector features anchor holes throughout the length of the part to enable use with a wide array of stand-offs. The FSB can also be field-trimmed for smaller stand-offs.

See pp. 61–62 for more information.

IDCB Drift-Clip Bypass Framing Connector

The IDCB drift-clip connector is used to secure bypass stud framing to the edge of a slab. The connector will accommodate 1" of lateral drift in each direction and 1" of upward and downward vertical deflection. Horizontal embossments and corner gussets optimize performance for resisting out-of-plane loads.

See p. 43 for more information.

RCA Rigid Connector Angles

The Simpson Strong-Tie® rigid connector angle is a general-purpose clip angle designed for a wide range of cold-formed steel construction applications. With prepunched holes for fastener attachment, these L-shaped clips save time and labor on the job.

See pp. 92–98 for more information.

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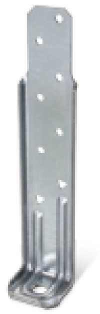
New Products for 2017

S/DHUTF Drywall Hangers

The S/DHUTF top-mount hangers are designed to carry floor joist loads to a CFS stud wall through two layers of ⅝" gypsum board. These hangers install after the drywall is in place. The hangers come in sizes that accommodate 8", 10" and 12" joist depths.

See p. 255 for more information.



DTT1Z Tension Tie

DTT1Z tension tie is suitable for lighter-duty hold-down applications on single or back-to-back studs, and installs easily with #10 self-drilling screws.

See p. 244 for more information.

Titen® 2 Concrete and Masonry Screw

With patented undercutting threads that make installation easier and increase load capacity, the Titen 2 concrete and masonry screw is ideal for attaching all types of components to concrete and masonry. The improved thread design undercuts the base material more efficiently, reducing installation torque and making it easier to drive without binding, snapping or stripping, even during installation into hard base material.

See pp. 204–207 for more information.

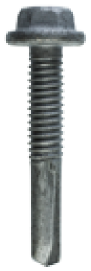
Drop-In

Lipped Drop-In

DIAB Drop-In Internally Threaded Anchor

Simpson Strong-Tie introduces a new, redesigned Drop-In Anchor (DIAB) that provides easier installation into base materials. Improved geometry in the preassembled expansion plug allows the anchor to install with 40% fewer hammer strikes than previous versions. These deformation-controlled expansion anchors are easily set by driving the plug toward the bottom of the anchor using either the hand- or power-setting tools.

See pp. 215–217 for more information.



Strong-Drive® XM MEDIUM-HEAD METAL Screw

Strong-Drive XM Medium-Head Metal screws have been engineered as a 1-for-1 replacement option for power-actuated pins in steel decking to structural members involving wide or narrow valley, nestable or interlocking steel decking. This means you can keep the same spacing and easily substitute screws for pins. This screw is also an ideal solution for CFS connectors that demand high pullover values.

See p. 147 for more information.

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How To Use This Catalog

New Products

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

Value Engineered

This icon indicates a product that is preferable to similar connectors because of a) easier installation, b) higher loads, c) lower installed cost, or a combination of these features.

Extra Corrosion Protection

The teal arrow icon identifies products that are available with additional corrosion protection (ZMAX®, hot-dip galvanized or double-barrier coating). The SS teal arrow icon identifies products also available in stainless steel. Other products may also be available with additional protection; contact Simpson Strong-Tie for options. 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). Stainless products may need to be manufactured upon ordering. See pp. 18–21 for information on corrosion, and visit our website **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.

Where available, testing is performed to test criteria established by industry (ASTM, AISI or ICC-ES Acceptance Criteria). Where a test standard is unavailable, testing is conducted per sound engineering principles. 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 in an IAS accredited laboratory. **Typically the allowable load is limited to an average test load at ⅛" deflection, an average or lowest test value (nominal load) divided by a safety factor or the calculated value. The safety factor is prescribed by Section F of AISI-S100. For LRFD, the nominal connector strength is multiplied by a resistance factor, also prescribed by Section F of AISI-S100.**

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

Load Table Explanation

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 Load: 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. When connectors are attached to two CFS members of different thicknesses, the Designer shall use the thinner of the two members for selecting allowable loads.

Model No.: This is the Simpson Strong-Tie product name.

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

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

Code Ref: See p. 11 for the Code Reference Key Chart, to determine which code reports include this product.

Model No.	Connector Material Thickness mil. (ga.)	Dimensions (in.)		Fasteners (Total)			Allowable ASD Tension Load			Code Ref.
				Rafter/Stud/Joist Thickness						
		W	L	33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)	33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)	
LSTA9	33 (20 ga.)	1¼	9	(8) #10	(8) #10	(8) #10	705	1,120	1,190	IP1, L2, FL
LSTA12		1¼	12	(10) #10	(10) #10	(8) #10	885	1,190	1,190	
LSTA15		1¼	15	(12) #10	(12) #10	(10) #10	1,060	1,190	1,190	
LSTA18		1¼	18	(14) #10	(12) #10	(10) #10	1,190	1,190	1,190	

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 AISI-S100 using specified material strengths and dimensions. Typically taken as the average value of at least three 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 the lesser of the amplified seismic load or the maximum force the system can deliver.

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Code Reference Column in Load Tables

The alpha-numeric "Code Reference numbers" that appear in the "Code Reference" column in load tables throughout this catalog are intended to identify products listed in evaluation agency reports, typically called "code reports," and the specific reports that cover them. The letter designates the evaluation agency from which the report was obtained. 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 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)
- Product is calculated per code; testing is not required (200)

Where a model has been submitted for listing (160) or does not have an evaluation report listing (170), Simpson Strong-Tie can supply complete test data to support our published loads. Please contact us for a copy of our product test documentation at (800) 999-5099. 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 **strongtie.com/codes** or visit the product evaluation agencies' web sites for the current evaluation reports.

Simpson Strong-Tie® products are listed by several product evaluation agencies. Agencies that list our products include ICC-ES; IAPMO UES; UL; FM; the City of Los Angeles, California; and the State of Florida.

Simpson Strong-Tie currently maintains more than 60 ICC-ES ESR and IAPMO UES ER reports evaluated to the 2006/2009/2012/2015 IBC and IRC. We continue to submit product information to ICC-ES in order to update reports or receive additional reports for products in compliance with the latest codes.

To quickly determine which of our stamped and welded connector products are listed in ESR reports, we have obtained the ICC-ES ESR-2523 index report. This report is a reference document to other ESR reports held by Simpson Strong-Tie and will be updated frequently by ICC-ES as new stamped and welded connector evaluation services reports are issued. Please visit **strongtie.com** for the latest information or contact ICC Evaluation Service at **icc-es.org**.

IAPMO Uniform Evaluation Service has been evaluating products for more than 75 years and has the same ANSI accreditation as ICC Evaluation Service for evaluating structural building products to the building codes. IAPMO UES began evaluating structural building products in 2004, utilizing licensed structural engineers to perform quality reviews. To quickly determine which of our stamped and welded connector products are listed in ER reports, we have obtained IAPMO UES ER-102 index report, which will be updated frequently as products are added to ERs. Please visit **strongtie.com** for the latest information or contact IAPMO Uniform Evaluation Service at **iapmoes.org**.

In November 2010, the California Division of the State Architect, issued a revised IR 23-1. The revised Interpretation of Regulation (IR) 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 Connector Fabrication (which addresses corrosion-resistant material and/or coatings) and testing requirements. Also IRA-5, updated in October 2012, addresses product and evaluation report acceptance.

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 is 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.

To access pertinent code reports related to Simpson Strong-Tie® products, you can access our Code Report Finder Software at **strongtie.com/codes.**

Code Report Reference Key Chart

Agency	Code Listing	Code Reference
ICC-ES ESR	ESR-1161	I1
	ESR-2138	I2
	ESR-2508	I3
	ESR-2555	I4
	ESR-2611	I5
	ESR-2713	I6
	ESR-2811	I7
	ESR-2920	I8
	ESR-1679	I9
	ESR-3006	I10
IAPMO UES ER	ER-124	IP1
	ER-238	IP2
	ER-242	IP3
	ER-326	IP4
	ER-263	IP5
City of Los Angeles, California	RR 25469	L1
	RR 25489	L2
	RR 25741	L3
	RR 25744	L4
	RR 25827	L5
	RR 25837	L6
	RR 25851	L7
	RR 25943	L8
	RR 25960	L9
	RR 25625	L10
	RR25670	L11
	RR25917	L12
State of Florida	Florida Product Approval Visit **strongtie.com/codes** or **floridabuilding.org** for accurate and up-to-date product approval and code evaluation reports.	FL
Submitted for Listing	Call us for Status and Test Data	160
No Code Listing	Call us for Test Data	170
No Load Rating	—	180
Prescriptive Code	—	190
Calculated per Code	—	200

* Because code reports can be issued throughout the year, we encourage the user to visit **strongtie.com**, **icc-es.org**, **iapmoes.org**, **ladbs.org**, and **floridabuilding.org.** For the most current information, call Simpson Strong-Tie at (800) 999-5099, or contact the code agency directly.

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Important Information and General Notes

SIMPSON Strong-Tie®

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 maximal 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, *Installer's Pocket Guide* or any other Simpson Strong-Tie publications.
3. Install all required fasteners per installation instructions provided by Simpson 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 require 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 ⅛" unless otherwise noted.

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.

Important Information

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 **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-C-INSTALL), 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 Strong-Tie conducts at various training centers throughout the country;
- Product-specific installation videos;
- Specialty catalogs;
- Code reports – Simpson Strong-Tie® Code Report Finder software;
- Technical fliers and bulletins;
- Engineering letters;
- Master format specifications;
- Safety data sheets;
- Corrosion information;
- Connector selection guides for engineered wood products (by manufacturer);
- Simpson Strong-Tie® Connector Selector® software;
- Simpson Strong-Tie® Joist Hanger Selector;
- Simpson Strong-Tie® AutoCAD® menu;
- Simpson Strong-Tie® CFS Designer™ software;
- Simpson Strong-Tie® Anchor Designer software;
- Simpson Strong-Tie® Strong-Wall® Selector software;
- Simpson Strong-Tie® Strong Frame® Selector;
- Simpson Strong-Tie® Fastener Finder;
- Simpson Strong-Tie® YouTube Channel; and
- Answers to frequently asked questions and technical topics.
- For all our web and mobile apps, visit **strongtie.com/software**.

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Important Information and General Notes

General Notes

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 Strong-Tie product is individually selected based on the product's steel specifications, including strength, thickness, formability, finish, and weldability. Contact Simpson Strong-Tie for steel information on specific products.

c. Unless otherwise noted, dimensions are in inches and loads are in pounds.

d. Unless otherwise noted, welds, bolts, screws and nails may not be combined to achieve highest load value.

e. Unless otherwise noted, catalog loads are based on cold-formed steel members having a minimum yield strength, F_y, of 33 ksi and tensile strength, F_u, of 45 ksi for 43 mil (18 ga.) and thinner, and a minimum yield strength, F_y, of 50 ksi and tensile strength, F_u, of 65 ksi for 54 mil (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 ⅛", 3⁄16", and ¼" 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. SSTB (p. 237) is ASTM A36, RFB (p. 239) is ASTM A307.

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 Simpson Strong-Tie 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 Strong-Tie 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 Strong-Tie. 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 comply with ASTM A1003 Grade 33 minimum. Reference General Note "e" for additional requirements.

q. Quik Drive® screws have been tested per AISI Standard Test Method S904.

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 products. The performance of modified products may be substantially weakened. Simpson Strong-Tie will not warrant or guarantee the performance of such modified products.

t. All references to bolts or machine bolts (MBs) are for structural quality through bolts (not lag screws or carriage bolts) equal to or better than ASTM Standard A307, Grade A.

General Instructions to the Installer

These general instructions for the installer are provided to ensure proper selection and installation of Simpson Strong-Tie products and must be followed carefully. These general instructions are in addition to the specific installation instructions and notes provided for each particular product, all of which should be consulted prior to and during installation of Simpson Strong-Tie products.

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 ½" diameter or greater bolts shall be no more than a maximum of 1⁄16" larger than the bolt diameter per AISI S100 Table E3a, Appendix A.

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. The gap between the end of the joist and the connector or header shall not exceed ⅛" per ICC-ES AC 261 and ASTM D1761 test standards, unless otherwise noted.

g. For holdowns, anchor bolt nuts should be finger-tight plus ⅓ to ½ turn with a hand wrench. Care should be taken to not over-torque the nut and impact wrenches should not be used. This may preload the holdown.

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General Instructions to the Installer (cont.)

h. Holdowns and tension ties may be raised off the track as dictated by field conditions to accommodate an anchor mislocated no more than 1½". The holdown shall be raised off the bottom track at least 3" for every ¼" that the anchor is offset from the model's centerline. Anchor bolt slope shall be no greater than 1:12 (or 5 degrees). Contact the Designer if the holdown anchor is offset more than 1½" or raised more than 18". Raised holdown height is measured from the top of the concrete to the top of the holdown bearing plate.

i. 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 three full exposed threads per AISI S200 General Provisions Section D1.3.

j. Welding galvanized steel may produce harmful fumes; follow proper welding procedures and safety precautions. Welding should be in accordance with American Welding Society (AWS) standards. Unless otherwise noted, Simpson Strong-Tie connectors cannot be welded.

k. Temporary lateral support for members may be required during installation.

General Instructions to the Designer

These general instructions for the Designer are provided to ensure proper selection and installation of Simpson Strong-Tie Company Inc. products and must be followed carefully. These general instructions are in addition to the specific design and installation instructions and notes provided for each particular product, all of which should be consulted prior to and during the design process.

a. Allowable loads are determined per the AISI S100 unless otherwise specified. Other code agencies may use different methodologies.

b. The allowable load is typically limited to an average test load at ⅛" deflection, or 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 AISI S100.

c. To achieve the loads shown in this catalog, the Designer must verify that the self-drilling screws used for connector installation have P_{SS}/Ω and P_{ts}/Ω values greater than or equal to the values given in the table, Minimum ASD Loads for Screws (lb.), per p. 22 of this catalog.

d. 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 connector. The number of terms that must be considered for simultaneous loading is at the sole discretion of the Designer and is dependent on their method of calculating wind forces and the utilization of the connector within the structural system.

e. 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.

f. All connected members and related elements shall be designed by the Designer.

g. Unless otherwise noted, member strength is not considered in the loads given and, therefore, one should reduce allowable loads when member strength is limiting.

h. The average ultimate breaking strength for some models is listed under "nominal tension load".

i. Simpson Strong-Tie 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."

j. Verify that the dimensions of the supporting member are sufficient to receive the specified fasteners, and develop the top flange bearing length.

k. Simpson Strong-Tie will provide, upon request, code testing data on all products that have been code tested.

l. Most of 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 AISI S100. When designing with LRFD, the nominal connector strength multiplied by the resistance factor must be used. If not listed or noted in a table footnote, contact Simpson Strong-Tie for the LRFD values of products listed in this catalog.

m. All steel-to-steel connector screws must comply with ASTM C1513.

n. Screw strength shall be calculated in accordance to AISI S100 Section E4 or shall be based upon the manufacturer's design capacity determined from testing.

o. Simpson Strong-Tie recommends that hanger height be at least 60% of joist height for stability against rotation while under construction prior to sheathing install.

p. 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 Strong-Tie products do not require special inspection.

q. When connectors are attached to two CFS members of different thicknesses, the Designer shall use the thinner of the two members for selecting allowable loads.

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SIMPSON Strong-Tie®

Additional Important Information and 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® products and must be followed fully.

a. 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. The section from the AC13 criteria indicating the range of specific gravity reads as follows: 3.2.3 The species of lumber used shall have a specific gravity not greater than 0.55 as determined in accordance with the NDS. This chart shows specific gravity and perpendicular to grain compression capacities for the different wood species:

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	650 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

b. For face-mount hangers and straight straps, use 0.86 of Douglas-Fir table loads for Spruce-Pine-Fir.

c. 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 0.75 of the nail diameter (2015 NDS 12.1.5.3).

d. 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 Strong-Tie manufactures products to fit common dry lumber dimensions. If you need a connector with dimensions other than those listed in this catalog, Simpson Strong-Tie may be able to vary connector dimensions; contact Simpson Strong-Tie. 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.

e. Top flange hangers may cause unevenness. Possible remedies should be evaluated by a professional and include using a face mount hanger, and notching the beam or cutting the subfloor to accommodate the top flange thickness.

f. 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.

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

a. Bolt holes into wood members shall be at least a minimum of 1⁄32" and no more than a maximum of 1⁄16" larger than the bolt diameter (per the 2015 NDS 12.1.3.2 and AISI S100 Table E3a, if applicable).

b. Joist shall bear completely on the connector seat, and the gap between the joist end and the header shall not exceed ⅛" per ICC-ES AC261, ASTM D1761 and ASTM D7147 test standards (unless specifically noted otherwise).

c. For holdowns, anchor bolt nuts should be finger-tight plus ⅓ to ½ turn with a hand wrench, with consideration given to possible future wood shrinkage. Care should be taken to not over-torque the nut and impact wrenches should not be used. This may preload the holdown.

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Important Information and General Notes

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

a. Loads are based on the AISI S100 and the 2015 AF National Design Specifications (NDS), unless otherwise specified. Other code agencies may use different methodologies.

Duration of load adjustments for fasteners into wood as specified by the code are as follows:

Do not alter installation procedures from those set forth in this catalog.
"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" (160) — 160% of design load for earthquake/wind loading.

b. 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.

c. Most of 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 AISI S100. When designing with LRFD, the nominal connector strength multiplied by the resistance factor must be used. If not listed or noted in a table footnote, contact Simpson Strong-Tie for the LRFD values of products listed in this catalog. A method for using Load and Resistance Factor Design (LRFD) for wood has been published in ASTM D5457. For more information, refer to the 2015 NDS Appendix N, which contains a conversion procedure that can be used to derive LRFD capacities. When designing with LRFD, reference lateral resistances must be used.

d. Pneumatic or powder-actuated fasteners may deflect and injure the operator or others. Unless otherwise noted, 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 Strong-Tie as needed.

General Information

Additional Important Information and General Notes for Allowable Anchorage Load Tables for SCB / MSCB, SC, SCW, SSB, FCB, FC and FSB Connectors

1. Allowable loads for #12–24 self-drilling screws and PDPAT powder-actuated fasteners are based on installation in minimum 3⁄16" thick structural steel with F_y = 36 ksi. It is the responsibility of the Designer to select the proper length fasteners based on the installation.
2. Allowable loads for Simpson Strong-Tie® PDPAT-62KP powder-actuated "tophat" fasteners also apply to alternate fasteners with a minimum shank 0.157", a minimum head diameter of 0.300", a minimum allowable shear of 410 lb. and tension strength of 260 lb. for A36 steel, and a minimum allowable shear of 420 lb. and tension strength of 305 lb. for A572 or A992 steel per ESR-2138. "Tophat" fasteners are recommended to ensure adequate clamping force and consistent installations.
3. Allowable loads for Simpson Strong-Tie Titen® screws are based on installation in concrete with a minimum f'_c = 2,500 psi and a maximum f'_c = 4,000 psi. Reference the current *Anchoring and Fastening Systems for Concrete and Masonry* catalog for more information about Titen screws.
4. Allowable loads for welded connections require E70XX electrodes with a minimum throat size equal to the clip thickness. Welding shall be in compliance with AWS D1.3. Welding galvanized steel may produce harmful fumes; follow proper welding procedures and precautions.
5. Allowable loads are for anchorage only. It is the responsibility of the Designer to verify the strength and stability of the structure for the loads imposed by the cold-formed steel framing connections.

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Important Information and 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 when properly specified, installed and maintained. This warranty does not apply to uses not in compliance with specific applications and installations 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 impact events such as earthquakes and high-velocity winds. Other Simpson Strong-Tie products are designed to the load capacities and uses listed in this catalog. Properly-installed Simpson Strong-Tie products will perform in accordance with the specifications set forth in the applicable Simpson Strong-Tie catalog. Additional performance limitations for specific products may be listed on the applicable catalog pages.

Due to the particular characteristics of potential impact events, 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 impact event do not exceed Simpson Strong-Tie 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 strongtie.com for current information.

Terms and 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 installations should only be made by a qualified Designer. The performance of such modified products or altered installations is the sole responsibility of the Designer.

Indemnity

Customers or Designers modifying products or installations, 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

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	6,895 Pa

Bolt Diameter

in.	mm
⅜	9.5
½	12.7
⅝	15.9
¾	19.1
⅞	22.2
1	25.4

If Common Rafter Roof Pitch is... / **Then Hip/Valley Rafter Roof Pitch becomes...**

Rise/Run	Slope	Rise/Run	Slope
1/12	5°	1/17	3°
2/12	10°	2/17	7°
3/12	14°	3/17	10°
4/12	18°	4/17	13°
5/12	23°	5/17	16°
6/12	27°	6/17	19°
7/12	30°	7/17	22°
8/12	34°	8/17	25°
9/12	37°	9/17	28°
10/12	40°	10/17	30°
11/12	42°	11/17	33°
12/12	45°	12/17	35°

Use these Roof Pitch to Hip/Valley Rafter Roof Pitch conversion tables only for hip/valley rafters that are skewed 45° right or left. All other skews will cause the slope to change from that listed.

US Standard Steel Gauge Equivalents in Nominal Dimensions

Min. Thick.	Design Thick.	Ref. Ga.[2]	Thickness of Steel Sheets (in.)		
mil	in.		Uncoated Steel	Galvanized Steel (G90)	ZMAX® (G185)
229	0.2405	3	0.239	—	—
171	0.1795	7	0.179	0.186	—
118	0.1240	10	0.134	0.138	0.140
111	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

1. Steel thickness may vary according to industry mill standards.
2. Gauge numbers shown are for reference only.

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Understanding the Corrosion Issue

Many environments and materials can cause corrosion, including ocean salt air, fire retardants, fumes, fertilizers, preservative-treated wood, de-icing salts, dissimilar metals and more. Metal connectors, fasteners and anchors could corrode and lose load-carrying capacity when installed in corrosive environments or when installed in contact with corrosive materials.

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

It is common to see some corrosion in outdoor applications. Even stainless steel can corrode. The presence of some corrosion does not mean that load capacity has been affected or that failure is imminent. If significant corrosion is apparent or suspected, then the framing members, fasteners and connectors should be inspected by a qualified engineer or qualified inspector. Replacement of affected components may be appropriate.

Some wood-preservative chemicals and fire-retardant chemicals and retentions pose increased corrosion potential and are more corrosive to steel connectors and fasteners than others. Testing by Simpson Strong-Tie has shown that ACQ-Type D is more corrosive than Copper Azole Type C, Micronized Copper Azole and CCA-C. At the same time, others have shown that the inorganic boron treatment chemicals, specifically SBX-DOT, are less corrosive than CCA-C.

Due to the many different chemical treatment formulations, chemical retention levels, moisture conditions and regional formulation variants, selection of fasteners 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 (**strongtie.com/info**) and also by reviewing information, literature and evaluation reports published by others.

Galvanic Corrosion

Galvanic corrosion occurs when two electrochemically dissimilar metals contact each other in the presence of an electrolyte (such as water) that acts as a conductive path for metal ions to move from the more anodic to the more cathodic metal. In the galvanic couple, the more anodic metal will corrode preferentially. The Galvanic Series of Metals table provides a qualitative guide to the potential for two metals to interact galvanically. Metals in the same group (see table) have similar electrochemical potentials. The farther the metals are apart on the table, the greater the difference in electrochemical potential, and the more rapidly galvanic corrosion will occur. Corrosion also increases with increasing conductivity of the electrolyte.

Good detailing practice, including the following, can help reduce the possibility of galvanic corrosion of fasteners:

- Use fasteners and metals with similar electrochemical properties
- Separate dissimilar metals with insulating materials
- Ensure that the fastener is the cathode when dissimilar metals are present
- Prevent exposure to and pooling of electrolytes

Galvanic Series of Metals

Corroded End (Anode)
Magnesium, Magnesium alloys, Zinc
Aluminum 1100, Cadmium, Aluminum 2024-T4, Iron and Steel
Lead, Tin, Nickel (active), Inconel Ni-Cr alloy (active), Hastelloy alloy C (active)
Brasses, Copper, Cu-Ni alloys, Monel
Nickel (passive)
304 stainless steel (passive), 316 stainless steel (passive), Hasteloy alloy C (passive)
Silver, Titanium, Graphite, Gold, Platinum
Protected End (Cathode)

Hydrogen-Assisted Stress-Corrosion Cracking

Some hardened fasteners may experience premature failure if exposed to moisture as a result of hydrogen-assisted stress-corrosion cracking. These fasteners are recommended specifically for use in dry, interior locations.

Treatment Use Categories and Exposure Conditions

The American Wood Protection Association (AWPA) identifies 12 Use Category designations (UC) for wood treatment chemicals that are based on protection of the wood material; the Use Categories are based on service conditions and environments and agents of deterioration. At the same time, the building codes require specific corrosion resistance for connectors and fasteners that are in contact with chemically-treated wood, and the corrosion resistance is independent of the service environments and treatments that are the basis of the AWPA Use Categories. From the building code perspective, fastener corrosion resistance is provided by hot-dip galvanization applied following ASTM A153, Class D, or by a corrosion-resistant base metal, such as stainless steel, silicon bronze or copper, regardless of exposure. Connectors in contact with preservative-treated wood require a minimum of ASTM A653, Type G185 zinc-coated galvanized steel, or equivalent.

Some exceptions are provided in the International Code Council's (ICC) International Residential Code (IRC) for mechanical galvanization applied to screws. The International Building Code (IBC) has exceptions for plain carbon steel fasteners, nuts and washers in SBX/DOT and zinc borate preservative-treated wood in interior, dry environments.

The International Code Council – Evaluation Service (ICC-ES) implemented AC257 as a method to evaluate alternate corrosion resistance mechanisms for fasteners used in wood construction where hot-dip galvanization (ASTM A153, Class D) is used as the benchmark performance. Under AC257, fastener corrosion resistance is qualified for one or more of four exposure conditions with no salt exposure: (1) treated wood in dry service; (2) clean wood in a salt air dry-service environment; (3) treated wood in a wet-service condition with no salt exposure; and (4) general use with no limitations.

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Corrosion Information

Coatings Available

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

Finish/Material	Description	Level of Corrosion Resistance
Connectors		
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
Galvanized	Standard (G90) zinc-galvanized coating containing 0.90 oz. of zinc per square foot of surface area (total both sides).	Low
ZMAX® G185	Galvanized (G185) 1.85 oz. of zinc per square foot of surface area (hot-dip galvanized per ASTM A653 total both sides). These products require hot-dip galvanized fasteners (fasteners which meet the specifications of ASTM A153). Products with a powder-coat finish over a ZMAX base have the same level of corrosion resistance.	Medium
HOT DIP HDG GALVANIZED®	Products are hot-dip galvanized after fabrication (14 ga. and thicker). The coating weight increases with material thickness. The minimum average coating weight is 2.0 oz./ft.^{2} (per ASTM A123 total both sides). These products require hot-dip galvanized fasteners (fasteners which meet the specifications of ASTM A153). Anchor bolts are hot-dip galvanized per ASTM F2329.	Medium
316 Stainless Steel Type 316L Stainless Steel	Type 316L stainless steel is a nickel-chromium austenitic grade of stainless steel with 2-3% Molybdenum. Type 316L stainless steel is not hardened by heat treatment and is inherently nonmagnetic. It provides a level of corrosion protection suitable for severe environments, especially environments with chlorides. Type 316L stainless-steel fasteners are compliant with the 2012 and 2015 IBC and IRC.	High/Severe
Fasteners		
Electrocoating (E-Coat™)	Electrocoating utilizes electrical current to deposit the coating material on the fastener. After application, the coating is cured in an oven. Electrocoating provides a minimum amount of corrosion protection and is recommended for dry, non-corrosive applications only.	Low
Type 410 Stainless Steel with Protective Top Coat	Carbon martensitic grade of stainless steel which is inherently magnetic, with an added protective top coat. This material can be used in mild atmospheres and many mild chemical environments.	Medium
Mechanically Galvanized Coating, Class 55	Simpson Strong-Tie® Strong-Drive® SD Connector screws are manufactured with a mechanically-applied zinc coating in accordance with ASTM B695, Class 55 with a supplemental overcoat. These fasteners are compatible with painted and zinc-coated (G90 and ZMAX) connectors.	Medium
Double-Barrier Coating	Simpson Strong-Tie Strong-Drive SDS Heavy-Duty Connector screws are manufactured with two different finishes that together provide a level of corrosion protection that equals that provided by the previous HDG coating.	Medium
HOT DIP HDG GALVANIZED® ASTM A153, Class C	Simpson Strong-Tie Strong-Drive Timber-Hex screws are hot-dip galvanized in accordance with ASTM A153, Class C. Hot-dip galvanized fasteners have a minimum average of 1.25 oz./ft.^{2} of zinc coating. Hot-dip galvanized fasteners are compliant with the 2012 and 2015 IRC (R317.3) and IBC.	High/Severe

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

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Corrosion Information

SIMPSON Strong-Tie®

Simpson Strong-Tie General Recommendations

Simpson Strong-Tie has evaluated the AWPA (American Wood Protection Association) Use Categories (AWPA U1-16) and the ICC-ES, AC257 Exposure Conditions and developed from that evaluation a set of Corrosion Resistance Recommendations. These recommendations address the coating systems and materials used by Simpson Strong-Tie for connector and fastener products.

Dry-service (or damp-service) environments lead to wood moisture contents less than or equal to 19%. The corrosion potential, even in chemically-treated wood, is reduced in these conditions. These conditions are typical of AWPA UC1 and UC2 for wood treatment and AC257 Exposure Condition 1. See the Corrosion Resistance Classification Table for the Simpson Strong-Tie assessment of corrosion needs in these conditions. The AC257 Exposure Condition 2 reflects the presence of air-borne salt in a dry-service environment and corrosion hazard to exposed metal surfaces; it does not include effects of treatment chemicals.

Outdoor environments are generally more corrosive to steel either because the moisture exposure is elevated (greater than 19%) and/or the treatment chemical-retention level is higher than for interior service. The AWPA classifies exterior above-ground treatments as Use Categories UC3 (A and B) depending on moisture run-off; and for ground-contact levels of protection, it has Use Categories UC4 (A-C). ICC-ES considers the exterior exposure to be limited by the type of chemicals and retention level of the chemicals in the qualification testing and whether the exposure includes salt exposure. In general, The AC257 Exposure Condition 3 includes AWPA Use Categories UC1 (interior dry) to UC4A (exterior ground contact, general use).

Types 316/305/304 stainless steel, copper, silicon bronze and hot-dip galvanized (Class-C) are the most effective protection against corrosion risk, where Type 316 is the best choice for salt marine and chloride-containing environments regardless of treatment chemicals or wood species. If you choose to use hot-dip galvanized (Class-D), mechanically-galvanized (C3, N2000, or Class 55), double-barrier or Quik Guard® coated fasteners on outdoor projects (e.g., a deck), you should periodically inspect the fasteners or have a professional inspection performed, and regular maintenance is a good practice. See the Corrosion Resistance Classifications Table for the Simpson Strong-Tie assessment of the corrosion resistance associated with materials and coatings and an appropriate level of corrosion resistance for various environments.

Due to the many variables involved, Simpson Strong-Tie cannot provide estimates of service life of connectors and fasteners. We suggest that all users and specifiers obtain recommendations on corrosion from the treated wood supplier or for the type of wood used. As long as Simpson Strong-Tie recommendations are followed, Simpson Strong-Tie stands behind its product performance and our standard warranty applies (p. 17).

Simpson Strong-Tie does not recommend painting stainless-steel fasteners or hardware. The reason behind this recommendation is that sometimes painting can facilitate corrosion. Stainless steel is "stainless" because it forms a protective chromium oxide film on the surface by passive oxidation with air. The paint film on the stainless steel surface may be imperfect or it can be injured during service, and in either case the metal may be exposed. Microscopic-sized film imperfections and scratches facilitate collection of dirt and water that can be stagnant and degrade or block the passive formation of the protective chromium oxide film. When this happens, crevice corrosion can initiate. Crevice corrosion eventually becomes visible as a brown stain or as red rust. This is the reason that painting usually does not improve corrosion resistance of stainless steel.

Guidelines for Selecting Corrosion-Resistant Connectors and Fasteners

Evaluate the Application

Consider the importance of the connection.

Evaluate the Exposure

Consider these moisture and treatment chemical exposure conditions:

- **Dry Service:** Generally interior applications and includes wall and ceiling cavities, raised floor applications in enclosed buildings that have been designed to prevent condensation and exposure to other sources of moisture. Prolonged exposure during construction should also be considered, as this may constitute a Wet Service or Elevated Service Condition.
- **Wet Service:** Generally exterior construction in conditions other than Elevated Service. These include Exterior Protected and Exposed and General Use Ground Contact as described by the AWPA UC4A.
- **Elevated Service:** Includes fumes, fertilizers, soil, some preservative-treated wood (AWPA UC4B and UC4C), industrial zones, acid rain and other corrosive elements.
- **Uncertain:** Unknown exposure, materials or treatment chemicals.
- **Ocean/Water Front:** Marine environments that include airborne chlorides and some splash. Environments with de-icing salts are included.
- **Treatment Chemicals:** See AWPA Use Category Designations. The preservative-treated wood supplier should provide all of the pertinent information about the wood being used. The information should include Use Category Designation, wood species group, wood treatment chemical and chemical retention. See appropriate evaluation reports for corrosion effects of treatment chemicals and fastener corrosion resistance recommendations.
- **Fire-Retardant-Treated (FRT) Wood:** Metal connectors in contact with FRT wood in dry service applications may generally be uncoated, painted or galvanized G90 zinc-coated steel. Refer to the FRT wood manufacturer's recommendations for fastener and connector protection requirements. The 2015 IBC Section 2304.10.5.4 and 2015 IRC Section R317.3.4 refer to the manufacturer's recommendations for fastener corrosion requirements. In the absence of recommendations from the manufacturer, the code requires fasteners to be hot-dip galvanized, stainless steel, silicon bronze or copper. Fastener shear and withdrawal allowable loads may be reduced in FRT lumber. Refer to the FRT manufacturer's evaluation report for reduction factors.

Use the Simpson Strong-Tie® Corrosion Classification Table

If the treatment chemical information is incomplete, Simpson Strong-Tie recommends the use of a 300-series stainless-steel product. If the treatment chemical is not shown in the Corrosion Classification Table, then Simpson Strong-Tie has not evaluated it and cannot make any recommendations other than the use of coatings and materials in the Severe category. Manufacturers may independently provide test results of other product information; Simpson Strong-Tie expresses no opinion regarding such information.

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Corrosion Information

Corrosion Resistance Recommendations

Low	Medium	High	Severe
Fasteners			
Phosphate (gray, black), Clear (bright) zinc (ASTM F1941), Heavy electro-galvanized (ASTM A641 – Class 1), Yellow zinc (ASTM F1941), Electrocoat (E-Coat™), Type 410 stainless steel	Mechanically galvanized (AS 3566.2-C3, N2000, ASTM B695 – Class 55), Quik Guard® coating, Hot-dip galvanized (ASTM A153 – Class D), Double-barrier coating, Type 410 stainless steel with protective top coat	Type 304 stainless steel, Type 305 stainless steel	Type 316 stainless steel, Hot-dip galvanized (ASTM A153 – Class C), Silicon bronze, Copper
Connectors			
Simpson Strong-Tie® gray paint, Powder coating, Standard G90 zinc coating	ZMAX® (G185) Hot-dip galvanized (ASTM A123)	Type 316L stainless steel	Type 316L stainless steel

Corrosion Resistance Classifications

Environment	Material to Be Fastened						
	Untreated Wood or Other Material	Preservative-Treated Wood					FRT Wood[9]
		SBX-DOT Zinc Borate	Chemical Retention ≤ AWPA, UC4A	Chemical Retention > AWPA, UC4A	ACZA	Other or Uncertain	
Dry Service	Low	Low	Low	High	Med	High	Med
Wet Service	Med	N/A	Med	High	High	High	High
Elevated Service	High	N/A	Severe	Severe	High	Severe	N/A
Uncertain	High	High	High	Severe	High	Severe	Severe
Ocean/Water Front	Severe	N/A	Severe	Severe	Severe	Severe	N/A

1. These are general guidelines that may not consider all application criteria. Refer to product-specific information for additional guidance.
2. Type 316/305/304 stainless-steel products are recommended where preservative-treated wood used in ground contact has a chemical retention level greater than those for AWPA UC4A; CA-C, 0.15 pcf; CA-B, 0.21 pcf; micronized CA-C, 0.14 pcf; micronized CA-B, 0.15 pcf; ACQ-Type D (or C), 0.40 pcf.
3. Testing by Simpson Strong-Tie following ICC-ES AC257 showed that mechanical galvanization (ASTM B695, Class 55), Quik Guard® coating and double-barrier coating will provide corrosion resistance equivalent to hot-dip galvanization (ASTM A153, Class D) in contact with chemically-treated wood in dry-service and wet-service exposures (AWPA UC1-UC4A, ICC-ES AC257 Exposure Conditions 1 and 3) and will perform adequately subject to regular maintenance and periodic inspection.
4. Mechanical galvanizations C3 and N2000 should not be used in conditions that would be more corrosive than AWPA UC3A (exterior, above ground, rapid water run off).
5. If uncertain about Use Category, treatment chemical or environment, use Types 316/305/304 stainless steel, silicon bronze or copper.
6. Some treated wood may have excess surface chemicals making it potentially more corrosive than wood with lower retentions. If this condition is suspected, use Type 316/305/304 stainless steel, silicon bronze or copper fasteners.
7. Type 316 stainless-steel, silicon bronze and copper fasteners are the best recommendation for ocean-salt air and other chloride-containing environments. Hot-dip galvanized fasteners with at least ASTM A153, Class C protection can also be an alternative for some applications in environments with ocean air and/or elevated wood moisture content.
8. Some woods, such as cedars, redwood and oak, contain water-soluble tannins and are more susceptible to staining when in contact with metal connectors and fasteners. According to the California Redwood Association (**calredwood.org**), applying a quality finish to all surfaces of the wood prior to installation can help reduce the amount of staining, which in redwood, for example, is caused by surface tannins leaching out during rains.
9. Fasteners in contact with FRT lumber shall be hot-dip galvanized, stainless steel, silicon bronze or copper unless recommended otherwise by the FRT manufacturer. Some FRT manufacturers permit low-resistant finishes for interior dry conditions. Fastener shear and withdrawal capacities may be reduced in FRT lumber. Refer to the FRT manufacturer's code report for reduction factors.

Interior Dry

Exterior

Severe

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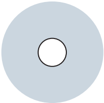
Fastening Information

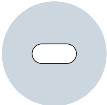
SIMPSON Strong-Tie®



Round Holes

Purpose:
To fasten a connector.

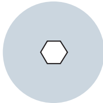
Fill Requirements:
Always fill, unless noted otherwise.



Obround Holes

Purpose:
To make fastening a connector in a tight location easier.

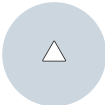
Fill Requirements:
Always fill.



Hexagonal Holes

Purpose:
To fasten a connector to concrete or masonry.

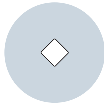
Fill Requirements:
Always fill when fastening a connector to concrete or masonry.



Triangular Holes

Purpose:
To increase a connector's strength or to achieve max. strength.

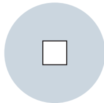
Fill Requirements:
When the Designer specifies max. nailing.



Diamond Holes

Purpose:
To temporarily fasten a connector to make installing it easier.

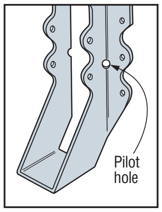
Fill Requirements:
None.



Square Holes

Purpose:
To provide fastening option for unique custom designs

Fill Requirements:
Only when specified by Designer.



Pilot Holes

Tooling holes for manufacturing purposes. No fasteners required.

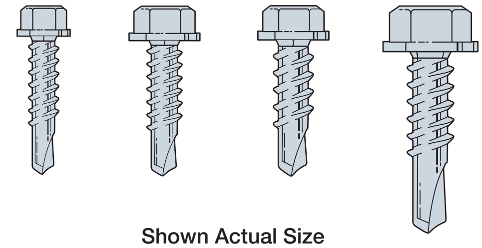
To achieve the loads shown in this catalog, the Designer must verify that the self-drilling screws used for connector installation have P_{ss}/Ω and P_{ts}/Ω values greater than or equal to the values tabulated in this table.

Hex head screws shown are required for connectors in this catalog. Where sheathing or finishes will be applied over the screws and low-profile heads are needed (such as with bracing connectors, hurricane ties and stud-plate ties), the Designer is to ensure that the minimum screw head diameter complies with ASME B18.6.4.

Minimum ASD Loads for Screws (lb.)

Screw No. Designation	Nominal Diameter d (in.)	Washer Diameter dw (in.)	Allowable Screw Shear Strength (P_{ss}/Ω)	Allowable Shear Connection Strength (P_{ns}/Ω, P_{ss}/Ω) Steel Thickness mil (ga.)					Allowable Screw Tension Strength (P_{ts}/Ω)	Allowable Tensile Pull-Out Strength (P_{not}/Ω, P_{ts}/Ω) Steel Thickness mil (ga.)				
				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)
#8	0.164	0.318	470	150	235	335	335	335	605	70	95	170	215	305
#10	0.190	0.375	540	165	255	510	540	540	820	75	110	200	250	355
#12	0.216	0.375	840	175	260	545	730	755	845	75	110	215	285	405
#14	0.242	0.500	1,045	180	285	555	795	825	1,220	85	120	215	295	455

1. Allowable loads are per AISI S-100 and are for use when utilizing the traditional Allowable Stress Design methodology. The tabulated loads may be multiplied by a Factor of Safety (Ω) of 3 to determine the screw nominal strength. The LRFD load may be determined by multiplying the nominal screw load by a Resistance Factor (ϕ) of 0.50.
2. Allowable loads may not be increased for wind or seismic load unless otherwise noted.
3. Allowable loads are based on cold-formed steel members with a minimum yield strength, F_y, of 33 ksi and tensile strength, F_u, of 45 ksi for 43 mil (18 ga.) and thinner, and a minimum yield strength of 50 ksi and tensile strength of 65 ksi for 54 mil (16 ga.) and thicker.
4. Allowable loads are based on design steel thickness for 33 mil = 0.0346", 43 mil = 0.0451", 54 mil = 0.0566", 68 mil = 0.0713", and 97 mil = 0.1017" per AISI S201 Product Data, Table B2-1.
5. Self-drilling tapping screw fasteners for steel-to-steel connections used for connectors in this catalog shall be in compliance with ASTM C1513.
6. Minimum required screw length is the greater of ¾" and the minimum length required for the screw to extend through the steel connection a minimum of (3) exposed threads per AISI S200-12 General Provisions Standard, Sect. D1.3.
7. Screw diameters per AISI S200-12 Commentary Table C-E4-1.
8. Size ¼"-diameter self-tapping screws may be substituted for #14 screws.



Shown Actual Size

See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.

Screw Suitability

Screw Point Type	Screw Size	Maximum Material Thickness[1,2] (in.)	(mm)
#2	#6	0.100	2.54
	#8	0.100	2.54
	#10	0.100	2.54
#3	#7	0.125	3.18
	#8	0.140	3.56
	#10	0.175	4.45
	#12	0.210	5.33
	#14	0.220	5.59
#4	#12	0.250	6.35
	#14	0.250	6.35
#5	#12	0.500	12.70
	#14	0.500	12.70

1. Total thickness of all steel, including any spacing between layers.
2. Drill and tap capacities may vary.
3. Table is guideline only; see individual product for specific maximum material thickness.

CFS Framing Member

Mil	Gauge	Design Thickness (in.)	(mm)	Minimum Thickness (in.)	(mm)
18	25	0.0188	0.48	0.0179	0.45
27	22	0.0283	0.72	0.0269	0.68
30	20 (drywall)	0.0312	0.79	0.0296	0.75
33	20 (structural)	0.0346	0.88	0.0329	0.84
43	18	0.0451	1.14	0.0428	1.09
54	16	0.0566	1.44	0.0538	1.37
68	14	0.0713	1.81	0.0677	1.72
97	12	0.1017	2.58	0.0966	2.45

1. One "mil" is 1⁄1000 (0.001) of an inch. Mil thickness measures the uncoated base material.

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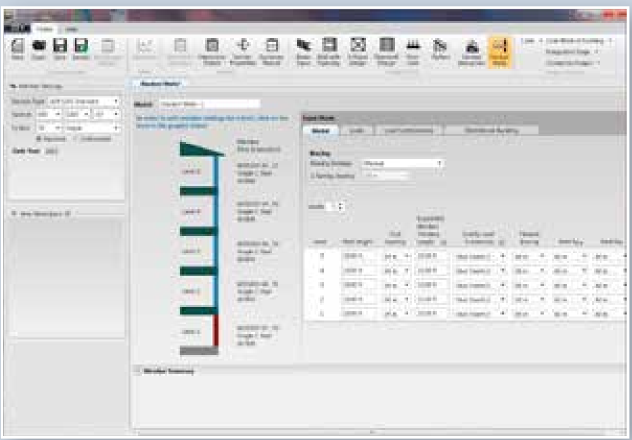
SIMPSON Strong-Tie®

GET THERE QUICKER!

With Simpson Strong-Tie® CFS Designer™ Software

New for 2017 – CFS Designer Version V2.0!

CFS Designer V2.0 now includes a module that empowers users to design multi-story load-bearing wall systems. With this new time-saving feature engineers can design up to 8-stories of wall framing in a matter of minutes. The design tool automates the bookkeeping for transferring loads from one level to another, and it also checks up to ten different load combinations for each stud.



Stacked walls design module automates load-bearing framing for platform and ledger framing

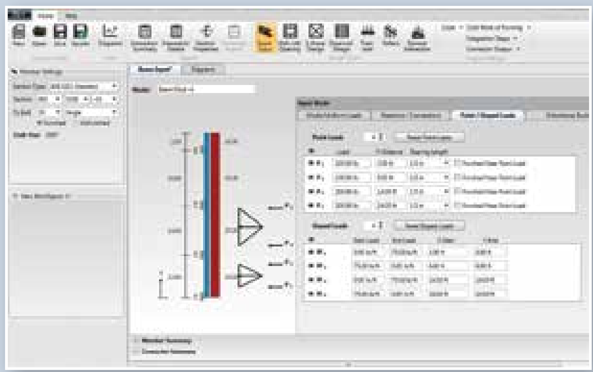
Additional Key Features:

- Enables input of a complicated array of axial loads, distributed loads, sloped loads, and point loads.
- Supports 2012, 2010, 2007 and 2004 AISI Specifications
- Member design includes single stud and track sections, z-sections, box-sections, I-Sections, built-up stud and track sections, and HSS sections per AISC 13th Edition.
- Automates the selection of Simpson Strong-Tie SUBH bridging connectors, and SCB, SCW, SSB, and FCB curtain-wall connectors.

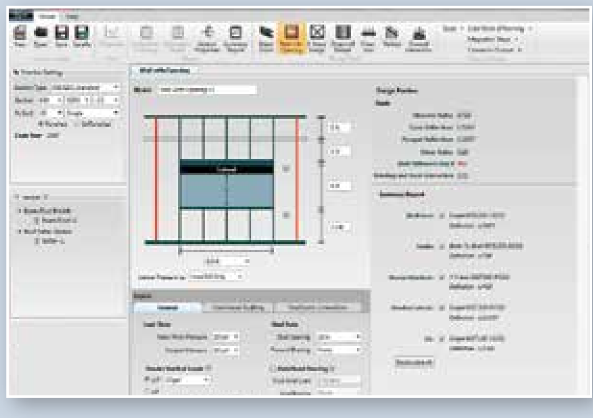
Please visit strongtie.com/cfsdesigner to:

- View complete system features
- Compare to LGBEAMER™ software
- Test drive the demo version
- View release notes
- Purchase and download CFS Designer™ software

Efficient, accurate, AISI-compliant design of cold-formed steel (CFS) structures is made possible by Simpson Strong-Tie® CFS Designer™ software. Powerful design tools automate common CFS systems, complicated AISI design provisions, complex loading scenarios and more. A modern development platform and intuitive user interface enable fast input and simplify file management, as multiple systems can be saved within a single job file. Output is generated in PDF files that can be saved separately, if needed.



Beam-column design tool models up to 3-span beams with overhangs at each end



Design automation tools for framed wall openings, x-braced and sheathed shearwalls, floor joists, rafters and stacked walls

System Requirements

1. Microsoft Windows® 2003 or newer
2. Microsoft .NET Framework 4.0 Client Profile
3. Adobe Reader 9.0
4. Display Resolution 1280 x 768

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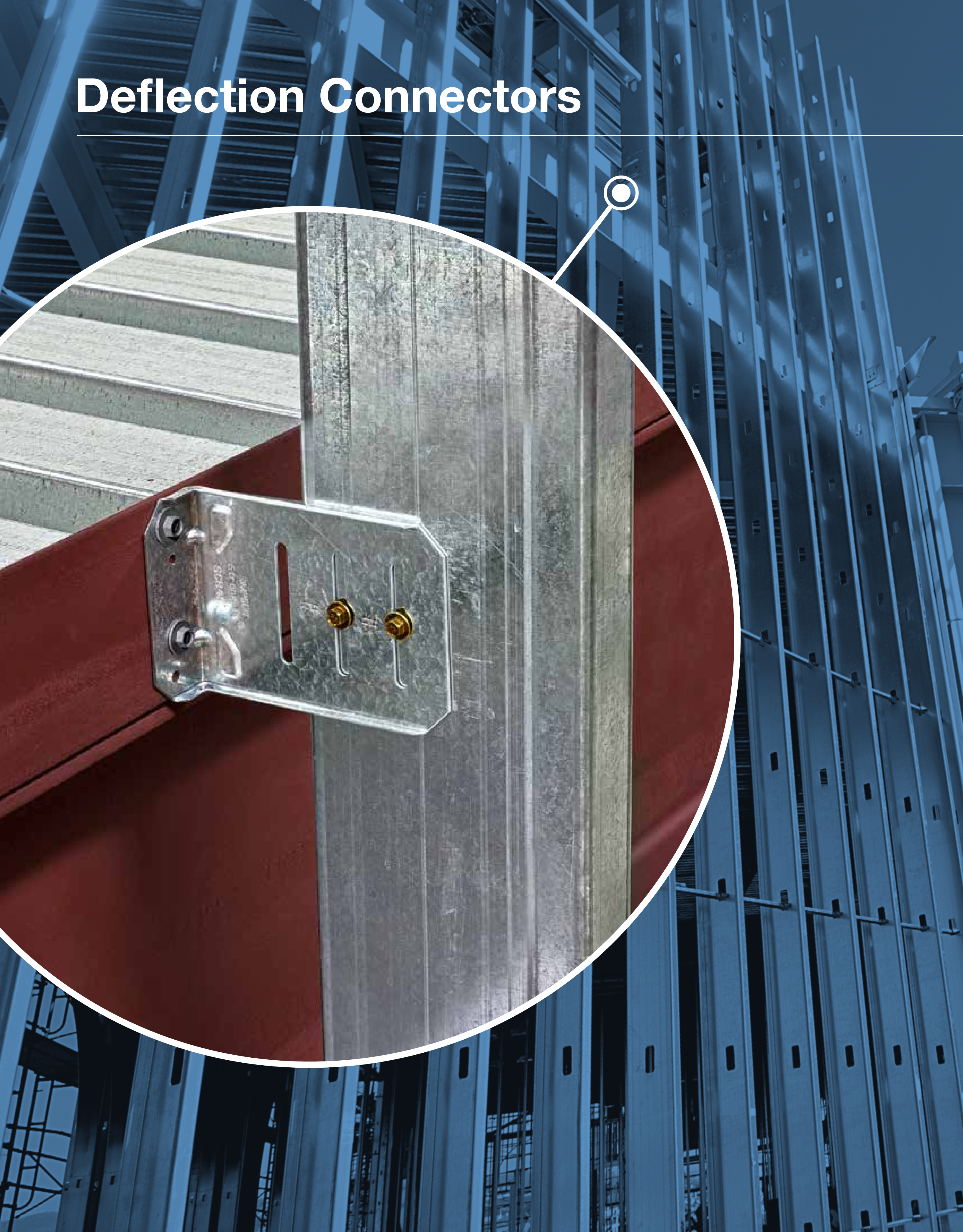
Deflection Connectors



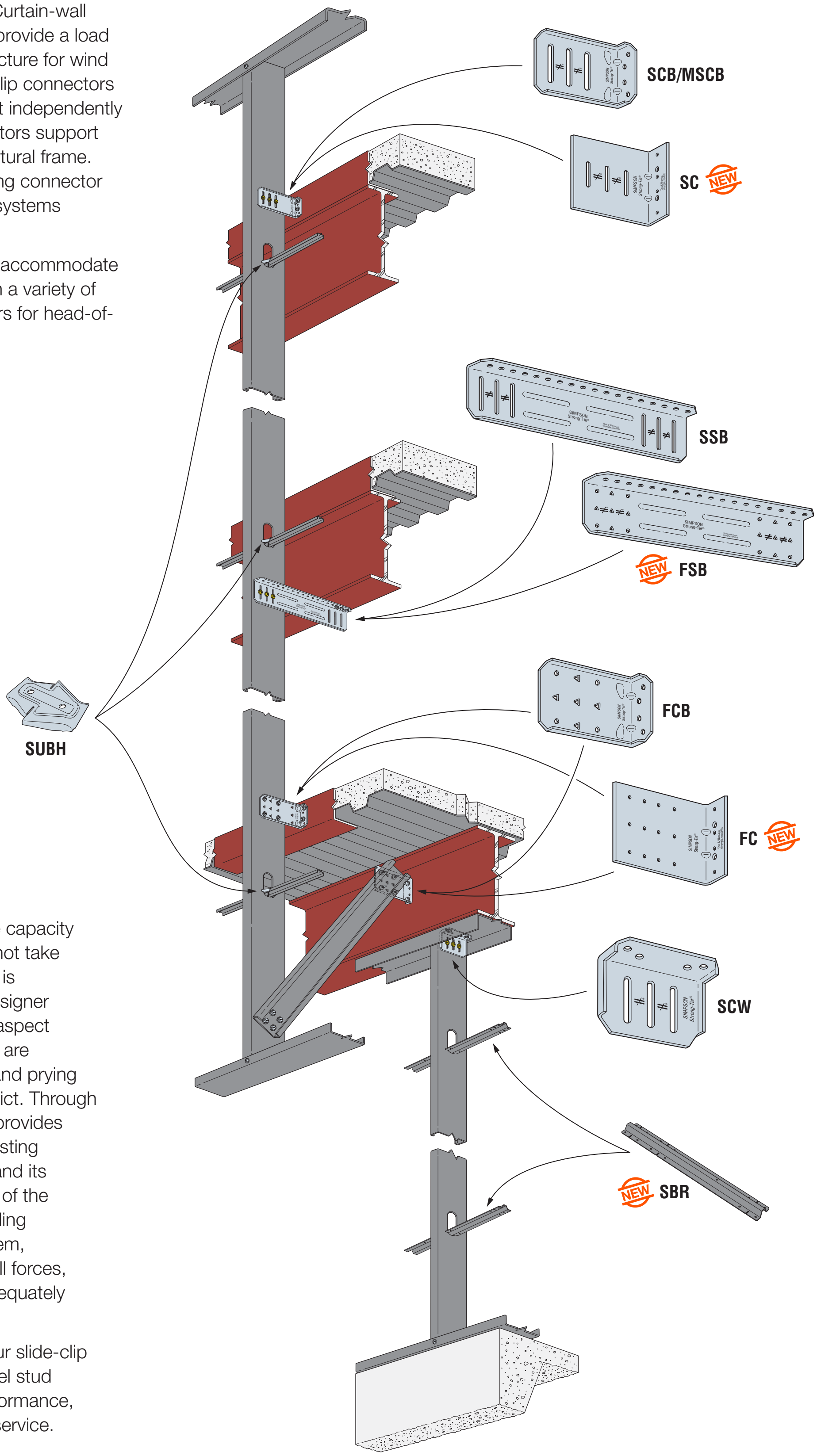
Innovative Solutions for Curtain-Wall Framing

Simpson Strong-Tie has developed a line of connectors for use with curtain-wall steel stud framing. Curtain-wall projects require a variety of connectors that provide a load path from the curtain wall to the primary structure for wind loads, seismic loads and dead loads. Slide-clip connectors enable the structural building frame to deflect independently of the curtain-wall system. Fixed-clip connectors support the dead load of a curtain wall from the structural frame. Fixed clips have the added benefit of providing connector solutions for load-bearing walls and for roof systems utilizing steel trusses and rafters.

Our connectors for curtain-wall construction accommodate many different bypass framing applications in a variety of stand-off conditions. We also offer connectors for head-of-wall and strut applications.

Tailored to Your Design

Our standard slide clips accommodate either ¾" or 1" of both upward and downward movement, equivalent to an L/360 live-load deflection for a 30' span. Our standard clips also accommodate stand-offs as large as 12¼". For deflections greater than 1", or stand-offs greater than 12¼", Simpson Strong-Tie can provide custom clips to suit most framing needs (see p. 56).



Complete, Tested Solutions

Designers of curtain walls will often know the capacity of a connector, but since the capacity does not take into account the way in which the connector is anchored to the supporting structure, the Designer must then manually calculate this important aspect of the connection design. These calculations are complicated by considerations of eccentric and prying forces that often exist but are difficult to predict. Through comprehensive testing Simpson Strong-Tie provides total, code-listed connector solutions. Our testing extends from the capacity of the connector and its attachment to the framing, to the anchorage of the connector to the primary structure. By providing complete data on the entire connection system, we save the Designer time and ensure that all forces, including eccentric and prying forces, are adequately considered.

As with all Simpson Strong-Tie® products, our slide-clip and fixed-clip connectors for curtain-wall steel stud framing carry our promise of quality and performance, and are backed by prompt, knowledgeable service.

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SCB/MSCB Bypass Framing Slide-Clip Connector

SIMPSON Strong-Tie®

This product is preferable to similar connectors because of a) easier installation, b) higher loads, c) lower installed cost, or a combination of these features.

The SCB/MSCB slide-clip connectors are high-performance connectors for bypass framing applications designed to reduce design time and overall installed cost. Various anchorage methods have been tested, and the resulting allowable loads eliminate the need to design connector anchorage. The SCB/MSCB can accommodate applications that typically require two parts with a single connector, reducing material and labor cost. These connectors are manufactured in five different lengths to accommodate a variety of stand-off conditions and steel-stud sizes.

Features:

- Provides a full 1" of both upward and downward movement
- The precision-manufactured shouldered screws provided with the SCB/MSCB connector are designed to prevent overdriving and to ensure the clip functions properly
- Strategically placed stiffeners, embossments and anchor holes maximize connector performance
- Simpson Strong-Tie® No-Equal stamps mark the center of the slots to help ensure correct shouldered-screw placement

Material: SCB — 54 mil (16 ga.); MSCB — 68 mil (14 ga.)

Finish: Galvanized (G90)

Installation:

- Use the specified type and number of anchors.
- Use the specified number of XLSH34B1414 #14 shouldered screws (included). Install shouldered screws in the slots adjacent to the No-Equal stamp.
- Use a maximum of one screw per slot.

Codes: See p. 11 for Code Reference Key Chart

Ordering Information:

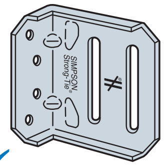
SCB43.5-KT contains:

- 25 connectors
- (55) XLSH34B1414 #14 shouldered screws

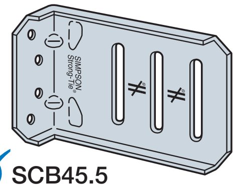
SCB45.5-KT, MSCB45.5-KT, SCB47.5-KT, MSCB47.5-KT, SCB49.5-KT, and SCB411.5-KT contain:

- 25 connectors
- (83) XLSH34B1414 #14 shouldered screws

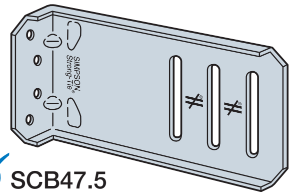
Note: Replacement #14 shouldered screws for SCB/MSCB connectors are XLSH34B1414-RP83



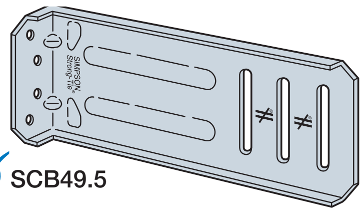
SCB43.5



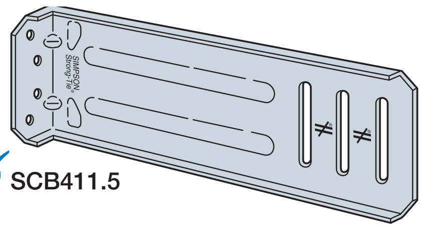
SCB45.5
(MSCB45.5 similar)



SCB47.5
(MSCB47.5 similar)

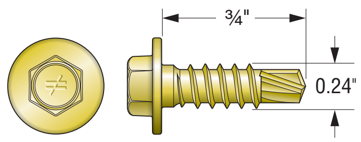


SCB49.5

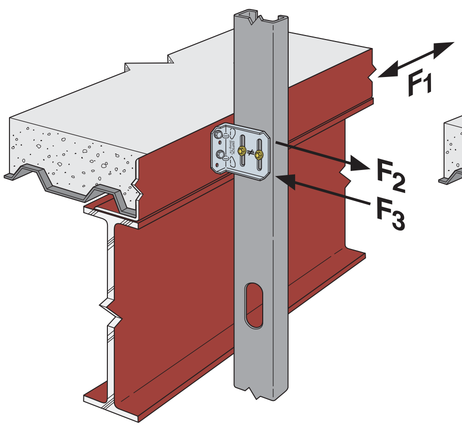


SCB411.5

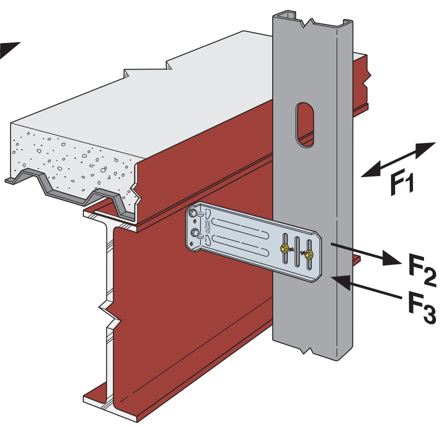
U.S. Patent 8,555,592



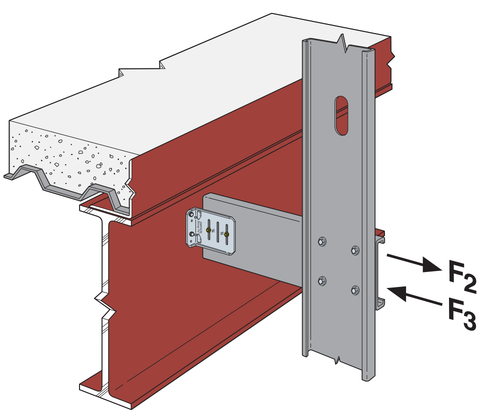
XLSH34B1414
#14 Shouldered Screw



Typical SCB/MSCB Installation



SCB/MSCB Installation at Fascia Beam



Typical SCB/MSCB Installation with Stud Strut

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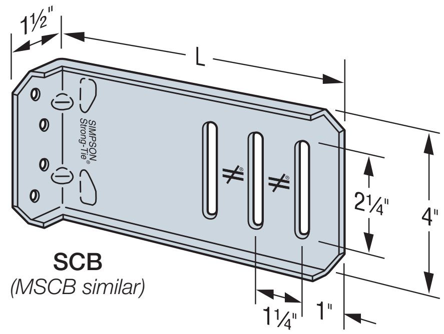
SCB/MSCB Bypass Framing Slide-Clip Connector

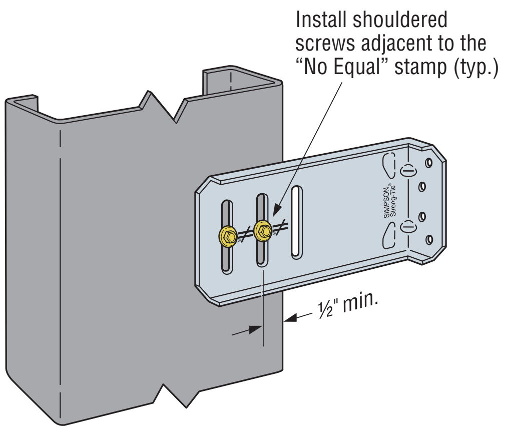
SCB/MSCB Allowable Connector Loads

Model No.	Connector Material Thickness mil (ga.)	L (in.)	No. of #14 Shouldered Screws	Stud Thickness												Code Ref.
				33 mil (20 ga.)			43 mil (18 ga.)			54 mil (16 ga.)			68 mil (14 ga.)			
				F1[3,4]	F2[2]	F3[2]	F1[3,4]	F2[2]	F3[2]	F1[3,4]	F2[2]	F3[2]	F1[3,4]	F2[2]	F3[2]	
SCB43.5	54 (16)	3½	2	100	520	520	155	610	690	185	760	975	185	760	975	IP2, L8, FL
SCB45.5	54 (16)	5½	2[1]	75	490	520	85	610	690	85	760	975	85	760	975	
			3	120	675	675	140	895	1,000	140	990	1,260	140	990	1,260	
MSCB45.5	68 (14)	5½	2[1]	75	490	520	120	780	690	135	1,055	1,200	135	1,195	1,475	IP2, L8
			3	120	675	675	185	1,070	1,000	225	1,220	1,930	225	1,365	1,930	
SCB47.5	54 (16)	7½	2[1]	55	490	520	55	610	690	55	760	945	55	760	945	IP2, L8, FL
			3	70	675	675	70	895	1,000	70	990	1,260	70	990	1,260	
MSCB47.5	68 (14)	7½	2[1]	70	490	520	75	780	690	85	1,055	1,200	85	1,195	1,475	IP2, L8
			3	90	675	675	90	1,070	1,000	110	1,220	1,930	110	1,365	1,930	
SCB49.5	54 (16)	9½	2[1]	40	490	520	40	690	690	40	760	945	40	760	945	IP2, L8, FL
			3	45	675	675	45	895	1,000	45	990	1,260	45	990	1,260	
SCB411.5	54 (16)	11½	2[1]	30	490	520	30	690	690	30	990	920	30	990	920	
			3	35	675	675	35	860	1,000	35	990	1,260	35	990	1,260	

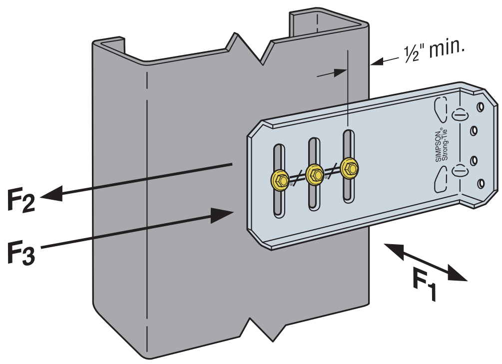
1. When the SCB or MSCB connector is used with two shouldered screws, the screws may be installed in any two slots.
2. Allowable loads are based on clips installed with (4) #12–14 screws in the anchor leg. For other anchorage installations, the capacity of the connection system will be the minimum of the tabulated value and the allowable load from the SCB/MSCB Allowable Anchorage Loads table on p. 28.
3. Anchorage to the supporting structure using welds or a minimum of (2) #12–24 self-drilling screws is required.
4. Allowable loads are based on in-plane loads applied to the stud fasteners that are nearest the support with complete rotational restraint at the studs. For a more extensive treatment of in-plane loads please refer to Simpson Strong-Tie engineering letter L-CF-CWCF1DIR17 at **strongtie.com**.
5. Reference pp. 63–67 for LRFD design strengths.



SCB
(MSCB similar)



SCB/MSCB Installation with Two Shouldered Screws



SCB/MSCB Installation with Three Shouldered Screws

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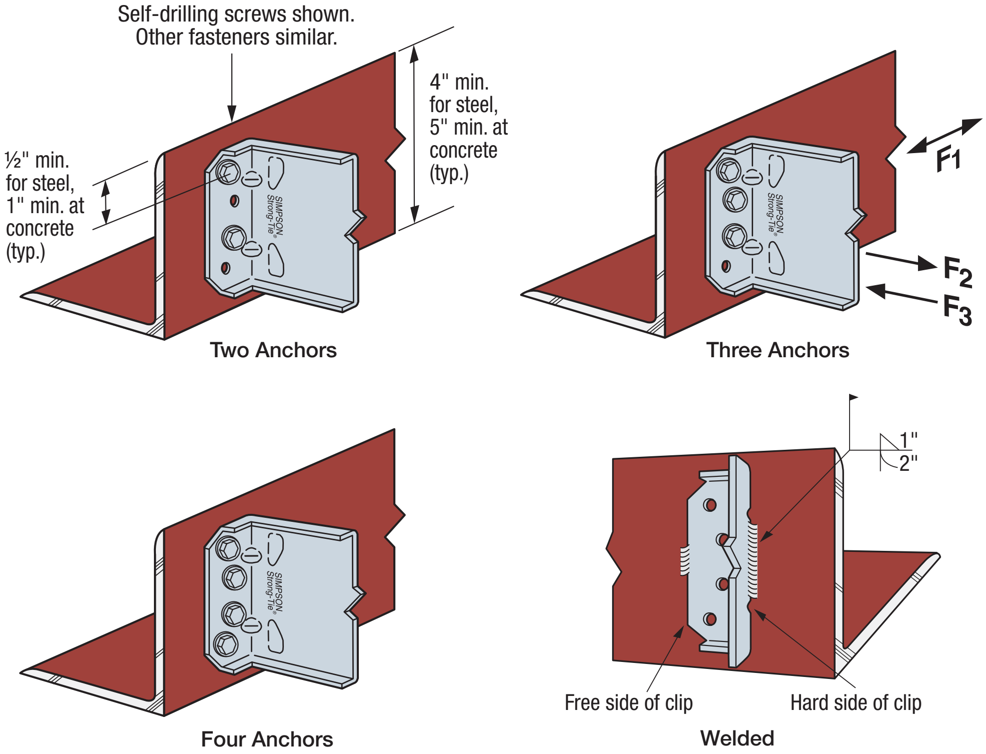
SCB/MSCB Bypass Framing Slide-Clip Connector

SCB/MSCB Allowable Anchorage Loads

Anchorage Type	Minimum Base Material	No. of Anchors	F_2 and F_3	
			SCB	MSCB
#12 self-drilling screws Simpson Strong-Tie® X Metal screws XQ1S1214, X1S1214	A36 steel 3⁄16" thick	2	795	1,020
		3	1,120	1,525
		4	1,590	2,040
Simpson Strong-Tie #12–24 x 1 1⁄4" Strong-Drive® XL Large-Head Metal screws XLQ114T1224, XLQ114B1224-2K	A36 steel 3⁄16" thick	2	1,115	1,150
		3	1,645	1,725
		4	2,230	2,300
Simpson Strong-Tie 0.157" x 5⁄8" power-actuated fasteners PDPAT-62KP	A36 steel 3⁄16" thick	2	440	520
		3	585	780
		4	895	1,040
Simpson Strong-Tie 0.157" x 5⁄8" power-actuated fasteners PDPAT-62KP	A572 or A992 steel 3⁄16" thick	2	585	610
		3	800	915
		4	1,170	1,220
Simpson Strong-Tie 1⁄4" x 1 3⁄4" Titen® hex-head masonry screws TTN25134H	Concrete f'_c = 2,500 psi	2	380	380
		3	445	445
		4	510	510
Welded E70XX electrodes	A36 steel 3⁄16" thick	Hard side: 2" Free side: 1"	1,735	2,040

1. For additional important information, see General Information on p. 16.
2. Allowable loads are for clip anchorage only. The capacity of the connection system will be the minimum of the tabulated allowable anchorage loads the allowable load from the SCB/MSCB Allowable Connector Load table on p. 27.
3. Allowable loads for #12–24 self-drilling screws and PDPAT powder-actuated fasteners are based on installation in minimum 3⁄16" thick structural steel with F_y = 36 ksi. PDPAT values are also provided for A572 steel. Values listed above maybe used where other thicknesses of steel are encountered provided that the fastener has equal or better tested values into thicker steel (see p. 16). It is the responsibility of the Designer to select the proper length fasteners based on the steel thickness installation.
4. For screw fastener installation into steel backed by concrete, predrilling of both the steel and the concrete is suggested. For predrilling use a maximum 3⁄16"-diameter drill bit.



SCB/MSCB Anchor Layout

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SC Bypass Framing Slide-Clip Connector

Ideal for high-seismic areas, Simpson Strong-Tie® SC connectors are the optimal solution for slide-clip bypass framing. SC clips are often welded to the structure in high-seismic zones, but they also feature anchorage holes so that concrete screws or powder-actuated fasteners can be used to attach the clip to the structure. In addition to anchorage versatility, the SC clips include "No-Equal" stamps at the center of the slots to ensure proper shouldered screw placement. SC connectors are manufactured using heavy-duty 10- and 12-gauge steel to provide exceptional resistance to in-plane seismic load.

Features:

- The clips come in lengths of 3½", 6" and 8" for use with 3⅝", 6" and 8" studs, respectively
- The maximum stand-off distance is 1" for 3⅝" studs and 1½" for 6" and 8" studs
- Provides a full ¾" of both upward and downward deflection
- Embossments in the bend line provide increased strength and stiffness in the F_1 and F_2 load directions, but are positioned towards the center of the clip so that 1½" long welds can be applied at the top and bottom of the clip
- Prepunched large-diameter anchor holes accommodate ¼"-diameter concrete screws like the Simpson Strong-Tie Titen HD®
- Prepunched small-diameter anchor holes accommodate powder-actuated fasteners like the 0.157"-diameter Simpson Strong-Tie PDPAT or the #12 self-drilling Simpson Strong-Tie Strong-Drive® XL large-head metal screw
- Precision-manufactured shouldered screws, provided with SC connectors, are designed to prevent overdriving and to ensure the clip functions properly

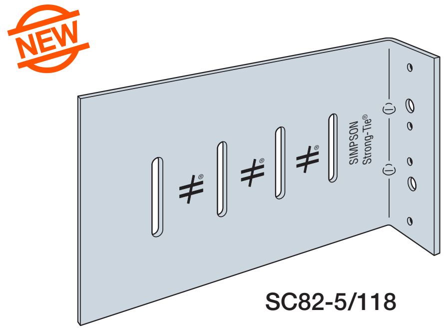
Material: 50 ksi

Finish: Galvanized (G90)

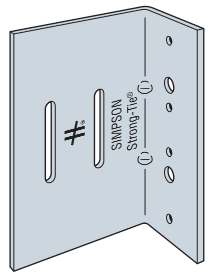
Installation:

- Use the specified type and number of anchors.
- Use the specified number of XLSH78B1414 #14 shouldered screws (included). Install the screws in the slots adjacent to the "No-Equal" stamps.
- Use one shouldered screw per slot (maximum).

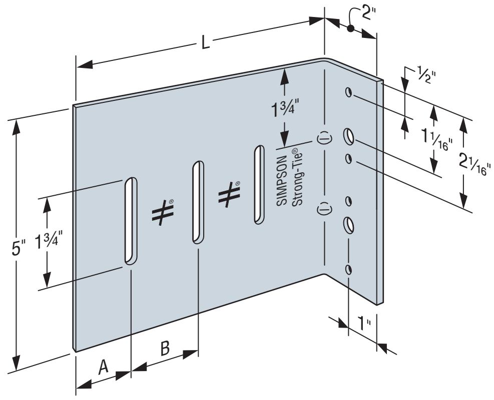
Codes: See p. 11 for Code Reference Key Chart



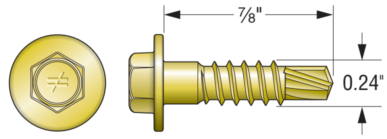
SC82-5/118



SC32-5/97



SC62-5/97, SC62-5/118



XLSH78B1414
#14 Shouldered Screw for Attachment to Stud Framing (included)

Ordering Information and Dimensions

Model No.	Ordering SKU	Thickness mil (ga.)	L (in.)	A (in.)	B (in.)
SC32-5/97	SC32-5/97-KT25	97 (12)	3½	⅞	1¼
SC62-5/97	SC62-5/97-KT25	97 (12)	6	1⅛	1½
SC62-5/118	SC62-5/118-KT25	118 (10)	6	1⅛	1½
SC82-5/118	SC82-5/118-KT25	118 (10)	8	1⅝	1½

1. Each box contains (25) connectors and enough shouldered screws for installation.
2. Replacement #14 shouldered screws for SC connectors are XLSH78B1414-RP83.

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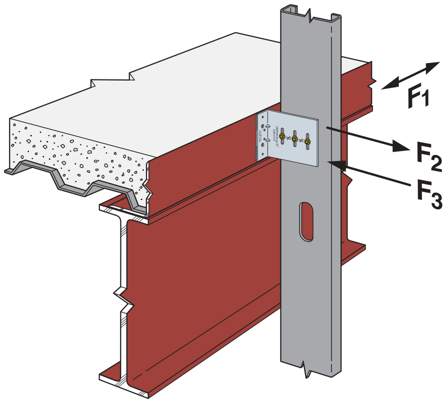
SC Bypass Framing Slide-Clip Connector

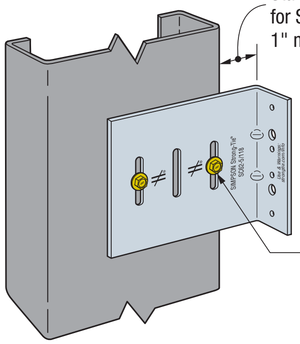
SC Allowable Connector Loads

Model No.	Stud Thickness mil (ga.)	Fasteners to Stud: Allowable Pullout per Single #14 Shouldered Screw	Fasteners to Stud: No. of #14 Shouldered Screws	Allowable Load: F_1 1" Stand-Off	Allowable Load: F_1 1½" Stand-Off	Allowable Load: F_2	Allowable Load: F_3	Code Ref.
SC32-5/97	33 (20)	100	2	170	—	585	715	170
SC62-5/97			2	100	115	585	715	
			3	115	130	880	1,070	
SC62-5/118			2	100	115	585	710	
			3	115	130	880	1,070	
SC82-5/118			2	115	130	585	710	
			4	115	130	1,170	1,425	
SC32-5/97	43 (18)	145	2	220	—	765	930	
SC62-5/97			2	135	155	765	930	
			3	150	175	1,145	1,395	
SC62-5/118			2	135	155	765	930	
			3	150	175	1,145	1,395	
SC82-5/118			2	150	175	765	930	
			4	150	175	1,525	2,125	
SC32-5/97	54 (16)	270	2	300	—	1,145	1,645	
SC62-5/97			2	255	295	1,145	1,645	
			3	265	305	2,120	2,345	
SC62-5/118			2	255	295	1,405	1,685	
			3	265	305	2,110	2,530	
SC82-5/118			2	260	300	1,405	1,685	
			4	260	300	2,810	3,370	
SC32-5/97	68 (14)	410	2	375	—	1,695	1,645	
SC62-5/97			2	320	370	1,695	1,645	
			3	335	385	2,540	2,345	
SC62-5/118			2	330	380	2,165	2,040	
			3	345	395	3,250	3,060	
SC82-5/118			2	325	375	2,165	2,085	
			4	325	375	4,330	4,165	
SC32-5/97	97 (12)	725	2	540	—	1,695	1,645	
SC62-5/97			2	555	555	1,695	1,645	
			3	555	555	2,540	2,345	
SC62-5/118			2	555	555	2,165	2,040	
			3	635	635	3,250	3,060	
SC82-5/118			2	465	465	2,165	2,085	
			4	465	465	4,330	4,165	

1. For additional important information, see General Information on p. 16.
2. SC Allowable Connector Loads are also limited by the SC Anchorage Load tables on pp. 31 and 32. Use the minimum tabulated values from the connector and anchorage load tables as applicable.
3. See illustration for fastener placement when using only two shouldered screws to the stud.
4. Tabulated F_1 loads are based on assembly tests with the load through the centerline of the stud. Tested failure modes were due to screw pullout; therefore compare F_1 against F_p calculated per ASCE 7-10 Chapter 13 with $a_p = 1.25$ and $R_p = 1.0$.
5. F_1 loads are based on maximum stand-off distances of 1" or 1½" as shown. Other loads are applicable to a 1" stand-off for SC32 and 1" or 1½" stand-off for SC62 and SC82.
6. At the bend line, the gross allowable plastic moment in the F_1 load direction for 97 mil (12 ga.) and 118 mil (10 ga.) SC connectors are 395 in.-lb. and 675 in.-lb., respectively.
7. At a vertical slot, the net allowable plastic moment in the F_1 load direction for 97 mil (12 ga.) and 118 mil (10 ga.) SC connectors are 260 in.-lb. and 440 in.-lb., respectively.



Typical SC Installation



SC62 with Two Screws
(SC82 similar)

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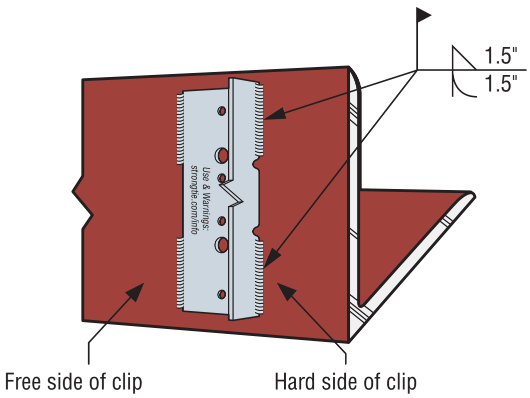
SC Bypass Framing Slide-Clip Connector

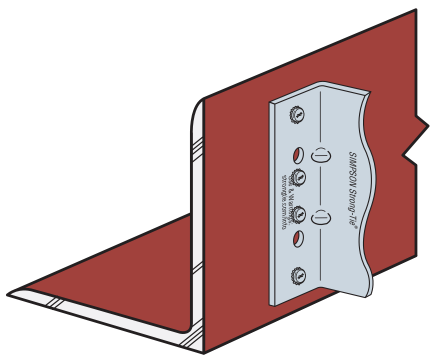
SC Allowable Anchorage Loads to Steel

Anchorage Type	Minimum Base Material	No. of Anchors	Allowable Load	
			F_1	F_2 and F_3
#12 self-drilling screws Simpson Strong-Tie® X Metal screws XQ1B1214, X1B1214	A36 steel 3⁄16" thick	4	—	2,070
#12–24 x 1¼" Strong-Drive® XL Large-Head Metal screws XLQ114T1224, XLQ114B1224	A36 steel 3⁄16" thick	4	—	2,545
#14 self-drilling screws Simpson Strong-Tie E Metal screw E1B1414	A36 steel 3⁄16" thick	4	—	2,620
Simpson Strong-Tie 0.157" x 5⁄8" powder-actuated fasteners PDPAT-62KP	A36 steel 3⁄16" thick	4	—	1,040
Simpson Strong-Tie 0.157" x 5⁄8" powder-actuated fasteners PDPAT-62KP	A572 grade 50 or A992 steel 3⁄16" thick	4	—	1,710
Welded E70XX electrodes	A36 steel 3⁄16" thick	Hard side: 3" Free side: 3"	2,110	3,710

1. For additional important information, see General Information on p. 16.
2. Allowable anchorage loads are also limited by the SC Connector Load Table on p. 30. Use the minimum tabulated values from the connector and anchorage load tables as applicable.
3. Allowable loads for #12–24 self-drilling screws and PDPAT powder-actuated fasteners are based on installation in minimum 3⁄16" thick structural steel with F_y = 36 ksi. PDPAT values are also provided for A572 steel. Values listed above may be used where other thicknesses of steel are encountered provided that the fastener has equal or better tested values into thicker steel (see p. 16). It is the responsibility of the Designer to select the proper length fasteners based on the steel thickness installation.
4. For screw fastener installation into steel backed by concrete, predrilling of both the steel and the concrete is suggested. For predrilling use a maximum 3⁄16"-diameter drill bit.



Weld Anchorage



PAF Anchorage

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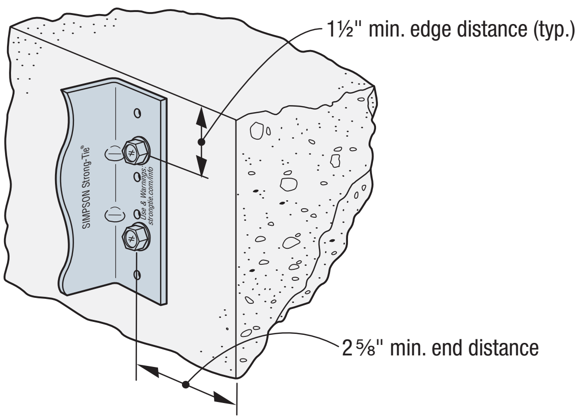
SC Bypass Framing Slide-Clip Connector

Allowable Titen HD® Anchorage Loads into Concrete with SC Clip

Simpson Strong-Tie ¼" Titen HD Screw Anchor	Nominal Embedment (in.)	Anchor Quantity and Size	f'_c (psi)	Load Direction	Wind and Seismic in SDC A&B		Seismic in SDC C through F
					Uncracked Concrete	Cracked Concrete	Cracked Concrete[6]
THDB25178H	1⅝	(2) ¼" x 1⅞"	3,000	F_1	335	240	280
				F_2 and F_3	660	630	550
			4,000	F_1	390	280	325
				F_2 and F_3	760	725	635
THDB25234H	2½	(2) ¼" x 2¾"	3,000	F_1	370	265	310
				F_2 and F_3	475	695	610
			4,000	F_1	430	305	360
				F_2 and F_3	550	805	705

1. Allowable anchor capacities have been determined using ACI 318-14 Chapter 17 calculations with a minimum concrete compressive strength (f'_c) of 3,000 and 4,000 psi in normal-weight concrete. Tabulated values shall be multiplied by a factor (λ_a) of 0.6 for sand light-weight concrete.
2. Edge distance is assumed to be 1½", and end distance is 2⅝".
3. Load values are for group anchors based on ACI 318, condition B, load factors from ACI 318-14 Section 5.3, no supplement edge reinforcement, ψ_c, v = 1.0 for cracked concrete and periodic special inspection.
4. Allowable Stress Design (ASD) values were determined by multiplying calculated LRFD capacities by a conversion factor, Alpha (α), of 0.70 for seismic load and 0.6 for wind loads. ASD values for other combinations may be determined using alternate conversion factors.
5. Tabulated allowable ASD loads for Wind and Seismic in SDC A&B are based on using wind conversion factors and may be increased by 1.17 for SDC A&B only.
6. Design loads shall include the over-strength factor per ASCE7 Section 12.4.3. For fasteners in exterior wall connection systems, Ω_0 = 1.5 per Table 13.5-1.
7. Allowable loads for F_1 are based on the governing loading direction which is toward the end of slab.
8. For anchor subjected to both tension and shear loads, it shall be designed to satisfy following:
   - For $N_a / N_{all} \leq 0.2$, the full allowable load in shear is permitted.
   - For $V_a / V_{all} \leq 0.2$, the full allowable load in tension is permitted.
   - For all other cases: $N_a / N_{all} + V_a / V_{all} \leq 1.2$ where:
     N_a = Applied ASD tension load
     N_{all} = Allowable F_2 and F_3 load from the SC Allowable Anchorage Loads for Concrete table
     V_a = Applied ASD shear load
     V_{all} = Allowable F_1 load from the SC Allowable Anchorage Loads for Concrete table
9. Tabulated allowable loads are based on anchorage only. The capacity of the connection system shall be the minimum of the allowable anchorage load and the SC Allowable Connector Loads.



Titen HD® Anchorage

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SSB Bypass Framing Slide-Clip Strut Connector

The SSB connector is a versatile strut connector that is commonly used at the bottom of a steel beam to accommodate large stand-off conditions. It accommodates 1" of upward and 1" of downward movement.

Material: 54 mil (16 ga.)

Finish: Galvanized (G90)

Installation:

- Use the specified type and number of anchors.
- Use the specified number of XLSH34B1414 #14 shouldered screws (included). Install shouldered screws in the slots adjacent to the No-Equal stamp.
- Use a maximum of one screw per slot.
- If the SSB intrudes on interior space, it can be trimmed. The trimmed part shall allow an edge distance from the center of the nearest anchor to the end of the trimmed part of ½" or greater.

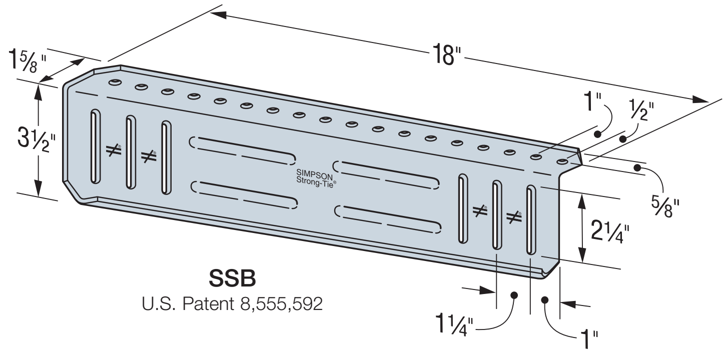
Codes: See p. 11 for Code Reference Key Chart

Ordering Information:

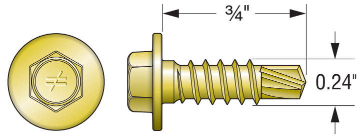
SSB3.518-KT contains:

- Box of 25 connectors
- (83) XLSH34B1414 #14 shouldered screws

Note: Replacement #14 shouldered screws for SSB connectors are XLSH34B1414-RP83.



SSB
U.S. Patent 8,555,592

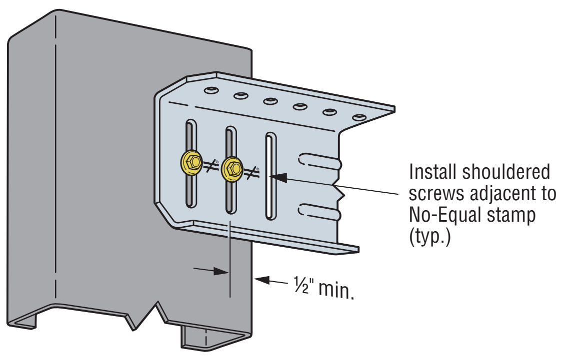


XLSH34B1414
#14 Shouldered Screw

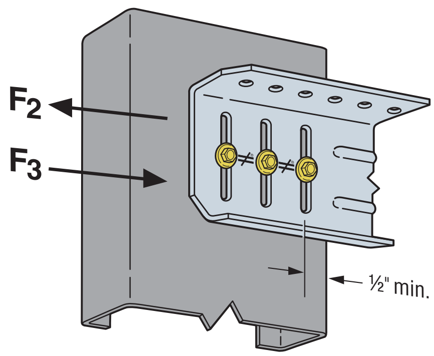
SSB Allowable Connector Loads

Model No.	Connector Material Thickness mil (ga.)	No. of #14 Shouldered Screws	Stud Thickness						Code Ref.
			33 mil (20 ga.)		43 mil (18 ga.)		54 mil (16 ga.)		
			F_2	F_3	F_2	F_3	F_2	F_3	
SSB3.518	54 (16)	2[1]	520	520	690	690	1,075	960	IP2, L8, FL
		3	815	815	1,030	1,080	1,335	1,225	

1. When the SSB connector is used with two shouldered screws, the screws may be installed in any two slots.
2. Allowable loads are based on clips installed with (3) #12–24 screws in the anchor leg. For other anchorage installations, the capacity of the connection system will be the minimum of the tabulated value and the allowable load from the SSB Allowable Anchorage Loads table on p. 34.
3. Reference pp. 63–67 for LRFD design strengths.



SSB Installation with Two Shouldered Screws



SSB Installation with Three Shouldered Screws

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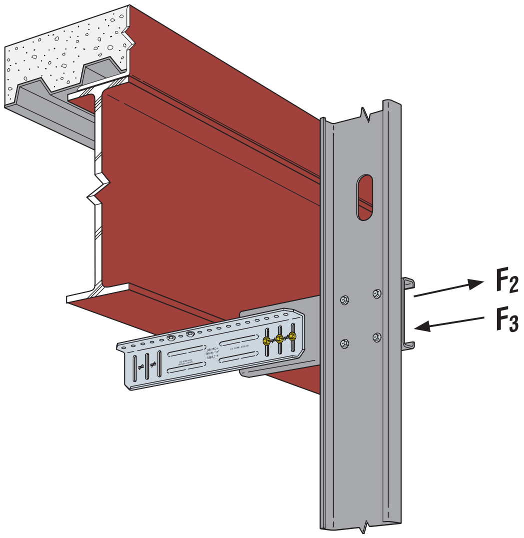
SSB Bypass Framing Slide-Clip Strut Connector

SIMPSON Strong-Tie®

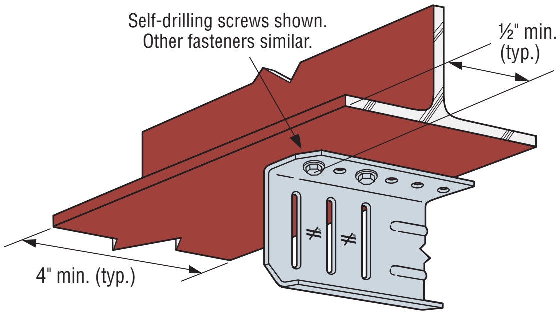
SSB Allowable Anchorage Loads

Anchorage Type	No. of Anchors	Allowable Load F_2 and F_3
#12–24 self-drilling screws[3]	2	1,250
	3	1,335
Simpson Strong-Tie® 0.157" PDPAT powder-actuated fasteners	2	1,320
	3	1,335
Welded	Hard side: 2" Free side: 1"	1,335

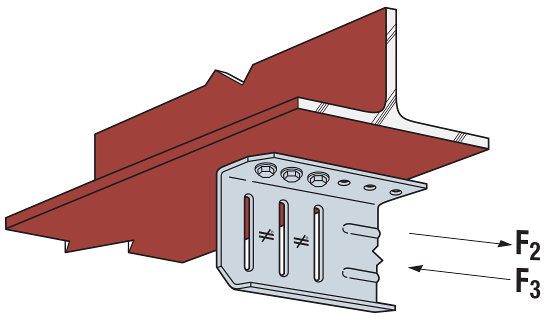
1. For additional important information, see General Information on p. 16.
2. Allowable loads are for clip anchorage only. The capacity of the connection system will be the minimum of the tabulated value and the allowable load from the SSB Allowable Connector Loads table on p. 33.
3. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



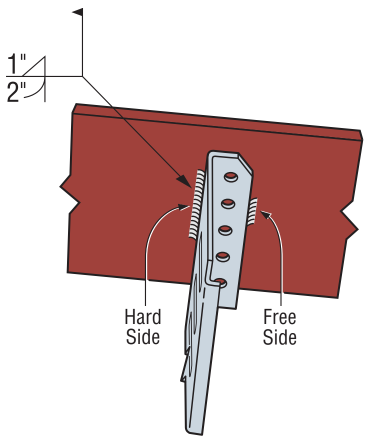
Typical SSB Installation with Stud Strut



Two Anchors

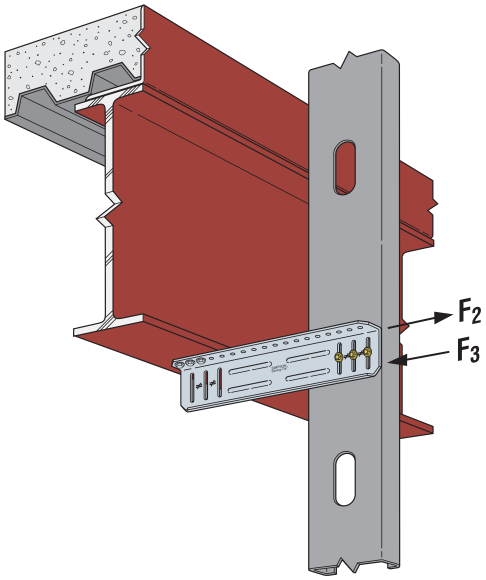


Three Anchors



Welded

SSB Anchor Layout



Typical SSB3.518 Installation

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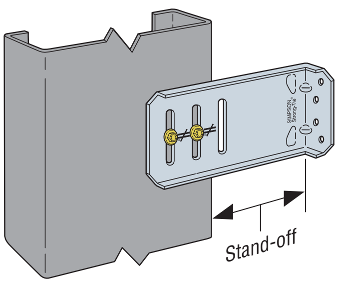
Design Aid – SCB, SSB and FCB

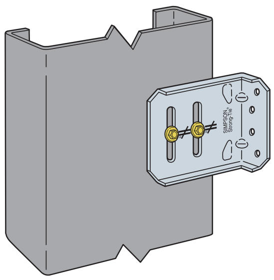
Curtain-Wall Connector Stand-Off Distances

Model No.	Fastener Pattern	Depth of Stud				
		3⅝"	6"	8"	10"	12"
SCB43.5	A	0" to 1"	0" to 1"	0" to 1"	0" to 1"	0" to 1"
SCB45.5/MSCB45.5	B	1⅞" to 2¾"	0" to 2¾"	0" to 2¾"	0" to 2¾"	0" to 2¾"
	C, D and E	—	0" to 1½"	0" to 1½"	0" to 1½"	0" to 1½"
SCB47.5/MSCB47.5	B	3⅞" to 4¾"	1½" to 4¾"	0" to 4¾"	0" to 4¾"	0" to 4¾"
	C, D and E	—	1½" to 3½"	0" to 3½"	0" to 3½"	0" to 3½"
SCB49.5	B	5⅞" to 6¾"	3½" to 6¾"	1½" to 6¾"	0" to 6¾"	0" to 6¾"
	C, D and E	—	3½" to 5½"	1½" to 5½"	0" to 5½"	0" to 5½"
SCB411.5	B	7⅞" to 8¾"	5½" to 8¾"	3½" to 8¾"	1½" to 8¾"	0" to 8¾"
	C, D and E	—	5½" to 7½"	3½" to 7½"	1½" to 7½"	0" to 7½"
SSB3.518/FSB3.518	B[2]	0" to 12¼"	0" to 12¼"	0" to 12¼"	0" to 12¼"	0" to 12¼"
	C, D and E[3]	—	0" to 11"	0" to 11"	0" to 11"	0" to 11"
FCB43.5	Min.[4]	0" to 1"	0" to 1"	0" to 1"	0" to 1"	0" to 1"
	Max.[4]	0" to 1"	0" to 1"	0" to 1"	0" to 1"	0" to 1"
FCB45.5	Min.[4]	—	0" to 1½"	0" to 1½"	0" to 1½"	0" to 1½"
	Max.[4]	—	0" to 1½"	0" to 1½"	0" to 1½"	0" to 1½"
FCB47.5	Min.[4]	—	1½" to 3½"	0" to 3½"	0" to 3½"	0" to 3½"
	Max.[4]	—	—	0" to 1"	0" to 1"	0" to 1"
FCB49.5	Min.[4]	—	3½" to 5½"	1½" to 5½"	0" to 5½"	0" to 5½"
	Max.[4]	—	—	—	0" to 1"	0" to 1"
FCB411.5	Min.[4]	—	5½" to 7½"	3½" to 7½"	1½" to 7½"	0" to 7½"
	Max.[4]	—	—	—	—	0" to 1"

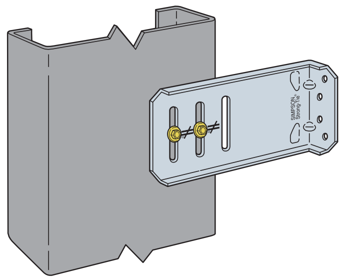
1. The stand-off is the distance from the interior flange of the stud to the face of the supporting structure (see illustration below). All dimensions assume fasteners are installed a minimum of ½" from the edge of stud, and the connector does not extend beyond the exterior flange of the stud; "—" designates conditions where fastener pattern will not fit on stud.
2. A tabulated maximum stand-off of 12¼" is based on three anchors. For two anchors, maximum stand-off is 13¼".
3. A tabulated maximum stand-off of 11" is based on three anchors. For two anchors, maximum stand-off is 12".
4. For FCB fixed connectors (pp. 47–49), minimum indicates fill all round holes, and maximum indicates fill all round and triangle holes.
5. Fastener patterns are as follows:



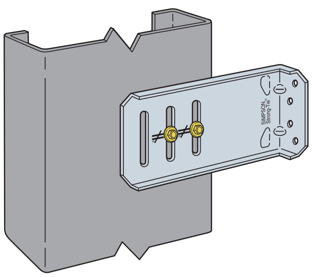
Stand-Off Distance



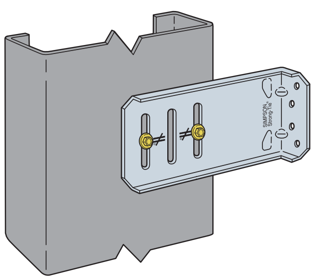
Pattern A
Two screws installed with one in each slot



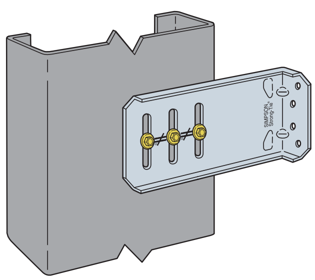
Pattern B
Two screws installed in slots farthest from the anchor leg



Pattern C
Two screws installed in slots closest to the anchor leg



Pattern D
Two screws installed in outer slots with center slot empty



Pattern E
Three screws

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SCW Head-of-Wall Slide-Clip Connector

The SCW connectors offer 1" of upward and 1" of downward movement. They are primarily used in head-of-wall applications that require vertical movement relative to the structure. SCW connectors are often used to strengthen window and door jambs for projects that utilize slip track.

Material: 54 mil (16 ga.)

Finish: Galvanized (G90)

Installation:

- Use the specified type and number of anchors.
- Use the specified number of #14 shouldered screws (included). Install shouldered screws in the slots adjacent to the No-Equal stamp.
- Use a maximum of one screw per slot.

Codes: See p. 11 for Code Reference Key Chart

Ordering Information:

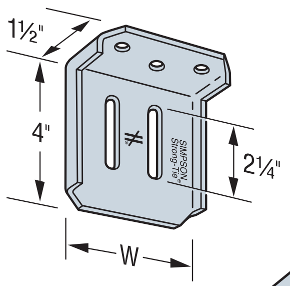
SCW3.25-KT contains:

- Box of 25 connectors
- 55 XLSH34B1414 #14 shouldered screws

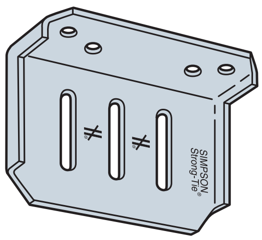
SCW5.5-KT contains:

- Box of 25 connectors
- 83 XLSH34B1414 #14 shouldered screws

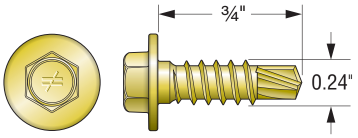
Note: Replacement #14 shouldered screws for SCW connectors are XLSH34B1414-RP83.



SCW3.25



SCW5.5

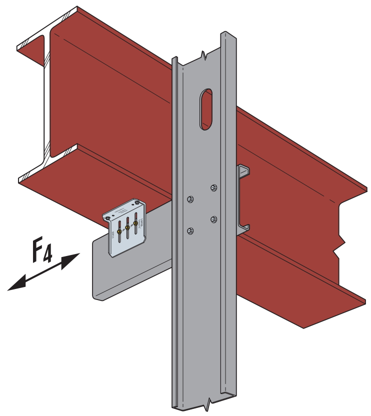


XLSH34B1414 #14 Shouldered Screw

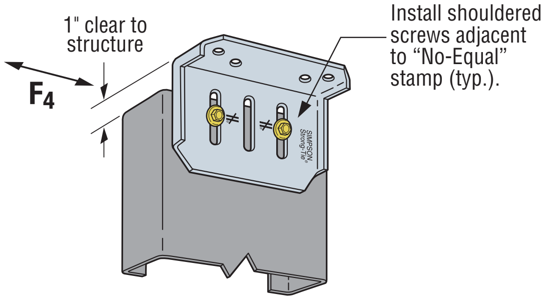
SCW Allowable Connector Loads

Model No.	Connector Material Thickness mil (ga.)	W (in.)	No. of #14 Shouldered Screws	Stud Thickness 33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)	Code Ref.
				F_4	F_4	F_4	
SCW3.25	54 (16)	3¼	2	455	630	755	IP2, L8, FL
SCW5.5	54 (16)	5½	2[1]	455	630	995	
			3	455	630	1,220	

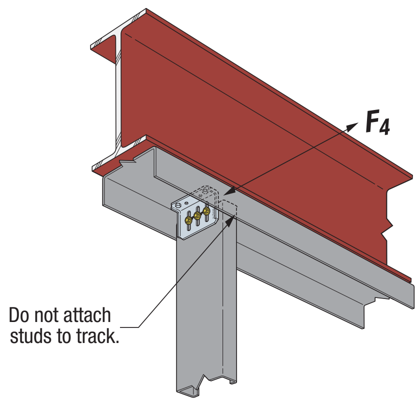
1. When the SCW5.5 connector is used with two shouldered screws, install screws in the outermost slots.
2. Allowable loads are based on clips installed with all holes in the anchor leg filled with #12–14 screws. For other anchorage installations, the capacity of the connection system will be the minimum of the tabulated value and the allowable load from the SCW Allowable Anchorage Loads table on p. 37.
3. Reference pp. 63–67 for LRFD design strengths.



Typical SCW Installation with Stud Strut



SCW5.5 Installation with Two Shouldered Screws
(Three shouldered screws and SCW3.25 similar)



Typical SCW Installation at Stud

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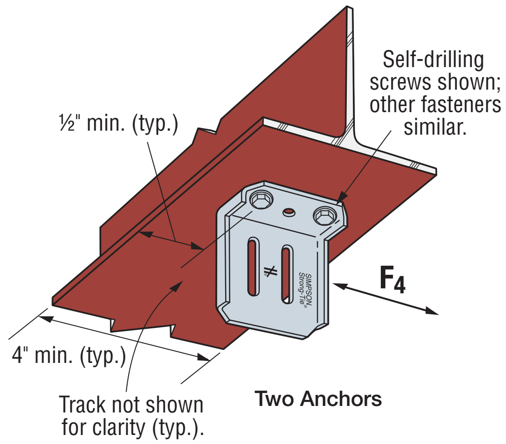
SCW Head-of-Wall Slide-Clip Connector

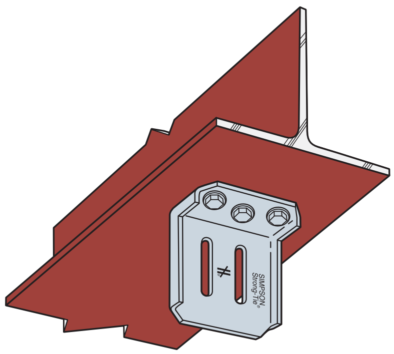
SCW Allowable Anchorage Loads

Model No.	Anchorage Type	No. of Anchors	Allowable Load F_4
SCW3.25	#12–24 self-drilling screws[3]	2	640
		3	755
	Simpson Strong-Tie® 0.157" PDPAT powder-actuated fasteners	2	520
		3	560
SCW5.5	#12–24 self-drilling screws[3]	2	1,200
		4	1,220
	Simpson Strong-Tie® 0.157" PDPAT powder-actuated fasteners	2	920
		4	1,220

1. For additional important information, see General Information on p. 16.
2. Allowable loads are for clip anchorage only. The capacity of the connection system will be the minimum of the tabulated value and the allowable load from the SCW Allowable Connector Loads table on p. 36.
3. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.

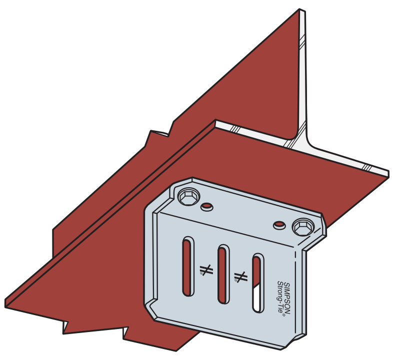


Two Anchors

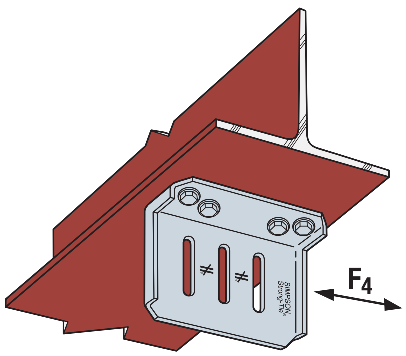


Three Anchors

SCW3.25 Anchor Layout



Two Anchors



Four Anchors

SCW5.5 Anchor Layout

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DTC Head-of-Wall Slide-Clip Application

DTC clips are a cost-effective solution for light-duty, head-of-wall slide clip applications. The 1⅝" slot will allow ¾" movement in each direction.

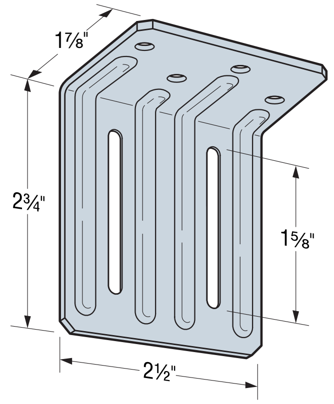
Material: 43 mil (18 ga.)

Finish: Galvanized (G90)

Installation:

- Use specified type and number of anchors per the installation drawing below
- Install (2) #8 screws centered in the vertical slots
- Once tightened, back-out screws ½ turn to ensure slip

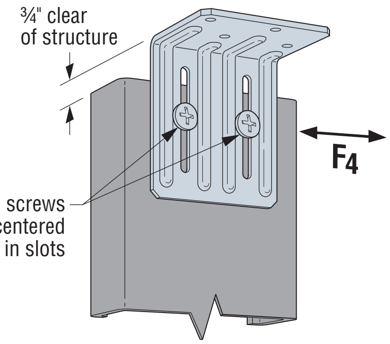
Codes: See p. 11 for Code Reference Key Chart



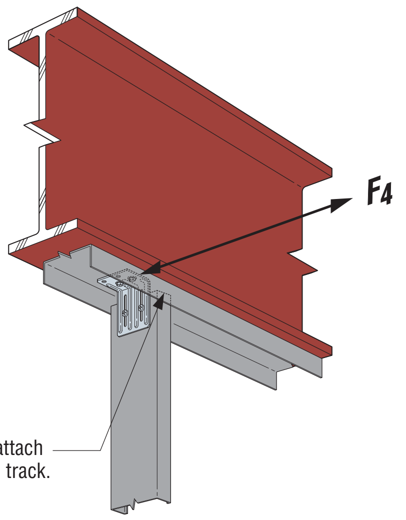
DTC

Model No.	Connector Material mil (ga.)	Fasteners	Anchorage	Stud Thickness mil (ga.)	Stud Steel Strength F_y (ksi)	Allowable Load F_4	Code Ref.
DTC	43 (18)	(2) #8 self-drilling screws[4]	(2) 0.157" PDPAT powder-actuated fasteners or (2) #12 self-drilling screws[4]	15 (25 EQ)	50	60	170
				18 (25)	33	70	
				19 (20 EQ)	65	80	
				20 (20 EQ)	57		
				30 (20 DW)	33	165	
				33 (20 STR)	33	170	
				43 (18)	33	215	

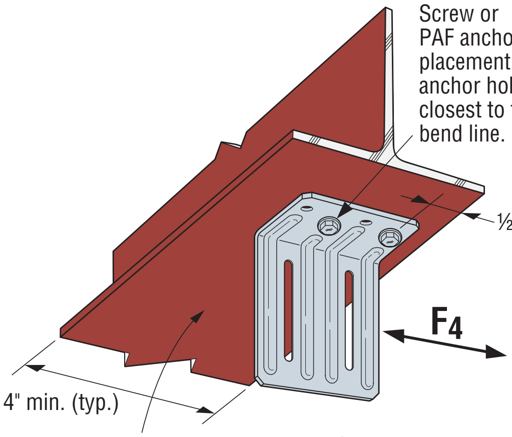
1. Allowable loads may not be increased for wind or seismic load.
2. Clips do not replace stud lateral or stability bracing. Design of bracing is the responsibility of the Designer.
3. It is the responsibility of the Designer to verify the adequacy of the stud. Allowable loads are based on clips installed an adequate distance away from penetrations, notches, ends of studs and other conditions that may affect the clip performance.
4. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



Typical DTC Screw Installation



Typical DTC Installation at Stud



DTC Anchor Layout

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SCHA Slide-Clip Connectors for Horizontal Anchorage

This product is preferable to similar connectors because of a) easier installation, b) higher loads, c) lower installed cost, or a combination of these features.

SCHA connectors are an ideal solution for panelized or stick-frame construction where the CFS framing anchors to the top of a concrete floor slab or the bottom of a steel beam. The connector features a wide support leg to decrease eccentricity on anchors and provide a variety of anchorage options. The included SCVC vertical slider helps to strengthen the connector for the highest tension (F_2) and compression (F_3) loads in the industry.

Features:

- Provides a full 1" of both upward and downward movement
- Tabulated design values for anchorage help mitigate risk and provide ease of specification
- Either face of anchorage leg can be used against the support
- Accommodates stand-off distances up to 4¾"
- Can be used with 3⅝", 4", 6" and 8" studs
- Prepunched anchor holes accommodate ¼"-diameter Titen HD® or other ¼"-diameter concrete screw anchors, and 0.157"-diameter powder-actuated fasteners such as the Simpson Strong-Tie® PDPAT-62KP
- Prepunched anchor holes also eliminate the need for pre-drilling and help ensure accurate anchor placement

Material: SCHA —118 mil (10 ga., 33 ksi); SCVS — 97 mil (12 ga., 33 ksi)

Coating: Galvanized (G90)

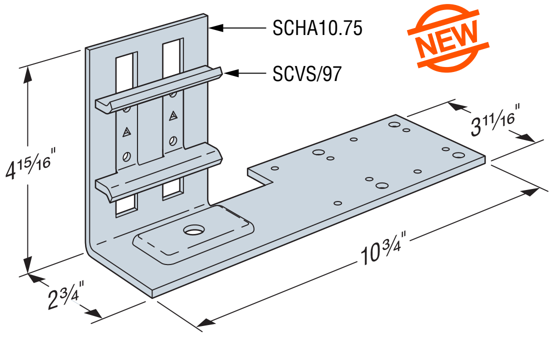
Installation:

- Use all specified fasteners and anchors. Note that the smaller diameter anchor holes are provided for PAF installation, and the larger diameter anchor holes are for ¼"-diameter concrete screw anchors.
- Ensure that the SCVS vertical slider is centered in the SCHA vertical slots by aligning the tic-marks adjacent to the triangle holes on the slider with the ≠ stamp on the SCHA clip.

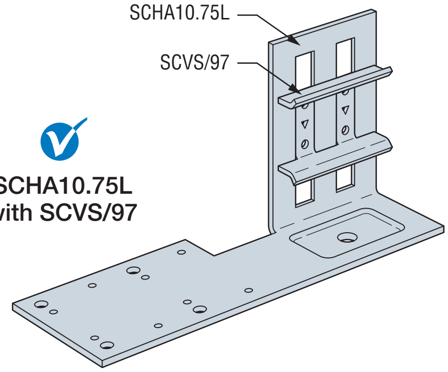
Codes: See p. 11 for Code Reference Key Chart

Ordering Information:

- SCHA10.75-KT15 contains (15) SCHA10.75 connectors and (15) SCVS/97 sliders
- SCHA10.75L-KT15 contains (15) SCHA10.75L connectors and (15) SCVS/97 sliders

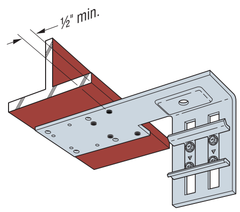
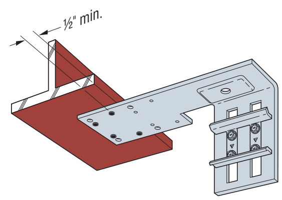
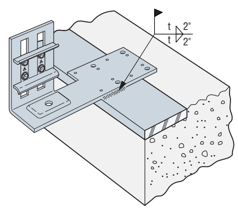
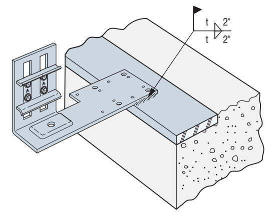
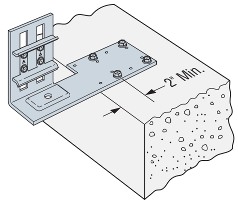
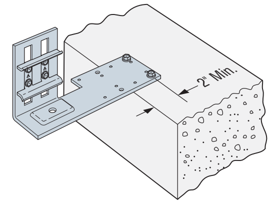


SCHA10.75 with SCVS/97
U.S. Patent Pending



SCHA10.75L with SCVS/97

SCHA Anchorage Types and Conditions

Four PDPAT Anchors to Steel	
Front Condition	**End Condition**
	
4" Weld	
Front Condition	**End Condition**
	
¼"-Diameter Concrete Screws	
Four Anchors	**Two Anchors**
	

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SCHA Slide-Clip Connectors for Horizontal Anchorage

SIMPSON Strong-Tie®

SCHA Allowable Loads

Primary Structure Base Material	Anchorage		Fasteners to Stud Self-Drilling Screws		Stud Thickness mil (ga.)	Maximum Stand-Off Distance (in.)	Allowable Load (lb.)			Code Ref.
	Qty./Type/Size	Condition	Min./Max.	No. #12–14			F1[7]	F2	F3	
Structural steel A36 3/16" thick minimum	(4) PAF – 0.157" dia. x ⅝" PDPAT-62KP or (2) welds – 2" length	Front condition	Min.	4	33 (20)	2	150	645	490	170
					43 (18)		195	860	610	
					54 (16)		235	990	880	
					68 (14)		235	990	880	
			Max.	6	54 (16)	2	350	1,300	1,045	
					68 (14)		350	1,495	1,045	
		End condition	Min.	4	33 (20)	4¾	105	625	470	
					43 (18)		110	830	570	
					54 (16)		165	830	720	
					68 (14)		165	830	720	
			Max.	6	54 (16)	4¾	350	1,060	775	
					68 (14)		350	1,060	775	
Normal or lightweight concrete f'_c = 2,500 psi minimum	(4) concrete screw anchors – ¼" diameter[3]	4 anchors	Min.	4	33 (20)	2	105	625	470	
					43 (18)		110	830	570	
					54 (16)		165	830	720	
					68 (14)		165	830	720	
			Max.	6	54 (16)	2	350	1,060	775	
					68 (14)		350	1,060	775	
	(2) concrete screw anchors – ¼" diameter[3]	2 anchors	Min.	4	33 (20)	4¾	105	625	470	
					43 (18)		105	830	570	
					54 (16)		165	830	720	
					68 (14)		165	830	720	
			Max.	6	54 (16)	4¾	350	860	745	
					68 (14)		350	860	745	

1. For additional important information, see the General Information on p. 16.
2. Allowable loads are based on connectors installed with tabulated anchorage type, quantity and size into structural steel. For anchorage installations into concrete, the capacity of the connection system will be the minimum of the tabulated value and the allowable load using concrete screws indicated on the table on p. 41. Note that if the Designer chooses to calculate concrete anchorage with alternate ¼"-diameter anchors, then the maximum load shall not exceed the tabulated values in this table. Refer to the figures on p. 39 for anchorage conditions.
3. Please refer to the table on p. 41 for Simpson Strong-Tie® Titen HD anchorage loads.
4. Min. fasteners quantity and tabulated values — fill round holes; max. fasteners quantity and tabulated values — fill round and triangular holes.
5. The stand-off is the distance from the interior flange of the stud to the face of the supporting structure. Note that the interior flange of the stud is assumed to align with the inside vertical edge of the connector as indicated in the illustrations on p. 41.
6. Tabulated values are based on 3⅝" studs. Web crippling checks for deeper members are the responsibility of the Designer.
7. Allowable loads are based on in-plane loads applied to the stud fasteners that are nearest the support, with complete rotational restraint at the studs.

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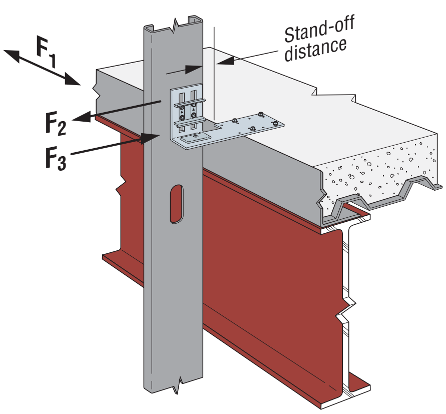
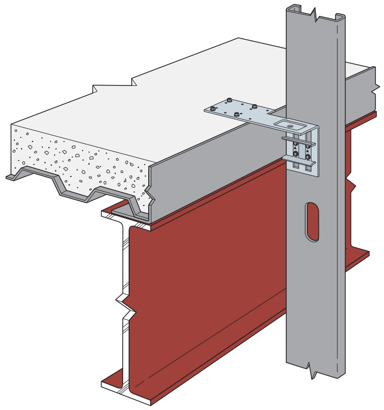
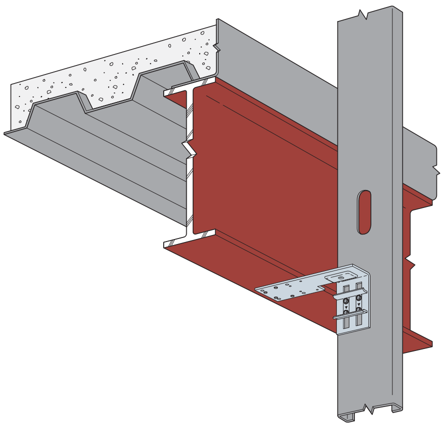
SCHA Slide-Clip Connectors for Horizontal Anchorage



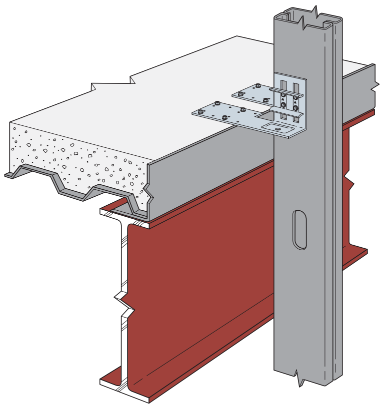
Typical SCHA Installation
at Floor Slab



Typical SCHA Installation
at Floor Slab
(inverted)



Typical SCHA Installation
at Beam Flange



Typical SCHA Installation
for Built-Up Studs at Floor Slab
(SCHA10.75L near side and SCHA10.75 far side)

Allowable ¼" Titen HD® Concrete Screw Anchorage Loads

Anchorage Type	Anchors Quantity and Size	Allowable Anchor Load (lb.) F_2 and F_3			
		Wind and Seismic in SDC A&B		Seismic in SDC C through F	
		Uncracked Concrete	Cracked Concrete	Cracked Concrete (Ω = 1.0)	Cracked Concrete[7] (Ω = 2.5)
Simpson Strong-Tie® Titen HD screw anchor model THDB25178H	(4) ¼" x 1⅞"	1,025	730	855	350
	(2) ¼" x 1⅞"	510	365	425	175

1. Allowable anchor capacities have been determined using ACI 318-14 Chapter 17 calculations with a minimum concrete compressive strength (f'_c) of 2,500 psi and 5" slab thickness in normal-weight concrete. Tabulated values can be multiplied by a factor (λ_a) of 0.6 for sand-lightweight concrete.
2. Nominal Embedment Depth/Effective Embedment Depth relationship is 1.75" (h_{nom}) / 1.30" (h_{ef}).
3. Edge distance is assumed to be 2", and end distance is 7⅛".
4. Load values are for group anchors based on ACI 318-14, condition B, load factors from ACI 318-14 Section 5.3, no supplement edge reinforcement, $\psi_{c, V}$ = 1.0 for cracked concrete and periodic special inspection.
5. Allowable Stress Design (ASD) values were determined by multiplying calculated LRFD capacities by a conversion factor, Alpha (α), of 0.70 for seismic load and 0.6 for wind loads. ASD values for other combinations may be determined using alternate conversion factors.
6. Tabulated allowable ASD loads for Wind and Seismic in SDC A&B are based on using wind conversion factors and may be increased by 1.17 for SDC A&B only.
7. Allowable loads have been divided by an Omega (Ω) seismic factor of 2.5 for brittle failure as required by ACI 318-14 Chapter 17.
8. Allowable F_2 and F_3 loads are based on the governing loading direction, which is toward the edge of slab.
9. Tabulated capacities are based on maximum allowable anchorage loads only. The capacity of the connection system shall be the minimum of the tabulated value and the SCHA Allowable Connector Loads.

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Drift Clips

IDCB Drift-Clip Bypass Framing Connector

The IDCB drift-clip connector is used to secure bypass stud framing to the edge of a slab. The connector will accommodate 1" of lateral drift in each direction and 1" of upward and downward vertical deflection. Tested load values are provided for anchorage to a steel-edge angle using #12 x 1¼" Strong-Drive® XL Large-Head Metal screws.

Features:

- Horizontal embossments and corner gussets optimize performance in the F_2 load direction
- Precision-manufactured shouldered screws provided with the IDCB connector are designed to prevent overdriving and to ensure that the clip functions properly
- Simpson Strong-Tie® No-Equal stamps mark the center of the slots to help ensure correct shouldered screw and anchor placement

Material: 97 mil (12 ga.)

Coating: Galvanized (G90)

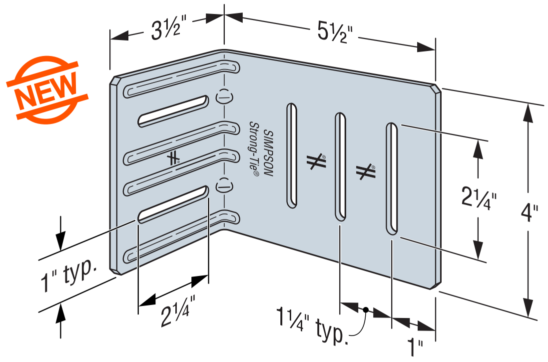
Installation:

- Use the specified type and number of fasteners and anchors.
- In the vertical slots, use the specified number of #14 shouldered screws (included) for attachment to the stud. Install screws to align with the No-Equal stamp.
- For attachment to a minimum ³⁄₁₆"- and maximum ½"-thick steel edge angle, use Simpson Strong-Tie® Strong-Drive XL Large-Head Metal screws (XLQ114B1224). Use one screw centered in each horizontal slot. Install screws to align with the No-Equal stamp and back out ½ turn.
- For fastener installation into steel backed by concrete, predrilling of both the steel and the concrete may be required. For predrilling, use a maximum ³⁄₁₆"-diameter drill bit.

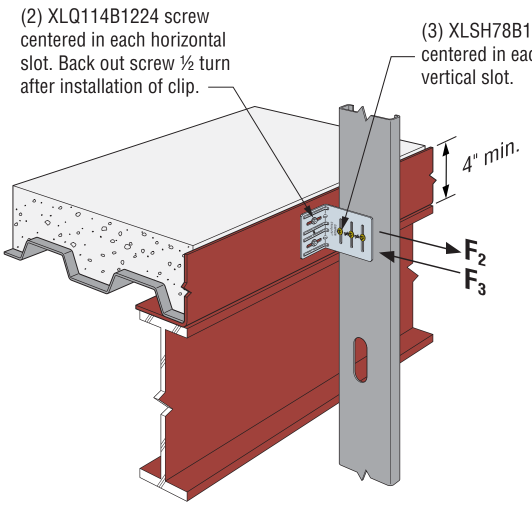
Codes: See p. 11 for Code Reference Key Chart

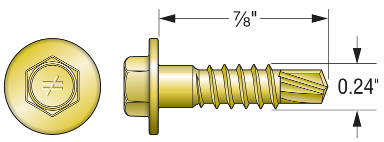
Ordering Information:

IDCB45.5-KT25 contains (25) IDCB45.5 connectors and (83) XLSH78B1414 #14 shouldered screws

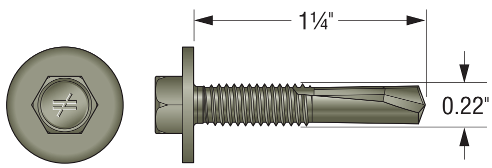


IDCB45.5

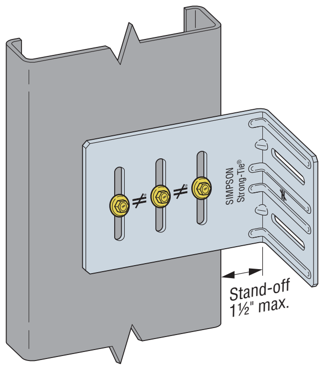




XLSH78B1414
#14 Shouldered Screw for Attachment to Stud Framing
(included)



XLQ114B1224 Screw for Anchorage to Steel Edge Angle
(sold separately)



Stand-Off Distance

IDCB45.5 Connector Loads

Model No.	No. of #14 Shouldered Screws[1]	No. of #12 XLQ Screw Anchors[2]	Load Direction	Stud Thickness mil (ga.)	Strength[3]		Service Limit[3]		Code Ref.
					ASD	LRFD	⅛" Deformation	³⁄₁₆" Deformation	
IDCB45.5	3	2	F_2 and F_3	33 mil (20 ga.)	600	900	410	650	170
				43 mil (18 ga.)	680	1,060	455	695	
				54 mil (16 ga.)	760	1,220	500	745	

1. #14 x ⅞" shouldered screw (model no. "XLSH78B1414") provided with the clips are ASTM C1513 compliant.
2. For additional information on the #12 XL screw (model no. "XLQ114B1224") refer to p. 149.
3. The capacity of the connection will be the minimum of Strength Load and applicable Service Limit Load as determined by the Designer.
4. See additional important general information on p. 16.

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DSSCB Drift Strut Sliding Clip Bypass

This product is preferable to similar connectors because of a) easier installation, b) higher loads, c) lower installed cost, or a combination of these features.

Available in the summer of 2017

Simpson Strong-Tie introduces the DSSCB for cold-formed steel construction. The DSSCB is used to anchor cold-formed steel bypass framing to the edge of a floor slab for situations that accomodate horizontal building drift. The DSSCB is also used by contractors that perform panelized construction. For this application the DSSCB makes it a snap to anchor finished panels to the slab edge by enabling the installer to work off of the top of the slab without having to waste time drilling and installing anchors. It also eliminates the coordination difficulties associated with pre-anchorage of standard bypass clips.

Features:

- The clips come in lengths of 3½", 6", and 8".
- Prepunched slots provide a full ¾" of both upward and downward deflection.
- Precision manufactured shouldered screws, provided with DSSCB connectors, are designed to prevent overdriving and to ensure the clip functions properly.
- Works with 13⁄16" and 1⅝" strut channels as given in the figures below. Common manufacturers are Unistrut®, PHD and B-Line. Struts are not supplied by Simpson Strong-Tie.
- The maximum stand-off distance for 13⁄16" struts is 3⅛", and for 1⅝" struts is 4¼".
- Depending on the application and the Designer's specifications, struts can be mechanically anchored or welded.
- Pre-engineered design solutions are provided for channel strut anchorage.

Material: 97 mil (12 ga.), 50 ksi

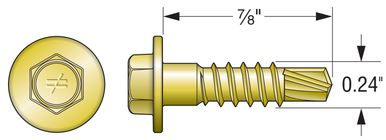
Coating: Galvanized (G90)

Installation:

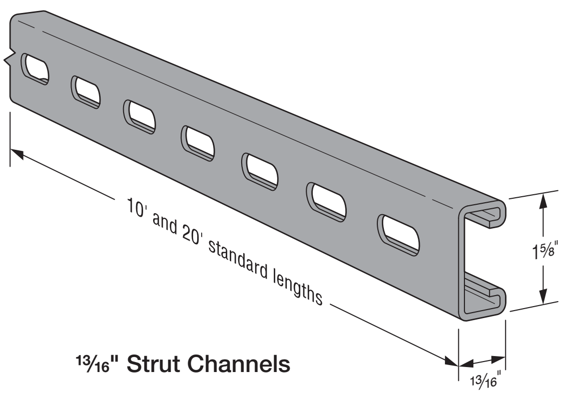
- Use the specified type and number of fasteners

Ordering Information:

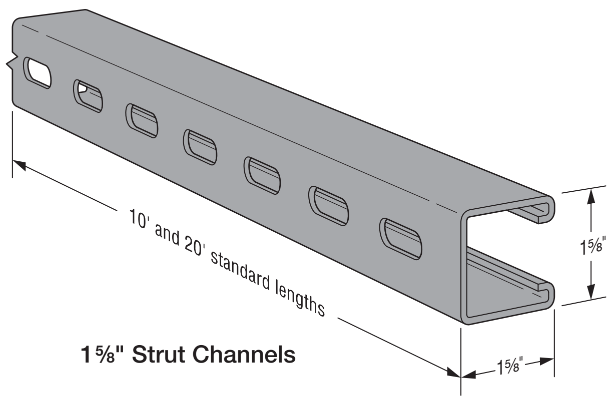
- DSSCB43.5-KT25, DSSCB46-KT25, DSSCB48-KT25 contains: 25 connectors and enough shouldered screws for installation



XLSH78B1414
#14 Shouldered Screw for Attachment to Stud Framing
(included)



13⁄16" Strut Channels



1⅝" Strut Channels

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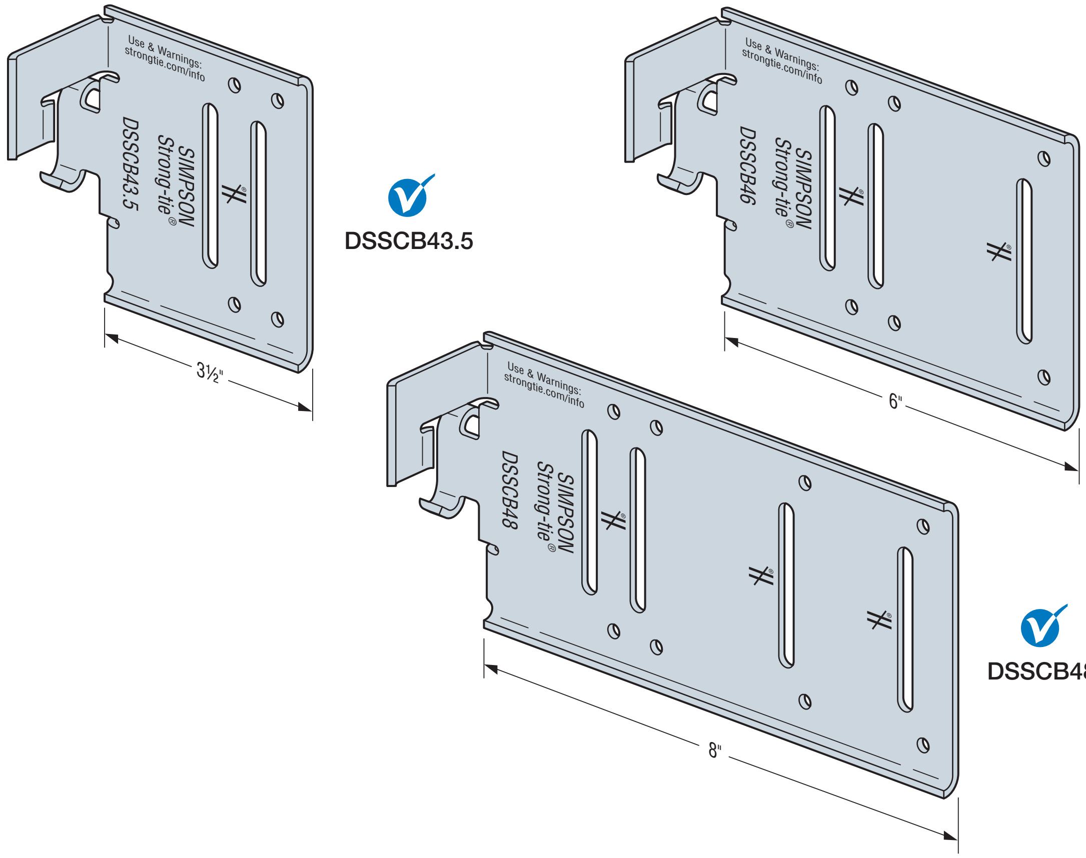
DSSCB Drift Strut Sliding Clip Bypass



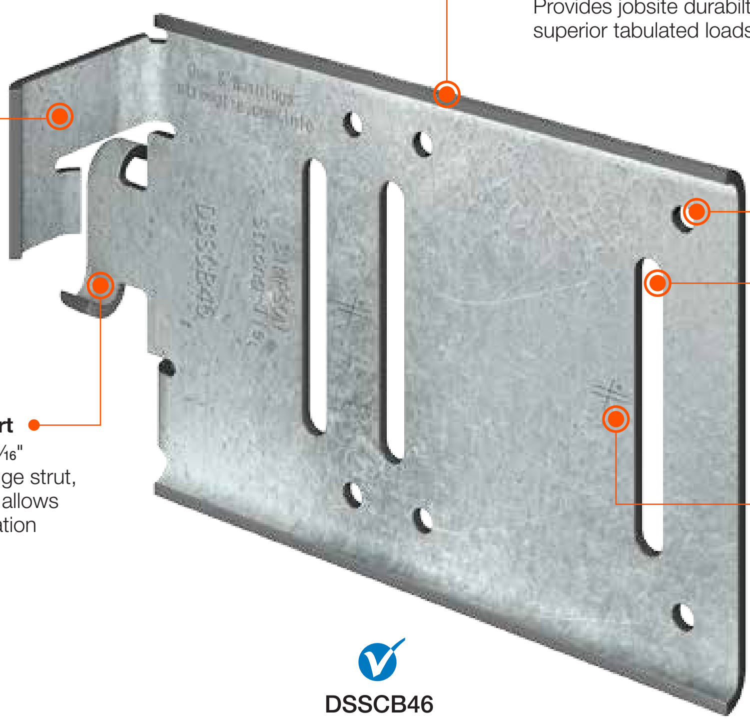
DSSCB43.5

DSSCB46

DSSCB48

Squaring Flanges
Helps the clip stay square with the strut

Stiffened Edges and Heavy 12-Gauge Construction
Provides jobsite durabilty and superior tabulated loads



Dual Function
Clips can be used for either deflection or fixed conditions

Unique Formed Insert
Works with standard 1³⁄₁₆" and 1⅝" deep, 12-gauge strut, minimizes friction, and allows an easy twist-in installation

No-Equal Stamps
Marks the center of the slots to help ensure correct shouldered-screw placement

DSSCB46
U.S. Patent Pending

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Rigid Connectors

FCB Bypass Framing Fixed-Clip Connector

SIMPSON Strong-Tie®

This product is preferable to similar connectors because of a) easier installation, b) higher loads, c) lower installed cost, or a combination of these features.

The FCB clip is an economical, high-performance fixed-clip connector that can be used for a variety of framing applications. It is rated for tension, compression, shear and in-plane loads and offers the Designer the flexibility of specifying different screw and anchorage patterns that conform to desired load levels.

Features:

- Rated for tension, compression, shear and in-plane loads
- Provides design flexibility with varying screw and anchorage patterns that achieve different load levels
- Strategically placed stiffeners, embossments and anchor holes maximize connector performance

Material: 54 mil (16 ga.)

Finish: Galvanized (G90)

Installation:

- Use the specified type and number of anchors.
- Use the specified number of #12 self-drilling screws to CFS framing. Note that #10 self-drilling screws can be used per the load tables given on pp. 54, 55.

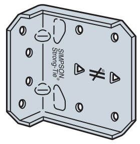
Codes: See p. 11 for Code Reference Key Chart

Ordering Information:

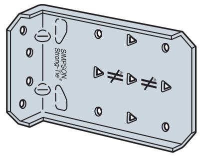
FCB43.5-R25, FCB45.5-R25, FCB47.5-R25, FCB49.5-R25, and FCB411.5-R25 contain:

- Box of 25 connectors (screws not included)

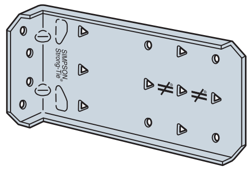
FCB43.5



FCB45.5

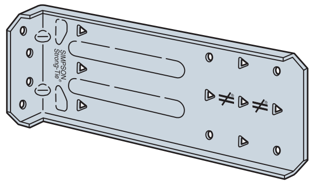


FCB47.5

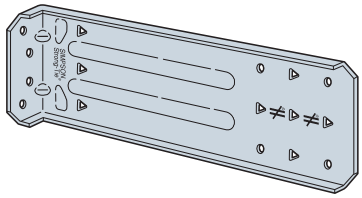


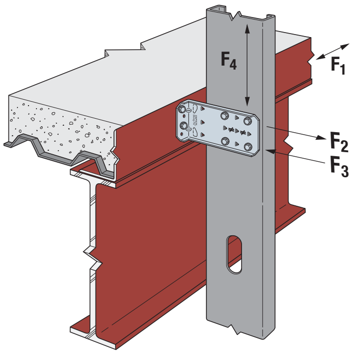
U.S. Patent 8,555,592

FCB49.5

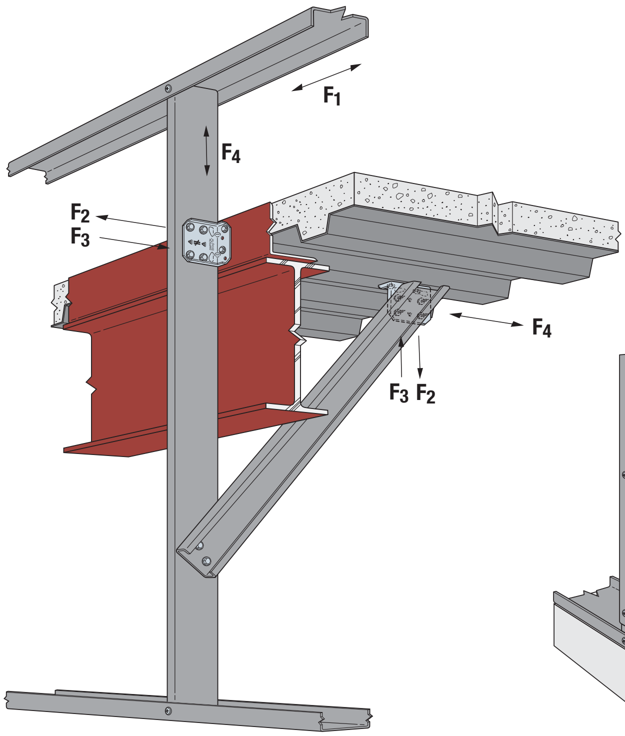


FCB411.5

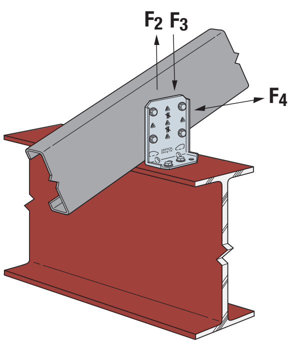




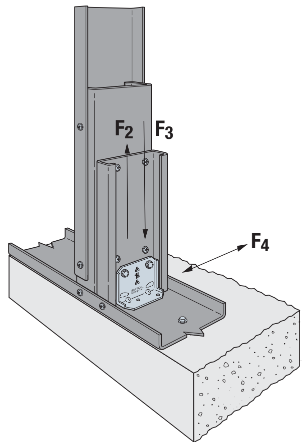
Typical FCB Installation at Bypass Framing



Typical FCB Installation at Sprandrel Studs and Kickers



Typical FCB Installation for Roof Rafters



Typical FCB Installation at the Base of a 6" Jamb Stud

Rigid Connectors

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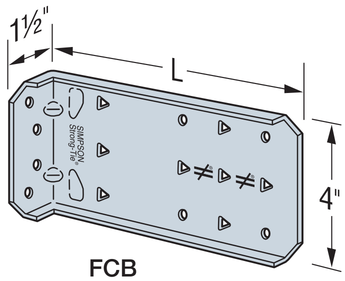
FCB Bypass Framing Fixed-Clip Connector

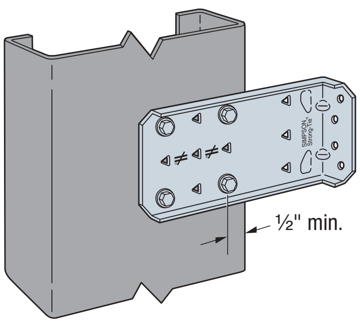
FCB Allowable Connector Loads

Model No.	Connector Material Thickness mil (ga.)	L (in.)	Min./ Max.	No. of #12–14 Self-Drilling Screws[5]	Stud Thickness												Code Ref.
					33 mil (20 ga.)				43 mil (18 ga.)				54 mil (16 ga.)				
					F_1[3,4]	F_2[2]	F_3[2]	F_4[2]	F_1[3,4]	F_2[2]	F_3[2]	F_4[2]	F_1[3,4]	F_2[2]	F_3[2]	F_4[2]	
FCB43.5	54 (16)	3½	Min.	4	135	755	755	755	205	1,105	975	1,120	235	1,250	975	1,490	IP2, L8, FL
			Max.	6	205	1,100	1,130	1,130	205	1,105	1,260	1,455	235	1,250	1,735	1,910	
FCB45.5	54 (16)	5½	Min.	4	120	755	755	755	175	1,105	975	945	175	1,105	975	1,325	
			Max.	9	155	1,100	1,260	1,180	175	1,105	1,260	1,485	175	1,105	1,735	1,925	
FCB47.5	54 (16)	7½	Min.	4	90	755	755	220	90	1,105	945	330	90	1,105	945	365	
			Max.	12	205	1,100	1,260	705	235	1,105	1,260	1,050	235	1,105	1,735	1,445	
FCB49.5	54 (16)	9½	Min.	4	60	755	755	170	60	1,105	945	255	60	1,105	945	365	
			Max.	12	205	1,100	1,260	750	235	1,105	1,260	1,115	235	1,105	1,735	1,200	
FCB411.5	54 (16)	11½	Min.	4	45	755	755	140	45	1,105	920	205	45	1,105	920	365	
			Max.	12	205	1,100	1,260	795	235	1,105	1,260	860	235	1,105	1,735	860	

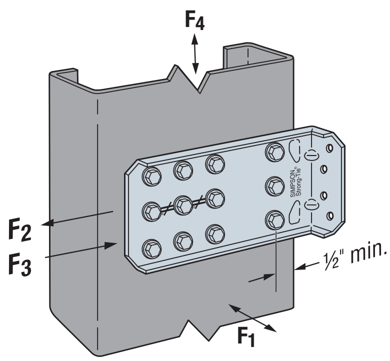
1. Min. fastener quantity and load values — fill all round holes; max. fastener quantity and load values — fill all round and triangular holes.
2. Allowable loads are based on clip capacity only and do not consider anchorage. The capacity of the connection system will be the minimum of the tabulated value and the allowable load from the FCB Allowable Anchorage Loads table on p. 49.
3. Anchorage to the supporting structure using welds or a minimum of (2) #12–24 self-drilling screws is required.
4. Allowable loads are based on in-plane loads applied to the stud fasteners that are nearest the support with complete rotational restraint at the studs. For a more extensive treatment of in-plane loads please refer to Simpson Strong-Tie engineering letter L-CF-CWCF1DIR17 at **strongtie.com**.
5. Reference pp. 54, 55 for loads for #10–16 screws.
6. Reference pp. 63–67 for LRFD design strengths.



FCB



FCB Installation
with Min. Fasteners



FCB Installation
with Max. Fasteners

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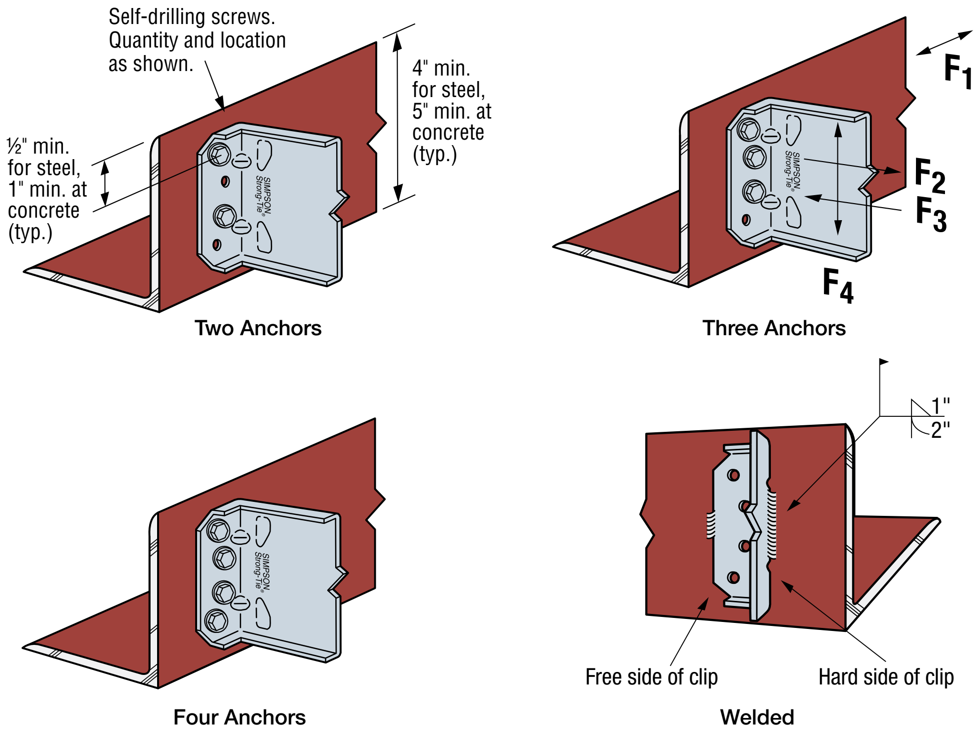
FCB Bypass Framing Fixed-Clip Connector

FCB Allowable Anchorage Loads

Anchorage Type	Minimum Base Material	No. of Anchors	Allowable Load (lb.)								
			F_2 and F_3	F_4							
				FCB43.5	FCB45.5	FCB47.5		FCB49.5		FCB411.5	
				Min./Max.	Min./Max.	Min.	Max.	Min.	Max.	Min.	Max.
#12 self-drilling screws Simpson Strong-Tie® X Metal screws XQ1S1214, X1S1214	A36 steel 3⁄16" thick	2	795	625	410	255	445	185	265	120	190
		3	1,120	690	450	280	490	200	295	135	210
		4	1,590	1,255	820	365	890	355	535	275	380
Simpson Strong-Tie #12–24 x 1¼" Strong-Drive® XL Large-Head Metal screws XLQ114T1224, XLQ114B1224-2K	A36 steel 3⁄16" thick	2	1,115	625	410	255	445	185	265	120	190
		3	1,645	690	450	280	490	200	295	135	210
		4	2,230	1,255	820	365	890	355	535	275	380
Simpson Strong-Tie 0.157" x ⅝" power-actuated fasteners PDPAT-62KP	A36 steel 3⁄16" thick	2	390	410	265	165	290	120	175	75	125
		3	715	465	305	190	330	135	195	85	140
		4	970	840	550	340	595	245	355	145	255
Simpson Strong-Tie 0.157" x ⅝" power-actuated fasteners PDPAT-62KP	A572 or A992 steel 3⁄16" thick	2	585	410	265	165	290	120	175	75	125
		3	800	465	305	190	330	135	195	85	140
		4	1,170	840	550	340	595	245	355	145	255
Simpson Strong-Tie ¼" x 1¾" Titen® hex-head masonry screws TTN25134H	Concrete f'_c = 2,500 psi	2	380	415	270	165	295	120	175	105	125
		3	445	470	310	190	335	140	200	120	145
		4	510	645	420	260	455	190	275	165	195
Welded E70XX electrodes	A36 steel 3⁄16" thick	Hard side: 2" Free side: 1"	1,735	1,910	1,925	365	1,445	365	1,200	365	860

1. For additional important information, see General Information on p. 16.
2. Allowable loads are for clip anchorage only. The capacity of the connection system will be the minimum of the tabulated allowable anchorage loads the allowable load from the FCB Allowable Connector Load table on p. 48.
3. Allowable loads for #12–24 self-drilling screws and PDPAT powder-actuated fasteners are based on installation in minimum 3⁄16"-thick structural steel with F_y = 36 ksi. PDPAT values are also provided for A572 steel. Values listed above maybe used where other thicknesses of steel are encountered provided that the fastener has equal or better tested values into thicker steel (see p. 16). It is the responsibility of the Designer to select the proper length fasteners based on the steel thickness installation.
4. For screw fastener installation into steel backed by concrete, predrilling of both the steel and the concrete is suggested. For predrilling use a maximum 3⁄16"-diameter drill bit.



FCB Anchor Layout

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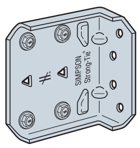
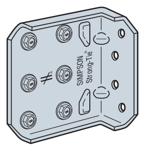
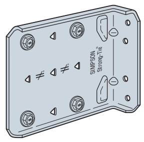
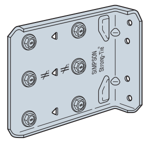
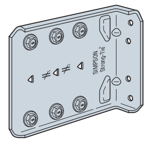
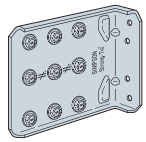
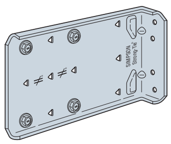
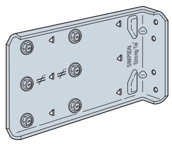
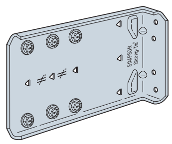
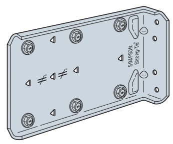
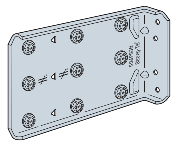
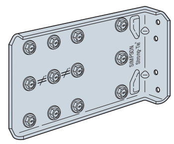
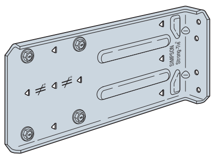
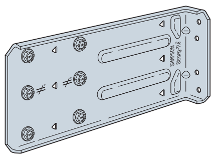
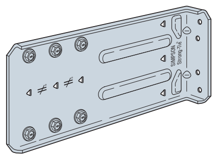
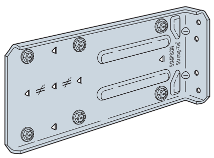
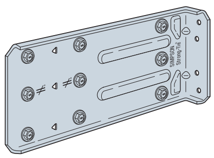
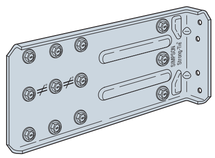
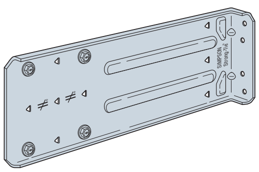
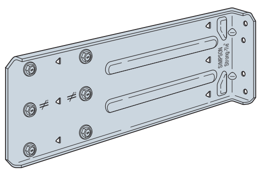
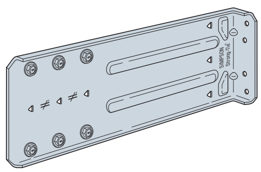
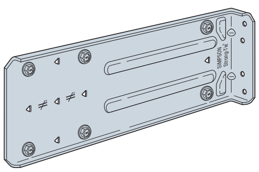
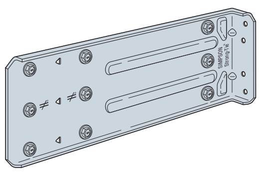
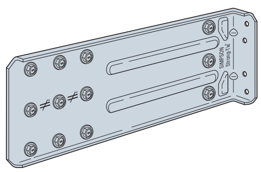
FCB Supplemental Information

The following FCB supplemental information is given to help Designers with value-engineered solutions for our FCB connectors. Loads are given for fastener patterns other than our standard “min.” (fill all round holes) and “max.” (fill all round and triangle holes). In addition, the tables give LRFD loads and loads for #10 screws as well as #12 screws.

Table 1: FCB Screw Patterns

FCB43.5	Pattern “Min.”	Pattern “Max.”				
						
FCB45.5	Pattern “Min.”	Pattern 1	Pattern 2	Pattern “Max.”		
						
FCB47.5	Pattern “Min.”	Pattern 3	Pattern 4	Pattern 5	Pattern 6	Pattern “Max.”
						
FCB49.5	Pattern “Min.”	Pattern 7	Pattern 8			
						
	Pattern 9	Pattern 10	Pattern “Max.”			
						
FCB411.5	Pattern “Min.”	Pattern 11	Pattern 12			
						
	Pattern 13	Pattern 14	Pattern “Max.”			
						

Rigid Connectors

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Footnotes for Tables 2, 3, 4 and 5

1. Calculated values are per AISI RP15-2, AISI S-100, or generally accepted industry standards. Shaded values for #12–14 screws are tabulated in this catalog and are based on testing per ICC-ES AC261. For #12–14 screws unshaded tabulated values are conservatively based on the maximum value from calculations and from the minimum (4-screw) tested values.
2. The tabulated values do not account for anchorage to the support. Anchor strength must be calculated separately and may reduce the capacity of the connection when compared to the tabulated values.
3. Tabulated values do not include shear, web crippling, buckling or other local effects in the member. The Designer must check member limit states separately.
4. For load combinations that include F_1 and/or F_2 and/or F_3, use an appropriate interaction equation.
5. #10–16 screws shall have $P_{ss} \geq$ 1,620 lb. #12–14 screws shall have $P_{ss} \geq$ 2,520. Calculated values are per AISI S-100. Screws must be installed with three (min.) exposed threads.
6. The number of screws listed is for one clip leg that is attached to the supported stud.
7. For the minimum screw pattern, fill all round holes. For the maximum screw pattern fill all round and triangle holes. Reference Table 1 on p. 50.
8. Reference p. 48 for load direction definitions.
9. In addition to calculations of net and gross section tension, and screw shear of the clip leg attached to the stud, F_2 values are also calculated for weak-axis bending of the anchored clip leg with the line of bending at the holes farthest from the bend radius of the angle. The Designer is responsible for calculating pull-over, pullout and tension strength of the anchors and this may reduce F_2 strength compared to the tabulated values.
10. F_3 values are computed using the plate buckling provisions of AISI RP15-2.
11. For the F_4 values it is assumed that all of the connection eccentricity is taken by screws in the supported stud. F_4 values are also limited by plate shear buckling per AISI RP15-2. The Designer is responsible for calculating the shear capacity of the anchorage which may reduce F_4 strength compared to the tabulated values.
12. In addition to the limit states given in notes 9, 10 and 11, F_2, F_3 and F_4 are also limited by screw shear according to the thinnest connected part of the connector and stud.
13. Where test data is not available, service load limits for F_2 and F_3 are not given since there are no generally accepted industry methods available to compute these values. Calculated F_4 service load limits are based on AISI Research Report RP15-2 for ⅛" deflection.
14. For 50 ksi studs, 68 mil (14 ga.) and thicker, use tabulated values for 54 mil (16 ga.) — 50 ksi studs.

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FCB Supplemental Information

Table 2: FCB Bypass Framing Fixed-Clip Connectors (FCB43.5, FCB45.5, FCB47.5 with #12–14 Screws) — Service Load Limits and Strengths (lb.)

Model No.	No. of #12 Screws	Screw Pattern	Load Direction	Service Load Limit	Stud Thickness and Yield Strength								
					33 mil (20 ga.) – 33 ksi			43 mil (18 ga.) – 33 ksi			54 mil (16 ga.) – 50 ksi		
					ASD	LRFD	Nominal	ASD	LRFD	Nominal	ASD	LRFD	Nominal
FCB43.5	4	Min.	F_2	1,100	755	1,130	2,255	1,105	1,680	3,360	1,250	3,040	4,655
			F_3	1,185	755	1,130	2,180	975	1,565	2,180	975	1,565	2,180
			F_4	2,170	755	1,130	1,980	1,120	1,680	2,590	1,490	2,380	3,380
	6	Max.	F_2	1,100	1,100	1,690	3,245	1,105	2,425	3,720	1,250	3,040	4,655
			F_3	1,260	1,130	1,690	3,245	1,260	2,425	3,720	1,735	3,040	4,010
			F_4	2,415	1,130	1,690	2,635	1,455	2,330	3,315	1,910	3,055	4,345
FCB45.5	4	Min.	F_2	1,100	755	1,130	2,255	1,105	1,680	3,360	1,105	2,680	4,110
			F_3	1,185	755	1,130	2,180	975	1,565	2,180	975	1,565	2,180
			F_4	1,225	755	1,130	1,720	945	1,515	2,150	1,325	2,120	3,015
	6	1	F_2	1,100	755	1,130	2,255	1,105	1,680	3,360	1,105	2,680	4,110
			F_3	1,185	755	1,130	2,180	975	1,565	2,180	975	1,565	2,180
			F_4	1,225	755	1,130	1,720	945	1,515	2,150	1,325	2,120	3,015
	6	2	F_2	1,100	755	1,130	2,255	1,105	1,680	3,360	1,105	2,680	4,110
			F_3	1,185	755	1,130	2,180	975	1,565	2,180	975	1,565	2,180
			F_4	1,225	755	1,130	1,720	945	1,515	2,150	1,325	2,120	3,015
	9	Max.	F_2	1,100	1,100	2,025	2,880	1,105	2,425	3,720	1,105	2,680	4,110
			F_3	1,260	1,260	2,285	3,245	1,260	2,425	3,720	1,735	2,870	4,010
			F_4	2,570	1,180	1,890	2,685	1,485	2,375	3,380	1,925	3,080	4,380
FCB47.5	4	Min.	F_2	1,100	755	1,130	2,255	1,105	1,680	3,360	1,105	2,680	4,110
			F_3	1,185	755	1,130	2,115	945	1,515	2,115	945	1,515	2,115
			F_4	380	200	330	660	330	495	830	365	580	830
	6	3	F_2	1,100	755	1,130	2,255	1,105	1,680	3,360	1,105	2,680	4,110
			F_3	1,185	755	1,130	2,115	945	1,515	2,115	945	1,515	2,115
			F_4	380	260	390	775	380	575	1,060	380	585	1,060
	6	4	F_2	1,100	755	1,130	2,255	1,105	1,680	3,360	1,105	2,680	4,110
			F_3	1,185	755	1,130	2,115	945	1,515	2,115	945	1,515	2,115
			F_4	380	275	410	820	380	585	1,060	380	585	1,060
	6	5	F_2	1,100	755	1,130	2,255	1,105	1,680	3,360	1,105	2,680	4,110
			F_3	1,185	785	1,275	2,550	945	1,515	2,550	945	1,515	2,550
			F_4	465	385	580	1,155	575	860	1,720	900	1,385	2,520
	9	6	F_2	1,100	755	1,130	2,255	1,105	1,680	3,360	1,105	2,680	4,110
			F_3	1,185	755	1,195	2,390	945	1,515	2,390	945	1,515	2,390
			F_4	465	530	800	1,595	790	1,185	2,370	900	1,385	2,520
	12	Max.	F_2	1,100	1,100	2,025	2,880	1,105	2,425	3,720	1,105	2,680	4,110
			F_3	1,260	1,360	2,285	3,245	1,260	2,425	3,720	1,735	2,870	3,780
			F_4	1,875	705	1,060	2,120	1,060	1,575	3,155	1,445	2,310	3,440

See footnotes on p. 51.

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FCB Supplemental Information

Table 3: FCB Bypass Framing Fixed-Clip Connectors (FCB49.5, FCB411.5 with #12–14 Screws) — Service Load Limits and Strengths (lb.)

Model No.	No. of #12 Screws	Screw Pattern	Load Direction	Service Load Limit	Stud Thickness and Yield Strength								
					33 mil (20 ga.) – 33 ksi			43 mil (18 ga.) – 33 ksi			54 mil (16 ga.) – 50 ksi		
					ASD	LRFD	Nominal	ASD	LRFD	Nominal	ASD	LRFD	Nominal
FCB49.5	4	Min.	F_2	1,100	755	1,130	2,255	1,105	1,680	3,360	1,105	2,680	4,110
			F_3	1,185	755	1,130	2,180	945	1,565	2,180	945	1,565	2,180
			F_4	380	170	255	510	255	380	760	365	580	830
	6	7	F_2	1,100	755	1,130	2,255	1,105	1,680	3,360	1,105	2,680	4,110
			F_3	1,185	755	1,130	2,180	945	1,565	2,180	945	1,565	2,180
			F_4	380	195	295	590	265	410	760	365	580	830
	6	8	F_2	1,100	755	1,130	2,255	1,105	1,680	3,360	1,105	2,680	4,110
			F_3	1,185	755	1,130	2,180	945	1,565	2,180	945	1,565	2,180
			F_4	380	210	315	630	265	410	760	365	580	830
	6	9	F_2	1,100	755	1,130	2,255	1,105	1,680	3,360	1,105	2,680	4,110
			F_3	1,185	785	1,275	2,550	945	1,565	2,550	945	1,565	2,550
			F_4	465	390	585	1,170	580	870	1,735	900	1,385	2,520
	9	10	F_2	1,100	755	1,130	2,255	1,105	1,680	3,360	1,105	2,680	4,110
			F_3	1,185	755	1,195	2,390	945	1,565	2,390	945	1,565	2,390
			F_4	465	555	835	1,670	830	1,240	2,485	900	1,385	2,520
	12	Max.	F_2	1,100	1,100	2,025	2,880	1,105	2,425	3,720	1,105	2,680	4,110
			F_3	1,260	1,360	2,285	3,245	1,260	2,425	3,720	1,735	2,870	4,010
			F_4	2,290	750	1,120	2,245	1,115	1,670	3,020	1,200	2,125	3,020
FCB411.5	4	Min.	F_2	1,100	755	1,130	2,255	1,105	1,680	3,360	1,105	2,680	4,110
			F_3	1,185	755	1,130	1,720	920	1,470	1,720	920	1,470	1,720
			F_4	380	140	210	415	205	310	620	365	580	830
	6	11	F_2	1,100	755	1,130	2,255	1,105	1,680	3,360	1,105	2,680	4,110
			F_3	1,185	755	1,130	1,720	920	1,470	1,720	920	1,470	1,720
			F_4	380	160	240	480	205	315	620	365	580	830
	6	12	F_2	1,100	755	1,130	2,255	1,105	1,680	3,360	1,105	2,680	4,110
			F_3	1,185	755	1,130	1,720	920	1,470	1,720	920	1,470	1,720
			F_4	380	170	255	510	205	315	620	365	580	830
	6	13	F_2	1,100	755	1,130	2,255	1,105	1,680	3,360	1,105	2,680	4,110
			F_3	1,185	785	1,275	2,550	920	1,470	2,550	920	1,470	2,550
			F_4	465	405	605	1,210	600	900	1,795	900	1,385	2,520
	9	14	F_2	1,100	755	1,130	2,255	1,105	1,680	3,360	1,105	2,680	4,110
			F_3	1,185	755	1,195	2,390	920	1,470	2,390	920	1,470	2,390
			F_4	465	585	880	1,760	870	1,310	2,520	900	1,385	2,520
	12	Max.	F_2	1,100	1,100	2,025	2,880	1,105	2,425	3,720	1,105	2,680	4,110
			F_3	1,260	1,260	2,285	3,245	1,260	2,425	3,645	1,735	2,870	3,645
			F_4	2,290	795	1,195	2,390	860	1,780	3,020	860	2,125	3,020

See footnotes on p. 51.

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FCB Supplemental Information

Table 4: FCB Bypass Framing Fixed-Clip Connectors (FCB43.5, FCB45.5, FCB47.5 with #10–16 Screws) — Service Load Limits and Strengths (lb.)

Model No.	No. of #10 Screws	Screw Pattern	Load Direction	Service Load Limit	Stud Thickness and Yield Strength								
					33 mil (20 ga.) – 33 ksi			43 mil (18 ga.) – 33 ksi			54 mil (16 ga.) – 50 ksi		
					ASD	LRFD	Nominal	ASD	LRFD	Nominal	ASD	LRFD	Nominal
FCB43.5	4	Min.	F_2	—	490	735	815	490	735	815	490	735	815
			F_3	—	440	715	1,430	440	715	1,430	440	715	1,430
			F_4	465	340	515	1,025	530	795	1,585	900	1,385	2,520
	6	Max.	F_2	—	490	735	815	490	735	815	490	735	815
			F_3	—	660	1,075	2,145	660	1,075	2,145	660	1,075	2,145
			F_4	465	415	620	1,240	640	960	1,915	900	1,385	2,520
FCB45.5	4	Min.	F_2	—	490	735	815	490	735	815	490	735	815
			F_3	—	660	990	1,980	670	1,085	2,170	670	1,085	2,170
			F_4	350	270	410	815	420	630	1,260	700	1,075	1,955
	6	1	F_2	—	490	735	815	490	735	815	490	735	815
			F_3	—	625	1,015	2,035	625	1,015	2,035	625	1,015	2,035
			F_4	350	350	525	1,055	545	815	1,630	700	1,075	1,955
	6	2	F_2	—	490	735	815	490	735	815	490	735	815
			F_3	—	670	1,085	2,170	670	1,085	2,170	670	1,085	2,170
			F_4	—	370	555	1,110	570	855	1,710	700	1,075	1,955
	9	Max.	F_2	—	490	735	815	490	735	815	490	735	815
			F_3	—	625	1,015	2,035	625	1,015	2,035	625	1,015	2,035
			F_4	350	460	690	1,380	700	1,065	1,955	700	1,075	1,955
FCB47.5	4	Min.	F_2	—	490	735	815	490	735	815	490	735	815
			F_3	—	455	735	1,470	455	735	1,470	455	735	1,470
			F_4	175	195	290	580	300	450	895	380	585	1,060
	6	3	F_2	—	490	735	815	490	735	815	490	735	815
			F_3	—	425	690	1,380	425	690	1,380	425	690	1,380
			F_4	175	245	365	730	375	565	1,060	380	585	1,060
	6	4	F_2	—	490	735	815	490	735	815	490	735	815
			F_3	—	455	735	1,470	455	735	1,470	455	735	1,470
			F_4	175	260	390	775	380	585	1,060	380	585	1,060
	6	5	F_2	—	490	735	815	490	735	815	490	735	815
			F_3	—	785	1,275	2,550	785	1,275	2,550	785	1,275	2,550
			F_4	465	365	545	1,090	560	845	1,685	900	1,385	2,520
	9	6	F_2	—	490	735	815	490	735	815	490	735	815
			F_3	—	735	1,195	2,390	735	1,195	2,390	735	1,195	2,390
			F_4	465	500	750	1,505	775	1,165	2,325	900	1,385	2,520
	12	Max.	F_2	—	490	735	815	490	735	815	490	735	815
			F_3	—	735	1,195	2,390	735	1,195	2,390	735	1,195	2,390
			F_4	465	620	930	1,855	900	1,385	2,520	900	1,385	2,520

See footnotes on p. 51.

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Table 5: FCB Bypass Framing Fixed-Clip Connectors (FCB49.5, FCB411.5 w/ #10–16 Screws) — Service Load Limits and Strengths (lb.)

Model	No. of #10 Screws	Screw Pattern	Load Direction	Service Load Limit	Stud Thickness and Yield Strength								
					33 mil (20 ga.) – 33 ksi			43 mil (18 ga.) – 33 ksi			54 mil (16 ga.) – 50 ksi		
					ASD	LRFD	Nominal	ASD	LRFD	Nominal	ASD	LRFD	Nominal
FCB49.5	4	Min.	F_2	—	490	735	815	490	735	815	490	735	815
			F_3	—	360	585	1,175	360	585	1,175	360	585	1,175
			F_4	115	150	225	450	230	345	690	265	410	745
	6	7	F_2	—	490	735	815	490	735	815	490	735	815
			F_3	—	340	550	1,100	340	550	1,100	340	550	1,100
			F_4	115	185	280	560	265	410	745	265	410	745
	6	8	F_2	—	490	735	815	490	735	815	490	735	815
			F_3	—	360	585	1,175	360	585	1,175	360	585	1,175
			F_4	115	200	295	595	265	410	745	265	410	745
	6	9	F_2	—	490	735	815	490	735	815	490	735	815
			F_3	—	785	1,275	2,550	785	1,275	2,550	785	1,275	2,550
			F_4	465	365	550	1,100	570	850	1,705	900	1,385	2,520
	9	10	F_2	—	490	735	815	490	735	815	490	735	815
			F_3	—	735	1,195	2,390	735	1,195	2,390	735	1,195	2,390
			F_4	465	525	790	1,575	810	1,220	2,435	900	1,385	2,520
	12	Max.	F_2	—	490	735	815	490	735	815	490	735	815
			F_3	—	735	1,195	2,390	735	1,195	2,390	735	1,195	2,390
			F_4	465	655	985	1,965	900	1,385	2,520	900	1,385	2,520
FCB411.5	4	Min.	F_2	—	490	735	815	490	735	815	490	735	815
			F_3	—	210	320	375	210	320	375	210	320	375
			F_4	90	120	180	365	190	280	565	205	315	575
	6	11	F_2	—	490	735	815	490	735	815	490	735	815
			F_3	—	210	320	375	210	320	375	210	320	375
			F_4	90	150	225	450	205	315	575	205	315	575
	6	12	F_2	—	490	735	815	490	735	815	490	735	815
			F_3	—	210	320	375	210	320	375	210	320	375
			F_4	90	160	240	480	205	315	575	205	315	575
	6	13	F_2	—	490	735	815	490	735	815	490	735	815
			F_3	—	785	1,275	2,550	785	1,275	2,550	785	1,275	2,550
			F_4	465	380	570	1,140	585	880	1,760	900	1,385	2,520
	9	14	F_2	—	490	735	815	490	735	815	490	735	815
			F_3	—	735	1,195	2,390	735	1,195	2,390	735	1,195	2,390
			F_4	465	555	830	1,660	855	1,285	2,520	900	1,385	2,520
	12	Max.	F_2	—	490	735	815	490	735	815	490	735	815
			F_3	—	735	1,195	2,390	735	1,195	2,390	735	1,195	2,390
			F_4	465	695	1,045	2,090	900	1,385	2,520	900	1,385	2,520

See footnotes on p. 51.

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Special Order Custom Clips and Connectors

Simpson Strong-Tie can make a variety of flat and bent steel clips and connectors for cold-formed steel framing. Most custom clips can be punched with different holes and slots.

Material: 229 mil (3 ga.) maximum, 43 mil (18 ga.) minimum mill-certified steel (carbon and type 316L stainless steel)

Finish: Galvanized, Simpson Strong-Tie® gray paint. Contact Simpson Strong-Tie for availability.

To Obtain Quote:

- Supply a CAD drawing in .dwg or .dxf format complete with all dimensions, hole diameter and centerline locations, bend angles, steel strength (min. F_y and F_u), thickness (mil and/or ga.) and finish: (galvanized to G90, G185) or Simpson Strong-Tie gray paint (specify)
- Total shape and size up to a maximum of 48" x 48" (approx. 1⁄16" tolerance)
- Simpson Strong-Tie does not provide product engineering or load values for special-order custom clips and connectors
- Contact Simpson Strong-Tie for pricing information
- For additional information, please refer to Important Information and General Notes on pp. 12–16

Specification Example:

Quantity: XX pieces

Dimensions: Per the attached CAD drawing (.dwg or .dxf format)

Drawing must be fully dimensioned, including:

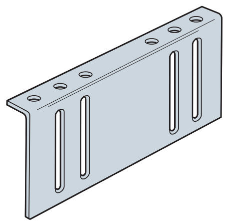
- Overall dimensions
- Leg dimensions
- Bend angles (if required)
- Hole/slot sizes and centerlines (if required)

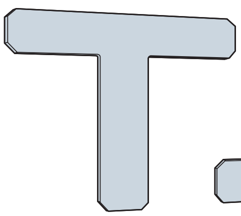
Material Specification: Contact Simpson Strong-Tie for availability

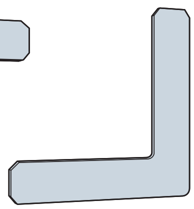
Thickness: 54 mil (16 ga.)

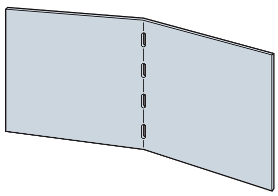
Strength: Min. Yield Strength (F_y) = 33 ksi, Min. Tensile Strength (F_u) = 45 ksi

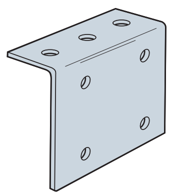
Finish: Galvanized G90

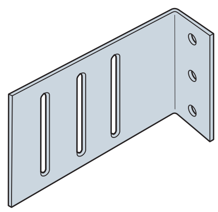


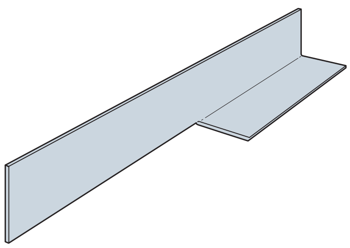


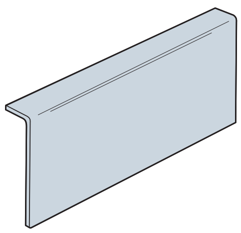


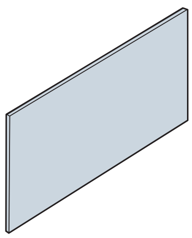


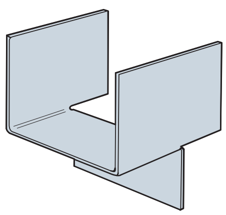


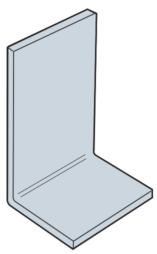












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FC Bypass Framing Fixed-Clip Connector

Ideal for high-seismic areas, Simpson Strong-Tie® FC connectors are the optimal solution for fixed-clip bypass framing. FC clips are often welded to the structure in high-seismic zones, but they also feature anchorage holes so that concrete screws or powder-actuated fasteners can be used to attach the clip to the structure. In addition to its anchorage versatility, the FC clip features prepunched screw holes for the framing attachment, eliminating the need for predrilling holes or worrying that fastener placement doesn't match the Designer specifications. FC connectors are manufactured using heavy-duty 10- and 12-gauge steel to provide exceptional resistance to in-plane seismic load.

Features:

- The clips come in lengths of 3½", 6" and 8" and are intended to be used with 3⅝", 6" and 8" studs, respectively
- The maximum stand-off distance is 1" for 3⅝" studs and 1½" for 6" and 8" studs
- Embossments in the bend line provide increased strength and stiffness in the F_1 and F_2 load directions, but are positioned towards the center of the clip so that 1½"-long welds can be applied at the top and bottom of the clip
- Prepunched large-diameter anchor holes accommodate ¼"-diameter concrete screws like the Simpson Strong-Tie Titen HD® screw anchor
- Prepunched small-diameter anchor holes accommodate powder-actuated fasteners like the 0.157"-diameter Simpson Strong-Tie PDPAT or #12 self-drilling Simpson Strong-Tie Strong-Drive® XL Large-Head Metal screw

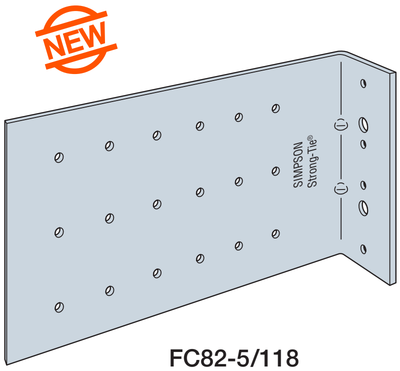
Material: 50 ksi

Finish: Galvanized (G90)

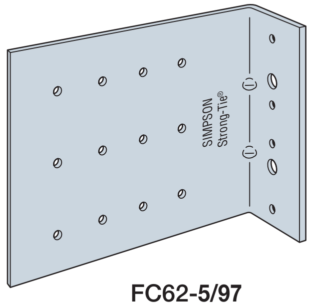
Installation:

- Use the specified type and number of fasteners and anchors

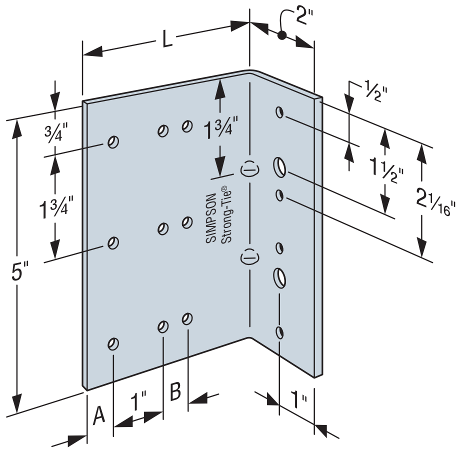
Codes: See p. 11 for Code Reference Key Chart



FC82-5/118



FC62-5/97
(FC62-5/118 similar)



FC32-5/97

Ordering Information and Dimensions

Model No.	Ordering SKU	Thickness mil (ga.)	L (in.)	A (in.)	B (in.)
FC32-5/97	FC32-5/97-KT25	97 (12)	3½	½	½
FC62-5/97	FC62-5/97-KT25	97 (12)	6	1	1
FC62-5/118	FC62-5/118-KT25	118 (10)	6	1	1
FC82-5/118	FC82-5/118-KT25	118 (10)	8	1	1

Note: Each box contains (25) connectors.

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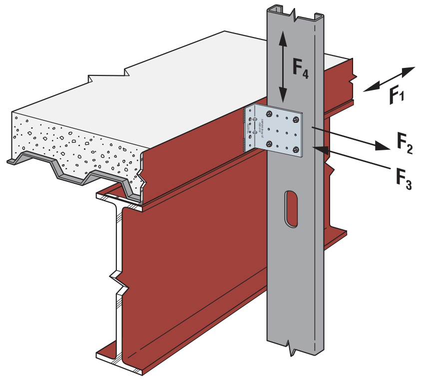
FC Bypass Framing Fixed-Clip Connector

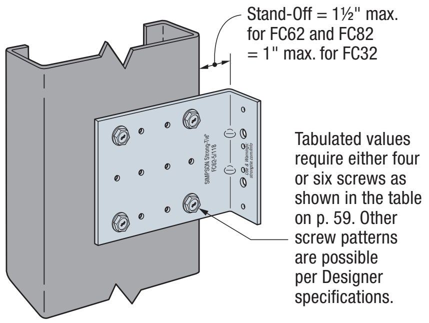
SIMPSON Strong-Tie®

FC Allowable Connector Loads (lb.)

Model No.	Stud Thickness mil (ga.)	Fasteners to Stud: Allowable Pullout Per Single #10 Screw	Fasteners to Stud: No. of #10 Self-Drilling Screws	Allowable Load F_1 1" Stand-Off	Allowable Load F_1 1½" Stand-Off	F_2	F_3	F_4	Code Ref.
FC32-5/97	33 (20)	85	4	165	—	705	1,130	705	170
			6	225	—	1,060	1,355	1,060	
FC62-5/97			4	115	130	705	1,130	705	
			6	140	160	1,060	1,355	1,060	
FC62-5/118			4	115	130	705	1,130	705	
			6	140	160	1,060	1,355	1,060	
FC82-5/118			4	105	120	705	1,130	705	
			6	135	155	1,060	1,355	1,060	
FC32-5/97	43 (18)	110	4	215	—	1,050	1,470	1,050	
			6	290	—	1,580	1,765	1,580	
FC62-5/97			4	150	175	1,050	1,470	1,050	
			6	185	215	1,580	1,765	1,580	
FC62-5/118			4	150	175	1,050	1,470	1,050	
			6	185	215	1,580	1,765	1,580	
FC82-5/118			4	140	160	1,050	1,470	1,050	
			6	175	200	1,580	1,765	1,580	
FC32-5/97	54 (16)	200	4	395	—	2,135	2,885	2,045	
			6	530	—	2,690	2,885	2,195	
FC62-5/97			4	325	375	2,135	2,885	2,045	
			6	405	465	2,690	2,885	2,195	
FC62-5/118			4	345	395	2,135	2,885	2,045	
			6	370	425	3,205	2,885	2,195	
FC82-5/118			4	325	375	2,135	2,885	2,045	
			6	440	505	3,205	2,885	2,195	
FC32-5/97	68 (14)	250	4	495	—	2,160	2,885	2,045	
			6	670	—	2,690	2,885	2,195	
FC62-5/97			4	435	500	2,160	2,885	2,045	
			6	465	535	2,690	2,885	2,195	
FC62-5/118			4	435	500	2,160	2,885	2,045	
			6	465	535	3,240	3,780	2,195	
FC82-5/118			4	410	470	2,160	2,885	2,045	
			6	555	640	3,240	3,780	2,195	
FC32-5/97	97 (12)	355	4	710	—	2,160	2,885	2,045	
			6	955	—	2,690	2,885	2,195	
FC62-5/97			4	775	775	2,160	2,885	2,045	
			6	1295	1295	2,690	2,885	2,195	
FC62-5/118			4	775	775	2,160	2,885	2,045	
			6	1150	1150	3,240	3,780	2,195	
FC82-5/118			4	585	585	2,160	2,885	2,045	
			6	790	790	3,240	3,780	2,195	



Typical FC Installation at Bypass Framing



FC62 with Four Screws

1. For additional important information, see General Information on pp. 14–16.
2. FC Allowable Connector Loads are also limited by the FC Anchorage Load tables on pp. 59 and 60. Use the minimum tabulated values from the connector and anchorage load tables as applicable.
3. See illustrations on p. 59 for screw fastener placement to stud framing.
4. Tabulated F_1 loads are based on assembly tests with the load through the centerline of stud. Tested failure modes were due to screw pullout; therefore compare F_1 against F_p calculated per ASCE 7-10 Chapter 13 with a_p = 1.25 and R_p = 1.0.
5. F_1 loads are based on maximum stand-off distances of 1" or 1½" as shown. Other loads are applicable to a 1" stand-off for FC32 and 1" or 1½" stand-off for FC62 and FC82.
6. The allowable plastic moment at the bend line in the F_1 load direction for 97 mil (12 ga.) and 118 mil (10 ga.) FC connectors are 395 in.-lb. and 675 in.-lb., respectively.

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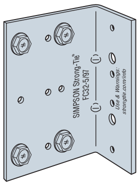
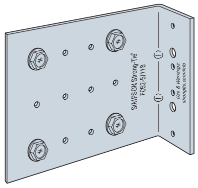
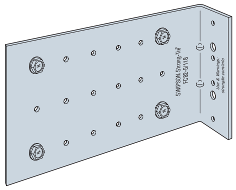
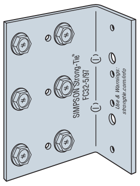
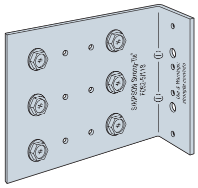
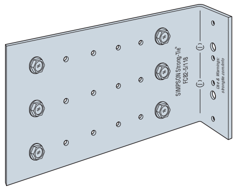
FC Bypass Framing Fixed-Clip Connector

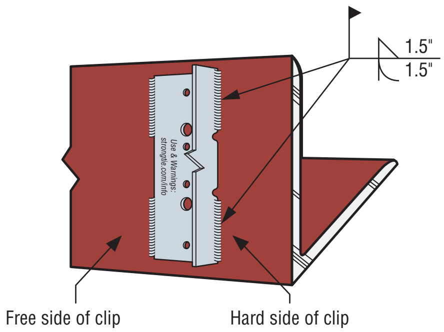
FC Screw Patterns

Screw Pattern	Models		
	FC32-5/97	FC62-5/97 and FC62-5/118	FC82-5/118
4 screws			
6 screws			

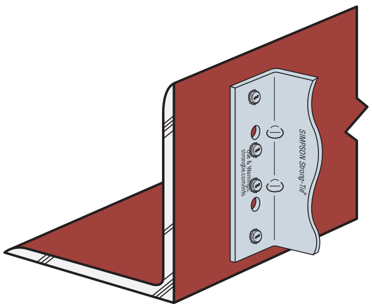
FC Allowable Anchorage Loads to Steel (lb.)

Anchorage Type	Minimum Base Material	No. of Anchors	Allowable Load		
			F_1	F_2 and F_3	F_4
#12 self-drilling screws Simpson Strong-Tie® X Metal screws XQ1B1214, X1B1214	A36 steel 3/16" thick	4	—	2,070	2,200
#12–24 x 1¼" Strong-Drive® XL Large-Head Metal screws XLQ114T1224, XLQ114B1224	A36 steel 3/16" thick	4	—	2,545	2,545
#14 self-drilling screws Simpson Strong-Tie E Metal screws E1B1414	A36 steel 3/16" thick	4	—	2,620	2,610
Simpson Strong-Tie 0.157" x 5/8" powder-actuated fasteners PDPAT-62KP	A36 steel 3/16" thick	4	—	1,040	1,040
Simpson Strong-Tie 0.157" x 5/8" powder-actuated fasteners PDPAT-62KP	A572 Gr. 50 or A992 steel 3/16" thick	4	—	1,710	1,710
Welded E70XX electrodes	A36 steel 3/16" thick	Hard side: 3" Free side: 3"	2,040	3,710	4,330

1. For additional important information, see General Information on p. 16.
2. Allowable anchorage loads are also limited by the FC Connector Load table on p. 58. Use the minimum tabulated values from the connector and anchorage load tables as applicable.
3. Allowable loads for #12–24 self-drilling screws and PDPAT powder-actuated fasteners are based on installation in minimum 3/16" thick structural steel with F_y = 36 ksi. PDPAT values are also provided for A572 steel. Values listed above maybe used where other thicknesses of steel are encountered provided that the fastener has equal or better tested values into thicker steel (see p. 16). It is the responsibility of the Designer to select the proper length fasteners based on the steel thickness installation.
4. For screw fastener installation into steel backed by concrete, predrilling of both the steel and the concrete is suggested. For predrilling, use a maximum 3/16"-diameter drill bit.



Weld Anchorage



PAF Anchorage

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FC Bypass Framing Fixed-Clip Connector

SIMPSON Strong-Tie®

Allowable Titen HD® Anchorage Loads into Concrete with FC Clip (lb.)

Simpson Strong-Tie® ¼" Titen HD® Screw Anchor	Nominal Embedment (in.)	Anchor Quantity and Size	f'_c (psi)	Load Direction	Wind and Seismic in SDC A&B		Seismic in SDC C through F
					Uncracked Concrete	Cracked Concrete	Cracked Concrete[6]
THDB25178H	1⅝	(2) ¼" x 1⅞"	3,000	F_1	335	240	280
				F_2 and F_3	660	630	550
				F_4	565	405	470
			4,000	F_1	390	280	325
				F_2 and F_3	760	725	635
				F_4	655	465	545
THDB25234H	2½	(2) ¼" x 2¾"	3,000	F_1	370	265	310
				F_2 and F_3	475	695	610
				F_4	515	445	520
			4,000	F_1	430	305	360
				F_2 and F_3	550	805	705
				F_4	590	515	600

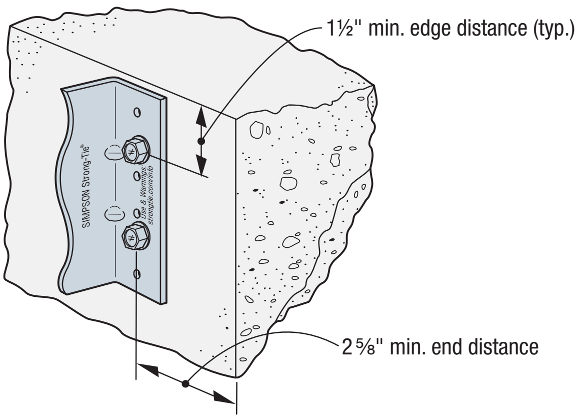
1. Allowable anchor capacities have been determined using ACI 318-14 Appendix D calculations with a minimum concrete compressive strength (f'_c) of 3,000 and 4,000 psi in normal-weight concrete. Tabulated values shall be multiplied by a factor (λ_a) of 0.6 for sand light-weight concrete.
2. Edge distance is assumed to be 1½", and end distance is 2⅝".
3. Load values are for group anchors based on ACI 318, condition B, load factors from ACI 318-14 Section 5.3, no supplement edge reinforcement, $\psi_{c, v}$ = 1.0 for cracked concrete and periodic special inspection.
4. Allowable Stress Design (ASD) values were determined by multiplying calculated LRFD capacities by a conversion factor, Alpha (α), of 0.70 for seismic load and 0.6 for wind loads. ASD values for other combinations may be determined using alternate conversion factors.
5. Tabulated allowable ASD loads for Wind and Seismic in SDC A&B are based on using wind conversion factors and may be increased by 1.17 for SDC A and B only.
6. Design loads shall include the over-strength factor per ASCE7 Section 12.4.3. For fasteners in exterior wall connection systems, Ω_o = 1.5 per Table 13.5-1.
7. Allowable loads for F_4 are based on the governing loading direction which is toward the edge of slab.
8. Allowable loads for F_1 are based on the governing loading direction which is toward the end of slab.
9. For anchor subjected to both tension and shear loads, it shall be designed to satisfy the following:
   - For $N_a / N_{all} \leq 0.2$, the full allowable load in shear is permitted.
   - For $V_a / V_{all} \leq 0.2$, the full allowable load in tension is permitted.
   - For all other cases: $N_a / N_{all} + V_a / V_{all} \leq 1.2$ where:

     N_a = Applied ASD tension load

     N_{all} = Allowable F_2 or F_3 load from the FC Allowable Anchorage Loads for Concrete table

     V_a = Applied ASD shear load

     V_{all} = Allowable F_4 or F_1 load from the FC Allowable Anchorage Loads for Concrete table
10. Tabulated allowable loads are based on anchorage only. The capacity of the connection system shall be the minimum of the allowable anchorage load and the FC Allowable Connector Loads.



Titen HD® Anchorage

Rigid Connectors

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FSB Bypass Framing Fixed-Clip Strut Connector

The FSB connector is the fixed-clip version of our popular SSB slide-clip strut connector. The FSB is commonly used at the bottom flange of a steel beam to accommodate large stand-off distances for bypass curtain-wall studs.

Material: 54 mil (16 ga.)

Finish: Galvanized (G90)

Installation:

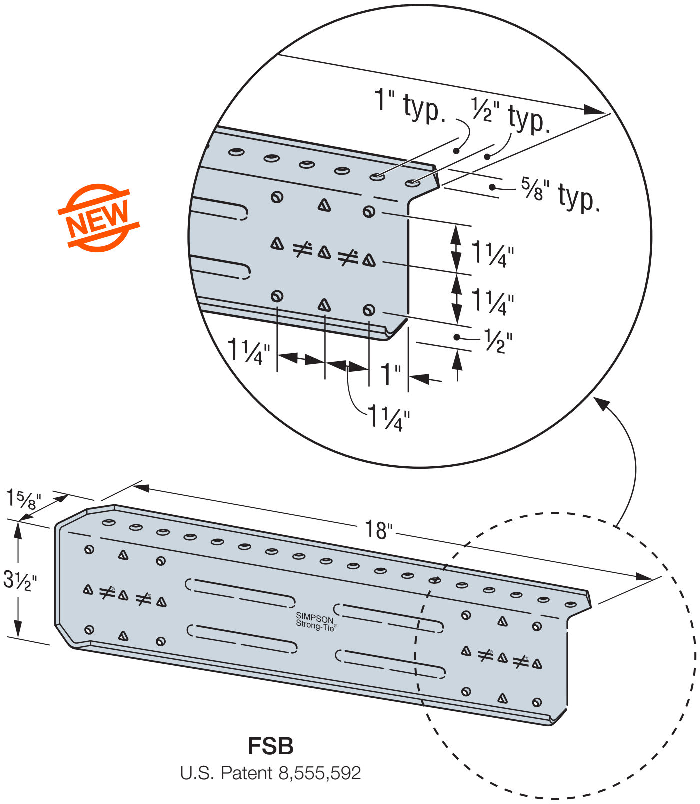
- Use the specified type and number of anchors.
- Use the specified type and number of screw fasteners to the stud.
- If the FSB intrudes on interior space, it can be trimmed. The trimmed part shall allow an edge distance of ½" or greater from the center of the nearest anchor to the end of the trimmed part.

Codes: See p. 11 for Code Reference Key Chart

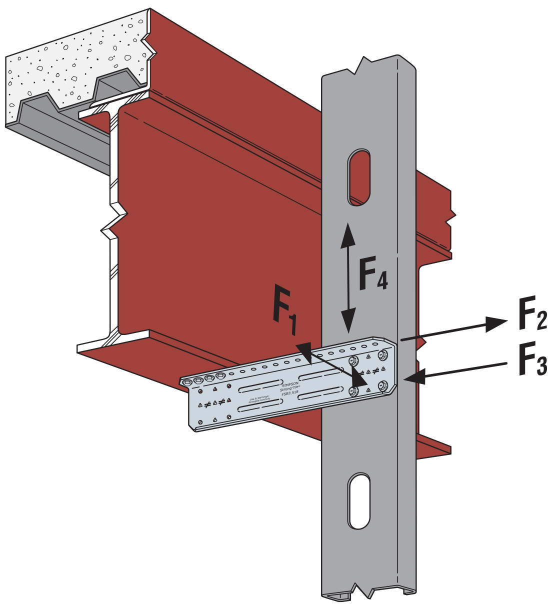
Ordering Information:

FSB3.518-R25 is a box of 25 connectors.

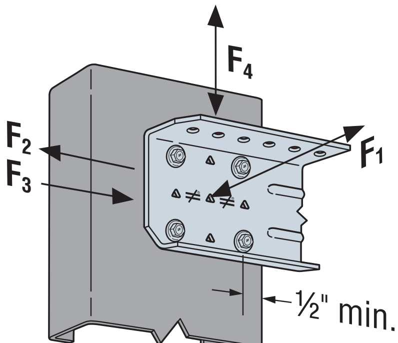
NEW



FSB
U.S. Patent 8,555,592



Typical FSB3.518 Installation



FSB Installation with the Min. Number of Fasteners

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FSB Bypass Framing Fixed-Clip Strut Connector

FSB Allowable Connector Loads (lb.)

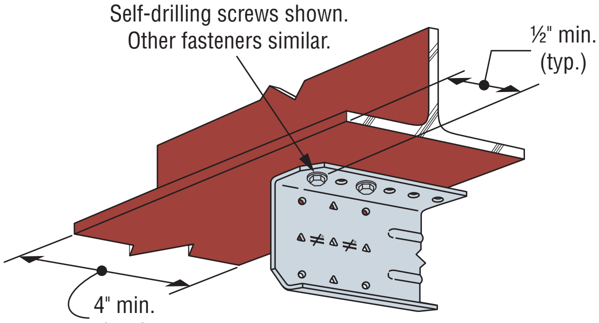
Model No.	Connector Material Thickness mil (ga.)	Min./ Max.	No. of #10–16 Screws	Stud Thickness												Code Ref.
				33 mil (20 ga.)				43 mil (18 ga.)				54 mil (16 ga.)				
				F_1[4]	F_2	F_3	F_4[5]	F_1[4]	F_2	F_3	F_4[5]	F_1[4]	F_2	F_3	F_4[5]	
FSB3.518	54 (16)	Min.	4	120	705	705	160	150	1,050	1,050	210	200	1,670	1,615	210	170
		Max.	9	155	1,590	1,340	160	200	2,365	2,180	210	270	2,670	2,180	260	

1. For additional important information, see General Information pp. 14–16.
2. FSB Allowable Connector Loads are also limited by the FSB Allowable Anchorage Loads table. Use the minimum value from the connector and anchorage load tables as applicable.
3. Min. fasteners quantity and tabulated values — fill round holes; max. fasteners quantity and tabulated values — fill round and triangle holes.
4. Allowable F_1 loads are based on in-plane loads applied to the stud fasteners that are nearest the support with complete rotational restraint at the studs. For more extensive treatment of in-plane loads please refer to Simpson Strong-Tie® engineering letter L-CF-CWCF1DIR at **strongtie.com**.
5. Tabulated F_4 values are controlled by ⅛" deformation limit. The connector strength load in the F_4 direction is 550 lb.

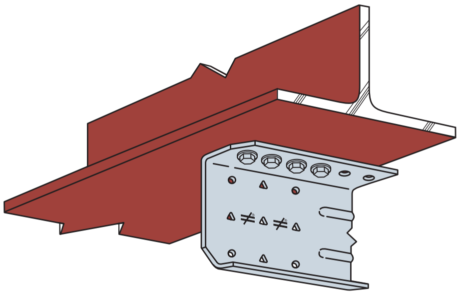
FSB Allowable Anchorage Loads (lb.)

Anchorage Type	No. of Anchors	F_1	F_2 and F_3	F_4
#12–24 self-drilling screws	2	270	1,250	550
	4	270	2,500	550
Simpson Strong-Tie® 0.145" PDPT or 0.157" PDPAT powder-actuated fasteners	2	—	820	—
	4	270	1,640	550
Welded	Hard side: 2"	270	2,455	550
	Free side: 1"			

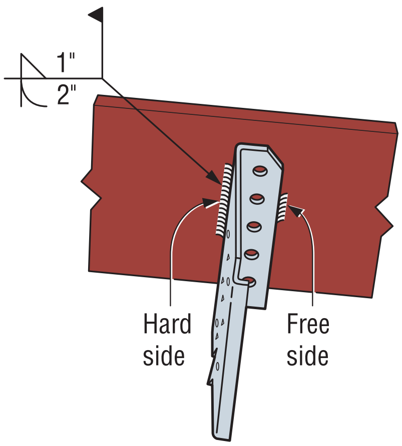
1. Allowable loads for #12–24 self-drilling screws and PDPT powder-actuated fasteners are based on installation in minimum 3⁄16" thick structural steel with F_y = 36 ksi. It is the responsibility of the Designer to select the proper length fasteners.
2. Allowable loads for welded connections require E70XX electrodes with a minimum throat size equal to the clip thickness. Welding shall comply with AWS D1.3. Welding galvanized steel may produce harmful fumes; follow proper welding procedures and precautions.
3. Allowable loads are for anchorage only. It is the responsibility of the Designer to verify the strength and stability of the structure for loads imposed by the cold-formed steel framing connections.



Two Anchors



Four Anchors



Welded Anchorage

FSB Anchor Layout

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Supplemental Information for Slide-Clip and Rigid Connector

SIMPSON Strong-Tie®

Does your project require DoD-compliant blast design?

Although Allowable Strength Design (ASD) is widely used by Designers of Cold-Formed Steel (CFS) construction, some projects require additional connector limit states beyond the typical ASD values that are normally tabulated in our load tables. For example, many Department of Defense (DoD) projects require blast design of exterior wall framing and connections. Such projects may require the LRFD strength or nominal strength for the blast calculations. For a more comprehensive background on blast design please reference the Simpson Strong-Tie® Structural Engineering Blog at **seblog.strongtie.com** and enter the search term “DoD”.

Not finding what you need? Please contact Simpson Strong-Tie.

Table 1: SCB/MSCB Bypass Framing Slide-Clip Connector — Service Load Limits, LRFD Design Strengths and Nominal Strengths

Model No.	Dimensions (in.)		No. of #14 Shldr. Screws	Load Dir.	Stud Thickness											
					33 mil (20 ga.)			43 mil (18 ga.)			54 mil (16 ga.)			68 mil (14 ga.)		
	L	S			Service Load Limit (lb.)	LRFD Design Strength (lb.)	Nominal Strength (lb.)	Service Load Limit (lb.)	LRFD Design Strength (lb.)	Nominal Strength (lb.)	Service Load Limit (lb.)	LRFD Design Strength (lb.)	Nominal Strength (lb.)	Service Load Limit (lb.)	LRFD Design Strength (lb.)	Nominal Strength (lb.)
SCB43.5	3½	1½	2	F_2	860	830	1,180	975	975	1,475	990	1,215	1,795	990	1,215	1,795
				F_3	1,260	830	1,180	1,260	1,105	1,570	1,260	1,565	2,180	1,260	1,565	2,180
SCB45.5	5½	2	2	F_2	860	785	1,115	975	975	1,475	990	1,215	1,795	990	1,215	1,795
				F_3	1,260	830	1,180	1,260	1,105	1,570	2,360	1,565	2,180	2,360	1,565	2,180
			3	F_2	860	1,080	1,535	975	1,605	2,280	990	2,205	3,135	990	2,205	3,135
				F_3	1,260	1,080	1,535	1,260	1,605	2,280	1,260	2,025	2,825	1,260	2,025	2,825
MSCB45.5	5½	2	2	F_2	860	785	1,115	990	1,245	1,770	1,055	1,855	2,640	1,195	1,920	2,730
				F_3	1,260	830	1,180	1,260	1,105	1,570	2,210	1,925	2,685	2,195	2,360	2,760
			3	F_2	860	1,080	1,535	1,105	1,715	2,435	1,220	2,570	3,655	1,365	2,575	3,660
				F_3	1,260	1,080	1,535	1,260	1,605	2,280	2,910	3,090	3,610	2,910	3,090	3,610
SCB47.5	7½	4	2	F_2	860	785	1,115	975	975	1,475	990	1,215	1,795	990	1,215	1,795
				F_3	1,260	830	1,180	1,260	1,105	1,570	2,260	1,515	2,115	2,260	1,515	2,115
			3	F_2	860	1,080	1,535	975	1,605	2,280	990	2,205	3,135	990	2,205	3,135
				F_3	1,260	1,080	1,535	1,260	1,605	2,280	2,750	2,025	2,825	2,750	2,025	2,825
MSCB47.5	7½	4	2	F_2	860	785	1,115	990	1,245	1,770	1,055	1,855	2,640	1,195	1,920	2,730
				F_3	1,260	830	1,180	1,260	1,105	1,570	2,210	1,925	2,685	2,195	2,360	2,760
			3	F_2	860	1,080	1,535	1,105	1,715	2,435	1,220	2,570	3,655	1,365	2,575	3,660
				F_3	1,260	1,080	1,535	1,260	1,605	2,280	2,910	3,090	3,610	2,910	3,090	3,610
SCB49.5	9½	6	2	F_2	860	785	1,115	975	1,105	1,570	990	1,215	1,795	990	1,215	1,795
				F_3	860	830	1,180	860	1,105	1,570	2,295	1,565	2,180	2,295	1,565	2,180
			3	F_2	860	1,080	1,535	975	1,605	2,280	990	2,205	3,135	990	2,205	3,135
				F_3	860	1,080	1,535	1,260	1,605	2,280	2,620	2,025	2,710	2,620	2,025	2,710
SCB411.5	11½	8	2	F_2	860	785	1,115	860	1,105	1,570	990	1,690	2,405	990	1,690	2,405
				F_3	860	830	1,180	860	1,105	1,570	1,890	1,470	1,720	1,890	1,470	1,720
			3	F_2	860	1,080	1,535	860	1,605	2,280	990	2,205	3,135	990	2,205	3,135
				F_3	860	1,080	1,535	1,260	1,605	2,280	2,335	2,025	2,375	2,335	2,025	2,375

1. Tabulated values are for the connector and attachment to the stud-wall framing.
   The assembly strengths are the minimum of those listed and the anchorage values listed in Table 5 on p. 66.
2. Service Load Limit is the load at ⅛" deflection for use in evaluating the performance under service-level loads.
3. LRFD Design Strength is the Nominal Strength multiplied by a resistance factor, ϕ.
4. Nominal Strength is defined in AISI S100-07.

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Supplemental Information for Slide-Clip and Rigid Connector

Table 2: SCW Head-of-Wall Slide-Clip Connector — Service Load Limits, LRFD Design Strengths and Nominal Strengths

Model No.	W (in.)	No. of #14 Shldr. Screws	Load Direction	Stud Thickness								
				33 mil (20 ga.)			43 mil (18 ga.)			54 mil (16 ga.)		
				Service Load Limit (lb.)	LRFD Design Strength (lb.)	Nominal Strength (lb.)	Service Load Limit (lb.)	LRFD Design Strength (lb.)	Nominal Strength (lb.)	Service Load Limit (lb.)	LRFD Design Strength (lb.)	Nominal Strength (lb.)
SCW3.25	3¼	2	F_4	935	730	865	1,030	1,010	1,175	1,095	1,200	1,680
SCW5.5	5½	2	F_4	1,125	730	1,020	1,655	1,010	1,580	1,950	1,590	2,220
		3	F_4	1,125	730	1,020	1,655	1,010	1,580	2,630	1,950	2,725

1. Tabulated values are for the connector and attachment to the stud-wall framing. The assembly strengths are the minimum of those listed and the anchorage values listed in Table 6 on p. 67.
2. Service Load Limit is the load at ⅛" deflection for use in evaluating the performance under service-level loads.
3. LRFD Design Strength is the Nominal Strength multiplied by a resistance factor, ϕ.
4. Nominal Strength is defined in AISI S100-07.

Table 3A: SSB Bypass Framing Slide-Clip Strut Connector — Service Load Limits, LRFD Design Strengths and Nominal Strengths

Model No.	No. of #14 Shldr. Screws	Load Direction	Stud Thickness								
			33 mil (20 ga.)			43 mil (18 ga.)			54 mil (16 ga.)		
			Service Load Limit (lb.)	LRFD Design Strength (lb.)	Nominal Strength (lb.)	Service Load Limit (lb.)	LRFD Design Strength (lb.)	Nominal Strength (lb.)	Service Load Limit (lb.)	LRFD Design Strength (lb.)	Nominal Strength (lb.)
SSB3.518	2	F_2	1,085	830	1,185	1,220	1,105	1,570	1,830	1,715	2,440
		F_3	1,085	830	1,185	1,220	1,105	1,570	2,240	1,540	2,150
	3	F_2	1,815	1,305	1,855	1,500	1,650	2,345	1,365	2,140	3,280
		F_3	1,815	1,305	1,855	2,650	1,730	2,415	2,915	1,960	3,050

See footnotes below.

Table 3B: FSB Bypass Framing Fixed-Clip Connector — Service Load Limits, LRFD Design Strengths and Nominal Strengths

Model No.	No. of #10–16 Screws	Load Direction	Stud Thickness								
			33 mil (20 ga.)			43 mil (18 ga.)			54 mil (16 ga.)		
			Service Load Limit (lb.)	LRFD Design Strength (lb.)	Nominal Strength (lb.)	Service Load Limit (lb.)	LRFD Design Strength (lb.)	Nominal Strength (lb.)	Service Load Limit (lb.)	LRFD Design Strength (lb.)	Nominal Strength (lb.)
FSB3.518	4	F_2	1,850	1,060	2,115	2,540	1,575	3,150	3,165	2,670	4,090
		F_3	2,045	1,060	2,115	2,855	1,575	3,150	3,405	2,585	3,965
		F_4	160	875	1,285	210	875	1,285	210	875	1,285
	9	F_2	2,815	2,385	4,770	3,900	3,550	7,095	4,170	4,090	6,075
		F_3	2,515	2,140	2,420	3,820	3,485	4,130	3,955	3,485	4,130
		F_4	160	875	1,285	210	875	1,285	260	875	1,285

1. Tabulated values are for the connector and attachment to the stud-wall framing. The assembly strengths are the minimum of those listed and the anchorage values listed in Table 5A and 5B on p. 66.
2. Service Load Limit is the load at ⅛" deflection for use in evaluating the performance under service-level loads.
3. LRFD Design Strength is the Nominal Strength multiplied by a resistance factor, ϕ.
4. Nominal Strength is defined in AISI S100-07.

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Table 4: FCB Bypass Framing Fixed-Clip Connector — Service Load Limits, LRFD Design Strengths and Nominal Strengths

Model No.	Dimensions (in.)			Min. or Max.	No. of #12–14 Self-Drilling Screws	Load Direction	Stud Thickness								
							33 mil (20 ga.)			43 mil (18 ga.)			54 mil (16 ga.)		
	L	S_{min}	S_{max}				Service Load Limit (lb.)	LRFD Design Strength (lb.)	Nominal Strength (lb.)	Service Load Limit (lb.)	LRFD Design Strength (lb.)	Nominal Strength (lb.)	Service Load Limit (lb.)	LRFD Design Strength (lb.)	Nominal Strength (lb.)
FCB43.5	3½	1½	1½	Min.	4	F2	1,100	1,130	2,255	1,120	1,680	3,360	1,250	3,040	4,655
						F3	1,185	1,130	2,180	1,185	1,565	2,180	1,185	1,565	2,180
						F4	2,170	1,130	1,980	2,515	1,680	2,590	3,360	2,380	3,380
				Max.	6	F2	1,100	1,690	3,245	1,120	2,425	3,720	1,250	3,040	4,655
						F3	1,260	1,690	3,245	1,260	2,425	3,720	3,365	3,040	4,010
						F4	2,415	1,690	2,635	2,860	2,330	3,315	2,865	3,055	4,345
FCB45.5	5½	2	2	Min.	4	F2	1,100	1,130	2,255	1,120	1,680	3,360	1,105	2,680	4,110
						F3	1,185	1,130	2,180	1,185	1,565	2,180	1,185	1,565	2,180
						F4	1,225	1,130	1,720	1,500	1,515	2,150	2,100	2,120	3,015
				Max.	9	F2	1,100	2,025	2,880	1,120	2,425	3,720	1,105	2,680	4,110
						F3	1,260	2,285	3,245	1,260	2,425	3,720	3,365	2,870	4,010
						F4	2,570	1,890	2,685	2,965	2,375	3,380	3,505	3,080	4,380
FCB47.5	7½	4	1½	Min.	4	F2	1,100	1,130	2,255	1,120	1,680	3,360	1,105	2,680	4,110
						F3	1,185	1,130	2,115	1,185	1,515	2,115	1,185	1,515	2,115
						F4	380	330	660	380	495	830	380	580	830
				Max.	12	F2	1,100	2,025	2,880	1,120	2,425	3,720	1,105	2,680	4,110
						F3	1,260	2,285	3,245	1,260	2,425	3,720	4,170	2,870	3,780
						F4	1,875	1,060	2,120	1,875	1,575	3,155	1,875	2,3w10	3,440
FCB49.5	9½	6	1½	Min.	4	F2	1,100	1,130	2,255	1,120	1,680	3,360	1,105	2,680	4,110
						F3	1,185	1,130	2,180	1,185	1,565	2,180	1,185	1,565	2,180
						F4	380	255	510	380	380	760	380	580	830
				Max.	12	F2	1,100	2,025	2,880	1,120	2,425	3,720	1,105	2,680	4,110
						F3	1,260	2,285	3,245	1,260	2,425	3,720	4,345	2,870	4,010
						F4	2,290	1,120	2,245	2,290	1,670	3,020	2,290	2,125	3,020
FCB411.5	11½	8	1½	Min.	4	F2	1,100	1,130	2,255	1,120	1,680	3,360	1,105	2,680	4,110
						F3	1,185	1,130	1,720	1,185	1,470	1,720	1,185	1,470	1,720
						F4	380	210	415	380	310	620	380	580	830
				Max.	12	F2	1,100	2,025	2,880	1,120	2,425	3,720	1,105	2,680	4,110
						F3	1,260	2,285	3,245	1,260	2,425	3,645	4,015	2,870	3,645
						F4	2,290	1,195	2,390	2,290	1,780	3,020	2,290	2,125	3,020

1. Tabulated values are for the connector and attachment to the stud-wall framing. The assembly strengths are the minimum of those listed and the anchorage values listed in Table 5 and 6 on pp. 66, 67.
2. Service Load Limit is the load at ⅛" deflection for use in evaluating the performance under service-level loads.
3. LRFD Design Strength is the Nominal Strength multiplied by a resistance factor, ϕ.
4. Nominal Strength is defined in AISI S100-07.

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Supplemental Information for Slide-Clip and Rigid Connector

Table 5A: Anchor Values (lb.) in the F_2 and F_3 Direction for SCB, FCB, MSCB and SSB

Anchorage Type	Minimum Base Material	No. of Anchors	SCB and FCB		MSCB		SSB	
			LRFD Design Strength	Nominal Strength	LRFD Design Strength	Nominal Strength	LRFD Design Strength	Nominal Strength
#12 self-drilling screws Simpson Strong-Tie® X Metal screws XQ1S1214, X1S1214	A36 steel 3⁄16" thick	2	1,270	2,010	1,635	2,505	1,875	3,280
		3	1,790	2,745	2,440	3,740	2,140	3,280
		4	2,540	4,015	3,265	5,005	—	—
Simpson Strong-Tie #12–24 x 1¼" Strong-Drive® XL Large-Head Metal screws XLQ114T1224, XLQ114B1224-2K	A36 steel 3⁄16" thick	2	1,780	2,730	2,175	3,330	—	—
		3	2,630	4,035	3,260	5,000	—	—
		4	3,565	5,465	4,345	6,660	—	—
Simpson Strong-Tie 0.157" x ⅝" power-actuated fasteners PDPAT-62KP	A36 steel 3⁄16" thick	2	700	1,130	830	1,710	1,980	3,435
		3	935	1,550	1,250	2,430	2,240	3,435
		4	1,430	2,175	1,665	3,415	—	—
Simpson Strong-Tie 0.157" x ⅝" power-actuated fasteners PDPAT-62KP	A572 or A992 steel 3⁄16" thick	2	935	1,435	975	1,710	—	—
		3	1,275	2,000	1,465	2,430	—	—
		4	1,875	2,870	1,950	3,415	—	—
Simpson Strong-Tie ¼" x 1¾" Titen® Hex-Head Masonry screws TTN25134H	Concrete f'_c = 2,500 psi	2	605	1,515	605	1,515	—	—
		3	710	1,775	710	1,775	—	—
		4	815	2,035	815	2,035	—	—
Welded E70XX electrodes	A36 steel 3⁄16" thick	Hard side: 2" Free side: 1"	2,780	4,265	3,265	5,005	3,320	5,085

See footnotes below.

Table 5B: Anchor Values (lb.) in F_1, F_2, F_3, and F_4 Direction for FSB

Anchorage Type	No. of Anchors	FSB					
		F_1		F_2 / F_3		F_4	
		LRFD Design Strength	Nominal Strength	LRFD Design Strength	Nominal Strength	LRFD Design Strength	Nominal Strength
#12–14 self-drilling screws	2	435	495	1,875	3,200	875	1,285
	4	435	495	3,745	6,075	875	1,285
Simpson Strong-Tie 0.157" x ⅝" power-actuated fasteners PDPAT-62KP	2	—	—	1,310	2,530	—	—
	4	435	495	2,620	6,075	875	1,285
Welded	Hard side: 2" Free side: 1"	435	495	5,330	6,020	875	1,285

1. Tabulated values are for the anchorage only. The assembly strengths are the minimum of those listed above and the connector capacity and attachment to the stud-wall framing listed in Tables 1–4 on pp. 63–65.
2. LRFD Design Strength is the Nominal Strength multiplied by a resistance factor, ϕ.
3. Nominal Strength is defined in AISI S100-07.
4. For the Service Load Limit, use the values listed for the connectors in Tables 1–4 on pp. 63–65.

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Supplemental Information for Slide-Clip and Rigid Connector

Table 6: Anchor Values (lb.) in the F_4 Direction

Anchorage Type	No. of Anchors	Load Type	FCB43.5	FCB45.5	FCB47.5		FCB49.5		FCB411.5		SCW3.25	SCW5.5
			Min./ Max.	Min./ Max.	Min.	Max.	Min.	Max.	Min.	Max.		
#12–24 self-drilling screws	2	LRFD Design Strength	1,000	655	410	710	295	425	190	305	1,020	1,875
		Nominal Strength	1,530	1,005	625	1,090	455	650	295	465	1,565	2,945
	3	LRFD Design Strength	1,105	720	450	785	320	470	215	335	1,330	—
		Nominal Strength	1,690	1,105	685	1,200	490	725	330	515	2,040	—
	4	LRFD Design Strength	2,010	1,310	785	1,425	570	855	440	610	—	2,295
		Nominal Strength	3,075	2,010	915	2,180	665	1,310	515	930	—	3,805
Simpson Strong-Tie® 0.157" PDPAT powder-actuated fasteners	2	LRFD Design Strength	655	425	265	465	190	280	120	200	830	1,470
		Nominal Strength	1,005	650	405	710	295	430	185	305	1,270	2,255
	3	LRFD Design Strength	745	490	305	530	215	310	135	225	895	—
		Nominal Strength	1,140	745	465	810	330	480	210	345	1,370	—
	4	LRFD Design Strength	1,345	880	545	950	390	570	230	410	—	2,385
		Nominal Strength	2,060	1,350	835	1,460	600	870	355	625	—	3,660
Simpson Strong-Tie ¼" x 1¾" Titen® hex-head screws	2	LRFD Design Strength	580	380	230	415	170	245	300	175	—	—
		Nominal Strength	1,660	1,080	660	1,180	480	700	400	500	—	—
	3	LRFD Design Strength	660	435	265	470	195	280	140	205	—	—
		Nominal Strength	1,880	1,240	700	1,340	515	800	400	580	—	—
	4	LRFD Design Strength	905	590	365	635	265	385	390	275	—	—
		Nominal Strength	2,580	1,680	915	1,820	670	1,100	525	780	—	—
Welded	Hard side: 2" Free side: 1"	LRFD Design Strength	5,070	3,320	1,265	3,210	910	1,920	720	1,375	—	—
		Nominal Strength	7,765	5,085	1,475	3,750	1,065	2,245	1,280	1,610	—	—

1. Tabulated values are for the anchorage only. The assembly strengths are the minimum of those listed above and the connector capacity and attachment to the stud-wall framing listed in Tables 1–4 on pp. 63–65.
2. LRFD Design Strength is the Nominal Strength multiplied by a resistance factor, ϕ.
3. Nominal Strength is defined in AISI S100-07.
4. For the Service Load Limit, use the values listed for the connectors in Tables 1–4 on pp. 63–65.

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Raise Your Expectations, Lower Your Installed Costs!

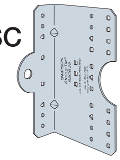
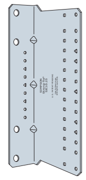
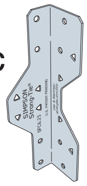
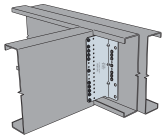
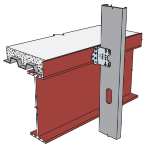
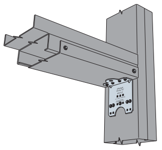
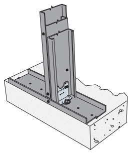
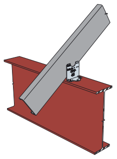
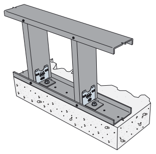
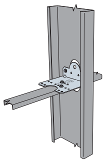
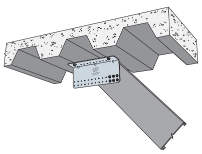
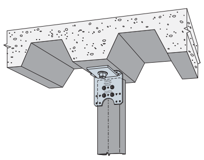
SIMPSON Strong-Tie®

Utility Clip Connectors

The SSC steel stud connector, the SJC steel joist connector and the SFC steel framing connector, are designed so that a minimum number of clips can be stocked to accommodate a wide array of applications. Prepunched holes and intuitive fastener hole patterns ensure that the structural needs of the Designer and the efficient installation goals of the contractor are both satisfied.

Testing You Can Trust

Simpson Strong-Tie® utility clip connectors have undergone industry-first testing to provide maximum benefit to both the installer and the Designer. By testing these connectors as part of a complete system in the applications for which they are intended, rather than only testing the physical capabilities of the connector, Simpson Strong-Tie is able to provide comprehensive allowable loads for real-world conditions. This system-based approach eliminates the need for Designers to manually calculate connector performance and anchorage, and provides confidence that designs based on these values have been thoroughly evaluated by the industry leader in structural connector research and development.

	Product Category		
Tested Application	SSC 	SJC 	SFC 
Steel-to-steel 	✓	✓	✓
Bypass Framing 	✓		
Headers 	✓		
Base of Jamb 	✓		
Rafter 	✓		
Kneewall 	✓		
U-Channel Bridging 	✓		✓
Kicker 		✓	
Soffit Hanger 	✓	✓	

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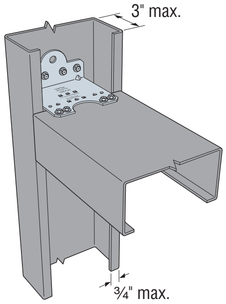
Innovative Design Lets You Work Smarter — Not Harder!

Simpson Strong-Tie® utility clip connectors have been designed with both the contractor and Designer in mind. Connector dimensions and fastener/anchor locations have been developed to maximize design flexibility and installation efficiency.

Intelligent Connector Dimensions

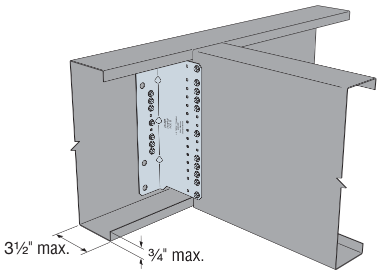
SSC Steel Stud Connectors

Designed to accommodate open-side connections with flanges up to 3" wide and stiffener lips up to ¾"*



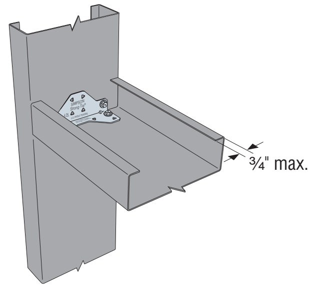
SJC Steel Joist Connectors

Designed to accommodate open-side connections with flanges up to 3½" wide and stiffener lips up to ¾"



SFC Steel Framing Connectors

Designed to accommodate open-side connections with stiffener lips up to ¾" long**



*SSC2.25 clips will accommodate 2" wide flange and ⅝" stiffener lips.
**SFC2.25 clips will accommodate ⅝" long stiffener lips.

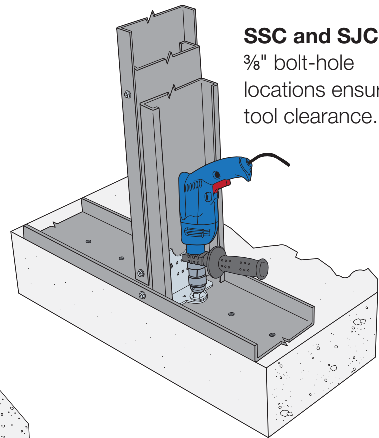
For detailed product dimensions, refer to pp. 90–91.

Intuitive Fastener Patterns

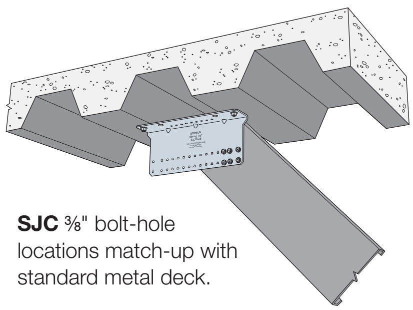
SSC and SJC Connectors include prepunched holes for ⅜" diameter anchors that enable easy anchorage to concrete.

SSC and SJC anchorage leg also includes prepunched holes for #10 self-drilling screws.

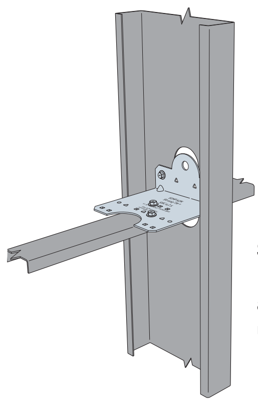
SSC and SJC clips include round and triangle holes for minimum and maximum tabulated load values. Square holes are also provided, and can be combined with round and triangle holes for custom screw patterns per installation needs.



SSC and SJC
⅜" bolt-hole locations ensure tool clearance.



SJC ⅜" bolt-hole locations match-up with standard metal deck.



SSC and SFC
Hole locations accommodate u-channel.

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SSC Steel-Stud Connector

This product is preferable to similar connectors because of a) easier installation, b) higher loads, c) lower installed cost, or a combination of these features.

SSC connectors are versatile utility clips ideal for a variety of stud-to-stud and stud-to-structure applications in cold-formed steel construction. The clips have been designed to enable easy installation on the open side of studs or joists with flanges up to 3" long and return lips up to ¾". A wide pattern of strategic fastener locations allows the SSC to accommodate a variety of traditional and custom designs.

Features:

- Prepunched holes reduce installation cost by eliminating predrilling
- Intuitive fastener hole positions ensure accurate clip installation in accordance with design, support a wide range of design and application requirements and provide installation flexibility
- Angle lengths accommodate either hard-side or soft-side attachment for studs and joists with return lips up to ¾"*
- 4" leg length enables soft-side connections for studs and joists with flanges up to 3"*
- Also suitable for u-channel bridging

Product Information:

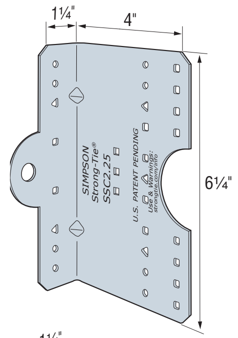
Material: LSSC — 54 mil (50 ksi); SSC — 68 mil (50 ksi); MSSC — 97 mil (50 ksi)

Finish: Galvanized (G90)

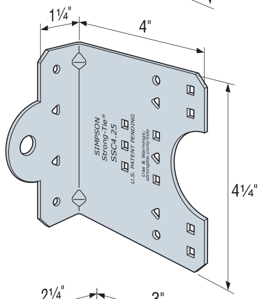
Installation: Use all specified fasteners/anchors

Codes: See p. 11 for Code Reference Key Chart

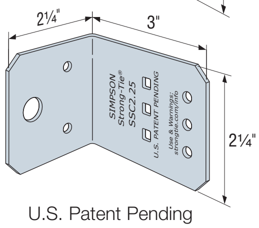
For detailed product dimensions, refer to p. 90.



SSC6.25
(LSSC6.25, MSSC6.25 similar)



SSC4.25
(LSSC4.25, MSSC4.25 similar)



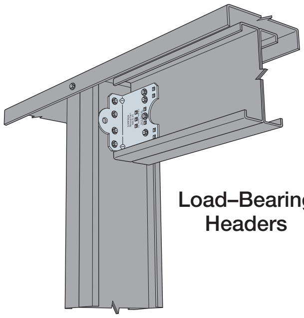
SSC2.25
(MSSC2.25 similar)

U.S. Patent Pending

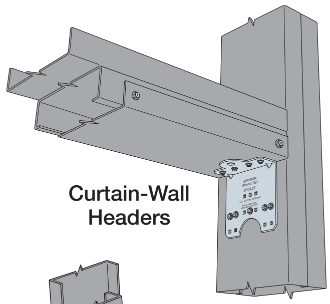
Ordering Information

Model No.	Ordering SKU	Package Quantity
SSC2.25	SSC2.25-R125[1]	Bucket of 125
MSSC2.25	MSSC2.25-R90[1]	Bucket of 90
LSSC4.25	LSSC4.25-R50[2]	Bucket of 50
SSC4.25	SSC4.25-R50[2]	
MSSC4.25	MSSC4.25-R50[2]	
LSSC6.25	LSSC6.25-R30	Bucket of 30
SSC6.25	SSC6.25-R30	
MSSC6.25	MSSC6.25-R30	

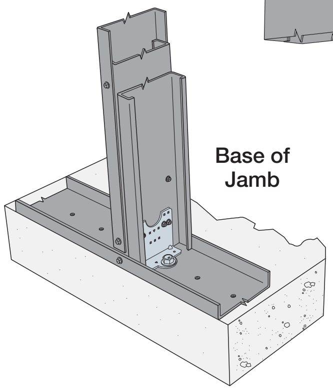
1. By leaving off the "-RXXX" suffix, items can also be ordered in cartons of 50.
2. By leaving off the "-RXX" suffix, items can be ordered in cartons of 25.



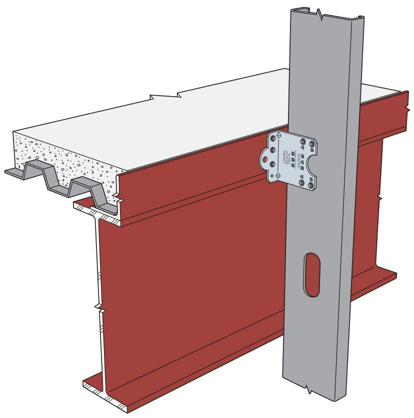
Load–Bearing Headers



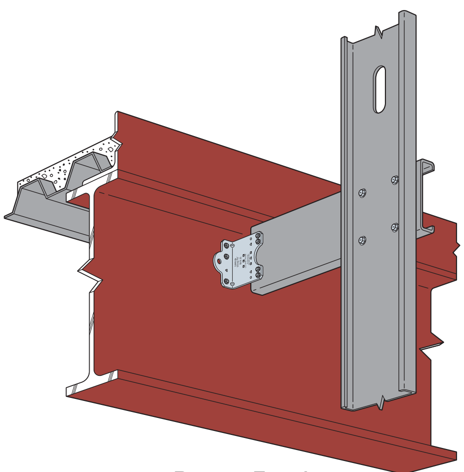
Curtain-Wall Headers



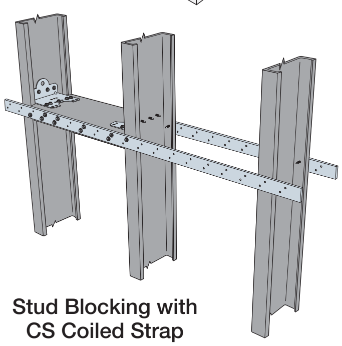
Base of Jamb



Bypass Framing



Bypass Framing with Stud Strut



Stud Blocking with CS Coiled Strap

*SSC2.25 clips will accommodate 2" wide flange and ⅝" stiffener lips.

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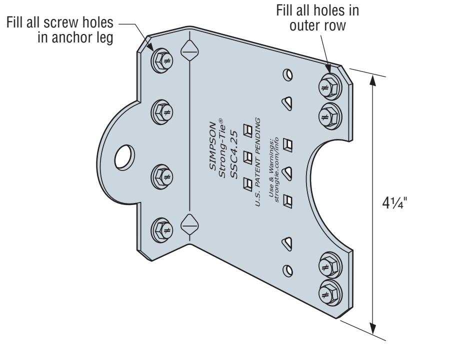
SSC Steel-Stud Connector

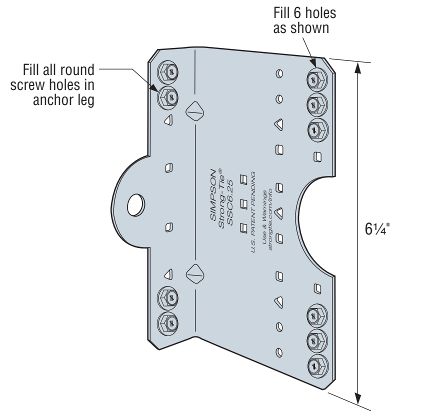
SSC Connectors — Steel-to-Steel Allowable Loads

Model No.	Connector Material Thickness mil (ga.)	L (in.)	Framing Member Depth (in.)	Fasteners			Allowable F4 Load (lb.)				Code Ref.
				Pattern[1]	Carried Member	Carrying Member	Minimum Member Thickness			Maximum Connector Load[3]	
							33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)		
SSC2.25	68 (14)	2¼	3⅝	Min.	(3) #10	(2) #10	165	225	345	690	IP2
MSSC2.25	97 (12)	2¼	3⅝	Min.	(3) #10	(2) #10	165	225	345	690	
LSSC4.25	54 (16)	4¼	6	Min.	(2) #10	(2) #10	215	440	675	1,615	
				Max.	(5) #10	(4) #10	215	440	725		
				Outer	(4) #10	(4) #10	200	310	520		
SSC4.25	68 (14)	4¼	6	Min.	(2) #10	(2) #10	355	525	890	1,615	
				Max.	(5) #10	(4) #10	365	600	1,005		
				Outer	(4) #10	(4) #10	235	330	625		
MSSC4.25	97 (12)	4¼	6	Min.	(2) #10	(2) #10	355	525	890	1,615	
				Max.	(5) #10	(4) #10	365	600	1,005		
				Outer	(4) #10	(4) #10	235	330	625		
LSSC6.25	54 (16)	6¼	8	Min.	(4) #10	(4) #10	265	660	1,190	2,590	
				Max.	(7) #10	(6) #10	265	660	1,190		
				Outer	(6) #10	(4) #10	270	375	695		
SSC6.25	68 (14)	6¼	8	Min.	(4) #10	(4) #10	385	720	1,190	2,590	
				Max.	(7) #10	(6) #10	385	720	1,190		
				Outer	(6) #10	(4) #10	270	460	725		
MSSC6.25	97 (12)	6¼	8	Min.	(4) #10	(4) #10	385	720	1,190	2,590	
				Max.	(7) #10	(6) #10	385	720	1,365		
				Outer	(6) #10	(4) #10	270	460	725		

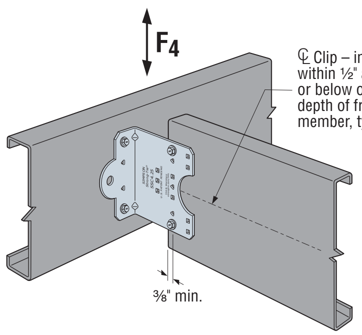
1. Min. fastener quantity and load values — fill all round holes; Max. fastener quantity and load values — fill all round and triangular holes; Outer fastener quantity and load values — see illustrations for fastener placement.
2. Allowable loads are based on bracing of the members located within 12" of the connection.
3. Maximum allowable load for connector that may not be exceeded when designing custom installations. Designer is responsible for member and fastener design.
4. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.
5. Reference pp. 76–81 for supplemental information and alternate screw patterns.



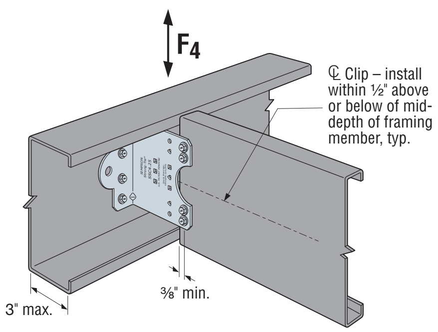
SSC4.25 – Outer Fastener Pattern
(LSSC4.25 and MSSC4.25 similar)



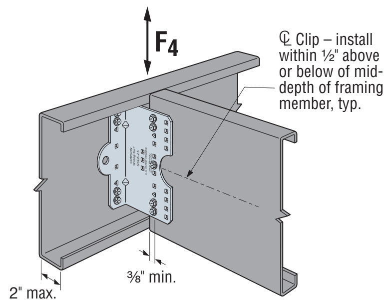
SSC6.25 – Outer Fastener Pattern
(LSSC6.25 and MSSC6.25 similar)



Typical SSC Installation



SSC Installation with Carried Member Fasteners in Outer Row



SSC Installation with Carried Member Fasteners in Inner Row

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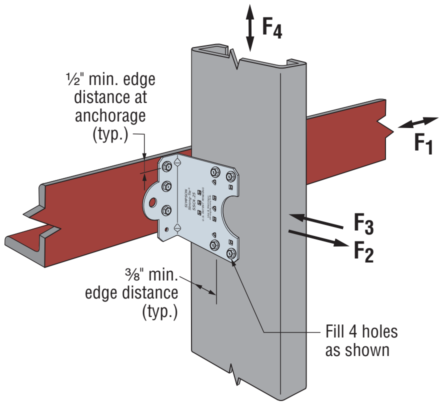
SSC Steel-Stud Connector

SSC Connectors — Bypass Framing Allowable Loads

Model No.	Connector Material Thickness mil (ga.)	L (in.)	Fasteners[1,4]		Stud Thickness												Code Ref.
					33 mil (20 ga.)				43 mil (18 ga.)				54 mil (16 ga.)				
			Anchorage[2]	Stud	F_1[3]	F_2	F_3	F_4	F_1[3]	F_2	F_3	F_4	F_1[3]	F_2	F_3	F_4	
SSC4.25	68 (14)	4¼	(3) #10	(4) #10	40	705	705	700	40	870	1,050	850	40	935	1,210	850	IP2
			(3) PDPAT-62K	(4) #10	40	705	705	700	40	780	1,050	850	40	780	1,210	850	160
MSSC4.25	97 (12)	4¼	(3) #10	(4) #10	105	705	705	705	105	1,050	1,050	880	105	1,385	1,210	880	IP2
			(3) PDPAT-62K	(4) #10	105	705	705	705	105	780	1,050	880	105	780	1,210	880	160

1. See illustration for fastener placement.
2. Allowable loads are based on anchors installed in minimum 3⁄16"-thick structural steel with F_y = 36 ksi.
3. Allowable loads based on in-plane loads applied at the centroid of the fasteners to the stud, with no rotational restraint of stud.
4. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.

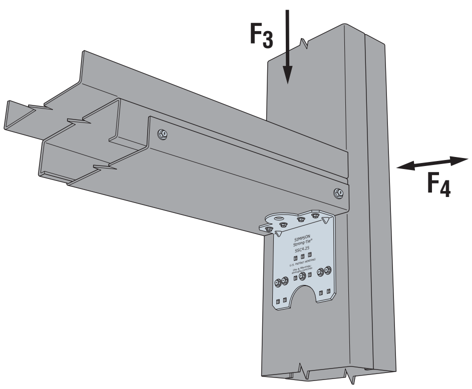


Typical SSC Installation

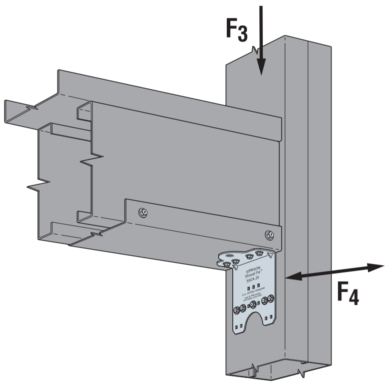
SSC Connectors — Headers Allowable Loads

Model No.	Connector Material Thickness mil (ga.)	L (in.)	Jamb Stud Depth (in.)	Fasteners[4]			Jamb and Header Thickness mil (ga.)	Allowable F_3 Load (lb.)		Allowable F_4 Load (lb.)	Code Ref.
				Pattern	Jamb	Header		Nested Stud and Track Header[3]	Back to Back Header[2]		
LSSC4.25	54 (16)	4¼	6	Max.	(5) #10	(4) #10	33 (20)	140	455	215	IP2
							43 (18)	220	660	440	
SSC4.25	68 (14)	4¼	6	Max.	(5) #10	(4) #10	54 (16)	375	1,055	1,005	
							68 (14)	570	1,055	1,005	
LSSC6.25	54 (16)	6¼	8	Max.	(7) #10	(6) #10	33 (20)	160	455	265	
							43 (18)	250	730	660	
SSC6.25	68 (14)	6¼	8	Max.	(7) #10	(6) #10	54 (16)	410	1,110	1,190	
							68 (14)	640	1,110	1,190	

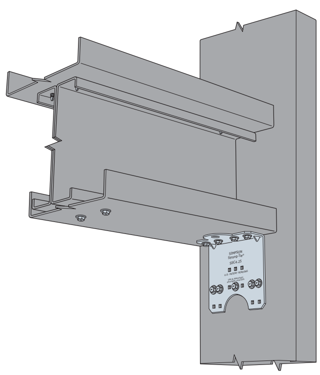
1. Max. fastener quantity and load values—fill all round and triangular holes.
2. Designer is responsible for checking web crippling of the header and reducing allowable loads accordingly.
3. Also applies to box header per illustration below.
4. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



Nested Stud and Track



Box Header



Back-to-Back Header

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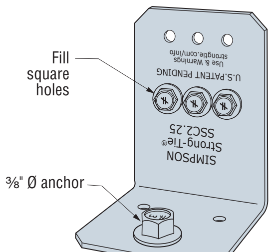
SSC Steel-Stud Connector

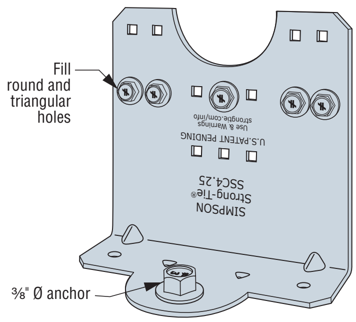
SSC Connectors — Base of Jamb Allowable Loads

Model No.	Connector Material Thickness mil (ga.)	L (in.)	Stud Member Depth (in.)	Fasteners		Stud Thickness mil (ga.)	Allowable F4 Load (lb.)	Code Ref.
				Anchor Diameter	Stud Fasteners[3]			
SSC2.25	68 (14)	2¼	3⅝	⅜	(3) #10	33 (20)	390	IP2
						43 (18)	605	
						54 (16)	940	
SSC4.25	68 (14)	4¼	6	⅜	(5) #10	33 (20)	420	
						43 (18)	685	
						54 (16)	975	
SSC6.25	68 (14)	6¼	8	⅜	(7) #10	33 (20)	470	
						43 (18)	715	
						54 (16)	1,020	

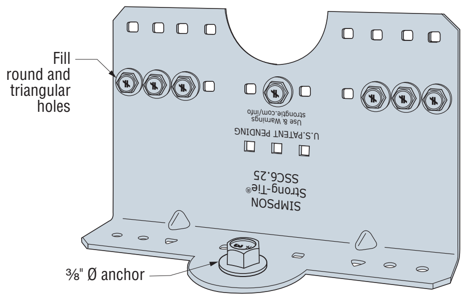
1. Allowable loads are based on minimum 33 mil (20 ga.) track for 33 mil (20 ga.) and 43 mil (18 ga.) studs, and minimum 43 mil (18 ga.) track for 54 mil (16 ga.) studs, with one #10 screw into each stud flange.
2. Allowable loads assume adequate torsional bracing is provided. Bracing design is the responsibility of the Designer.
3. See illustrations for fastener placement.
4. Designer is responsible for anchorage design.
5. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



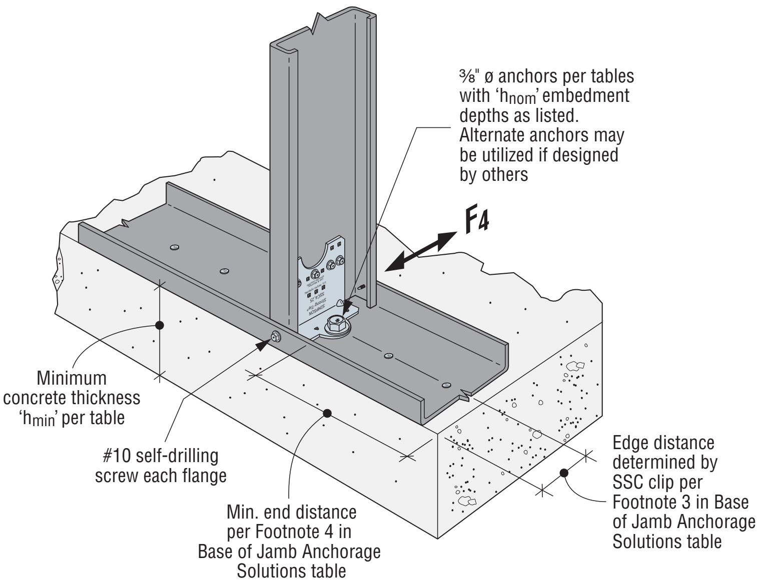
SSC2.25 Fastener Pattern



SSC4.25 Fastener Pattern



SSC6.25 Fastener Pattern



Typical SSC Installation
(Note: This figure references the table on the following page.)

Titen HD® Screw Anchor

Strong-Bolt® 2 Wedge Anchor

AT-XP® Adhesive

See pp. 182–203 for Simpson Strong-Tie anchor solutions for this application.

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SSC Steel-Stud Connector

Base of Jamb Anchorage Solutions

Model No.	Minimum Concrete Thickness (h_{min}) (in.)	⅜" Diameter Simpson Strong-Tie® Anchor Type	Nominal Embedment Depth (h_{nom}) (in.)	Allowable Anchor Load, F_4 (lb.) 3,000 psi SLWC	3,000 psi NWC	4,000 psi NWC
Uncracked Concrete, Wind and Seismic in SDC A&B[8]						
SSC2.25	4	Titen HD®	2½	275	455	530
	6	Titen HD	3¼	290	485	560
		SET-XP®	4	345	510	590
		AT-XP®	4	345	510	590
SSC4.25	4	Titen HD	2½	550	920	975
	6	Titen HD	3¼	620	975	975
		SET-XP	4	735	880	880
		AT-XP	4	735	880	880
SSC6.25	4	Titen HD	2½	735	1,020	1,020
	6	Titen HD	3¼	960	1,020	1,020
		SET-XP	4	880	880	880
		AT-XP	4	880	880	880
Cracked Concrete, Wind and Seismic in SDC A&B[8]						
SSC2.25	4	Titen HD	2½	195	325	375
	6	Titen HD	3¼	210	345	400
		SET-XP	4	245	360	420
		AT-XP	4	245	360	420
SSC4.25	4	Titen HD	2½	395	655	760
	6	Titen HD	3¼	445	740	855
		SET-XP	4	525	775	880
		AT-XP	4	525	775	880
SSC6.25	4	Titen HD	2½	525	875	1,010
	6	Titen HD	3¼	685	1,020	1,020
		SET-XP	4	810	880	880
		AT-XP	4	810	880	880
Cracked Concrete, Seismic in SDC C through F[9]						
SSC2.25	4	Titen HD	2½	90	150	175
	6	Titen HD	3¼	95	160	185
		SET-XP	4	115	170	195
		AT-XP	4	115	170	195
SSC4.25	4	Titen HD	2½	185	305	355
	6	Titen HD	3¼	205	345	400
		SET-XP	4	245	355	355
		AT-XP	4	245	350	350
SSC6.25	4	Titen HD	2½	245	410	470
	6	Titen HD	3¼	320	480	480
		SET-XP	4	355	355	355
		AT-XP	4	350	350	350

1. Allowable anchor capacities have been determined using ACI 318-14 Chapter 17 calculations with the minimum concrete compressive strength, f'_c and slab thickness listed. Sand-lightweight concrete is abbreviated as "SLWC" while normal-weight concrete is abbreviated as "NWC".
2. Nominal Embedment Depth/Effective Embedment Depth relationships:
   - ⅜" Titen HD® in 4" Slab : 2.50" (h_{nom}) / 1.77" (h_{ef})
   - ⅜" Titen HD in 6" Slab or thicker : 3.25" (h_{nom}) / 2.40" (h_{ef})
   - SET-XP® or AT-XP® Adhesive with ⅜" F1554 Gr. 36 All-Thread Rod in 6" Slab or thicker : 4.0" (h_{nom}) = 4" (h_{ef})
3. Edge distances are assumed to be 1.81", 3.0" and 4.0" (½ of stud width) as determined for 3⅝", 6" and 8" studs, respectively.
4. End distances are assumed as 1.5 x Min. Edge Distance in one direction and 'N/A' in the other direction. See figure on p. 73.
5. Load values are for a single anchor based on ACI 318-14, condition B, load factors from ACI 318-14 Section 5.3, no supplemental edge reinforcement, $\psi_{c,V}$ = 1.0 for cracked concrete and periodic special inspection. Reference ICC-ES or IAPMO-UES evaluation reports for further information.
6. Load values are based on a short-term temperature range of 150°F and 180°F for SET-XP and AT-XP. Long-term temperature range is assumed to be 110°F for both SET-XP and AT-XP. Dry hole conditions are assumed. Other conditions may be evaluated using Anchor Designer™ Software for ACI 318, ETAG and CSA. See **strongtie.com/software**.
7. Allowable Stress Design (ASD) values were determined by multiplying calculated LRFD capacities by a conversion factor, Alpha (α), of 0.7 for seismic loads and 0.6 for wind loads. ASD values for other load combinations may be determined using alternate conversion factors.
8. Tabulated allowable ASD loads for Wind and Seismic in SDC A&B are based on using wind conversion factors and may be increased by 1.17 for SDC A & B only.
9. Allowable loads have been divided by an Omega (Ω) seismic factor of 2.5 for brittle failure as required by ACI 318-14 Chapter 17.
10. Allowable F_4 load based on loading direction towards the edge of slab.
11. Tabulated capacities are based on maximum allowable anchorage loads only. The capacity of the connection system shall be the minimum of the tabulated value and the allowable load value from the SSC Connectors: Base of Jamb Allowable Load Tables.

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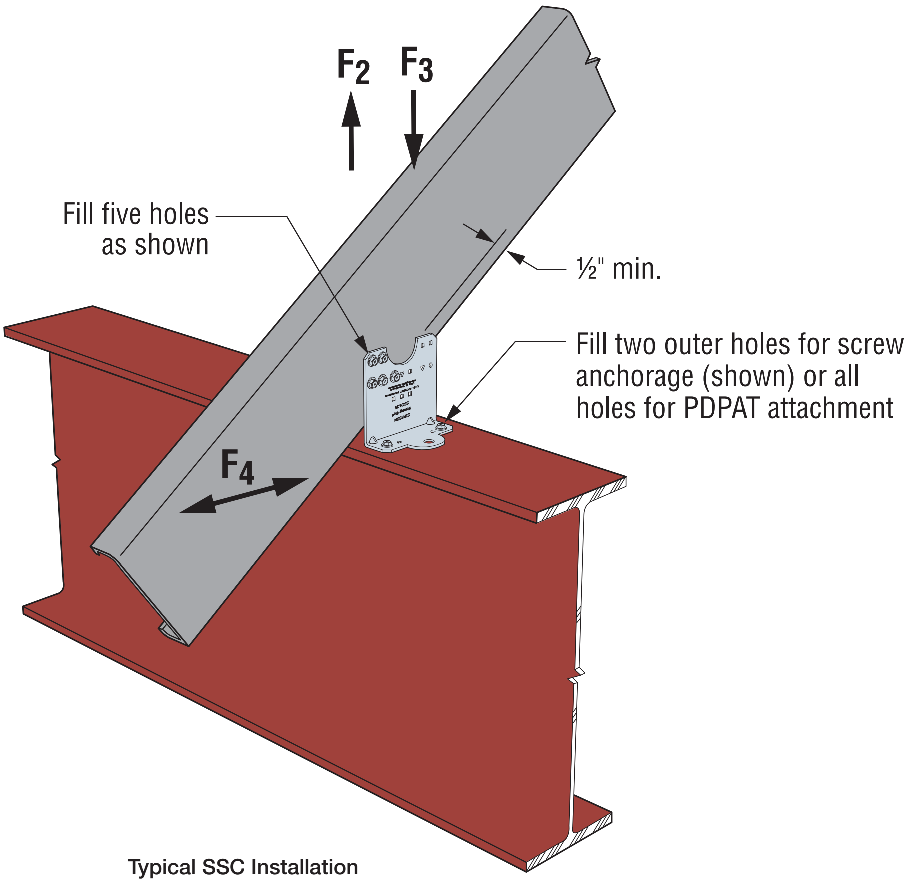
SSC Steel-Stud Connector

SSC Connectors — Rafters Allowable Loads

Model No.	Connector Material Thickness mil (ga.)	L (in.)	Fasteners[1,4]		Allowable Load (lb.)			Code Ref.
			Anchorage to Steel[2]	Supported Member	43 mil (18 ga.)			
					F_2	F_3	F_4	
SSC4.25	68 (14)	4¼	(2) #12	(5) #10	710	1,075	595	IP2
			(4) PDPAT	(5) #10	1,020	1,075	630	
MSSC4.25	97 (12)	4¼	(2) #12	(5) #10	710	1,335	595	
			(4) PDPAT	(5) #10	1,025	1,335	815	

1. See illustrations for fastener placement.
2. Allowable loads are based on anchors installed in minimum 3⁄16"-thick structural steel with F_y = 36 ksi.
3. Allowable loads are based on a 6"-deep member. For deeper members, Designer must consider web crippling of the member and reduce loads accordingly.
4. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



Typical SSC Installation

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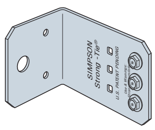
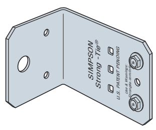
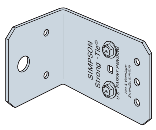
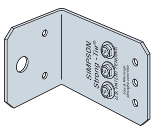
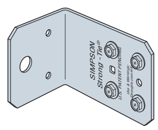
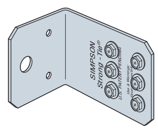
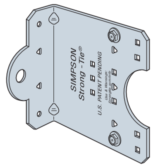
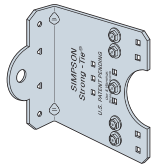
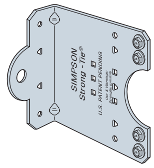
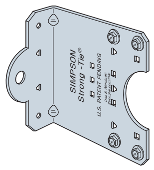
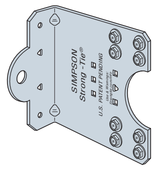
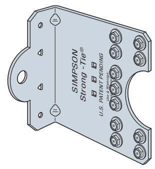
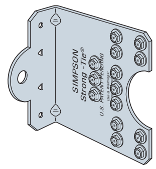
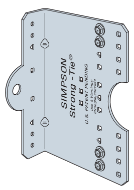
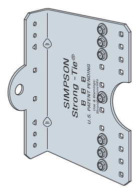
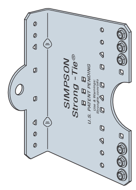
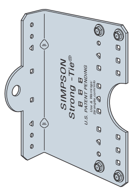
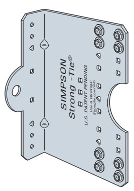
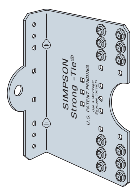
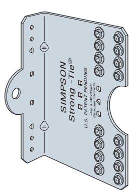
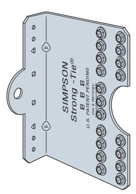
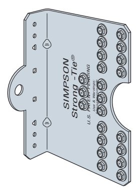
SIMPSON Strong-Tie®

SSC Supplemental Information

The following SSC supplemental information is given to help Designers with value-engineered solutions for our SSC connectors. Loads are given for fastener patterns other than our standard “min.” (fill all round holes) and “max.” (fill all round and triangle holes). The tables give service, ASD, LRFD and nominal loads.

Table 1: SSC Screw Patterns

SSC2.25, MSSC2.25	Pattern “Min.”	Pattern A	Pattern B	
				
	Pattern C	Pattern D	Pattern E	
				
LSSC4.25, SSC4.25, MSSC4.25	Pattern “Min.”	Pattern “Max.”	Pattern “Outer”	
				
	Pattern F	Pattern G	Pattern H	Pattern I
				
LSSC6.25 SSC6.25 MSSC6.25	Pattern “Min.”	Pattern “Max.”	Pattern “Outer”	
				
	Pattern J	Pattern K	Pattern L	
				
	Pattern M	Pattern N	Pattern O	
				

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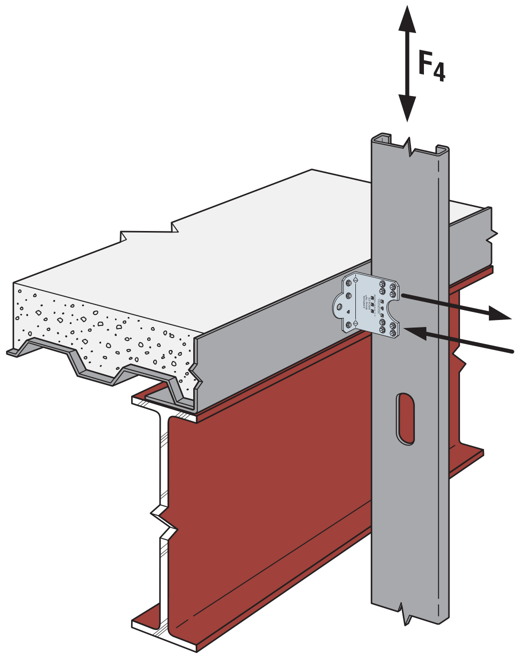
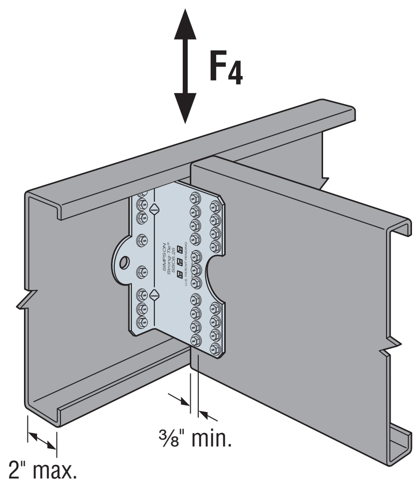
Footnotes for Tables 2, 3, 4 and 5

1. Calculated values are per AISI RP15-2, AISI S-100, or generally accepted industry standards. Shaded values for F_4 are derived from test data. Whenever possible, unshaded F_4 values are based on the maximum calculated value and applicable tested value.
2. The tabulated values do not account for anchorage to the support. Anchor strength must be calculated separately and may reduce the capacity of the connection when compared to the tabulated values.
3. Tabulated values do not include shear, web crippling, buckling, or other local effects in the member. The Designer must check member limit states separately.
4. For load combinations that include F_4 and/or F_2 and/or F_3, use an appropriate interaction equation.
5. #10–16 screws shall have $P_{SS} \geq$ 1,620 lb. Calculated values are per AISI S-100. Screws must be installed with three (min.) exposed threads.
6. The number of screws is for one clip leg that is attached to the supported stud.
7. For the minimum screw pattern, fill all round holes. For the maximum screw pattern, fill all round and triangle holes. Reference p. 76.
8. In addition to calculations of net and gross section tension, and screw shear of the clip leg attached to the stud, F_2 values are also calculated for weak-axis bending of the anchored clip leg with the line of bending at the smaller anchor holes. The Designer is responsible for calculating pullover, pullout, and tension strength of the anchors, and this may reduce F_2 strength compared to the tabulated values.
9. F_3 values are computed using the plate buckling provisions of AISI RP15-2.
10. For the F_4 calculated values, it's assumed that the connection eccentricity is taken by screws in the supported stud.
11. Service load limits for F_2 and F_3 are not given since there are no generally accepted industry methods available to compute these values. F_4 service load limits are based on AISI Research Report RP15-2 for ⅛" deflection or applicable test data.
12. For 50 ksi studs, 68 mil (14 ga.) and thicker, use tabulated values for 54 mil (16 ga.) — 50 ksi studs.



Installation Example #1 —
SSC4.25 Typical
Bypass Framing Installation



Installation Example #2 —
SSC6.25 Typical
Joist-to-Girder Installation

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SSC Supplemental Information

Table 2: SSC Steel Stud Connectors (SSC2.25 and MSSC2.25) — Service Load Limits and Strengths (lb.)

Model No.	No. of #10 Screws	Screw Pattern	Load Direction	Service Load Limit	Stud Thickness and Yield Strength								
					33 mil (20 ga.) – 33 ksi			43 mil (18 ga.) – 33 ksi			54 mil (16 ga.) – 50 ksi		
					ASD	LRFD	Nominal	ASD	LRFD	Nominal	ASD	LRFD	Nominal
SSC2.25	3	Min.	F_2	—	235	350	390	235	350	390	235	350	390
			F_3	—	455	740	1,475	455	740	1,475	455	740	1,475
			F_4	810	165	265	295	225	360	410	345	550	675
	2	A	F_2	—	235	350	390	235	350	390	235	350	390
			F_3	—	330	495	990	355	575	1,150	355	575	1,150
			F_4	190	65	95	190	100	145	295	195	295	585
	2	B	F_2	—	235	350	390	235	350	390	235	350	390
			F_3	—	330	495	990	465	755	1,515	465	755	1,515
			F_4	310	100	150	300	155	235	465	310	465	935
	3	C	F_2	—	235	350	390	235	350	390	235	350	390
			F_3	—	495	745	1,485	600	975	1,945	600	975	1,945
			F_4	810	165	265	310	225	360	480	345	550	960
	4	D	F_2	—	235	350	390	235	350	390	235	350	390
			F_3	—	465	755	1,515	465	755	1,515	465	755	1,515
			F_4	810	180	270	535	275	415	830	555	830	1,660
	6	E	F_2	—	235	350	390	235	350	390	235	350	390
			F_3	—	600	975	1,945	600	975	1,945	600	975	1,945
			F_4	810	230	350	695	360	540	1,075	690	1,075	1,830
MSSC2.25	3	Min.	F_2	—	475	710	790	475	710	790	475	710	790
			F_3	—	495	745	1,485	765	1,150	2,295	785	1,280	2,560
			F_4	810	165	265	295	225	360	410	345	550	675
	2	A	F_2	—	330	495	790	475	710	790	475	710	790
			F_3	—	330	495	990	510	765	1,530	610	995	1,990
			F_4	270	65	95	190	100	145	295	195	295	585
	2	B	F_2	—	330	495	790	475	710	790	475	710	790
			F_3	—	330	495	990	510	765	1,530	810	1,315	2,625
			F_4	445	100	150	300	155	235	465	310	465	935
	3	C	F_2	—	475	710	790	475	710	790	475	710	790
			F_3	—	495	745	1,485	765	1,150	2,295	1,040	1,690	3,375
			F_4	810	165	265	310	225	360	480	345	550	960
	4	D	F_2	—	475	710	790	475	710	790	475	710	790
			F_3	—	660	990	1,980	810	1,315	2,625	810	1,315	2,625
			F_4	810	180	270	535	275	415	830	555	830	1,660
	6	E	F_2	—	475	710	790	475	710	790	475	710	790
			F_3	—	990	1,485	2,970	1,040	1,690	3,375	1,040	1,690	3,375
			F_4	810	230	350	695	360	540	1,075	690	1,075	1,830

See footnotes on p. 77.

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Table 3: SSC Steel Stud Connectors (LSSC4.25 and SSC4.25) — Service Load Limits and Strengths (lb.)

Model No.	No. of #10 Screws	Screw Pattern	Load Direction	Service Load Limit	Stud Thickness and Yield Strength								
					33 mil (20 ga.) – 33 ksi			43 mil (18 ga.) – 33 ksi			54 mil (16 ga.) – 50 ksi		
					ASD	LRFD	Nominal	ASD	LRFD	Nominal	ASD	LRFD	Nominal
LSSC4.25	2	Min.	F_2	—	330	495	725	435	650	725	435	650	725
			F_3	—	250	410	815	250	410	815	250	410	815
			F_4	2,135	215	345	490	440	705	800	675	1,080	1,205
	5	Max.	F_2	—	435	650	725	435	650	725	435	650	725
			F_3	—	610	990	1,980	610	990	1,980	610	990	1,980
			F_4	2,135	215	345	490	440	705	800	725	1,160	1,465
	4	Outer	F_2	—	435	650	725	435	650	725	435	650	725
			F_3	—	420	680	1,360	420	680	1,360	420	680	1,360
			F_4	1,550	200	320	375	310	495	555	520	830	1,020
	4	F	F_2	—	435	650	725	435	650	725	435	650	725
			F_3	—	250	410	815	250	410	815	250	410	815
			F_4	1,550	300	450	895	460	690	1,385	670	1,035	1,880
	8	G	F_2	—	435	650	725	435	650	725	435	650	725
			F_3	—	500	815	1,630	500	815	1,630	500	815	1,630
			F_4	1,550	495	740	1,480	670	1,035	1,880	670	1,035	1,880
	11	H	F_2	—	435	650	725	435	650	725	435	650	725
			F_3	—	610	990	1,980	610	990	1,980	610	990	1,980
			F_4	1,550	545	820	1,640	670	1,035	1,880	670	1,035	1,880
	14	I	F_2	—	435	650	725	435	650	725	435	650	725
			F_3	—	610	990	1,980	610	990	1,980	610	990	1,980
			F_4	1,550	670	1,015	1,880	670	1,035	1,880	670	1,035	1,880
SSC4.25	2	Min.	F_2	—	330	495	990	510	765	1,105	660	995	1,105
			F_3	—	330	495	990	350	565	1,130	350	565	1,130
			F_4	2,450	355	570	635	525	840	990	890	1,425	1,590
	5	Max.	F_2	—	660	995	1,105	660	995	1,105	660	995	1,105
			F_3	—	825	1,240	2,475	845	1,375	2,750	845	1,375	2,750
			F_4	2,450	365	585	650	600	960	1,070	1,005	1,610	1,795
	4	Outer	F_2	—	660	990	1,105	660	995	1,105	660	995	1,105
			F_3	—	580	945	1,890	580	945	1,890	580	945	1,890
			F_4	1,930	235	375	430	330	530	650	625	1,000	1,225
	4	F	F_2	—	660	990	1,105	660	995	1,105	660	995	1,105
			F_3	—	350	565	1,130	350	565	1,130	350	565	1,130
			F_4	1,930	300	450	895	460	690	1,385	920	1,385	2,745
	8	G	F_2	—	660	995	1,105	660	995	1,105	660	995	1,105
			F_3	—	695	1,130	2,265	695	1,130	2,265	695	1,130	2,265
			F_4	1,930	495	740	1,480	765	1,145	2,290	980	1,510	2,745
	11	H	F_2	—	660	995	1,105	660	995	1,105	660	995	1,105
			F_3	—	845	1,375	2,750	845	1,375	2,750	845	1,375	2,750
			F_4	1,930	545	820	1,640	845	1,270	2,535	980	1,510	2,745
	14	I	F_2	—	660	995	1,105	660	995	1,105	660	995	1,105
			F_3	—	845	1,375	2,750	845	1,375	2,750	845	1,375	2,750
			F_4	1,930	675	1,015	2,030	980	1,510	2,745	980	1,510	2,745

See footnotes on p. 77.

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SSC Supplemental Information

Table 4: SSC Steel Stud Connectors (MSSC4.25 and LSSC6.25) — Service Load Limits and Strengths (lb.)

Model No.	No. of #10 Screws	Screw Pattern	Load Direction	Service Load Limit	Stud Thickness and Yield Strength: 33 mil (20 ga.) – 33 ksi			43 mil (18 ga.) – 33 ksi			54 mil (16 ga.) – 50 ksi		
					ASD	LRFD	Nominal	ASD	LRFD	Nominal	ASD	LRFD	Nominal
MSSC4.25	2	Min.	F_2	—	330	495	990	510	765	1,530	1,020	1,530	2,235
			F_3	—	330	495	990	510	765	1,530	605	980	1,965
			F_4	2,450	355	570	635	525	840	990	890	1,425	1,590
	5	Max.	F_2	—	825	1,240	2,235	1,275	1,915	2,235	1,340	2,015	2,235
			F_3	—	825	1,240	2,475	1,275	1,915	3,825	1,465	2,385	4,770
			F_4	2,450	365	585	650	600	960	1,070	1,005	1,610	1,820
	4	Outer	F_2	—	660	990	1,980	1,020	1,530	2,235	1,340	2,015	2,235
			F_3	—	660	990	1,980	1,010	1,530	3,060	1,010	1,640	3,280
			F_4	1,930	235	375	430	330	530	650	625	1,000	1,225
	4	F	F_2	—	660	990	1,980	1,020	1,530	2,235	1,340	2,015	2,235
			F_3	—	605	980	1,965	605	980	1,965	605	980	1,965
			F_4	1,930	300	450	895	460	690	1,385	920	1,385	2,765
	8	G	F_2	—	1,320	1,980	2,235	1,340	2,015	2,235	1,340	2,015	2,235
			F_3	—	1,210	1,965	3,925	1,210	1,965	3,925	1,210	1,965	3,925
			F_4	1,930	495	740	1,480	765	1,145	2,290	1,525	2,290	4,280
	11	H	F_2	—	1,340	2,015	2,235	1,340	2,015	2,235	1,340	2,015	2,235
			F_3	—	1,465	2,385	4,770	1,465	2,385	4,770	1,465	2,385	4,770
			F_4	1,930	545	820	1,640	845	1,270	2,535	1,615	2,535	4,280
	14	I	F_2	—	1,340	2,015	2,235	1,340	2,015	2,235	1,340	2,015	2,235
			F_3	—	1,465	2,385	4,770	1,465	2,385	4,770	1,465	2,385	4,770
			F_4	1,930	675	1,015	2,030	1,045	1,570	3,135	1,615	2,585	4,280
LSSC6.25	4	Min.	F_2	—	640	960	1,065	640	960	1,065	640	960	1,065
			F_3	—	500	815	1,630	500	815	1,630	500	815	1,630
			F_4	2,440	265	425	635	660	1,055	1,185	1,190	1,905	2,125
	7	Max.	F_2	—	640	960	1,065	640	960	1,065	640	960	1,065
			F_3	—	880	1,425	2,855	880	1,425	2,855	880	1,425	2,855
			F_4	2,440	265	425	635	660	1,055	1,185	1,190	1,905	2,350
	6	Outer	F_2	—	640	960	1,065	640	960	1,065	640	960	1,065
			F_3	—	630	1,020	2,040	630	1,020	2,040	630	1,020	2,040
			F_4	1,940	270	430	480	375	600	670	695	1,110	1,365
	4	J	F_2	—	640	960	1,065	640	960	1,065	640	960	1,065
			F_3	—	250	410	815	250	410	815	250	410	815
			F_4	415	405	610	1,215	625	940	1,880	1,015	1,565	2,850
	8	K	F_2	—	640	960	1,065	640	960	1,065	640	960	1,065
			F_3	—	500	815	1,630	500	815	1,630	500	815	1,630
			F_4	1,940	730	1,100	2,195	1,015	1,565	2,850	1,015	1,565	2,850
	12	L	F_2	—	640	960	1,065	640	960	1,065	640	960	1,065
			F_3	—	750	1,225	2,445	750	1,225	2,445	750	1,225	2,445
			F_4	1,940	975	1,465	2,850	1,015	1,565	2,850	1,015	1,565	2,850
	16	M	F_2	—	640	960	1,065	640	960	1,065	640	960	1,065
			F_3	—	895	1,455	2,910	895	1,455	2,910	895	1,455	2,910
			F_4	1,940	1,015	1,565	2,850	1,015	1,565	2,850	1,015	1,565	2,850
	19	N	F_2	—	640	960	1,065	640	960	1,065	640	960	1,065
			F_3	—	895	1,455	2,910	895	1,455	2,910	895	1,455	2,910
			F_4	1,940	1,015	1,565	2,850	1,015	1,565	2,850	1,015	1,565	2,850
	22	O	F_2	—	640	960	1,065	640	960	1,065	640	960	1,065
			F_3	—	895	1,455	2,910	895	1,455	2,910	895	1,455	2,910
			F_4	1,940	1,015	1,565	2,850	1,015	1,565	2,850	1,015	1,565	2,850

See footnotes on p. 77.

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Table 5: SSC Steel Stud Connectors (SSC6.25 and MSSC6.25) — Service Load Limits and Strengths (lb.)

Model No.	No. of #10 Screws	Screw Pattern	Load Direction	Service Load Limit	Stud Thickness and Yield Strength								
					33 mil (20 ga.) – 33 ksi			43 mil (18 ga.) – 33 ksi			54 mil (16 ga.) – 50 ksi		
					ASD	LRFD	Nominal	ASD	LRFD	Nominal	ASD	LRFD	Nominal
SSC6.25	4	Min.	F_2	—	660	990	1,625	975	1,460	1,625	975	1,460	1,625
			F_3	—	660	990	1,980	695	1,130	2,265	695	1,130	2,265
			F_4	2,440	385	615	685	720	1,150	1,380	1,190	1,905	2,270
	7	Max.	F_2	—	975	1,460	1,625	975	1,460	1,625	975	1,460	1,625
			F_3	—	1,155	1,735	3,465	1,220	1,980	3,965	1,220	1,980	3,965
			F_4	2,440	385	615	685	720	1,150	1,375	1,190	1,905	2,205
	6	Outer	F_2	—	975	1,460	1,625	975	1,460	1,625	975	1,460	1,625
			F_3	—	870	1,420	2,835	870	1,420	2,835	870	1,420	2,835
			F_4	1,940	270	430	480	460	735	820	725	1,160	1,330
	4	J	F_2	—	660	990	1,625	975	1,460	1,625	975	1,460	1,625
			F_3	—	350	565	1,130	350	565	1,130	350	565	1,130
			F_4	515	405	610	1,215	625	940	1,880	1,255	1,880	3,760
	8	K	F_2	—	975	1,460	1,625	975	1,460	1,625	975	1,460	1,625
			F_3	—	695	1,130	2,265	695	1,130	2,265	695	1,130	2,265
			F_4	1,940	730	1,100	2,195	1,130	1,700	3,395	1,485	2,290	4,165
	12	L	F_2	—	975	1,460	1,625	975	1,460	1,625	975	1,460	1,625
			F_3	—	1,045	1,700	3,395	1,045	1,700	3,395	1,045	1,700	3,395
			F_4	1,940	975	1,465	2,930	1,485	2,265	4,165	1,485	2,290	4,165
	16	M	F_2	—	975	1,460	1,625	975	1,460	1,625	975	1,460	1,625
			F_3	—	1,245	2,020	4,045	1,245	2,020	4,045	1,245	2,020	4,045
			F_4	1,940	1,140	1,710	3,425	1,485	2,290	4,165	1,485	2,290	4,165
	19	N	F_2	—	975	1,460	1,625	975	1,460	1,625	975	1,460	1,625
			F_3	—	1,245	2,020	4,045	1,245	2,020	4,045	1,245	2,020	4,045
			F_4	1,940	1,210	1,815	3,630	1,485	2,290	4,165	1,485	2,290	4,165
	22	O	F_2	—	975	1,460	1,625	975	1,460	1,625	975	1,460	1,625
			F_3	—	1,245	2,020	4,045	1,245	2,020	4,045	1,245	2,020	4,045
			F_4	1,940	1,350	2,020	4,045	1,485	2,290	4,165	1,485	2,290	4,165
MSSC6.25	4	Min.	F_2	—	660	990	1,980	1,020	1,530	3,060	1,970	2,960	3,290
			F_3	—	660	990	1,980	1,020	1,530	3,060	1,210	1,965	3,925
			F_4	2,440	385	615	685	720	1,150	1,380	1,190	1,905	2,270
	7	Max.	F_2	—	1,155	1,735	3,290	1,785	2,680	3,290	1,970	2,960	3,290
			F_3	—	1,155	1,735	3,465	1,785	2,680	5,355	2,115	3,435	6,870
			F_4	2,440	385	615	685	720	1,150	1,375	1,365	2,185	2,490
	6	Outer	F_2	—	990	1,485	2,970	1,530	2,295	3,290	1,970	2,960	3,290
			F_3	—	990	1,485	2,970	1,515	2,295	4,590	1,515	2,460	4,915
			F_4	1,940	270	430	480	460	735	820	725	1,160	1,330
	4	J	F_2	—	660	990	1,980	1,020	1,530	3,060	1,970	2,960	3,290
			F_3	—	605	980	1,965	605	980	1,965	605	980	1,965
			F_4	735	405	610	1,215	625	940	1,880	1,255	1,880	3,760
	8	K	F_2	—	1,320	1,980	3,290	1,970	2,960	3,290	1,970	2,960	3,290
			F_3	—	1,210	1,965	3,925	1,210	1,965	3,925	1,210	1,965	3,925
			F_4	1,940	730	1,100	2,195	1,130	1,700	3,395	2,265	3,395	6,790
	12	L	F_2	—	1,970	2,960	3,290	1,970	2,960	3,290	1,970	2,960	3,290
			F_3	—	1,810	2,945	5,890	1,810	2,945	5,890	1,810	2,945	5,890
			F_4	1,940	975	1,465	2,930	1,510	2,265	4,525	2,590	4,145	6,865
	16	M	F_2	—	1,970	2,960	3,290	1,970	2,960	3,290	1,970	2,960	3,290
			F_3	—	2,160	3,505	7,010	2,160	3,505	7,010	2,160	3,505	7,010
			F_4	1,940	1,140	1,710	3,425	1,765	2,645	5,290	2,590	4,145	6,865
	19	N	F_2	—	1,970	2,960	3,290	1,970	2,960	3,290	1,970	2,960	3,290
			F_3	—	2,160	3,505	7,010	2,160	3,505	7,010	2,160	3,505	7,010
			F_4	1,940	1,210	1,815	3,630	1,870	2,805	5,610	2,590	4,145	6,865
	22	O	F_2	—	1,970	2,960	3,290	1,970	2,960	3,290	1,970	2,960	3,290
			F_3	—	2,160	3,505	7,010	2,160	3,505	7,010	2,160	3,505	7,010
			F_4	1,940	1,350	2,020	4,045	2,085	3,125	6,250	2,590	4,145	6,865

See footnotes on p. 77.

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SJC Steel-Joist Connectors

This product is preferable to similar connectors because of a) easier installation, b) higher loads, c) lower installed cost, or a combination of these features.

SJC connectors have been specifically designed for various CFS joist, rafter and underside of metal-deck applications. The unique clip dimensions enable easy installation on the open side of joists and rafters with up to 3½" flanges and return lips up to ¾". For metal-deck applications, the prepunched ⅜" holes easily accommodate 6", 8", 10" and 12" on-center metal-deck flutes.

Features:

- Prepunched holes reduce installation cost by eliminating predrilling
- Intuitive fastener hole positions ensure accurate clip installation in accordance with design, support a wide range of design and application requirements and provide installation flexibility
- Angle lengths accommodate either hard-side or soft-side attachment for joists with return lips up to ¾"
- 4½" leg length enables soft-side connections for joists with flanges up to 3½"
- Also accommodates kicker-to-metal-deck applications

Material: SJC — 68 mil (50 ksi); MSJC — 97 mil (50 ksi)

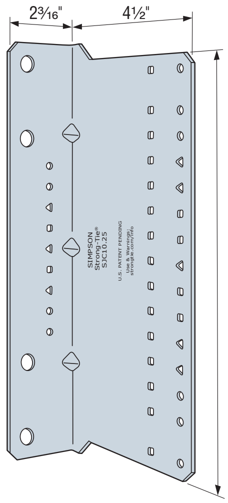
Finish: Galvanized (G90)

Installation:

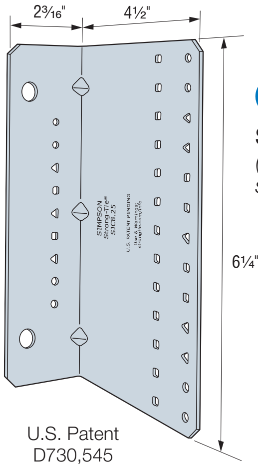
- Use all specified fasteners/anchors

Codes: See p. 11 for Code Reference Key Chart

For detailed product dimensions, refer to p. 91.



SJC10.25
(MSJC10.25 similar)

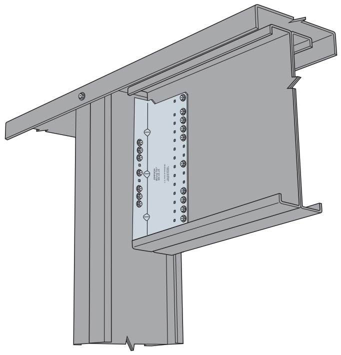


SJC8.25
(MSJC8.25 similar)

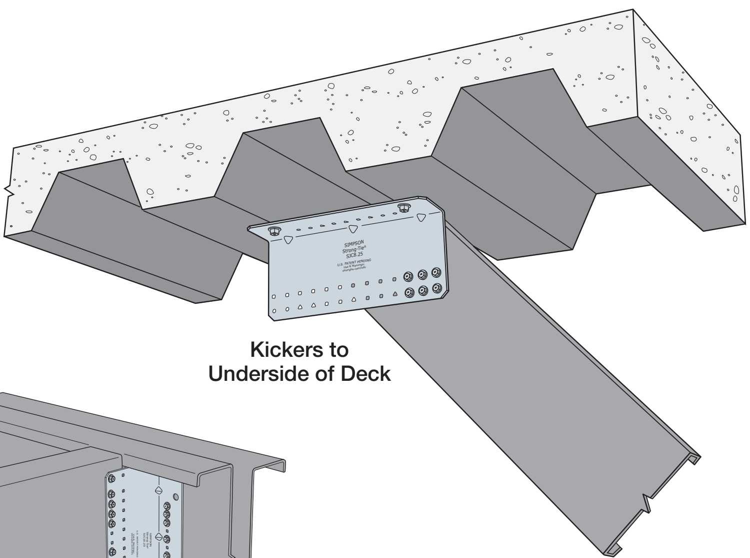
U.S. Patent D730,545

Ordering Information

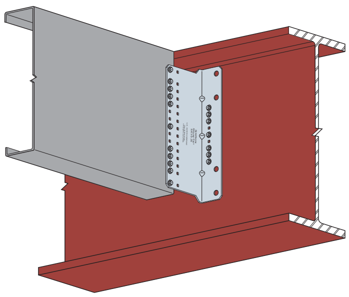
Model No.	Ordering SKU	Package Quantity
SJC8.25	SJC8.25-R15	Box of 15
MSJC8.25	MSJC8.25-R15	
SJC10.25	SJC10.25-R15	Box of 15
MSJC10.25	MSJC10.25-R15	



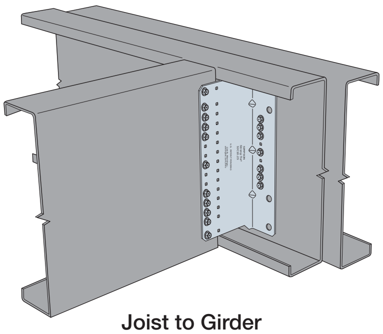
Header to Jamb



Kickers to Underside of Deck



Joists to I-Beam



Joist to Girder

Note: For 6" and 8" joists: SSC connectors are recommended.

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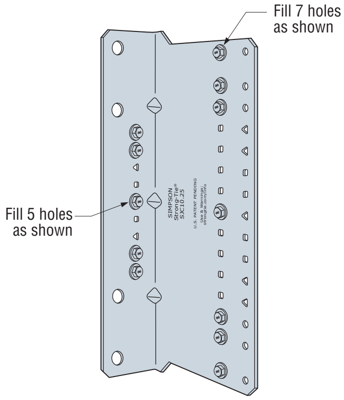
SJC Steel-Joist Connectors

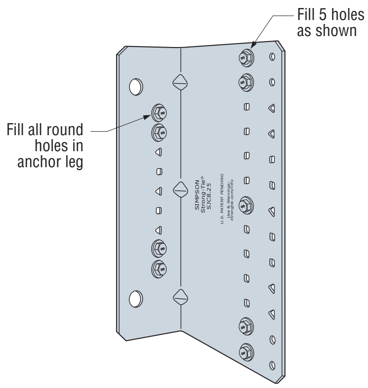
SJC Connectors — Steel-to-Steel Allowable Loads

Model No.	Connector Material Thickness mil (ga.)	L (in.)	Framing Member Depth[4] (in.)	Fasteners[5]			Allowable F_4 Load (lb.)[2]			Code Ref.
				Pattern[1]	Carried Member	Carrying Member	Minimum Member Thickness		Maximum Connector Load[3]	
							54 mil (16 ga.)	68 mil (14 ga.)		
SJC8.25	68 (14)	8¼	10	Min.	(4) #10	(4) #10	980	980	2,930	IP2
				Max.	(9) #10	(7) #10	1,005	1,490		
				Inner	(5) #10	(4) #10	1,345	2,005		
MSJC8.25	97 (12)	8¼	10	Min.	(4) #10	(4) #10	1,005	1,710	2,930	
				Max.	(9) #10	(7) #10	1,135	1,765		
				Inner	(5) #10	(4) #10	1,535	2,220		
SJC10.25	68 (14)	10¼	12	Min.	(6) #10	(4) #10	1,170	1,625	3,935	
				Max.	(11) #10	(7) #10	1,265	1,625		
				Inner	(7) #10	(5) #10	1,620	2,170		
MSJC10.25	97 (12)	10¼	12	Min.	(6) #10	(4) #10	1,200	2,045	3,935	
				Max.	(11) #10	(7) #10	1,265	2,045		
				Inner	(7) #10	(5) #10	1,730	2,635		

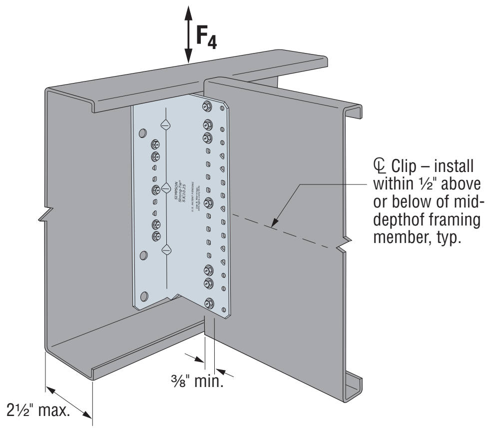
1. Min. fastener quantity and load values — fill all round holes; Max. fastener quantity and load values — fill all round and triangular holes; Inner fastener quantity and load values — see illustrations for fastener placement.
2. Allowable loads are based on bracing of the members located within 12" of the connection.
3. Maximum allowable load for connector that may not be exceeded when designing custom installations. Designer is responsible for member and fastener design.
4. For 6" and 8" joists, SSC connectors are recommended.
5. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



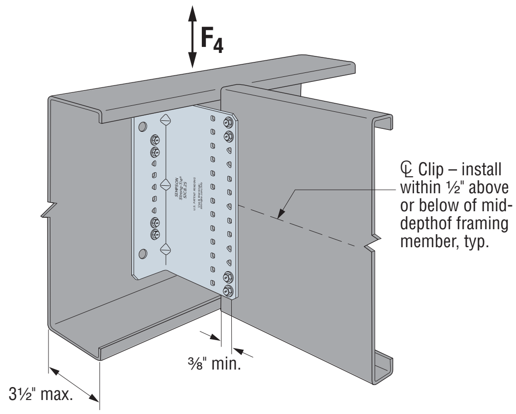
SJC10.25-Inner Fastener Pattern
(MSJC10.25 similar)



SJC8.25-Inner Fastener Pattern
(MSJC8.25 similar)



SJC Installation with Carried Member Fasteners in Inner Row



SJC Installation with Carried Member Fasteners in Outer Row
(For min./max. load values)

Rigid Connectors

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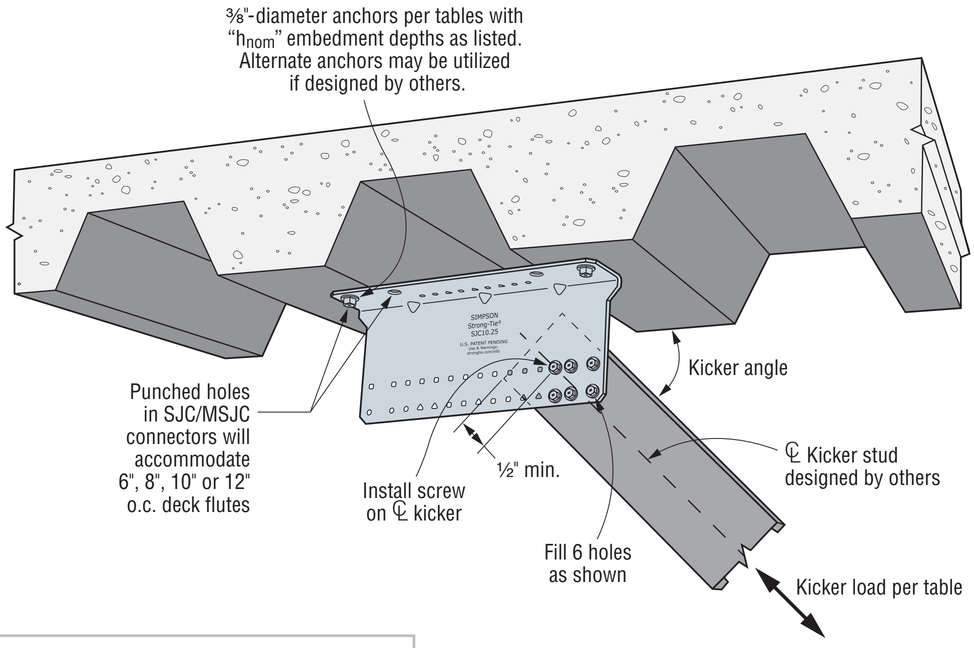
SJC Steel-Joist Connectors

SJC Connectors — Kicker Allowable Loads

Model No.	Connector Material Thickness mil (ga.)	L (in.)	Fasteners to Kicker	Kicker Angle[2]	Maximum Kicker Load (lb.)	Anchor Tension at Maximum Load (lb.)	Code Ref.
SJC8.25	68 (14)	8¼	(6) #10	30°	490	345	IP2
				45°	535	570	
SJC10.25	68 (14)	10¼	(6) #10	30°	625	475	
				45°	530	440	
MSJC10.25	97 (12)	10¼	(6) #10	30°	950	675	
				45°	780	680	

1. Loads apply to connectors installed perpendicular or parallel to metal-deck flutes, with minimum 33 mil (20 ga.) kicker.
2. Kicker angle is the acute angle measured relative to the horizontal plane of the metal deck.
3. The tabulated value for anchor tension is per anchor. Anchors must be designed for combined shear and tension. Simpson Strong-Tie anchorage solutions are tabulated on pp. 85 and 86. Alternate anchors may be utilized if designed by others.
4. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



Typical SJC Installation
(MSJC similar)

Titen HD® Screw Anchor

Strong-Bolt® 2 Wedge Anchor

See pp. 182–203 for Simpson Strong-Tie anchor solutions for this application.

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SJC Steel-Joist Connectors

SJC and MSJC Kicker Anchorage Solutions

Uncracked Concrete, Wind and Seismic in SDC A&B					
Minimum 2.5" Slab (3,000 psi concrete min.) Over Metal Deck					
Model No.	Kicker Angle	⅜" Diameter Simpson Strong-Tie® Anchor Type	Nominal Embedment Depth (h_{nom})	Anchor Tension at Max. Load	Reduced Max. Kicker Load (If Applicable)
SJC8.25	30°	STB2	2½"	345	—
		Titen HD®	2¼"	345	—
	45°	STB2	2½"	570	—
		Titen HD	2½"	570	—
SJC10.25	30°	STB2	2½"	475	—
		Titen HD	2¼"	475	—
	45°	STB2	2½"	440	—
		Titen HD	2¼"	440	—
MSJC10.25	30°	STB2	2¾"	675	—
		Titen HD	2½"	575	805
	45°	STB2	2½"	680	—
		Titen HD	2½"	650	745

Cracked Concrete, Wind and Seismic in SDC A&B					
Minimum 2.5" Slab (3,000 psi concrete min.) Over Metal Deck					
Model No.	Kicker Angle	⅜" Diameter Simpson Strong-Tie® Anchor Type	Nominal Embedment Depth (h_{nom})	Anchor Tension at Max. Load	Reduced Max. Kicker Load (If Applicable)
SJC8.25	30°	STB2	2¾"	345	—
		Titen HD	2½"	320	455
	45°	STB2	2¾"	570	—
		Titen HD	2½"	340	320
SJC10.25	30°	STB2	2¾"	475	—
		Titen HD	2½"	330	435
	45°	STB2	2¾"	440	—
		Titen HD	2½"	340	410
MSJC10.25	30°	STB2	3⅜"	675	—
		Titen HD	2½"	325	460
	45°	STB2	2¾"	680	—
		Titen HD	2½"	340	390

1. Allowable loads have been determined using ACI 318-14 Chapter 17 anchorage calculations with the minimum concrete compressive strength, f'_c and slab thickness listed.
2. STB2 = ⅜" diameter Strong-Bolt® 2 carbon steel anchor, THD = ⅜" diameter Titen HD® screw anchor.
3. Concrete over metal deck may be Normal Weight or Sand-Lightweight with f'_c of 3,000 psi minimum and 2.5" minimum slab height above upper flute.
4. Minimum deck flute height is 1.5" (distance from top flute to bottom flute). All other anchor installation requirements shall follow ICC-ES ESR-3037 and ICC-ES ESR-2713.
5. Minimum Spacing, Edge and End distances for bottom of metal deck assemblies shall comply with those required in ICC-ES ESR-3037 for STB2 anchors and ICC-ES ESR-2713 for Titen HD anchors.
6. Load values are based on ACI 318-14, condition B, load factors from ACI 318-14 Section 5.3, no supplemental edge reinforcement for uncracked concrete, $\psi_{c,V}$ = 1.0 for cracked concrete, and periodic special inspection. Reference ICC-ES ESR-3037 and ICC-ES ESR-2713 for further information.
7. Allowable Stress Design (ASD) values have been determined by multiplying Load Resistance Factor Design (LRFD) values by a conversion factor, Alpha (α), of 0.7 for seismic loads and 0.6 for wind loads. ASD values for other types or load combinations may be determined using alternate conversion factors.

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SJC Steel-Joist Connectors

SJC and MSJC Kicker Anchorage Solutions

Cracked Concrete, Seismic in SDC C through F							
Minimum 2.5" Slab (3,000 psi concrete min.) Over Metal Deck							
Model No.	Kicker Angle	⅜" Diameter Simpson Strong-Tie® Anchor Type	Nominal Embedment Depth (h_{nom})	Ω = 1.5		Ω = 2.5	
				Anchor Tension at Max. Load	Reduced Max. Kicker Load	Anchor Tension at Max. Load	Reduced Max. Kicker Load
SJC8.25	30°	STB2	3⅜"	345	—	310	435
		Titen HD®	2½"	180	255	110	155
	45°	STB2	3⅜"	570	—	355	330
		Titen HD	2½"	200	185	120	110
SJC10.25	30°	STB2	3⅜"	475	—	320	420
		Titen HD	2½"	185	245	110	145
	45°	STB2	3⅜"	440	—	340	410
		Titen HD	2½"	195	235	120	140
MSJC10.25	30°	STB2	3⅜"	525	740	315	445
		Titen HD	2½"	185	260	110	155
	45°	STB2	3⅜"	575	660	345	395
		Titen HD	2½"	200	225	120	135

1. Allowable loads have been determined using ACI 318-14 Chapter 17 anchorage calculations with the minimum concrete compressive strength, f'_c and slab thickness listed.
2. STB2 = ⅜"-diameter Strong-Bolt® 2 carbon steel anchor, THD = ⅜"-diameter Titen HD® screw anchor.
3. Concrete over metal deck may be Normal Weight or Sand-Lightweight with f'_c of 3,000 psi minimum and 2.5" minimum slab height above upper flute.
4. Minimum deck flute height is 1.5" (distance from top flute to bottom flute). All other anchor installation requirements shall follow ICC-ES ESR-3037 and ICC-ES ESR-2713.
5. Minimum Spacing, Edge and End distances for bottom of metal deck assemblies shall comply with those required in ICC-ES ESR-3037 for STB2 anchors and ICC-ES ESR-2713 for Titen HD anchors.
6. Load values are based on ACI 318-14, condition B, load factors from ACI 318-14 Section 5.3, no supplemental edge reinforcement for uncracked concrete, ψ_c, v = 1.0 for cracked concrete, and periodic special inspection. Reference ICC-ES ESR-3037 and ICC-ES ESR-2713 for further information.
7. Allowable Stress Design (ASD) values have been determined by multiplying Load Resistance Factor Design (LRFD) values by a conversion factor, Alpha (α), of 0.7 for seismic loads and 0.6 for wind loads. ASD values for other types or load combinations may be determined using alternate conversion factors.
8. Allowable anchor loads have been divided by an Omega (Ω) seismic factor of 1.5 or 2.5 for brittle failure as required by ACI 318-14 Chapter 17.

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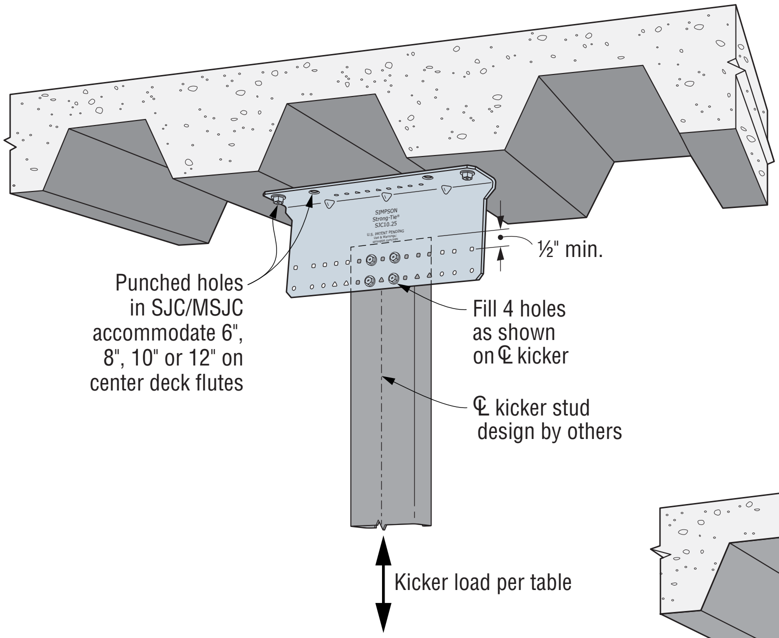
SJC Steel-Joist Connectors

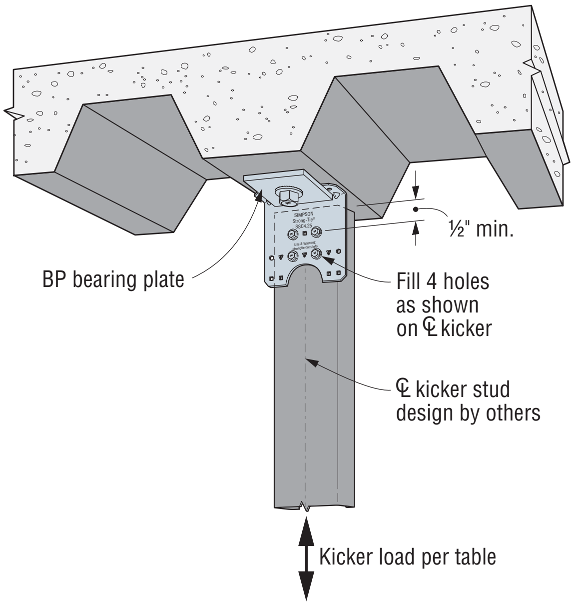
SJC and SSC Connectors — Soffit Stud Hanger Allowable Loads

Model No.	Connector Thickness mil (ga.)	L (in.)	Anchors	Fasteners to Stud	Allowable Tension Load	
					No Bearing Plate	BP½-3 Bearing Plate
SJC8.25	68 (14)	8¼	(2) ⅜"	(4) #10	465	930
SJC10.25	68 (14)	10¼	(2) ⅜"	(4) #10	465	930
SSC4.25	68 (14)	4¼	(1) ⅜"	(4) #10	220	585

1. Loads apply to connectors installed perpendicular or parallel to metal-deck flutes.
2. Stud member design per Designer. Tabulated loads for stud fasteners are based on a minimum stud thickness of 33 mil (20 ga.) with a yield stress of 33 ksi. For 30 mil interior studs with a yield strength of 33 ksi, multiply the tabulated values by 0.9.
3. Anchor design per Designer. Note that the SJC requires the symmetrical placement of one anchor on each side of the stud centerline.
4. For the bearing plate option, use Simpson Strong-Tie® BP½-3 bearing plates at each ⅜"-diameter anchor. Bearing plates are sold separately.



Typical SJC Soffit Installation
(MSJC similar)



Typical SSC Soffit Installation

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SFC Steel Framing Connectors

This product is preferable to similar connectors because of a) easier installation, b) higher loads, c) lower installed cost, or a combination of these features.

SFC connectors are a low-cost, multi-use utility clips for light to moderate loading conditions in CFS stud-to-stud and stud-to-structure applications where long leg lengths are not required.

Features:

- Reduced number of screws reduces installation cost
- Prepunched holes reduce installation cost by eliminating predrilling
- Intuitive fastener hole positions ensure accurate clip installation in accordance with design, support a wide range of design and application requirements and provide installation flexibility
- In soft-side stud installations, SFC will not interfere with stud lips up to ¾" long*
- Also suitable for U-channel bridging

Material: LSFC — 43 mil (33 ksi); SFC — 54 mil (50 ksi)

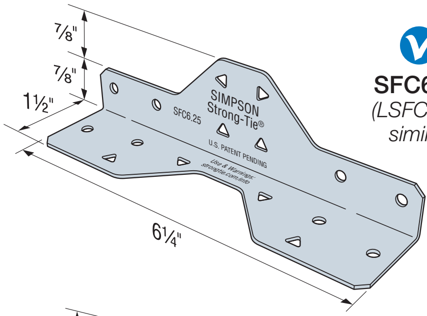
Finish: Galvanized (G90)

Installation:

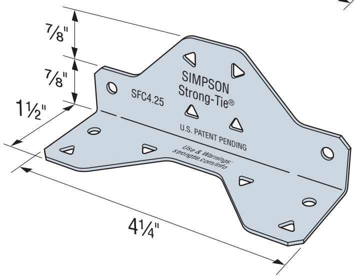
- Use all specified fasteners/anchors.

Codes: See p. 11 for Code Reference Key Chart

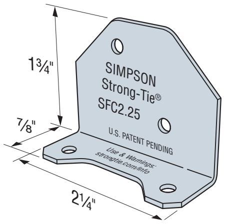
For detailed product dimensions, refer to p. 90.



SFC6.25
(LSFC6.25 similar)

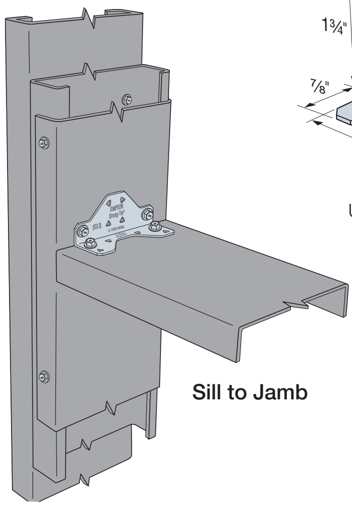


SFC4.25
(LSFC4.25 similar)



SFC2.25
(LSFC2.25 similar)

U.S. Patent 9,016,024

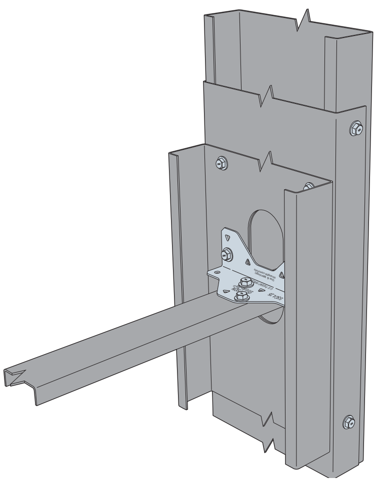


Sill to Jamb

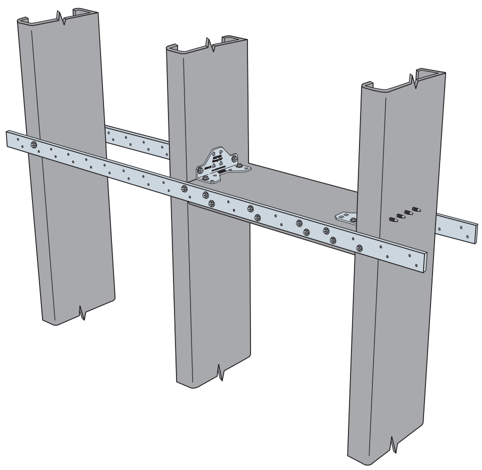
Ordering Information

Model No.	Ordering SKU[1]	Package Quantity
SFC2.25	SFC2.25-R300	Bucket of 300
LSFC2.25	LSFC2.25-R300	
SFC4.25	SFC4.25-R175	Bucket of 175
LSFC4.25	LSFC4.25-R175	
SFC6.25	SFC6.25-R100	Bucket of 100
LSFC6.25	LSFC6.25-R100	Bucket of 100

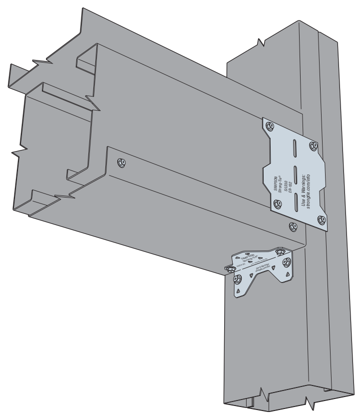
1. By leaving off the "-RXXX" suffix, items can also be ordered in cartons of 50.



U-Channel to Jamb



Stud Blocking with CS Coiled Strap



Box Headers to Jambs with S/LS Angles

*SFC2.25 clips will accommodate ⅝" long stiffener clips.

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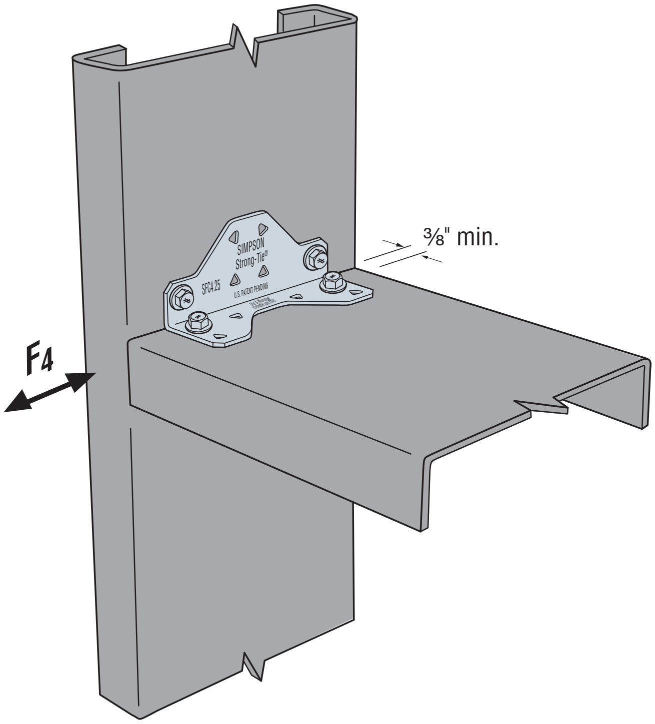
SFC Steel Framing Connectors

SFC Connectors — Steel-to-Steel Allowable Loads

Model No.	Connector Material Thickness mil (ga.)	L (in.)	Framing Member Depth (in.)	Fasteners			Allowable F_4 Load (lb.)				Code Ref.
				Pattern[1]	Carried Member	Carrying Member	Minimum Member Thickness			Maximum Connector Load[3]	
							33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)		
LSFC2.25	43 (18)	2¼	3⅝	Min.	(2) #10	(2) #10	295	310	475	630	IP2
SFC2.25	54 (16)	2¼	3⅝	Min.	(2) #10	(2) #10	295	355	630	630	
LSFC4.25	43 (18)	4¼	6	Min.	(2) #10	(2) #10	355	525	525	1,750	
				Max.	(6) #10	(6) #10	440	865	1,320		
SFC4.25	54 (16)	4¼	6	Min.	(2) #10	(2) #10	355	525	745	1,750	
				Max.	(6) #10	(6) #10	575	985	1,750		
LSFC6.25	43 (18)	6¼	8	Min.	(4) #10	(4) #10	490	920	1,050	2,640	
				Max.	(8) #10	(8) #10	510	980	1,495		
SFC6.25	54 (16)	6¼	8	Min.	(4) #10	(4) #10	590	1,035	1,840	2,640	
				Max.	(8) #10	(8) #10	590	1,055	1,880		

1. Min. fastener quantity and load values — fill all round holes; Max. fastener quantity and load values — fill all round and triangular holes.
2. Allowable loads are based on bracing of the members located within 12" of the connection.
3. Maximum allowable load for connector that may not be exceeded when designing custom installations. Designer is responsible for member and fastener design.
4. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



Typical SFC Installation

Rigid Connectors

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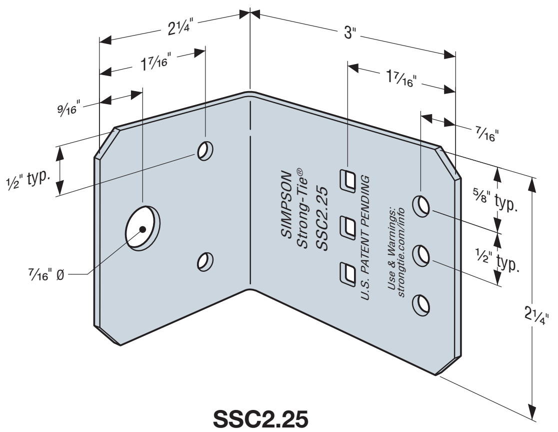
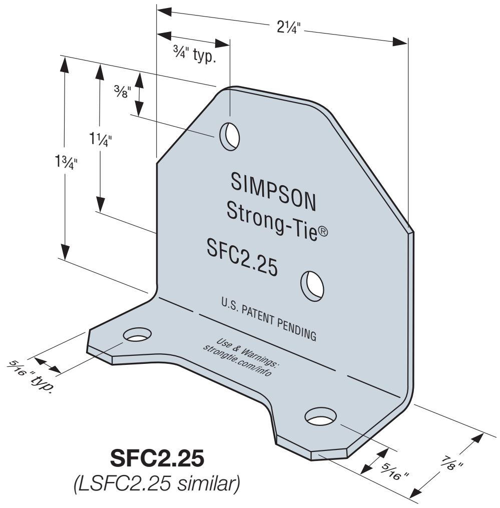
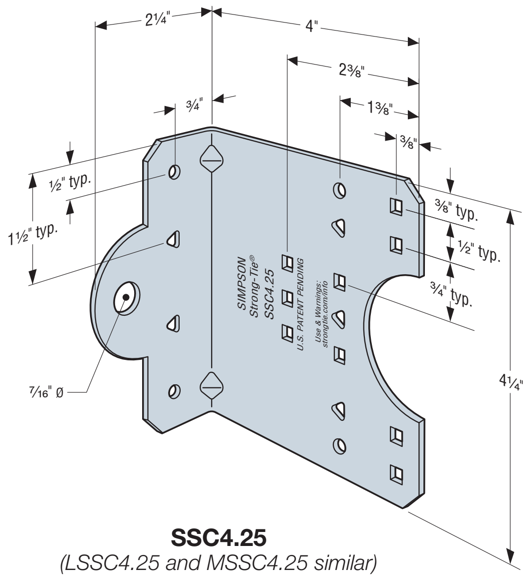
Utility Clip Dimensions



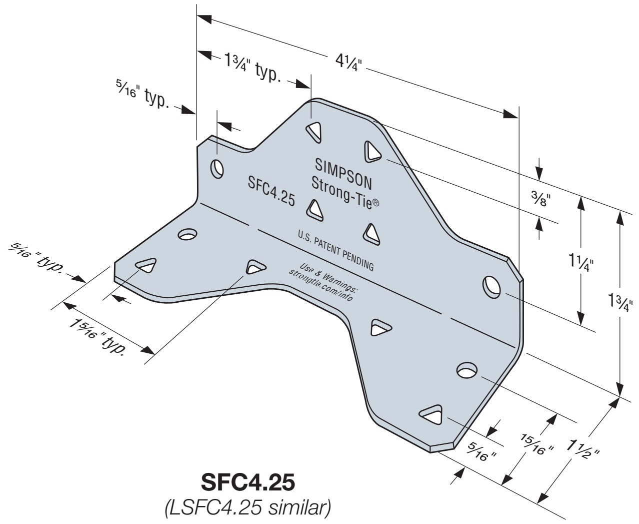
SSC2.25
(MSSC2.25 similar)



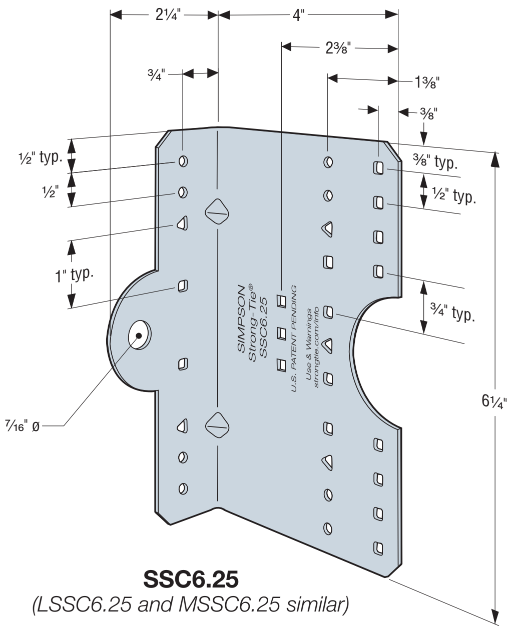
SFC2.25
(LSFC2.25 similar)



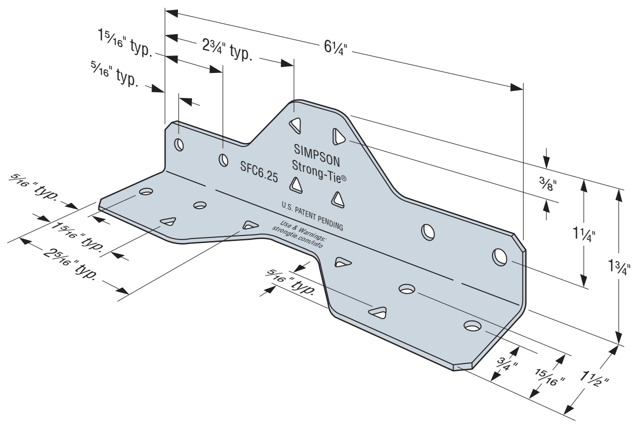
SSC4.25
(LSSC4.25 and MSSC4.25 similar)



SFC4.25
(LSFC4.25 similar)



SSC6.25
(LSSC6.25 and MSSC6.25 similar)



SFC6.25
(LSFC6.25 similar)

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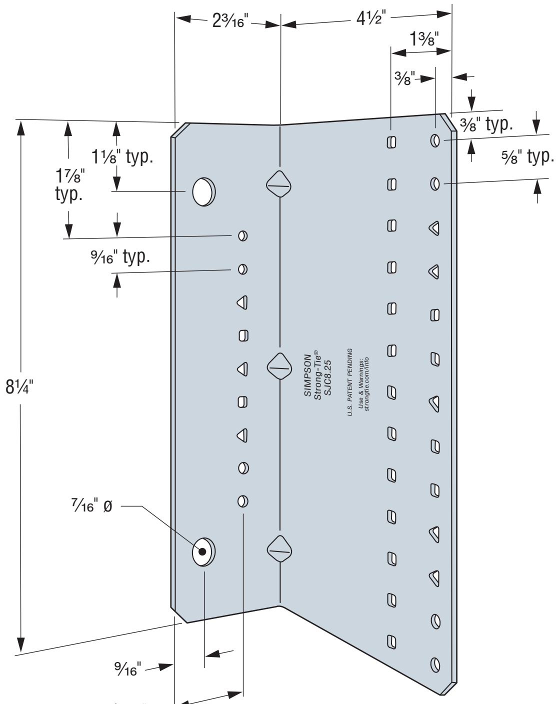
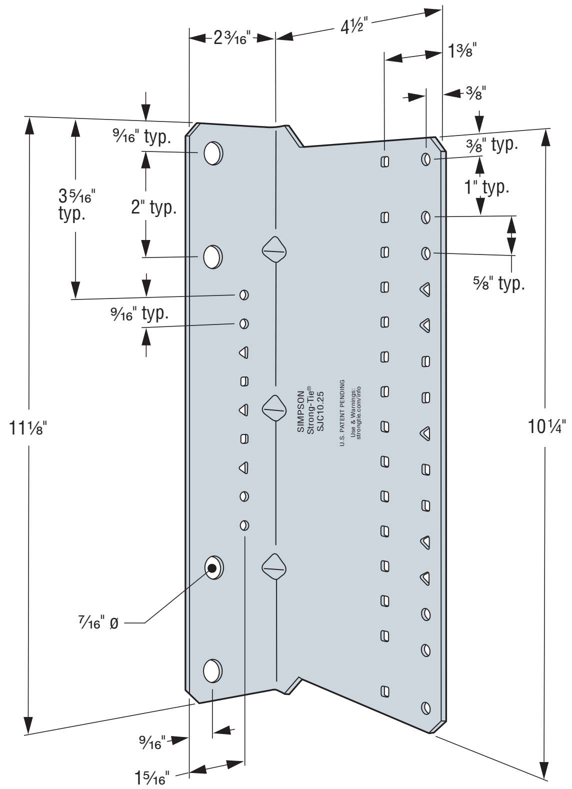
Utility Clip Dimensions



SJC8.25
(MSJC8.25 similar)



SJC10.25
(MSJC10.25 similar)

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SIMPSON Strong-Tie®

RCA Rigid Connector Angles

The Simpson Strong-Tie® rigid connector angle is a general-purpose clip angle designed for a wide range of cold-formed steel construction applications. With prepunched holes for fastener attachment, these L-shaped clips save time and labor on the job.

Features:

- Use with miscellaneous header/sill connections to jamb studs, jamb stud reinforcement at track, u-channel bridging, stud-blocking, bypass curtain-wall framing and more
- Easy to install, with prepunched holes for quick and accurate fastener attachment

Material: RCA223/54, RCA225/54, RCA227/54, RCA333/54, RCA335/54 — 54 mil (16 ga.), 50 ksi; RCA223/68, RCA225/68, RCA227/68, RCA333/68, RCA335/68 — 68 mil (14 ga.), 50 ksi; RCA223/97, RCA225/97, RCA227/97, RCA333/97, RCA335/97 — 97 mil (12 ga.), 50 ksi

Finish: Galvanized (G90)

Installation:

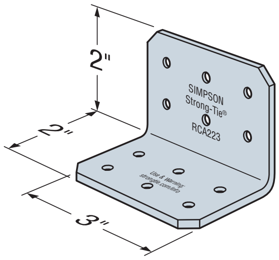
- Use all specified anchors/fasteners

Codes: See p. 11 for Code Reference Key Chart

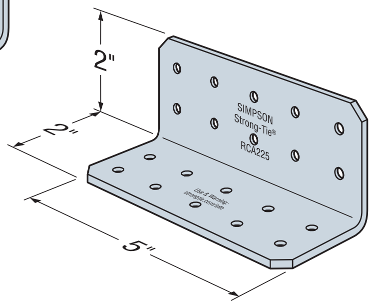
Ordering Information

Model No.	Ordering SKU	Bucket Quantity
RCA223/54	RCA223/54-R150	150
RCA223/68	RCA223/68-R125	125
RCA223/97	RCA223/97-R90	90
RCA225/54	RCA225/54-R90	90
RCA225/68	RCA225/68-R75	75
RCA225/97	RCA225/97-R55	55
RCA227/54	RCA227/54-R65	65
RCA227/68	RCA227/68-R55	55
RCA227/97	RCA227/97-R40	40
RCA333/54	RCA333/54-R100	100
RCA333/68	RCA333/68-R85	85
RCA333/97	RCA333/97-R60	60
RCA335/54	RCA335/54-R60	60
RCA335/68	RCA335/68-R50	50
RCA335/97	RCA335/97-R35	35

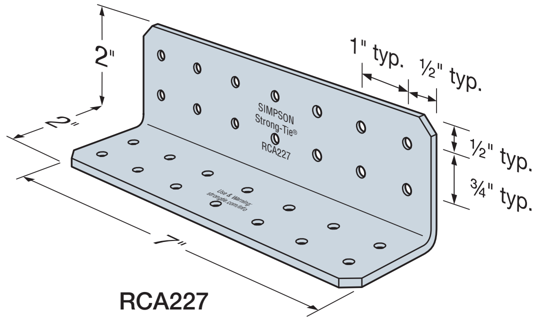
NEW



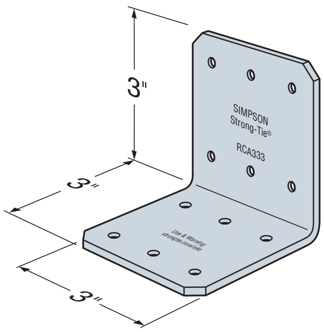
RCA223



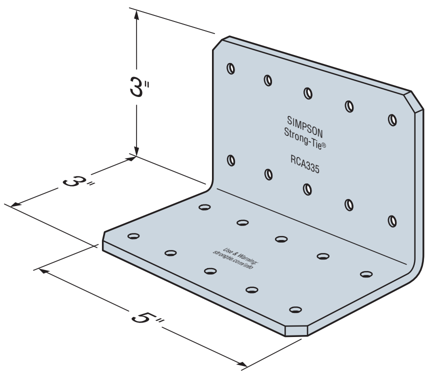
RCA225



RCA227



RCA333



RCA335

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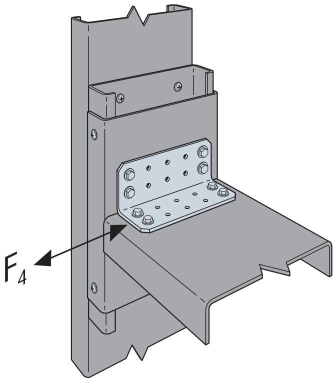
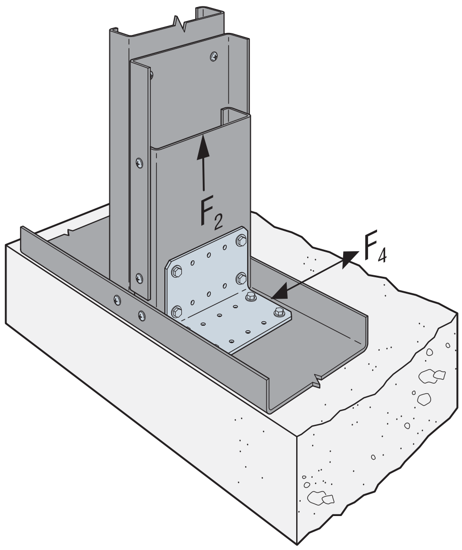
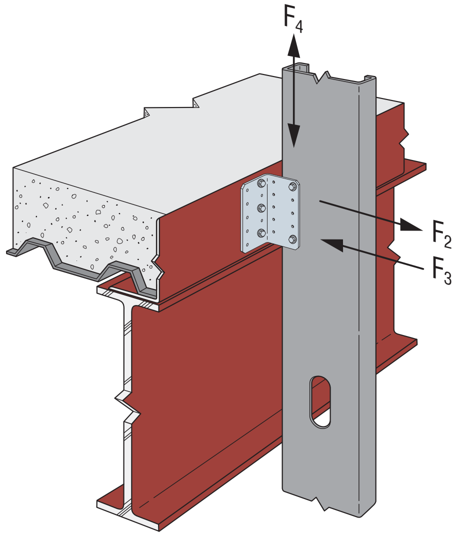
RCA Rigid Connector Angles



Typical RCA225
Installation at Sill/Jamb

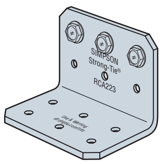
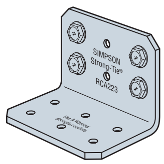
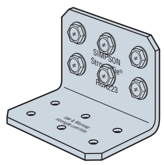
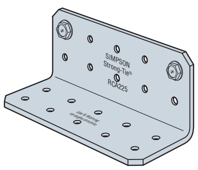
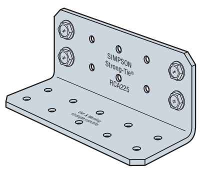
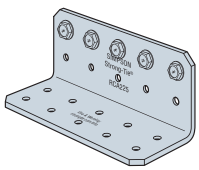
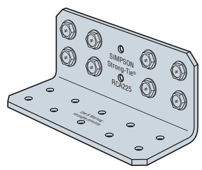
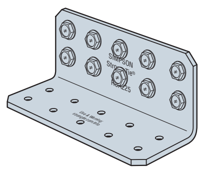
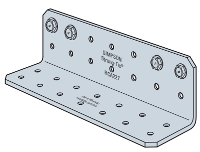
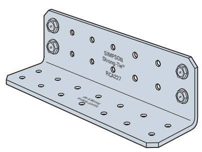
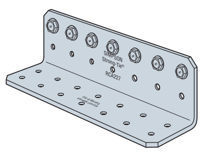
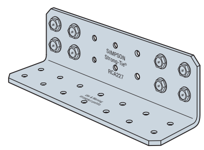
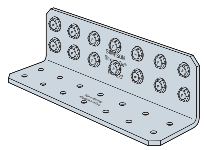


Typical RCA335 Installation
at Base of Jamb



Typical RCA335 Installation
at Bypass Framing

Screw Patterns for Rigid Connector Angles

Models	Pattern 1	Pattern 2	Pattern 3		
RCA223/54 RCA223/68 RCA223/97 RCA333/54 RCA333/68 RCA333/97					
Models	**Pattern 4**	**Pattern 5**	**Pattern 6**	**Pattern 7**	**Pattern 8**
RCA225/54 RCA225/68 RCA225/97 RCA335/54 RCA335/68 RCA335/97					
Models	**Pattern 9**	**Pattern 10**	**Pattern 11**	**Pattern 12**	**Pattern 13**
RCA227/54 RCA227/68 RCA227/97					

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Footnotes for RCA Load Tables

1. As applicable, the tabulated values are calculated based on AISI RP15-2, AISI S100 or generally accepted industry standards.
2. The tabulated values do not account for anchorage to the support. Anchor strength must be calculated separately and may reduce the capacity of the connection when compared to the tabulated values.
3. Tabulated values do not include shear, web crippling, buckling or other local effects in the member. The Designer must check member limit states separately.
4. For load combinations that include F_4 and/or F_2 and/or F_3, use an appropriate interaction equation.
5. #10–16 screws shall have $P_{SS} \geq$ 1,620 lb. Calculated values are per AISI S100. Screws must be installed with three (minimum) exposed threads.
6. The number of screws is for one clip leg that is attached to the supported stud.
7. In addition to calculations of net and gross section tension, F_2 values are also calculated and normally controlled by weak-axis bending of the anchored clip leg with the line of bending at the holes nearest the bend radius of the angle. The Designer is responsible for calculating pullover, pullout and tension strength of the anchors and this may reduce F_2 strength compared to the tabulated values.
8. F_3 strength values are computed using the plate buckling provisions of AISI RP15-2.
9. For the F_4 strength values it's assumed that all of the connection eccentricity is taken by the screws in the supported stud. F_4 values are also limited by plate shear buckling per AISI RP15-2. The Designer is responsible for calculating the shear capacity of the anchorage, which may reduce F_4 strength compared to the tabulated values.
10. In addition to the limit states given in notes 7, 8 and 9, F_2, F_3 and F_4 are also limited by screw shear according to the thinnest connected part of the connector and stud.
11. Service load limits for F_2 and F_3 are not given since there are no generally accepted industry methods available to compute these values. F_4 service load limits are based on AISI Research Report RP15-2, using a safety factor of three for ⅛" deflection.
12. For 50 ksi studs, 68 mil (14 ga.) and thicker, use the tabulated values for 54 mil (16 ga.) — 50 ksi studs.

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RCA Rigid Connector Angles

RCA Rigid Connector Angles (2"x2"x3" and 2"x2"x5") — Service Load Limits and Strengths (lb.)

Model	No. of #10 Screws[5,6]	Screw Pattern	Load Direction	Service Load Limit[11]	Stud Thickness and Yield Strength								
					33 mil (20 ga.) – 33 ksi			43 mil (18 ga.) – 33 ksi			54 mil (16 ga.) – 50 ksi		
					ASD	LRFD	Nominal	ASD	LRFD	Nominal	ASD	LRFD	Nominal
RCA223/54	3	1	F_2	—	205	305	340	205	305	340	205	305	340
			F_3	—	495	745	1,485	590	955	1,910	590	955	1,910
			F_4	350	200	300	605	310	465	930	620	930	1,865
	4	2	F_2	—	205	305	340	205	305	340	205	305	340
			F_3	—	580	940	1,880	580	940	1,880	580	940	1,880
			F_4	700	390	585	1,175	605	905	1,815	1,095	1,685	3,065
	6	3	F_2	—	205	305	340	205	305	340	205	305	340
			F_3	—	865	1,410	2,820	865	1,410	2,820	865	1,410	2,820
			F_4	700	480	720	1,440	740	1,110	2,225	1,095	1,685	3,065
RCA223/68	3	1	F_2	—	310	470	520	310	470	520	310	470	520
			F_3	—	495	745	1,485	765	1,150	2,295	815	1,330	2,655
			F_4	435	200	300	605	310	465	930	620	930	1,865
	4	2	F_2	—	310	470	520	310	470	520	310	470	520
			F_3	—	660	990	1,980	805	1,305	2,610	805	1,305	2,610
			F_4	865	390	585	1,175	605	905	1,815	1,210	1,815	3,625
	6	3	F_2	—	310	470	520	310	470	520	310	470	520
			F_3	—	990	1,485	2,970	1,205	1,960	3,915	1,205	1,960	3,915
			F_4	865	480	720	1,440	740	1,110	2,225	1,350	2,080	3,785
RCA223/97	3	1	F_2	—	495	745	1,055	630	945	1,055	630	945	1,055
			F_3	—	495	745	1,485	765	1,150	2,295	1,415	2,295	4,590
			F_4	615	200	300	605	310	465	930	620	930	1,865
	4	2	F_2	—	630	945	1,055	630	945	1,055	630	945	1,055
			F_3	—	660	990	1,980	1,020	1,530	3,060	1,265	2,050	4,105
			F_4	1,230	390	585	1,175	605	905	1,815	1,210	1,815	3,625
	6	3	F_2	—	630	945	1,055	630	945	1,055	630	945	1,055
			F_3	—	990	1,485	2,970	1,530	2,295	4,590	1,895	3,080	6,155
			F_4	1,230	480	720	1,440	740	1,110	2,225	1,485	2,225	4,450
RCA225/54	2	4	F_2	—	330	495	570	340	510	570	340	510	570
			F_3	—	330	495	990	390	635	1,275	390	635	1,275
			F_4	585	265	395	790	410	610	1,225	815	1,225	2,450
	4	5	F_2	—	340	510	570	340	510	570	340	510	570
			F_3	—	580	940	1,880	580	940	1,880	580	940	1,880
			F_4	1,170	535	805	1,610	830	1,245	2,490	1,660	2,490	4,980
	5	6	F_2	—	340	510	570	340	510	570	340	510	570
			F_3	—	825	1,240	2,475	980	1,595	3,185	980	1,595	3,185
			F_4	585	460	685	1,375	705	1,060	2,120	1,310	2,015	3,665
	8	7	F_2	—	340	510	570	340	510	570	340	510	570
			F_3	—	1,155	1,880	3,760	1,155	1,880	3,760	1,155	1,880	3,760
			F_4	1,170	915	1,375	2,750	1,420	2,125	4,255	1,825	2,810	5,110
	10	8	F_2	—	340	510	570	340	510	570	340	510	570
			F_3	—	1,445	2,350	4,695	1,445	2,350	4,695	1,445	2,350	4,695
			F_4	1,170	1,035	1,555	3,105	1,600	2,400	4,800	1,825	2,810	5,110

See footnotes on p. 94.

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RCA Rigid Connector Angles

RCA Rigid Connector Angles (2"x2"x5" and 2"x2"x7") — Service Load Limits and Strengths (lb.)

Model	No. of #10 Screws[5,6]	Screw Pattern	Load Direction	Service Load Limit[11]	Stud Thickness and Yield Strength								
					33 mil (20 ga.) – 33 ksi			43 mil (18 ga.) – 33 ksi			54 mil (16 ga.) – 50 ksi		
					ASD	LRFD	Nominal	ASD	LRFD	Nominal	ASD	LRFD	Nominal
RCA225/68	2	4	F_2	—	330	495	865	510	765	865	520	780	865
			F_3	—	330	495	990	510	765	1,530	545	885	1,770
			F_4	720	265	395	790	410	610	1,225	815	1,225	2,450
	4	5	F_2	—	520	780	865	520	780	865	520	780	865
			F_3	—	660	990	1,980	805	1,305	2,610	805	1,305	2,610
			F_4	1,440	535	805	1,610	830	1,245	2,490	1,660	2,490	4,980
	5	6	F_2	—	520	780	865	520	780	865	520	780	865
			F_3	—	825	1,240	2,475	1,275	1,915	3,825	1,360	2,215	4,425
			F_4	720	460	685	1,375	705	1,060	2,120	1,415	2,120	4,245
	8	7	F_2	—	520	780	865	520	780	865	520	780	865
			F_3	—	1,320	1,980	3,960	1,605	2,610	5,220	1,605	2,610	5,220
			F_4	1,440	915	1,375	2,750	1,420	2,125	4,255	2,255	3,470	6,310
	10	8	F_2	—	520	780	865	520	780	865	520	780	865
			F_3	—	1,650	2,475	4,950	2,010	3,265	6,525	2,010	3,265	6,525
			F_4	1,440	1,035	1,555	3,105	1,600	2,400	4,800	2,255	3,470	6,310
RCA225/97	2	4	F_2	—	330	495	990	510	765	1,530	1,020	1,530	1,755
			F_3	—	330	495	990	510	765	1,530	945	1,530	3,060
			F_4	1,025	265	395	790	410	610	1,225	815	1,225	2,450
	4	5	F_2	—	660	990	1,755	1,020	1,530	1,755	1,050	1,580	1,755
			F_3	—	660	990	1,980	1,020	1,530	3,060	1,265	2,050	4,105
			F_4	2,050	535	805	1,610	830	1,245	2,490	1,660	2,490	4,980
	5	6	F_2	—	825	1,240	1,755	1,050	1,580	1,755	1,050	1,580	1,755
			F_3	—	825	1,240	2,475	1,275	1,915	3,825	2,360	3,825	7,650
			F_4	1,025	460	685	1,375	705	1,060	2,120	1,415	2,120	4,245
	8	7	F_2	—	1,050	1,580	1,755	1,050	1,580	1,755	1,050	1,580	1,755
			F_3	—	1,320	1,980	3,960	2,040	3,060	6,120	2,525	4,105	8,210
			F_4	2,050	915	1,375	2,750	1,420	2,125	4,255	2,835	4,255	8,505
	10	8	F_2	—	1,050	1,580	1,755	1,050	1,580	1,755	1,050	1,580	1,755
			F_3	—	1,650	2,475	4,950	2,550	3,825	7,650	3,155	5,130	10260
			F_4	2,050	1,035	1,555	3,105	1,600	2,400	4,800	3,200	4,800	8,980
RCA227/54	4	9	F_2	—	475	715	795	475	715	795	475	715	795
			F_3	—	660	990	1,980	785	1,275	2,550	785	1,275	2,550
			F_4	820	545	815	1,630	840	1,260	2,515	1,675	2,515	5,030
	4	10	F_2	—	475	715	795	475	715	795	475	715	795
			F_3	—	580	940	1,880	580	940	1,880	580	940	1,880
			F_4	1,635	595	890	1,785	920	1,380	2,760	1,840	2,760	5,515
	7	11	F_2	—	475	715	795	475	715	795	475	715	795
			F_3	—	1,155	1,735	3,465	1,280	2,080	4,160	1,280	2,080	4,160
			F_4	720	765	1,150	2,300	1,185	1,780	3,560	1,685	2,595	4,720
	8	12	F_2	—	475	715	795	475	715	795	475	715	795
			F_3	—	1,155	1,880	3,760	1,155	1,880	3,760	1,155	1,880	3,760
			F_4	1,635	1,120	1,680	3,360	1,730	2,595	5,190	2,555	3,935	7,155
	14	13	F_2	—	475	715	795	475	715	795	475	715	795
			F_3	—	2,025	3,290	6,575	2,025	3,290	6,575	2,025	3,290	6,575
			F_4	1,635	1,685	2,530	5,055	2,555	3,905	7,155	2,555	3,935	7,155
RCA227/68	4	9	F_2	—	660	990	1,215	725	1,090	1,215	725	1,090	1,215
			F_3	—	660	990	1,980	1,020	1,530	3,060	1,090	1,770	3,540
			F_4	1,010	545	815	1,630	840	1,260	2,515	1,675	2,515	5,030
	4	10	F_2	—	660	990	1,215	725	1,090	1,215	725	1,090	1,215
			F_3	—	660	990	1,980	805	1,305	2,610	805	1,305	2,610
			F_4	2,020	595	890	1,785	920	1,380	2,760	1,840	2,760	5,515
	7	11	F_2	—	725	1,090	1,215	725	1,090	1,215	725	1,090	1,215
			F_3	—	1,155	1,735	3,465	1,780	2,680	5,355	1,780	2,890	5,775
			F_4	890	765	1,150	2,300	1,185	1,780	3,560	2,370	3,560	6,900
	8	12	F_2	—	725	1,090	1,215	725	1,090	1,215	725	1,090	1,215
			F_3	—	1,320	1,980	3,960	1,605	2,610	5,220	1,605	2,610	5,220
			F_4	2,020	1,120	1,680	3,360	1,730	2,595	5,190	3,155	4,860	8,830
	14	13	F_2	—	725	1,090	1,215	725	1,090	1,215	725	1,090	1,215
			F_3	—	2,310	3,465	6,930	2,810	4,570	9,135	2,810	4,570	9,135
			F_4	2,020	1,685	2,530	5,055	2,605	3,905	7,815	3,155	4,860	8,830

See footnotes on p. 94.

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RCA Rigid Connector Angles

RCA Rigid Connector Angles (2"x2"x7" and 3"x3"x3") — Service Load Limits and Strengths (lb.)

Model	No. of #10 Screws[5,6]	Screw Pattern	Load Direction	Service Load Limit[11]	Stud Thickness and Yield Strength: 33 mil (20 ga.) – 33 ksi			43 mil (18 ga.) – 33 ksi			54 mil (16 ga.) – 50 ksi		
					ASD	LRFD	Nominal	ASD	LRFD	Nominal	ASD	LRFD	Nominal
RCA227/97	4	9	F_2	—	660	990	1,980	1,020	1,530	2,455	1,470	2,210	2,455
			F_3	—	660	990	1,980	1,020	1,530	3,060	1,890	3,060	6,120
			F_4	1,435	545	815	1,630	840	1,260	2,515	1,675	2,515	5,030
	4	10	F_2	—	660	990	1,980	1,020	1,530	2,455	1,470	2,210	2,455
			F_3	—	660	990	1,980	1,020	1,530	3,060	1,265	2,050	4,105
			F_4	2,875	595	890	1,785	920	1,380	2,760	1,840	2,760	5,515
	7	11	F_2	—	1,155	1,735	2,455	1,470	2,210	2,455	1,470	2,210	2,455
			F_3	—	1,155	1,735	3,465	1,785	2,680	5,355	3,080	5,010	10015
			F_4	1,265	765	1,150	2,300	1,185	1,780	3,560	2,370	3,560	7,115
	8	12	F_2	—	1,320	1,980	2,455	1,470	2,210	2,455	1,470	2,210	2,455
			F_3	—	1,320	1,980	3,960	2,040	3,060	6,120	2,525	4,105	8,210
			F_4	2,875	1,120	1,680	3,360	1,730	2,595	5,190	3,460	5,190	10385
	14	13	F_2	—	1,470	2,210	2,455	1,470	2,210	2,455	1,470	2,210	2,455
			F_3	—	2,310	3,465	6,930	3,570	5,355	10710	4,420	7,180	14365
			F_4	2,875	1,685	2,530	5,055	2,605	3,905	7,815	4,490	6,915	12570
RCA333/54	3	1	F_2	—	205	305	340	205	305	340	205	305	340
			F_3	—	440	720	1,435	440	720	1,435	440	720	1,435
			F_4	210	130	190	385	195	295	590	395	590	1,185
	4	2	F_2	—	205	305	340	205	305	340	205	305	340
			F_3	—	580	940	1,880	580	940	1,880	580	940	1,880
			F_4	700	325	490	975	505	755	1,510	1,005	1,510	3,020
	6	3	F_2	—	205	305	340	205	305	340	205	305	340
			F_3	—	865	1,410	2,820	865	1,410	2,820	865	1,410	2,820
			F_4	700	430	650	1,295	665	1,000	2,000	1,095	1,685	3,065
RCA333/68	3	1	F_2	—	310	470	520	310	470	520	310	470	520
			F_3	—	495	745	1,485	615	1,000	1,995	615	1,000	1,995
			F_4	260	130	190	385	195	295	590	395	590	1,185
	4	2	F_2	—	310	470	520	310	470	520	310	470	520
			F_3	—	660	990	1,980	805	1,305	2,610	805	1,305	2,610
			F_4	865	325	490	975	505	755	1,510	1,005	1,510	3,020
	6	3	F_2	—	310	470	520	310	470	520	310	470	520
			F_3	—	990	1,485	2,970	1,205	1,960	3,915	1,205	1,960	3,915
			F_4	865	430	650	1,295	665	1,000	2,000	1,335	2,000	3,785
RCA333/97	3	1	F_2	—	495	745	1,055	630	945	1,055	630	945	1,055
			F_3	—	495	745	1,485	765	1,150	2,295	1,065	1,730	3,460
			F_4	370	130	190	385	195	295	590	395	590	1,185
	4	2	F_2	—	630	945	1,055	630	945	1,055	630	945	1,055
			F_3	—	660	990	1,980	1,020	1,530	3,060	1,265	2,050	4,105
			F_4	1,230	325	490	975	505	755	1,510	1,005	1,510	3,020
	6	3	F_2	—	630	945	1,055	630	945	1,055	630	945	1,055
			F_3	—	990	1,485	2,970	1,530	2,295	4,590	1,895	3,080	6,155
			F_4	1,230	430	650	1,295	665	1,000	2,000	1,335	2,000	4,005

See footnotes on p. 94.

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RCA Rigid Connector Angles

RCA Rigid Connector Angles (3"x3"x5") – Service Load Limits and Strengths (lb.)

Model	No. of #10 Screws[5,6]	Screw Pattern	Load Direction	Service Load Limit[11]	Stud Thickness and Yield Strength								
					33 mil (20 ga.) – 33 ksi			43 mil (18 ga.) – 33 ksi			54 mil (16 ga.) – 50 ksi		
					ASD	LRFD	Nominal	ASD	LRFD	Nominal	ASD	LRFD	Nominal
RCA335/54	2	4	F_2	—	330	495	570	340	510	570	340	510	570
			F_3	—	295	480	955	295	480	955	295	480	955
			F_4	350	205	310	620	320	480	955	635	955	1,910
	4	5	F_2	—	340	510	570	340	510	570	340	510	570
			F_3	—	580	940	1,880	580	940	1,880	580	940	1,880
			F_4	1,170	450	675	1,350	695	1,045	2,085	1,390	2,085	4,175
	5	6	F_2	—	340	510	570	340	510	570	340	510	570
			F_3	—	735	1,195	2,395	735	1,195	2,395	735	1,195	2,395
			F_4	350	305	460	920	475	710	1,420	835	1,285	2,335
	8	7	F_2	—	340	510	570	340	510	570	340	510	570
			F_3	—	1,155	1,880	3,760	1,155	1,880	3,760	1,155	1,880	3,760
			F_4	1,170	755	1,135	2,265	1,170	1,750	3,505	1,825	2,810	5,110
	10	8	F_2	—	340	510	570	340	510	570	340	510	570
			F_3	—	1,445	2,350	4,695	1,445	2,350	4,695	1,445	2,350	4,695
			F_4	1,170	860	1,290	2,585	1,330	1,995	3,990	1,825	2,810	5,110
RCA335/68	2	4	F_2	—	330	495	865	510	765	865	520	780	865
			F_3	—	330	495	990	410	665	1,330	410	665	1,330
			F_4	435	205	310	620	320	480	955	635	955	1,910
	4	5	F_2	—	520	780	865	520	780	865	520	780	865
			F_3	—	660	990	1,980	805	1,305	2,610	805	1,305	2,610
			F_4	1,440	450	675	1,350	695	1,045	2,085	1,390	2,085	4,175
	5	6	F_2	—	520	780	865	520	780	865	520	780	865
			F_3	—	825	1,240	2,475	1,025	1,665	3,325	1,025	1,665	3,325
			F_4	435	305	460	920	475	710	1420	945	1,420	2,840
	8	7	F_2	—	520	780	865	520	780	865	520	780	865
			F_3	—	1,320	1,980	3,960	1,605	2,610	5,220	1,605	2,610	5,220
			F_4	1,440	755	1,135	2,265	1,170	1,750	3,505	2,255	3,470	6,310
	10	8	F_2	—	520	780	865	520	780	865	520	780	865
			F_3	—	1,650	2,475	4,950	2,010	3,265	6,525	2,010	3,265	6,525
			F_4	1,440	860	1,290	2,585	1,330	1,995	3,990	2,255	3,470	6,310
RCA335/97	2	4	F_2	—	330	495	990	510	765	1,530	1,020	1,530	1,755
			F_3	—	330	495	990	510	765	1,530	710	1,155	2,305
			F_4	615	205	310	620	320	480	955	635	955	1,910
	4	5	F_2	—	660	990	1,755	1,020	1,530	1,755	1,050	1,580	1,755
			F_3	—	660	990	1,980	1,020	1,530	3,060	1,265	2,050	4,105
			F_4	2,050	450	675	1,350	695	1,045	2,085	1,390	2,085	4,175
	5	6	F_2	—	825	1,240	1,755	1,050	1,580	1,755	1,050	1,580	1,755
			F_3	—	825	1,240	2,475	1,275	1,915	3,825	1,775	2,885	5,765
			F_4	615	305	460	920	475	710	1,420	945	1,420	2,840
	8	7	F_2	—	1,050	1,580	1,755	1,050	1,580	1,755	1,050	1,580	1,755
			F_3	—	1,320	1,980	3,960	2,040	3,060	6,120	2,525	4,105	8,210
			F_4	2,050	755	1,135	2,265	1,170	1,750	3,505	2,335	3,505	7,010
	10	8	F_2	—	1,050	1,580	1,755	1,050	1,580	1,755	1,050	1,580	1,755
			F_3	—	1,650	2,475	4,950	2,550	3,825	7,650	3,155	5,130	10,260
			F_4	2,050	860	1,290	2,585	1,330	1,995	3,990	2,660	3,990	7,985

See footnotes on p. 94.

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L, LS and S/LS Utility Clips and Skewable Angles

L, LS 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. These angles also have well-defined fastener locations, and testing ensures that the tabulated load values account for connection eccentricities. The connectors are general utility reinforcing angles with multiple uses. LS and S/LS connectors are skewable and can be used to attach members intersecting at angles.

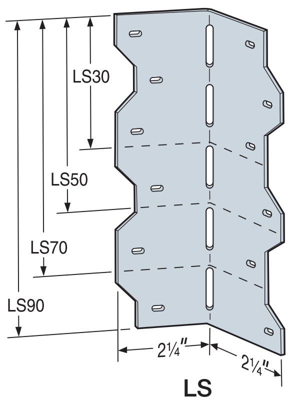
Material: L — 54 mil (16 ga.); LS — 43 mil (18 ga.); S/LS — 43 mil (18 ga.)

Finish: Galvanized (G90)

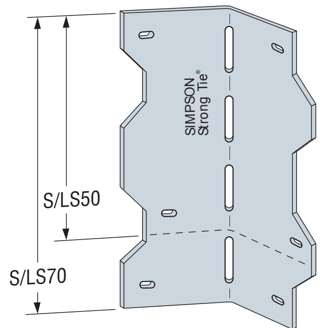
Installation:

- Use all specified fasteners
- S/LS — field-skewable; bend one time only
- CFS framing must be constrained against rotation when using a single S/LS per connection

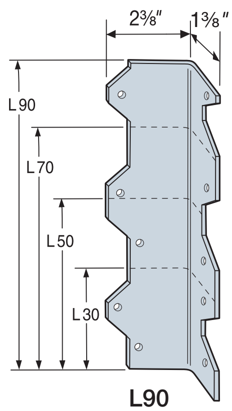
Codes: See p. 11 for Code Reference Key Chart



LS



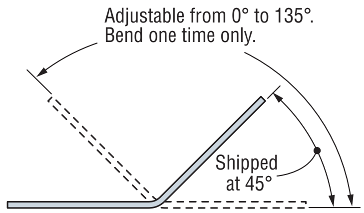
S/LS



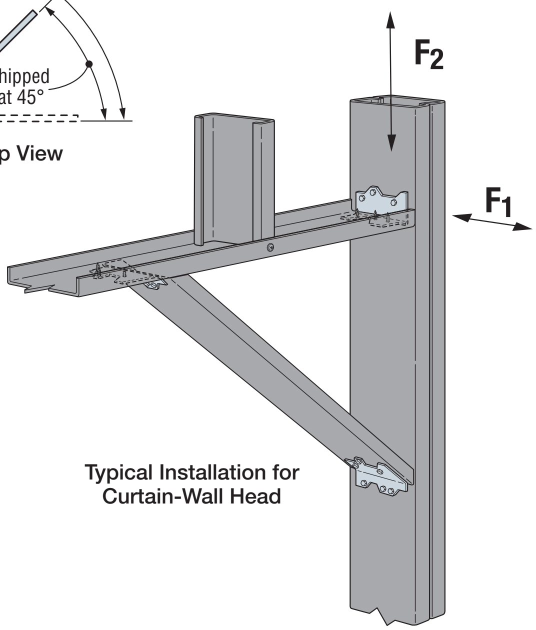
L90

Model No.	Length (in.)	Fasteners	Allowable Load (lb.)						Code Ref.
			33 mil (20 ga.)		43 mil (18 ga.)		54 mil (16 ga.)		
			F_1	F_2	F_1	F_2	F_1	F_2	
L30	3	(4) #10	200	60	315	85	610	—	160
L50	5	(6) #10	475	—	675	90	750	110	
L70	7	(8) #10	705	—	760	110	1,100	110	
L90	9	(10) #10	795	—	945	110	1,740	110	
LS30	3⅜	(6) #10	200	—	370	—	500	—	
S/LS50	4⅞	(4) #10	200	—	370	—	500	—	
S/LS70	6⅜	(6) #10	465	—	575	—	715	—	
LS90	7⅞	(12) #10	465	—	895	—	915	—	

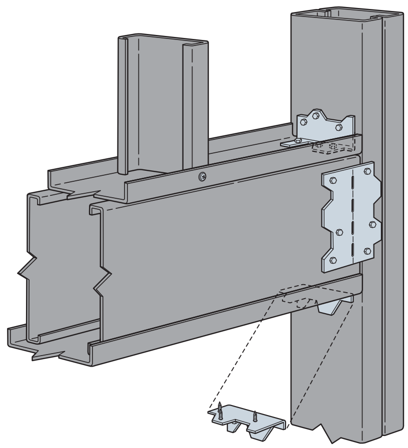
1. Loads are for one part only.
2. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



LS and S/LS Top View



Typical Installation for Curtain-Wall Head



Typical Installation for Gravity Headers

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RCKW Kneewall Connectors

This product is preferable to similar connectors because of a) easier installation, b) higher loads, c) lower installed cost, or a combination of these features.

The Simpson Strong-Tie® RCKW rigid connectors have been developed to resist overturning moment at the base of exterior kneewalls and parapets as well as interior partial-height walls. These connectors offer a unique anchor-hole pattern that permits anchorage to both concrete and structural steel, with the larger hole designed to accommodate ½"-diameter concrete screws such as the Simpson Strong-Tie Titen HD®. The RCKWS is a heavy 171 mil (7 ga.) stiffener that nests onto the RCKW clip. The screw holes and anchor holes in the stiffener line up with those in the RCKW clip, making fastener and anchor installation a snap. The RCKW clip and RCKWS stiffener are sold separately.

Features:

- Anchorage legs incorporate stiffened flanges, improving overturning moment resistance
- Large-diameter anchor hole accommodates ½"-diameter concrete screws and wedge anchors, such as the Simpson Strong-Tie Titen HD heavy-duty screw and the Strong-Bolt® 2 wedge anchor
- Additional smaller-diameter anchor holes enable attachment to structural steel through use of #12 self-drilling screws
- Attachment to CMU can be achieved with use of Titen® concrete and masonry screws
- For the RCKWS: 171 mil (7 ga.) stiffeners are secured to the RCKW clip with screws, optimizing overturning moment resistance and stiffness

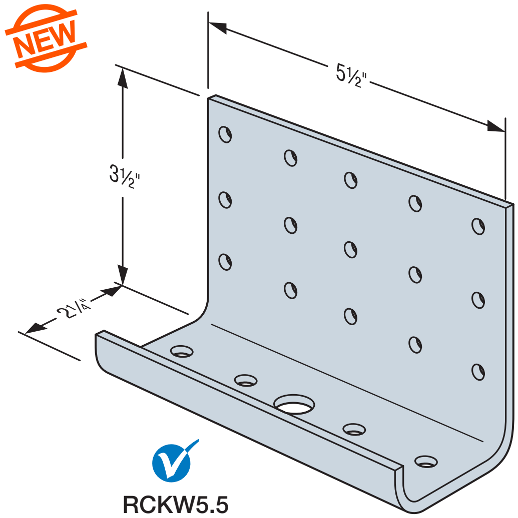
Material: RCKW and RCKWS — 171 mil (7 ga.), 33 ksi

Coating: Galvanized (G90)

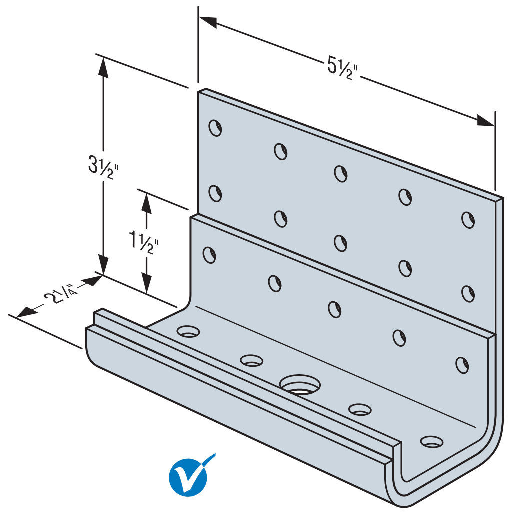
Installation:

- Use all specified screw fasteners. To achieve tabulated load values, use #12–14 screws according to the screw patterns below.
- When using the RCKWS, secure the stiffener to the clip with the specified screw fasteners. Screws must be at least 1" long and extend through the connection with a minimum of three exposed threads.
- Use all specified anchors. To achieve tabulated stiffness values, the installation torque for ½"-diameter anchors shall be at least 17 ft.-lb.
- When using the ½"-diameter Simpson Strong-Tie Titen HD® anchor, the bottom track must be pre-drilled or punched with a ¾"-diameter hole.

Codes: See p. 11 for Code Reference Key Chart



RCKW5.5
(RCKW3 and RCKW7.5 models also available)



RCKW5.5 shown with RCKW5.5S stiffener
(RCKW5.5S can also be used with the RCKW7.5; RCKW3S can be used with RCKW3)
U.S. Patent Pending

Ordering Information

Model No.	Ordering SKU	Package Quantity
RCKW3	RCKW3-R10	10 RCKW3 clips
RCKW5.5	RCKW5.5-R10	10 RCKW5.5 clips
RCKW7.5	RCKW7.5-R10	10 RCKW7.5 clips
RCKW3S	RCKW3S-R10	10 RCKW3S stiffeners
RCKW5.5S	RCKW5.5S-R10	10 RCKW5.5S stiffeners

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Ease of Specification

Many cold-formed steel connector manufacturers provide limited technical data for their products. As a result, Designers often rely on detailed and time-consuming hand calculations for CFS connection design. This often involves assumptions regarding connection eccentricity, prying and connection stiffness.

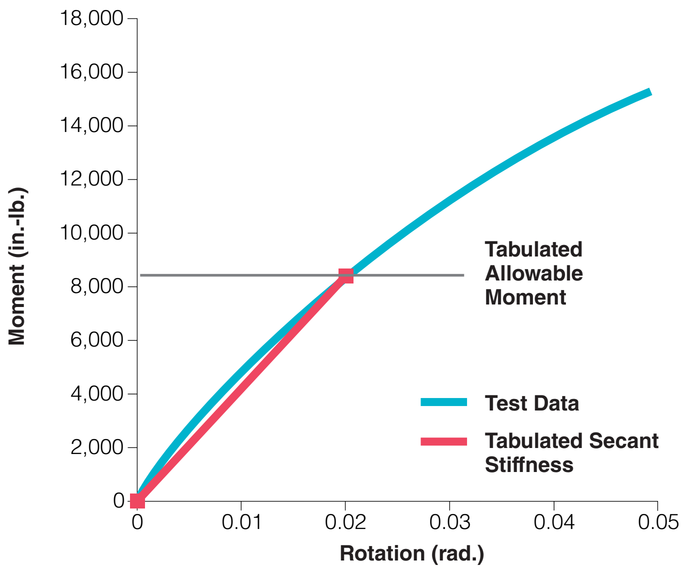
Simpson Strong-Tie strives for ease of specification by providing comprehensive load tables based on tests that simulate real-world conditions. These load tables ensure that tabulated values reflect not only the strength of the connector, but also the strength of the fasteners, the anchorage, the member near the connection, and the overall stiffness. The photo to the right is an example of member failure near the connection. Such failures are reflected in our tabulated loads because of our assembly testing.

RCKW Assembly Test with Member Failure

Simplified Stiffness Calculations

Some manufacturers tabulate stiffness values only for the connector. It's often unknown or unclear if their stiffness includes the screw fastener slip and how this varies with the thickness of the stud. Additionally, with some manufacturers, the deflection of the stud must be added to the deflection from the rotation of the connector in order to arrive at the final deflection for design.

Because we have tested the entire assembly, Simpson Strong-Tie tabulates stiffness that includes connector deflection, fastener slip and stud deflection for walls up to 38" in height. Our stiffness also takes into account the thickness of the stud, making it simple for the Designer to calculate deflections: Simply divide the required moment by the tabulated stiffness, and then multiply the result by the stud length (Ref. Example #1 on p. 104). For walls over 38", a different approach is required (Ref. Example #2 on pp. 105–106).



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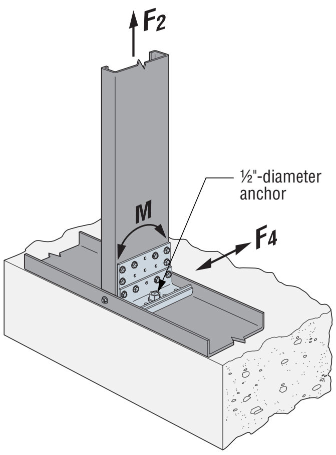
RCKW Kneewall Connectors

SIMPSON Strong-Tie®

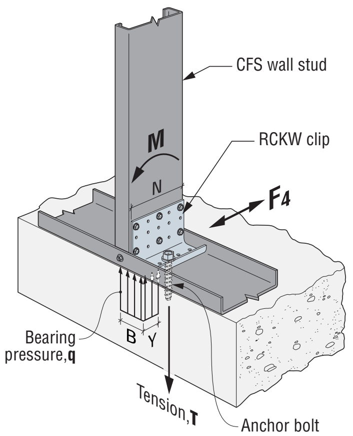
RCKW Allowable Loads — Concrete Anchorage

Model No.	Fastener Pattern	Fasteners to Stud	Framing Members Thickness mil (ga.)	Allowable Moment M (in.-lb.)	Assembly Rotational Stiffness β (in.-lb./rad.)	Connector Rotational Stiffness β_c (in.-lb./rad.)	Anchor Tension, T at Allowable Moment (lb.) f'_c = 3,000 psi	Anchor Tension, T at Allowable Moment (lb.) f'_c = 4,000 psi	Allowable Tension Load F_2 (lb.)	Anchor Tension, T at Allowable Tension Load F_2 (lb.) f'_c = 3,000 psi	Anchor Tension, T at Allowable Tension Load F_2 (lb.) f'_c = 4,000 psi	Allowable Shear Load F_4 (lb.)	Code Ref.
RCKW3	1	(4) #12	33 (20)	2,425	87,000	92,900	1,870	1,790	860	1,080	1,055	620	IP2
			43 (18)	3,080	112,800	115,000	2,510	2,355	1,340	1,780	1,705	755	
			54 (16)	4,330	127,900	136,600	4,120	3,585	1,850	2,645	2,470	1,120	
			68 (14)	5,150	141,400	153,000	6,515	4,570	1,850	2,645	2,470	1,120	160
RCKW3 and RCKW3S (Stiffener)	2	(9) #12	33 (20)	3,335	177,200	198,000	2,790	2,590	1,310	1,730	1,665	620	160
			43 (18)	4,215	162,200	179,100	3,935	3,465	1,710	2,390	2,250	795	IP2
			54 (16)	5,160	139,600	149,800	6,700	4,585	2,220	3,410	3,085	1,120	
			68 (14)	5,160	130,900	136,600	6,700	4,585	2,410	3,875	3,425	1,415	
RCKW5.5	3	(6) #12	30 (20 DW)[6,7]	3,775	240,500	266,600	1,460	1,435	1,030	1,250	1,235	600	160
			33 (20 STR)[7]	4,670	259,700	281,000	1,830	1,795	1,140	1,395	1,375	665	
			33 (20)	4,670	303,900	328,200	1,830	1,795	1,140	1,395	1,375	665	IP2
			43 (18)	6,245	333,100	355,300	2,525	2,450	1,440	1,790	1,755	1,035	
			54 (16)	8,225	306,000	320,500	3,470	3,320	2,455	3,255	3,125	1,390	
			68 (14)	10,290	422,400	441,400	4,570	4,290	2,455	3,255	3,125	1,390	160
RCKW5.5 and RCKW5.5S (Stiffener)	4	(10) #12	33 (20)	4,855	255,500	271,800	1,910	1,870	1,660	2,090	2,040	665	160
			43 (18)	8,445	449,800	489,600	3,580	3,420	2,165	2,815	2,720	1,035	IP2
			54 (16)	11,575	467,000	502,300	5,340	4,935	2,980	4,115	3,895	1,390	
			68 (14)	13,935	432,300	456,300	7,020	6,215	2,980	4,115	3,895	1,830	
RCKW7.5	5	(6) #12	33 (20)	6,445	388,500	402,000	1,815	1,790	1,095	1,315	1,300	795	IP2
			43 (18)	8,200	510,400	535,800	2,345	2,305	1,280	1,550	1,530	1,200	
			54 (16)	11,400	553,900	571,200	3,370	3,275	2,165	2,715	2,655	1,695	
			68 (14)	13,895	605,200	627,800	4,225	4,065	2,165	2,715	2,655	1,695	160
RCKW7.5 and RCKW5.5S (Stiffener)	6	(10) #12	33 (20)	8,705	495,100	516,700	2,505	2,453	1,730	2,130	2,095	795	160
			43 (18)	10,915	590,800	623,400	3,210	3,125	2,255	2,840	2,775	1,200	IP2
			54 (16)	14,045	762,600	808,400	4,275	4,115	2,625	3,360	3,265	1,695	
			68 (14)	16,670	615,800	631,300	5,245	4,985	2,665	3,420	3,320	2,065	

1. For additional important information, see General Information on pp. 14–16.
2. The Designer is responsible for anchorage design.
3. See illustrations for fastener pattern placement.
4. Screw length shall be selected based on the total thickness of materials to be joined such that the screws extend through the steel connection a minimum of three exposed threads.
5. Tabulated values are based on framing members with track and stud of the same thickness and (1) #10 screw into each stud flange unless otherwise noted.
6. Tabulated values may be used for framing members with track and stud of thickness 20 mil, F_y = 57 ksi (20 EQ).
7. Tabulated values are applicable for framing members with CFS track of thickness 20 mil, F_y = 57 ksi (20 EQ).
8. EQ — equivalent, DW — drywall, STR — structural.
9. Tabulated moment values correspond to maximum connector strength without consideration of serviceability. Designer must check out-of-plane deflections using tabulated Rotational Stiffness.
10. Tabulated Assembly Rotational Stiffness is applicable for walls at 38" tall with corresponding framing member depth and thickness. Reference Example #1 on p. 104.
11. Tabulated Connector Rotational Stiffness may be used for wall heights other than 38" tall; the Designer must consider member deflection due to bending in the stud member. Reference Example #2 on pp. 105–106.
12. Per IBC 2015 Table 1604.3 footnote f, wind load is permitted to be taken as 0.42 times "component and cladding loads" for deflection checks. For IBC 2009 and earlier, the factor is 0.7 instead of 0.42.
13. Anchor Tension, (T), is the force in the anchor at maximum allowable moment (M) or maximum allowable vertical tension (F_2).
14. Anchor tension is calculated using AISC Steel Design Guide 1. The 'Anchor Bolt Design' illustration given below shows the anchor tension (T) based on an applied moment (M). An illustration for the anchor tension (T) based on a vertical tension load (F_2) is not shown. The bearing pressure for F_2 load is similar along the length of the clip as opposed to the width of the clip as shown.
15. Anchor tension may be interpolated.
16. For LRFD loads, multiply the ASD tabulated loads by 1.6.



RCKW5.5 and RCKW5.5S Anchored Into Concrete



Anchor Bolt Design

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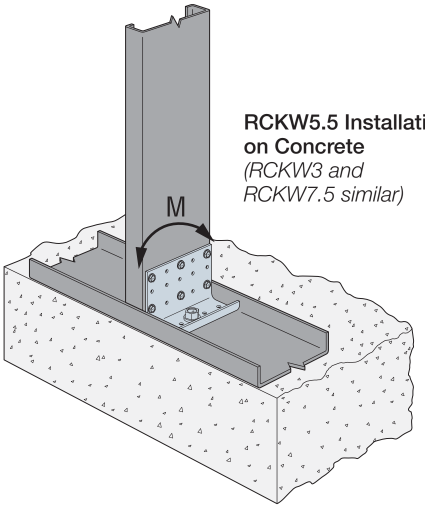
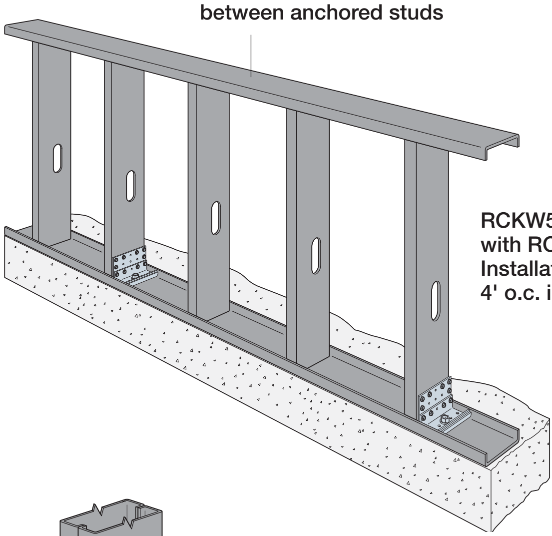
RCKW Kneewall Connectors

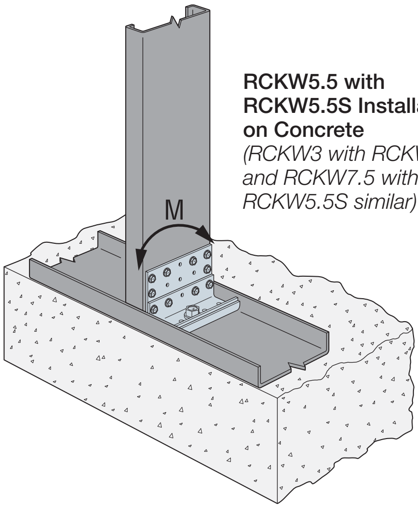


RCKW5.5 Installation on Concrete
(RCKW3 and RCKW7.5 similar)

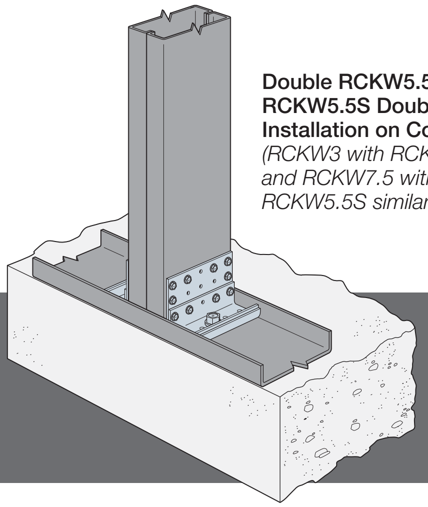
Top track designed as a header between anchored studs



RCKW5.5 with RCKW5.5S Installation at 4' o.c. in Concrete

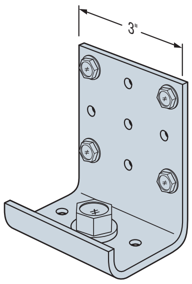


RCKW5.5 with RCKW5.5S Installation on Concrete
(RCKW3 with RCKW3S and RCKW7.5 with RCKW5.5S similar)

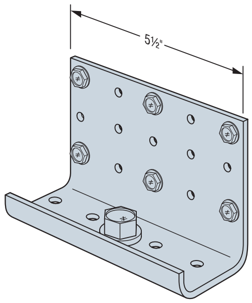


Double RCKW5.5 with RCKW5.5S Double-Stud Installation on Concrete
(RCKW3 with RCKW3S and RCKW7.5 with RCKW5.5S similar)

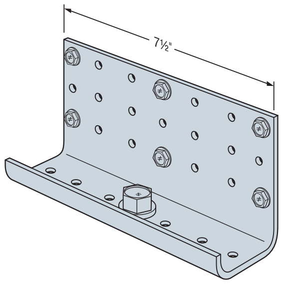
Need to replace a prefabricated post, or having trouble with concrete anchorage? Consider using this detail.



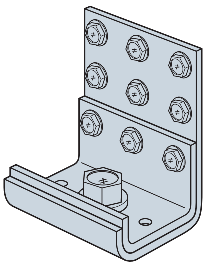
RCKW3
Screw Pattern 1



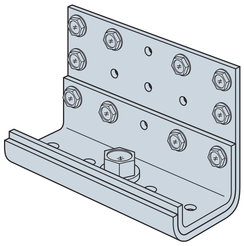
RCKW5.5
Screw Pattern 3



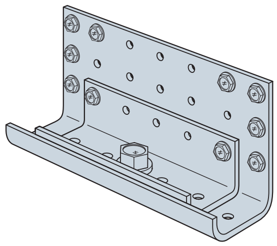
RCKW7.5
Screw Pattern 5



RCKW3 with RCKW3S
Screw Pattern 2



RCKW5.5 with RCKW5.5S
Screw Pattern 4



RCKW7.5 with RCKW5.5S
Screw Pattern 6

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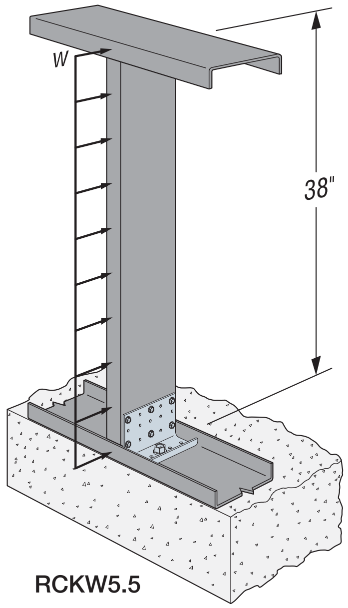
RCKW Kneewall Connectors

Example #1: Exterior Parapet Stud

Given:

- 2015 IBC (ASCE 7-10 and AISI S100-2012)
- 600S162-33 (33 ksi) studs @ 16" o.c. supported at the base
- Parapet height, L = 38"-tall studs
- Wind design pressure = 49.67 psf (LRFD)
- Deflection Limits, Δ_{allow} = L/240 (Ref. IBC Table 1604.3)



RCKW5.5

Calculations:

Determine ASD wind pressure:

$$p = (0.6)(49.67\ psf) = 29.8\ psf$$

Note: 2015 IBC load combinations for ASD include a factor of 0.6 for wind loads.

$$w = (29.8\ psf)\frac{16\ in.}{12\ in.} = 39.7\ plf$$

Determine Required Moment:

$$M_{req} = \frac{wL^2}{2} = \frac{(39.7\ plf)(38\ in.)^2}{2\left(12\frac{in.}{ft.}\right)} = 2{,}389\ in.\text{-}lb.$$

From Allowable Loads table (p. 102) for 600S162-33, 6"-deep 33-mil stud:

- Select RCKW5.5 connector, screw pattern 3, with ½" anchor diameter and (6) #12 self-drilling screws, attaching to each stud @ 16" o.c.
- Allowable Moment = 4,670 in.-lb. > 2,389 in.-lb. **OK**
- Assembly Rotational Stiffness, β = 303,900 in.-lb. / rad. for RCKW5.5 connector at 38" wall height

Select Anchorage:
Normal weight concrete with f'_c = 3,000 psi
Table 1 — Cracked Concrete, Wind and Seismic in SDC A&B
Titen HD® with 3¼" embedment
M_{allow} = 3,010 in.-lb. > 2,389 in.-lb. **OK**

Check Deflection at Required Moment:

$$\Delta_{req} = \left(\frac{(0.7)(M_{req})}{\beta}\right)L = \left(\frac{(0.7)(2{,}389\ in.\text{-}lb.)}{303{,}900\ \frac{in.\text{-}lb.}{rad.}}\right)38\ in. = 0.209\ in.$$

Note: Per IBC Table 1604.3 footnote f, 0.7 factor can be used to calculate deflections for components and cladding wind load.

Allowable Deflection:

$$\Delta_{allow} = \frac{2L}{240} = \frac{2(38\ in.)}{240} = 0.317\ in. > 0.209\ in.\ \textbf{OK}$$

Rigid Connectors

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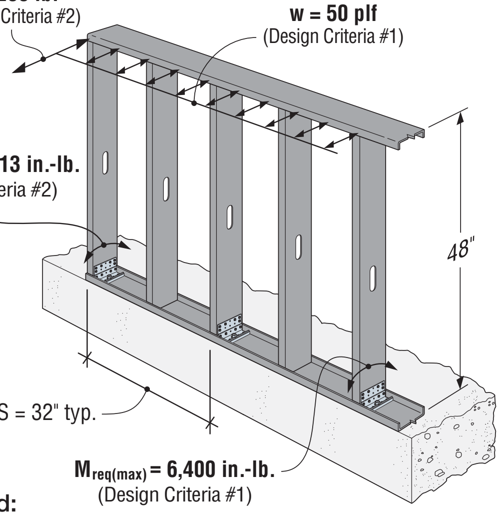
Example #2: High Interior Half-Wall

Given:

- 2015 IBC (ASCE 7-10 and AISI S100-2012)
- The top track 600T125-54 (50 ksi) spans between 600S162-54 (50 ksi) studs @ spacing, S = 32" o.c. supported at the base
- 6" drywall studs at 16" o.c. as infill between the bottom and top track
- Wall height, L = 48"-tall studs
- Design Load: w = 50 plf or P = 200 lb. concentrated load for guard or handrail applications in accordance with Section 4.5.1 of ASCE (Ref. IBC 1607.8.1 and 1607.8.1.1)
- Deflection Limit, Δ_{allow} = L/120 (Ref. IBC Table 1604.3)

Calculations:



RCKW5.5 with RCKW5.5S Installation on Concrete

Design criteria #1 for linear load of 50 lb./ft.

Determine Required Concentrated Load, P_{req}:

$$P = (w)(S) = (50\ plf)(32\ in.)\left(\frac{1\ ft.}{12\ in.}\right) = 133.3\ lb.$$

Determine Required Moment, M_{req}:

$$M_{req} = (P_{req})(L) = (133.3\ lb.)(48\ in.) = 6{,}400\ in.\text{-}lb.$$

Design criteria #2 for concentrated load of 200 lb.

Note: From a 3D structural analysis with the 200 lb. concentrated load at the end stud, a continuous top track distributes some load to adjacent studs so that the worst-case moment is $M_{req(max)}$ = 7,513 in.-lb. as indicated in the illustration.

From Allowable Loads table (p. 102) for 600S162-54, 6"-deep, 54-mil stud:

- Select an RCKW5.5 connector with the RCKW5.5S stiffener, screw pattern 4 with (10) #12 self-drilling screws and a ½"-diameter anchor
- Allowable Moment = 11,575 in.-lb. > 6,400 in.-lb. (for linear load) **OK**
- Allowable Moment = 11,575 in.-lb. > 7,513 in.-lb. (for concentrated load) **OK**
- Connector Rotational Stiffness, β_C = 502,300 in.-lb./rad.

Check Deflection for Design Criteria #1 at Required Load:

Determine Stud Deflection, Δ_S, at P_{req} = 133.3 lb.

$$\Delta_S = \frac{P_{req}L^3}{3EI_{xe}} = \left(\frac{(133.3\ lb.)(48\ in.)^3}{3(29{,}500{,}000\ psi)(2.86\ in.^4)}\right) = 0.058\ in.$$

Note: Effective moment of inertia for a 600S162-54 stud is I_{xe} = 2.86 in.^{4}

Determine Connector Deflection, Δ_C, at M_{req} = 6,400 in.-lb. by utilizing the Connector Rotational Stiffness, β_C = 502,300 in.-lb./rad. for RCKW5.5 and RCKW5.5S.

$$\Delta_C = \frac{M_{req}}{\beta_C}L = \frac{6{,}400\ in.\text{-}lb.}{502{,}300\ \frac{in.\text{-}lb.}{rad.}}(48\ in.) = 0.612\ in.$$

Note: The Connector Rotational Stiffness may be used for wall heights other than 38"; the Designer must consider member deflection due to bending in the stud member. See footnote 11 of the Allowable Loads Table (p. 102).

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Example #2: High Interior Half-Wall (cont.)

Total Deflection is the sum of the Stud Deflection and the Connector Deflection.

$$\Delta_{total} = \Delta_S + \Delta_C = 0.058\ in. + 0.612\ in. = 0.670\ in.$$

Allowable Deflection:

$$\Delta_{allow} = \frac{2L}{120} = \frac{(2)(48\ in.)}{120} = 0.800\ in. > 0.670\ in.\ \textbf{OK}$$

Check Deflection for Design Criteria #2 at Required Load:

Determine Stud Deflection, Δ_S, at M_{req} = 7,513 in.-lb. from concentrated load.

$$\Delta_S = \frac{M_{req}L^2}{3EI_{xe}} = \left(\frac{(7{,}513\ in.\text{-}lb.)(48\ in.)^2}{3(29{,}500{,}000\ psi)(2.86\ in.^4)}\right) = 0.068\ in.$$

Determine Connector Deflection, Δ_C, at M_{req} = 7,513 in.-lb. by utilizing the Connector Rotational Stiffness, β_C = 502,300 in.-lb. / rad. for RCKW5.5 and RCKW5.5S.

$$\Delta_C = \frac{M_{req}}{\beta_C} L = \frac{7{,}513\ in.\text{-}lb.}{502{,}300\ \frac{in.\text{-}lb.}{rad.}} (48\ in.) = 0.718\ in.$$

Total Deflection is the sum of Stud Deflection and Connector Deflection.

$$\Delta_{total} = \Delta_S + \Delta_C = 0.068\ in. + 0.718\ in. = 0.786\ in.$$

Allowable Deflection:

$$\Delta_{allow} = \frac{2L}{120} = \frac{(2)(48\ in.)}{120} = 0.800\ in. > 0.786\ in.\ \textbf{OK}$$

Note: Per ASCE Section 4.5.1, for handrail and guardrail systems, there is no need to apply the 50 plf linear load and the 200 lb. concentrated load concurrently. Example #2 demonstrates the design for both loading cases, and the outermost anchored stud governs when using the 200 lb. concentrated load.

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RCKW Kneewall Connectors

Table 1: RCKW Allowable Moments Using Simpson Strong-Tie® Anchorage Solutions — Edge of Slab

Model No.	Simpson Strong-Tie Anchor Model ½" Diameter	Edge of Concrete Slab Allowable Moment, M (in.-lb.)							
		Titen HD®	Titen HD	Strong-Bolt® 2	AT-XP®	SET-XP®	SET-XP	AT-XP	SET-XP
	Minimum Concrete Thickness, h_{min} (in.)	5	6	6	6	6	6½	9½	9½
	Nominal Embedment Depth, h_{nom} (in.)	3¼	3¾	3⅞	3½	3½	4	7	7
Uncracked Concrete, Wind and Seismic in SDC A&B[8,10]									
f'c = 4,000 psi									
RCKW3	SLWC	1,020	1,130	—	630	770	—	—	—
	NWC	1,635	1,795	—	1,200	1,440	—	—	—
RCKW5.5	SLWC	2,960	3,150	—	1,755	2,085	—	—	—
	NWC	4,800	5,255	—	3,365	3,980	—	—	—
RCKW7.5	SLWC	4,280	4,845	4,545	3,225	3,765	—	—	—
	NWC	7,120	8,080	7,430	6,200	7,010	—	—	—
f'c = 3,000 psi									
RCKW3	SLWC	875	970	—	630	805	—	—	—
	NWC	1,390	1,530	—	1,175	1,295	—	—	—
RCKW5.5	SLWC	2,545	2,715	—	2,185	1,750	—	—	—
	NWC	4,110	4,680	—	3,825	3,330	—	—	—
RCKW7.5	SLWC	3,680	3,990	3,920	3,945	3,225	—	—	—
	NWC	6,125	6,945	6,385	6,800	6,155	—	—	—
Cracked Concrete, Wind and Seismic in SDC A&B[8,10]									
f'_c = 4,000 psi									
RCKW3	SLWC	740	815	—	520	—	470	1,010	805
	NWC	1,200	1,320	—	990	—	895	1,865	1,510
RCKW5.5	SLWC	2,145	2,250	—	1,440	—	1,260	2,745	2,180
	NWC	3,500	3,770	—	2,770	—	2,435	4,030	4,030
RCKW7.5	SLWC	3,075	3,470	3,630	2,645	—	2,270	4,220	3,935
	NWC	5,105	5,785	5,960	5,105	—	4,395	6,220	6,210
f'_c = 3,000 psi									
RCKW3	SLWC	640	705	—	515	—	465	990	790
	NWC	1,030	1,130	—	970	—	880	1,610	1,460
RCKW5.5	SLWC	1,845	1,945	—	1,430	—	1,255	2,370	2,160
	NWC	3,010	3,235	—	2,735	—	2,405	3,470	3,360
RCKW7.5	SLWC	2,635	2,995	3,105	2,630	—	2,260	3,640	3,640
	NWC	4,390	4,970	5,170	5,050	—	4,355	5,355	5,545
Cracked Concrete, Seismic in SDC C Through F[9,10]									
f'_c = 4,000 psi									
RCKW3	SLWC	265	295	—	155	—	165	310	290
	NWC	440	485	—	305	—	325	605	560
RCKW5.5	SLWC	765	875	—	435	—	445	865	780
	NWC	1,265	1,445	—	845	—	870	1,675	1,510
RCKW7.5	SLWC	1,180	1,470	1,440	795	—	805	1,585	1,400
	NWC	1,960	2,430	2,385	1,555	—	1,565	2,900	2,510
f'_c = 3,000 psi									
RCKW3	SLWC	230	255	—	155	—	165	310	290
	NWC	380	420	—	305	—	325	595	555
RCKW5.5	SLWC	660	755	—	435	—	445	860	775
	NWC	1,090	1,250	—	845	—	865	1,630	1,500
RCKW7.5	SLWC	1,020	1,270	1,245	795	—	800	1,580	1,395
	NWC	1,695	2,100	2,060	1,550	—	1,560	2,500	2,515

See footnotes on p. 110.

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RCKW Kneewall Connectors

Table 2: RCKW Allowable Moments Using Simpson Strong-Tie® Anchorage Solutions — Center of Concrete Slab

Model No.	Simpson Strong-Tie Anchor Model ½" Diameter	Edge of Concrete Slab Allowable Moment, M (in.-lb.)							
		Titen HD®	Titen HD	Strong-Bolt® 2	AT-XP®	SET-XP®	SET-XP	AT-XP	SET-XP
	Minimum Concrete Thickness, h_{min} (in.)	5	6	6	6	6	6½	9½	9½
	Nominal Embedment Depth, h_{nom} (in.)	3¼	3¾	3⅞	3½	3½	4	7	7
Uncracked Concrete, Wind and Seismic in SDC A&B[8,10]									
f'_c = 4,000 psi									
RCKW3	SLWC	1,785	2,250	2,135	2,030	2,470	2,780	3,705	4,395
	NWC	2,825	3,500	3,340	3,645	4,330	4,435	4,435	4,435
RCKW5.5	SLWC	3,385	4,305	4,080	3,870	4,760	5,395	7,385	7,505
	NWC	5,495	6,930	6,580	7,255	7,505	7,505	7,505	7,505
RCKW7.5	SLWC	4,665	5,955	5,635	5,340	6,590	7,485	7,565	7,515
	NWC	7,625	9,675	9,175	7,500	7,500	7,500	7,565	7,515
f'_c = 3,000 psi									
RCKW3	SLWC	1,530	1,915	1,825	1,970	2,380	2,660	3,470	4,030
	NWC	2,400	2,950	2,820	3,420	3,810	4,065	4,065	4,065
RCKW5.5	SLWC	2,915	3,700	3,505	3,810	4,670	5,275	7,150	7,580
	NWC	4,705	5,920	5,625	7,025	7,580	7,580	7,580	7,580
RCKW7.5	SLWC	4,020	5,125	4,855	5,280	6,500	7,365	7,525	7,525
	NWC	6,555	8,295	7,870	7,525	7,500	7,500	7,525	7,525
Cracked Concrete, Wind and Seismic in SDC A&B[8,10]									
f'_c = 4,000 psi									
RCKW3	SLWC	1,295	1,640	1,560	1,360	—	1,315	2,575	2,210
	NWC	2,080	2,605	2,485	2,530	—	2,450	4,435	3,935
RCKW5.5	SLWC	2,425	3,095	2,940	2,560	—	2,470	4,965	4,235
	NWC	3,970	5,035	4,790	4,875	—	4,715	7,505	7,505
RCKW7.5	SLWC	3,335	4,265	4,045	3,515	—	3,395	6,880	5,850
	NWC	5,480	6,980	6,630	6,755	—	6,525	7,565	7,515
f'_c = 3,000 psi									
RCKW3	SLWC	1,110	1,405	1,335	1,335	—	1,295	2,475	2,140
	NWC	1,775	2,215	2,115	2,435	—	2,360	4,065	3,660
RCKW5.5	SLWC	2,090	2,665	2,535	2,535	—	2,450	4,865	4,160
	NWC	3,410	4,320	4,110	4,780	—	4,625	7,580	7,580
RCKW7.5	SLWC	2,875	3,675	3,490	3,490	—	3,370	6,780	5,780
	NWC	4,720	6,005	5,705	6,660	—	6,435	7,525	7,525
Cracked Concrete, Seismic in SDC C Through F[9,10]									
f'_c = 4,000 psi									
RCKW3	SLWC	470	600	570	420	—	475	830	825
	NWC	770	985	935	810	—	920	1,575	1,565
RCKW5.5	SLWC	865	1,110	1,050	775	—	880	1,540	1,530
	NWC	1,430	1,835	1,740	1,510	—	1,710	2,970	2,735
RCKW7.5	SLWC	1,180	1,515	1,440	1,060	—	1,205	2,110	2,095
	NWC	1,960	2,515	2,385	2,070	—	2,345	2,985	2,730
f'_c = 3,000 psi									
RCKW3	SLWC	405	515	490	420	—	475	820	815
	NWC	665	845	805	805	—	905	1,540	1,530
RCKW5.5	SLWC	745	960	910	775	—	880	1,530	1,520
	NWC	1,235	1,580	1,500	1,500	—	1,700	2,935	2,765
RCKW7.5	SLWC	1,020	1,310	1,245	1,060	—	1,200	2,100	2,085
	NWC	1,695	2,170	2,060	2,060	—	2,335	2,860	2,860

See footnotes on p. 110.

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RCKW Kneewall Connectors

Table 3: RCKW Allowable Tension and Shear Loads Using Simpson Strong-Tie® Anchorage Solutions — Edge of Concrete Slab

Model No.	Simpson Strong-Tie Anchor Model ½" Diameter		Edge of Concrete Slab Allowable Moment, M (in.-lb.)							
			Titen HD®	Titen HD	Strong-Bolt® 2	AT-XP®	SET-XP®	SET-XP	AT-XP	SET-XP
	Minimum Concrete Thickness, h_{min} (in.)		5	6	6	6	6	6½	9½	9½
	Nominal Embedment Depth, h_{nom} (in.)		3¼	3¾	3⅞	3½	3½	4	7	7
Uncracked Concrete, Wind and Seismic in SDC A&B[8,10] (f'_c = 4,000 psi)										
RCKW3	SLWC	Tension	720	805	—	435	535	—	—	—
		Shear	365	375	—	445	445	—	—	—
	NWC	Tension	1,200	1,340	—	855	1,045	—	—	—
		Shear	605	625	—	655	655	—	—	—
RCKW5.5	SLWC	Tension	1,120	1,290	—	655	760	—	—	—
		Shear	780	810	—	960	960	—	—	—
	NWC	Tension	1,865	2,150	—	1,280	1,500	—	—	—
		Shear	1,305	1,350	—	1,410	1,410	—	—	—
RCKW7.5	SLWC	Tension	1,280	1,585	1,245	875	1,025	—	—	—
		Shear	1,100	1,245	1,295	1,480	1,480	—	—	—
	NWC	Tension	2,130	2,645	2,080	1,720	2,015	—	—	—
		Shear	1,830	2,075	2,160	1,800	1,800	—	—	—
Cracked Concrete, Wind and Seismic in SDC A&B[8,10] (f'_c = 4,000 psi)										
RCKW3	SLWC	Tension	515	570	—	355	—	320	710	560
		Shear	260	270	—	320	—	325	325	325
	NWC	Tension	860	950	—	700	—	630	1,395	1,100
		Shear	430	445	—	465	—	480	480	480
RCKW5.5	SLWC	Tension	800	920	—	535	—	465	1,065	815
		Shear	560	580	—	685	—	705	705	705
	NWC	Tension	1,335	1,530	—	1,045	—	915	2,090	1,600
		Shear	930	965	—	1,010	—	1,035	1,035	1,035
RCKW7.5	SLWC	Tension	905	1,130	1,105	715	—	615	1,435	1,075
		Shear	785	890	925	1,055	—	1,085	1,085	1,085
	NWC	Tension	1,510	1,880	1,845	1,405	—	1,205	2,810	2,110
		Shear	1,310	1,485	1,540	1,550	—	1,595	1,595	1,595
Cracked Concrete, Seismic in SDC C Through F[9,10] (f'_c = 4,000 psi)										
RCKW3	SLWC	Tension	180	200	—	105	—	110	210	195
		Shear	120	125	—	150	—	150	150	150
	NWC	Tension	300	335	—	210	—	220	415	385
		Shear	200	210	—	220	—	225	225	225
RCKW5.5	SLWC	Tension	280	320	—	160	—	165	315	285
		Shear	260	270	—	320	—	330	330	330
	NWC	Tension	470	535	—	310	—	320	620	560
		Shear	435	450	—	470	—	485	485	485
RCKW7.5	SLWC	Tension	315	395	385	215	—	215	425	375
		Shear	365	415	430	495	—	505	505	505
	NWC	Tension	530	660	645	420	—	420	835	740
		Shear	610	690	720	725	—	645	745	645

See footnotes on p. 110.

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RCKW Kneewall Connectors

SIMPSON Strong-Tie®

Table 4: RCKW Allowable Tension and Shear Loads Using Simpson Strong-Tie® Anchorage Solutions — Center of Concrete Slab

Model No.	Simpson Strong-Tie® Anchor Model ½" Diameter		Allowable Tension and Shear Load (lb.)							
			Mechanical Anchors			Epoxy Anchors				
			Titen HD®	Titen HD	Strong-Bolt® 2	AT-XP®	SET-XP®	SET-XP	AT-XP	SET-XP
	Minimum Concrete Thickness, h_{min} (in.)		5	6	6	6	6	6½	9½	9½
	Nominal Embedment Depth, h_{nom} (in.)		3¼	3¾	3⅞	3½	3½	4	7	7
RCKW all models	Uncracked Concrete, Wind and Seismic in SDC A&B[8,10] (f'_c = 4,000 psi)									
	SLWC	Tension	1,280	1,645	1,555	1,470	1,830	2,090	2,940	3,660
		Shear	1,380	2,685	2,820	1,925	1,925	1,925	1,925	1,925
	NWC	Tension	2,130	2,745	2,595	2,885	3,360	3,705	3,705	3,705
		Shear	2,295	2,685	2,820	1,925	1,925	1,925	1,925	1,925
	Cracked Concrete, Wind and Seismic in SDC A&B[8,10] (f'_c = 4,000 psi)									
	SLWC	Tension	905	1,165	1,105	960	—	925	1,915	1,615
		Shear	975	2,510	2,820	1,925	—	1,925	1,925	1,925
	NWC	Tension	1,510	1,945	1,845	1,880	—	1,810	3,705	3,170
		Shear	1,625	2,685	2,820	1,925	—	1,925	1,925	1,925
	Cracked Concrete, Seismic in SDC C Through F[9,10] (f'_c = 4,000 psi)									
	SLWC	Tension	315	410	385	285	—	325	570	565
		Shear	455	805	1,185	765	—	700	765	700
	NWC	Tension	530	680	645	560	—	635	1,115	1,110
		Shear	760	805	1,185	765	—	700	765	700

1. Anchor Allowable Loads have been determined using ACI 318-14 Chapter 17 anchorage calculations with the minimum concrete compressive strength, f'_c, and slab thickness listed. Sand-Lightweight Concrete is abbreviated as ‘SLWC’, Normal Weight Concrete is abbreviated as ‘NWC’.
2. Load values are for a single anchor based on ACI 318-14, condition B, load factors from ACI 318-14 Section 5.3, no supplemental edge reinforcement, $\Psi_{c,v}$ = 1.0 for cracked concrete and periodic special inspection. Reference ICC-ES or IAPMO-UES evaluation reports for further information.
3. Load values are based on short-term temperature range of 150°F and 180°F for SET-XP and AT-XP adhesive, respectively. Long term temperature range is assumed to be 110°F for both SET-XP and AT-XP adhesives.
4. Allowable Stress Design (ASD) values were determined by multiplying calculated Strength Design values by a conversion factor, Alpha (α), of 0.7 for seismic loads and 0.6 for wind loads. ASD values for other load combinations may be determined using alternate conversion factors.
5. At edge of slab, edge distances are assumed to be 1⅞", 3.0" and 4.0" (½ of stud width) as determined for 3⅝", 6" and 8" studs, respectively. ‘End distances’ are assumed as 1.5 x Min. Edge Distance in one direction and ‘N/A’ in the other direction. See figure on this page.
6. At center of slab, edge and end distances are assumed as ‘N/A’ in all directions at locations away from edge of slab. See RCKW to concrete illustration below.
7. Tabulated anchorage capacities for RCKW models shown are applied to the same model size with stiffener. For example, a value for model RCKW3 is equivalent to model RCKW3 and RCKW3S.
8. Tabulated allowable ASD loads for Wind and Seismic in SDC A&B are based on using wind conversion factors and may be increased by 1.17 for seismic SDC A&B only.
9. Allowable loads have been divided by an Omega (Ω) seismic factor of 2.5 for brittle failure as required by ACI 318-14 Chapter 17, unless steel failure governs.
10. Tabulated capacities are based on maximum allowable anchorage loads only. The capacity of the connection system shall be the minimum of the tabulated value and the RCKW allowable load value listed on p. 102.
11. Tabulated loads in Table 3 and 4 are based on f'_c = 4,000 psi. For f'_c = 3,000 psi use an adjustment factor of 0.86 for the blue shaded values and 1.0 for all other values.
12. Tabulated values in Table 1 and Table 2 have been checked for combine moment and shear with the following conditions: $N_a / N_{al} + V_a / V_{al} \leq 1.2$
    - N_a = Applied ASD anchor tension load at moment M
    - N_{al} = Allowable anchor tension load from Tables 3 or 4
    - V_a = 2M/L is based on uniform loading wind application. L is the wall height at 38".
    - V_{al} = Allowable shear load from Tables 3 or 4

    Blue shaded values in Tables 1 and 2 exceed 1.2 combine loading limits. Designer is responsible to check.

For anchor subjected to both tension and shear loads, it shall be designed to satisfy following:
- For $N_a / N_{al} \leq 0.2$, the full allowable load in shear is permitted.
- For $V_a / V_{al} \leq 0.2$, the full allowable load in tension is permitted.
- For all other cases: $N_a / N_{al} + V_a / V_{al} \leq 1.2$

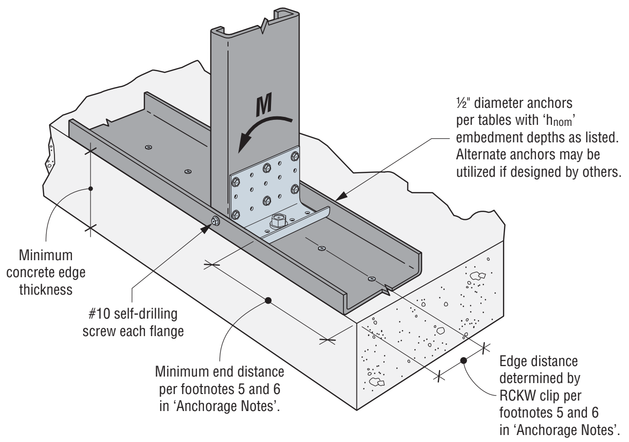
  where:

  N_a = Applied ASD tension load

  N_{al} = Allowable tension load from Tables 3 or 4

  V_a = Applied ASD shear load

  V_{al} = Allowable shear load from Tables 3 or 4.



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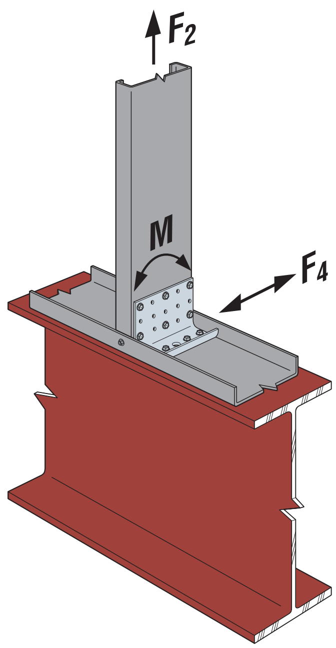
RCKW Kneewall Connectors

SIMPSON Strong-Tie®

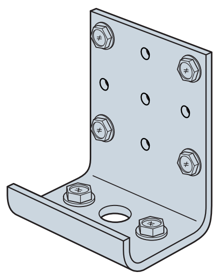
RCKW Allowable Loads — Steel Anchorage

Model No.	Framing Member Depth (in.)	Fastener to Structural Steel[2]	Fastener to Stud[3]	Framing Member Thickness mil (ga.)	Allowable Moment[4,5] M (in.-lb.)	Assembly Rotational Stiffness[6,8] β (in.-lb./rad)	Connector Rotational Stiffness[7,8] β_C (in.-lb./rad)	Allowable Tension Load F_2 (lb.)	Allowable Shear Load F_4 (lb.)	Code Ref.
RCKW3	3.625	(2) #12	(4) #12	33 (20)	2,105	55,500	58,000	850	455	170
				43 (18)	2,570	73,300	76,700	1,225	745	
				54 (16)	2,690	87,260	91,200	1,115	1,115	
RCKW5.5	6.00	(4) #12	(6) #12	33 (20)	5,165	199,200	209,200	1,245	650	
				43 (18)	6,370	272,600	287,100	1,900	1,060	
				54 (16)	6,430	255,900	266,100	2,310	1,295	
RCKW7.5	8.00	(6) #12	(6) #12	33 (20)	7,030	456,700	483,200	965	655	
				43 (18)	9,595	571,600	603,600	1,950	1,135	
				54 (16)	11,320	693,600	731,600	2,535	1,710	

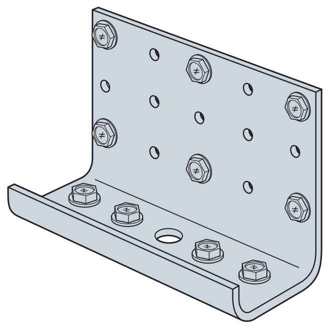
1. For additional important information, see General Information on pp. 14–16.
2. Designer is responsible for structural steel design.
3. See illustrations for fastener patterns.
4. Tabulated values are based on framing members with track and stud of the same thickness and #10 screws into each stud flange.
5. Tabulated moment values correspond to the maximum connector strength without consideration of serviceability. Designer must check out-of-plane deflections using tabulated Rotational Stiffness.
6. Tabulated Assembly Rotational Stiffness is for walls at 38" tall. Reference Example #1 on p. 104.
7. The tabulated Connector Rotational Stiffness is for walls other than 38" tall. The Designer must consider member deflection due to bending in the stud. Reference Example #2 on pp. 105–106.
8. Per IBC 2015 Table 1604.3 footnote f, wind load is permitted to be taken as 0.42 times "component and cladding loads" for deflection checks. For IBC 2009 and earlier, the factor is 0.7 instead of 0.42.



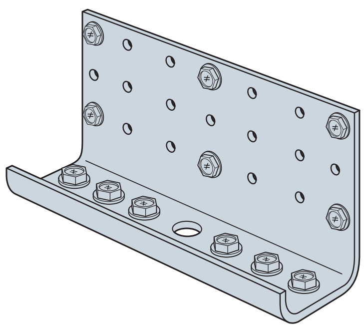
RCKW5.5 Installation on Structural Steel
(RCKW3 and RCKW7.5 similar)



RCKW3 Screw Pattern for Steel Anchorage



RCKW5.5 Screw Pattern for Steel Anchorage



RCKW7.5 Screw Pattern for Steel Anchorage

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MSSC4.25KW and MSSC6.25KW Kneewall Connectors

MSSC connectors are designed to work in tandem with Simpson Strong-Tie® BP½-3 bearing plates to provide solutions for moment-resisting kneewall lighter-duty applications.

Features:

- One simple custom hole pattern for each stud size simplifies specification and installation
- ⅜" diameter anchor bolt location enables easy tool access

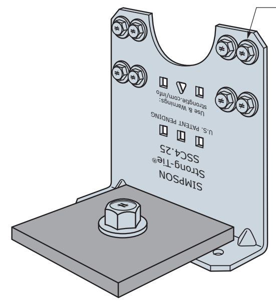
Material: MSSC — 97 mil (50 ksi); BP — 229 mil (33 ksi)

Finish: MSSC — Galvanized (G90); BP — None

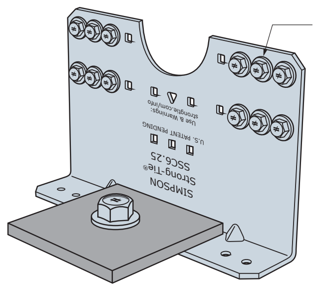
Installation:

- Use all specified fasteners/anchors
- Install BP½-3 bearing plate over anchor leg of MSSC connectors as shown in the illustrations

Codes: See p. 11 for Code Reference Key Chart



MSSC4.25KW Fastener Pattern



MSSC6.25KW Fastener Pattern

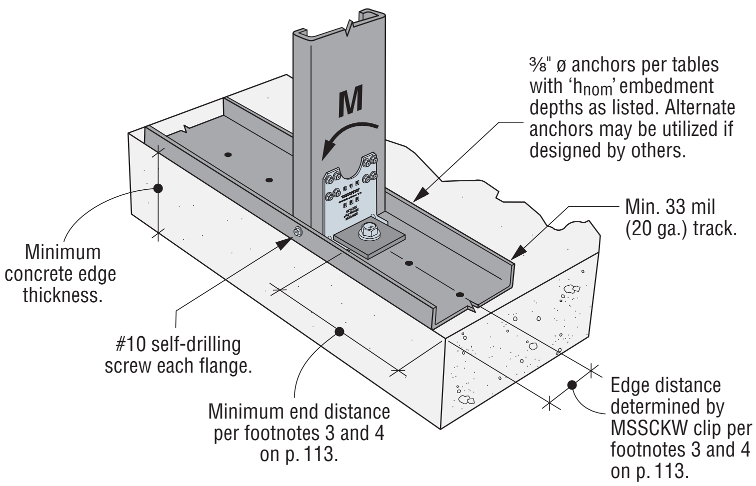
Ordering Information

Model No.	Ordering SKU	Package Quantity
MSSC4.25KW	MSSC4.25KW-KT20	Box of 20 connectors and 20 BP bearing plates
MSSC6.25KW	MSSC6.25KW-KT20	

Allowable Loads

Model No.	Connector Material Thickness mil (ga.)	L (in.)	Framing Member Depth (in.)	Fasteners[5]		Stud Thickness mil (ga.)	Allowable Moment, M (in.-lb.)[1]	Anchor Tension at Allowable Moment (lb.)[2]	Rotational Stiffness for Wind Deflection (in.-lb./rad.)[3,4]	Code Ref.
				Anchor Diameter (in.)	Stud					
MSSC4.25KW	97 (12)	4¼	6	⅜	(8) #10	33 (20)	3,135	1,690	45,360	IP2
						43 (18)	4,320	2,375		
						54 (16)	5,830	2,765		
MSSC6.25KW	97 (12)	6¼	8	⅜	(12) #10	33 (20)	3,845	1,705	77,245	
						43 (18)	3,845	1,705		
						54 (16)	8,350	2,885		

1. Tabulated values correspond to maximum connector strength without consideration of serviceability. Designer must check out-of-plane deflections using tabulated rotational stiffness.
2. Uplift may be linearly interpolated for design moment less than allowable. Designer is responsible for anchorage design.
3. Tabulated stiffness is applicable for walls up to 38" tall. For taller walls, the Designer must consider additional deflection due to bending in the studs.
4. Per IBC 2015 Table 1604.3 footnote f, wind load is permitted to be taken as 0.42 times "component and cladding loads" for deflection checks. For IBC 2009 and earlier, the factor is 0.7 instead of 0.42.
5. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



Typical MSSCKW Installation

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MSSC4.25KW and MSSC6.25KW Kneewall Connectors

SIMPSON Strong-Tie®

Kneewall Connector Anchorage Solutions

Uncracked Concrete, Wind and Seismic in SDC A&B [8, 10]

Model No.	Min. Concrete Thickness (h_{min})	⅜" Diameter Simpson Strong-Tie® Anchor Type	Nominal Embedment Depth (h_{nom}) (in.)	Allowable Moment, M (in-lb.) Edge of Slab[3]			Allowable Moment, M (in-lb.) Center of Slab[4]		
				3,000 psi SLWC	3,000 psi NWC	4,000 psi NWC	3,000 psi SLWC	3,000 psi NWC	4,000 psi NWC
MSSC4.25KW	4" or thicker	STB2	2¼	—	—	—	1,220	2,040	2,365
		Titen HD®	2½	1,255	2,090	2,425	1,255	2,090	2,425
	6" or thicker	STB2	2⅞	—	—	—	1,555	2,590	2,995
		Titen HD	3¼	1,795	2,995	3,450	2,075	3,465	3,995
		SET-XP®	4	725	1,425	1,425	1,930	3,705	3,705
		AT-XP®	4	750	1,470	1,470	2,005	3,705	3,705
	Concrete thickness ≥ 9.5"	SET-XP	7½	670	1,320	1,320	3,610	3,705	3,705
		AT-XP	7½	695	1,360	1,360	3,690	3,705	3,705
MSSC6.25KW	4" or thicker	STB2	2¼	—	—	—	1,515	2,530	2,930
		Titen HD	2½	1,555	2,590	3,005	1,555	2,590	3,005
	6" or thicker	STB2	2⅞	—	—	—	1,930	3,215	3,715
		Titen HD	3¼	2,570	4,295	4,950	2,570	4,295	4,950
		SET-XP	4	1,110	2,170	2,170	2,395	4,595	4,595
		AT-XP	4	1,135	2,235	2,235	2,480	4,595	4,595
	Concrete thickness ≥ 9.5"	SET-XP	7½	1,030	2,015	2,015	4,480	4,595	4,595
		AT-XP	7½	1,055	2,065	2,065	4,575	4,595	4,595

Cracked Concrete, Wind and Seismic in SDC A&B [8, 10]

Model No.	Min. Concrete Thickness (h_{min})	⅜" Diameter Simpson Strong-Tie® Anchor Type	Nominal Embedment Depth (h_{nom}) (in.)	Allowable Moment, M (in-lb.) Edge of Slab[3]			Allowable Moment, M (in-lb.) Center of Slab[4]		
				3,000 psi SLWC	3,000 psi NWC	4,000 psi NWC	3,000 psi SLWC	3,000 psi NWC	4,000 psi NWC
MSSC4.25KW	4" or thicker	STB2	2¼	—	—	—	860	1,435	1,660
		Titen HD	2½	575	955	1,100	575	955	1,100
	6" or thicker	STB2	2⅞	—	—	—	1,295	2,150	2,495
		Titen HD	3¼	1,255	2,095	2,430	1,255	2,095	2,430
		SET-XP	4	1,175	2,305	2,305	1,485	2,915	2,915
		AT-XP	4	1,220	2,395	2,395	1,560	3,065	3,065
	Concrete thickness ≥ 9.5"	SET-XP	7½	2,200	3,705	3,705	2,790	3,705	3,705
		AT-XP	7½	2,290	3,705	3,705	2,935	3,705	3,705
MSSC6.25KW	4" or thicker	STB2	2¼	—	—	—	1,070	1,780	2,055
		Titen HD	2½	715	1,185	1,365	715	1,185	1,365
	6" or thicker	STB2	2⅞	—	—	—	1,605	2,665	3,090
		Titen HD	3¼	1,555	2,600	3,010	1,555	2,600	3,010
		SET-XP	4	1,795	3,505	3,505	1,840	3,615	3,615
		AT-XP	4	1,860	3,645	3,645	1,935	3,800	3,800
	Concrete thickness ≥ 9.5"	SET-XP	7½	3,350	4,595	4,595	3,455	4,595	4,595
		AT-XP	7½	3,490	4,595	4,595	3,640	4,595	4,595

Cracked Concrete, Seismic in SDC C through F [9, 10]

Model No.	Min. Concrete Thickness (h_{min})	⅜" Diameter Simpson Strong-Tie® Anchor Type	Nominal Embedment Depth (h_{nom}) (in.)	Allowable Moment, M (in-lb.) Edge of Slab[3]			Allowable Moment, M (in-lb.) Center of Slab[4]		
				3,000 psi SLWC	3,000 psi NWC	4,000 psi NWC	3,000 psi SLWC	3,000 psi NWC	4,000 psi NWC
MSSC4.25KW	4" or thicker	STB2	2¼	—	—	—	300	500	580
		Titen HD	2½	200	335	385	200	335	385
	6" or thicker	STB2	2⅞	—	—	—	450	755	870
		Titen HD	3¼	440	735	850	440	735	850
		SET-XP	4	410	805	805	520	1,020	1,020
		AT-XP	4	430	840	840	550	1,070	1,070
	Concrete thickness ≥ 9.5"	SET-XP	7½	770	1,495	1,495	975	4,325	4,325
		AT-XP	7½	800	1,575	1,575	1,025	4,325	4,325
MSSC6.25KW	4" or thicker	STB2	2¼	—	—	—	375	620	720
		Titen HD	2½	250	415	480	250	415	480
	6" or thicker	STB2	2⅞	—	—	—	560	935	1,080
		Titen HD	3¼	545	910	1,050	545	910	1,050
		SET-XP	4	625	1,225	1,225	645	1,265	1,265
		AT-XP	4	650	1,275	1,275	680	1,330	1,330
	Concrete thickness ≥ 9.5"	SET-XP	7½	1,180	5,360	5,360	1,210	5,360	5,360
		AT-XP	7½	1,220	5,310	5,310	1,270	5,310	5,310

1. Allowable Moments have been determined using ACI 318-14 Chapter 17 anchorage calculations with the minimum concrete compressive strength, f'_c and slab thickness listed. Sand-Lightweight Concrete is abbreviated as 'SLWC', Normal Weight Concrete is abbreviated as 'NWC'.
2. Nominal Embedment Depth/Effective Embedment Depth relationships:
   - ⅜" Titen HD® in 4" concrete: 2.50" (h_{nom}) / 1.77" (h_{ef})
   - ⅜" Titen HD in 6" concrete: 3.25" (h_{nom}) / 2.40" (h_{ef})
   - ⅜" Carbon Steel STB2 into 4" concrete: 2.25"(h_{nom})/1.875"(h_{ef})
   - ⅜" Carbon Steel STB2 into 6" concrete: 2.875"(h_{nom})/2.5"(h_{ef})
   - SET-XP® or AT-XP® Adhesive with ⅜" F1554 Gr. 36 All-Thread Rod in 6" concrete: 4.0" (h_{nom}) = 4" (h_{ef})
   - SET-XP or AT-XP Adhesive with ⅜" F1554 Gr. 36 All-Thread Rod in 9.5" concrete: 7.5" (h_{nom}) = 7.5" (h_{ef})
3. At edge of slab, edge distances are assumed to be 3.0" and 4.0" (½ of stud width) as determined for 6" and 8" studs, respectively. 'End distances' are assumed as 1.5 x Min. Edge Distance in one direction and 'N/A' in the other direction. See figure on p. 112.
4. At center of slab, edge and end distances are assumed as 'N/A' in all directions at locations away from edge of slab. See figure on p. 112.
5. Load values are for a single anchor based on ACI 318-14, condition B, load factors from ACI 318-14 Section 5.3, no supplemental edge reinforcement, $\psi_{c,V}$ = 1.0 for cracked concrete and periodic special inspection. Reference ICC-ES or IAPMO-UES evaluation reports for further information.
6. Load values are based on a short-term temperature range of 150°F and 180°F for SET-XP and AT-XP. Long-term temperature range is assumed to be 110°F for both SET-XP and AT-XP. Dry hole conditions are assumed.Other conditions may be evaluated using Anchor Designer™ Software for ACI 318, ETAG and CSA. See **strongtie.com/software.**
7. Allowable Stress Design (ASD) values were determined by multiplying calculated LRFD capacities by a conversion factor, Alpha (α), of 0.7 for seismic loads and 0.6 for wind loads. ASD values for other load combinations may be determined using alternate conversion factors.
8. Tabulated allowable ASD loads for Wind and Seismic in SDC A&B are based on using wind conversion factors and may be increased by 1.17 for SDC A&B only.
9. Allowable loads have been divided by an Omega (Ω) seismic factor of 2.5 for brittle failure as required by ACI 318-14 Chapter 17, unless steel failure governs.
10. Tabulated allowable moments are for MSSC Kneewall Connectors attached to studs with 33 (20) or 43 (18) mil (ga.) thickness. Allowable moment may be increased for MSSC Kneewall Connectors attached to studs with 54 (16) mil (ga.) thickness by multiplying by a factor of 1.16 for MSSC4.25KW and 1.28 for MSSC6.25KW.
11. Tabulated capacities assume lateral force applied at height of 38" above concrete. Tabulated capacities are based on maximum allowable anchorage loads only. The capacity of the connection system shall be the minimum of the tabulated value and the allowable load value from the MSSCKW Connectors: Allowable Load Tables.

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Bridging and Bracing Connectors

Simplified Design and Installation Through Innovation

Simpson Strong-Tie® SUBH and MSUBH wall stud bridging connectors for cold-formed steel (CFS) framing offer a compact profile that allows standard 1⅝" studs to be sistered directly against adjacent studs. The LSUBH connector provides the same installation benefits of the SUBH/MSUBH connectors, and is suitable for many wind- and load-bearing situations where the load demand is light to moderate. Many applications require only one screw, greatly reducing labor costs and increasing productivity.

This product is preferable to similar connectors because of a) easier installation, b) higher loads, c) lower installed cost, or a combination of these features.

Features:

- Tested to include stud-web strength and stiffness in the tabulated design values
- Design values ensure compliance with AISI S100 Sections D3.2.1 and D3.3 for axially and laterally loaded studs
- Flexible design solutions for web thicknesses of 33 mil (20 ga.) through 97 mil (12 ga.) and stud sizes from 3⅝" to 8"
- MSUBH accommodates back-to-back built-up members ranging from 33 mil (20 ga.) to 54 mil (16 ga.)

Material: LSUBH3.25 — 33 mil (20 ga.); SUBH3.25 — 43 mil (18 ga.); MSUBH3.25 — 68 mil (14 ga.)

Finish: Galvanized (G90)

Installation:

- See pp. 116 through 118

Codes: See p. 11 for Code Reference Key Chart

Ordering Information:

LSUBH3.25 and SUBH3.25-R150 (Bucket of 150),
MSUBH3.25-R100 (Bucket of 100)

SUBH3.25

(LSUBH3.25 and MSUBH3.25 similar)

U.S. Patent 8,813,456

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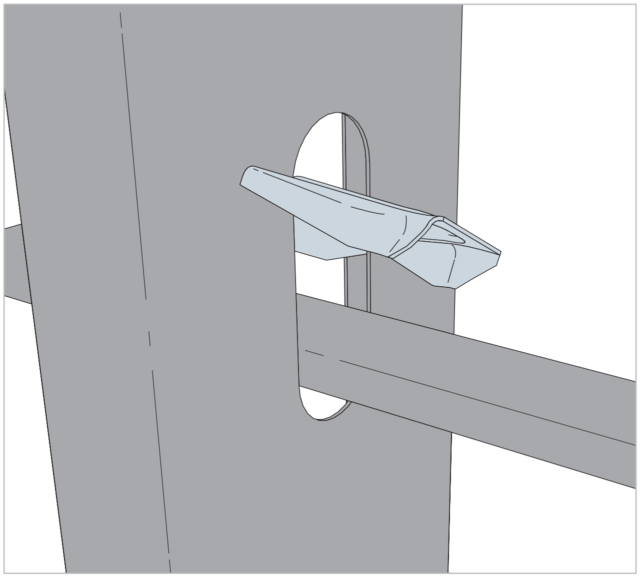
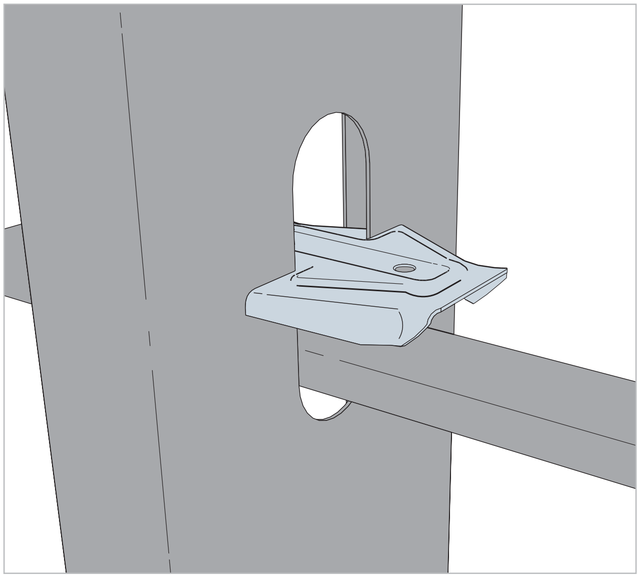
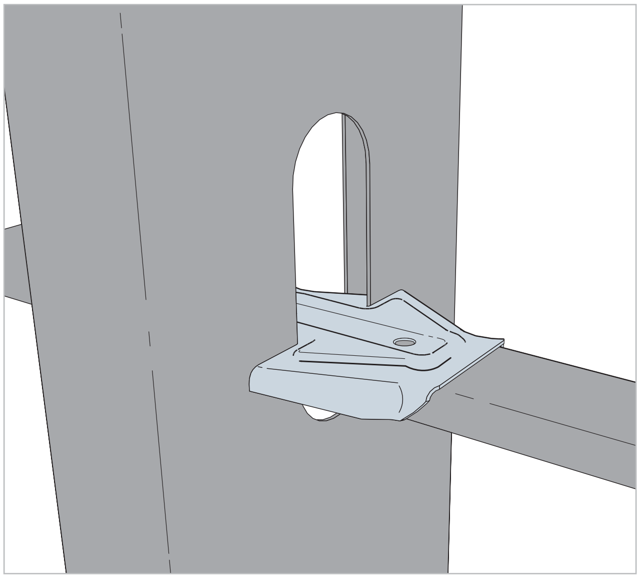
Installation Instructions



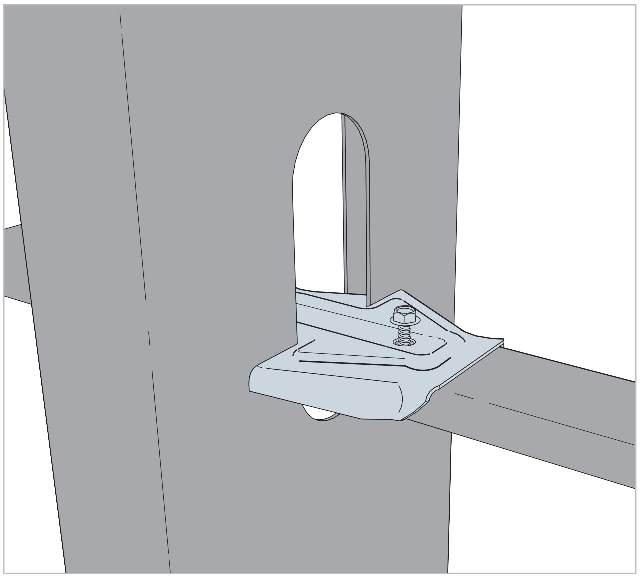
Step 1: With the u-channel in a stable, horizontal position, insert either end of the SUBH into the web knockout at approximately 45°.



Step 2: Rotate the SUBH into a horizontal position aligned with the u-channel so the slots engage the stud web.



Step 3: Slide the SUBH down over the u-channel flanges, ensuring that the connector and u-channel are fully seated. (Note: For installations at slip track, the connector may be installed inverted — see p. 117).



Step 4: Install the specified type and number of screws through the holes of the SUBH into the u-channel.

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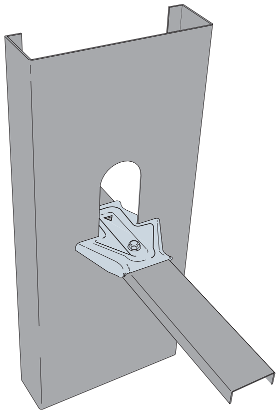
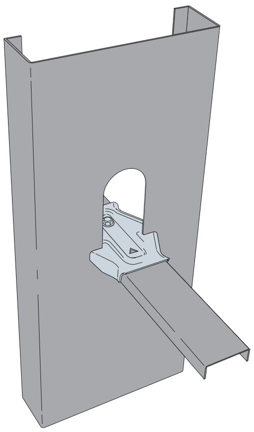
Installation Details

Typical Orientations

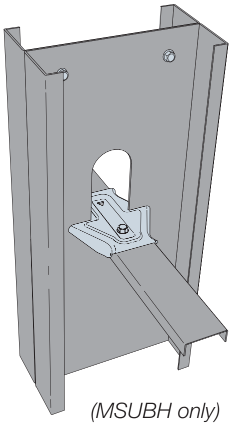
1


Round Hole Near Side

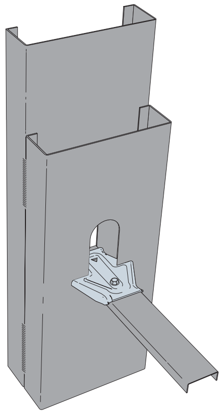
2


Round Hole Far Side

Recommended Details at Built-Up Studs

1


(MSUBH only)

3


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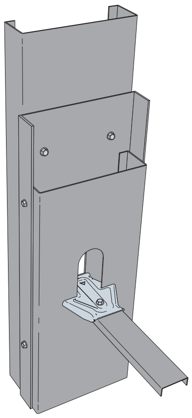

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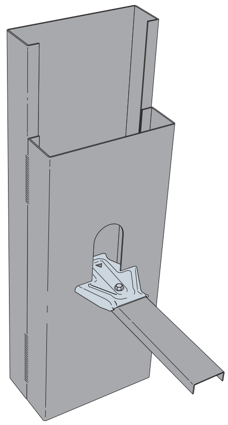
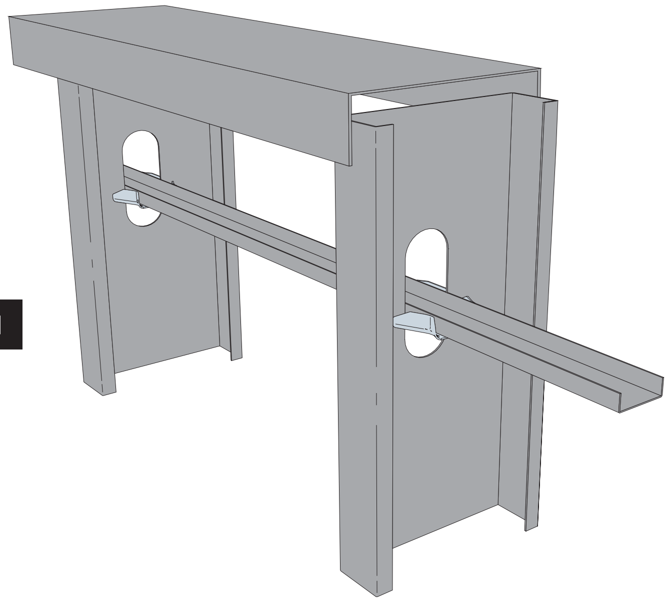


Recommended Detail at Slip Track

1


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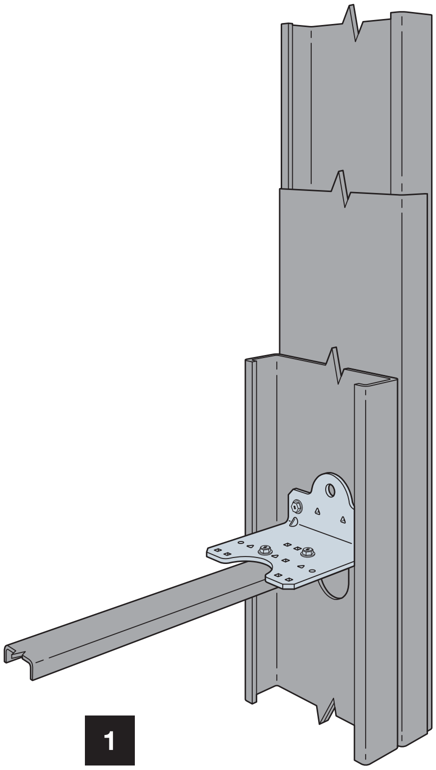
Alternate and Optional U-Channel Bridging Installation Details

Recommended details where knockout access is restricted, or where additional U-channel restraint is needed for load path considerations.



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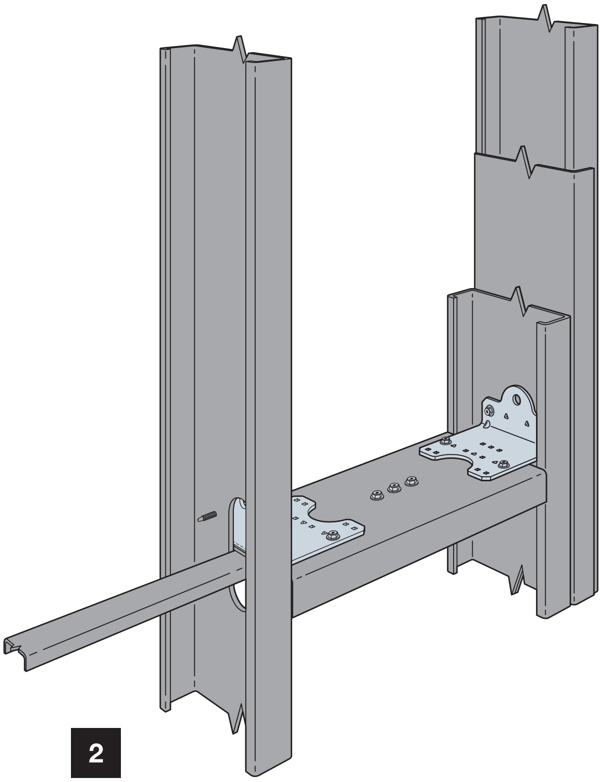

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How to Use Bridging Connector Allowable Load Table

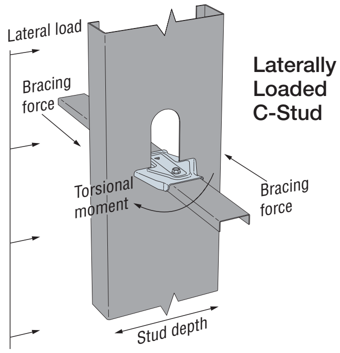
The tabulated strength and stiffness values are for use with Sections D3.2.1 and D3.3 of the 2012 edition of AISI North American Specification for the Design of Cold-Formed Steel Structural Members (AISI S100-2012) as follows:

Bracing Design for Laterally Loaded C-Studs

Step 1: Calculate required bracing force for each flange using equation D3.2.1-3

Step 2: Multiply result by stud depth to obtain torsional moment

Step 3: Select connector with tabulated allowable torsional moment that exceeds torsional moment from Step 2 for the stud depth and gauge required

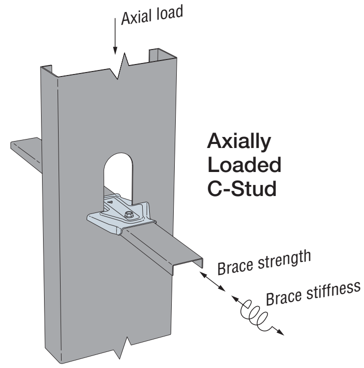


Bracing Design for Axially Loaded C-Studs

Step 1: Calculate required brace strength using equation D3.3-1

Step 2: Calculate required brace stiffness using equation D3.3-2a

Step 3: Select connector with tabulated allowable brace strength that exceeds strength from Step 1 and tabulated brace stiffness that exceeds stiffness from Step 2 for the stud depth and gauge required



SUBH Bridge Clip Connector — Strength and Stiffness

Model No.	Stud Depth (in.)	Stud Thickness mils (ga.)	Laterally Loaded C-Stud: Allowable Torsional Moment[1] (in.-lb.)		Axially Loaded C-Stud: Allowable Brace Strength[1,2] (lb.)		Axially Loaded C-Stud: Brace Stiffness[3] (lb./in.)		Code Ref.
			Min.	Max.	Min.	Max.	Min.	Max.	
LSUBH3.25	3.625	33 (20)	215	330	155	275	2,300	2,685	IP1
		43 (18)	230	370	175	310	5,075	7,585	
		54 (16)	225	370	195	345	5,075	8,100	
SUBH3.25		33 (20)	320	345	230	370	1,450	1,985	IP1, L2
		43 (18)	355	430	255	420	2,780	4,035	
		54 (16)	420	455	290	475	2,925	3,975	
MSUBH3.25		54 (16)	550	800	435	630	3,440	4,015	
		68 (14)	640	860	485	695	4,040	6,145	
		97 (12)	670	860	515	770	6,860	14265	
LSUBH3.25	6.00	33 (20)	225	330	120	140	670	730	IP1
		43 (18)	250	395	155	285	1,010	2,075	
		54 (16)	265	395	180	330	1,025	2,565	
SUBH3.25		33 (20)	275	385	110	110	605	605	IP1, L2
		43 (18)	295	525	230	250	1,050	1,205	
		54 (16)	350	550	275	415	1,130	1,700	
MSUBH3.25		54 (16)	565	895	385	430	1,630	1,695	
		68 (14)	655	925	455	620	1,860	2,655	
		97 (12)	690	960	505	765	4,070	4,090	
LSUBH3.25	8.00	43 (18)	235	375	135	135	815	815	IP1
		54 (16)	250	375	180	260	1,130	1,130	
SUBH3.25		43 (18)	255	570	190	190	505	535	IP1, L2
		54 (16)	325	605	250	300	895	1,025	
MSUBH3.25		54 (16)	545	890	270	270	1,025	1,045	
		68 (14)	635	925	435	455	1,400	1,400	
		97 (12)	665	955	545	545	2,465	2,465	
MSUBH	10, 12	54 (16)	—	820	—	200	—	510	170

1. Allowable loads are for use when utilizing Allowable Stress Design methology. For LRFD loads multiply the ASD tabulated values by 1.6.
2. Allowable brace strengths are based on ultimate test load divided by a safety factor. Serviceability limit is not considered, as brace stiffness requirements are given in section D3.3 of AISI S100-2012. Contact Simpson Strong-Tie if nominal brace strength is required.
3. Tabulated stiffness values apply to both ASD and LRFD designs.
4. Allowable loads consider bridging connection only. It is responsibility of the Designer to verify the strength and serviceability of the framing members.
5. Min. fastener quantity and tabulated values – fill round hole (one screw total); Max. fastener quantity and tabulated values – fill round and triangle holes (two screws total).

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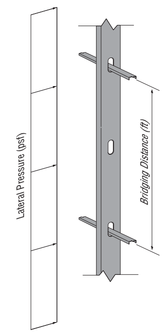
LSUBH — Maximum Vertical Spacing for Rows of U-Channel Bridging (ft.)

Stud Spacing (in.)	Stud Section	Stud Thickness mil (ga.)	Lateral Stud Pressure (psf)																			
			5		10		15		20		25		30		35		40		45		50	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
16	362S162	33 (20)	8	8	8	8	8	8	6	8	5	8	4	6	—	5	—	5	—	4	—	4
		43 (18)	8	8	8	8	8	8	7	8	5	8	4	7	4	6	—	5	—	5	—	4
		54 (16)	8	8	8	8	8	8	7	8	5	8	4	7	4	6	—	5	—	5	—	4
	362S200	33 (20)	8	8	8	8	6	8	5	8	4	6	—	5	—	4	—	4	—	—	—	—
		43 (18)	8	8	8	8	7	8	5	8	4	7	—	6	—	5	—	4	—	4	—	—
		54 (16)	8	8	8	8	7	8	5	8	4	7	—	6	—	5	—	4	—	4	—	—
	362S250	43 (18)	8	8	8	8	6	8	4	7	—	5	—	4	—	4	—	—	—	—	—	—
		54 (16)	8	8	8	8	5	8	4	7	—	5	—	4	—	4	—	—	—	—	—	—
	600S162	33 (20)	8	8	8	8	8	8	8	8	6	8	5	8	4	6	4	6	—	5	—	4
		43 (18)	8	8	8	8	8	8	8	8	7	8	6	8	5	8	4	7	4	6	—	5
		54 (16)	8	8	8	8	8	8	8	8	7	8	6	8	5	8	4	7	4	6	—	5
	600S200	33 (20)	8	8	8	8	8	8	6	8	4	7	4	6	—	5	—	4	—	4	—	—
		43 (18)	8	8	8	8	8	8	6	8	5	8	4	7	—	6	—	5	—	4	—	4
		54 (16)	8	8	8	8	8	8	7	8	5	8	4	7	4	6	—	5	—	4	—	4
	600S250	43 (18)	8	8	8	8	7	8	5	8	4	6	—	5	—	4	—	4	—	—	—	—
		54 (16)	8	8	8	8	7	8	5	8	4	6	—	5	—	4	—	4	—	—	—	—
	800S162	43 (18)	8	8	8	8	8	8	8	8	7	8	6	8	5	8	4	7	4	6	—	6
		54 (16)	8	8	8	8	8	8	8	8	8	8	7	8	6	8	5	7	4	7	4	6
	800S200	43 (18)	8	8	8	8	8	8	7	8	5	8	4	7	4	6	—	5	—	5	—	4
		54 (16)	8	8	8	8	8	8	7	8	6	8	5	7	4	6	—	5	—	5	—	4
	800S250	43 (18)	8	8	8	8	7	8	5	8	4	7	—	5	—	5	—	4	—	—	—	—
		54 (16)	8	8	8	8	8	8	6	8	4	7	4	6	—	5	—	4	—	4	—	—
24	362S162	33 (20)	8	8	8	8	6	8	4	6	—	5	—	4	—	—	—	—	—	—	—	—
	362S162	43 (18)	8	8	8	8	6	8	4	7	—	6	—	5	—	4	—	—	—	—	—	—
	362S162	54 (16)	8	8	8	8	6	8	4	7	—	6	—	5	—	4	—	—	—	—	—	—
	362S200	33 (20)	8	8	6	8	4	7	—	5	—	4	—	—	—	—	—	—	—	—	—	—
	362S200	43 (18)	8	8	7	8	4	8	—	6	—	4	—	4	—	—	—	—	—	—	—	—
	362S200	54 (16)	8	8	7	8	4	8	—	6	—	4	—	4	—	—	—	—	—	—	—	—
	362S250	43 (18)	8	8	6	8	4	6	—	4	—	—	—	—	—	—	—	—	—	—	—	—
	362S250	54 (16)	8	8	5	8	—	6	—	4	—	—	—	—	—	—	—	—	—	—	—	—
	600S162	33 (20)	8	8	8	8	7	8	5	8	4	6	—	5	—	4	—	4	—	—	—	—
	600S162	43 (18)	8	8	8	8	8	8	6	8	4	7	4	6	—	5	—	4	—	4	—	—
	600S162	54 (16)	8	8	8	8	8	8	6	8	5	7	4	6	—	5	—	4	—	4	—	—
	600S200	33 (20)	8	8	8	8	5	8	4	6	—	4	—	4	—	—	—	—	—	—	—	—
	600S200	43 (18)	8	8	8	8	6	8	4	7	—	5	—	4	—	4	—	—	—	—	—	—
	600S200	54 (16)	8	8	8	8	6	8	4	7	—	5	—	4	—	4	—	—	—	—	—	—
	600S250	43 (18)	8	8	7	8	4	7	—	5	—	4	—	—	—	—	—	—	—	—	—	—
	600S250	54 (16)	8	8	7	8	5	7	—	5	—	4	—	—	—	—	—	—	—	—	—	—
	800S162	43 (18)	8	8	8	8	8	8	6	8	5	8	4	6	—	5	—	5	—	4	—	4
	800S162	54 (16)	8	8	8	8	8	8	7	8	5	8	4	7	4	6	—	5	—	4	—	4
	800S200	43 (18)	8	8	8	8	6	8	4	7	—	6	—	5	—	4	—	—	—	—	—	—
	800S200	54 (16)	8	8	8	8	6	8	5	7	4	6	—	5	—	4	—	—	—	—	—	—
	800S250	43 (18)	8	8	7	8	5	7	—	5	—	4	—	—	—	—	—	—	—	—	—	—
	800S250	54 (16)	8	8	8	8	5	8	4	6	—	4	—	4	—	—	—	—	—	—	—	—

1. See General Notes on pp. 14–16.
2. Tabulated solutions are for ASD lateral pressure. Contact Simpson Strong-Tie for LRFD solutions.
3. Lateral pressure shall be determined based on load combinations of the applicable code. For designs in accordance with the 2009 IBC and earlier, wind pressures are at working stress level and may be used directly. For designs in accordance with the 2012 IBC and later, wind pressures are at strength level and must be multiplied by 0.6 for ASD load combinations.
4. "Min." designates a solution with the minimum number of fasteners ((1) #10 screw installed in round hole). "Max." designates a solution requiring the maximum number of fasteners ((2) #10 screws; fill both round and triangle holes). Blank areas designate conditions where the LSUBH does not offer a solution.



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SUBH Design Tables

SUBH — Maximum Vertical Spacing for Rows of U-Channel Bridging (ft.)

Stud Spacing (in.)	Stud Section	Stud Thickness mil (ga.)	Lateral Stud Pressure (psf)																			
			5		10		15		20		25		30		35		40		45		50	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
16	362S162	33 (20)	8	8	8	8	8	8	8	8	8	8	6	7	5	6	5	5	4	4	4	4
		43 (18)	8	8	8	8	8	8	8	8	8	8	7	8	6	7	5	6	5	6	4	5
		54 (16)	8	8	8	8	8	8	8	8	8	8	8	8	7	8	6	7	6	6	5	5
	362S200	33 (20)	8	8	8	8	8	8	7	8	6	6	5	5	4	4	—	4	—	—	—	—
		43 (18)	8	8	8	8	8	8	8	8	6	8	5	6	4	5	4	5	—	4	—	4
		54 (16)	8	8	8	8	8	8	8	8	8	8	6	7	5	6	5	5	4	4	4	4
	362S250	43 (18)	8	8	8	8	8	8	6	8	5	6	4	5	—	4	—	4	—	—	—	—
		54 (16)	8	8	8	8	8	8	8	8	6	7	5	5	4	5	4	4	—	—	—	—
	600S162	33 (20)	8	8	8	8	8	8	8	8	8	8	6	8	5	8	5	7	4	6	4	5
		43 (18)	8	8	8	8	8	8	8	8	8	8	7	8	6	8	5	8	4	8	4	7
		54 (16)	8	8	8	8	8	8	8	8	8	8	8	8	7	8	6	8	5	8	5	8
	600S200	33 (20)	8	8	8	8	8	8	7	8	6	8	5	7	4	6	—	5	—	4	—	4
		43 (18)	8	8	8	8	8	8	8	8	6	8	5	8	4	8	4	7	—	6	—	5
		54 (16)	8	8	8	8	8	8	8	8	7	8	6	8	5	8	4	7	4	6	—	6
	600S250	43 (18)	8	8	8	8	8	8	6	8	5	8	4	7	—	6	—	5	—	5	—	4
		54 (16)	8	8	8	8	8	8	7	8	6	8	5	8	4	6	—	6	—	5	—	4
	800S162	43 (18)	8	8	8	8	8	8	8	8	8	8	7	8	6	8	5	8	4	8	4	8
		54 (16)	8	8	8	8	8	8	8	8	8	8	8	8	7	8	6	8	6	8	5	8
	800S200	43 (18)	8	8	8	8	8	8	7	8	6	8	5	8	4	8	—	8	—	7	—	7
		54 (16)	8	8	8	8	8	8	8	8	8	8	6	8	5	8	5	8	4	8	4	7
	800S250	43 (18)	8	8	8	8	8	8	6	8	4	8	4	8	—	7	—	6	—	6	—	5
		54 (16)	8	8	8	8	8	8	7	8	6	8	5	8	4	8	—	7	—	6	—	5
24	362S162	33 (20)	8	8	8	8	8	8	6	7	5	5	4	4	—	4	—	—	—	—	—	—
		43 (18)	8	8	8	8	8	8	7	8	6	7	5	6	4	5	—	4	—	4	—	—
		54 (16)	8	8	8	8	8	8	8	8	7	7	6	6	5	5	4	4	4	4	—	—
	362S200	33 (20)	8	8	8	8	6	7	5	5	4	4	—	—	—	—	—	—	—	—	—	—
		43 (18)	8	8	8	8	7	8	5	6	4	5	—	4	—	—	—	—	—	—	—	—
		54 (16)	8	8	8	8	8	8	6	7	5	5	4	4	—	4	—	—	—	—	—	—
	362S250	43 (18)	8	8	8	8	6	7	4	5	—	4	—	—	—	—	—	—	—	—	—	—
		54 (16)	8	8	8	8	7	7	5	5	4	4	—	—	—	—	—	—	—	—	—	—
	600S162	33 (20)	8	8	8	8	8	8	6	8	5	7	4	6	—	5	—	4	—	4	—	—
		43 (18)	8	8	8	8	8	8	7	8	5	8	4	8	4	7	—	6	—	5	—	5
		54 (16)	8	8	8	8	8	8	8	8	7	8	5	8	5	7	4	6	—	6	—	5
	600S200	33 (20)	8	8	8	8	6	8	5	7	4	5	—	4	—	4	—	—	—	—	—	—
		43 (18)	8	8	8	8	7	8	5	8	4	7	—	6	—	5	—	4	—	4	—	—
		54 (16)	8	8	8	8	8	8	6	8	5	8	4	6	—	5	—	5	—	4	—	4
	600S250	43 (18)	8	8	8	8	5	8	4	7	—	6	—	5	—	4	—	—	—	—	—	—
		54 (16)	8	8	8	8	6	8	5	8	4	6	—	5	—	4	—	4	—	—	—	—
	800S162	43 (18)	8	8	8	8	8	8	7	8	5	8	4	8	4	8	—	7	—	7	—	6
		54 (16)	8	8	8	8	8	8	8	8	7	8	6	8	5	8	4	8	4	7	—	6
	800S200	43 (18)	8	8	8	8	6	8	5	8	4	8	—	7	—	6	—	5	—	5	—	4
		54 (16)	8	8	8	8	8	8	6	8	5	8	4	8	—	7	—	6	—	5	—	5
	800S250	43 (18)	8	8	8	8	5	8	4	8	—	7	—	6	—	5	—	4	—	4	—	—
		54 (16)	8	8	8	8	6	8	5	8	4	7	—	6	—	5	—	4	—	4	—	—

1. See General Notes on pp. 14–16.
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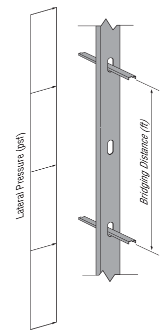
4. "Min." designates a solution with the minimum number of fasteners ((1) #10 screw installed in round hole). "Max." designates a solution requiring the maximum number of fasteners ((2) #10 screws; fill both round and triangle holes). Blank areas designate conditions where the SUBH does not offer a solution.



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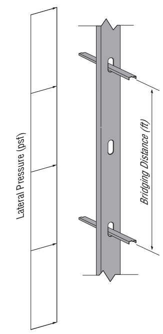
SUBH Design Tables

MSUBH — Maximum Vertical Spacing for Rows of U-Channel Bridging (ft.)

Stud Spacing (in.)	Stud Section	Stud Thickness mil (ga.)	Lateral Stud Pressure (psf)																			
			5		10		15		20		25		30		35		40		45		50	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
16	362S162	54 (16)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	7	8
		68 (14)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
		97 (12)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	362S200	54 (16)	8	8	8	8	8	8	8	8	8	8	8	8	7	8	6	8	6	8	5	7
		68 (14)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	7	8	6	8
		97 (12)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	6	8
	362S250	54 (16)	8	8	8	8	8	8	8	8	8	8	7	8	6	8	5	7	4	7	4	6
		68 (14)	8	8	8	8	8	8	8	8	8	8	8	8	7	8	6	8	5	7	5	6
		97 (12)	8	8	8	8	8	8	8	8	8	8	8	8	7	8	6	8	6	7	5	6
	600S162	54 (16)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
		68 (14)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
		97 (12)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	600S200	54 (16)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	7	8	6	8
		68 (14)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8
		97 (12)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	600S250	54 (16)	8	8	8	8	8	8	8	8	8	8	8	8	7	8	6	8	5	8	5	7
		68 (14)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	6	8	5	8
		97 (12)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	6	8	6	8
	800S162	54 (16)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
		68 (14)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
		97 (12)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	800S200	54 (16)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	6	8
		68 (14)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8
		97 (12)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	800S250	54 (16)	8	8	8	8	8	8	8	8	8	8	8	8	7	8	6	8	5	8	5	8
		68 (14)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	6	8	6	8
		97 (12)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	6	8
	1000S162	54 (16)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
		68 (14)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
		97 (12)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
	1000S200	54 (16)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
		68 (14)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
		97 (12)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
	1000S250	54 (16)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
		68 (14)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
		97 (12)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
	1200S162	54 (16)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
		68 (14)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
		97 (12)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
	1200S200	54 (16)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
		68 (14)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
		97 (12)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
	1200S250	54 (16)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
		68 (14)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
		97 (12)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8

1. See General Notes on pp. 14–16.
2. Tabulated solutions are for ASD lateral pressure. Contact Simpson Strong-Tie for LRFD solutions.
3. Lateral pressure shall be determined based on load combinations of the applicable code. For designs in accordance with the 2009 IBC and earlier, wind pressures are at working stress level and may be used directly. For designs in accordance with the 2012 IBC and later, wind pressures are at strength level and must be multiplied by 0.6 for ASD load combinations.
4. "Min." designates a solution with the minimum number of fasteners ((1) #10 screw installed in round hole). "Max." designates a solution requiring the maximum number of fasteners ((2) #10 screws; fill both round and triangle holes). Blank areas designate conditions where the MSUBH does not offer a solution.



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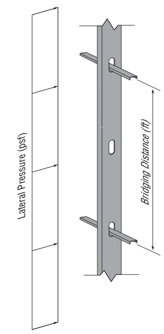
SUBH Design Tables

MSUBH — Maximum Vertical Spacing for Rows of U-Channel Bridging (ft.) (cont.)

Stud Spacing (in.)	Stud Section	Stud Thickness mil (ga.)	Lateral Stud Pressure (psf)																			
			5		10		15		20		25		30		35		40		45		50	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
24	362S162	54 (16)	8	8	8	8	8	8	8	8	8	8	7	8	6	8	5	8	5	7	4	6
		68 (14)	8	8	8	8	8	8	8	8	8	8	8	8	7	8	6	8	6	8	5	7
		97 (12)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	6	8	5	7
	362S200	54 (16)	8	8	8	8	8	8	8	8	7	8	6	8	5	7	4	6	4	5	—	5
		68 (14)	8	8	8	8	8	8	8	8	8	8	7	8	6	8	5	7	4	6	4	5
		97 (12)	8	8	8	8	8	8	8	8	8	8	7	8	6	8	5	7	5	6	4	5
	362S250	54 (16)	8	8	8	8	8	8	7	8	5	8	4	7	4	6	—	5	—	4	—	4
		68 (14)	8	8	8	8	8	8	8	8	6	8	5	7	4	6	4	5	—	5	—	4
		97 (12)	8	8	8	8	8	8	8	8	7	8	6	7	5	6	4	5	4	5	—	4
	600S162	54 (16)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	6	8	5	8
		68 (14)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	6	8
		97 (12)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8
	600S200	54 (16)	8	8	8	8	8	8	8	8	8	8	7	8	6	8	5	8	4	7	4	6
		68 (14)	8	8	8	8	8	8	8	8	8	8	8	8	7	8	6	8	5	7	4	7
		97 (12)	8	8	8	8	8	8	8	8	8	8	8	8	7	8	6	8	5	8	5	7
	600S250	54 (16)	8	8	8	8	8	8	8	8	6	8	5	8	4	7	4	6	—	5	—	5
		68 (14)	8	8	8	8	8	8	8	8	7	8	6	8	5	7	4	6	4	6	—	5
		97 (12)	8	8	8	8	8	8	8	8	8	8	6	8	5	8	5	7	4	6	4	5
	800S162	54 (16)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	6	8	6	8
		68 (14)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8
		97 (12)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8
	800S200	54 (16)	8	8	8	8	8	8	8	8	8	8	7	8	6	8	5	8	5	8	4	7
		68 (14)	8	8	8	8	8	8	8	8	8	8	8	8	7	8	6	8	5	8	5	7
		97 (12)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	6	8	5	8
	800S250	54 (16)	8	8	8	8	8	8	8	8	7	8	5	8	5	8	4	7	—	6	—	5
		68 (14)	8	8	8	8	8	8	8	8	8	8	6	8	5	8	5	7	4	6	4	6
		97 (12)	8	8	8	8	8	8	8	8	8	8	7	8	6	8	5	7	4	7	4	6
	1000S162	54 (16)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
		68 (14)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
		97 (12)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
	1000S200	54 (16)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	7
		68 (14)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	7
		97 (12)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	7
	1000S250	54 (16)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	7	—	6	—	5
		68 (14)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	7	—	6	—	5
		97 (12)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	7	—	6	—	5
	1200S162	54 (16)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
		68 (14)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
		97 (12)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
	1200S200	54 (16)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
		68 (14)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
		97 (12)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	8
	1200S250	54 (16)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	7	—	6	—	6
		68 (14)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	7	—	6	—	6
		97 (12)	—	8	—	8	—	8	—	8	—	8	—	8	—	8	—	7	—	7	—	6

1. See General Notes on pp. 14–16.
2. Tabulated solutions are for ASD lateral pressure. Contact Simpson Strong-Tie for LRFD solutions.
3. Lateral pressure shall be determined based on load combinations of the applicable code. For designs in accordance with the 2009 IBC and earlier, wind pressures are at working stress level and may be used directly. For designs in accordance with the 2012 IBC and later, wind pressures are at strength level and must be multiplied by 0.6 for ASD load combinations.
4. "Min." designates a solution with the minimum number of fasteners ((1) #10 screw installed in round hole). "Max." designates a solution requiring the maximum number of fasteners ((2) #10 screws; fill both round and triangle holes). Blank areas designate conditions where the MSUBH does not offer a solution.



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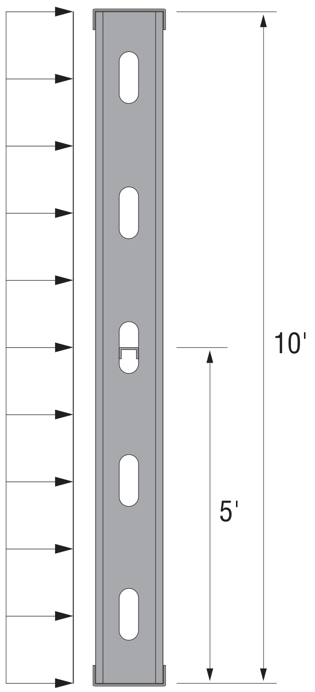
Example #1: Curtain-Wall Stud



Given

- 2015 IBC (ASCE 7-10 and AISI S100-2012)
- 600S162–43 (33 ksi) studs at 24" o.c.
- 10'-tall studs with mid-point bracing (5' o.c.)
- Wind design pressure = 41 psf

Select Connector Using Design Table (p. 121)

ASD wind pressure:

$p = (0.6)(41 \text{ psf}) = 24.6 \text{ psf}$

Note: 2015 IBC load combinations for ASD include a factor of 0.6 for wind loads.

For 600S162-43 stud with SUBH3.25 connector, and 25 psf wind pressure with 5' bracing distance:

➡ SUBH3.25 with Min. fasteners **OK**

Notes

1. Only lateral load has been included for clarity. Design of curtain-wall studs should consider load combinations with vertical load in accordance with the applicable building code (see Example #2).
2. Bridging connector may also be designed using Allowable Loads table on p. 119 (see Example #2).

Example #2: Exterior Bearing-Wall Stud

Given

- 2015 IBC (ASCE 7-10 and AISI S100-2012)
- 600S162–54 (50 ksi) studs at 24" o.c., 10' tall
  Mid-point bracing (5' o.c.)
  Required axial stud strength, P_{ra} = 2,200 lb.
  Distance from shear center to mid-plane of web, m = 0.663" (2013 AISI Manual, Table I-2)
- Wind design pressure = 34 psf

Axially-Loaded Stud Design

Required brace strength (AISI S100 Eq. D3.3-1):

$P_{br,1} = 0.01P_{ra} = (0.01)(2{,}200 \text{ lb.}) = 22 \text{ lb.}$

Required brace stiffness (AISI S100 Eq. D3.3-2a):

$\beta_{rb} = \{2[4 - (2/n)]/L_b\}\Omega P_{ra} = \{2[4 - (2/1)]/60 \text{ in.}\}(2)(2{,}200) = 294 \text{ lb./in.}$

From Allowable Loads table (p. 119) for 6"-deep 54-mil stud:

➡ Select SUBH3.25 with Min. fasteners

Allowable brace strength = 275 lb. > 22 lb. **OK**

Brace stiffness = 1,130 lb./in. > 294 lb./in. **OK**

Laterally-Loaded Stud Design

Design load tributary to a single connector:

$W = (0.6)(34 \text{ psf})(2 \text{ ft.})(5 \text{ ft.}) = 204 \text{ lb.}$

Note: 2015 IBC load combinations for ASD include a factor of 0.6 for wind loads.

Required flange force (AISI S100 Eq. D3.2.1-3):

$P_{L1} = -P_{L2} = 1.5(m/d)W = (1.5)(0.663 \text{ in.}/6 \text{ in.})(204 \text{ lb.}) = 33.8 \text{ lb.}$

Torsional moment:

$M_z = P_{L1}d = -P_{L2}d = (33.8 \text{ lb.})(6 \text{ in.}) = 203 \text{ in.-lb.}$

From Allowable Loads table (p. 119) for 6"-deep 54-mil stud:

➡ Select SUBH3.25 with Min. fasteners

Allowable torsional moment = 350 in.-lb. > 203 in.-lb. **OK**

Combined-Loading Check

($P_{br,1}$/Allowable brace strength) + (M_z/Allowable torsional moment) = (22 lb./275 lb.) + (203 in.-lb./350 in.-lb.) = 0.66 < 1.0 **OK**

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SBR / DBR Spacer Bracers

SIMPSON Strong-Tie®

This product is preferable to similar connectors because of a) easier installation, b) higher loads, c) lower installed cost, or a combination of these features.

Simpson Strong-Tie introduces the SBR and DBR spacer bracers for cold-formed steel construction. These spacer bracers reduce the installed cost of cold-formed steel stud walls by enabling faster stud layout while minimizing the need for bridging clips.

The DBR is used for interior walls to eliminate stud bow and allow for quicker drywall attachment, while the SBR is designed for structural exterior walls. Both products provide bracing along the length of the stud, and for head-of-wall slip conditions. The SBR and DBR also come with prepunched slots that eliminate the need to use bridging clips with on-module studs.

The SBR and DBR spacer bracers come with bracing load data based on assembly testing, thus mitigating risk for designers and maximizing confidence in design specs. In fact, the SBR and DBR are the only spacer bracers on the market with tabulated design values based on assembly tests.

Features:

- SBR and DBR have patent-pending precision-engineered prepunched slots strategically located to enable 12", 16" and 24" on-center stud spacing and can be used to space the studs without having to mark the top track for layout
- The SBR will accommodate 3⅝" and 6" studs in thicknesses of 33 mil (20 ga.) thru 68 mil (14 ga.)
- The DBR will accommodate 2½", 3⅝" and 6" studs in thicknesses of 15 mil (25 ga. EQ) through 33 mil (20 ga.)
- Prepunched holes in the SBR provide rapid screw installation when spacer-bracer splices are needed for axial load-bearing studs
- In off-layout or end-of run conditions, the hat-section profiles enable clip attachments to the stud with Simpson Strong-Tie® LSSC or RCA connectors

Installation:

- Spacer bracers are fed through the stud knockout at a 90° angle until studs align with spacer-bracer slots. With the slots engaging the stud web, the spacer-bracer is then rotated back to the flat position so that the slotted flanges are on the bottom.
- For off-layout or end-of-run studs where a spacer-bracer slot does not engage a stud, manually snip the spacer-bracer flanges with a ½"-deep slot and secure the spacer bracer to the stud with Simpson Strong-Tie LSSC or RCA connectors. Use all specified fasteners.
- Wear gloves while handling and installing spacer bracers.

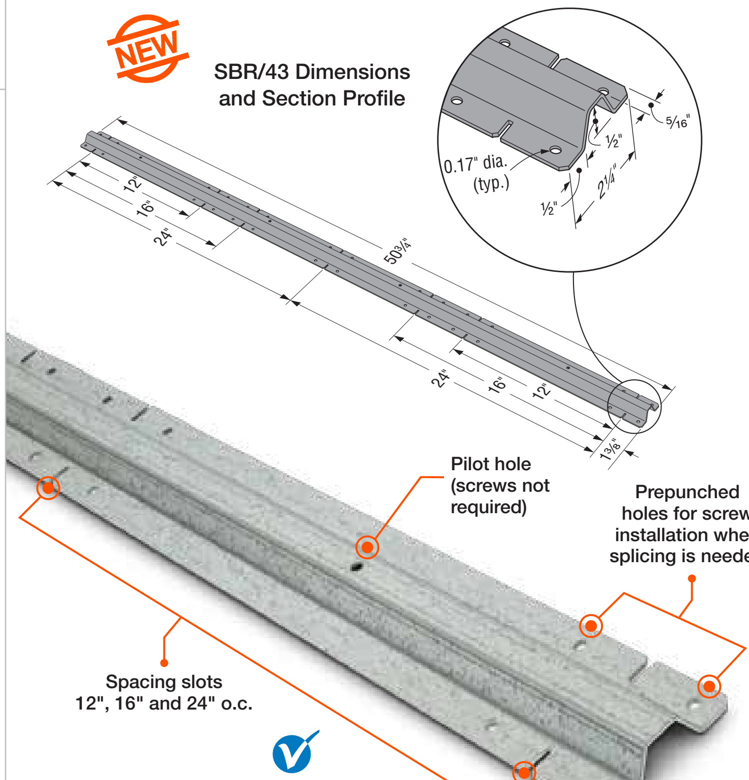
Material: SBR/43 — 43 mil (40 ksi);
DBR/30 — 27 mil (33 ksi)

Finish: Galvanized (G90)

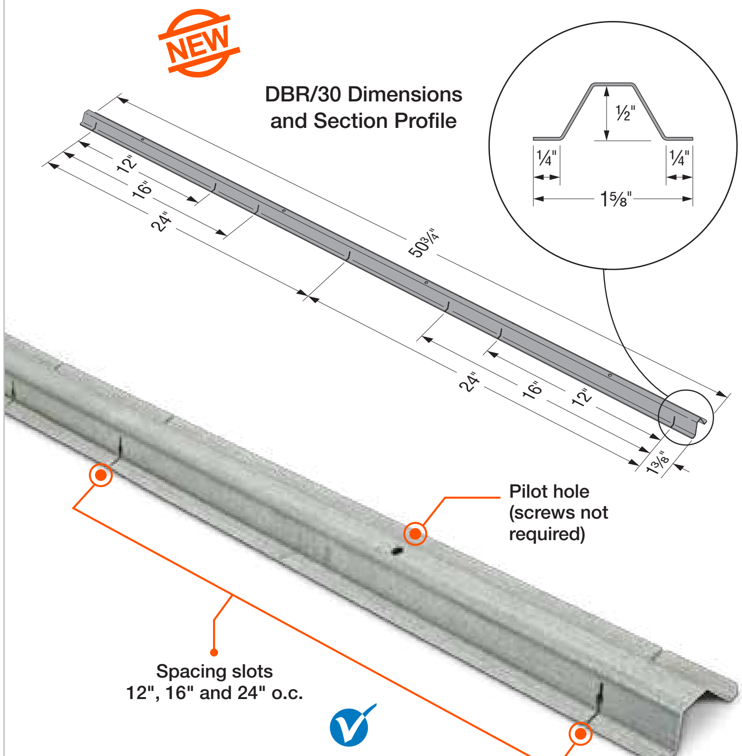
Codes: See p. 11 for Code Reference Key Chart

Ordering Information:

SBR/43-R20 (Box of 20)
DBR/30-R20 (Box of 20)



SBR/43
Structural Spacer Bracer
Patent Pending



DBR/30
Drywall Spacer Bracer
Patent Pending

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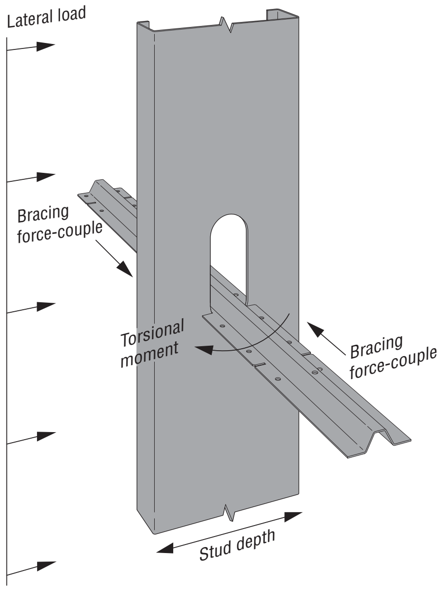
SBR / DBR Spacer Bracers

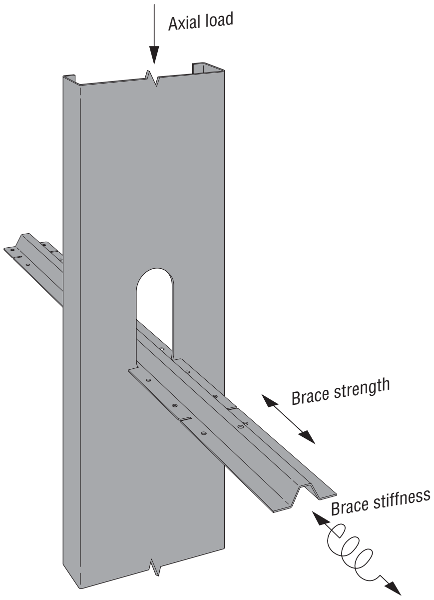
SBR and DBR Spacer Bracer — Connection Strength and Stiffness

Model No.	Stud Depth (in.)	Stud Thickness mil (ga.)	Allowable Torsional Moment (in./lb.)	Allowable Brace Strength (lb.)	Brace Stiffness (lb./in.)	Code Ref.
SBR/43	3⅝	33 (20)	235	390	845	170
		43 (18)	310	435	1,390	
		54 (16)	400	435	1,390	
		68 (14)	400	435	1,390	
	6	33 (20)	215	160	495	
		43 (18)	310	330	765	
		54 (16)	365	450	840	
		68 (14)	365	450	840	
DBR/30	2½	15 (25 EQ)	55	—	—	
		18 (25)	55	—	—	
		19 (20 EQ)	60	—	—	
		30 (20 DW)	85	—	—	
		33 (20 STR)	90	—	—	
	6	15 (25 EQ)	55	—	—	
		18 (25)	55	—	—	
		19 (20 EQ)	60	—	—	
		30 (20 DW)	85	—	—	
		33 (20 STR)	90	—	—	

1. Allowable loads are for use when utilizing the traditional Allowable Stress Design methodology. For LRFD loads multiply the ASD tabulated values by 1.6.
2. Tabulated Allowable Brace Strengths are based on ultimate test load divided by a safety factor. Serviceability limit is not considered, as brace stiffness requirements are given in section D3.3 of AISI S100-2012.
3. Tabulated Brace Stiffness values apply to both ASD and LRFD designs.
4. Allowable loads consider bridging connection only. It is the responsibility of the Designer to verify the strength and serviceability of the framing members.
5. EQ — equivalent, DW — drywall, STR — structural.



Laterally Loaded C-Stud with SBR Spacer Bracer
(DBR spacer bracer similar)



Axially Loaded C-Stud with SBR Spacer Bracer

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SBR / DBR Spacer Bracers

SBR and DBR Gross Properties

Model No.	Design Thickness (in.)	F_y (ksi)	Area[2] (in.)	I_x[4] (in.)	S_x[3] (in.)	R_x (in.)	I_y[4] (in.)	S_y[3] (in.)	R_y (in.)	Torsional Properties					
										Jx1,000[4] (in.)	C_w[6] (in.)	Y_o (in.)	m (in.)	R_o (in.)	β
SBR/43	0.0468	40	0.126	0.0047	0.1458	0.1936	0.0436	0.0400	0.5891	0.0916	5.56E-04	0.283	0.017	0.681	0.828
DBR/30	0.0289	33	0.060	0.0023	0.0082	0.1936	0.0109	0.0141	0.4259	0.0167	7.05E-05	0.346	0.087	0.582	0.647

SBR and DBR Net Properties

Model No.	Area[2] (in.)	I_x[4] (in.)	S_x[3] (in.)	R_x (in.)	I_y[4] (in.)	S_y[3] (in.)	R_y (in.)	Torsional Properties					
								Jx1,000[4] (in.)	C_w[6] (in.)	Y_o (in.)	m (in.)	R_o (in.)	β
SBR/43	0.085	0.0028	0.0097	0.1816	0.0120	0.0184	0.3765	0.0617	3.43E-05	0.355	0.141	0.548	0.581
DBR/30	0.022	0.0001	0.0004	0.0479	0.0008	0.0027	0.1944	0.0061	1.09E-06	0.086	0.051	0.218	0.844

SBR and DBR Allowable Member Strengths

Model No.	M_a (F_y) (in.-lb.)	M_a (12" o.c.) (in.-lb.)	M_a (16" o.c.) (in.-lb.)	M_a (24" o.c.) (in.-lb.)	P_a (12" o.c.) (lb.)	P_a (16" o.c.) (lb.)	P_a (24" o.c.) (lb.)
SBR/43	369	369	369	360	945	904	618
DBR/30	44	40	38	32	—	—	—

1. Net section properties are based a section that excludes all material that is interrupted by the slots.
2. Member strengths are based on DSM Analysis (non-prequalified section, $\Omega = 2.0$).
3. $C_b = 1.67$ has been applied to M_a to account for a triangular moment diagram with zero end moment.

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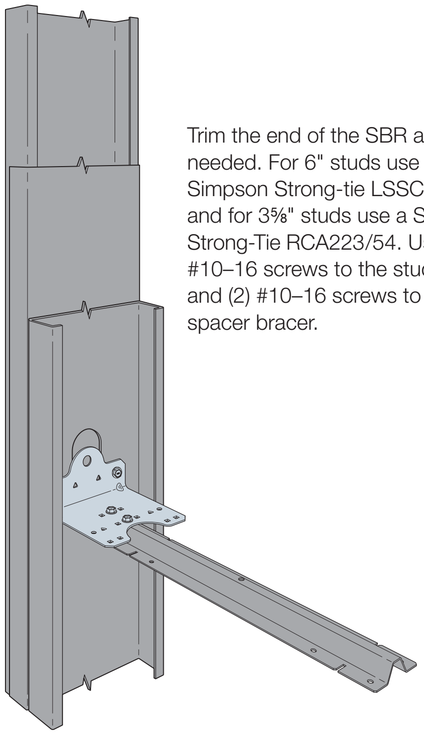
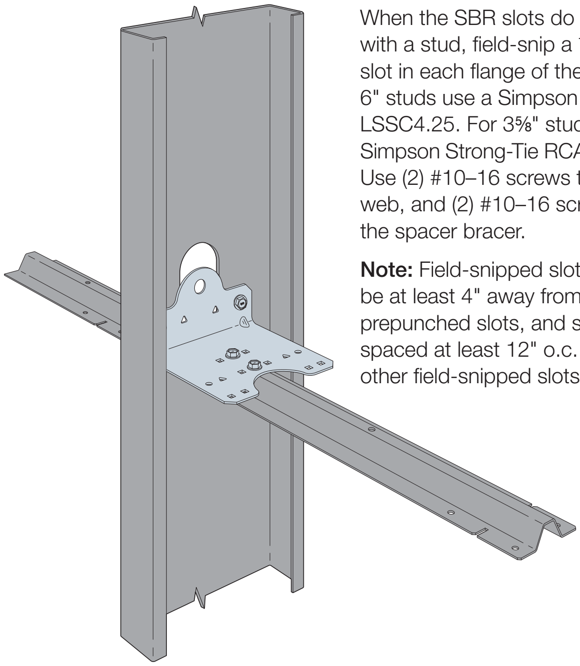
SBR / DBR Spacer Bracers



Trim the end of the SBR as needed. For 6" studs use a Simpson Strong-tie LSSC4.25 and for 3⅝" studs use a Simpson Strong-Tie RCA223/54. Use (2) #10–16 screws to the stud web, and (2) #10–16 screws to the spacer bracer.

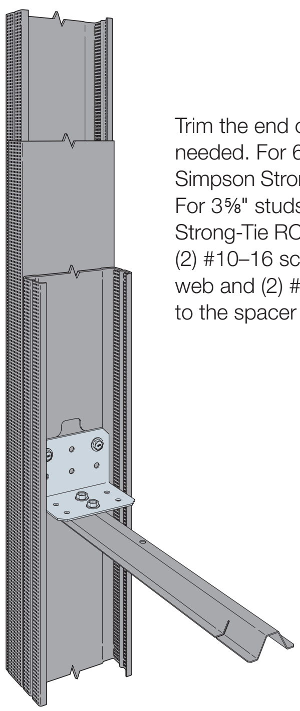
SBR End-of-Run for 6" Studs with LSSC4.25
(3⅝" studs with RCA 223/54 similar)



When the SBR slots do not line-up with a stud, field-snip a ½"-deep slot in each flange of the SBR. For 6" studs use a Simpson Strong-Tie LSSC4.25. For 3⅝" studs use a Simpson Strong-Tie RCA223/54. Use (2) #10–16 screws to the stud web, and (2) #10–16 screws to the spacer bracer.

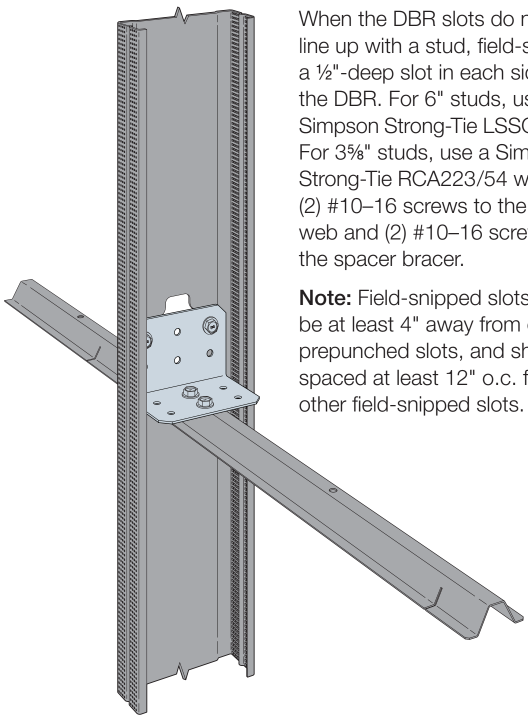
Note: Field-snipped slots shall be at least 4" away from other prepunched slots, and shall be spaced at least 12" o.c. from other field-snipped slots.

SBR Off-Module for 6" Studs with LSSC4.25
(3⅝" studs with RCA 223/54 similar)



Trim the end of the DBR as needed. For 6" studs use a Simpson Strong-Tie LSSC4.25. For 3⅝" studs use a Simpson Strong-Tie RCA223/54. Use (2) #10–16 screws to the stud web and (2) #10–16 screws to the spacer bracer.

DBR End-of-Run for 3⅝" Studs with RCA223/54
(6" studs with LSSC4.25 similar)



When the DBR slots do not line up with a stud, field-snip a ½"-deep slot in each side of the DBR. For 6" studs, use a Simpson Strong-Tie LSSC4.25. For 3⅝" studs, use a Simpson Strong-Tie RCA223/54 with (2) #10–16 screws to the stud web and (2) #10–16 screws to the spacer bracer.

Note: Field-snipped slots shall be at least 4" away from other prepunched slots, and shall be spaced at least 12" o.c. from other field-snipped slots.

DBR Off-Module for 3⅝" Studs with RCA223/54
(6" studs with LSSC4.25 similar)

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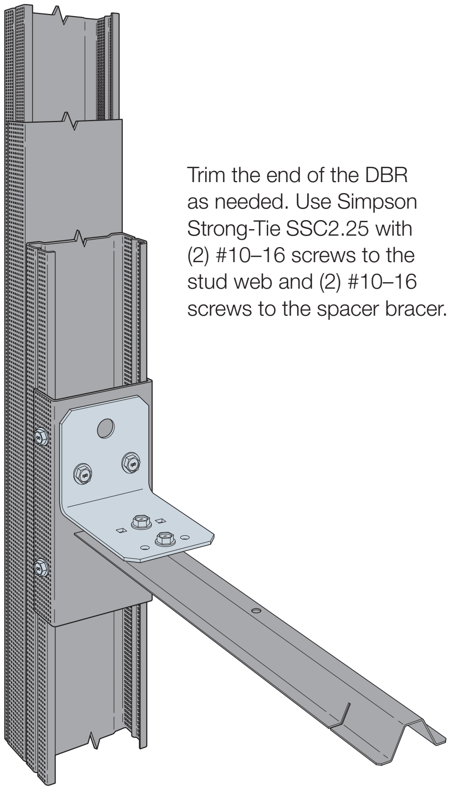
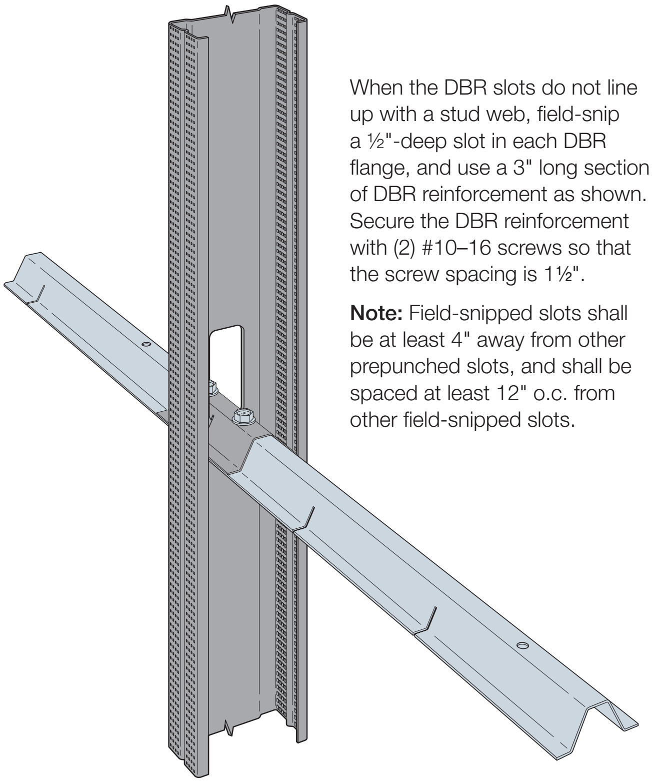
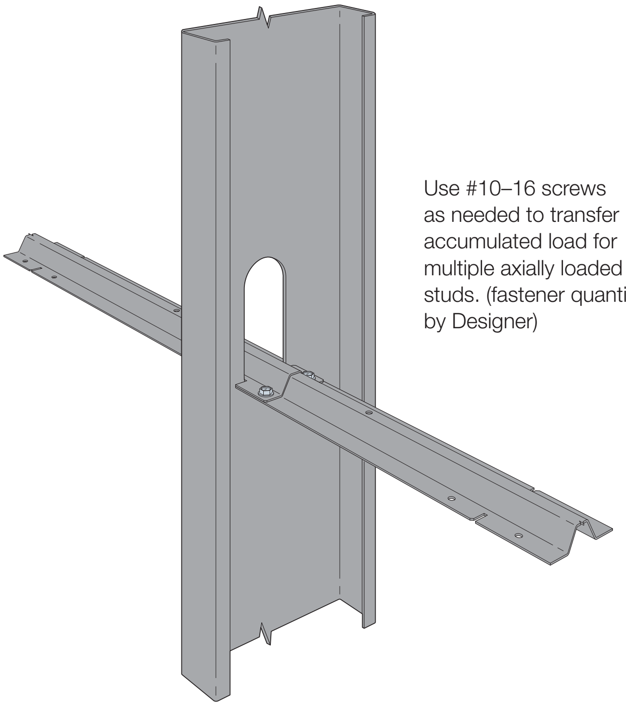
SBR / DBR Spacer Bracers



DBR End-of-Run for 2.5" Studs with SSC2.25



DBR Off-Module for 2½" Studs with DBR Reinforcement
(DBR and SBR with 3⅝" studs and 6" studs similar)



Typical SBR Splice for Axially Loaded Studs

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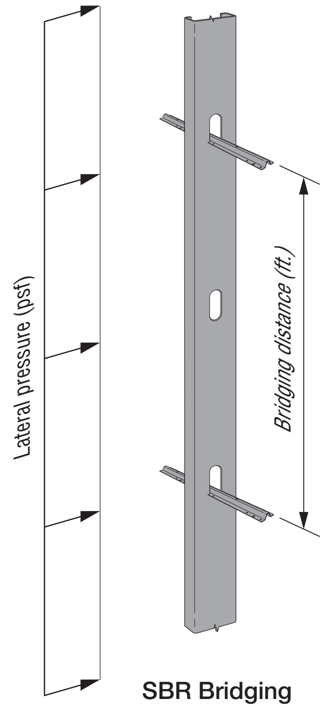
SBR / DBR Spacer Bracers

SBR/43 Maximum Bridging Distance (ft.)

Stud Spacing (in.)	Stud Section	Stud Thickness mil (ga.)	Lateral Stud Pressure (psf)									
			5	10	15	20	25	30	35	40	45	50
12	362S162	33 (20)	8	8	8	8	7	6	5	4	4	—
		43 (18)	8	8	8	8	8	8	7	6	5	5
		54 (16)	8	8	8	8	8	8	8	7	7	6
		68 (14)	8	8	8	8	8	8	8	8	7	6
	362S200	33 (20)	8	8	8	7	6	5	4	—	—	—
		43 (18)	8	8	8	8	8	6	5	5	4	4
		54 (16)	8	8	8	8	8	8	6	6	5	4
		68 (14)	8	8	8	8	8	8	6	6	5	4
	600S162	33 (20)	8	8	8	8	8	7	6	5	4	4
		43 (18)	8	8	8	8	8	8	8	7	6	6
		54 (16)	8	8	8	8	8	8	8	8	8	7
		68 (14)	8	8	8	8	8	8	8	8	8	7
	600S200	33 (20)	8	8	8	7	6	5	4	—	—	—
		43 (18)	8	8	8	8	8	7	6	5	5	4
		54 (16)	8	8	8	8	8	8	7	6	6	5
		68 (14)	8	8	8	8	8	8	7	6	6	5
16	362S162	33 (20)	8	8	8	7	5	4	4	—	—	—
		43 (18)	8	8	8	8	7	6	5	4	4	—
		54 (16)	8	8	8	8	8	7	6	5	5	4
		68 (14)	8	8	8	8	8	8	6	6	5	4
	362S200	33 (20)	8	8	7	5	4	—	—	—	—	—
		43 (18)	8	8	8	7	6	5	4	—	—	—
		54 (16)	8	8	8	8	7	6	5	4	4	—
		68 (14)	8	8	8	8	7	6	5	4	4	—
	600S162	33 (20)	8	8	8	7	6	5	4	—	—	—
		43 (18)	8	8	8	8	8	7	6	5	5	4
		54 (16)	8	8	8	8	8	8	7	6	6	5
		68 (14)	8	8	8	8	8	8	7	6	6	5
	600S200	33 (20)	8	8	7	5	4	—	—	—	—	—
		43 (18)	8	8	8	8	6	5	4	4	—	—
		54 (16)	8	8	8	8	8	6	5	5	4	4
		68 (14)	8	8	8	8	8	6	5	5	4	4
24	362S162	33 (20)	8	8	6	4	—	—	—	—	—	—
		43 (18)	8	8	8	6	5	4	—	—	—	—
		54 (16)	8	8	8	7	6	5	4	—	—	—
		68 (14)	8	8	8	7	6	5	4	—	—	—
	362S200	33 (20)	8	7	5	—	—	—	—	—	—	—
		43 (18)	8	8	6	5	4	—	—	—	—	—
		54 (16)	8	8	7	5	4	—	—	—	—	—
		68 (14)	8	8	7	5	4	—	—	—	—	—
	600S162	33 (20)	8	8	7	5	4	—	—	—	—	—
		43 (18)	8	8	8	7	6	5	4	—	—	—
		54 (16)	8	8	8	8	7	6	5	4	4	—
		68 (14)	8	8	8	8	7	6	5	4	4	—
	600S200	33 (20)	8	7	5	—	—	—	—	—	—	—
		43 (18)	8	8	7	5	4	—	—	—	—	—
		54 (16)	8	8	8	6	5	4	—	—	—	—
		68 (14)	8	8	8	6	5	4	—	—	—	—



SBR Bridging Distance
(DBR similar)

1. Tabulated solutions are for ASD lateral pressure. Contact Simpson Strong-Tie for LRFD solutions.
2. Lateral pressures shall be determined based on the load combinations of the applicable building code. For designs in accordance with the 2009 IBC and earlier, wind pressures are at the working stress level and may be used directly. For designs in accordance with the 2012 and 2015 IBC, wind pressures are at the strength level and must be multiplied by 0.6 for ASD load combinations.
3. Tabulated values are based on the minimum of the tested connection strength and the calculated SBR/DBR member strength. Studs must be checked separately for unbraced length.

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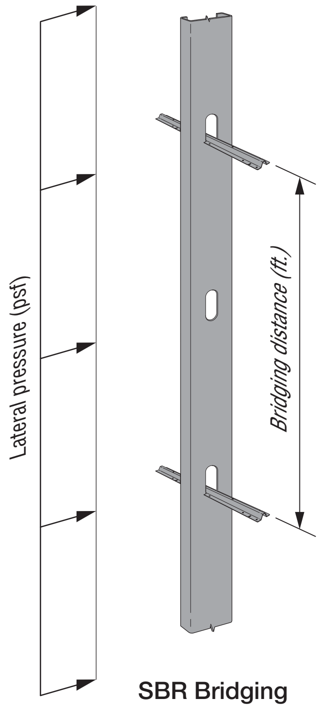
SBR / DBR Spacer Bracers

DBR/30 Maximum Bridging Distance (ft.)

Stud Spacing (in.)	Stud Section	Stud Thickness mils (ga.)	Lateral Stud Pressure (psf)	
			5	10
12	362S125	15 (25 EQ)	8	5
		18 (25)	8	5
		19 (20 EQ)	8	5
		30 (20 DW)	8	5
		33 (20 STR)	8	5
	600S125	15 (25 EQ)	8	6
		18 (25)	8	6
		19 (20 EQ)	8	6
		30 (20 DW)	8	6
		33 (20 STR)	8	6
16	362S125	15 (25 EQ)	7	—
		18 (25)	7	—
		19 (20 EQ)	7	—
		30 (20 DW)	7	—
		33 (20 STR)	7	—
	600S125	15 (25 EQ)	8	4
		18 (25)	8	4
		19 (20 EQ)	8	4
		30 (20 DW)	8	4
		33 (20 STR)	8	4
24	362S125	15 (25 EQ)	4	—
		18 (25)	4	—
		19 (20 EQ)	4	—
		30 (20 DW)	4	—
		33 (20 STR)	4	—
	600S125	15 (25 EQ)	4	—
		18 (25)	4	—
		19 (20 EQ)	4	—
		30 (20 DW)	5	—
		33 (20 STR)	5	—



SBR Bridging Distance
(DBR similar)

1. Tabulated solutions are for ASD lateral pressure. Contact Simpson Strong-Tie for LRFD solutions.
2. Lateral pressures shall be determined based on the load combinations of the applicable building code. For designs in accordance with the 2009 IBC and earlier, wind pressures are at the working stress level and may be used directly. For designs in accordance with the 2012 and 2015 IBC, wind pressures are at the strength level and must be multiplied by 0.6 for ASD load combinations.
3. Tabulated values are based on the minimum of the tested connection strength and the calculated SBR/DBR member strength. Studs must be checked separately for unbraced length.

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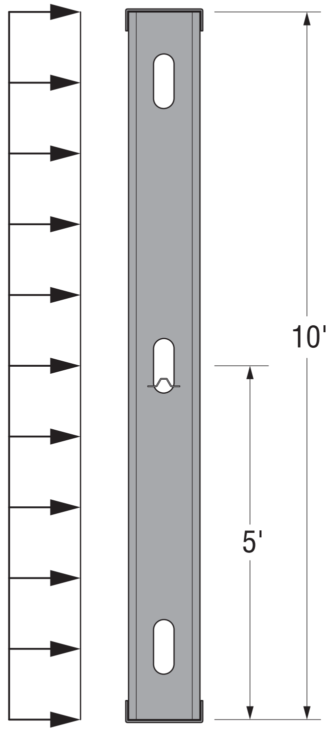
SBR Spacer Bracer

Given

- 2015 IBC (ASCE 7-10 and AISI S100-2012)
- 600S162-54 (50 ksi) studs at 24" o.c., 10'-stud height
  - Mid-point bracing (5' o.c.)
  - Distance from shear center to mid-plane of web, m = 0.663". (2013 AISI Manual, Table I-2)
- Wind design pressure = 34 psf
- P_{ra} = Required ASD axial load = 3,000 lb.



Axially Loaded Stud

Required brace strength (AISI S100, Eq. D3.3-1)

$P_{rb} = 0.01P_{ra} = (0.01)(3{,}000\text{ lb.}) = 30\text{ lb.}$

Required brace stiffness (AISI S100, Eq. D3.3-2a)

$\beta_{rb} = (2[4\text{-}(2/n)]/L_b)(\Omega P_{ra}) = (2[4-(2/1)]/60)(2)(3{,}000) = 400\text{ lb./in.}$

Check connection strength and stiffness from Strength and Stiffness table (page 4) for the SBR/43 for 6"-deep, 54-mil studs

- ➢ Allowable brace strength = 450 lb. > 30 lb. **OK**
- ➢ Allowable brace stiffness = 840 lb./in. > 400 lb./in. **OK**

Check member strength from Allowable Strengths table (page 4) for the SBR/43 for 24" o.c.

- ➢ P_a (24" o.c.) = Allowable member strength = 618 lb. > 30 lb. **OK**

Note: Member stiffness and the effects of accumulated load for multiple axially loaded studs have not been accounted for in the above calculations. Reference CFSEI Tech Note W400-16 for additional guidance on these topics.

Laterally Loaded Stud

ASD Design load tributary to brace:

W = (0.6)(34 psf)(2 ft.)(5 ft.) = 204 lb.

Note: 2015 IBC load combinations for ASD include a factor of 0.6

Required flange force (AISI S100 Eq. D3.2.1-3)

$P_{L1} = -P_{L2} = 1.5(m/d)W = (1.5)(0.663\text{ in.}/6\text{ in.})(204\text{ lb.}) = 33.8\text{ lb.}$

Torsional moment

$M_z = P_{L1}d = -P_{L2}d = (33.8)(6) = 202.8\text{ in.-lb.}$

Moment applied to bridging member

$M_m = 0.64M_z = (0.64)(202.8) = 129.8\text{ in.-lb.}$

Note: The 0.64 factor is from an analysis of a five-span continuous beam that is loaded with equal support moments (Reference AISI Design Guide D110-07, pp. 2–9, Figure 2-6)

Check connection strength from Strength and Stiffness table (p. 126) for the SBR/43 for 6"-deep, 54-mil studs

- ➢ Allowable torsional moment = 365 in.-lb. > 202.8 in.-lb. **OK**

Check member strength from Allowable Strengths table (p. 126) for the SBR/43 for 24" o.c.

- ➢ M_a (24" o.c.) = Allowable moment = 360 in.-lb. > 129.8 in.-lb. **OK**

Combined-Loading Check of Connection

(P_{br}/Allowable brace strength) + (M_z/Allowable torsional moment) ≤ 1.0

(30 lb./450 lb.) + (202.8 in.-lb./365 in.-lb.) = 0.62 < 1.0 **OK**

Combined-Loading Check of Bridging Member

Reference AISI Eqs. C5.2.1-1, C5.2.1-2, or Eq. C52.1-3 as applicable. For this condition, Eq. C5.2.1-3 applies.

$$\frac{\Omega_c P}{P_n} + \frac{\Omega_b M}{M_n} \le 1.0$$

$$P_n = 2P_a \qquad M_n = 2M_a$$

$$\frac{1.8\,(30)}{2\,(618)} + \frac{1.67\,(129.8)}{2\,(360)} = 0.34 < 1.0 \textbf{ OK}$$

Note: The allowable strengths given in the Allowable Strengths table (p. 126) have been converted to nominal strengths by multiplying by Ω = 2.0.

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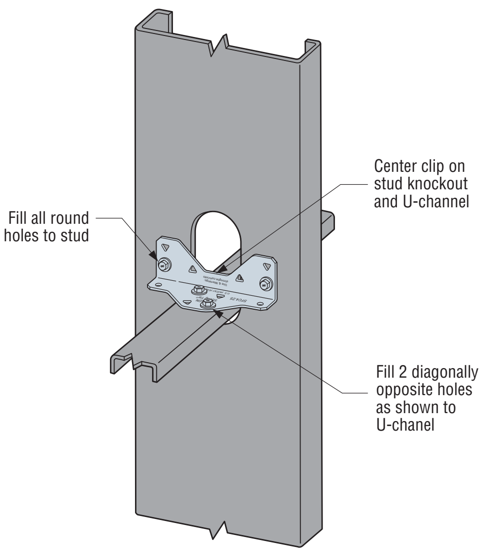
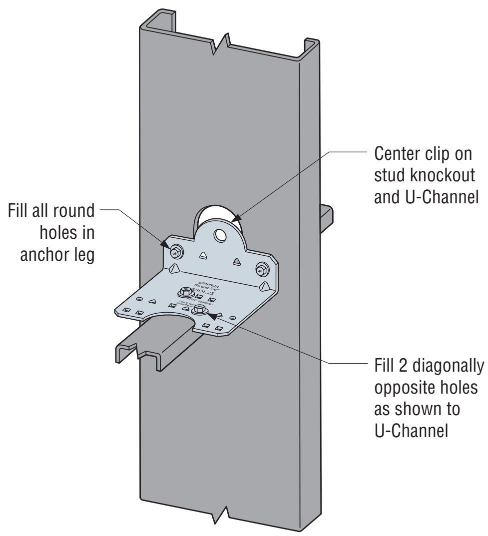
SFC/SSC Connectors – U-Channel Bridging Allowable Loads

Model No.	Connector Material Thickness mil (ga.)	L (in.)	Stud Depth (in.)	Stud Thickness mil (ga.)	Fasteners[1,5]		Laterally Loaded C-Stud	Axially Loaded C-Stud		Code Ref.
					Stud	Bridging	Allowable Torsional Moment[2] (in.-lb.)	Allowable Brace Strength[2, 3] (lb.)	Brace Stiffness[4] (lb./in.)	
SFC4.25	54 (16)	4¼	6	33 (20)	(2) #10	(2) #10	275	125	860	IP2
				43 (18)	(2) #10	(2) #10	510	190	1,220	
				54 (16)	(2) #10	(2) #10	645	280	2,045	
LSSC4	54 (16)	4¼	6	54 (16)	(2) #10	(2) #10	1,085	180	165	
SSC4.25	68 (14)	4¼	6	54 (16)	(2) #10	(2) #10	655	280	2,045	
				68 (14)	(2) #10	(2) #10	805	335	2,305	
				97 (12)	(2) #10	(2) #10	920	660	4,230	
LSSC6.25	54 (16)	6¼	8, 10, 12	54 (16)	(2) #10	(2) #10	1,085	180	685	

1. See illustrations for fastener placement.
2. Allowable loads are for use when utilizing Allowable Stress Design methodology. For LRFD loads, multiply the tabulated ASD values by 1.6.
3. Allowable brace strengths are based on ultimate test load divided by a safety factor. Serviceability limit is not considered, as brace stiffness requirements are given in Section D3.3 of AISI S100. Contact Simpson Strong-Tie if nominal brace strength is required.
4. Tabulated stiffness values apply to both ASD and LRFD designs.
5. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



Typical SFC4.25 Installation



Typical SSC4.25 Installation

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DBC Drywall Bridging Connector

SIMPSON Strong-Tie®

Work smarter, not harder

Patented design allows for one- or two-screw installation of the DBC, significantly reducing labor and material cost. The first and only connector load rated for ¾" u-channel, the DBC joins the SUBH line of bridging connectors tested as a system, ensuring that published design capacities capture the influence of stud web depth and thickness.

Features:

- Most applications require only a single screw
- Designed for ¾" u-channel to fit smaller web knockouts common to drywall studs
- Compatible with drywall stud depths of 3⅝" and 6" with 1½" wide knockouts

VALUE ENGINEERED

This product is preferable to similar connectors because of a) easier installation, b) higher loads, c) lower installed cost, or a combination of these features.

DBC2.5
U.S. Patents
8,813,456 and 8,590,255

Material: 33 mil (20 ga.) carbon steel

Finish: Galvanized (G90)

Installation:

- With ¾" x 54 mil (16 ga.) u-channel installed through the stud web knockouts, insert the DBC2.5 through the knockout so that the DBC slots engage the stud web and the DBC flanges engage the u-channel as shown in the illustration
- Use the specified number of #8 screws to fasten the DBC to the u-channel

Codes: See p. 11 for Code Reference Key Chart

Ordering Information: DBC2.5-R200 (Bucket of 200)

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DBC Drywall Bridging Connector

DBC — Bridging Connector Strength Allowable Loads

Model No.	Stud Depth	Stud Thickness and Yield Strength			Fasteners		Laterally Loaded C-Stud Allowable Torsional Moment (in. - lb.)	Code Ref.
		Mil	Gauge[3]	Fy (ksi)				
DBC2.5	3⅝	15	25 EQ.	50	Min.	(1) #8	65	170
		18	25	33				
		19	20 EQ.	65				
		20	20 EQ.	57				
		30	20 DW	33	Min.	(1) #8	85	
					Max.	(2) #8	125	
		33	20 STR	33	Min.	(1) #8	85	
					Max.	(2) #8	125	
	6	15	25 EQ.	50	Min.	(1) #8	65	
		18	25	33				
		19	20 EQ.	65				
		21	20 EQ.	57				
		30	20 DW	33	Min.	(1) #8	85	
					Max.	(2) #8	125	
		33	20 STR	33	Min.	(1) #8	85	
					Max.	(2) #8	125	

1. Allowable loads are for use when utilizing Allowable Stress Design methodology. For LRFD loads, multiply the ASD tabulated values by 1.6.
2. Min. fastener quantity and tabulated values — fill round hole (one screw total); Max. fastener quantity and tabulated values — fill round and triangle holes (two screws total).
3. EQ — equivalent, DW — drywall, STR — structural.

Design Example

Given

- 600S125–18 (33 ksi) studs at 24" o.c., 10' tall
  Mid-point bracing (5' o.c.)
  Distance from shear center to mid-plane of web, m = 0.408 in.
  (SFIA Technical Guide Version 2012.101)
- Lateral load = 5 psf

Laterally-Loaded Stud Design

ASD Design load tributary to brace:

W = (5 psf)(2 ft.)(5 ft.) = 50 lb.

Required bracing force (AISI S100 Eq. D3.2.1-3):

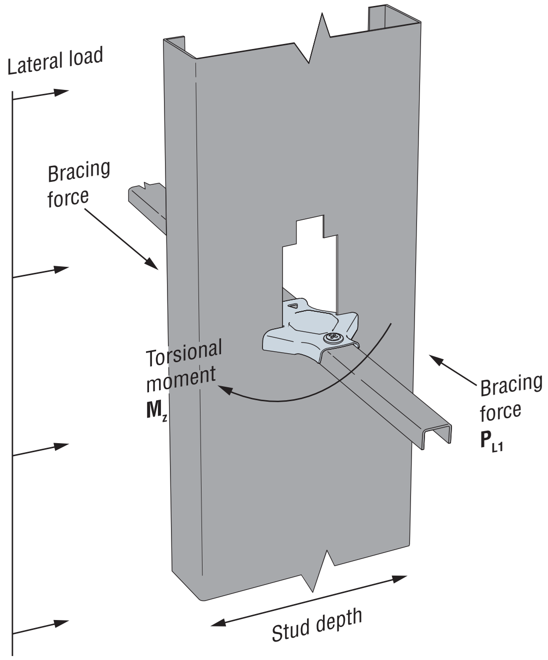
$P_{L1} = -P_{L2} = 1.5(m/d)W = (1.5)(0.408 \text{ in.}/6 \text{ in.})(50 \text{ lb.}) = 5.1 \text{ lb.}$

Torsional moment:

$M_Z = P_{L1}d = -P_{L2}d = (5.1 \text{ lb.})(6 \text{ in.}) = 30.6 \text{ in.- lb.}$

From Allowable Loads table above, for 6"–18 mil stud:

➡ Select DBC2.5 with Min. fasteners ((1) #8)
Allowable torsional moment = 65 in.- lb. > 30.6 in.- lb. **OK**



Laterally Loaded C-Stud

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CS Coiled Strap

SIMPSON Strong-Tie®

CS coiled utility straps are an ideal solution when it is desired to brace wall studs via the flanges with strap. These products are packaged in lightweight (about 40 pounds) cartons and can be cut to length on the job site.

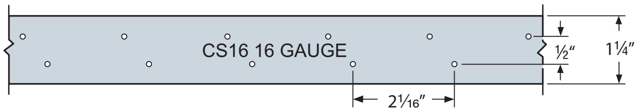
Materials: See table.

Finish: Galvanized (G90); ZMAX®

Installation:

- Use all specified fasteners. See General Notes.
- Refer to the applicable code for minimum edge and end distance.
- The table shows the maximum allowable loads and the screws required to obtain them. See footnote #1. Fewer screws may be used as given by footnote #3.

Codes: See p. 11 for Code Reference Key Chart



CS16 Hole Pattern
(all other CS straps similar)

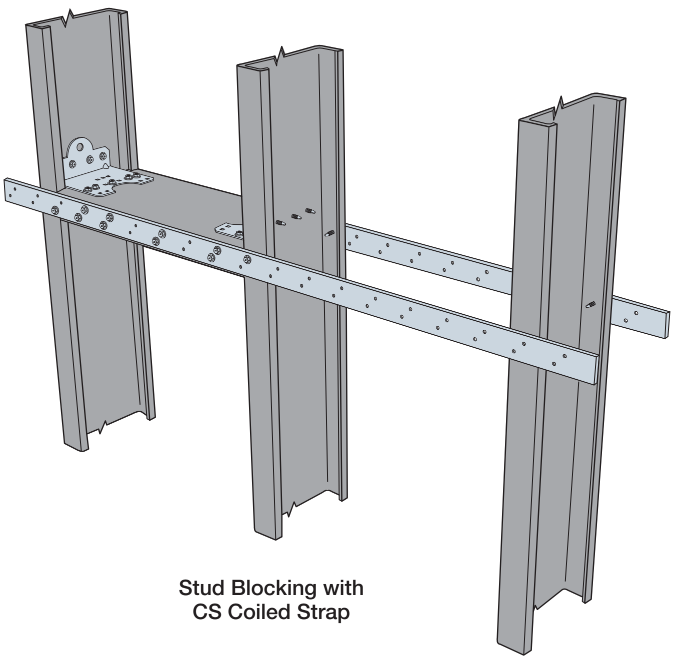
Model No.	Total Length (ft.)	Connector Material Thickness mil (ga.)	Width (in.)	Fasteners (At Blocking)[4]			Allowable Tension Load (lb.)	Code Ref.
				Framing Thickness mil (ga.)				
				33 (20)	43 (18)	54 (16)		
CS16	150	54 (16)	1¼	(9) #10	(6) #10	(4) #10	1,550	IP1, L2, FL
CS18	200	43 (18)	1¼	(7) #10	(5) #10	(3) #10	1,235	
CS20	250	33 (20)	1¼	(6) #10	(4) #10	(3) #10	945	
CS22	300	27 (22)	1¼	(5) #10	(3) #10	(3) #10	775	

These products are available with additional corrosion protection. Additional products on this page may also be available with this option. Check with Simpson Strong-Tie for details.

1. In order to achieve the tabulated loads in the strap, attach each strap to the blocking with the tabulated number of screws.
2. Strap length at blocking to achieve tabulated load = number of tabulated screws + 1".
3. Calculate the strap value for a reduced number of screws to the blocking as follows:

$$\text{Allowable Load} = \frac{\text{No. of Screws Used}}{\text{No. of Screws in Table}} \text{ x Table Load.}$$

4. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



Stud Blocking with CS Coiled Strap

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SIMPSON Strong-Tie

LTB Bridging

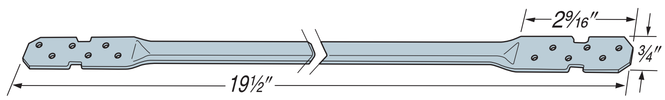
LTB bridging connectors are a cost-effective solution for bracing between non-load-bearing wall studs when compared with field fabricated blocking and clip angles.

Material: 27 mil (22 ga.)

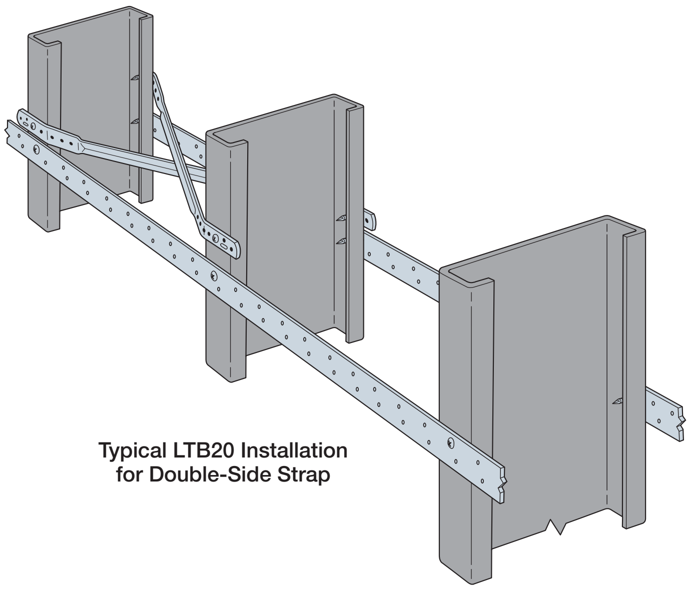
Finish: Galvanized (G90)

Installation:

- Use (2) #10 screws at each end
- The LTB can be utilized with 3⅝", 6", 8", and 10" studs at 16" o.c.
- LTB works only in tension, so must be used in cross pairs
- Install bridging tightly; loose installation may allow stud movement



LTB20



Typical LTB20 Installation for Double-Side Strap

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Fasteners and Quik Drive®

In the Fastener Marketplace, Simpson Strong-Tie Stands Apart from the Rest.

Quality and reliability are our top priorities. That's why we hire Ph.D.s, metallurgists, materials engineers and structural engineers to create the best possible fasteners. And why each production run goes through rigorous testing to ensure our products can handle higher loads, resist corrosion and make installation more efficient.

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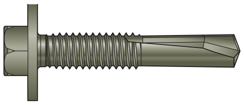
Applications: Fastening to Metal

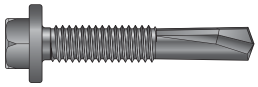
Screws

Strong-Drive®
XL **LARGE-HEAD METAL** Screw



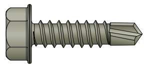
5/16" hex head, Quik Guard® coating, p. 149

Strong-Drive®
XM **MEDIUM-HEAD METAL** Screw



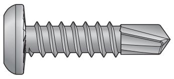
5/16" hex head, Quik Guard® coating, p. 147

Strong-Drive® XE **EXTERIOR STRUCTURAL METAL** Screw



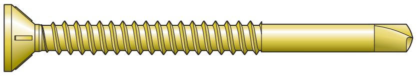
5/16" hex head, Quik Guard® coating, p. 141

Strong-Drive®
FPHSD **FRAMING-TO-CFS** Screw



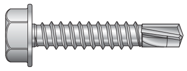
Flat-pan head, clear zinc coating, p. 143

Strong-Drive®
PPSD **SHEATHING-TO-CFS** Screw



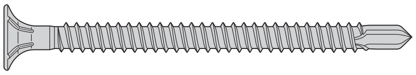
Subfloor to CFS screw Quik Guard® and yellow zinc coating, p. 152

Strong-Drive®
SELF-DRILLING X METAL Screw



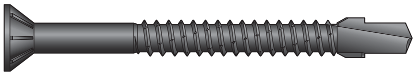
5/16" hex head, Quik Guard® and clear zinc coating, p. 145

Self-Drilling
Fiber-Cement Screw



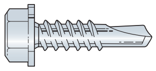
Type 410 stainless steel

Strong-Drive®
TB **WOOD-TO-STEEL** Screw



#4 drill point, black phosphate, mechanically galvanized coating, p. 156

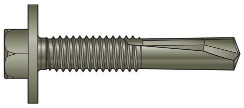
Self-Drilling
E Metal Screw



#3 drill point, clear zinc coating, p. 142

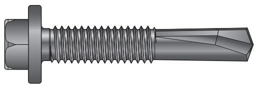
Collated Screws for the Quik Drive® System

Strong-Drive®
XL **LARGE-HEAD METAL** Screw



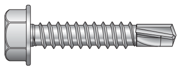
5/16" hex head, Quik Guard® coating, p. 149

Strong-Drive®
XM **MEDIUM-HEAD METAL** Screw



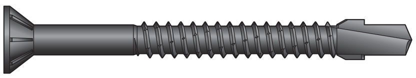
5/16" hex head, Quik Guard® coating, p. 147

Strong-Drive®
SELF-DRILLING X METAL Screw



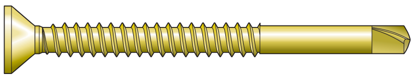
5/16" hex head, Quik Guard® and clear zinc coating, p. 145

Strong-Drive®
TB **WOOD-TO-STEEL** Screw



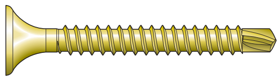
#4 drill point, black phosphate, yellow zinc, mechanically galvanized coating, p. 156

Strong-Drive®
PPSD **SHEATHING-TO-CFS** Screw



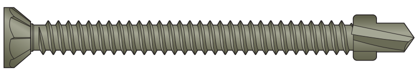
#3 drill point, Quik Guard®, yellow zinc coating, p. 152

DWFSD Drywall-to-CFS Screw



Drywall to steel, #2 point, yellow zinc coating (54, 43 mil / 16, 18 ga.), p. 155

CBSDQ Sheathing-to-CFS Screw

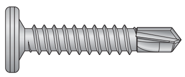


Sheathing to steel, #2 drill point, Quik Guard® coating, p. 150

DWF Drywall-to-CFS Screw

Drywall to steel, gray phosphate coating (33, 27, 18 mil / 20, 22, 25 ga.), p. 155

PCSD Standing-Seam Roofing Panel Clip Screw



#3 drill point , clear zinc or Quik Guard® coating and Type 410 stainless steel, p. 154

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Strong-Drive® XE EXTERIOR STRUCTURAL METAL Screw

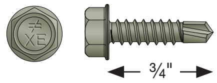
Common Applications:

Cold-formed steel framing or connectors to cold-formed steel.

Features:

- 5⁄16" hex head
- 16 threads per inch
- Dual hardened heat treatment improves drilling efficiency, maximizes ductility and reduces the potential for hydrogen embrittlement
- Quik Guard® coated for corrosion protection
- Only fastener load rated for Simpson Strong-Tie® L70Z and LS70Z connectors for use with Trex® Elevations™ steel deck framing

Codes/Standards: ASTM C1513 compliant



Quik Guard® Coating

Length (in.)	Screw Size/ Nail Gauge	Shank Dia. (in.)	Head Dia. (in.)	Drive	Head Type	Threads	Drill Point Size	Point Size	Material/ Coating	Package Size	Model No.
¾	#10	0.19	0.4	5⁄16" hex	Hex washer head	Machine threads	#2	2	Quik Guard coating	100	XEQ34B1016C
¾	#10	0.19	0.4	5⁄16" hex	Hex washer head	Machine threads	#2	2	Quik Guard coating	1,000	XEQ34B1016M

Single-Fastener Cold-Formed Steel Member Connection Load[1, 2, 3]

Screw Size	Nominal Dia. d (in.)	Washer Dia. d_w (in.)	Load Description	Shear (lb.)						Pullover (lb.)						Pullout (lb.)					
				Steel Thickness: mil (ga.)						Steel Thickness: mil (ga.)						Steel Thickness: mil (ga.)					
				27 (22)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)	27 (22)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)	27 (22)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)
#10 x ¾"	0.19	0.4	Allowable strength (ASD)	182	235	365	465	465	465	330	425	605	785	785	785	64	95	128	226	306	501
			Design strength (LRFD)	292	375	585	695	695	695	525	675	970	1,175	1,175	1,175	103	152	205	361	490	801
			Nominal strength	423	535	830	1,290	1,290	1,290	805	1,035	1,485	2,065	2,065	2,065	167	234	348	555	750	1,225

1. Screws and their connections have been tested per AISI Standard Test Method S904-08 and S905-08.
2. Loads are based on cold-formed steel members with a minimum yield strength, F_y = 33 ksi and tensile strength, F_u = 45 ksi for 43 mil (18 ga.) and thinner, and a minimum yield strength, F_y = 50 ksi and tensile strength, F_u = 65 ksi for 54 mil (16 ga.) and thicker.
3. Screws shall extend through the connection with a minimum of three exposed threads per AISI General Provisions Standard Section D1.3.

Screw Strength (lb.)

Screw Size	Nominal Strength		Design Strength (LRFD) $\phi = 0.5$		Allowable Strength (ASD) $\Omega = 3.0$	
	P_{ss}	P_{ts}	$\phi\ P_{ss}$	$\phi\ P_{ts}$	P_{ss}/Ω	P_{ts}/Ω
#10 x ¾"	1,390	2,350	695	1,175	465	785

P_{ss} – Shear strength.
P_{ts} – Tensile strength.

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Self-Drilling E Metal Screw

SIMPSON Strong-Tie®

Common Application:

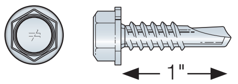
Cold-formed steel framing or connectors to cold-formed steel.

Features:

- Hex-washer head
- Clear zinc finish
- Recommended for use with certain Simpson Strong-Tie® connectors that require large diameter #14 screws
- Bit included in each box

Codes/Standards: ASTM C1513 compliant

Warning: Industry studies show that hardened fasteners can experience performance problems in wet or corrosive environments. Accordingly, use this product in dry, interior and noncorrosive environments only.



Clear Zinc Coating

Size	Length (in.)	Hex Head Size (in.)	Threads per Inch	Head Diameter (in.)	Drill Point Size	Carton Quantity	Model No.
#14	1	⅜	14	0.5	#3	100	E1B1414R100
#14	1	⅜	14	0.5	#3	2,500	E1B1414B

Screw Strength

Screw Size	Model No.	Nominal Strength (lb.)		Design Strength (LRFD) (lb.) $\phi = 0.5$		Allowable Strength (ASD) (lb.) $\Omega = 3.0$	
		P_{ss}	P_{ts}	ϕP_{ss}	ϕP_{ts}	P_{ss}/Ω	P_{ts}/Ω
#14 x 1"	E1B1414	3,130	5,395	1,565	2,700	1,045	1,800

Cold-Formed Steel Member Connection Loads

Screw Size	Model No.	Nominal Dia. (in.)	Washer Dia. (in.)	Load Description	Shear (lb.)					Pullover (lb.)					Pullout (lb.)				
					Steel Thickness: mil (ga.)					Steel Thickness: mil (ga.)					Steel Thickness: mil (ga.)				
					33 (20)	43 (18)	54 (16)	68 (14)	97 (12)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)
#14 x 1"	E1B1414	0.242	0.5	ASD	200	295	605	850	1,045	390	505	920	1,160	1,655	105	140	250	320	455
				LRFD	300	445	905	1,280	1,565	585	760	1,380	1,740	2,480	160	210	380	480	680
				Nominal strength	600	890	1,810	2,555	3,130	1,170	1,520	2,760	3,475	4,960	320	415	755	955	1,360

1. Screws shall extend through the connection with a minimum of three exposed threads per AISI S200 General Provisions Standard Section D1.3.
2. Tabulated loads are based on calculations per AISI S100 using the thinner steel member in the connection. A safety factor of $\Omega = 3.0$ and resistance factor $\phi = 0.5$ were used to determine the ASD and LRFD strength values.
3. Loads are based on cold-formed steel members with a minimum yield strength, F_y, of 33 ksi and tensile strength, F_u, of 45 ksi for 43 mil (18 ga.) and thinner, and a minimum yield strength of 50 ksi and tensile strength of 65 ksi for 54 mil (16 ga.) and thicker.
4. For other pertinent information, please refer to the Important Information and General Notes on pp. 14–16 of this catalog.

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Strong-Drive® FPHSD FRAMING-TO-CFS Screw

Common Applications:

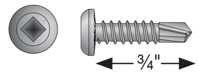
Cold-formed steel sheet, framing or connectors to cold-formed steel.

Features:

- Flat pan head
- #3 square drive (Driver bit in each box; replacement bit model BIT3S-2)
- Clear zinc finish
- Self-drilling
- This screw is also available collated for the Quik Drive® system.

Codes/Standards: ASTM C1513 compliant; ICC-ES ESR-3006; City of L.A. RR 25670

Warning: Industry studies show that hardened fasteners can experience performance problems in wet or corrosive environments. Accordingly, use this product in dry, interior and noncorrosive environments only.



Clear Zinc Coating

Size	Length (in.)	Thread per Inch	Head Diameter (in.)	Drill Point Size	Approx. Count per lb.	1 lb. Model No.	Bulk	
							Carton Quantity	Model No.
#10	¾	16	0.365	#3	165	FPHSD34B1016	5,000	FPHSD34B1016-5K
#12	¾	14	0.365	#3	147	FPHSD34B1214	5,000	FPHSD34B1214-5K

Refer to *Fastening Systems* catalog C-F-2017 for collated fastener information.

Cold-Formed Steel Member Connection Loads

Model No.	Size	Nominal Dia. (in.)	Load Description	Shear (lb.)						Pullover (lb.)						Pullout (lb.)					
				Steel Thickness: mil (ga.)						Steel Thickness: mil (ga.)						Steel Thickness: mil (ga.)					
				27 (22)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)	27 (22)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)	27 (22)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)
FPHSD34S1016	#10–16 x ¾"	0.190	ASD load	175	235	380	570	570	570	280	365	485	695	740	740	76	95	156	240	340	505
			LRFD load	280	375	605	855	855	855	445	585	775	1,110	1,110	1,110	123	151	250	380	545	805
			Nominal strength	395	535	860	1,305	1,305	1,305	685	895	1,190	1,705	2,215	2,215	190	230	385	585	840	1,235
FPHSD34S1214	#12–14 x ¾"	0.216	ASD load	205	260	410	610	610	610	240	330	430	630	840	1,125	76	95	159	240	345	530
			LRFD load	330	420	650	975	975	975	390	530	685	1,005	1,340	1,690	123	151	255	385	550	855
			Nominal strength	485	610	930	1,385	1,385	1,385	595	815	1,050	1,540	2,060	2,065	190	230	390	590	845	1,295

1. Screws and connections have been tested per AISI Standard Test Method S904-08 and S905-08.
2. The tabulated ASD and LRFD allowable loads for cold-formed steel (CFS) members are based on the lower of the screw strength or the strength of the screw in the connected members per AISI S100 Section E4. Values are based on CFS members with a minimum yield strength of F_y = 33 ksi and tensile strength of F_u = 45 ksi for 43 mil (18 ga) to 27 mil (22 ga), minimum yield strength of F_y = 50 ksi and F_u = 65 ksi for 54 mil (16 ga) to 97 mil (12 ga).
3. For design purposes, steel sheet thicknesses are 0.0283" for 27 mil, 0.0346" for 33 mil, 0.0451" for 43 mil, 0.0566" for 54 mil, 0.0713" for 68 mil, and 0.1017" for 97 mil. The actual sheet thickness shall not be less than 95% of these design thicknesses as specified in AISI S100 Section A2.4.
4. Screw diameters per AISI S200 General Provision Commentary Table D1.1.
5. Minimum required screw length is the lesser of ¾" or the minimum length required for the screw to extend through the steel connection a minimum of 3 exposed threads per AISI S200 General Provisions Standard Section D1.3.
6. The allowable load (ASD) values shown are not permitted to be increased for short-duration loads such as wind or earthquake loads.
7. The lower of the Pullover and Pullout allowable loads should be used for tension design.
8. The tabulated shear values are based on the thinner steel member in connection. Steel thickness for both members must be in the range of 12–22 gauge.

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Strong-Drive® FPHSD FRAMING-TO-CFS Screw

FPHSD (#10) Screw — (Sheet Steel Sheathing to CFS) Nominal Shear Strength (R_n) for Wind (W) and Seismic (S) for Shear Walls[1] (lb./ft.)

Assembly Description	Max. Aspect Ratio (h/w)	Fastener Spacing at Panel Edges[2] (in.)				Designation Thickness[5] of Stud, Track and Blocking[7] (mil)
		6	4	3	2	
0.018" sheet steel, one side	2:1	485 (W) 390 (S)	—	—	—	33 (min.)
0.027" sheet steel, one side	4:1	—	1,000	1,085	1,170	43 (min.)
	2:1[3]	647	710	778	845	33 (min.)
0.018" sheet steel, both sides	2:1	970 (W) 780 (S)	—	—	—	33 (min.)
0.027" sheet steel, both sides	4:1	—	2,000	2,170	2,340	43 (min.)
	2:1[3]	1,294	1,420	1,556	1,690	33 (min.)

1. Nominal strength shall be multiplied by the resistance factor (ϕ = 0.6, LRFD Seismic, ϕ = 0.65, LRFD Wind) to determine design strength or divided by the safety factor (Ω = 2.5, ASD Seismic, Ω = 2.0, ASD Wind) to determine allowable strength.
2. Screws in the field of the panel shall be installed 12" (305 mm) on center (o.c.).
3. Shear wall height to width aspect ratio (h/w) greater than 2:1, but not exceeding 4:1, shall be permitted provided the nominal strength values are multiplied by 2w/h.
4. Wall studs and track shall be of ASTM A1003 Stuctural Grade 33 Type H steel for members with a designation thickness of 33 and 43 mil.
5. In lieu of blocking, panel edges shall be permitted to be overlapped and attached to each other with screw spacing as required for panel edges. Where such a connection is used, tabulated design values shall be reduced 30%.
6. Maximum stud spacing 24" o.c.
7. Blocking, if applicable, shall be a minimum 33 mil 1½" width.
8. Table based on Table C2.1-1 AISI Standard *"North American Standard for Cold-Form Steel Framing-Lateral Design 2007 Edition with Supplement No. 1 and Commentary"*.

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Strong-Drive® SELF-DRILLING X METAL Screw

SIMPSON Strong-Tie®

Common Applications:

1. Steel decking or other cold-formed steel framing or connectors to structural steel, up to ⅜" thick.
2. Side-lap (stitching) for steel decking.
3. Cold-formed steel framing or connectors to cold-formed steel.

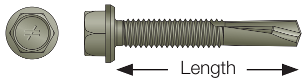
Features:

- 5⁄16" hex head
- Drill point
- Hex washer head
- This screw is also available collated for the Quik Drive® system

Codes/Standards: ICC-ES ESR-3006, City of LA RR 25670, RR25917 and RR26009, ASTM C1513 compliant, FM Approval #3045651 and #3050714, SDI DDM03, Appendix VII; SDI DDM04; IAPMO UES ER-326

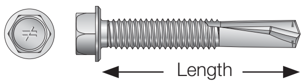
Warning: Industry studies show that hardened fasteners can experience performance problems in wet or corrosive environments. Accordingly, use this product in dry, interior and noncorrosive environments only.

Refer to *Fastening Systems* catalog C-F-2017 for collated fastener information.



Quik Guard® Coating

Shank Size	Length (in.)	Threads per Inch	Drill Point Size	Suitable Material Thickness (in.)	Finish	Carton Quantity	Model No.	Application(s)
10	1	16	#3	0.110 – 0.175	Quik Guard	4,000	XQ1B1016-4K	2, 3
12	1	14	#3	0.110 – 0.210	Quik Guard	3,500	XQ1B1214-3.5K	2, 3
12	1¼	24	#5	0.125 – 0.500	Quik Guard	2,500	XQ114B1224-2.5K	1, 3
12	1½	24	#5	0.125 – 0.500	Quik Guard	2,000	XQ112B1224-2K	1, 3



Clear-Zinc Coating

Shank Size	Length (in.)	Threads per Inch	Drill Point Size	Suitable Material Thickness[1] (in.)	Finish	Carton Quantity	Model No.	Application(s)
10	¾	16	#1	0.030 – 0.110	Clear Zinc	5,000	XU34B1016-5K	2, 3
10	¾	16	#3	0.110 – 0.175	Clear Zinc	5,000	X34B1016-5K	2, 3
10	1	16	#3	0.110 – 0.175	Clear Zinc	4,000	X1B1016-4K	2, 3
12	1	14	#3	0.110 – 0.210	Clear Zinc	3,500	X1B1214-3.5K	2, 3

1. Suitable material thickness includes all material layers and gaps between layers.

Screw Strength

Model	Size	Model Numbers	Nominal Diameter (in.)	Washer Diameter (in.)	Nominal	
					Shear (lb.)	Tension (lb.)
					P_{ss}	P_{ts}
Self-Drilling X Metal Screw	#12 x 1¼"	XQ114S1224, XQ114B1224-2.5K, X114S1224	0.216	0.415	3,110	4,985
Self-Drilling X Metal Screw	#12 x 1½"	XQ112S1224, XQ112B1224-2K	0.216	0.415		
Self-Drilling X Metal Screw	#10 x ¾"	X34B1016-5K	0.190	0.415	1,625	—
Self-Drilling X Metal Screw	#10 x 1"	X1S1016, XQ1S1016, X1B1016-4K, XQ1B1016-4K	0.190	0.415	1,625	—
Self-Drilling X Metal Screw (undersized drillpoint)	#10 x ¾"	XU34B1016-5K	0.190	0.475	1,735	—

1. P_{SS} and P_{ts} are nominal shear strength and nominal tension strength for the screw itself, respectively, and are the average (ultimate) value of all tests determined by independent laboratory testing.
2. The ASD and LRFD loads for tension are calculated using a safety factor $\Omega = 3.0$ and the resistance factor $\phi = 0.5$ respectively.

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Strong-Drive® SELF-DRILLING X METAL Screw

SIMPSON Strong-Tie®

Cold-Formed Steel Connection Loads

Model No.	Nominal Dia. (in.)[8]	Load Description	Shear (lb.)								Pullover (lb.)						Pullout (lb.)								
			Steel Thickness: mil (ga.)								Steel Thickness: mil (ga.)						Steel Thickness: mil (ga.)								
			27 (22)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)	1/8"[12]	1/4"[12]	27 (22)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)	27 (22)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)	3/16"	1/4"	1/2"[12]
X34B1016-5K XQ1S1016 X1S1016 (#10–16 x 1")	0.190	ASD	175	235	360	540	540	540	—	—	330	400	475	645	925	975	71	87	129	200	270	445	—	—	—
		LRFD	280	375	570	810	810	810	—	—	525	640	755	1,035	1,475	1,465	114	139	205	320	430	715	—	—	—
		Nominal strength	400	535	815	1,290	1,290	1,290	—	—	805	990	1,160	1,585	2,260	2,695	174	215	315	490	660	1,095	—	—	—
XQ1S1214 X1S1214 (#12–14 x 1")	0.216	ASD	176	235	385	595	840	840	—	—	295	375	525	785	1,045	1,210	74	96	147	215	325	500	—	—	—
		LRFD	280	375	610	950	1,265	1,265	—	—	470	600	835	1,255	1,675	1,930	117	154	235	340	520	795	—	—	—
		Nominal strength	400	535	870	1,350	2,135	2,135	—	—	720	920	1,285	1,925	2,565	2,965	180	235	360	520	800	1,220	—	—	—
XQ78S1224 (#12–24 x 7/8") XQ112S1224 (#12–24 x 1½")	0.216	ASD	140	230	350	640	740	935	935	935	265	290	400	720	790	1,390	78	80	115	200	260	460	730	1,375	1,420
		LRFD	210	365	560	1,025	1,175	1,355	1,355	1,355	395	440	640	1,155	1,260	2,160	117	125	185	320	415	735	1,170	2,135	2,160
		Nominal strength	420	550	920	1,455	1,675	2,675	2,675	2,675	795	875	985	1,770	1,930	3,400	235	205	280	505	640	1,130	1,990	3,370	4,260

1. Screws and screw connections have been tested per AISI Standard Test Method S904-08 and S905-08 with the exception of 22-gauge values which are based on calculations of the AISI S100 Section E4.
2. The tabulated ASD and LRFD allowable loads for cold-formed steel (CFS) members are based on the lower of the screw strength or the strength of the screw in the connected members per AISI S100.
3. The safety factor Ω and resistance factor ϕ used to determine the ASD and LRFD strength are based on AISI S100 Section F.
4. The nominal strength values listed are achieved under laboratory conditions and should not be used for design loads.
5. Values are based on CFS members with a minimum yield strength of F_y = 33 ksi and tensile strength of F_u = 45 ksi for 43 mil (18 ga) to 27 mil (22 ga), minimum yield strength of F_y = 50 ksi and F_u = 65 ksi for 54 mil (16 ga) to 97 mil (12 ga), and a minimum yield strength of F_y = 36 ksi and F_u = 58 ksi for ⅛" and thicker.
6. For design purposes, steel sheet thicknesses are 0.0283" for 27 mil, 0.0346" for 33 mil, 0.0451" for 43 mil, 0.0566" for 54 mil, 0.0713" for 68 mil, and 0.1017" for 97 mil. The actual sheet thickness shall not be less than 95% of these design thickness as specified in AISI S100 Section A2.4.
7. Screw diameters per AISI S200 General Provisions Commentary Table D1-1.
8. Minimum required screw length is the lesser of ¾" 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.
9. Screw head or washer diameter, d_w for #10 and #12 screws is 0.398".
10. The allowable load (ASD) values showing are not permitted to be increased for short duration loads such as wind or earthquake loads.
11. The lower of the Pullover and Pullout allowable loads should be used for tension design.
12. Not applicable for XQ78S1224.
13. The tabulated shear values are based on the thinner steel member in connection. Steel thickness for both members must be in the range of ½" – 22 gauge.
14. The XQ-S1224 screws are recommended for 16-gauge and thicker steel.

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Strong-Drive® XM MEDIUM-HEAD METAL Screw

SIMPSON Strong-Tie®

Common Applications:

Steel decking to structural members involving wide or narrow valley; nestable or interlocking steel decking

NEW

Strong-Drive® metal screws are load-tested and code-listed, allowing you to get the maximum load values for installation. Comparison testing shows Strong-Drive® XM Medium-Head Metal screws are stronger than many alternative fastener types in 33 ksi and 50 ksi steel decking.

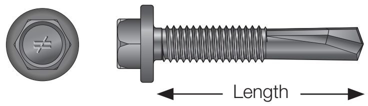
Features:

- 5⁄16" hex drive
- ½"-diameter hex washer head is ideal for narrow-channel steel decking
- Available only in 1¼" length with #5 drill point
- Available in Quik Guard® coating
- Available in bulk for hand-drive installation and collated for the Quik Drive® system

Codes/Standards: IAPMO UES ER-326, FM Approval 3050714, State of Florida FL16937, City of Los Angeles RR26009, SDI DDM04

U.S. Patent Pending

Warning: Industry studies show that hardened fasteners can experience performance problems in wet or corrosive environments. Accordingly, use this product in dry, interior and noncorrosive environments only.



Quik Guard® Coating

Size	Length (in.)	Hex Head Size (in.)	Washer Dia. (in.)	Threads per Inch	Point Size	Suitable Material Thickness (in.)	Bulk		Collated		
							Carton Qty.	Model No.	Carton Qty.	Model No.	PROSDX150
#12	1¼	5⁄16	0.483	24	#5	0.125 – 0.500	2,000	XMQ114B1224-2K	1,500	XMQ114S1224	✓

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Strong-Drive® XL LARGE-HEAD METAL Screw

SIMPSON Strong-Tie®

High-Performance Screw Alternative to Welds and Pins

Strong-Drive® metal screws are load-tested and code-listed, allowing you to get the maximum load values for installation. Strong-Drive® XL Large-Head Metal screws are the perfect choice when high shear or uplift resistance is required. Strong-Drive® XM Medium-Head Metal screws, with their ½" washer head, are designed for narrow flutes commonly found on interlocking deck profiles. In high-strength decks (F_y = 50 ksi), these screws are excellent 1-for-1 replacements for pins. The Self-Drilling X Metal screw is your go-to screw for lighter-duty support fastening and stitching applications. These screws are available in bulk or collated for Quik Drive® steel-decking systems.

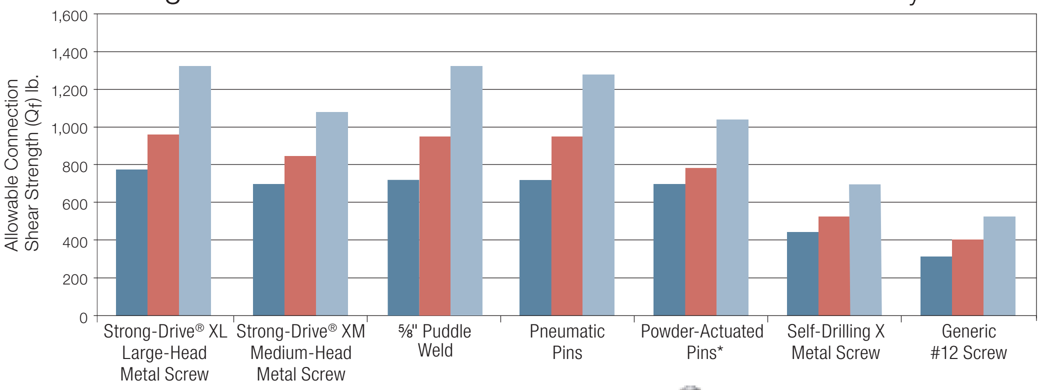
Simpson Strong-Tie provides a full offering of code-listed fasteners for your next steel-decking job.

DDM03 APPENDIX VII, IX DDM04 Approved	IAPMO UES ER-326	FM APPROVAL #3050714, #3045651	City of L.A. RR26009	State of Florida FL16937

Strength in Numbers

Comparison testing shows that Strong-Drive XL Large-Head Metal screws and Strong-Drive XM Medium-Head Metal screws are stronger than many alternative fastener types in 33 ksi and 50 ksi steel decking.

Strength in Numbers for Standard SDI DDM03 Decks with F_y = 33 ksi



Wind Load

- 22 ga. deck
- 20 ga. deck
- 18 ga. deck

- Standard screw based on AISI Eq.
- PAF values based on SDI DDM03 Manual
- Values based on ¼" support thickness
- Safety factors per DDM03

*Average

Fastener Type

Steel Deck Diaphragm Calculator

Steel Deck Design Made Easier

The Steel Deck Diaphragm Calculator web app offers optimized steel deck design solutions based on fastener and labor costs for a given shear and uplift. It can provide calculations for any solution generated. Generate diaphragm tables for various roof and floor decks using Simpson Strong-Tie® fasteners. The app can also generate a submittal package that includes fastener information, code reports, Factory Mutual reports, Appendix VII of DDM03, coating information and tools for installation. The app is accessible from any web browser and does not require downloading or installing special software. Users can:

- Design for multiple zones and develop solutions in either ASD or LRFD
- Modify deck properties from the standard properties listed in SDI DDM03 and DDM04
- Generate multiple cost- and labor-optimized solutions with calculations included
- Generate tables in Nominal, ASD Wind, LRFD Wind, ASD Seismic or LRFD Seismic
- Design for loads using the new Strong-Drive® XL Large-Head Metal screw (included in the optimization calculator)
- Design for additional structural patterns not covered in SDI literature
- Access proprietary deck tables with the new Strong-Drive® XM Medium-Head Metal screw

strongtie.com/diaphragmcalc

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Strong-Drive® XL LARGE-HEAD METAL Screw

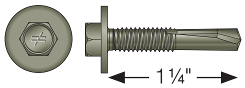
Common Applications:

Steel decking or other cold-formed steel framing or connectors to structural steel supports up to ⅜" in thickness where high shear and pullover values are needed.

Features:

- 5/16" hex drive (driver part #BITHEXLB516)
- #5 drill point
- Quik Guard® coating
- ⅝" diameter hex washer head
- Available collated; see **strongtie.com/steeldeck**

Codes/Standards: IAPMO UES ER-326, FM Approval #3050714, SDI DDM03 Appendix IX; SDI DDM04, Patent Pending



Quik Guard® Coating

Size	Length (in.)	Hex Head Size (in.)	Washer (in.)	Threads per Inch	Drill Point Size	Suitable Material Thickness (in.)*	Carton Qty.	Model No.
#12	1¼	5/16	0.625	24	#5	0.125 – 0.500	2,000	XLQ114B1224-2K

*Maximum material thickness includes all material layers and gaps between layers

Refer to *Fastening Systems* catalog C-F-2017 for collated fastener information.

Cold-Formed Steel Connection Loads

Model No.	Size	Nominal Dia. (in.)	Washer Dia. (in.)	Load Description	Shear (lb.)						Pullover (lb.)						Pullout (lb.)
					Steel Thickness mil (ga.)						Steel Thickness mil (ga.)						Support Thickness (in.)
					27 (22)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)	27 (22)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)	3/16"
XLQ114T1224, XLQ114B1224-2K	#12– 24 x 1¼"	0.216	0.625	ASD	605	725	1,015	1,035	1,035	1,035	525	690	990	1,220	1,220	1,220	575
				LRFD	970	1,160	1,555	1,555	1,555	1,555	840	1,100	1,585	1,950	1,950	1,950	860
				Nominal strength	1,400	1,670	2,340	3,110	3,110	3,110	1,295	1,705	2,430	2,995	2,995	2,995	1,720

1. Screws and screw connections have been tested per AISI Standard Test Method S904-08 and S905-08.
2. The tabulated ASD and LRFD allowable loads for cold-formed steel (CFS) members are based on the lower of the screw strength or the strength of the screw in connected members per AISI S100.
3. The safety factor Ω and resistance factor ϕ used to determine the ASD and LRFD strengths are based on AISI S100, Section F.
4. The nominal strength values listed are achieved under laboratory conditions and should not be used for design loads.
5. Values are based on CFS members with a minimum yield strength of F_y = 33 ksi and tensile strength of F_u = 45 ksi for 43 mil (18 ga.) to 27 mil (22 ga.), minimum yield strength of F_y = 50 ksi and F_u = 65 ksi for 54 mil (16 ga.) to 97 mil (12 ga.) and a support member of 3/16" thickness with a minimum yield strength of F_y = 36 ksi and tensile strength of F_u = 50 ksi.
6. For design purposes, steel sheet thickness are 0.0283" for 27 mil, 0.0346" for 33 mil, 0.0451" for 43 mil, 0.0566" for 54 mil, 0.0713" for 68 mil, and 0.1017" for 97 mil. The actual sheet thickness shall not be less than 95% of these design thicknesses as specified in AISI S100 Section A2.4.
7. Screw diameters are per AISI S200 General Provisions Commentary Table D1-1.
8. Minimum required screw length is the lesser of ¾" or the minimum length required for the screw to extend through the steel connection a minimum of three exposed threads per AISI General Provisions Standard Section D1.3.
9. The tabulated values are based on a minimum support thickness of 3/16".

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CBSDQ SHEATHING-TO-CFS Screw

Common Applications:

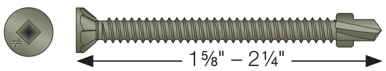
Sheathing to cold-formed steel. (Recommended thicknesses: 16 and 18 ga.)

Features:

- Ribbed flat head with nibs for easy countersinking
- #2 undersized square drive (driver bit in each box; replacement bit model BIT2SU)
- #2 drill point with wings
- Quik Guard® coating
- Curved collation

Codes/Standards: ASTM C1513 compliant, #8 screws meet minimum head diameter requirement per AISI S213, Lateral Design Standard; City of L.A. RR 25670

Warning: Industry studies show that hardened fasteners can experience performance problems in wet or corrosive environments. Accordingly, use this product in dry, interior and noncorrosive environments only.



Quik Guard® Coating

Length (in.)	Shank Size	Threads per Inch	Drill Point Size	Carton Quantity	Min. Head Dia. (in.)	Model No.	PRO 200S	PRO 250	PRO 300S
1⅝	#8	18	#2	1,500	0.322	CBSDQ158S	✓	✓	✓
2¼	#10	16	#2	1,000	0.322	CBSDQ214S		✓	✓

These coated fasteners possess a level of corrosion resistance that makes them suitable for use in some exterior and corrosive environments and with some preservative-treated woods. For applications in higher-exposure applications, consider Type-300 series stainless-steel fasteners for superior corrosion resistance. See pp. 18–21 for additional important information before selecting a fastener for a specific application.

CBSDQ/PPSD Screws[10] — Nominal Shear Strength (R_n) for Wind and Other In-Plane Loads for Shear Walls[1,4,6] (lb./ft.)

Assemble Description	Maximum Aspect Ratio (h/w)	Fastener Spacing at Panel Edges (in.)			
		6	4	3	2
15/32" structural 1 sheathing (4-ply), one side	2:1	1,065[3]	—	—	—
7/16" rated sheathing (OSB), one side	2:1	910[3]	1,410	1,735	1,910
7/16" rated sheathing (OSB), one side oriented perpendicular to framing	2:1	1,020	—	—	—
7/16" rated sheathing (OSB), one side	2:1[5]	—	1,025	1,425	1,825

1. Nominal strength shall be multiplied by the resistance factor (ϕ = 0.65) to determine the design strength or divided by the safety factor (Ω = 2.0) to determine the allowable strength.
2. Screws in the field of the panel shall be installed 12" (305 mm) on center (o.c.).
3. Where fully blocked gypsum board is applied to the opposite side of this assembly, per Table C2.1-2 AISI S-213 Lateral Standard, with screw spacing at 7" (178 mm) o.c. edge and 7" (178 mm) o.c. field, these nominal strengths are permitted to be increased by 30%.
4. For walls with material of the same type and nominal strength applied to opposite faces of the same wall, the available strength of material of same capacity is cumulative. Where the material nominal strengths are not equal, the available strength shall be either two times the available strength of the material with the smaller value or shall be taken as the value of the stronger side, whichever is greater. Summing the available strengths of dissimilar material applied to opposite faces or to the same wall line is not allowed.
5. Shear wall height to width aspect ratio (h/w) greater than 2:1, but not exceeding 4:1, shall be permitted provided the nominal shear strength is multiplied by 2w/h.
6. For wood structural panel sheathed shear walls, tabulated Rn values shall be applicable for short-term load duration (wind loads). For other in-plane lateral loads of normal or permanent load duration as defined by the AWC NDS, the values in the table above for wood structural panel sheathed shear walls shall be multiplied by 0.63 (normal) or 0.56 (permanent).
7. Maximum stud spacing 24" o.c.
8. All sheathing edges shall be attached to framing or 1½" width 33 mil blocking.
9. Table based on Table C2.1-1 AISI S-213 Lateral Standard.
10. #8 screws — CBSDQ and PPSD.
11. Stud, track and blocking (if applicable) shall be a minimum of 33 mil.

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CBSDQ/PPSD Screws[11] — Nominal Shear Strength (R_n) for Seismic and Other In-Plane Loads for Shear Walls[1,4,7] (lb./ft.)

Assemble Description	Maximum Aspect Ratio (h/w)	Fastener Spacing at Panel Edges[2] (in.)				Designation Thickness[5,6] of Stud, track and Blocking (mil)	Required Sheathing Screw Size
		6	4	3	2		
15⁄32" structural 1 sheathing (4-ply), one side	2:1[3]	780	990	—	—	33 or 43	8
	2:1	890	1,330	1,775	2,190	43 or 54	8
						68	10
7⁄16" rated sheathing (OSB), one side	2:1[3]	700	915	—	—	33	8
	2:1[3]	825	1,235	1,545	2,060	43 or 54	8
	2:1	940	1,410	1,760	2,350	54	8
	2:1	1,232	1,848	2,310	3,080	68	10

1. Nominal strength shall be multiplied by the resistance factor ($\phi = 0.60$) to determine the design strength or divided by the safety factor ($\Omega = 2.5$) to determine the allowable strength.
2. Screws in the field of the panel shall be installed 12" (305 mm) on center (o.c.).
3. Shear wall height to width aspect ratio (h/w) greater than 2:1, but not exceeding 4:1, shall be permitted provided the nominal shear strength is multiplied by 2w/h.
4. For walls with material of the same type and nominal strength applied to opposite faces of the same wall, the available strength of material of same capacity is cumulative. Where the material nominal strengths are not equal, the available strength shall be either two times the available strength of the material with the smaller value or shall be taken as the value of the stronger side, whichever is greater. Summing the available strengths of dissimilar material applied to opposite faces or to the same wall line is not allowed.
5. Substitution of a stud or track of a different designation thickness is not permitted.
6. Wall studs and track shall be of ASTM A1003 Structural Grade 33 Type H steel for members with a designation thickness of 33 and 43 mil, and A1003 Structural Grade 50 Type H steel for members with a designation thickness equal to greater than 54 mil.
7. For wood structural panel sheathed shear walls, tabulated R_n values shall be applicable for short-term load duration (seismic loads). For other in-plane lateral loads of normal or permanent load duration as defined by the AF&PA NDS, the values in the table above for wood structural panel sheathed shear walls shall be multiplied by 0.63 (normal) or 0.56 (permanent).
8. Maximum stud spacing 24" o.c.
9. All sheathing edges shall be attached to framing or 1½" width 33 mil blocking.
10. Table based on Table C2.1-3 AISI S-213 Lateral Standard.
11. #8 screws — CBSDQ and PPSD.

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Strong-Drive® PPSD SHEATHING-TO-CFS Screw

Common Application:

- Subfloor/sheathing to cold-formed steel. (#8 — maximum thickness: 54 mil / 16 ga.; #10 and #12 — maximum thickness: 97 mil / 12 ga.)
- Shearwall applications (see load tables on pp. 150 and 151)

Features:

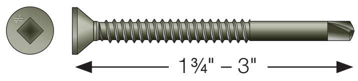
- Flat head with nibs for easier countersinking
- #3 square drive (replacement bit BIT3SU-2 for Quik Guard® and BIT3S-2 for yellow-zinc coating)
- Fine threads
- Pilot point
- Head diameter meets AISI S-213 Lateral Standard
- This screw is also available collated for the Quik Drive® system

Codes/Standards: ASTM C1513 compliant; ICC-ES ESR-3006; City of L.A. RR 25670

Warning: Industry studies show that hardened fasteners can experience performance problems in wet or corrosive environments. Accordingly, use this product in dry, interior and noncorrosive environments only.

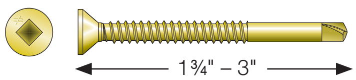
Refer to *Fastening Systems* catalog C-F-2017 for collated fastener information.

Quik Guard® Coating



Shank Size	Length (in.)	Head Diameter (in.)	Drill Point Size	Threads per Inch	Carton Quantity	Model No.
#8	1 15⁄16	0.323	#2	18	4,000	PPSDQ11516B-4K
#10	1¾	0.333	#3	16	4,000	PPSDQ134B1016-4K
#12	1¾	0.333	#3	16	4,000	PPSDQ134B1214-4K*
#10	3	0.333	#3	16	2,000	PPSDQ3B1016-2K
#12	3	0.333	#3	16	2,000	PPSDQ3B1214-2K*

Yellow Zinc Coating



Shank Size	Length (in.)	Head Diameter (in.)	Drill Point Size	Threads per Inch	Carton Quantity	Model No.
#8	1 15⁄16	0.323	#2	18	4,000	PPSD11516B-4K
#10	1¾	0.333	#3	16	4,000	PPSD134B1016-4K
#12	1¾	0.333	#3	16	4,000	PPSD134B1214-4K*
#10	3	0.333	#3	16	2,000	PPSD3B1016-2K
#12	3	0.333	#3	16	2,000	PPSD3B1214-2K*

* Has underhead nibs.

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Strong-Drive® PPSD SHEATHING-TO-CFS Screw

SIMPSON Strong-Tie®

PPSD — Pullout Loads — Steel Connections

Model No.	Screw Size	Load Description	Pullout Load (lb.)					
			Steel Thickness: mil (ga.)					
			27 (22)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)
PPSD11516S0818 PPSDQ11516S0818	#8	ASD	63	87	119	183	—	—
		LRFD	100	139	190	295	—	—
		Nominal strength	154	215	290	450	—	—
PPSD134S1016 PPSDQ134S1016	#10	ASD	80	128	194	315	425	480
		LRFD	128	205	310	500	680	765
		Nominal strength	225	325	480	765	1,045	1,205
PPSD3S1016 PPSDQ3S1016	#10	ASD	80	128	194	315	425	480
		LRFD	128	205	310	500	680	765
		Nominal strength	225	325	480	765	1,045	1,205

1. Screws and connections have been tested per AISI Standard Methods S904-08 and S905-08.
2. Values are based on cold-formed steel (CFS) members with a minimum yield strength, F_y of 33 ksi and minimum tensile strength, F_u of 45 ksi for 43 mil (18 ga.) to 27 mil (22 ga.), and a minimum yield strength, F_y of 50 ksi and minimum tensile strength, F_u of 65 ksi for 54 mil (16 ga.) to 97 mil (12 ga.).
3. For design purposes, steel sheet thicknesses are 0.0283" for 27 mil (22 ga.), 0.0346" for 33 mil (20 ga.), 0.0451" for 43 mil (18 ga.), 0.0566" for 54 mil (16 ga.), 0.0713" for 68 mil (14 ga.) and 0.1017" for 97 mil (12 ga.). The actual sheet thickness shall not be less than 95% of these design thicknesses as specified in AISI S100, Section A2.4.
4. A minimum of three exposed screw threads is required to achieve the loads in the Table.

PPSD — Pull-Through Loads — Rated Sheathing Panels

Model No.	Screw Size	Load Description	Reference Pull-Through Load (lb.)					
			Minimum Nominal Panel Thickness (in.)					
			Plywood			OSB		
			15⁄32	19⁄32	23⁄32	15⁄32	19⁄32	23⁄32
PPSD11516S0818 PPSDQ11516S0818	#8	ASD	83	84	116	49	109	117
		LRFD	179	181	250	106	235	255
		Nominal strength	415	420	580	245	545	585
PPSD134S1016 PPSDQ134S1016	#10	ASD	75	85	118	52	111	114
		LRFD	162	184	255	112	240	245
		Nominal strength	375	425	590	260	555	570
PPSD3S1016 PPSDQ3S1016	#10	ASD	75	85	118	52	111	114
		LRFD	162	184	255	112	240	245
		Nominal strength	375	425	590	260	555	570

1. The tabulated values are based on testing per AC233.
2. ASD pull-through loads based on a factor of safety of 5 applied to the nominal strength value (C_D = 1.0, increases to C_D = 1.6 allowed where applicable).
3. LRFD load based on adjustment of ASD load per NDS 2015, Appendix N using K_f = 3.32, ϕ = 0.65, and λ =1.0.

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PCSD Standing-Seam Roofing Panel Clip Screw

SIMPSON Strong-Tie®

Common Applications:

Cold-formed steel framing or connectors to cold-formed steel.

Features:

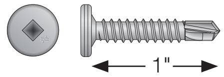
- Pancake head
- #2 square drive (replacement bit BIT2SU-2 for Quik Guard®; BIT2S-2 for Type 410 stainless steel and clear-zinc coating)
- Type 410 stainless steel is coated for additional corrosion protection
- This screw is also available collated for the Quik Drive® system

Codes/Standards: ASTM C1513 compliant

Warning: Industry studies show that hardened fasteners can experience performance problems in wet or corrosive environments. Accordingly, use this product in dry, interior and noncorrosive environments only.

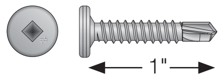
Refer to *Fastening Systems* catalog C-F-2017 for collated fastener information.

Type 410 Stainless Steel



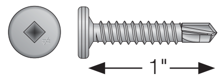
Size	Length (in.)	Thread per Inch	Drill Point Size	Head Diameter (in.)	Carton Quantity	Model No.
#10	1	16	#3	0.405	5,000	SSPCSD1B1016-5K

Quik Guard® Coating



Size	Length (in.)	Thread per Inch	Drill Point Size	Head Diameter (in.)	Carton Quantity	Model No.
#10	1	16	#3	0.405	5,000	PCSDQ1B1016-5K
#12	1	14	#3	0.405	4,000	PCSDQ1B1214-4K

Clear Zinc Coating



Size	Length (in.)	Thread per Inch	Drill Point Size	Head Diameter (in.)	Carton Quantity	Model No.
#10	1	16	#3	0.405	5,000	PCSD1B1016-5K
#12	1	14	#3	0.405	4,000	PCSD1B1214-4K

Cold-Formed Steel (CFS) Member Connection Loads

Model	Model No.	Size	Nominal Dia.[7] (in.)	Load Description	Shear (lb.)						Pullover (lb.)						Pullout (lb.)						
					Steel Thickness: mil (ga.)[6]						Steel Thickness: mil (ga.)[6]						Steel Thickness: mil (ga.)[6]						
					27 (22)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)	27 (22)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)	22 (24)	27 (22)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)
PCSD	PCSD1S1016	#10–16x1"	0.190	ASD[2]	168	250	385	570	570	570	172	255	430	—	—	—	67	68	95	138	255	310	—
				Nominal load[4]	420	570	875	1,475	1,645	1,690	420	735	1,220				171	166	235	340	630	760	
PCSD	PCSD1S1214	#12–14x1"	0.216	ASD[2]	156	295	420	585	585	585	210	320	505	—	—	—	66	66	88	129	255	320	—
				Nominal load[4]	400	695	955	1,640	1,890	2,290	520	780	1,245				170	162	240	315	625	785	

1. Screws and screw connections have been tested per AISI Standard Test Method S904-08 and S905-08.
2. The tabulated ASD loads for cold-formed steel (CFS) members are based on the lower of the screw strength or the strength of the screw in the connected members per AISI S100 Section E4.
3. The safety factor is based on AISI S100 Chapter F for tested connections.
4. The nominal load values listed are achieved under laboratory conditions and should not be used for design loads.
5. Values are based on CFS members with a minimum yield strength of F_y = 33 ksi and tensile strength of F_u = 45 ksi for 43 mil (18 ga.) to 27 mil (22 ga.), minimum yield strength of F_y = 50 ksi and tensile strength of F_u = 65 ksi for 22 mil (24 ga.), and a minimum yield strength of F_y = 50 ksi and F_u = 65 ksi for 54 mil (16 ga.) and thicker.
6. For design purposes, steel sheet thicknesses are 0.0227" for 22 mil, 0.0283" for 27 mil, 0.0346" for 33 mil, 0.0451" for 43 mil, 0.0566" for 54 mil, 0.0713" for 68 mil, and 0.1017" for 97 mil. The actual sheet thickness shall not be less than 95% of these design thickness as specified in AISI S100 Section A2.4.
7. Screw diameters per AISI S200 General Provision Commentary Table D1.1.
8. Minimum required screw length is the lesser of ¾" or the minimum length required for the screw to extend through the steel connection a minimum of 3 exposed threads per AISI S200 General Provisions Standard Section D1.3.
9. Larger of screw head or washer diameter, d_W, for #10 and #12 screws is 0.375".
10. The allowable load (ASD) values shown are not permitted to be increased for short-duration loads such as wind or earthquake loads.
11. The lower of the Pullover and Pullout allowable loads should be used for tension design.
12. The tabulated shear values are based on the thinner steel member in connection. Steel thickness for both members must be in the range of 12–22 gauge.

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DWFSD Drywall-to-CFS Screw

Common Applications:

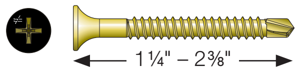
Drywall to cold-formed steel. (Recommended max. steel thicknesses: 54 and 43 mil / 16 and 18 ga.)

Features:

- Bugle head
- #2 Phillips (driver bit in each box; replacement bit model BIT2P)
- Fine threads
- Curved collation

Codes/Standards: ASTM C954 compliant; City of L.A. RR 25670

Yellow-Zinc Coating



Length (in.)	Shank Size	Threads per Inch	Drill Point Size	Box Quantity	Model No.
1¼	#6	20	#2	2,500	DWFSD114PS
1⅝	#6	20	#2	2,500	DWFSD158PS
1⅞	#6	20	#2	2,000	DWFSD178PS
2⅜	#8	20	#2	1,500	DWFSD238PS

DWF Drywall-to-CFS Screw

Common Applications:

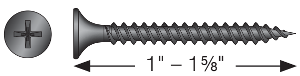
Drywall to cold-formed steel. (Recommended thicknesses: 33, 27 and 18 mil; 20, 22 and 25 ga.)

Features:

- Bugle head
- #2 Phillips (driver bit in each box; replacement bit model BIT2P)
- Fine threads
- Sharp point
- Gray-phosphate coating
- Curved collation

Codes/Standards: ASTM C1002-04 Type S compliant; City of L.A. RR 25670

Gray-Phosphate Coating



Length (in.)	Shank Size	Carton Quantity	Model No.
1¼	#6	2,500	DWF114PS
1⅝	#6	2,500	DWF158PS

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Strong-Drive® TB WOOD-TO-STEEL Screw

SIMPSON Strong-Tie®

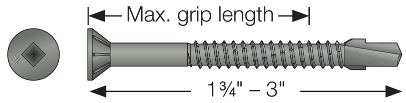
Common Applications:

Wood to hot-rolled or heavy-gauge cold-formed steel (Maximum recommended thicknesses: 5⁄16")

Features:

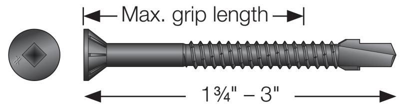
- Flat head with nibs for easy countersinking
- #3 square drive (driver bit in each box; replacement bit model BIT3S; use BIT3SU for Mechanically Galvanized – N2000®)
- #4 drill point with wings
- This screw is also available collated in straight collation for the Quik Drive® system; see p. 171 for details

Warning: Industry studies show that hardened fasteners can experience performance problems in wet or corrosive environments. Accordingly, use this product in dry, interior and noncorrosive environments only.



Mechanically Galvanized — N2000

Length (in.)	Maximum Grip Length (in.)	Shank Size	Head Diameter (in.)	Threads per Inch	Carton Quantity	Model No.
2⅜"	1.65	#12	0.39	14	1,500	TBG1260R1500



Black Phosphate Coating

Length (in.)	Maximum Grip Length (in.)	Shank Size	Head Diameter (in.)	Threads per Inch	Carton Quantity	Model No.
1¾"	1.06	#12	0.39	14	2,000	TBP1245R2000
1¾"	1.06	#12	0.39	14	50	TBP1245R50
2⅜"	1.65	#14	0.46	14	1,000	TBP1460R1000
2⅜"	1.65	#14	0.46	14	50	TBP1460R50
3"	2.24	#14	0.46	14	1,000	TBP1475R1000
3"	2.24	#14	0.46	14	50	TBP1475R50

* Grip length includes side member, steel thickness, air gap (if any) and allowance for three threads protuding through the steel.

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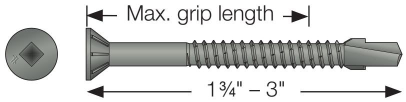
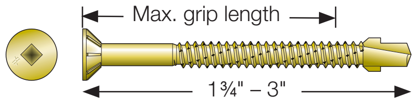
Strong-Drive® TB WOOD-TO-STEEL Screw



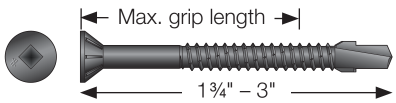
Mechanically Galvanized — N2000®

Length in. (mm)	Max. Grip Length (in.)*	Shank Size	Threads Per Inch	Carton Quantity	Model No.	PRO HSD60	PRO HSD75
1¾ (45)	1.055	#12	14	1,000	TBG1245S	✓	
2⅜ (60)	1.645	#12	14	1,000	TBG1260S	✓	✓
1¾ (45)	1.055	#14	14	1,000	TBG1445S	✓	
2⅜ (60)	1.645	#14	14	750	TBG1460S	✓	✓
3 (75)	2.236	#14	14	750	TBG1475S		✓



Yellow Zinc Coating

Length in. (mm)	Max. Grip Length (in.)*	Shank Size	Threads Per Inch	Carton Quantity	Model No.	PRO HSD60	PRO HSD75
1½ (40)	0.826	#14	14	1,000	TB1440S	✓	
1¾ (45)	1.055	#14	14	1,000	TB1445S	✓	
2⅜ (60)	1.645	#14	14	750	TB1460S	✓	✓
3 (75)	2.236	#14	14	750	TB1475S		✓



Black Phosphate Coating

Length in. (mm)	Max. Grip Length (in.)*	Shank Size	Threads Per Inch	Carton Quantity	Model No.	PRO HSD60	PRO HSD75
1¾ (45)	1.055	#12	14	1,000	TBP1245S	✓	
2⅜ (60)	1.645	#12	14	1,000	TBP1260S	✓	✓
2⅜ (60)	1.645	#14	14	750	TBP1460S	✓	✓
3 (75)	2.236	#14	14	750	TBP1475S		✓

* Grip length includes side member, steel thickness, air gaps (if any) and allowance for three threads protruding through the steel.

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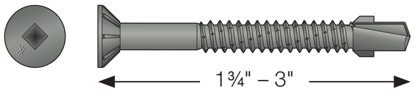
Strong-Drive® TB WOOD-TO-STEEL Screw

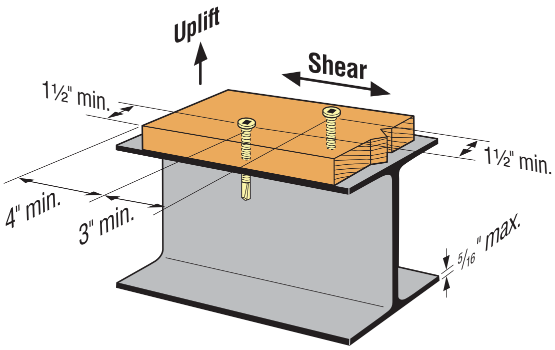
SIMPSON Strong-Tie®

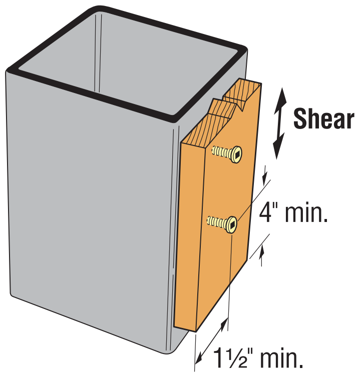
TB — Allowable Loads — DF and SP Lumber Attachment to Steel (Steel Members 16 ga. – 5⁄16" Thick)



Model No.	Length in. (mm)	Nominal Wood Thickness (in.)	Steel Thickness mil (ga.)	DF/SP Allowable Load (lb.)			
				Uplift		Shear	
				C_D = 1.0	C_D = 1.6	C_D = 1.0	C_D = 1.6
TB1460S	2⅜ (60)	2x	54 (16)	195	195	210	335
			68 (14)	225	225	210	335
			97–312 (12 – 5⁄16")	245	390	215	345
TB1475S	3 (75)		54 (16)	195	195	210	335
			68 (14)	225	225	210	335
			97–312 (12 – 5⁄16")	245	390	215	345

1. For use with structural steel members up to 5⁄16" thick or cold-formed steel members 54 mil (16 ga.) or thicker.
2. Standard product available in a black phosphate, yellow zinc or N2000 coating for additional corrosion protection *(TBG1460S or TBG1475S).*
3. For use with 2x (1½") DF/SP only.
4. For use with QD HSD60 or HSD75 tool.
5. Use increased allowable loads (C_D = 1.6) only when resisting wind or seismic forces.





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Quik Drive® Systems

PROLDH Underlayment/Backerboard System

Applications: Cement board and fiber-cement board underlayment/ backerboard to wood or steel

PRO200 Drywall System

Applications: Drywall to wood or steel

PRO250 Subfloor System

Applications: Subfloor to wood or steel

PROPP150 Metal Roofing System

Applications: Panel clips for standing-seam roofing, steel decking to structural steel members, panel flanges for snap-and-seam metal roofing

BSD200 Structural Steel-Decking System

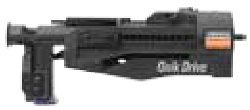
Applications: Steel decking to structural steel members and stitching of steel panels at the edges (“side lap” stitching)

PROSDX150 Steel-Decking Attachment

Applications: Steel decking to structural steel members

PROPH Cold-Formed Steel Framing Attachment

Applications: Fasten cold-formed steel framing

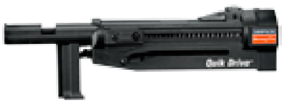


PROHX516 Steel-to-Steel Fastening Attachment

Applications: Cold-formed steel framing, steel decking to structural steel members

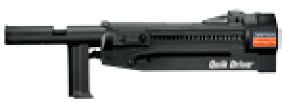
PRO200S Multi-Purpose Attachment

Applications: Subfloor to wood or steel, wall plates, stair treads, sheathing, fiber cement siding to steel, gypsum panel to wood or steel



PROHSD60 Wood-to-Steel Attachment

Applications: Truck beds and trailer flooring to steel, wood nailer to structural steel



PROHSD75 Wood-to-Steel Attachment

Applications: Truck beds and trailer flooring to steel, wood nailer to structural steel

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Quik Drive® Applications: Drywall

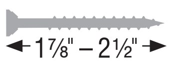
Quik Drive® auto-feed screw driving systems are ideal for fastening drywall. They provide a fast, efficient solution with a precision countersink adjustment that produces consistent dimples.

PRO200 System

- Compact body for reduced weight and easy handling
- Smooth nose will not mar drywall surface
- Slim profile allows driving in corners

PRO250DW Attachment

- Compact body for reduced weight and easy handling
- Smooth nose will not mar drywall surface
- Slim profile allows driving in corners



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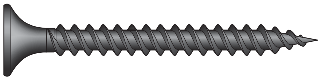
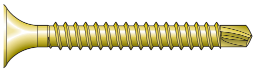
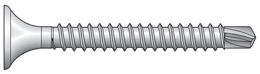
Quik Drive® Applications: Drywall

Collated Screws for the Quik Drive® System

Fastener Model	PRO200	PRO250DW
DWF Drywall-to-CFS Screw  Drywall to steel, gray phosphate coating (33, 27, 18 mil / 20, 22, 25 ga.)	1¼", 1⅝"	N/A
DWFSD Drywall-to-CFS Screw  Drywall to steel, #2 point, yellow zinc coating (54, 43 mil / 16, 18 ga.)	1¼", 1⅝", 1⅞"	1⅞", 2⅜"
DWFSD Drywall-to-CFS Screw  Drywall to steel, #2 point, Quik Guard® coating (54, 43 mil / 16, 18 ga.)	1¼"	1¼"

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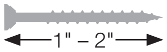
Quik Drive® Applications: Underlayment/Backerboard

Quik Drive® auto-feed screw driving systems are ideal for underlayment. The variety of screws solves challenges such as driving over radiant heat panels and the extension enables stand-up-and-drive installation.

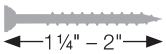
PROCGB Combo System

- Slim profile allows driving in corners
- Drives fasteners that meet ANSI standards
- Compact body for reduced weight and easy handling
- Includes both PROLDH Attachment and PRO200S Attachment for added versatility



PROLDH System

- Slim profile allows driving in corners
- Compact body for reduced weight and easy handling



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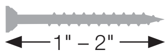
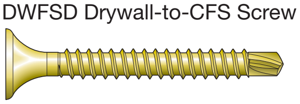
PRO200S System

- Slim profile allows driving in corners
- Compact body for reduced weight and easy handling



Collated Screws for the Quik Drive® System

Fastener Model	PROCGB	PROLDH	PRO200S
DWF Drywall-to-CFS Screw  Gypsum panel to steel, gray phosphate coating	1¼", 1⅝"	—	1¼", 1⅝"
DWFSD Drywall-to-CFS Screw  Gypsum panel to steel, yellow zinc or Quik Guard® coating	1¼", 1⅝"	—	1¼", 1⅝"

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Quik Drive® Applications: Steel Decking/Stitching

The Quik Drive® PROSDX150 auto-feed screw driving system is the right choice for steel decking because it provides an efficient fastening solution that is safer and easier than welding or P.A.T.

PROSDX150 System

- Features an extended nosepiece for easy access to valley
- Stand-up driving increases comfort and productivity
- One system for fastening steel decking to structural members and steel stitching
- No special inspection or certification required as with welding or P.A.T. fastening

BSD200 System

- Innovative Precision Placement™ nosepiece allows for easy location of the standing seam metal roofing clip holes
- Stand-up driving increases comfort and productivity
- Patented belt collation enables auto-feed fastening of screws
- Depth control prevents over driving

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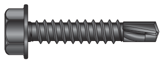
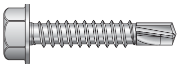
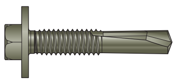
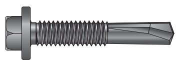
Quik Drive® Applications: Steel Decking/Stitching

Collated Screws for the Quik Drive® System

Fastener Model	PROSDX150	BSD200
Strong-Drive® **SELF-DRILLING X METAL** Screw  Quik Guard® coating, 5/16" hex head	1", 1¼", 1½"	—
Strong-Drive® **SELF-DRILLING X METAL** Screw  Clear zinc coating, 5/16" hex head	¾", 1", 1¼"	—
Strong-Drive® **XL LARGE-HEAD METAL** Screw  Quik Guard® coating, 5/16" hex head	—	1¼"
Strong-Drive® **XM MEDIUM-HEAD METAL** Screw  Quik Guard® coating, 5/16" hex head	1¼"	—

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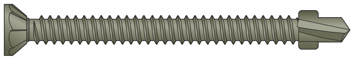
Quik Drive® Applications: Fiber-Cement

PROLDH System

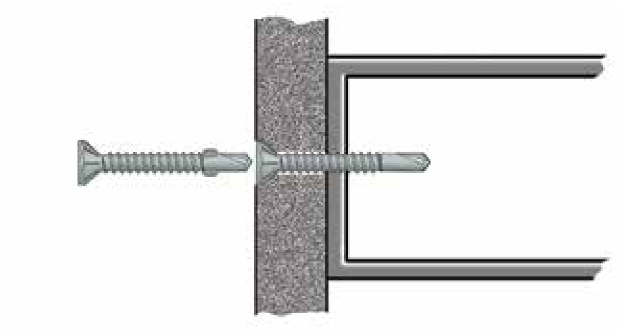
- Slim profile allows driving in corners
- Drives fasteners that meet ANSI standards
- Compact body for reduced weight and easy handling

Collated Screws for the Quik Drive® System

Fastener Model	PRO200S	PROCGB	PROLDH	PRO250
CBSDQ Sheathing Screw*  Self-drilling screw* #2 drill point, Quik Guard® coating	1⅝"	1⅝"	—	2¼"

*** #2 Drill Point with Wings**

Wings cut a path, protecting the integrity of the threads and break away before penetrating the steel.



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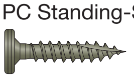
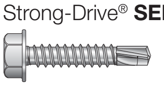
Quik Drive® Applications: Standing-Seam Metal

The Quik Drive® PROPP150 auto-feed screw driving system is ideal for standing-seam metal roofing. The Precision Placement™ nosepiece cuts installation time and the collated fasteners eliminate handling of individual screws.

PROPP150 System

- Innovative Precision Placement nosepiece allows for easy location of the hole in the clip
- Hands-free screw advancement speeds installation
- Collated fastener strips reduce waste and prevent damage to roof panels
- Suitable for panel clips up to 2½" tall
- Also ideal for fastening panel flanges for snap-and-seam metal roofing and installing trim and drip edge

Collated Screws for the Quik Drive® System

Fastener Model	PROPP150
PC Standing-Seam-Roofing Panel Clip Screw  Type 17 point, Type 410 stainless steel, Quik Guard® and clear zinc coating	1", 1½"
PCSD Standing-Seam-Roofing Panel Clip Screw  #3 drill point, Type 410 stainless steel, Quik Guard® and clear zinc coating	1"
Strong-Drive® **SELF-DRILLING X METAL** Screw  ⁵⁄₁₆" hex head, Quik Guard® and clear zinc coating	1"

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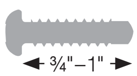
Quik Drive® Applications: Steel Framing/Stitching

Quik Drive® auto-feed screw driving systems save time when fastening cold-formed steel framing. The collated fastening strips eliminate the handling of individual screws and the attachments hold the screw in place while it drills through the material.

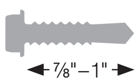
PROPH Attachment

- Compact body for reduced weight and easy handling
- Slim profile allows driving in corners
- Long-lasting reliability for targeted applications



PROHX516 Attachment

- Engineered to drive screws for steel fastening
- Precise depth adjustment prevents over and under driving
- Long-lasting reliability for targeted applications



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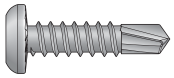
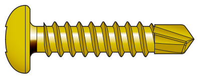
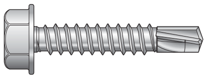
Collated Screws for the Quik Drive® System

Fastener Model	PROPH	PROHX516
Strong-Drive® FPHSD **FRAMING-TO-CFS** Screw  Flat pan head, #3 drill point, clear zinc coating	¾"	—
Strong-Drive® PHSD **FRAMING-TO-CFS** Screw  Pan head, #2 drill point, yellow zinc coating	¾"	—
Strong-Drive® **SELF-DRILLING X METAL** Screw  5/16" hex head, clear zinc coating	—	⅞"–1"

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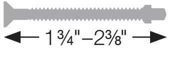
Quik Drive® Applications: Nailers/Ledgers-to-Steel

Quik Drive® PROHSD auto-feed fastening systems are ideal for wood-to-steel fastening. They hold the screw in place while drilling and our self-drilling screws eliminate the need for pre-drilling.

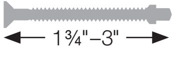
PROHSD60 System

- Specifically engineered for fastening wood-to-steel
- Expanded depth settings for various material thickness
- Broad nose increases stability and protects surfaces



PROHSD75 System

- Specifically engineered for fastening wood-to-steel
- Expanded depth settings for various material thickness
- Broad nose increases stability and protects surfaces



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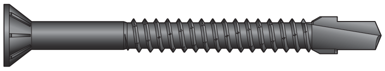
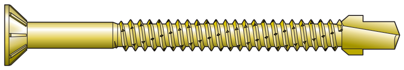
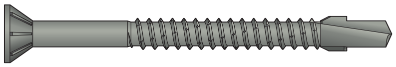
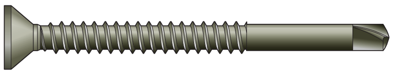
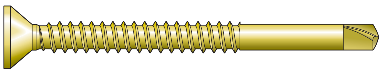
Quik Drive® Applications: Nailers/Ledgers-to-Steel

Collated Screws for the Quik Drive® System

Fastener Model	PROHSD60	PROHSD75
Strong-Drive® TB **WOOD-TO-STEEL** Screw  Black phosphate coating	1¾", 2⅜" (45, 60 mm)	2⅜", 3" (60, 75 mm)
Strong-Drive® TB **WOOD-TO-STEEL** Screw  Yellow zinc coating	1¾", 2⅜" (45, 60 mm)	2⅜", 3" (60, 75 mm)
Strong-Drive® TB **WOOD-TO-STEEL** Screw  N2000® galvanized coating	1¾", 2⅜" (45, 60 mm)	2⅜", 3" (60, 75 mm)
Strong-Drive® PPSD **SHEATHING-TO-CFS** Screw  Quik Guard® coating	#12 x 1¾"	#12 x 1¾", #12 x 3"
Strong-Drive® PPSD **SHEATHING-TO-CFS** Screw  Yellow zinc coating	#12 x 1¾"	#12 x 1¾", #12 x 3"

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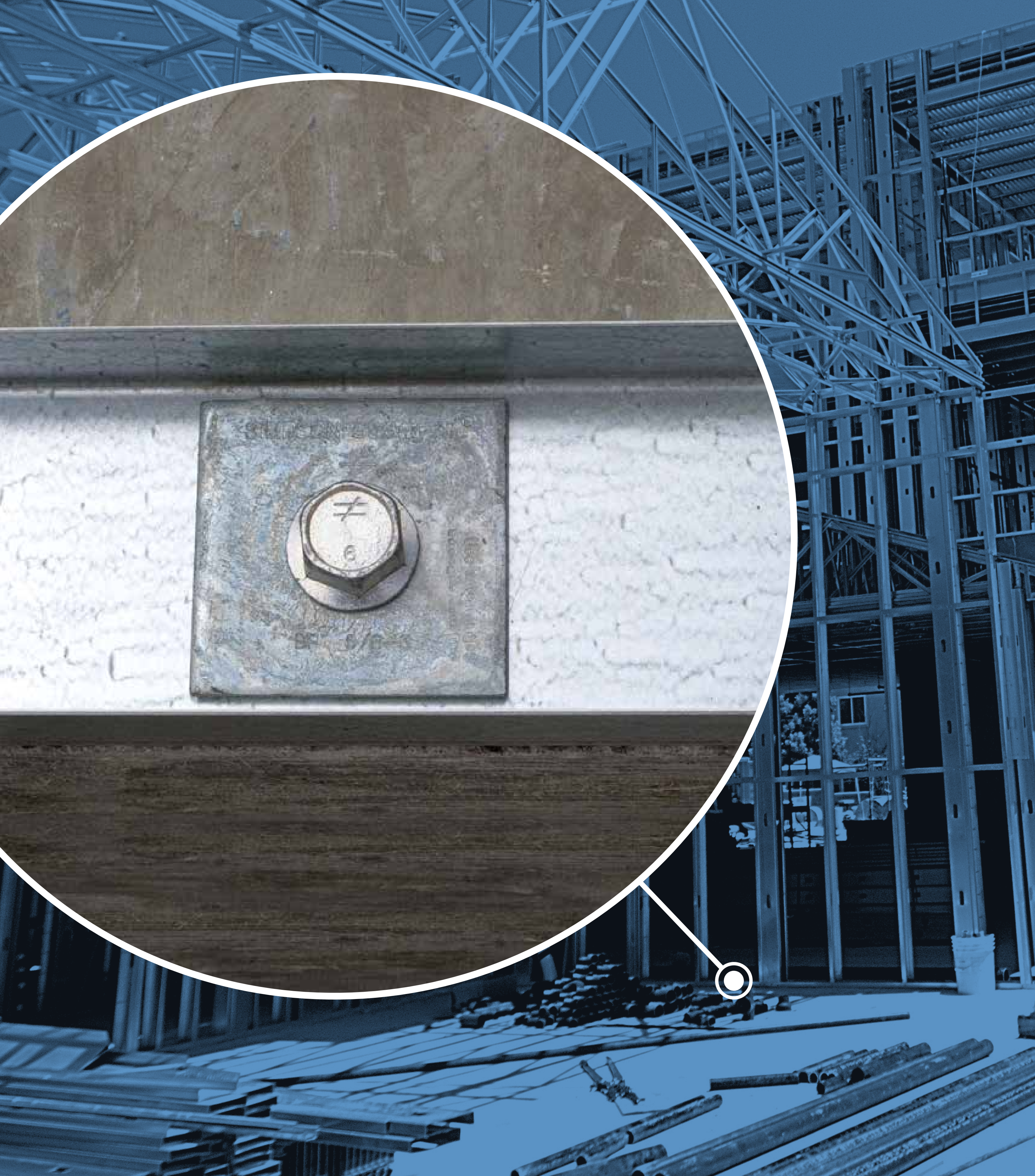
Concrete Connectors



SIMPSON Strong-Tie®

AnchorMate® Anchor Bolt Holders

The reusable AnchorMate® anchor bolt holder is designed to hold the anchor in place before the concrete pour, as required in some jurisdictions. The gripping section secures the bolt in place without a nut for quicker setup and teardown. It also protects the threads from wet concrete and simplifies trowel finishing.

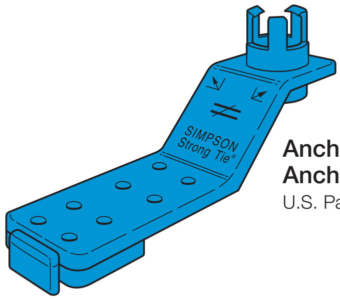
Features:

- Built-in 2x4 and 2x6 stops eliminate measuring.
- Color coded for easy size identification.
- Use the ⅝" and ⅞" AnchorMate to secure the SSTB to the formboard before the concrete pour. Alignment arrows (left or right) match the SSTB bolt head arrow.

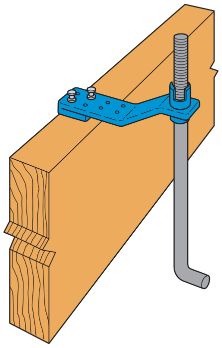
Material: Nylon

Codes: See p. 11 for Code Reference Key Chart

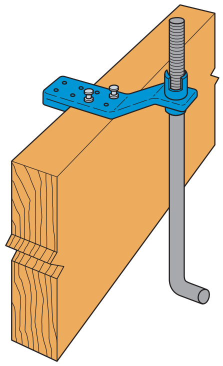
Model No.	Diameter (in.)	Color	Code Ref.
AM½	½	Yellow	180
AM⅝	⅝	Blue	
AM¾	¾	Red	
AM⅞	⅞	Green	
AM1	1	Black	



AnchorMate®
Anchor Bolt Holder
U.S. Patent 6,065,730



Typical AnchorMate Installation for a 2x6 Mudsill



Typical AnchorMate Installation for a 2x4 Mudsill

ABS Anchor Bolt Stabilizer

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

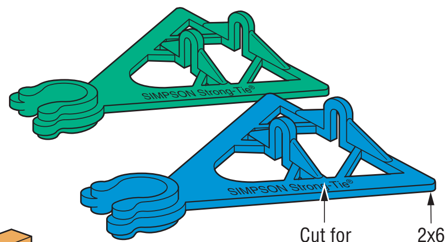
Features:

- Supports the bolt approximately 8" below the top of the concrete
- Model ABS⅝ is for the ⅝" SSTB and ABS⅞ is for the ⅞" SSTB
- Thin section limits the effect of a cold joint
- Sized for 2x4 and 2x6 mudsills

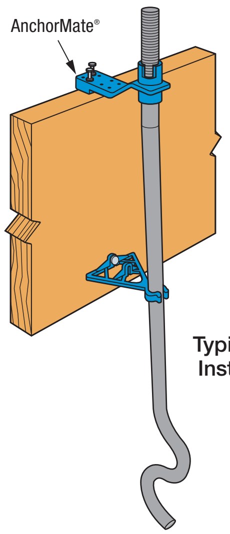
Material: Engineered Composite Plastic

Codes: See p. 11 for Code Reference Key Chart

Model No.	Diameter (in.)	Color	Code Ref.
ABS⅝	⅝	Blue	180
ABS⅞	⅞	Green	



ABS
Anchor Bolt Stabilizer



Typical ABS Installation

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StrapMate® Strap Holder

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

Features:

- The StrapMate is reusable
- Works with STHD, LSTHD

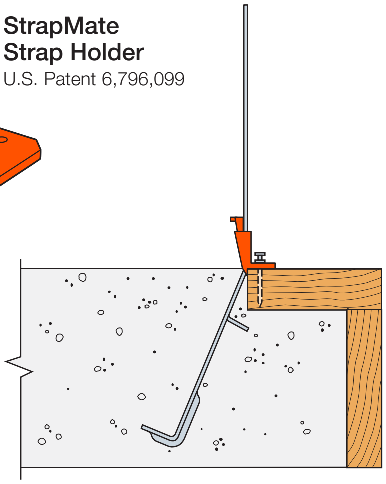
Material: Engineered Composite Plastic

- Designed to fit ¾" plywood forms up to 1¾" LVL forms and larger
- The strap is positioned off the front edge of the form board

Codes: See p. 11 for Code Reference Key Chart

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

StrapMate Strap Holder
U.S. Patent 6,796,099



Alternate StrapMate Installation for Brick Ledges

ABL Anchor Bolt Locator

The ABL enables the accurate and secure placement of anchor bolts on concrete-deck forms prior to concrete placement. The structural heavy-hex nut is attached to a pre-formed steel “chair,” which eliminates the need for an additional nut on the bottom of the anchor bolt. Electro-galvanized versions available for HDG anchor bolts. Order ABL-OST when using HDG anchor bolts.

Features:

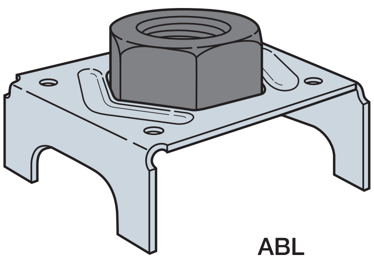
- Designed for optimum concrete flow.
- Installed with nails or screws.
- Meets code requirement for 1" stand off. Also available with 1½" standoff. Order ABLXX-1.5.
- PAB anchors are not designed for use with the ABL. Contact Simpson Strong-Tie for pre-assembled anchor solutions to be used with ABL.

Material: Nut — Heavy hex; Chair — Steel

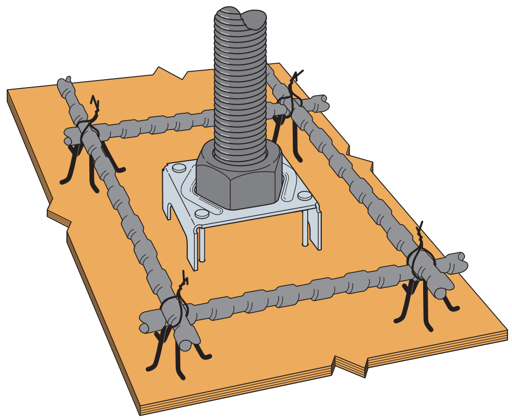
Finish: Nut — None or Electro-galvanized; Chair — G90; ABL-OST — HDG

Codes: See p. 11 for Code Reference Key Chart

Model No.	Anchor Bolt Diameter (in.)	Code Ref.
ABL4-1	½	180
ABL5-1	⅝	
ABL6-1	¾	
ABL7-1	⅞	
ABL8-1	1	
ABL9-1	1⅛	
ABL10-1	1¼	



ABL
U.S. Patents 8,621,816 and 8,381,482



Typical ABL Installation

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BP/LBP Bearing Plates

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

The BP½-3 and BP⅝-3 are 3" x 3" bearing plates that meet the latest requirements of the IRC and IBC. These plate washers are available uncoated or with a hot-dip galvanized (HDG) coating.

The BPS and LBPS are bearing plates that offer increased flexibility. The slotted hole allows for adjustability to account for bolts that are not in the middle of the track-bottom plate.

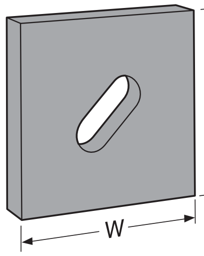
Material: See table

Finish: LBP, LBPS and BP⅝S — Galvanized;
BP⅞-2 and BP⅝S — Zinc Plated; BPS, BP — None.
BPs and BPSs may be ordered HDG;
LBP and LBPS products may be ordered ZMAX®; contact Simpson Strong-Tie. Refer to pp. 18–21 for Corrosion Information.

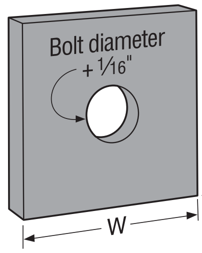
Installation:

- See General Notes on pp. 14–16.
- BP/BPS — For shearwall applications, position edge of plate washer within ½" of sheathed edge of track-bottom plate.

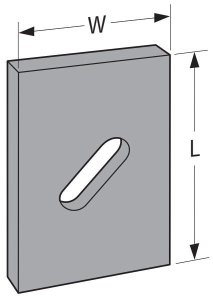
Codes: See p. 11 for Code Reference Key Chart



BPS
(LBPS similar)



BP
(LBP similar)

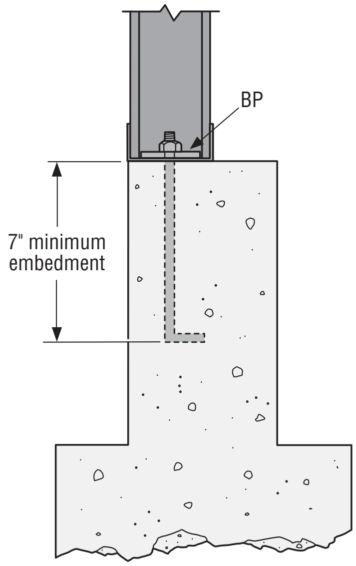


BPS½-6
(other models similar)

Bolt Dia. (in.)	Model No.	Thickness	Dimensions (in.)		Code Ref.
			W	L	
⅜	BP⅜-2	3⁄16"	2	2	I1, FL
½	LBP½	9⁄64"	2	2	190
	LBPS½	9⁄64"	3	3	
	BPS½-3	3 ga.	3	3	
	BPS½-6	3 ga.	3	4½	
	BP½	3⁄16"	2	2	
	BP½-3	3 ga.	3	3	I1, FL
⅝	LBP⅝	9⁄64"	2	2	190
	LBPS⅝	9⁄64"	3	3	
	BPS⅝-3	3 ga.	3	3	
	BPS⅝-6	3 ga.	3	4½	
	BP⅝-2	3⁄16"	2	2	I1, FL
	BP⅝	¼"	2½	2½	180
	BP⅝-3	3 ga.	3	3	I1, FL
¾	BP¾	5⁄16"	2¾	2¾	
	BP¾-3	3 ga.	3	3	
	BPS¾-3	3 ga.	3	3	190
	BPS¾-6	3 ga.	3	4½	
⅞	BP⅞-2	⅜"	1 15⁄16	2¼	
	BP⅞	5⁄16"	3	3	
1	BP1	⅜"	3½	3½	

These products are available with additional corrosion protection. Additional products on this page may also be available with this option. Check with Simpson Strong-Tie for details.

1. Standard cut washer required with BPS½-3, BPS⅝-3, BPS¾-3, BPS½-6, BPS⅝-6 and BPS¾-6 (not provided) per the 2015 IRC and 2015 SPDWS.



Typical BP Installed with a Bottom Track Anchor Bolt

Concrete Connectors

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CNW Coupler Nuts

Simpson Strong-Tie® 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 positive stop feature helps ensure even threading into each end of the nut. CNWs meet and exceed the specified minimum tensile capacity of corresponding ASTM A36 bolts and threaded rod. HSCNWs meet and exceed the specified minimum tensile capacity of corresponding ASTM A449 bolts and threaded rod. Contact Simpson Strong-Tie for other coupler nut sizes.

Finish: Zinc Plated

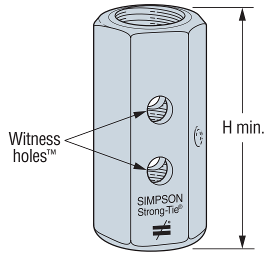
Installation:

- Tighten the two rods until each all-thread rod is visible in the witness hole. Any portion of the thread visible in the witness is a correct installation.
- Standard CNW for use with non-hot-dip galvanized all-thread rod only.
- ⅝" and ⅞" diameter couplers available with oversized threads for installation to hot-dip galvanized bolts (order CNW⅝-⅝OST and CNW⅞-⅞OST). Note that only one side is oversized to accommodate HDG rods and bolts.
- Some OST couplers are typically oversized on one end of the coupler nut only and will be marked with an "O" on the oversized side. Couplers may be oversized on both ends. Contact Simpson Strong-Tie.

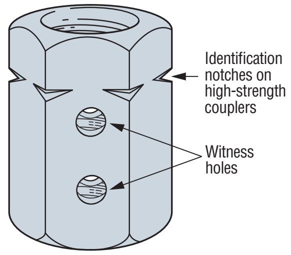
Codes: See p. 11 for Code Reference Key Chart

Model No.	Rod Diameter (in.)	H Min. (in.)	Allowable Tension Capacity (lb.) (100)	Code Ref.
CNW½	0.500	1½	4,265	I1, FL
CNW⅝	0.625	1⅞	6,675	
CNW¾	0.750	2¼	9,610	
CNW⅞	0.875	2½	13,080	170
CNW1	1.000	2¾	17,080	
CNW1¼	1.250	3	26,690	
HSCNW¾	0.750	2¼	19,880	
HSCNW1	1.000	2¾	35,345	
Transition Couplers				
CNW⅝ -½	0.625 to 0.500	1½	4,265	I1, FL
CNW¾ -⅝	0.750 to 0.625	1¾	6,675	
CNW⅞ -⅝	0.875 to 0.625	2	6,675	170
CNW1-⅞	1.000 to 0.875	2¼	13,080	

1. Allowable loads shown are based on AISC 14th Edition A36 and A449 (HS) threaded rod capacities.

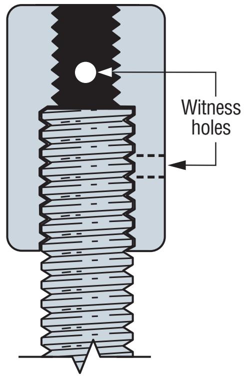


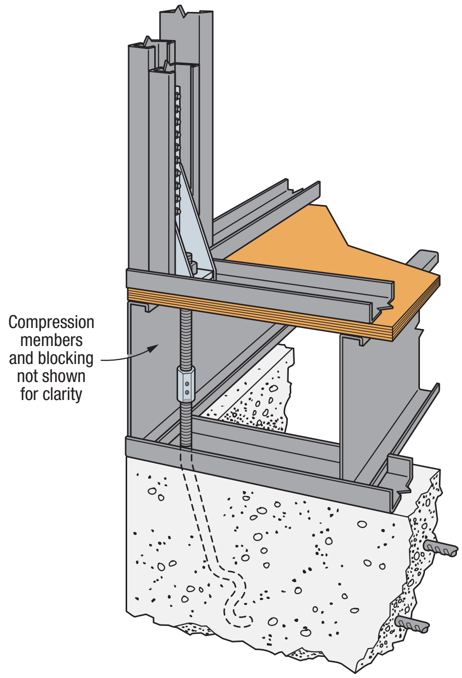
CNW
Allows Fast Visual Check for Correct All Thread Rod Installation



HSCNW
High-Strength Coupler Nut

CNW Transition Coupler Nut





Typical CNW Rim Joist Installation

Concrete Connectors

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LCB Column Base

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

Material: Strap — 97 (12 ga.) x2; Base — 54 (16 ga.)

Finish: LCB — galvanized.

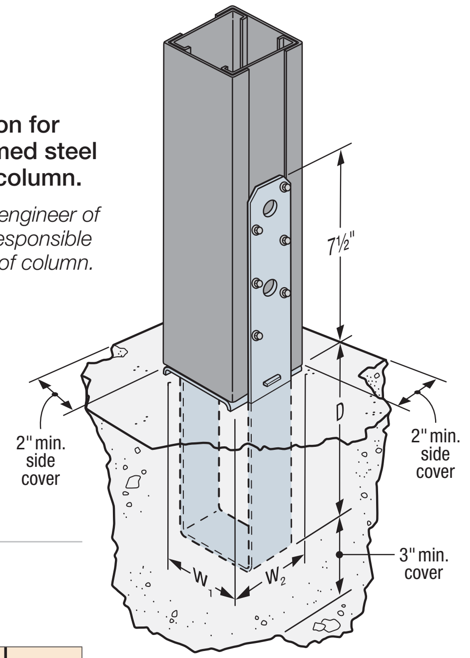
Installation:

- 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)

Codes: See p. 11 for Code Reference Key Chart

Installation for cold-formed steel built-up column.

Note: The engineer of record is responsible for design of column.



LCB44
(LCB46 and LCB66 similar)

Allowable Loads for LCB Column Base

Model No.	Nominal Column Size (in.)	Dimensions (in.)			Column Fasteners[7]	Allowable Load (lb.)				Code Ref.
						Wind and SDC A&B		SDC C–F		
		W_1	W_2	D		Non-Cracked	Cracked	Non-Cracked	Cracked	
						Uplift	Uplift	Uplift	Uplift	
LCB44	3.5 x 3.5	3⁹⁄₁₆	3½	6½	(12) #10	1,170	820	985	690	170
LCB46	3.5 x 5.5	3⁹⁄₁₆	5½	6½						
LCB66	5.5 x 5.5	5½	5½	5½						

1. Loads may not be increaed for short-term loading.
2. Concrete shall have a minimum compressive strength, f'_c = 2,500 psi.
3. Multiply Seismic and Wind ASD load values by 1.4 or 1.6 respectively to obtain LRFD capacities.
4. In accordance with IBC Section 1613.1, detached one- and two- family dwellings in Seismic Design Category (SDC) C may use "Wind and SDC A&B" allowable loads.
5. 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).
6. Designer is responsible for concrete foundation design.
7. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.

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MASA/MASAP Mudsill Anchors

SIMPSON Strong-Tie®

Mudsill anchors have always been a time-saving alternative to anchor bolts, and the MASA anchors provide even greater load-carrying capacity alternative. For ⅝" and ½" mudsill anchor bolts on bottom tracks, the MASA has load capacities that meet or exceed the parallel and perpendicular to plate shear capacity of other cast-in-place anchors. Two versions of the MASA are available — the standard MASA for installation on standard forms, and the MASAP for panelized forms.

The MASA and MASAP are code listed by ICC-ES under the 2006, 2009, 2012 and 2015 IBC® and IRC® and have been tested to meet the requirements of ICC-ES acceptance criteria AC-398 for cracked and uncracked concrete.

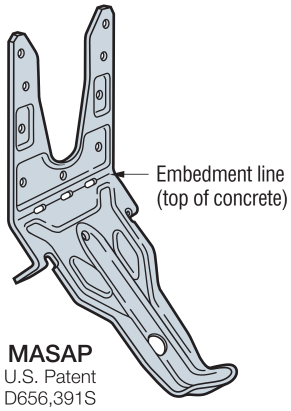
Material: 16 gauge

Finish: Galvanized, all available in ZMAX® coating. See Corrosion Information, pp. 18–21.

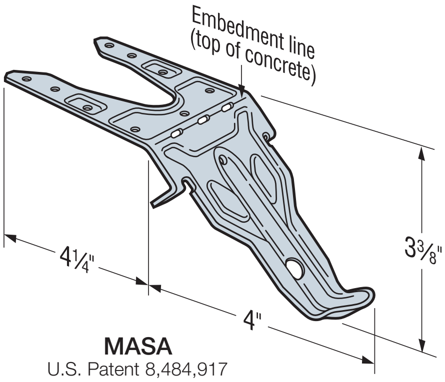
Installation:

- Use all specified fasteners; see General Notes
- **MASA/MASAP**
  - Concrete shall have a minimum f'c = 2,500 psi.
  - Spalling — Full loads apply for spalls up to a maximum height of 1¼" and a maximum depth of ⅞". Any exposed portion of the mudsill anchor must be protected against possible corrosion.
  - Minimum MASA end distance is 4" and minimum center-to-center spacing is 8" for a full load.
  - For continuous load path, MASA should be installed on the same side of the wall as uplift connectors.

Codes: See p. 11 for Code Reference Key Chart



MASAP
U.S. Patent
D656,391S



MASA
U.S. Patent 8,484,917

Allowable Loads for MASA/MASAP Cast-in-Place Mudsill Anchor on CFS Track

Model No.	Fasteners[8]		Allowable Load (lb.)[1,2,3,4,5] 43 mil (18 ga.) CFS						Code Ref.
			Standard Installation						
	Sides	Top of Track	Wind and SDC A&B[6]			SDC C–F			
			Uplift	Parallel to Track[7]	Perpendicular to Track	Uplift	Parallel to Track[7]	Perpendicular to Track	
MASA or MASAP	(3) #10	(6) #10	Non-Cracked						I4, L7, FL
			675	1,205	895	565	1,010	750	
			Cracked						
			510	1,205	655	425	1,010	550	

1. Allowable loads are governed by tests and may not be increased (C_D = 1.0).
2. The tabulated allowable (ASD) loads may be multiplied by 1.6 for designs for wind and in SDC A&B, and by 1.4 for designs in SDC C through F to obtain the LRFD loads.
3. Minimum concrete compression strength, f'_c is 2,500 psi.
4. Allowable loads are based on a minimum stemwall width of 6".
5. For simultaneous loads in more than one direction, the connector must be evaluated using the Unity Equation.
6. Per Section 1613 of the 2009, 2012 and 2015 IBC, detached one- and two-family dwellings in SDC C may use the “Wind and SDC A&B” allowable loads.
7. Parallel-to-Track loads for One-Leg-Up Installation: SDC A–C = 1,025 lb., SDC C–F = 860 lb.
8. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.

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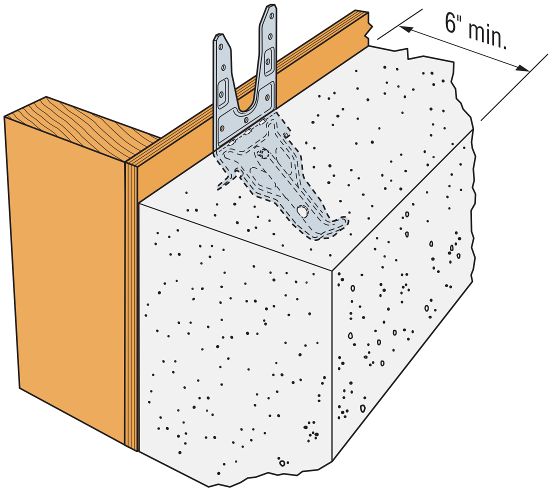
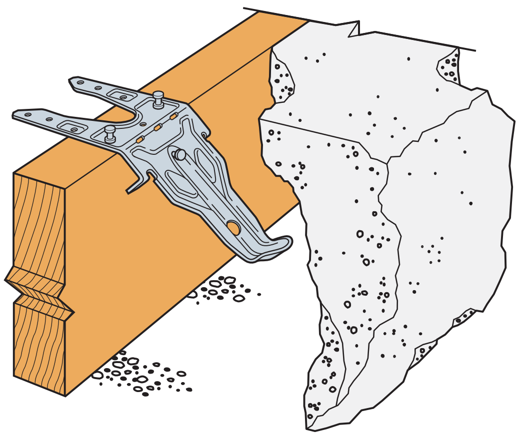
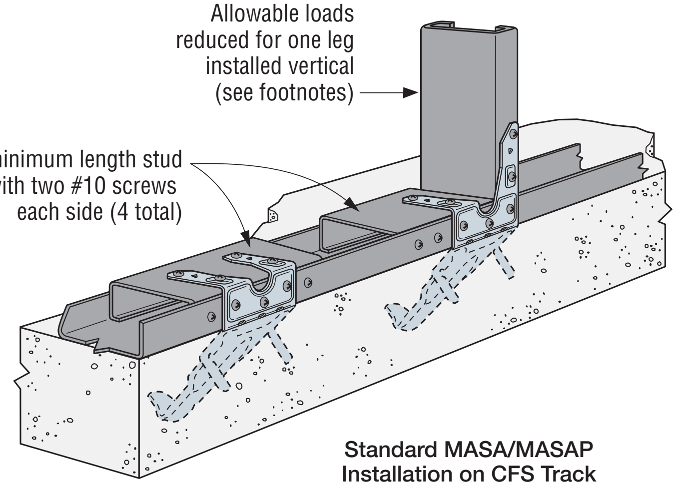
MASA/MASAP Mudsill Anchors



Standard MASAP
Installation in Concrete



Standard MASA
Installation in Concrete



Standard MASA/MASAP
Installation on CFS Track

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Anchors

Anchor Systems

Simpson Strong-Tie® Anchor Systems manufactures a full array of anchoring and fastening products for concrete and masonry — including adhesives for anchoring threaded rod and rebar, mechanical anchors, powder- and gas-actuated fastening systems and accessories. These products offer unique solutions to applications in light-framed construction when used with and without Simpson Strong-Tie connectors.

Mechanical Anchors

Anchoring Adhesives

Direct Fastening Systems

Software Tools to Help You Select the Right Products

Anchor Designer™ for ACI 318, ETAG and CSA

Adhesive Cartridge Estimator

For more information, visit **strongtie.com/software.**

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SET-XP® High-Strength Epoxy Adhesive

SIMPSON Strong-Tie®

SET-XP® epoxy anchoring adhesive is a high-strength formula for anchoring and doweling in cracked and uncracked concrete and masonry applications. It is a two-part system with the resin and hardener being simultaneously dispensed and mixed through the mixing nozzle. When properly mixed, adhesive will be a uniform teal color for easy post-installation identification.

Features:

- 1:1 two-component, high-solids, epoxy-based anchoring adhesive formula
- Passed the demanding ICC-ES AC308 adverse-condition tests pertaining to elevated temperatures and long-term sustained loads
- Code listed under the IBC/IRC for cracked and uncracked concrete per ICC-ES ESR-2508
- Code listed under the IBC/IRC for masonry per IAPMO UES ER-265
- Suitable for use under static and seismic loading conditions in cracked and uncracked concrete and masonry
- Cure times: 24 hours at 70°F, 72 hours at 50°F
- Easy hole-cleaning — no power-brushing required
- Suitable for use in dry or water-saturated concrete
- For best results, store between 45°F and 90°F
- Available in 8.5 oz., 22 oz. and 56 oz. cartridges for application versatility
- Manufactured in the USA using global materials

Applications:

- Threaded rod anchoring and rebar doweling into concrete and masonry
- Suitable for horizontal, vertical and overhead applications
- Multiple DOT listings — refer to **strongtie.com/DOT** for current approvals

Codes: ICC-ES ESR-2508 (concrete); IAPMO UES ER-265 (masonry); City of L.A. RR25744 (concrete), RR25965 (masonry); Florida FL-17449.2 (concrete), FL-16230.3 (masonry); AASHTO M-235 and ASTM C881 (Type I and IV, Grade 3, Class C); NSF/ANSI Standard 61 (216 in.^{2}/1,000 gal.)

Installation and Application Instructions:

- Surfaces to receive epoxy must be clean.
- Base material temperature must be 50°F or above at the time of installation. For best results, material should be between 70°F and 80°F at time of application.
- To warm cold material, store cartridges in a warm, uniformly heated area or storage container. Do not immerse cartridges in water to facilitate warming.
- Mixed material in nozzle can harden in 30 minutes at temperatures of 70°F and above.

Suggested Specifications:

See **strongtie.com** for more information.

Cracked Concrete CODE LISTED

SET-XP® Adhesive

Anchors

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SET-XP® High-Strength Epoxy Adhesive

Test Criteria

Anchors installed with SET-XP® adhesive have been tested in accordance with ICC-ES ***Acceptance Criteria for Post-Installed Adhesive Anchors in Masonry Elements (AC58) and Adhesive Anchors in Concrete Elements (AC308).***

Property	Test Method	Result*
Consistency	ASTM C881	Passed, non-sag
Glass transition temperature	ASTM E1356	155°F
Bond strength (moist cure)	ASTM C882	3,742 psi at 2 days
Water absorption	ASTM D570	0.10%
Compressive yield strength	ASTM D695	14,830 psi
Compressive modulus	ASTM D695	644,000 psi
Shore D Durometer	ASTM D2240	84
Gel time	ASTM C881	49 minutes
Volatile Organic Compound (VOC)	—	3 g/L

*Material and curing conditions: 73 ± 2°F, unless otherwise noted.

SET-XP® Cartridge System

Model No.	Capacity (ounces)	Cartridge Type	Carton Quantity	Dispensing Tool(s)	Mixing Nozzle
SET-XP10[4]	8.5	Single	12	CDT10S	EMN22i
SET-XP22-N[5]	22	Side-by-side	10	EDT22S, EDTA22P, EDTA22CKT	EMN22i
SET-XP56	56	Side-by-side	6	EDTA56P	EMN22i

1. Cartridge estimation guidelines are available at **strongtie.com/apps**.
2. Detailed information on dispensing tools, mixing nozzles and other adhesive accessories is available at **strongtie.com**.
3. Use only Simpson Strong-Tie® mixing nozzles in accordance with Simpson Strong-Tie instructions. Modification or improper use of mixing nozzle may impair SET-XP adhesive performance.
4. Two EMN22i mixing nozzles and two nozzle extensions are supplied with each cartridge.
5. One EMN22i mixing nozzle and one nozzle extension are provided with each cartridge.

Cure Schedule

Base Material Temperature		Cure Time (hrs.)
°F	°C	
50	10	72
60	16	48
70	21	24
90	32	24
110	43	24

For water-saturated concrete, the cure times must be doubled.

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SET-XP® High-Strength Epoxy Adhesive

SIMPSON Strong-Tie®

SET-XP® — Tension Loads for Threaded Rod in Normal-Weight Concrete

Anchor Dia. (in.)	Drill Bit (in.)	Emb. Depth (in.)	Tension Load[6,13] (lb.)										Tension Loads[10] F_u = 58 ksi Steel (lb.)	
			Critical Edge (C_c) + Critical End (C_c)					Minimum Edge (C_{min}) + Critical End (C_c)						
			C_c	LRFD[1] (Seismic)	LRFD[11] (Wind)	ASD[1,2] (Seismic)	ASD[2,11] (Wind)	C_{min}	LRFD[1] (Seismic)	LRFD[11] (Wind)	ASD[1,2] (Seismic)	ASD[2,11] (Wind)	LRFD	ASD
½	⅝	4	6	2,085	2,780	1,460	1,670	1¾	1,080	1,445	755	865	6,175	4,265
		7	8	4,700	6,175[9]	3,290	3,705	1¾	2,305	3,075	1,615	1,845		
		10	8	6,175[9]	6,175[9]	4,325	3,705	1¾	3,295	4,395	2,305	2,635		
⅝	¾	5	8	3,555	4,740	2,490	2,845	1¾	1,665	2,220	1,165	1,330	9,830	6,675
		8½	8	6,040	8,055	4,230	4,835	1¾	2,830	3,770	1,980	2,260		
		12	9	8,235	9,830[9]	5,765	5,900	1¾	4,005	5,340	2,805	3,205		
¾	⅞	6	9	4,415	5,885	3,090	3,530	1¾	2,030	2,705	1,420	1,625	14,530	9,615
		10½	12	7,985	10,650	5,590	6,390	1¾	3,595	4,795	2,515	2,875		
		15	15	11,410	14,530[9]	7,985	8,720	1¾	5,135	6,845	3,595	4,105		
⅞	1	8	10	5,045	8,410	3,530	5,045	1¾	2,270	3,780	1,590	2,270	20,095	13,070
		12	12	7,855	13,090	5,500	7,855	1¾	3,450	5,750	2,415	3,450		
		17½	14	11,455	19,095	8,020	11,455	1¾	5,035	8,390	3,525	5,035		
1	1⅛	8	12	6,690	9,695	4,685	5,815	1¾	2,895	4,190	2,025	2,515	26,360	17,075
		14	18	11,705	16,965	8,195	10,180	1¾	5,060	7,335	3,540	4,400		
		20	23	16,720	24,235	11,705	14,540	1¾	7,230	10,480	5,060	6,290		

Note: Reference p. 185 for footnotes.

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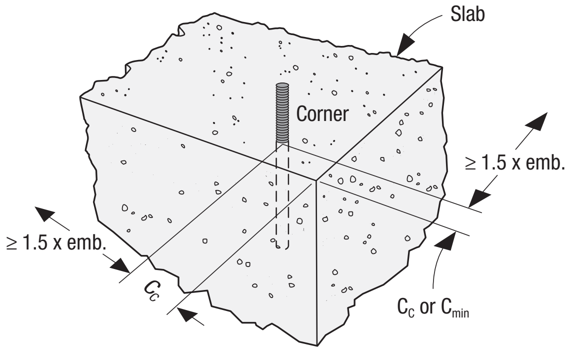
SIMPSON Strong-Tie®

SET-XP® — Shear Loads for Threaded Rod in Normal-Weight Concrete

Anchor Dia. (in.)	Drill Bit (in.)	Edge Distance (in.)	End Distance (in.)	Emb. Depth (in.)	Concrete Thickness (in.)	Spacing	Shear Load[6] (lb./ft.)						
							Concrete[4,13]				Cold-Formed Steel (ASD)[5]		
							LRFD[1] (Seismic)	LRFD[11] (Wind)	ASD[1,2] (Seismic)	ASD[2,11] (Wind)	33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)
½	⅝	1¾	5	4	6½	0' – 8"	1,825	1,825	1,280	1,095	895	1,320	2,485
						1'– 0"	1,215	1,215	850	730	595	880	1,655
						1'– 4"	910	910	635	545	445	660	1,240
						2' – 0"	610	610	425	365	300	440	830
						2' – 8"	455	455	320	275	225	330	620
						4' – 0"	305	305	215	185	150	220	415
						6' – 0"	205	205	145	125	100	145	275
⅝	¾	1¾	5	5	8½	0' – 8"	2,035	2,035	1,425	1,220	960	1,490	2,995
						1'– 0"	1,355	1,355	950	815	640	995	2,000
						1'– 4"	1,015	1,015	710	610	480	745	1,500
						2' – 0"	680	680	475	410	320	495	1,000
						2' – 8"	510	510	355	305	240	375	750
						4' – 0"	340	340	240	205	160	250	500
						6' – 0"	225	225	160	135	105	165	335
¾	⅞	1¾	5	6	10	0' – 8"	2,190	2,190	1,535	1,315	965	1,600	3,320
						1'– 0"	1,460	1,460	1,020	875	640	1,065	2,215
						1'– 4"	1,095	1,095	765	655	480	800	1,660
						2' – 0"	730	730	510	440	320	535	1,110
						2' – 8"	550	550	385	330	240	400	830
						4' – 0"	365	365	255	220	160	265	555
						6' – 0"	245	245	170	145	105	180	370

1. Anchorage designs conform to ACI 318-14 Chapter 17 and assume cracked concrete with no supplementary reinforcement.
2. Allowable Stress Design (ASD) values are obtained by multiplying Load Resistance Factor Design (LRFD) capacities by 0.7 for seismic and 0.6 for wind.
3. Load values based on the following: minimum concrete strength of 2,500 psi, dry hole, maximum short-term temperature of 150°F, maximum long-term temperature of 110°F, and continuous special inspection. Reference ICC-ES ESR-2508 for further information.
4. Shear load is applied parallel to the edge of concrete. Anchor is considered as an individual anchor without influence from other anchors.
5. Cold-formed steel (CFS) shear values are based on AISI-S100, Eq. E3.3.1-1, $m_f = 0.75$, $\Omega = 2.5$. Reference General Notes for CFS properties. To convert from ASD to LRFD, multiply value by 1.5.
6. Governing shear load is the lesser of concrete and CFS. Governing tension load is the lesser of concrete and steel.
7. For conditons not covered by this table, use the Simpson Strong-Tie® Anchor Designer™ software available at **strongtie.com**.
8. Third- and fourth-edge distances must be ≥ 1.5 x Embedment Depth.
9. Failure mode governed by ductile steel rod (F1554 Grade 36).
10. LRFD steel strength based on ACI 318-14 Chapter 17. ASD steel strength based on AISC Steel Construction Manual, 13th Edition, F_u = 58 ksi.
11. Wind design includes SDC A&B.
12. Minimum concrete thickness must be ≥ embedment depth + 5 x anchor diameter.
13. Designer shall consider the design requirements of ACI 318-14 Sections 17.2.3.4.3 and 17.2.3.5.3, where applicable.



Anchors

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AT-XP® High-Strength Acrylic Adhesive

Formulated for high-strength anchorage of threaded rod and rebar into cracked and uncracked concrete and masonry under a wide range of conditions, AT-XP® adhesive dispenses easily in cold or warm environments and in below-freezing temperatures with no need to warm the cartridge. When mixed properly, this low-odor formula is a dark teal color for easy post-installation identification.

Features:

- Passed the demanding ICC-ES AC308 adverse-condition tests pertaining to reduced and elevated temperatures and long-term sustained loads
- Code listed under the IBC/IRC for cracked and uncracked concrete per IAPMO UES ER-263 and City of L.A. RR25960
- Code listed under the IBC/IRC for masonry per IAPMO UES ER-281 and City of L.A. RR25966
- 10:1 two-component high-strength, acrylic-based anchoring adhesive
- Suitable for use under static and seismic loading conditions in cracked and uncracked concrete as well as masonry
- Easy hole-cleaning procedure — no power-brushing required
- Suitable for use in dry or water-saturated concrete
- For best results, store between 14°F and 80°F
- Cures in substrate temperatures as low as 14°F (–10°C) in 24 hours or less
- Available in 9.4 oz., 12.5 oz. and 30 oz. cartridges for application versatility
- Volatile Orgainic Compound (VOC) — 30 g/L
- Manufactured in the USA using global materials

Applications:

- Threaded rod anchoring and rebar doweling into concrete and masonry
- Suitable for horizontal, vertical and overhead applications

Codes: IAPMO UES ER-263 (concrete); IAPMO UES ER-281 (masonry); City of L.A. RR25960 (concrete), RR25966 (masonry); FL-16230.1; NSF/ANSI Standard 61 (43.2 in.^{2}/1,000 gal.)

Installation and Application Instructions:

- Surfaces to receive adhesive must be clean.
- Base material temperature must be 14°F or above at the time of installation. For best results, material should be 14–80°F at time of application.
- To warm cold material, store cartridges in a warm, uniformly heated area or storage container. Do not immerse cartridges in water to facilitate warming.
- Mixed material in nozzle can harden in 3–4 minutes at temperatures of 70°F and above.

Suggested Specifications

See **strongtie.com** for more information.

AT-XP® Adhesive

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AT-XP® High-Strength Acrylic Adhesive

AT-XP® Adhesive Cartridge System

Model No.	Capacity ounces (cubic in.)	Cartridge Type	Carton Qty.	Dispensing Tool	Mixing Nozzle
AT-XP10	9.4 (16.9)	Coaxial	6	CDT10S	AMN19Q
AT-XP13	12.5 (22.5)	Side-by-side	10	ADT813S	
AT-XP30	30 (54)	Side-by-side	5	ADT30S ADTA30P or ADTA30CKT	

1. Cartridge estimation guidelines are available at **strongtie.com/apps**.
2. Detailed information on dispensing tools, mixing nozzles and other adhesive accessories is available at **strongtie.com**.
3. Use only Simpson Strong-Tie® mixing nozzles in accordance with Simpson Strong-Tie instructions. Modification or improper use of mixing nozzle may impair AT-XP adhesive performance.
4. One AMN19Q mixing nozzle and one nozzle extension are supplied with each cartridge.

Cure Schedule

Base Material Temperature		Cure Time (hrs.)
°F	°C	
14	−10	24
32	0	8
50	10	3
68	20	1
86	30	30 min.
100	38	20 min.

For water-saturated concrete, the cure times must be doubled.

AT-XP® — Tension Loads for Threaded Rod In Normal-Weight Concrete

Anchor Dia. (in.)	Drill Bit (in.)	Emb. Depth (in.)	Tension Load[6,13] (lb.)										Tension Load[10] F_u = 58 ksi Steel (lb.)	
			Critical Edge (C_C) + Critical End (C_C)					Minimum Edge (C_{min}) + Critical End (C_C)						
			C_C	LRFD[1] (Seismic)	LRFD[11] (Wind)	ASD[1,2] (Seismic)	ASD[2,11] (Wind)	C_{min}	LRFD[1] (Seismic)	LRFD[11] (Wind)	ASD[1,2] (Seismic)	ASD[2,11] (Wind)	LRFD	ASD
½	⅝	4	6	2,680	4,210	1,875	2,525	1¾	1,365	2,140	955	1,285	6,175	4,265
		7	8	4,715	6,175[9]	3,300	3,705	1¾	2,395	3,760	1,675	2,255		
		10	8	6,175[9]	6,175[9]	4,325	3,705	1¾	3,425	5,370	2,400	3,220		
⅝	¾	5	8	3,985	6,175	2,790	3,705	1¾	1,870	2,930	1,310	1,760	9,830	6,675
		8½	8	6,040	8,055	4,230	4,835	1¾	3,185	4,695	2,230	2,815		
		12	9	8,235	9,830[9]	5,765	5,900	1¾	4,495	6,890	3,145	4,135		
¾	⅞	6	9	5,180	8,120	3,625	4,870	1¾	2,420	3,680	1,695	2,210	14,530	9,615
		10½	12	9,740	13,545	6,820	8,125	1¾	4,355	6,745	3,050	4,045		
		15	15	13,915	14,530[9]	9,740	8,720	1¾	6,220	9,755	4,355	5,855		
⅞	1	8	10	4,550	9,980	3,185	5,990	1¾	2,130	4,810	1,490	2,885	20,095	13,070
		12	12	7,735	14,355	5,415	8,615	1¾	3,350	7,565	2,345	4,540		
		17½	14	11,275	20,095[9]	7,890	12,055	1¾	4,885	11,035	3,420	6,620		
1	1⅛	8	12	6,850	10,750	4,795	6,450	1¾	2,960	4,640	2,070	2,785	26,360	17,075
		14	18	12,335	19,350	8,635	11,610	1¾	5,235	8,215	3,665	4,930		
		20	23	17,625	26,360[9]	12,340	15,815	1¾	7,480	11,735	5,235	7,040		

Note: Reference p. 188 for footnotes.

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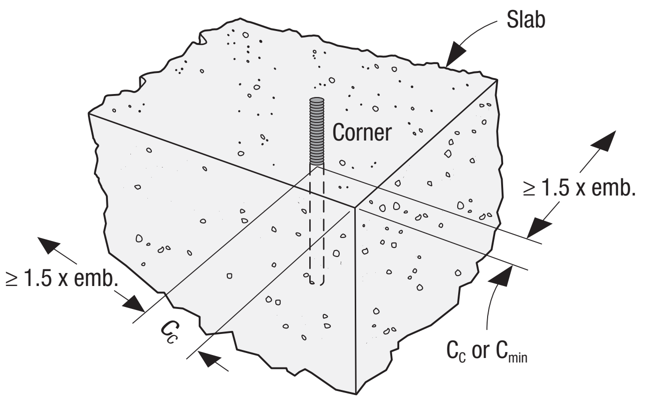
AT-XP® High-Strength Acrylic Adhesive

SIMPSON Strong-Tie®

AT-XP® — Shear Loads for Threaded Rod in Normal-Weight Concrete

Anchor Dia. (in.)	Drill Bit (in.)	Edge Distance (in.)	End Distance (in.)	Emb. Depth (in.)	Concrete Thickness (in.)	Spacing	Shear Load[6] (lb./ft.)						
							Concrete[4,13]				Cold-Formed Steel (ASD)[5]		
							LRFD[1] (Seismic)	LRFD[11] (Wind)	ASD[1,2] (Seismic)	ASD[2,11] (Wind)	33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)
½	⅝	1¾	5	4	6½	0' – 8"	1,825	1,825	1,280	1,095	895	1,320	2,485
						1'– 0"	1,215	1,215	850	730	595	880	1,655
						1'– 4"	910	910	635	545	445	660	1,240
						2' – 0"	610	610	425	365	300	440	830
						2' – 8"	455	455	320	275	225	330	620
						4' – 0"	305	305	215	185	150	220	415
						6' – 0"	205	205	145	125	100	145	275
⅝	¾	1¾	5	5	8½	0' – 8"	2,035	2,035	1,425	1,220	960	1,490	2,995
						1'– 0"	1,355	1,355	950	815	640	995	2,000
						1'– 4"	1,015	1,015	710	610	480	745	1,500
						2' – 0"	680	680	475	410	320	495	1,000
						2' – 8"	510	510	355	305	240	375	750
						4' – 0"	340	340	240	205	160	250	500
						6' – 0"	225	225	160	135	105	165	335
¾	⅞	1¾	5	6	10	0' – 8"	2,190	2,190	1,535	1,315	965	1,600	3,320
						1'– 0"	1,460	1,460	1,020	875	640	1,065	2,215
						1'– 4"	1,095	1,095	765	655	480	800	1,660
						2' – 0"	730	730	510	440	320	535	1,110
						2' – 8"	550	550	385	330	240	400	830
						4' – 0"	365	365	255	220	160	265	555
						6' – 0"	245	245	170	145	105	180	370

1. Anchorage designs conform to ACI 318-14 Chapter 17 and assume cracked concrete with no supplementary reinforcement.
2. Allowable Stress Design (ASD) values are obtained by multiplying Load Resistance Factor Design (LRFD) capacities by 0.7 for seismic and 0.6 for wind.
3. Load values based on the following: minimum concrete strength of 2,500 psi, dry hole, maximum short-term temperature of 180°F, maximum long-term temperature of 110°F, and continuous special inspection. Reference IAPMO UES ER-263 for further information.
4. Shear load is applied parallel to the edge of concrete. Anchor is considered as an individual anchor without influence from other anchors.
5. Cold-formed steel (CFS) shear values are based on AISI S-100, Eq. E3.3.1-1, $m_f = 0.75$, $\Omega = 2.5$. Reference General Notes for CFS properties. To convert from ASD to LRFD, multiply value by 1.5.
6. Governing shear load is the lesser of concrete and CFS. Governing tension load is the lesser of concrete and steel.
7. For conditons not covered by this table, use the Simpson Strong-Tie Anchor Designer™ software available at **strongtie.com**.
8. Third- and fourth-edge distances must be ≥ 1.5 x Embedment Depth.
9. Failure mode governed by ductile steel rod (A307 Grade C).
10. LRFD steel strength based on ACI 318-14 Chapter 17. ASD steel strength based on AISC Steel Construction Manual, 13th Edition, $F_u = 58$ ksi.
11. Wind design includes SDC A&B.
12. Minimum concrete thickness must be ≥ embedment depth + 5 x anchor diameter.
13. Designer shall consider the design requirements of ACI 318-14 Section 17.2.3.5.3, where applicable.



Anchors

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SIMPSON Strong-Tie®

Titen HD® Heavy-Duty Screw Anchor

The original high-strength screw anchor for use in cracked and uncracked concrete, as well as uncracked masonry. The Titen HD offers low installation torque and outstanding performance. Designed and tested in dry, interior, non-corrosive environments or temporary outdoor applications, the Titen HD demonstrates industry-leading performance even in seismic conditions.

Features:

- Code listed under IBC/IRC in accordance with ICC-ES AC193 for cracked and uncracked concrete per ICC-ES ESR-2713
- Code listed under IBC/IRC in accordance with ICC-ES AC106 for masonry per ICC-ES ESR-1056
- Qualified for static and seismic loading conditions
- Thread design undercuts to efficiently transfer the load to the base material
- Standard fractional sizes
- Specialized heat-treating process creates tip hardness for better cutting without compromising the ductility
- No special drill bit required — designed to install using standard-sized ANSI tolerance drill bits
- Testing shows the Titen HD installs in concrete with 50% less torque than competitor anchors
- Hex-washer head requires no separate washer and provides a clean installed appearance
- Removable — ideal for temporary anchoring (e.g., formwork, bracing) or applications where fixtures may need to be moved (reuse of the anchor to achieve listed load values is not recommended)

Codes: ICC-ES ESR-2713 (concrete); ICC-ES ESR-1056 (masonry); City of L.A. RR25741 (concrete), RR25560 (masonry); Florida FL-15730.6; FM 3017082, 3035761 and 3043442; Multiple DOT listings

Material: Carbon steel

Coating: Zinc plated or mechanically galvanized

Installation:

⚠ Holes in metal fixtures to be mounted should match the diameter specified in the table on p. 192.

⚠ Use a Titen HD screw anchor one time only — installing the anchor multiple times may result in excessive thread wear and reduce load capacity.

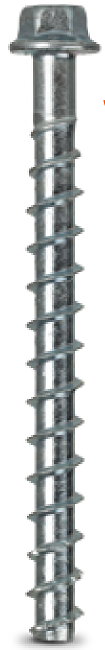
⚠ Do not use impact wrenches to install into hollow CMU.

Caution: Oversized holes in base material will reduce or eliminate the mechanical interlock of the threads with the base material and reduce the anchor's load capacity.

- Drill a hole in the base material using a carbide drill bit the same diameter as the nominal diameter of the anchor to be installed. Drill the hole to the specified embedment depth plus minimum hole depth overall (see table below right) to allow the thread tapping dust to settle, and blow it clean using compressed air. (Overhead installations need not be blown clean.) Alternatively, drill the hole deep enough to accommodate embedment depth and the dust from drilling and tapping.
- Insert the anchor through the fixture and into the hole.
- Tighten the anchor into the base material until the hex-washer head contacts the fixture.

Cracked Concrete CODE LISTED

Titen HD Screw Anchor
U.S. Patents 5,674,035 and 6,623,228



NEW

¼" Titen HD Screw Anchor
U.S. Patents 5,674,035 and 6,623,228

Serrated teeth on the tip of the Titen HD screw anchor facilitate cutting and reduce installation torque.

Anchors

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Titen HD® Heavy-Duty Screw Anchor

SIMPSON Strong-Tie®

Titen HD® Anchor Product Data — Zinc Plated

Size (in.)	Model No.	Drill Bit Diameter (in.)	Wrench Size (in.)	Quantity	
				Box	Carton
¼ x 1⅞	THDB25178H	¼	⅜	100	500
¼ x 2¾	THDB25234H	¼	⅜	50	250
¼ x 3	THDB25300H	¼	⅜	50	250
¼ x 3½	THDB25312H	¼	⅜	50	250
¼ x 4	THDB25400H	¼	⅜	50	250
⅜ x 1¾	THD37134H*	⅜	9/16	50	250
⅜ x 2½	THD37212H*	⅜	9/16	50	200
⅜ x 3	THD37300H	⅜	9/16	50	200
⅜ x 4	THD37400H	⅜	9/16	50	200
⅜ x 5	THD37500H	⅜	9/16	50	100
⅜ x 6	THD37600H	⅜	9/16	50	100
½ x 3	THD50300H	½	¾	25	100
½ x 4	THD50400H	½	¾	20	80
½ x 5	THD50500H	½	¾	20	80
½ x 6	THD50600H	½	¾	20	80
½ x 6½	THD50612H	½	¾	20	40
½ x 8	THD50800H	½	¾	5	25
½ x 12	THD501200H	½	¾	5	25
½ x 13	THD501300H	½	¾	5	25
½ x 14	THD501400H	½	¾	5	25
½ x 15	THD501500H	½	¾	5	25
⅝ x 4	THDB62400H	⅝	15/16	10	40
⅝ x 5	THDB62500H	⅝	15/16	10	40
⅝ x 6	THDB62600H	⅝	15/16	10	40
⅝ x 6½	THDB62612H	⅝	15/16	10	40
⅝ x 8	THDB62800H	⅝	15/16	10	20
¾ x 4	THD75400H	¾	1⅛	10	40
¾ x 5	THD75500H	¾	1⅛	5	20
¾ x 6	THDT75600H	¾	1⅛	5	20
¾ x 7	THD75700H	¾	1⅛	5	10
¾ x 8½	THD75812H	¾	1⅛	5	10
¾ x 10	THD75100H	¾	1⅛	5	10

NEW

*These models do not meet minimum embedment depth requirements for strength design and require maximum installation torque of 25 ft.–lb. using a torque wrench, driver drill or cordless ¼" impact driver with a maximum permitted torque rating of 100 ft.–lb.

Titen HD® Anchor Product Data — Mechanically Galvanized

Size (in.)	Model No.	Drill Bit Diameter (in.)	Wrench Size (in.)	Quantity	
				Box	Carton
⅜ x 5	THD37500HMG	⅜	9/16	50	100
⅜ x 6	THD37600HMG			50	100
½ x 5	THD50500HMG	½	¾	20	80
½ x 6	THD50600HMG			20	80
½ x 6½	THD50612HMG			20	40
½ x 8	THD50800HMG			20	40
¾ x 8½	THD75812HMG	¾	1⅛	5	10
¾ x 10	THD75100HMG			5	10
⅜ x 4	THD37300HMG	⅜	9/16	50	200
⅜ x 4	THD37400HMG			50	200
½ x 4	THD50400HMG	½	¾	20	80
¾ x 6	THDT75600HMG	¾	1⅛	5	20

Mechanical galvanizing meets ASTM B695, Class 65, Type 1. Intended for some pressure-treated wood sill plate applications. Not for use in other corrosive or outdoor environments. See pp. 18-21 or visit **strongtie.com/info** for more corrosion information.

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Titen HD® Installation Information and Additional Data[1]

Characteristic	Symbol	Units	Nominal Anchor Diameter, d_a (in.)									
			¼[4]		⅜		½		⅝[4]		¾	
Installation Information												
Drill Bit Diameter	d_{bit}	in.	¼		⅜		½		⅝		¾	
Baseplate Clearance Hole Diameter	d_c	in.	⅜		½		⅝		¾		⅞	
Maximum Installation Torque	$T_{inst,max}$	ft.-lbf	24[2]		50[2]		65[2]		100[2]		150[2]	
Maximum Impact Wrench Torque Rating	$T_{impact,max}$	ft.-lbf	125[3]		150[3]		340[3]		340[3]		385[3]	
Minimum Hole Depth	h_{hole}	in.	1¾	2⅝	2¾	3½	3¾	4½	4½	6	6	6¾
Nominal Embedment Depth	h_{nom}	in.	1⅝	2½	2½	3¼	3¼	4	4	5½	5½	6¼
Critical Edge Distance	c_{ac}	in.	3	6	2 11/16	3⅝	3 9/16	4½	4½	6⅜	6⅜	7 5/16
Minimum Edge Distance	c_{min}	in.	1½		1¾							
Minimum Spacing	s_{min}	in.	3									
Minimum Concrete Thickness	h_{min}	in.	3¼	3½	4	5	5	6¼	6	8½	8¾	10
Additional Data												
Anchor Category	Category	—	1									
Yield Strength	f_{ya}	psi	100,000		97,000							
Tensile Strength	f_{uta}	psi	125,000		110,000							
Minimum Tensile & Shear Stress Area	A_{se}	in^2	0.042		0.099		0.183		0.276		0.414	
Axial Stiffness in Service Load Range – Uncracked Concrete	β_{uncr}	lb./in.	202,000		715,000							
Axial Stiffness in Service Load Range – Cracked Concrete	β_{cr}	lb./in.	173,000		345,000							

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318-14 Chapter 17.
2. $T_{inst,max}$ is the maximum permitted installation torque for the embedment depth range covered by this table using a torque wrench.
3. $T_{impact,max}$ is the maximum permitted torque rating for impact wrenches for the embedment depth range covered by this table.
4. Data for ¼" anchor is only valid for THDB25 series. Data for the ⅝" anchor is valid only for the THDB62 series.

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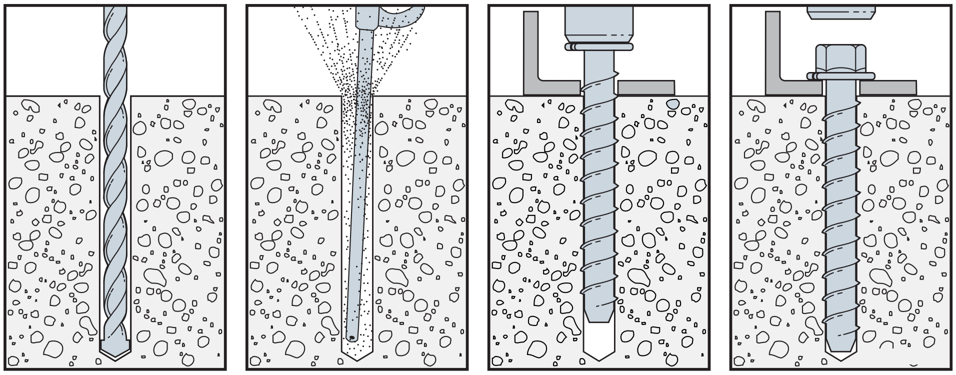
Titen HD® Heavy-Duty Screw Anchor

Additional Installation Information — Hole Dimensions

Titen HD® Diameter (in.)	Wrench Size (in.)	Recommended Fixture Hole Size in Steel (in.)	Min. Hole Depth Overdrill in Concrete (in.)
¼	⅜	⅜ to 7⁄16	⅛
⅜	9⁄16	½ to 9⁄16	¼
½	¾	⅝ to 11⁄16	½
⅝	15⁄16	¾ to 13⁄16	½
¾	1⅛	⅞ to 15⁄16	½

Note: Recommended fixture hole dimensions apply to structural steel greater than ¼" thick only and do not apply to CFS in 97 mil (12 ga.) and thinner. Standard 1⁄16" oversized holes may be used into CFS fixtures and tracks.

Installation Sequence



Titen HD — Tension Loads Attaching Cold-Formed Steel To Normal-Weight Concrete (lb.)[6]

Anchor Size (in.)	Drill Bit (in.)	Edge Distance (in.)	End Distance (in.)	Min. Emb. Depth (in.)	Concrete Thickness (in.)	Spacing (in.)	Concrete[3,4]				Cold-Formed Steel (ASD)[5]			
							LRFD[1,9,10] (Seismic)	LRFD[1,8,10] (Wind)	ASD[2,9,10] (Seismic)	ASD[2,8,10] (Wind)	33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)	68 mil (14 ga.)
¼ x 1⅞	¼	1½	3	1⅝	3¼	6	470	630	330	375	390	505	920	1,160
		1¾	3	1⅝	3¼	6	530	705	370	425				
		3	3	1⅝	3¼	6	540	715	375	430				
¼ x 2¾		1½	3	2½	3½	6	725	965	510	580				
		1¾	3	2½	3½	6	790	1,050	555	630				
		3	3	2½	3½	6	930	1,240	650	745				
⅜ x 3	⅜	1¾	3	2½	4	6	600	800	420	480	585	760	1,380	1,740
½ x 4	½	1¾	4	3¼	5	8	940	1,255	660	755	585	760	1,380	1,740
		3	4	3¼	5	8	1,320	1,760	925	1,055				
		4	4	3¼	5	8	1,490	1,985	1,045	1,190				

1. Anchorage designs conform to ACI 318-14 Chapter 17 and assume cracked concrete with no supplementary reinforcement.
2. Allowable Stress Design (ASD) values are obtained by multiplying Load Resistance Factor Design (LRFD) capacities by 0.7 for seismic and 0.6 for wind.
3. Anchor is considered as an individual anchor without influence from other anchors.
4. Concrete shall have a minimum f'_c of 2,500 psi. Reference ICC-ES ESR-2713 for further information.
5. Cold-Formed Steel (CFS) tension pullover values are based on AISI S-100, Eq. E4.4.2-1, d_W = 0.50" (¼" THD), d_W = 0.75" (⅜" and ½" THD) and Ω = 3.0. Reference General Notes for CFS properties. To convert from ASD to LRFD multiply value by 1.5. Tension values do not account for weak axis bending in the sill member.
6. Governing load is the lesser of concrete and CFS.
7. For conditions not covered by this table, use the Simpson Strong-Tie® Anchor Designer™ software available at **strongtie.com**.
8. Wind design includes SDC A&B.
9. The listed load values are governed by a brittle failure mode, the Designer shall consider ductility requirements of ACI 318-14 Section 17.2.3.4.3 for designing anchorage in Seismic Design Category C–F.
10. For installation in sand-lightweight concrete, concrete values shall be be multiplied by 0.68.

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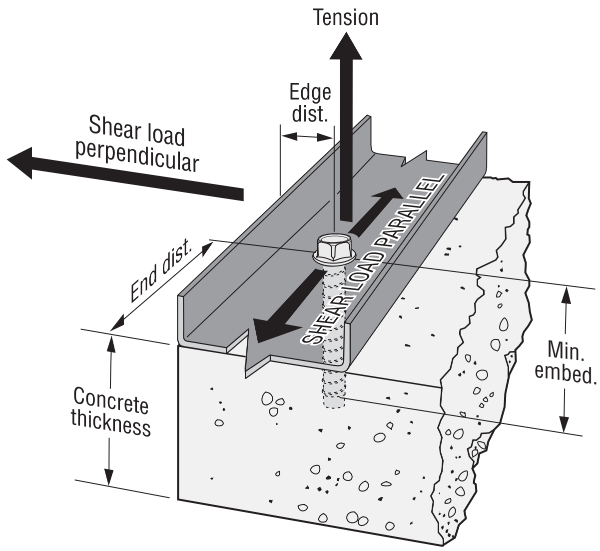
Titen HD — Shear Loads Perpendicular to Edge in Normal-Weight Concrete (lb.)[6]

Anchor Size (in.)	Drill Bit (in.)	Edge Distance (in.)	End Distance (in.)	Min. Emb. Depth (in.)	Concrete Thickness (in.)	Spacing (in.)	Concrete[3,4]				Cold-Formed Steel (ASD)[5]			
							LRFD[1,9,10] (Seismic)	LRFD[1,8,10] (Wind)	ASD[2,9,10] (Seismic)	ASD[2,8,10] (Wind)	33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)	68 mil (14 ga.)
¼ x 1⅞	¼	1½	3	1⅝	3¼	6	305	305	215	185	350	455	830	1,045
		1¾	3	1⅝	3¼	6	385	385	270	230				
		3	3	1⅝	3¼	9	555	555	390	335				
¼ x 2¾		1½	3	2½	3½	6	340	340	235	205				
		1¾	3	2½	3½	6	425	425	300	255				
		3	3	2½	3½	9	635	635	445	380				
⅜ x 3	⅜	1¾	7	2½	4	5¼	475	475	335	285	510	685	1,240	1,565
		3	7	2½	4	9	1,000	1,000	700	600				
½ x 4	½	1¾	8	3¼	5	5¼	545	545	380	325	595	880	1,655	2,085
		3	8	3¼	5	9	1,225	1,225	860	735				

1. Anchorage designs conform to ACI 318-14 Chapter 17 and assume cracked concrete with no supplementary reinforcement.
2. Allowable Stress Design (ASD) values are obtained by multiplying Load Resistance Factor Design (LRFD) capacities by 0.7 for seismic and 0.6 for wind.
3. Shear load is applied perpendicular to the edge of concrete. Anchor is considered as an individual anchor without influence from other anchors.
4. Concrete shall have a minimum f'_c of 2,500 psi. Reference ICC-ES ESR-2713 for further information.
5. Cold-formed steel (CFS) shear values are based on AISI-S100, Eq. E3.3.1-1, $m_f = 0.75$, $\Omega = 2.5$. Reference General Notes for CFS properties. To convert from ASD to LRFD multiply value by 1.5.
6. Governing load is the lesser of concrete and CFS.
7. For conditions not covered by this table, use the Simpson Strong-Tie® Anchor Designer™ software available at **strongtie.com**.
8. Wind design includes SDC A&B.
9. The listed load values are governed by a brittle failure mode, the Designer shall consider ductility requirements of ACI 318-14 Section 17.2.3.5.3 for designing anchorage in Seismic Design Category C–F.
10. For installation in sand-lightweight concrete, concrete values shall be be multiplied by 0.68.



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

U.S. Patent 5,674,035

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Titen HD® Heavy-Duty Screw Anchor

Titen HD — Shear Loads Parallel to Edge in Normal-Weight Concrete (lb./ft.)[6]

Anchor Size (in.)	Drill Bit (in.)	Edge Distance (in.)	End Distance (in.)	Min. Emb. Depth (in.)	Concrete Thickness (in.)	Spacing	Concrete[3,4]				Cold-Formed Steel (ASD)[5]			
							LRFD[1,9,10] (Seismic)	LRFD[1,8,10] (Wind)	ASD[2,9,10] (Seismic)	ASD[2,8,10] (Wind)	33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)	68 mil (14 ga.)
¼ x 1⅞	¼	1½	3	1⅝	3¼	0' – 6"	790	790	550	470	700	910	1,660	2,090
						0' – 8"	595	595	415	355	525	685	1,245	1,570
						1'– 0"	395	395	275	235	350	455	830	1,045
						1'– 4"	295	295	205	175	265	340	625	785
						2' – 0"	200	200	140	120	175	230	415	525
						2' – 8"	150	150	105	90	130	170	310	390
						4' – 0"	100	100	70	60	90	115	210	260
						6' – 0"	65	65	45	40	60	75	140	175
¼ x 1⅞	¼	1¾	3	1⅝	3¼	0' – 6"	840	840	590	500	700	910	1,660	2,090
						0' – 8"	630	630	445	375	525	685	1,245	1,570
						1'– 0"	420	420	295	250	350	455	830	1,045
						1'– 4"	315	315	220	190	265	340	625	785
						2' – 0"	210	210	150	125	175	230	415	525
						2' – 8"	160	160	110	95	130	170	310	390
						4' – 0"	105	105	75	65	90	115	210	260
						6' – 0"	70	70	50	40	60	75	140	175
¼ x 1⅞	¼	3	3	1⅝	3¼	0' – 9"	740	740	520	445	465	605	1,105	1,395
						1'– 0"	555	555	390	335	350	455	830	1,045
						1'– 4"	415	415	295	250	265	340	625	785
						2' – 0"	280	280	195	170	175	230	415	525
						2' – 8"	210	210	145	125	130	170	310	390
						4' – 0"	140	140	100	85	90	115	210	260
						6' – 0"	95	95	65	55	60	75	140	175
¼ x 2¾	¼	1½	3	2½	3½	0' – 6"	900	900	630	540	700	910	1,660	2,090
						0' – 8"	675	675	475	405	525	685	1,245	1,570
						1'– 0"	450	450	315	270	350	455	830	1,045
						1'– 4"	340	340	235	205	265	340	625	785
						2' – 0"	225	225	160	135	175	230	415	525
						2' – 8"	170	170	120	100	130	170	310	390
						4' – 0"	115	115	80	70	90	115	210	260
						6' – 0"	75	75	55	45	60	75	140	175
¼ x 2¾	¼	1¾	3	2½	3½	0' – 6"	960	960	670	580	700	910	1,660	2,090
						0' – 8"	720	720	505	435	525	685	1,245	1,570
						1'– 0"	480	480	335	290	350	455	830	1,045
						1'– 4"	360	360	250	220	265	340	625	785
						2' – 0"	240	240	170	145	175	230	415	525
						2' – 8"	180	180	125	110	130	170	310	390
						4' – 0"	120	120	85	75	90	115	210	260
						6' – 0"	80	80	55	50	60	75	140	175
¼ x 2¾	¼	3	3	2½	3½	0' – 9"	845	845	595	505	465	605	1,105	1,395
						1'– 0"	635	635	445	380	350	455	830	1,045
						1'– 4"	475	475	335	285	265	340	625	785
						2' – 0"	320	320	225	190	175	230	415	525
						2' – 8"	240	240	165	145	130	170	310	390
						4' – 0"	160	160	110	95	90	115	210	260
						6' – 0"	105	105	75	65	60	75	140	175

See footnotes on p. 195.

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Titen HD — Shear Loads Parallel to Edge in Normal-Weight Concrete (lb./ft.)[6] (cont.)

Anchor Size (in.)	Drill Bit (in.)	Edge Distance (in.)	End Distance (in.)	Min. Emb. Depth (in.)	Concrete Thickness (in.)	Spacing	Concrete[3,4]				Cold-Formed Steel (ASD)[5]			
							LRFD[1,9,10] (Seismic)	LRFD[1,8,10] (Wind)	ASD[2,9,10] (Seismic)	ASD[2,8,10] (Wind)	33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)	68 mil (14 ga.)
⅜ x 3	⅜	1¾	7	2½	4	0' – 8"	1,425	1,425	995	855	765	1,030	1,860	2,350
						1'– 0"	950	950	665	570	510	685	1,240	1,565
						1'– 4"	715	715	500	430	385	515	930	1,175
						2' – 0"	475	475	335	285	255	340	620	780
						2' – 8"	355	355	250	215	190	255	465	585
						4' – 0"	240	240	170	145	130	170	310	390
						6' – 0"	160	160	110	95	85	115	205	260
½ x 4	½	1¾	8	3¼	5	0' – 8"	1,645	1,645	1,150	985	895	1,320	2,485	3,130
						1'– 0"	1,095	1,095	765	655	595	880	1,655	2,085
						1'– 4"	820	820	575	490	445	660	1,240	1,565
						2' – 0"	550	550	385	330	300	440	830	1,045
						2' – 8"	410	410	285	245	220	330	620	780
						4' – 0"	275	275	195	165	150	220	415	520
						6' – 0"	185	185	130	110	100	145	275	350
⅜ x 3	⅜	3	7	2½	4	0' – 8"	1,770	1,770	1,240	1,060	765	1,030	1,860	2,350
						1'– 0"	1,180	1,180	825	710	510	685	1,240	1,565
						1'– 4"	885	885	620	530	385	515	930	1,175
						2' – 0"	590	590	415	355	255	340	620	780
						2' – 8"	445	445	310	265	190	255	465	585
						4' – 0"	295	295	205	175	130	170	310	390
						6' – 0"	195	195	135	115	85	115	205	260
½ x 4	½	3	8	3¼	5	0' – 8"	2,505	2,505	1,755	1,505	895	1,320	2,485	3,130
						1'– 0"	1,670	1,670	1,170	1,000	595	880	1,655	2,085
						1'– 4"	1,255	1,255	880	755	445	660	1,240	1,565
						2' – 0"	835	835	585	500	300	440	830	1,045
						2' – 8"	625	625	440	375	220	330	620	780
						4' – 0"	420	420	295	250	150	220	415	520
						6' – 0"	280	280	195	170	100	145	275	350

1. Anchorage designs conform to ACI 318-14 Chapter 17 and assume cracked concrete with no supplementary reinforcement.
2. Allowable Stress Design (ASD) values are obtained by multiplying Load Resistance Factor Design (LRFD) capacities by 0.7 for seismic and 0.6 for wind.
3. Shear load is applied parallel to the edge of concrete. Anchor is considered as an individual anchor without influence from other anchors.
4. Concrete shall have a minimum f'_c of 2,500 psi. Reference ICC-ES ESR-2713 for further information.
5. Cold-formed steel (CFS) shear values are based on AISI-S100, Eq. E3.3.1-1, $m_f = 0.75$, $\Omega = 2.5$. Reference General Notes for CFS properties. To convert from ASD to LRFD multiply value by 1.5.
6. Governing load is the lesser of concrete and CFS.
7. For conditons not covered by this table, use the Simpson Strong-Tie® Anchor Designer™ software available at **strongtie.com**.
8. Wind design includes SDC A&B.
9. The listed load values are governed by a brittle failure mode, the Designer shall consider ductility requirements of ACI 318-14 Section 17.2.3.5.3 for designing anchorage in Seismic Design Category C–F.
10. For installation in sand-lightweight concrete, concrete values shall be be multiplied by 0.68.

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Titen HD® Heavy-Duty Screw Anchor

SIMPSON Strong-Tie®

Titen HD — Tension Loads Attaching Cold-Formed Steel to Top of Normal-Weight Concrete over Metal Deck (lb.)[6,11]

Anchor Size (in.)	Drill Bit (in.)	Min. Edge Distance (in.)	Min. End Distance (in.)	Emb. Depth (in.)	Min. Concrete Thickness (in.)	Spacing (in.)	Concrete[3,4]				Cold-Formed Steel (ASD)[5]			
							LRFD[1,9,10] (Seismic)	LRFD[1,8,10] (Wind)	ASD[2,9,10] (Seismic)	ASD[2,8,10] (Wind)	33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)	68 mil (14 ga.)
¼ x 1⅞	¼	3½	3¾	1⅝	2½	3½	580	775	405	545	390	505	920	1,160
⅜ x 3	⅜	3	7¼	2½	3¼	3	660	880	460	615	585	760	1,380	1,740

1. Anchorage designs conform to ACI 318-14 Chapter 17 and assume cracked concrete with no supplementary reinforcement.
2. Allowable Stress Design (ASD) values are obtained by multiplying Load Resistance Factor Design (LRFD) capacities by 0.7 for seismic and 0.6 for wind.
3. Anchor is considered as an individual anchor without influence from other anchors.
4. Concrete shall have a minimum f'_c of 3,000 psi. Reference ICC-ES ESR-2713 for further information.
5. Cold-formed steel (CFS) tension pullover values are based on AISI S-100, Eq. E4.4.2-1, d_w = 0.50" (¼" THD), d_w = 0.75" (⅜" THD) and Ω = 3.0. Reference General Notes for CFS properties. To convert from ASD to LRFD multiply value by 1.5. Tension values do not account for weak axis bending in the sill member.
6. Governing load shall be the lesser of concrete and CFS.
7. For conditions not covered by this table, use the Simpson Strong-Tie® Anchor Designer™ software available at **strongtie.com**.
8. Wind design values include SDC A&B.
9. The listed load values are governed by a brittle failure mode, the Designer shall consider ductility requirements of ACI 318-14 Section 17.2.3.4.3 for designing anchorage in Seismic Design Category C–F.
10. For installation in top of sand-lightweight concrete over metal deck, concrete values shall be be multiplied by 0.68.
11. Metal deck configuration to comply with Figure 5 of ICC-ES ESR-2713.

Titen HD — Shear Loads Perpendicular to Edge in Top of Normal-Weight Concrete over Metal Deck (lb.)[6,11]

Anchor Size (in.)	Drill Bit (in.)	Min. Edge Distance (in.)	Min. End Distance (in.)	Emb. Depth (in.)	Min. Concrete Thickness (in.)	Spacing (in.)	Concrete[3,4]				Cold-Formed Steel (ASD)[5]			
							LRFD[1,9,10] (Seismic)	LRFD[1,8,10] (Wind)	ASD[2,9,10] (Seismic)	ASD[2,8,10] (Wind)	33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)	68 mil (14 ga.)
¼ x 1⅞	¼	3½	3¾	1⅝	2½	3½	450	450	315	315	350	455	830	1,045
⅜ x 3	⅜	3	7¼	2½	3¼	3	660	660	460	460	510	685	1,240	1,565

1. Anchorage designs conform to ACI 318-14 Chapter 17 and assume cracked concrete with no supplementary reinforcement.
2. Allowable Stress Design (ASD) values are obtained by multiplying Load Resistance Factor Design (LRFD) capacities by 0.7 for seismic and 0.6 for wind.
3. Anchor is considered as an individual anchor without influence from other anchors.
4. Concrete shall have a minimum f'_c of 3,000 psi. Reference ICC-ES ESR-2713 for further information.
5. Cold-formed steel (CFS) shear values are based on AISI-S100, Eq. E3.3.1-1, m_f = 0.75, Ω = 2.5. Reference General Notes for CFS properties. To convert from ASD to LRFD multiply value by 1.5.
6. Governing load shall be the lesser of concrete and CFS.
7. For conditions not covered by this table, use the Simpson Strong-Tie® Anchor Designer™ software available at **strongtie.com**.
8. Wind design values include SDC A&B.
9. The listed load values are governed by a brittle failure mode, the Designer shall consider ductility requirements of ACI 318-14 Section 17.2.3.5.3 for designing anchorage in Seismic Design Category C–F.
10. For installation in top of sand-lightweight concrete over metal deck, concrete values shall be be multiplied by 0.68.
11. Metal deck configuration to comply with Figure 5 of ICC-ES ESR-2713.

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Titen HD — Shear Loads Parallel to Edge in Top of Normal-Weight Concrete over Metal Deck (lb./ft.)[6,11]

Anchor Size (in.)	Drill Bit (in.)	Min. Edge Distance (in.)	Min. End Distance (in.)	Emb. Depth (in.)	Min. Concrete Thickness (in.)	Spacing	Concrete[3,4]				Cold-Formed Steel (ASD)[5]			
							LRFD[1,9,10] (Seismic)	LRFD[1,8,10] (Wind)	ASD[2,9,10] (Seismic)	ASD[2,8,10] (Wind)	33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)	68 mil (14 ga.)
¼ x 1⅞	¼	3½	3¾	1⅝	2½	1'–0"	635	635	445	445	350	455	830	1,045
						1'–4"	475	475	335	335	265	340	625	785
⅜ x 3	⅜	3	7¼	2½	3¼	0'–9"	1,590	1,590	1,115	1,115	680	915	1,655	2,085
						1'–0"	1,195	1,195	835	835	510	685	1,240	1,565
						1'–4"	895	895	625	625	385	515	930	1,175

1. Anchorage designs conform to ACI 318-14 Chapter 17 and assume cracked concrete with no supplementary reinforcement.
2. Allowable Stress Design (ASD) values are obtained by multiplying Load Resistance Factor Design (LRFD) capacities by 0.7 for seismic and 0.6 for wind.
3. Anchor is considered as an individual anchor without influence from other anchors.
4. Concrete shall have a minimum f'_c of 3,000 psi. Reference ICC-ES ESR-2713 for further information.
5. Cold-formed steel (CFS) shear values are based on AISI-S100, Eq. E3.3.1-1, $m_f = 0.75$, $\Omega = 2.5$. Reference General Notes for CFS properties. To convert from ASD to LRFD multiply value by 1.5.
6. Governing load shall be the lesser of concrete and CFS.
7. For conditions not covered by this table, use the Simpson Strong-Tie® Anchor Designer™ software available at **strongtie.com**.
8. Wind design values include SDC A&B.
9. The listed load values are governed by a brittle failure mode, the Designer shall consider ductility requirements of ACI 318-14 Section 17.2.3.5.3 for designing anchorage in Seismic Design Category C–F.
10. For installation in top of sand-lightweight concrete over metal deck, concrete values shall be be multiplied by 0.68.
11. Metal deck configuration to comply with Figure 5 of ICC-ES ESR-2713.

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Strong-Bolt® 2 Wedge Anchor

A wedge-type expansion anchor designed for optimal performance in cracked and uncracked concrete as well as uncracked masonry. The Strong-Bolt 2 is available in carbon steel (¼" through 1" diameter), Type 304 (¼" diameter only) and Type 316 stainless steel (¼" through ¾" diameter).

Features:

- Code listed under IBC/IRC for cracked and uncracked concrete per ICC-ES ESR-3037
- Code listed under IBC/IRC for masonry per IAPMO UES ER-240
- Qualified for static and seismic loading conditions (seismic design categories A through F)
- Suitable for horizontal, vertical and overhead applications
- Qualified for minimum concrete thickness of 3¼", and lightweight concrete-over-metal deck thickness of 2½" and 3¼"
- Standard (ANSI) fractional sizes: fits standard fixtures and installs with common drill bit and tool sizes

Codes: ICC-ES ESR-3037 (concrete); IAPMO UES ER-240 (carbon steel in CMU); City of L.A. RR25891 (concrete), RR25936 (carbon steel in CMU); Florida FL-15731.2; FL-16230.4; UL File Ex3605; FM 3043342 and 3047639; Mulitiple DOT listings; meets the requirements of Federal Specifications A-A-1923A, Type 4

Material: Carbon-steel stud with special alloy clip; stainless-steel stud with stainless-steel clip

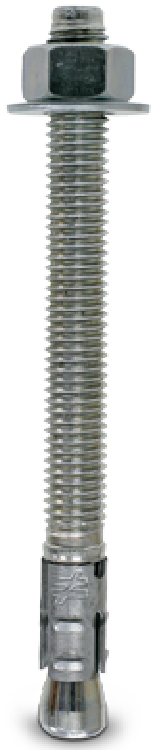
Coating: Zinc plated

c UL us LISTED FM APPROVED

Installation: Do not use an impact wrench to set or tighten the Strong-Bolt 2 anchor.

Caution: Oversized holes in the base material will make it difficult to set the anchor and will reduce the anchor's load capacity.

- Drill a hole in the base material using a carbide drill bit the same diameter as the nominal diameter of the anchor to be installed. Drill the hole to the specified minimum hole depth and blow it clean using compressed air. Overhead installations need not be blown clean. Alternatively, drill the hole deep enough to accommodate embedment depth and dust from drilling.
- Assemble the anchor with nut and washer so that the top of the nut is flush with the top of the anchor. Place the anchor in the fixture and drive into the hole until washer and nut are tight against the fixture.
- Tighten to the required installation torque.



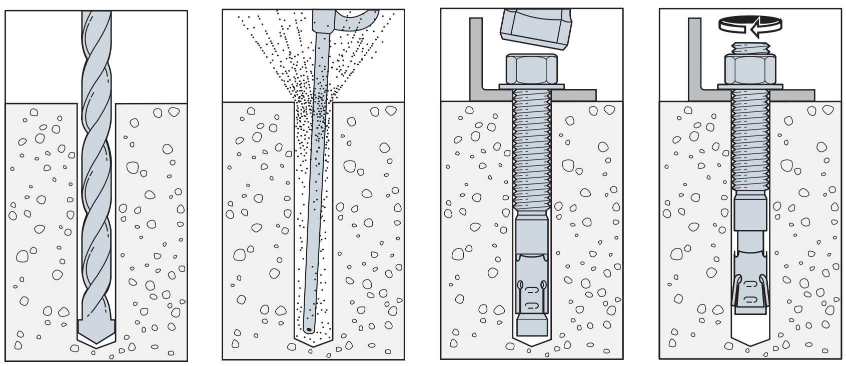
Strong-Bolt 2 Wedge Anchor

Cracked Concrete CODE LISTED

Head Stamp

The head is stamped with the length identification letter, bracketed top and bottom by horizontal lines.

Installation Sequence



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Strong-Bolt® 2 Wedge Anchor

Strong-Bolt® 2 Anchor Product Data

Size (in.)	Type 304 Stainless Steel Model No.	Type 316 Stainless Steel Model No.	Drill Bit Diameter (in.)	Thread Length (in.)	Quantity	
					Box	Carton
¼ x 1¾	STB2-251344SS	STB2-251346SS	¼	1 5⁄16	100	500
¼ x 2¼	STB2-252144SS	STB2-252146SS	¼	1 7⁄16	100	500
¼ x 3¼	STB2-253144SS	STB2-253146SS	¼	2 7⁄16	100	500
⅜ x 2¾	STB2-372344SS	STB2-372346SS	⅜	1 5⁄16	50	250
⅜ x 3	STB2-373004SS	STB2-373006SS	⅜	1 9⁄16	50	250
⅜ x 3½	STB2-373124SS	STB2-373126SS	⅜	2 1⁄16	50	250
⅜ x 3¾	STB2-373344SS	STB2-373346SS	⅜	2 5⁄16	50	250
⅜ x 5	STB2-375004SS	STB2-375006SS	⅜	3 9⁄16	50	200
⅜ x 7	STB2-377004SS	STB2-377006SS	⅜	5 9⁄16	50	200
½ x 3¾	STB2-503344SS	STB2-503346SS	½	2 1⁄16	25	125
½ x 4¼	STB2-504144SS	STB2-504146SS	½	2 9⁄16	25	100
½ x 4¾	STB2-504344SS	STB2-504346SS	½	3 1⁄16	25	100
½ x 5½	STB2-505124SS	STB2-505126SS	½	3 13⁄16	25	100
½ x 7	STB2-507004SS	STB2-507006SS	½	5 5⁄16	25	100
½ x 8½	STB2-508124SS	STB2-508126SS	½	6	25	50
½ x 10	STB2-501004SS	STB2-501006SS	½	6	25	50
⅝ x 4½	STB2-624124SS	STB2-624126SS	⅝	2 7⁄16	20	80
⅝ x 5	STB2-625004SS	STB2-625006SS	⅝	2 15⁄16	20	80
⅝ x 6	STB2-626004SS	STB2-626006SS	⅝	3 15⁄16	20	80
⅝ x 7	STB2-627004SS	STB2-627006SS	⅝	4 15⁄16	20	80
⅝ x 8½	STB2-628124SS	STB2-628126SS	⅝	6	20	40
⅝ x 10	STB2-621004SS	STB2-621006SS	⅝	6	10	20
¾ x 5½	STB2-755124SS	STB2-755126SS	¾	3 3⁄16	10	40
¾ x 6¼	STB2-756144SS	STB2-756146SS	¾	3 15⁄16	10	40
¾ x 7	STB2-757004SS	STB2-757006SS	¾	4 11⁄16	10	40
¾ x 8½	STB2-758124SS	STB2-758126SS	¾	6	10	20

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SIMPSON Strong-Tie®

Strong-Bolt® 2 Wedge Anchor

Carbon Steel Strong-Bolt® 2 Installation Information[1]

Characteristic	Symbol	Units	Nominal Anchor Diameter, d_a (in.)											
			¼[4]	⅜[5]		½[5]			⅝[5]		¾[5]		1[5]	
Installation Information														
Nominal diameter	d_a	in.	¼	⅜		½			⅝		¾		1	
Drill bit diameter	d	in.	¼	⅜		½			⅝		¾		1	
Baseplate clearance hole diameter[2]	d_c	in.	5⁄16	7⁄16		9⁄16			11⁄16		⅞		1⅛	
Installation torque	T_{inst}	ft-lbf	4	30		60			90		150		230	
Nominal embedment depth	h_{nom}	in.	1¾	1⅞	2⅞	2¾		3⅞	3⅜	5⅛	4⅛	5¾	5¼	9¾
Effective embedment depth	h_{ef}	in.	1½	1½	2½	2¼		3⅜	2¾	4½	3⅜	5	4½	9
Minimum hole depth	h_{hole}	in.	1⅞	2	3	3		4⅛	3⅝	5⅜	4⅜	6	5½	10
Minimum overall anchor length	ℓ_{anch}	in.	2¼	2¾	3½	3¾		5½	4½	6	5½	7	7	13
Critical edge distance	c_{ac}	in.	2½	6½	6	6½	6½	7½	7½	9	9	8	18	13½
Minimum edge distance	c_{min}	in.	1¾	6		7	4	4	6½		6½		8	
	for $s \geq$	in.	—	—		—	—	—	—		8		—	
Minimum spacing	s_{min}	in.	2¼	3		7	4	4	5		7		8	
	for $c \geq$	in.	—	—		—	—	—	—		?		—	
Minimum concrete thickness	h_{min}	in	3¼	3¼	4½	4½	5½	6	5½	7⅞	6¾	8¾	9	13½
Additional Data														
Yield strength	f_{ya}	psi	56,000	92,000		85,000					70,000		60,000	
Tensile strength	f_{uta}	psi	70,000	115,000							110,000		78,000	
Minimum tensile and shear stress area	A_{se}	in.²	0.0318	0.0514		0.105			0.166		0.270		0.472	
Axial stiffness in service load range — Cracked and uncracked concrete	β	lb./in.	73,700[3]	34,820		63,570			91,370		118,840		299,600	

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318-14 Chapter 17.
2. The clearance must comply with applicable code requirements for the connected element.
3. The tabulated value of β for ¼"-diameter carbon steel Strong-Bolt 2 anchor is for installations in uncracked concrete only.
4. The ¼"-diameter (6.4mm) anchor may be installed in top of uncracked normal-weight and sand-lightweight concrete over profile steel deck, where concrete thickness above upper flute meets the minimum thickness specified in this table.
5. The ⅜" through 1"-diameter (9.5mm through 25.4mm) anchors may be installed in top of cracked and uncracked normal-weight and sand-lightweight concrete over profile steel deck, where concrete thickness above upper flute meets the minimum thickness specified in this table.

Strong-Bolt 2 Carbon Steel — Tension Loads Attaching Cold-Formed Steel to Normal-Weight Concrete (lb.)[6]

Anchor Dia. (in.)	Drill Bit (in.)	Edge Distance (in.)	End Distance (in.)	Min. Emb. Depth (in.)	Concrete Thickness (in.)	Spacing (in.)	Concrete[3,4]				Cold-Formed Steel (ASD)[5]			
							LRFD[1,9,10] (Seismic)	LRFD[1,8,10] (Wind)	ASD[2,9,10] (Seismic)	ASD[2,8,10] (Wind)	33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)	68 mil (14 ga.)
⅜	⅜	6	6	1⅞	3¼	4½	635	845	445	505	615	805	1,460	1,835
				2⅞	4½	7½	1,355	1,805	950	1,085				
½	½	7	7	2¾	4½	7	1,400	1,865	980	1,120	825	1,080	1,955	2,460
		4	4	2¾	5½	6¾	1,400	1,865	980	1,120				
		4	4	3⅞	6	4	1,390	1,850	975	1,110				

1. Anchorage designs conform to ACI 318-14 Chapter 17 and assume cracked concrete with no supplementary reinforcement.
2. Allowable Stress Design (ASD) values are obtained by multiplying Load Resistance Factor Design (LRFD) capacities by 0.7 for seismic and 0.6 for wind.
3. Anchor is considered as an individual anchor without influence from other anchors.
4. Concrete shall have a minimum f'_c of 2,500 psi. Reference ICC-ES ESR-3037 for further information.
5. Cold-formed steel (CFS) tension pullover values are based on AISI S-100, Eq. E4.4.2-1, d_w = 0.793" (⅜" STB2), d_w = 1.062" (½" STB2) and Ω = 3.0. Reference General Notes for CFS properties. To convert from ASD to LRFD multiply value by 1.5. Tension values do not account for weak axis bending in the sill member.
6. Governing load shall be the lesser of concrete and CFS.
7. For conditions not covered by this table, use the Simpson Strong-Tie® Anchor Designer™ software available at **strongtie.com**.
8. Wind design values include SDC A&B.
9. The listed load values are governed by a brittle failure mode, the Designer shall consider ductility requirements of ACI 318-14 Section 17.2.3.4.3 for designing anchorage in Seismic Design Category C–F.
10. For installation in sand-lightweight concrete, concrete values shall be multiplied by 0.68.

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Strong-Bolt 2 Carbon Steel — Shear Loads Perpendicular to Edge in Normal-Weight Concrete (lb.)[6]

Anchor Dia. (in.)	Drill Bit (in.)	Edge Distance (in.)	End Distance (in.)	Min. Emb. Depth (in.)	Concrete Thickness (in.)	Spacing (in.)	Concrete[3,4]				Cold-Formed Steel (ASD)[5]			
							LRFD[1,9,10] (Seismic)	LRFD[1,8,10] (Wind)	ASD[2,9,10] (Seismic)	ASD[2,8,10] (Wind)	33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)	68 mil (14 ga.)
⅜	⅜	6	6	1⅞	3¼	4½	850	850	595	510	510	685	1,240	1,565
				2⅞	4½	7½	1,170	1,170	820	700				
½	½	7	7	2¾	4½	7	1,490	1,490	1,045	895	595	880	1,655	2,085
		4	4	2¾	5½	6¾	1,125	1,125	790	675				
		4	4	3⅞	6	4	1,065	1,065	745	640				

1. Anchorage designs conform to ACI 318-14 Chapter 17 and assume cracked concrete with no supplementary reinforcement.
2. Allowable Stress Design (ASD) values are obtained by multiplying Load Resistance Factor Design (LRFD) capacities by 0.7 for seismic and 0.6 for wind.
3. Anchor is considered as an individual anchor without influence from other anchors.
4. Concrete shall have a minimum f'_c of 2,500 psi. Reference ICC-ES ESR-3037 for further information.
5. Cold-formed steel (CFS) shear values are based on AISI-S100, Eq. E3.3.1-1, mf = 0.75, Ω = 2.5. Reference General Notes for CFS properties. To convert from ASD to LRFD multiply value by 1.5.
6. Governing load shall be the lesser of concrete and CFS.
7. For conditions not covered by this table, use the Simpson Strong-Tie® Anchor Designer™ software available at **strongtie.com**.
8. Wind design values include SDC A&B.
9. The listed load values are governed by a brittle failure mode, the Designer shall consider ductility requirements of ACI 318-14 Section 17.2.3.5.3 for designing anchorage in Seismic Design Category C–F.
10. For installation in sand-lightweight concrete, concrete values shall be multiplied by 0.68.

Strong-Bolt 2 Carbon Steel — Shear Loads Parallel to Edge in Normal-Weight Concrete (lb./ft.)[6]

Anchor Dia. (in.)	Drill Bit (in.)	Edge Distance (in.)	End Distance (in.)	Min. Emb. Depth (in.)	Concrete Thickness (in.)	Spacing (in.)	Concrete[3,4]				Cold-Formed Steel (ASD)[5]			
							LRFD[1,9,10] (Seismic)	LRFD[1,8,10] (Wind)	ASD[2,9,10] (Seismic)	ASD[2,8,10] (Wind)	33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)	68 mil (14 ga.)
⅜	⅜	6	6	1⅞	3¼	1'– 0"	1,090	1,090	765	655	510	685	1,240	1,565
						1'– 4"	820	820	575	490	385	515	930	1,175
						2' – 0"	545	545	380	325	255	340	620	780
						2' – 8"	410	410	285	245	190	255	465	585
						4' – 0"	275	275	195	165	130	170	310	390
						6' – 0"	180	180	125	110	85	115	205	260
⅜	⅜	6	6	2-⅞	4½	0' – 8"	1,755	1,755	1,230	1,055	765	1,030	1,860	2,350
						1'– 0"	1,170	1,170	820	700	510	685	1,240	1,565
						1'– 4"	880	880	615	530	385	515	930	1,175
						2' – 0"	585	585	410	350	255	340	620	780
						2' – 8"	440	440	310	265	190	255	465	585
						4' – 0"	295	295	205	175	130	170	310	390
						6' – 0"	195	195	135	115	85	115	205	260
½	½	4	4	2¾	5½	1'– 0"	1,345	1,345	940	805	595	880	1,655	2,085
						1'– 4"	1,010	1,010	705	605	445	660	1,240	1,565
						2' – 0"	675	675	470	405	300	440	830	1,045
						2' – 8"	505	505	355	305	220	330	620	780
						4' – 0"	335	335	235	200	150	220	415	520
						6' – 0"	225	225	160	135	100	145	275	350
½	½	4	4	3⅞	6	1'– 0"	1,520	1,520	1,065	910	595	880	1,655	2,085
						1'– 4"	1,140	1,140	800	685	445	660	1,240	1,565
						2' – 0"	760	760	530	455	300	440	830	1,045
						2' – 8"	570	570	400	340	220	330	620	780
						4' – 0"	380	380	265	230	150	220	415	520
						6' – 0"	255	255	180	155	100	145	275	350

1. Anchorage designs conform to ACI 318-14 Chapter 17 and assume cracked concrete with no supplementary reinforcement.
2. Allowable Stress Design (ASD) values are obtained by multiplying Load Resistance Factor Design (LRFD) capacities by 0.7 for seismic and 0.6 for wind.
3. Anchor is considered as an individual anchor without influence from other anchors.
4. Concrete shall have a minimum f'_c of 2,500 psi. Reference ICC-ES ESR-3037 for further information.
5. Cold-formed steel (CFS) shear values are based on AISI-S100, Eq. E3.3.1-1, m_f = 0.75, Ω = 2.5. Reference General Notes for CFS properties. To convert from ASD to LRFD multiply value by 1.5.
6. Governing load shall be the lesser of concrete and CFS.
7. For conditions not covered by this table, use the Simpson Strong-Tie® Anchor Designer™ software available at **strongtie.com**.
8. Wind design values include SDC A&B.
9. The listed load values are governed by a brittle failure mode, the Designer shall consider ductility requirements of ACI 318-14 Section 17.2.3.5.3 for designing anchorage in Seismic Design Category C–F.
10. For installation in sand-lightweight concrete, concrete values shall be multiplied by 0.68.

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Strong-Bolt® 2 Wedge Anchor

Carbon Steel Strong-Bolt 2 — Tension Loads Attaching Cold-Formed Steel to Top of Normal-Weight Concrete over Metal Deck (lb.)[6,11]

Anchor Size (in.)	Drill Bit (in.)	Min. Edge Distance (in.)	Min. End Distance (in.)	Emb. Depth (in.)	Min. Concrete Thickness (in.)	Spacing (in.)	Concrete[3,4]				Cold-Formed Steel (ASD)[5]			
							LRFD[1,9,10] (Seismic)	LRFD[1,8,10] (Wind)	ASD[2,9,10] (Seismic)	ASD[2,8,10] (Wind)	33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)	68 mil (14 ga.)
⅜ x 2¾	⅜	4¾	4¾	1⅞	2½	7	695	925	485	555	615	805	1,460	1,835
⅜ x 2¾	⅜	4½	4½	1⅞	3¼	6½								
½ x 3¾	½	4¾	4¾	2¾	3¼	8	1,530	2,040	1,070	1,225	825	1,080	1,955	2,460

1. Anchorage designs conform to ACI 318-14 Chapter 17 and assume cracked concrete with no supplementary reinforcement.
2. Allowable Stress Design (ASD) values are obtained by multiplying Load Resistance Factor Design (LRFD) capacities by 0.7 for seismic and 0.6 for wind.
3. Anchor is considered as an individual anchor without influence from other anchors.
4. Concrete shall have a minimum f'_c of 3,000 psi. Reference ICC-ES ESR-3037 for further information.
5. Cold-formed steel (CFS) tension pullover values are based on AISI S-100, Eq. E4.4.2-1, d_W = 0.793" (⅜" STB2), d_W = 1.062" (½" STB2) and Ω = 3.0. Reference General Notes for CFS properties. To convert from ASD to LRFD multiply value by 1.5. Tension values do not account for weak axis bending in the sill member.
6. Governing load shall be the lesser of concrete and CFS.
7. For conditions not covered by this table, use the Simpson Strong-Tie® Anchor Designer™ software available at **strongtie.com**.
8. Wind design values include SDC A&B.
9. The listed load values are governed by a brittle failure mode, the Designer shall consider ductility requirements of ACI 318-14 Section 17.2.3.4.3 for designing anchorage in Seismic Design Category C–F.
10. For installation in top of sand-lightweight concrete over metal deck, concrete values shall be be multiplied by 0.68.
11. Metal deck configuration to comply with Figure 5 of ICC-ES ESR-3037.

Carbon Steel Strong-Bolt 2 — Shear Loads Perpendicular to Edge in Top of Normal-Weight Concrete over Metal Deck (lb.)[6,11]

Anchor Size (in.)	Drill Bit (in.)	Min. Edge Distance (in.)	Min. End Distance (in.)	Emb. Depth (in.)	Min. Concrete Thickness (in.)	Spacing (in.)	Concrete[3,4]				Cold-Formed Steel (ASD)[5]			
							LRFD[1,9,10] (Seismic)	LRFD[1,8,10] (Wind)	ASD[2,9,10] (Seismic)	ASD[2,8,10] (Wind)	33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)	68 mil (14 ga.)
⅜ x 2¾	⅜	4¾	4¾	1⅞	2½	7	790	790	555	475	510	685	1,240	1,565
⅜ x 2¾	⅜	4½	4½	1⅞	3¼	6½	850	850	595	510				
½ x 3¾	½	4¾	4¾	2¾	3¼	8	1,125	1,125	790	675	595	880	1,655	2,085

1. Anchorage designs conform to ACI 318-14 Chapter 17 and assume cracked concrete with no supplementary reinforcement.
2. Allowable Stress Design (ASD) values are obtained by multiplying Load Resistance Factor Design (LRFD) capacities by 0.7 for seismic and 0.6 for wind.
3. Anchor is considered as an individual anchor without influence from other anchors.
4. Concrete shall have a minimum f'_c of 3,000 psi. Reference ICC-ES ESR-3037 for further information.
5. Cold-formed steel (CFS) shear values are based on AISI-S100, Eq. E3.3.1-1, m_f = 0.75, Ω = 2.5. Reference General Notes for CFS properties. To convert from ASD to LRFD multiply value by 1.5.
6. Governing load shall be the lesser of concrete and CFS.
7. For conditions not covered by this table, use the Simpson Strong-Tie® Anchor Designer™ software available at **strongtie.com**.
8. Wind design values include SDC A&B.
9. The listed load values are governed by a brittle failure mode, the Designer shall consider ductility requirements of ACI 318-14 Section 17.2.3.5.3 for designing anchorage in Seismic Design Category C–F.
10. For installation in top of sand-lightweight concrete over metal deck, concrete values shall be be multiplied by 0.68.
11. Metal deck configuration to comply with Figure 5 of ICC-ES ESR-3037.

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Carbon Steel Strong-Bolt 2 — Shear Loads Parallel to Edge in Top of Normal-Weight Concrete over Metal Deck (lb./ft.)[6,11]

Anchor Size (in.)	Drill Bit (in.)	Min. Edge Distance (in.)	Min. End Distance (in.)	Emb. Depth (in.)	Min. Concrete Thickness (in.)	Spacing (in.)	Concrete[3,4]				Cold-Formed Steel (ASD)[5]			
							LRFD[1,9,10] (Seismic)	LRFD[1,8,10] (Wind)	ASD[2,9,10] (Seismic)	ASD[2,8,10] (Wind)	33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)	68 mil (14 ga.)
⅜ x 2¾	⅜	4¾	4¾	1⅞	2½	1'–0"	995	995	695	595	510	685	1,240	1,565
						1'–4"	745	745	520	445	385	515	930	1,175
⅜ x 2¾	⅜	4½	4½	1⅞	3¼	1'–0"	1,075	1,075	755	645	510	685	1,240	1,565
						1'–4"	805	805	565	485	385	515	930	1,175
½ x 3¾	½	4¾	4¾	2¾	3¼	1'–0"	1,345	1,345	940	805	595	880	1,655	2,085
						1'–4"	1,005	1,005	705	605	445	660	1,240	1,565

1. Anchorage designs conform to ACI 318-14 Chapter 17 and assume cracked concrete with no supplementary reinforcement.
2. Allowable Stress Design (ASD) values are obtained by multiplying Load Resistance Factor Design (LRFD) capacities by 0.7 for seismic and 0.6 for wind.
3. Anchor is considered as an individual anchor without influence from other anchors.
4. Concrete shall have a minimum f'_c of 3,000 psi. Reference ICC-ES ESR-3037 for further information.
5. Cold-formed steel (CFS) shear values are based on AISI-S100, Eq. E3.3.1-1, $m_f = 0.75$, $\Omega = 2.5$. Reference General Notes for CFS properties. To convert from ASD to LRFD multiply value by 1.5.
6. Governing load shall be the lesser of concrete and CFS.
7. For conditions not covered by this table, use the Simpson Strong-Tie® Anchor Designer™ software available at **strongtie.com**.
8. Wind design values include SDC A&B.
9. The listed load values are governed by a brittle failure mode, the Designer shall consider ductility requirements of ACI 318-14 Section 17.2.3.5.3 for designing anchorage in Seismic Design Category C–F.
10. For installation in top of sand-lightweight concrete over metal deck, concrete values shall be be multiplied by 0.68.
11. Metal deck configuration to comply with Figure 5 of ICC-ES ESR-3037.

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Titen® 2 Concrete and Masonry Screws

SIMPSON Strong-Tie®

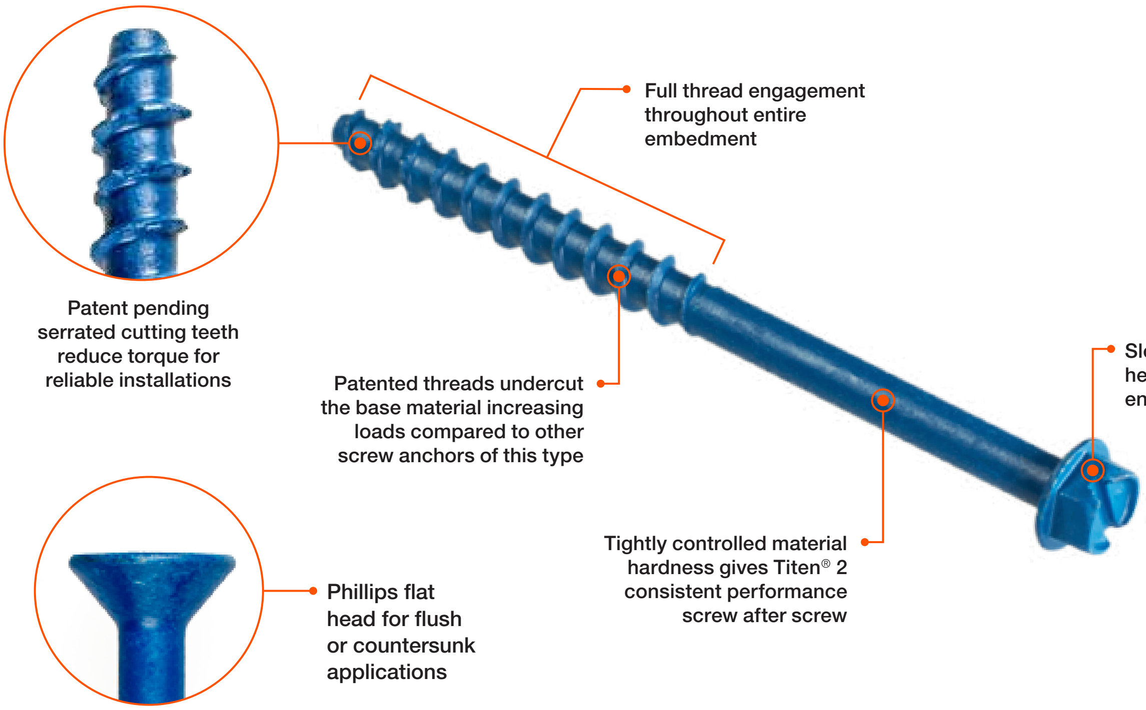
With patented undercutting threads that make installation easier and increase load capacity, the Titen® 2 concrete and masonry screw is ideal for attaching all types of components to concrete and masonry. The improved thread design undercuts the base material more efficiently, reducing installation torque and making it easier to drive without binding, snapping or stripping, even during installation into hard base material.

Features:

- Patented undercutting threads reduce installation torque
- Innovative design increases load capacity
- Code listed in accordance with ICC-ES AC193 for concrete application (IAPMO UES ER-449) and ICC-ES AC106 for masonry application (IAPMO UES ER-466)
- Suitable for near-edge concrete installations without expansion forces and cracking
- Installs with Standard ANSI drill bits (bit included in larger count boxes)
- Zinc plated with a baked-on ceramic coating
- Preservative treated wood applications: suited for use in non-ammonia formulations of CCA, ACQ-C, ACQ-D, CA-B, BX/DOT and zinc borate
- Use in dry interior environments only

Blue Titen 2 Hex Head | Blue Titen 2 Phillips Flat-Head | White Titen 2 Phillips Flat-Head

U.S. Patent Pending



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Titen® 2 Concrete and Masonry Screws

SIMPSON Strong-Tie®

Blue Titen® 2 Product Data (3⁄16" diameter)

Size	Head Style	Model No.	Drill Bit Diameter	Quantity	
				Box	Carton
3⁄16" x 1¼"	¼" Hex	TTN2-18114H	5⁄32"	100	1,600
3⁄16" x 1¾"		TTN2-18134H		100	500
3⁄16" x 2¼"		TTN2-18214H		100	500
3⁄16" x 2¾"		TTN2-18234H		100	500
3⁄16" x 3¼"		TTN2-18314H		100	400
3⁄16" x 3¾"		TTN2-18334H		100	400
3⁄16" x 4"		TTN2-18400H		100	1,600
3⁄16" x 1¼"	#2 Phillips Flat	TTN2-18114PF	5⁄32"	100	500
3⁄16" x 1¾"		TTN2-18134PF		100	500
3⁄16" x 2¼"		TTN2-18214PF		100	500
3⁄16" x 2¾"		TTN2-18234PF		100	400
3⁄16" x 3¼"		TTN2-18314PF		100	400
3⁄16" x 3¾"		TTN2-18334PF		100	400
3⁄16" x 4"		TTN2-18400PF		100	400

Blue Titen® 2 Product Data (¼" diameter)

Size	Head Style	Model No.	Drill Bit Diameter	Quantity	
				Box	Carton
¼" x 1¼"	5⁄16" Hex	TTN2-25114H	3⁄16"	100	1,600
¼" x 1¾"		TTN2-25134H		100	500
¼" x 2¼"		TTN2-25214H		100	500
¼" x 2¾"		TTN2-25234H		100	500
¼" x 3¼"		TTN2-25314H		100	400
¼" x 3¾"		TTN2-25334H		100	400
¼" x 4"		TTN2-25400H		100	1,600
¼" x 5"		TTN2-25500H		100	500
¼" x 6"		TTN2-25600H		100	500
¼" x 1¼"	#3 Phillips Flat	TTN2-25114PF	3⁄16"	100	500
¼" x 1¾"		TTN2-25134PF		100	400
¼" x 2¼"		TTN2-25214PF		100	400
¼" x 2¾"		TTN2-25234PF		100	400
¼" x 3¼"		TTN2-25314PF		100	400
¼" x 3¾"		TTN2-25334PF		100	400
¼" x 4"		TTN2-25400PF		100	400
¼" x 5"		TTN2-25500PF		100	400
¼" x 6"		TTN2-25600PF		100	400

White Titen® 2 Product Data (Phillips Flat-Head)

Size	Head Style	Model No.	Drill Bit Diameter	Quantity	
				Box	Carton
3⁄16" x 1¼"	#2 Phillips Flat	TTN2W18114PF	5⁄32"	100	1,600
3⁄16" x 1¾"		TTN2W18134PF		100	500
3⁄16" x 2¼"		TTN2W18214PF		100	500
3⁄16" x 2¾"		TTN2W18234PF		100	500
3⁄16" x 3¼"		TTN2W18314PF		100	400
3⁄16" x 3¾"		TTN2W18334PF		100	400
¼" x 1¼"	#3 Phillips Flat	TTN2W25114PF	3⁄16"	100	1,600
¼" x 1¾"		TTN2W25134PF		100	500
¼" x 2¼"		TTN2W25214PF		100	500
¼" x 2¾"		TTN2W25234PF		100	500
¼" x 3¼"		TTN2W25314PF		100	400
¼" x 3¾"		TTN2W25334PF		100	400

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Titen® 2 Concrete and Masonry Screws

SIMPSON Strong-Tie®

Titen 2 — Tension Loads Attaching Cold-Formed Steel to Normal-Weight Concrete (lb.)[6]

Anchor Diameter (in.)	Drill Bit (in.)	Edge Distance (in.)	End Distance (in.)	Min. Emb. Depth (in.)	Concrete Thickness (in.)	Min. Spacing (in.)	Concrete[3,4]		Cold-Formed Steel (ASD)[5]	
							LRFD[1,8,9] (Wind)	ASD[2,8,9] (Wind)	33 mil (20 ga.)	43 mil (18 ga.)
3⁄16	5⁄32	1¾	3	1¾	3¼	4	690	415	240	315
¼	3⁄16	1¾	3	1¾	3¼	4	690	415	290	380

1. Anchorage designs conform to ACI 318-14 Chapter 17 and assume uncracked concrete with no supplementary reinforcement.
2. Allowable Stress Design (ASD) values are obtained by multiplying Load Resistance Factor Design (LRFD) capacities by 0.6 for wind.
3. Anchor is considered as an individual anchor without influence from other anchors.
4. Concrete shall have a minimum f'_c of 2,500 psi. Reference IAPMO UES ER-449 for further information.
5. Cold-formed steel (CFS) tension pullover values are based on AISI S-100, Eq. E4.4.2-1, d_W = 5⁄16" (3⁄16" Titen 2), d_W = ⅜" (¼" Titen 2) and Ω = 3.0. Reference General Notes for CFS properties. To convert from ASD to LRFD multiply value by 1.5. Tension values do not account for weak axis bending in the sill member.
6. Governing load shall be the lesser of concrete and CFS.
7. For conditions not covered by this table, use the Simpson Strong-Tie® Anchor Designer™ software available at **strongtie.com**.
8. Wind design values include SDC A&B.
9. For installation in sand-lightweight concrete, concrete values shall be be multiplied by 0.68.

Titen 2 — Shear Loads Perpendicular to Edge in Normal-Weight Concrete (lb.)[6]

Anchor Diameter (in.)	Drill Bit (in.)	Edge Distance (in.)	End Distance (in.)	Min. Emb. Depth (in.)	Concrete Thickness (in.)	Min. Spacing (in.)	Concrete[3,4]		Cold-Formed Steel (ASD)[5]	
							LRFD[1,8,9] (Wind)	ASD[2,8,9] (Wind)	33 mil (20 ga.)	43 mil (18 ga.)
3⁄16	5⁄32	1¾	3	1¾	3¼	5¼	465	280	265	340
¼	3⁄16	1¾	3	1¾	3¼	5¼	500	300	350	455

1. Anchorage designs conform to ACI 318-14 Chapter 17 and assume uncracked concrete with no supplementary reinforcement.
2. Allowable Stress Design (ASD) values are obtained by multiplying Load Resistance Factor Design (LRFD) capacities by 0.6 for wind.
3. Anchor is considered as an individual anchor without influence from other anchors.
4. Concrete shall have a minimum f'_c of 2,500 psi. Reference IAPMO UES ER-449 for further information.
5. Cold-formed steel (CFS) shear values are based on AISI-S100, Eq. E3.3.1-1, m_f = 0.75, Ω = 2.5. Reference General Notes for CFS properties. To convert from ASD to LRFD multiply value by 1.5.
6. Governing load shall be the lesser of concrete and CFS.
7. For conditions not covered by this table, use the Simpson Strong-Tie® Anchor Designer™ software available at **strongtie.com**.
8. Wind design values include SDC A&B.
9. For installation in sand-lightweight concrete, concrete values shall be be multiplied by 0.68.

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Titen 2 — Shear Loads Parallel to Edge in Normal-Weight Concrete (lb./ft.)[6]

Anchor Diameter (in.)	Drill Bit (in.)	Edge Distance (in.)	End Distance (in.)	Min. Emb. Depth (in.)	Concrete Thickness (in.)	Min. Spacing (in.)	Concrete[3,4]		Cold-Formed Steel (ASD)[5]	
							LRFD[1,8,9] (Wind)	ASD[2,8,9] (Wind)	33 mil (20 ga.)	43 mil (18 ga.)
3⁄16	5⁄32	1¾	3	1¾	3½	0' – 8"	750	450	400	510
						1'– 0"	500	300	265	340
						1'– 4"	375	225	200	255
						2' – 0"	250	150	135	170
						2' – 8"	190	115	100	130
						4' – 0"	125	75	65	85
						6' – 0"	85	50	45	55
¼	3⁄16	1¾	3	1¾	3½	0' – 8"	810	485	525	685
						1'– 0"	540	325	350	455
						1'– 4"	405	245	265	340
						2' – 0"	270	160	175	230
						2' – 8"	205	125	130	170
						4' – 0"	135	80	90	115
						6' – 0"	90	55	60	75
3⁄16	5⁄32	1¾	5½	1¾	3½	0' – 8"	885	530	400	510
						1'– 0"	590	355	265	340
						1'– 4"	445	265	200	255
						2' – 0"	295	175	135	170
						2' – 8"	220	130	100	130
						4' – 0"	150	90	65	85
						6' – 0"	100	60	45	55
¼	3⁄16	1¾	5½	1¾	3½	0' – 8"	1,120	670	525	685
						1'– 0"	745	445	350	455
						1'– 4"	560	335	265	340
						2' – 0"	375	225	175	230
						2' – 8"	280	170	130	170
						4' – 0"	185	110	90	115
						6' – 0"	125	75	60	75

1. Anchorage designs conform to ACI 318-14 Chapter 17 and assume uncracked concrete with no supplementary reinforcement.
2. Allowable Stress Design (ASD) values are obtained by multiplying Load Resistance Factor Design (LRFD) capacities by 0.6 for wind.
3. Anchor is considered as an individual anchor without influence from other anchors.
4. Concrete shall have a minimum f'_c of 2,500 psi. Reference IAPMO UES ER-449 for further information.
5. Cold-formed steel (CFS) shear values are based on AISI-S100, Eq. E3.3.1-1, $m_f = 0.75$, $\Omega = 2.5$. Reference General Notes for CFS properties. To convert from ASD to LRFD multiply value by 1.5.
6. Governing load shall be the lesser of concrete and CFS.
7. For conditions not covered by this table, use the Simpson Strong-Tie® Anchor Designer™ software available at **strongtie.com**.
8. Wind design values include SDC A&B.
9. For installation in sand-lightweight concrete, concrete values shall be be multiplied by 0.68.

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Crimp Drive® Anchors

The crimp anchor is an easy-to-install expansion anchor for use in concrete and grout-filled block. The pre-formed curvature along the shaft creates an expansion mechanism that secures the anchor in place and eliminates the need for a secondary tightening procedure. This speeds up anchor installation and reduces the overall cost.

Five crimp anchor head styles are available to handle different applications that include fastening wood or light-gauge steel, attaching concrete formwork, hanging overhead support for sprinkler pipes or suspended ceiling panels.

Material: Carbon steel

Coating: Zinc plated and mechanically galvanized

Codes: Factory Mutual 3031136 for the ⅜" rod coupler.

Head Styles: Mushroom, rod coupler, countersunk, tie-wire and duplex

Installation:

Warning: Industry studies show that hardened fasteners can experience performance problems in wet or corrosive environments. Accordingly, with the exception of the duplex anchor, use these products in dry, interior and non-corrosive environments only.

1. Drill a hole using the specified diameter carbide bit into the base material to a depth of at least ½" deeper than the required embedment.
2. Blow the hole clean of dust and debris using compressed air. Overhead application need not be blown clean. Where a fixture is used, drive the anchor through the fixture into the hole until the head sits flush against the fixture.
3. Be sure the anchor is driven to the required embedment depth. The rod coupler and tie-wire models should be driven in until the head is seated against the surface of the base material.

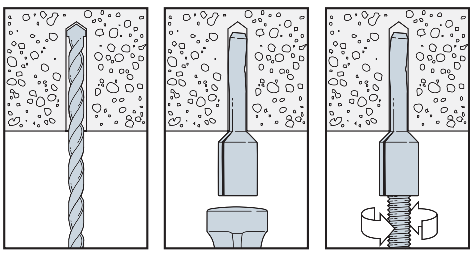
IBC Not Valid for International Building Code

Mushroom Head | Rod Coupler

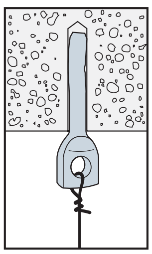
Countersunk Head | Tie-Wire | Duplex

Installation Sequence

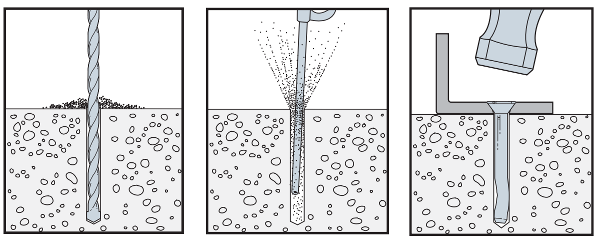
Rod Coupler



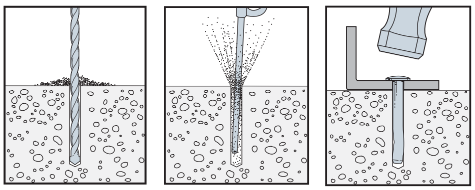
Tie-Wire



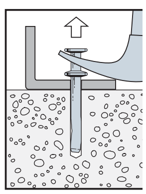
Countersunk Head



Mushroom Head



Duplex



Duplex-head anchor may be removed with a claw hammer

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Crimp Drive® Anchor Product Data

Size (in.)	Model No.	Head Style/Finish	Drill Bit Diameter (in.)	Min. Fixture Hole Size (in.)	Min. Embed. (in.)	Quantity	
						Pkg. Quantity	Carton Quantity
3/16 x 1¼	CD18114M	Mushroom head/ zinc plated	3/16	¼	⅞	100	1600
3/16 x 2	CD18200M				1¼	100	500
3/16 x 2½	CD18212M				1¼	100	500
3/16 x 3	CD18300M				1¼	100	500
3/16 x 3½	CD18312M				1¼	100	500
3/16 x 4	CD18400M				1¼	100	500
¼ x 1	CD25100M		¼	5/16	⅞	100	1,600
¼ x 1¼	CD25114M				⅞	100	1,600
¼ x 1½	CD25112M				1¼	100	1,600
¼ x 2	CD25200M				1¼	100	500
¼ x 2½	CD25212M				1¼	100	500
¼ x 3	CD25300M				1¼	100	500
¼ x 3½	CD25312M				1¼	100	500
¼ x 4	CD25400M				1¼	100	500
⅜ x 2	CD37200M		⅜	7/16	1¾	25	125
⅜ x 3	CD37300M				1¾	25	125
¼ x 3	CD25300MG	Mushroom head/ mechanically galvanized	¼	5/16	1¼	100	500
¼" rod coupler	CD25114RC	Rod coupler/ zinc plated	3/16	N/A	1¼	100	500
⅜" rod coupler	CD37112RC		¼	N/A	1½	50	250
3/16 x 2½	CD18212C	Countersunk head/ zinc plated	3/16	¼	1¼	100	500
3/16 x 3	CD18300C				1¼	100	500
3/16 x 4	CD18400C				1¼	100	500
¼ x 1½	CD25112C		¼	5/16	1¼	100	500
¼ x 2	CD25200C				1¼	100	500
¼ x 2½	CD25212C				1¼	100	500
¼ x 3	CD25300C				1¼	100	500
¼ x 3½	CD25312C				1¼	100	400
¼ x 4	CD25400C				1¼	100	400
¼ x 3	CD25300CMG	Countersunk head/ mechanically galvanized[1]	¼	5/16	1¼	100	500
¼ x 4	CD25400CMG				1¼	100	400
¼" Tie-Wire	CD25118T	Tie-Wire/zinc plated	¼	N/A	1⅛	100	500
¼" duplex	CD25234D	Duplex head/zinc plated	¼	5/16	1¼	100	500

1. Mechanical galvanizing meets ASTM B695, Class 55, Type 1. Intended for some pressure-treated wood sill plate applications. Not for use in other corrosive or outdoor environments. See pp. 18–21 for details.

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Crimp Drive® Anchors

Length Identification Head Marks on Mushroom and Duplex-Head Crimp Anchors (corresponds to length of anchor — inches)

Mark	☐	A	B	C	D	E	F
From	1	1½	2	2½	3	3½	4
Up to but not including	1½	2	2½	3	3½	4	4½

Tension and Shear Loads in Normal-Weight Concrete

Size (in.)	Drill Bit Diameter (in.)	Embed. Depth (in.)	Min. Spacing (in.)	Min. Edge Dist. (in.)	Tension Load		Shear Load	
					f'c ≥ 2,000 psi Concrete	f'c ≥ 4,000 psi Concrete	f'c ≥ 2,000 psi Concrete	f'c ≥ 4,000 psi Concrete
					Allowable Load (lb.)	Allowable Load (lb.)	Allowable Load (lb.)	Allowable Load (lb.)
Mushroom Head								
3⁄16	3⁄16	1¼	3	3	145	250	340	450
¼	¼	1¼	3	3	175	275	395	610
⅜	⅜	1¾	4	4	365	780	755	1,305
Duplex Head								
¼	¼	1¼	3	3	175	275	395	610
Tie-Wire								
¼	¼	1⅛	3	3	155	215	265	325
Rod Coupler[4]								
¼	3⁄16	1¼	3	3	145	250	—	—
⅜	¼	1½	4	4	265	600	—	—

1. The allowable loads listed are based on a safety factor of 4.0.
2. The minimum concrete thickness is 1½ times the embedment depth.
3. Allowable loads may be linearly interpolated between concrete strengths listed.
4. For rod coupler, mechanical and plumbing design codes may prescribe lower allowable loads; verify with local codes.

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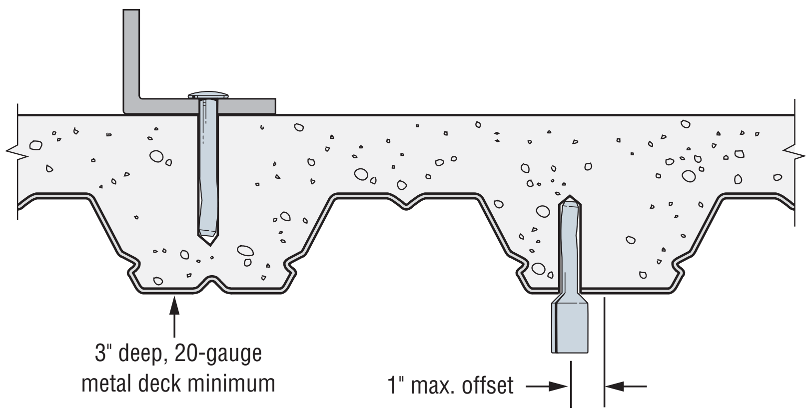
Crimp Drive® Anchors

SIMPSON Strong-Tie®

Tension and Shear Loads in Sand-Lightweight Concrete over Metal Deck

Size (in.)	Drill Bit Diameter (in.)	Embed. Depth (in.)	Min. Spacing (in.)	Min. Edge Dist. (in.)	Tension Load (Install in Concrete)	Tension Load (Install through Metal Deck)	Shear Load (Install in Concrete)	Shear Load (Install through Metal Deck)
					$f'_c \geq 3{,}000$ psi Concrete	$f'_c \geq 3{,}000$ psi Concrete	$f'_c \geq 3{,}000$ psi Concrete	$f'_c \geq 3{,}000$ psi Concrete
					Allowable Load (lb.)	Allowable Load (lb.)	Allowable Load (lb.)	Allowable Load (lb.)
Mushroom Head								
3⁄16	3⁄16	1 1⁄4	4	4	115	85	345	600
1⁄4	1⁄4	1 1⁄4	4	4	145	130	375	890
3⁄8	3⁄8	1 3⁄4	5 1⁄2	5 1⁄2	315	330	1,030	1,085
Duplex Head								
1⁄4	1⁄4	1 1⁄4	4	4	145	130	375	890
Tie-Wire								
1⁄4	1⁄4	1 1⁄8	3	3	130	90	275	210
Rod Coupler[6]								
1⁄4	3⁄16	1 1⁄4	4	4	115	85	—	—
3⁄8	1⁄4	1 1⁄2	5	5	300	280	—	—

1. The allowable loads listed are based on a safety factor of 4.0.
2. The minimum concrete thickness is 1 1⁄2 times the embedment depth.
3. Anchors may be installed off-center in the flute, up to 1" from the center of flute.
4. Anchor may be installed in either upper or lower flute.
5. Deck profile shall be 3" deep, 20-gauge minimum.
6. For rod coupler, mechanical and plumbing design codes may prescribe lower allowable loads; verify with local codes.



Sand-Lightweight Concrete Over Metal Deck

Anchors

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Zinc Nailon™ Pin Drive Anchors

SIMPSON Strong-Tie®

Zinc Nailon™ anchors are low-cost, easy-to-install anchors for applications under static loads.

Features:

- Available with carbon and stainless-steel pins
- Pin and head configuration designed to make anchor tamper-resistant

Materials: Body — Die-cast Zamac 3 alloy
Pin — Carbon steel; Type 304 stainless steel

Code: Meets Federal Specification A-A-1925A, Type 1

Installation:

Caution: Not for use in overhead applications.

Caution: Nailon anchors are not recommended for eccentric tension (prying) loads — capacity will be greatly reduced in such applications

1. Drill a hole in base material using a carbide drill bit the same diameter as the nominal diameter of the anchor to be installed. Drill the hole to specified embedment depth, plus ¼" for pin extension, and blow hole clean using compressed air. Alternatively, drill the hole deep enough to accommodate embedment depth and dust from drilling.
2. Position fixture and insert Nailon anchor.
3. Tap with hammer until flush with fixture, then drive pin until flush with top of head.

IBC Not Valid for International Building Code

Zinc Nailon™ Anchor
(mushroom)

Zinc Nailon™ Product Data

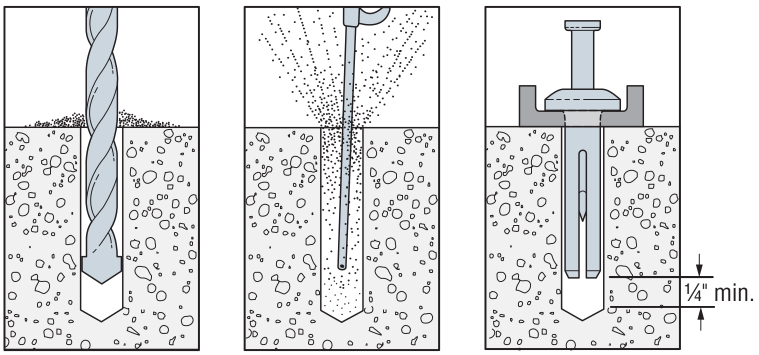
Size (in.)	Carbon Steel Pin Model No.	Stainless Steel Pin Model No.	Quantity		
			Box	Carton	Bulk
3⁄16 x 7⁄8	ZN18078	—	100	1,600	3,000
¼ x ¾	ZN25034	ZN25034SS	100	500	2,000
¼ x 1	ZN25100	ZN25100SS	100	500	1,500
¼ x 1¼	ZN25114	ZN25114SS	100	500	1,500
¼ x 1½	ZN25112	ZN25112SS	100	500	1,000
¼ x 2	ZN25200	ZN25200SS	100	400	1,000
¼ x 2½	ZN25212	ZN25212SS	100	400	1,000
¼ x 3	ZN25300	ZN25300SS	100	400	1,000

Allowable Tension and Shear Loads for Zinc Nailon™ in Normal-Weight Concrete

Size (in.)	Drill Bit Dia. (in.)	Embed. Depth (in.)	Ultimate Load (lb.)		Allowable Load (lb.)[1]	
			$f'_c \geq$ 3,000 psi		$f'_c \geq$ 3,000 psi	
			Tension	Shear	Tension	Shear
3⁄16	3⁄16	⅝	460	465	115	115
¼	¼	⅝	590	635	150	160
		¾	780	765	195	190
		1½	1,050	1,050	265	265

1. The allowable loads are based on a safety factor of 4.0.

Installation Sequence



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Tie-Wire Wedge Anchor

The Tie-Wire anchor is a wedge-style expansion anchor for use in normal-weight concrete or in concrete over metal deck. With a tri-segmented, dual-embossed clip, the Tie-Wire anchor is ideal for the installation of acoustic ceiling grid and is easily set with the claw of a hammer.

Features:

- ¼" eyelet for easy threading of wire
- Sets with claw of hammer
- Tri-segmented clip – each segment adjusts independently to hole irregularities
- Dual embossments on each clip segment enable the clip to undercut into the concrete, increasing follow-up expansion
- Wedge-style expansion anchor for use in normal weight concrete or concrete over metal deck

Material: Carbon steel

Coating: Zinc plated

Installation:

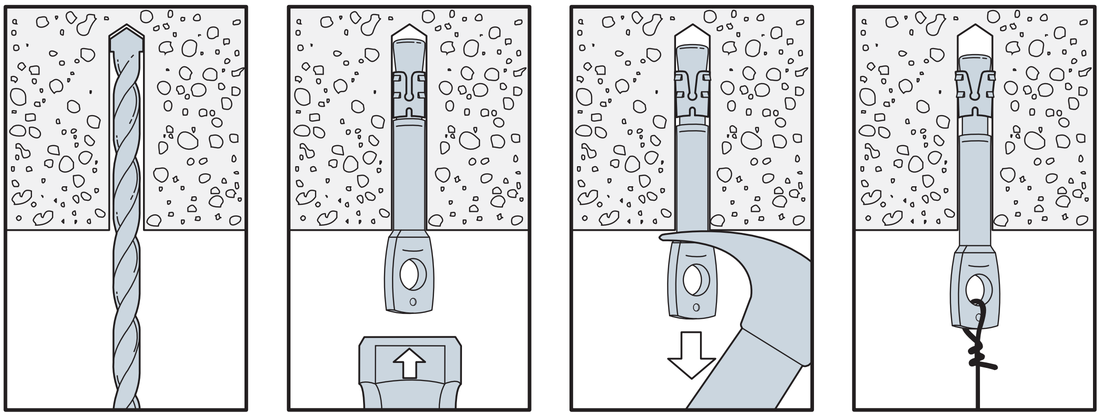
- Drill a hole at least 1½" deep using a ¼" diameter carbide tipped bit
- Drive the anchor into the hole until the bottom of the head is flush with the base material
- Set the anchor by prying/pulling the head with the claw end of the hammer

IBC
Not Valid for International Building Code

Tie-Wire Anchor

Size (in.)	Model No.	Drill Bit Diameter (in.)	Eyelet Hole Size (in.)	Quantity	
				Box	Carton
¼ x 1½	TW25112	¼	¼	100	500

Installation Sequence



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Tie-Wire Wedge Anchor

SIMPSON Strong-Tie®

Tie-Wire Anchor — Allowable Tension and Shear Loads in Normal-Weight Concrete

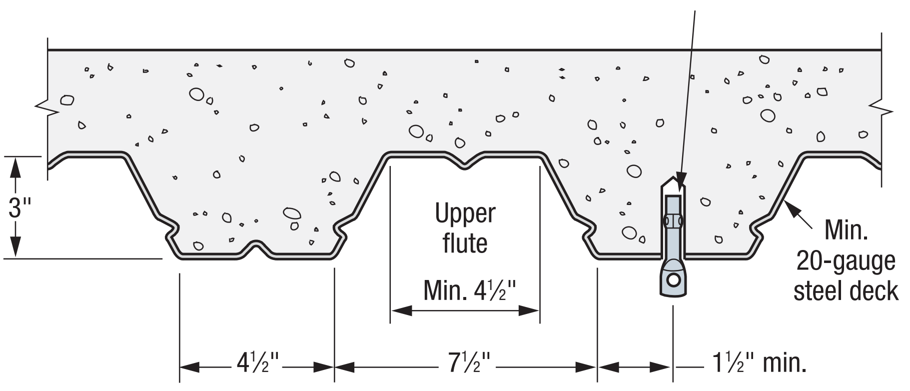
Size in. (mm)	Drill Bit Diameter in.	Embed Depth in. (mm)	Critical End Dist. in. (mm)	Critical Spacing in. (mm)	Tension Load		Shear Load	
					f'c ≥ 2,500 psi (17.2 MPa)		f'c ≥ 2,500 psi (17.2 MPa)	
					Ultimate lb. (kN)	Allowable lb. (kN)	Ultimate lb. (kN)	Allowable lb. (kN)
¼ (6.4)	¼	1½ (38)	2½ (64)	5 (127)	1,155 (5.1)	290 (1.3)	380 (1.7)	95 (0.4)

1. The allowable loads listed are based on a safety factor of 4.0.
2. The minimum concrete thickness is 1½ times the embedment depth.

Tie-Wire Anchor — Allowable Tension and Shear Loads in the Soffit of Normal-Weight Concrete or Sand-Lightweight Concrete over Metal Deck

Size in. (mm)	Drill Bit Diameter in.	Embed Depth in. (mm)	Critical End Dist.[5] in. (mm)	Critical Spacing in. (mm)	Tension Load		Shear Load	
					f'c ≥ 3,000 psi (20.7 MPa)		f'c ≥ 3,000 psi (20.7 MPa)	
					Ultimate lb. (kN)	Allowable lb. (kN)	Ultimate lb. (kN)	Allowable lb. (kN)
¼ (6.4)	¼	1½ (38)	2½ (64)	5 (127)	1,155 (5.1)	290 (1.3)	460 (2.0)	115 (0.5)

1. The allowable loads listed are based on a safety factor of 4.0.
2. The minimum concrete thickness is 1½ times the embedment depth.
3. Metal deck must be minimum 20-gauge thick with minimum yield strength of 33 ksi.
4. Anchors installed in the bottom flute of the steel deck must have a minimum edge distance of 1½" away from inclined edge of the bottom flute. See the figure below.
5. Critical end distance is defined as the distance from the end of the slab in the direction of the flute.



Installation in the Soffit of Concrete over Metal Deck

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Drop-In Internally Threaded Anchor (DIAB)

Expansion Shell Anchors for Use in Solid Base Materials

Simpson Strong-Tie introduces a new, redesigned Drop-In Anchor (DIAB) that provides easier installation into base materials. Improved geometry in the preassembled expansion plug improves setting capability so the anchor installs with 40% fewer hammer strikes than previous versions. These displacement-controlled expansion anchors are easily set by driving the plug toward the bottom of the anchor using either the hand- or power-setting tools. DIAB anchors feature a positive-set marking indicator at the top of the anchor — helping you see more clearly when proper installation has taken place.

Use a Simpson Strong-Tie fixed-depth stop bit to take the guesswork out of drilling to the correct depth. The fluted design of the tip draws debris away from the hole during drilling, allowing for a cleaner installation.

Features:

- New design offers easier installation then previous drop-in anchor design — sets with 40% fewer hammer hits
- Positive-set marking system indicates when anchor is properly set
- Lipped drop-in version available for flush installation
- Hand- and power-setting tools available for fast, easy and economical installation
- Fixed-depth stop bit helps you drill to the correct depth every time

c UL us LISTED FM APPROVED

Material: Carbon steel

Coating: Zinc plated

IBC Not Valid for International Building Code

NEW

Drop-In Lipped Drop-In

Drop-In Anchor Hand Setting Tool

Model No.	For Use With	Box Quantity
DIABST25	DIAB25, DIABL25	10
DIABST37	DIAB37, DIABL37	10
DIABST50	DIAB50, DIABL50	10
DIABST62	DIAB62	5
DIABST75	DIAB75	5

1. Setting tools sold separately; tools may be ordered by the piece.

Hand Setting Tool

Drop-In Anchor Power Setting Tool

Model No.	For Use With	Box Quantity
DIABST25-SDS	DIAB25, DIABL25	10
DIABST37-SDS	DIAB37, DIABL37	10
DIABST50-SDS	DIAB50, DIABL50	10

Power Setting Tool

Anchors

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Drop-In Internally Threaded Anchor (DIAB)

SIMPSON Strong-Tie®

DIAB — Allowable Tension and Shear Loads in Normal-Weight Concrete

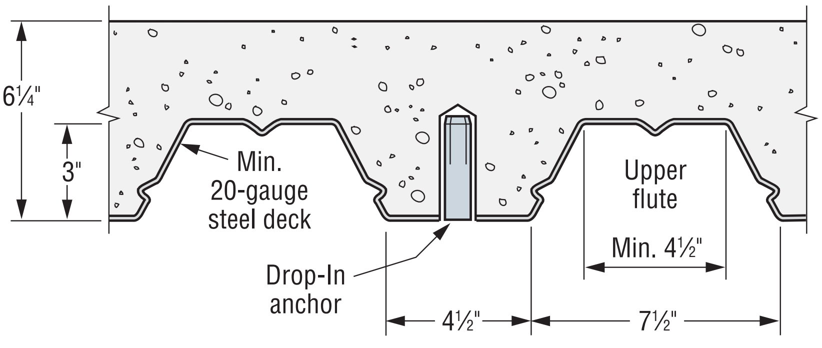
Model No.	Rod Size in. (mm)	Drill Bit Diameter in.	Embed Depth in. (mm)	Critical Edge Dist. in. (mm)	Critical Spacing in. (mm)	f'c ≥ 2,500 psi (17.2 MPa)				f'c ≥ 4,000 psi (27.6 MPa)			
						Tension Load		Shear Load		Tension Load		Shear Load	
						Ultimate lb. (kN)	Allowable lb. (kN)	Ultimate lb. (kN)	Allowable lb. (kN)	Ultimate lb. (kN)	Allowable lb. (kN)	Ultimate lb. (kN)	Allowable lb. (kN)
DIAB25 DIABL25	¼ (6.4)	⅜	1 (25)	3 (76)	4 (102)	1,565 (7.0)	390 (1.7)	1,840 (8.2)	460 (2.0)	1,965 (8.7)	490 (2.2)	1,840 (8.2)	460 (2.0)
DIAB37 DIABL37	⅜ (9.5)	½	1 9/16 (40)	4½ (114)	6 (152)	2,950 (13.1)	740 (3.3)	4,775 (21.2)	1,195 (5.3)	3,910 (17.4)	980 (4.4)	4,775 (21.2)	1,195 (5.3)
DIAB50 DIABL50	½ (12.7)	⅝	2 (51)	6 (152)	8 (203)	5,190 (23.1)	1,300 (5.8)	6,760 (30.1)	1,690 (7.5)	6,515 (29.0)	1,630 (7.3)	6,760 (30.1)	1,690 (7.5)
DIAB62	⅝ (15.9)	⅞	2½ (64)	7½ (191)	10 (254)	7,010 (31.2)	1,755 (7.8)	12,190 (54.2)	3,050 (13.6)	9,060 (40.3)	2,265 (10.1)	12,190 (54.2)	3,050 (13.6)
DIAB75	¾ (19.1)	1	3⅛ (79)	9 (229)	12½ (318)	9,485 (42.2)	2,370 (10.5)	15,960 (71.0)	3,990 (17.7)	11,660 (51.9)	2,915 (13.0)	15,960 (71.0)	3,990 (17.7)

1. The allowable loads listed are based on a safety factor of 4.0.
2. Refer to allowable load-adjustment factors for edge distance and spacing on p. 217.
3. Allowable loads may be linearly interpolated between concrete strength listed.
4. The minimum concrete thickness is 1½ times the embedment depth.

DIAB — Allowable Tension and Shear Loads in Soffit of Sand-Lightweight Concrete over Metal Deck

Model No.	Rod Size in. (mm)	Drill Bit Diameter in.	Embed Depth in. (mm)	Critical End Dist.[6] in. (mm)	Critical Spacing in. (mm)	f'c ≥ 3,000 psi (20.7 MPa)			
						Tension Load		Shear Load	
						Ultimate lb. (kN)	Allowable lb. (kN)	Ultimate lb. (kN)	Allowable lb. (kN)
DIAB37 DIABL37	⅜ (9.5)	½	1 9/16 (40)	4½ (114)	6 (152)	2,895 (12.9)	725 (3.2)	3,530 (15.7)	885 (3.9)
DIAB50 DIABL50	½ (12.7)	⅝	2 (51)	6 (152)	8 (203)	4,100 (18.2)	1,025 (4.6)	4,685 (20.8)	1,170 (5.2)

1. The allowable loads listed are based on a safety factor of 4.0.
2. Allowable loads may not be increased for short-term loading due to wind or seismic forces.
3. Refer to allowable load-adjustment factors for edge distance and spacing on p. 217.
4. Anchors were installed in the center of the bottom flute of the steel deck.
5. Metal deck must be minimum 20-gauge thick with minimum yield strength of 33 ksi.
6. Critical end distance is defined as the distance from end of the slab in the direction of the flute.



Lightweight Concrete over Metal Deck

Anchors

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Drop-In (DIAB) Design Information — Concrete

DIAB — Load-Adjustment Factors in Normal-Weight Concrete and Sand-Lightweight Concrete over Metal Deck: Edge Distance and Spacing, Tension and Shear Loads

Edge Distance Tension (f_c)

Edge Dist. c_{act} (in.)	Size	¼	⅜	½	⅝	¾
	c_{cr}	3	4½	6	7½	9
	c_{min}	1¾	2⅝	3½	4⅜	5¼
	f_{cmin}	0.77	0.77	0.77	0.77	0.77
1¾		0.77				
2		0.82				
2½		0.91				
2⅝		0.93	0.77			
3		1.00	0.82			
3½			0.88	0.77		
4			0.94	0.82		
4⅜			0.98	0.85	0.77	
4½			1.00	0.86	0.78	
5				0.91	0.82	
5¼				0.93	0.83	0.77
5½				0.95	0.85	0.79
6				1.00	0.89	0.82
6½					0.93	0.85
7					0.96	0.88
7½					1.00	0.91
8						0.94
8½						0.97
9						1.00

1. c_{act} = actual edge distance at which anchor is installed (inches).
2. c_{cr} = critical edge distance for 100% load (inches).
3. c_{min} = minimum edge distance for reduced load (inches).
4. f_c = adjustment factor for allowable load at actual edge distance.
5. f_{ccr} = adjustment factor for allowable load at critical edge distance. f_{ccr} is always = 1.00.
6. f_{cmin} = adjustment factor for allowable load at minimum edge distance.
7. $f_c = f_{cmin} + [(1 - f_{cmin}) (c_{act} - c_{min}) / (c_{cr} - c_{min})]$.

Edge Distance Shear (f_c)

Edge Dist. c_{act} (in.)	Size	¼	⅜	½	⅝	¾
	c_{cr}	3	4½	6	7½	9
	c_{min}	1¾	2⅝	3½	4⅜	5¼
	f_{cmin}	0.54	0.54	0.64	0.64	0.64
1¾		0.54				
2		0.63				
2½		0.82				
2⅝		0.86	0.54			
3		1.00	0.63			
3½			0.75	0.64		
4			0.88	0.71		
4⅜			0.97	0.77	0.64	
4½			1.00	0.78	0.65	
5				0.86	0.71	
5¼				0.89	0.74	0.64
5½				0.93	0.77	0.66
6				1.00	0.83	0.71
6½					0.88	0.76
7					0.94	0.81
7½					1.00	0.86
8						0.90
8½						0.95
9						1.00

1. c_{act} = actual edge distance at which anchor is installed (inches).
2. c_{cr} = critical edge distance for 100% load (inches).
3. c_{min} = minimum edge distance for reduced load (inches).
4. f_c = adjustment factor for allowable load at actual edge distance.
5. f_{ccr} = adjustment factor for allowable load at critical edge distance. f_{ccr} is always = 1.00.
6. f_{cmin} = adjustment factor for allowable load at minimum edge distance.
7. $f_c = f_{cmin} + [(1 - f_{cmin}) (c_{act} - c_{min}) / (c_{cr} - c_{min})]$.

Spacing Tension (f_s)

Spacing s_{act} (in.)	Size	¼	⅜	½	⅝	¾
	s_{cr}	4	6	8	10	12½
	s_{min}	1½	2¼	3	3¾	4¾
	f_{smin}	0.72	0.72	0.80	0.80	0.80
1½		0.72				
2		0.78				
2¼		0.80	0.72			
2½		0.83	0.74			
3		0.89	0.78	0.80		
3½		0.94	0.81	0.82		
3¾		0.97	0.83	0.83	0.80	
4		1.00	0.85	0.84	0.81	
4½			0.89	0.86	0.82	
4¾			0.91	0.87	0.83	0.80
5			0.93	0.88	0.84	0.81
5½			0.96	0.90	0.86	0.82
6			1.00	0.92	0.87	0.83
6½				0.94	0.89	0.85
7				0.96	0.90	0.86
7½				0.98	0.92	0.87
8				1.00	0.94	0.88
8½					0.95	0.90
9					0.97	0.91
9½					0.98	0.92
10					1.00	0.94
10½						0.95
11						0.96
11½						0.97
12						0.99
12½						1.00

1. s_{act} = actual spacing distance at which anchor is installed (inches).
2. s_{cr} = critical spacing distance for 100% load (inches).
3. s_{min} = minimum spacing distance for reduced load (inches).
4. f_s = adjustment factor for allowable load at actual spacing distance.
5. f_{scr} = adjustment factor for allowable load at critical spacing distance. f_{scr} is always = 1.00.
6. f_{smin} = adjustment factor for allowable load at minimum spacing distance.
7. $f_s = f_{smin} + [(1 - f_{smin}) (s_{act} - s_{min}) / (s_{cr} - s_{min})]$.

Spacing Shear (f_s)

Spacing s_{act} (in.)	Size	¼	⅜	½	⅝	¾
	s_{cr}	4	6	8	10	12½
	s_{min}	1½	2¼	3	3¾	4¾
	f_{smin}	1.00	1.00	1.00	1.00	1.00
1½		1.00				
2		1.00				
2¼		1.00	1.00			
2½		1.00	1.00			
3		1.00	1.00	1.00		
3½		1.00	1.00	1.00		
3¾		1.00	1.00	1.00	1.00	
4		1.00	1.00	1.00	1.00	
4½			1.00	1.00	1.00	
4¾			1.00	1.00	1.00	1.00
5			1.00	1.00	1.00	1.00
5½			1.00	1.00	1.00	1.00
6			1.00	1.00	1.00	1.00
6½				1.00	1.00	1.00
7				1.00	1.00	1.00
7½				1.00	1.00	1.00
8				1.00	1.00	1.00
8½					1.00	1.00
9					1.00	1.00
9½					1.00	1.00
10					1.00	1.00
10½						1.00
11						1.00
11½						1.00
12						1.00
12½						1.00

1. s_{act} = actual spacing distance at which anchor is installed (inches).
2. s_{cr} = critical spacing distance for 100% load (inches).
3. s_{min} = minimum spacing distance for reduced load (inches).
4. f_s = adjustment factor for allowable load at actual spacing distance.
5. f_{scr} = adjustment factor for allowable load at critical spacing distance. f_{scr} is always = 1.00.
6. f_{smin} = adjustment factor for allowable load at minimum spacing distance.
7. $f_s = f_{smin} + [(1 - f_{smin}) (s_{act} - s_{min}) / (s_{cr} - s_{min})]$.

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Drop-In Internally Threaded Anchor (DIA)

Drop-In anchors are internally threaded drop-in expansion anchors for use in flush-mount applications in solid base materials. Available in stainless steel (DIA), short (DIAS) or coil-thread (DIAC) versions. Minimum thread engagement should be equal to the nominal diameter of the threaded insert.

IBC
Not Valid for International Building Code

Features:

- Lipped edge (DIAS) eliminates need for precisely drilled-hole depth
- Available in coil-thread version for ½" and ¾" coil-threaded rod
- Short length (DIAS) enables shallow embedment to help avoid drilling into rebar or pre-stressed/post-tensioned cables
- Short Drop-In anchors include a setting tool compatible with the anchor to ensure consistent installation

Material: Carbon and stainless steel

Coating: Carbon steel; zinc plated

Codes: Drop-In — DOT; Factory Mutual 3017082; Underwriters Laboratories File Ex3605. Meets requirements of Federal Specifications A-A-55614, Type I.

Short Drop-In — Factory Mutual 3017082 and Underwriters Laboratories File Ex3605.

Caution: The load tables list values based upon results from the most recent testing and may not reflect those in current code reports. Where code jurisdictions apply, consult the current reports for applicable load values.

Installation:

- Drill a hole in the base material using the appropriate diameter carbide drill bit as specified in the table. Drill the hole to the specified embedment depth plus ⅛" for flush mounting. Blow the hole clean using compressed air. Overhead installations need not be blown clean.
- Insert designated anchor into hole. Tap with hammer until flush against surface.
- Using the designated drop-in setting tool, drive expander plug toward the bottom of the anchor until shoulder of setting tool makes contact with the top of the anchor.
- Minimum thread engagement should be equal to the nominal diameter of the threaded insert.

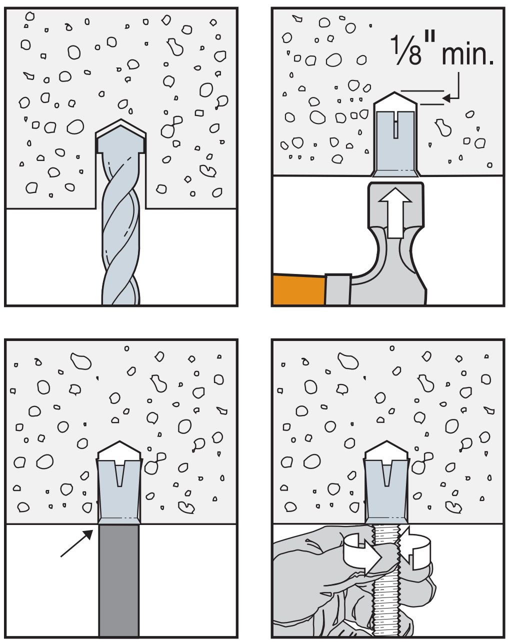
Caution: Oversized holes will make it difficult to set the anchor and will reduce the anchor's load capacity.

Drop-In Stainless Steel

Short Drop-In

Coil-Thread Drop-In

Installation Sequence



Material Specifications

Anchor Component	Component Material		
	Zinc-Plated Carbon Steel	Type 303/304 Stainless Steel	Type 316 Stainless Steel
Anchor body	Meets minimum 70,000 psi tensile	AISI 303. Meets chemical requirements of ASTM A582	Type 316
Expander plug	Meets minimum 50,000 psi tensile	AISI 303	Type 316
Thread	UNC / Coil-thread	UNC	UNC

Note: DIA37S, DIA50C and DIA75C are not available in stainless steel.

Anchors

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Drop-In Internally Threaded Anchor (DIA)

Drop-In Anchor Product Data — Stainless Steel

Rod Size (in.)	Type 303/304 Stainless Model No.	Type 316 Stainless Model No.	Drill Bit Diameter (in.)	Bolt Thread (per in.)	Body Length (in.)	Thread Length (in.)	Quantity	
							Box	Carton
¼	DIA25SS	DIA256SS	⅜	20	1	⅜	100	500
⅜	DIA37SS	DIA376SS	½	16	1 9/16	⅝	50	250
½	DIA50SS	DIA506SS	⅝	13	2	¾	50	200
⅝	DIA62SS	—	⅞	11	2½	1	25	100
¾	DIA75SS	—	1	10	3⅛	1¼	20	80

Short Drop-In Anchor Product Data

Rod Size (in.)	Model No.	Drill Bit Diameter (in.)	Bolt Thread (per in.)	Body Length (in.)	Thread Length (in.)	Quantity	
						Box	Carton
⅜	DIA37S[1]	½	16	¾	¼	100	500
½	DIA50S[1]	⅝	13	1	5/16	50	200

1. A dedicated setting tool is included with each box of DIA37S and DIA50S.

Coil-Thread Drop-In Anchor Product Data

Rod Size (in.)	Carbon Steel Model No.	Drill Bit Diameter (in.)	Bolt Thread (per in.)	Body Length (in.)	Thread Length (in.)	Quantity	
						Box	Ctn.
½	DIA50C[1]	⅝	6	2	¾	50	200
¾	DIA75C[1]	1	5	3⅛	1¼	20	80

1. DIA50C and DIA75C accept ½" and ¾" coil-thread rod, respectively.

Drop-In Anchor Setting Tool Product Data

Model No.	For Use With	Box Qty.
DIAST25	DIA25SS, DIA256SS	10
DIAST37	DIA37SS, DIA376SS	10
DIAST50	DIA50SS, DIA506SS, DIA50C	10
DIAST62	DIA62SS	5
DIAST75	DIA75SS, DIA75C	5

1. Setting tools sold separately except for DIA37S and DIA50S.
2. Setting tools for use with carbon and stainless-steel drop-in anchors.
3. Setting tools may be ordered by the piece.

Drop-In Anchor Setting Tool

Drop-In Anchor (DIA) Power Setting Tool

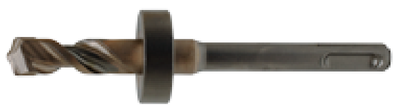
Model No.	For Use With	Box Qty.
DIAST37S-SDS	DIA37S	10
DIAST50S-SDS	DIA50S	10

Also sold by the piece.

Power Setting Tool

Drop-In Anchor Stop Bit

Model No.	Drill Bit Diameter (in.)	Drop-In Anchor (in.)	Drill Depth (in.)
MDPL037DIA	⅜	¼	1 1/16
MDPL050DIA	½	⅜	13/16
MDPL062DIA	½	½	1 11/16
MDPL050DIAS	⅝	⅜	1 1/16
MDPL062DIAS	⅝	½	2 1/16



Stop Bit

Anchors

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Drop-In (DIA) Design Information — Concrete

Drop-In (Stainless Steel) and Coil-Thread Drop-In (Carbon Steel) Anchors — Allowable Tension Loads in Normal-Weight Concrete

Rod Size in. (mm)	Drill Bit Dia. (in.)	Embed. Depth in. (mm)	Critical Edge Dist. in. (mm)	Critical Spacing in. (mm)	Tension Load						
					$f'_c \geq$ 2,000 psi (13.8 MPa) Concrete			$f'_c \geq$ 3,000 psi (20.7 MPa) Concrete	$f'_c \geq$ 4,000 psi (27.6 MPa) Concrete		
					Ultimate lb. (kN)	Std. Dev. lb. (kN)	Allowable lb. (kN)	Allowable lb. (kN)	Ultimate lb. (kN)	Std. Dev. lb. (kN)	Allowable lb. (kN)
¼ (6.4)	⅜	1 (25)	3 (76)	4 (102)	1,400 (6.2)	201 (0.9)	350 (1.6)	405 (1.8)	1,840 (8.2)	451 (2.0)	460 (2.0)
⅜ (9.5)	½	1 9/16 (40)	4½ (114)	6 (152)	2,400 (10.7)	251 (1.1)	600 (2.7)	795 (3.5)	3,960 (17.6)	367 (1.6)	990 (4.4)
½ (12.7)	⅝	2 (51)	6 (152)	8 (203)	3,320 (14.8)	372 (1.7)	830 (3.7)	1,178 (5.2)	6,100 (27.1)	422 (1.9)	1,525 (6.8)
⅝ (15.9)	⅞	2½ (64)	7½ (191)	10 (254)	5,040 (22.4)	689 (3.1)	1,260 (5.6)	1,715 (7.6)	8,680 (38.6)	971 (4.3)	2,170 (9.7)
¾ (19.1)	1	3⅛ (79)	9 (229)	12½ (318)	8,160 (36.3)	961 (4.3)	2,040 (9.1)	2,365 (10.5)	10,760 (47.9)	1,696 (7.5)	2,690 (12.0)

1. The allowable loads listed are based on a safety factor of 4.0.
2. Refer to allowable load-adjustment factors for edge distance and spacing on pp. 223–224.
3. Allowable loads may be linearly interpolated between concrete strengths listed.
4. The minimum concrete thickness is 1½ times the embedment depth.

Drop-In (Stainless Steel) and Coil-Thread Drop-In (Carbon Steel) Anchors — Allowable Shear Loads in Normal-Weight Concrete

Rod Size in. (mm)	Drill Bit Dia. (in.)	Embed. Depth in. (mm)	Critical Edge Dist. in. (mm)	Critical Spacing in. (mm)	Shear Load				
					$f'_c \geq$ 2,000 psi (13.8 MPa) Concrete			$f'_c \geq$ 3,000 psi (20.7 MPa) Concrete	$f'_c \geq$ 4,000 psi (27.6 MPa) Concrete
					Ultimate lb. (kN)	Std. Dev. lb. (kN)	Allowable lb. (kN)	Allowable lb. (kN)	Allowable lb. (kN)
¼ (6.4)	⅜	1 (25)	3½ (89)	4 (102)	1,960 (8.7)	178 (0.8)	490 (2.2)	490 (2.2)	490 (2.2)
⅜ (9.5)	½	1 9/16 (40)	5¼ (133)	6 (152)	3,240 (14.4)	351 (1.6)	810 (3.6)	925 (4.1)	1,040 (4.6)
½ (12.7)	⅝	2 (51)	7 (178)	8 (203)	7,000 (31.1)	562 (2.5)	1,750 (7.8)	1,750 (7.8)	1,750 (7.8)
⅝ (15.9)	⅞	2½ (64)	8¾ (222)	10 (254)	11,080 (49.3)	923 (4.1)	2,770 (12.3)	2,770 (12.3)	2,770 (12.3)
¾ (19.1)	1	3⅛ (79)	10½ (267)	12½ (318)	13,800 (61.4)	1,781 (7.9)	3,450 (15.3)	3,725 (16.6)	4,000 (17.8)

1. The allowable loads listed are based on a safety factor of 4.0.
2. Refer to allowable load-adjustment factors for edge distance and spacing on pp. 223–224.
3. Allowable loads may be linearly interpolated between concrete strengths listed.
4. The minimum concrete thickness is 1½ times the embedment depth.

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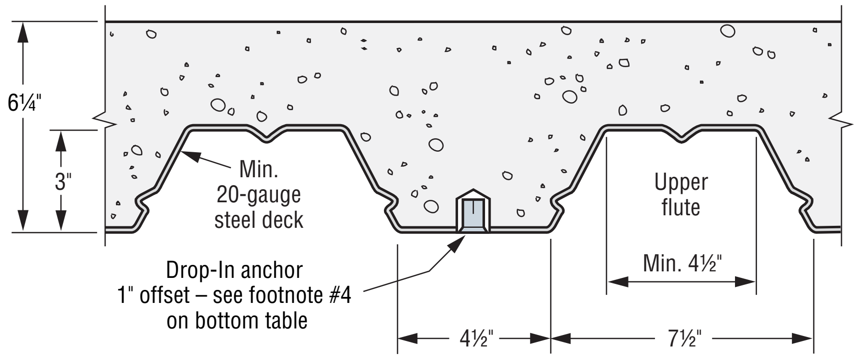
Drop-In (DIA) Design Information — Concrete

⅜" and ½" Short Drop-In Anchor — Allowable Tension and Shear Loads in Sand-Lightweight Concrete Fill over Metal Deck

Model No.	Rod Size (in.)	Drill Bit Dia. (in.)	Emb. Depth (in.)	Tension Critical End Distance (in.)	Shear Critical End Distance (in.)	Critical Spacing (in.)	Install through the Lower Flute or Upper Flute of Metal Deck, $f'_c \geq$ 3,000 psi Concrete (20.7 MPa)			
							Tension Load		Shear Load	
							Ultimate (lb.)	Allowable (lb.)	Ultimate (lb.)	Allowable (lb.)
DIA37S	⅜	½	¾	6	7	8	1,344	335	1,649	410
DIA50S	½	⅝	1	8	9⅜	10⅝	1,711	430	2,070	515

1. The allowable loads listed are based on a safety factor of 4.0.
2. Allowable loads may not be increased for short-term loading due to wind or seismic forces.
3. Refer to allowable load-adjustment factors for edge distances and spacing on pp. 223–224.
4. Anchors were installed with a 1" offset from the centerline of the flute.



Lightweight Concrete over Metal Deck

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Drop-In (DIA) Design Information — Concrete

⅜" and ½" Short Drop-In Anchor — Allowable Tension and Shear Loads in Normal-Weight Concrete

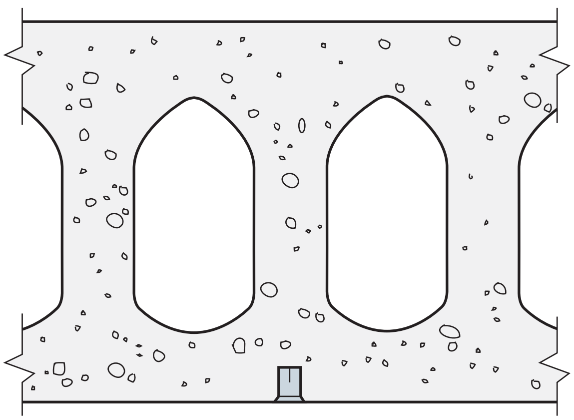
Model No.	Rod Size (in.)	Drill Bit Dia. (in.)	Emb. Depth (in.)	Tension Critical Edge Distance (in.)	Shear Critical Edge Distance (in.)	Critical Spacing (in.)	Normal-Weight Concrete, $f'_c \geq$ 2,500 psi				Normal-Weight Concrete, $f'_c \geq$ 4,000 psi			
							Tension Load		Shear Load		Tension Load		Shear Load	
							Ultimate (lb.)	Allowable (lb.)	Ultimate (lb.)	Allowable (lb.)	Ultimate (lb.)	Allowable (lb.)	Ultimate (lb.)	Allowable (lb.)
DIA37S	⅜	½	¾	4½	5¼	3	1,500	375	2,274	570	2,170	540	3,482	870
DIA50S	½	⅝	1	6	7	4	2,039	510	3,224	805	3,420	855	5,173	1,295

1. The allowable loads listed are based on a safety factor of 4.0.
2. Allowable loads may not be increased for short-term loading due to wind or seismic forces.
3. Refer to allowable load-adjustment factors for edge distances and spacing on pp. 223–224.
4. Allowable loads may be linearly interpolated between concrete strengths.
5. The minimum concrete thickness is 1½ times the embedment depth.

⅜" and ½" Short Drop-In Anchor — Allowable Tension and Shear Loads in Hollow-Core Concrete Panel

Model No.	Rod Size (in.)	Drill Bit Dia. (in.)	Emb. Depth (in.)	Tension Critical Edge Distance (in.)	Shear Critical Edge Distance (in.)	Critical Spacing (in.)	Hollow Core Concrete Panel, $f'_c \geq$ 4,000 psi			
							Tension Load		Shear Load	
							Ultimate (lb.)	Allowable (lb.)	Ultimate (lb.)	Allowable (lb.)
DIA37S	⅜	½	¾	4½	5¼	3	1,860	465	3,308	825
DIA50S	½	⅝	1	6	7	4	2,650	660	4,950	1,235

1. The allowable loads listed are based on a safety factor of 4.0.
2. Allowable loads may not be increased for short-term loading due to wind or seismic forces.
3. Refer to allowable load-adjustment factors for edge distances and spacing on pp. 223–224.
4. Allowable loads may be linearly interpolated between concrete strengths.



Hollow-Core Concrete Panel
(anchor can be installed below web or hollow core)

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Drop-In (DIA) Design Information — Concrete

Drop-In (Stainless Steel), Coil Thread (Carbon Steel) and Short Drop-In Anchors — Allowable Load-Adjustment Factors in Normal-Weight Concrete: Edge Distance and Spacing, Tension and Shear Loads

How to use these charts:

1. The following tables are for reduced edge distance and spacing.
2. Locate the anchor size to be used for either a tension and/or shear load application.
3. Locate the edge distance (c_{act}) or spacing (s_{act}) at which the anchor is to be installed.
4. The load adjustment factor (f_c or f_s) is the intersection of the row and column.
5. Multiply the allowable load by the applicable load adjustment factor.
6. Reduction factors for multiple edges or spacing are multiplied together.

Edge Distance Tension (f_c)

Edge Dist. c_{act} (in.)	Size	¼	⅜	½	⅝	¾
	c_{cr}	3	4½	6	7½	9
	c_{min}	1¾	2⅝	3½	4⅜	5¼
	f_{cmin}	0.65	0.65	0.65	0.65	0.65
1¾		0.65				
2		0.72				
2½		0.86				
2⅝		0.90	0.65			
3		1.00	0.72			
3½			0.81	0.65		
4			0.91	0.72		
4⅜			0.98	0.77	0.65	
4½			1.00	0.79	0.66	
5				0.86	0.72	
5¼				0.90	0.75	0.65
5½				0.93	0.78	0.67
6				1.00	0.83	0.72
6½					0.89	0.77
7					0.94	0.81
7½					1.00	0.86
8						0.91
8½						0.95
9						1.00

See notes below.

Edge Distance Shear (f_c)

Edge Dist. c_{act} (in.)	Size	¼	⅜	½	⅝	¾
	c_{cr}	3½	5¼	7	8¾	10½
	c_{min}	1¾	2⅝	3½	4⅜	5¼
	f_{cmin}	0.45	0.45	0.45	0.45	0.45
1¾		0.45				
2		0.53				
2½		0.69				
2⅝		0.73	0.45			
3		0.84	0.53			
3½		1.00	0.63	0.45		
4			0.74	0.53		
4⅜			0.82	0.59	0.45	
4½			0.84	0.61	0.47	
5			0.95	0.69	0.53	
5¼			1.00	0.73	0.56	0.45
5½				0.76	0.59	0.48
6				0.84	0.65	0.53
6½				0.92	0.72	0.58
7				1.00	0.78	0.63
7½					0.84	0.69
8					0.91	0.74
8½					0.97	0.79
8¾					1.00	0.82
9						0.84
9½						0.90
10						0.95
10½						1.00

1. c_{act} = actual edge distance at which anchor is installed (inches).
2. c_{cr} = critical edge distance for 100% load (inches).
3. c_{min} = minimum edge distance for reduced load (inches).
4. f_c = adjustment factor for allowable load at actual edge distance.
5. f_{ccr}= adjustment factor for allowable load at critical edge distance. f_{ccr} is always = 1.00.
6. f_{cmin} = adjustment factor for allowable load at minimum edge distance.
7. $f_c = f_{cmin} + [(1 - f_{cmin}) (c_{act} - c_{min}) / (c_{cr} - c_{min})]$.

Spacing Tension and Shear (f_s)

s_{act} (in.)	Size	¼	⅜ [9]	⅜	½ [10]	½	⅝	¾
	E	1	¾	1½	1	2	2½	3⅛
	s_{cr}	4	3	6	4	8	10	12½
	s_{min}	2	1½	3	2	4	5	6¼
	f_{smin}	0.50	0.50	0.50	0.50	0.50	0.50	0.50
1½			0.50					
2		0.50	0.67		0.50			
2½		0.63	0.83		0.63			
3		0.75	1.00	0.50	0.75			
3½		0.88		0.58	0.88			
4		1.00		0.67	1.00	0.50		
4½				0.75		0.56		
5				0.83		0.63	0.50	
5½				0.92		0.69	0.55	
6				1.00		0.75	0.60	
6¼						0.78	0.63	0.50
7						0.88	0.70	0.56
8						1.00	0.80	0.64
9							0.90	0.72
10							1.00	0.80
11								0.88
12								0.96
12½								1.00

1. E = Embedment depth (inches).
2. s_{act} = actual spacing distance at which anchors are installed (inches).
3. s_{cr} = critical spacing distance for 100% load (inches).
4. s_{min} = minimum spacing distance for reduced load (inches).
5. f_s = adjustment factor for allowable load at actual spacing distance.
6. f_{scr} = adjustment factor for allowable load at critical spacing distance. f_{scr} is always = 1.00.
7. f_{smin} = adjustment factor for allowable load at minimum spacing distance.
8. $f_s = f_{smin} + [(1 - f_{smin}) (s_{act} - s_{min}) / (s_{cr} - s_{min})]$.
9. ⅜" short drop-in (DIA37S).
10. ½" short Drop-in (DIA50S).

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Drop-In (DIA) Design Information — Concrete

Short Drop-in Anchors — Allowable Load-Adjustment Factors in Sand-Lightweight Concrete over Metal Deck: Edge Distance and Spacing, Tension and Shear Loads

How to use these charts:

1. The following tables are for reduced edge distance and spacing.
2. Locate the anchor size to be used for either a tension and/or shear load application.
3. Locate the edge distance (c_{act}) or spacing (s_{act}) at which the anchor is to be installed.
4. The load adjustment factor (f_c or f_s) is the intersection of the row and column.
5. Multiply the allowable load by the applicable load adjustment factor.
6. Reduction factors for multiple edges or spacing are multiplied together.

Edge Distance Tension (f_C)

Edge Dist. c_{act} (in.)	Size	⅜	½
	c_{cr}	6	8
	c_{min}	3½	4¾
	f_{cmin}	0.65	0.65
3½		0.65	
4		0.72	
4½		0.79	
4¾		0.83	0.65
5		0.86	0.68
5½		0.93	0.73
6		1.00	0.78
6½			0.84
7			0.89
7½			0.95
8			1.00

See notes below.

Edge Distance Shear (f_C)

Edge Dist. c_{act} (in.)	Size	⅜	½
	c_{cr}	7	9⅜
	c_{min}	3½	4¾
	f_{cmin}	0.45	0.45
3½		0.45	
4		0.53	
4½		0.61	
4¾		0.65	0.45
5		0.69	0.48
5½		0.76	0.54
6		0.84	0.60
6½		0.92	0.66
7		1.00	0.72
7½			0.78
8			0.84
8½			0.90
9			0.96
9⅜			1.00

1. c_{act} = actual edge distance at which anchor is installed (inches).
2. c_{cr} = critical edge distance for 100% load (inches).
3. c_{min} = minimum edge distance for reduced load (inches).
4. f_c = adjustment factor for allowable load at actual edge distance.
5. f_{ccr} = adjustment factor for allowable load at critical edge distance. f_{ccr} is always = 1.00.
6. f_{cmin} = adjustment factor for allowable load at minimum edge distance.
7. $f_c = f_{cmin} + [(1 - f_{cmin}) (c_{act} - c_{min}) / (c_{cr} - c_{min})]$.

Spacing Tension and Shear (f_S)

s_{act} (in.)	Size	⅜	½
	s_{cr}	8	10⅝
	s_{min}	4	5¼
	f_{smin}	0.50	0.50
4		0.50	
4½		0.56	
5		0.63	
5¼		0.66	0.50
6		0.75	0.57
6½		0.81	0.62
7		0.88	0.66
7½		0.94	0.71
8		1.00	0.76
8½			0.80
9			0.85
9½			0.90
10			0.94
10⅝			1.00

1. s_{act} = actual spacing distance at which anchors are installed (inches).
2. s_{cr} = critical spacing distance for 100% load (inches).
3. s_{min} = minimum spacing distance for reduced load (inches).
4. f_s = adjustment factor for allowable load at actual spacing distance.
5. f_{scr} = adjustment factor for allowable load at critical spacing distance. f_{scr} is always = 1.00.
6. f_{smin} = adjustment factor for allowable load at minimum spacing distance.
7. $f_s = f_{smin} + [(1 - f_{smin}) (s_{act} - s_{min}) / (s_{cr} - s_{min})]$.

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GCN-MEP Gas-Actuated Concrete Nailer

The GCN-MEP MAG tool is a portable fastener tool for attaching light fixtures to concrete, steel and concrete block (CMU), lightweight concrete over metal deck, and cold formed steel. This tool is ideal for attaching drywall track, furring strips, hat track and angle track using GDP and GDPA collated pins. The GDPMEPMAG tool is actuated with GFC34 fuel cells which means there no need for cords or hoses.

The GCN-MEPMAG tool has a removable magazine and nosepiece which can be removed with no additional hand tools for general maintenance of the tool or for clearing occasional pin jams. This tool also features a pin embedment control for fastening into low strength to high strength base materials.

Features:

- Easy magazine attachment with no extra tools
- 3,300 pins per battery charge
- Pin-depth control dial
- Easy nose-piece change out (for 0.25" and 0.300" headed fasteners) with no extra tools
- High-voltage spark for cleaner fuel combustion
- Comfortable "sure grip" rubber handle
- Battery charge indicator light
- Ladder hook

Code: ICC-ES ESR-2811

GCN-MEPMAG

GCN-MEPMAGKT or GCN-MEPKT
(with no magazine)

GDP Pins

GDP concrete pins are designed to work with the GCN-MEPMAG (with magazine-attached) gas-actuated concrete nailers as well as with most major-brand gas concrete-nailer tools. The patented 10-fastener strip is designed with break-away plastic. The pins are designed for use in A36 and A572 steel, concrete and CMU block.

Codes: ICC-ES ESR-2811; Florida FL15730; City of L.A. RR25837

GDP
U.S. Patent 605,016

GDPS Pins

The GDPS pins are also designed to work in the GCN-MEPMAG gas-actuated nailer tool for installation into A36 and A572 structural steel. The step-shank pin, with a smaller-diameter tip, facilitates easier penetration into the steel, while the larger diameter upper shank provides more shear resistance and successful installation.

Codes: ICC-ES ESR-2811; Florida FL15730

GDPS

Spiral Knurl Gas Pins

GDPSK gas pins are designed for attaching plywood and OSB to cold-formed steel studs. The spiral knurl provides a positive lock and resists back out. Installed with the GCN-MEPMAG, the GDPSK-138 gas pin provided faster installation and setup times, which contributes to lower labor costs. The hardened pins quickly and cleanly pierce the cold-form steel and leave the pin head flush with the wood fixture. The 1⅜" length pin can be used for ½"–¾" thick plywood, and 22–14 gauge steel.

GDPSK

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GCN-MEP Gas-Actuated Concrete Nailer

SIMPSON Strong-Tie®

GDP and GDPS Pins — Shear and Tension Loads

Model Type	Diameter (in.)	Spacing	Base Material					Attached Material		
			Normal-Weight Concrete[1]		A36 Steel[2]			Cold-Formed Steel[3]		
			2,000 psi	4,000 psi	⅛"	3⁄16"	¼"	33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)
Allowable Shear Load[4] (lb./ft.)										
GDP	0.106	0'–4"	135	225	855	675	615	445	580	1,055
		0'–6"	90	150	570	450	410	295	385	700
		0'–8"	70	115	430	340	305	225	290	525
		1'–0"	45	75	285	225	205	150	195	350
		2'–0"	25	40	145	115	100	75	95	175
		3'–0"	15	25	95	75	65	50	65	115
GDPS	0.118/0.102	0'–4"	—	—	—	540	795	430	560	1,015
		0'–6"	—	—	—	360	530	285	370	675
		0'–8"	—	—	—	270	400	215	280	505
		1'–0"	—	—	—	180	265	145	185	340
		2'–0"	—	—	—	90	135	70	95	170
		3'–0"	—	—	—	60	90	50	60	115
Allowable Tension Load[4] (lb.)										
GDP	0.106	—	30	30	125	210	220	195	255	460
GDPS	0.118/0.102	—	—	—	—	95	170	190	250	405

1. For Normal-Weight Concrete the minimum edge distance and spacing is 3" and 4" respectively with ¾" minimum embedment.
2. For A36 steel, the minimum edge distance and spacing is 0.5" and 1" respectively. Entire pointed portion of the fastener must fully penetrate steel base material to obtain tabulated values.
3. Cold-formed steel (CFS) values are based on AISI-S100, Section E4. Reference General Notes for CFS properties.
4. Governing load is the lesser of the base material and CFS.

GDPSK Pin — Shear and Tension Loads

Model Type	Diameter (in.)	Spacing	Base Material: Cold-Formed Steel			
			33 ksi Minimum Yield Strength		50 ksi Minimum Yield Strength	
			33 mils (20 ga.)	43 mils (18 ga.)	54 mils (16 ga.)	68 mils (14 ga.)
Allowable Shear Load[4] (lb./ft.)						
GDPSK	0.109	0'–4"	210	267	450	654
		0'–6"	140	178	300	436
		0'–8"	105	134	225	327
		1'–0"	70	89	150	218
		2'–0"	35	45	75	109
		3'–0"	23	30	50	73
Allowable Tension Load[4] (lb.)						
GDPSK	0.109	—	30	48	92	73

1. Entire pointed portion of the fastener must penetrate through the steel to obtain tabulated values.
2. The allowable tension and shear values are for the fastener only. Members connected to the steel must be investigated separately in accordance with accepted design criteria.
3. Fastener is to be installed in the center of the stud flange.
4. Minimum edge distance and spacing is 13⁄16" and 4", respectively.

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GDP Pins

GDP concrete pins are designed to work with the GCN-MEPMAG gas-actuated concrete nailer as well as with most major-brand gas-actuated concrete-nailer tools. The patented 10-fastener strip is designed with break-away plastic. The pins are designed for use in A36 and A572 steel, concrete, CMU block and sand-lightweight concrete over metal deck.

Codes: ICC-ES ESR-2811; Florida FL15730; City of L.A. RR25837

GDP
U.S. Patent 605,016

0.106"-Diameter Shank Drive Pins

Model No.	Length (in.)	Qty. Pins / Pack +1 Fuel Cell	Packs / Carton	Compatible with These Tools
GDP-50KT	½	1,000	5	Simpson Strong-Tie GCN-MEPMAG Others: TF1100, C3, TF1200
GDP-62KT	⅝	1,000	5	
GDP-75KT	¾	1,000	5	
GDP-100KT	1	1,000	5	
GDP-125KT	1¼	1,000	5	
GDP-150KT	1½	1,000	5	

GDPS Pins

The GDPS pins are also designed to work in the GCN-MEPMAG gas-actuated nailer tool for installation into steel and concrete. The step-shank pin, with a smaller-diameter tip, facilitates easier penetration, while the larger-diameter upper shank provides more shear resistance and successful installation.

GDPS

0.118"/0.102"-Diameter Stepped-Shank Drive Pins

Model No.	Length (in.)	Qty. Pins / Pack + 1 fuel cell	Packs / Carton	Compatible Tools	
				Simpson Strong-Tie	Others
GDPS-50KT	½	1,000	5	GCN-MEPMAG	TF1100, C3, TF1200
GDPS-62KT	⅝	1,000	5		
GDPS-75KT	¾	1,000	5		

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Spiral Knurl Gas Pins

GDPSK gas pins are designed for attaching plywood and OSB to cold-formed-steel studs. The spiral knurl provides a positive lock and resists back-out. Installed with the GCN-MEPMAG, the GDPSK-138 gas pin provides faster installation and setup times, which contributes to lower labor costs. The hardened pins quickly and cleanly pierce the cold-formed steel and leave the pin head flush with the wood fixture. The 1⅜" length pin can be used for ½"–¾" thick plywood, and 14–22 gauge steel.

GDPSK

Spiral Knurl Gas Pins

Model No.	Length (in.)	Qty. Pins / Pack + 1 fuel cell	Packs / Carton	Compatible with These Tools
GDPSK-138KT	1⅜	1,000	5	Simpson Strong-Tie: GCN-MEPMAG Others: TF1100, C3

GWL-100 Lathing Washer and GMR-2 Magnetic Ring

The GWL-100 lathing washer is used with the GCN-MEPMAG tool and attaches lath to the wall surface for overlaying scratch coats, brown coats and stucco. The washers are held onto the nose of the tool with the new GMR-2 magnetic ring and are attached to the substrate (including concrete and CMU) with GDP pins, which fasten through the washer. No extra tools are needed to install the magnetic ring to the nosepiece of the tool.

GWL-100

GMR-2

Lathing Washer and Magnetic Ring

Model No.	Description	Pack Qty.	Carton Qty.
GWL-100	Lathing washer, 1" diameter	1,000	5,000
GMR-2	Magnetic ring for GCN150	10	900

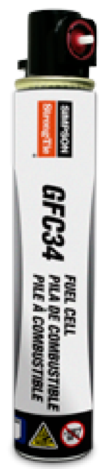
Lathing washer and magnetic rings are sold separately.

Fuel Cell

The GFC34 fuel cell is designed to operate with the GCN-MEPMAG and GCN-MEP, and with many major-brand gas-actuated concrete-nailer tools. The fuel cell provides 1,200 shots and can operate at temperatures between 20° and 120°F (–6°–49°C). The fuel cells are offered individually or in a two-per-pack clamshell. Additionally, one fuel cell is included with each pack of 1,000 pins.

Gas Fuel Cells for the GCN-MEP

Model No.	Description	Pack Qty.	Packs/ Carton	Compatible with These Tools
GFC34	34-gram fuel cells	12	—	Simpson Strong-Tie: GCN-MEP and GCN-MEPMAG Others: TrakFast® TF1100, Trak-It® C3
GFC34-RC2	(2) 34-gram fuel cells	2	6	



GFC Fuel Cell

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PT-27 General Purpose Tool

The PT-27 is a semi-automatic and fast-cycling fastening tool that is engineered for continuous use, high reliability and low maintenance. This versatile tool fires a variety of fastener types and lengths.

Key Fastening Applications

- Acoustical ceilings
- Electrical applications
- Sill plates
- Drywall track
- Water proofing material and/or lathing

Specifications

- Fastener Length: ½" – 2½" (3" or 4" washered)
- Fastener Type: .300" or 8 mm-headed fasteners or ¼" – 20 threaded studs
- Firing Action: Semi-automatic
- Load Caliber: 0.27 strip loads, brown through red (levels 2–5)
- Length: 13½"
- Weight: 5 lb., 4 oz.

Tool is sold in a rugged tool box complete with:

- Operator's manual
- Spall suppressor
- Tools for disassembly
- Safety glasses / ear plugs
- Tool lubricant
- Cleaning brushes
- Operator's exam and caution sign

PT-27

The full line of Simpson Strong-Tie® powder loads and fasteners begins on p. 232.

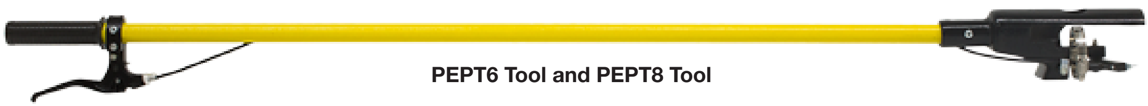
Replacement Parts — PT-27

Description	Model No.
Annular Spring	PT-301014
Ball Bearing (6 mm)	PT-301013
Barrel	PT-301006
Baseplate	PT-301009
Piston – Concave (includes ring)	PT-301217
Piston – Flat (includes ring)	PT-301903
Piston Ring	PT-301208
Piston Stop	PT-301012
Shear Clip	PT-301011

For tool repair and maintenance kits and complete tool schematics and parts list, visit **strongtie.com**.

Complementary Products

Extension pole tool for the PT-27 available in 6' and 8' lengths



PEPT6 Tool and PEPT8 Tool

Anchors

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PTP-27S and PTP-27SMAGR Premium Tools

Features:

- PTP-27S: Automatic fastening: no sliding barrel, just load and shoot
- PTP-27SMAGR: Fully automatic tool with rotating fastener magazine

Both Tools Feature:

- Adjustable power for fastening versatility
- Operator comfort: cushioned grip, reduced recoil and sound dampening muffler for quiet operation
- No manual resetting of piston required
- Easy disassembly for cleaning and maintenance
- The PTP-27S can be converted to a magazine tool and the PTP-27SMAGR can be converted to a single-shot tool

Specifications:

- Fastener Length: PTP-27S — ½" thru 1⅝"
  PTP-27SMAGR — ½" thru 1¼"
- Fastener Type: 0.300" or 8mm diameter
- Firing Action: PTP-27S — Automatic
  PTP-27SMAGR — Fully automatic
- Load Caliber: 0.27 strip loads, brown through purple (Levels 2–6)
- Length: 16¾" (PTP-27S), 17½" (LMAGR)
- Weight: PTP-27S — 6.25 lbs.
  PTP-27SMAGR — 8.1 lbs.

Key Fastening Applications:

PTP-27S:

- Conduit clips
- Ceiling clips
- Drywall track
- Metal decking

PTP-27SMAGR:

- Drywall track
- Hat channel
- HVAC duct straps

Tool is sold in a rugged tool box complete with:

- Operator's manual
- Spall suppressor
- Tools for disassembly
- Safety glasses / ear plugs
- Tool lubricant
- Cleaning brushes
- Operator's exam and caution sign
- Tool box also sold separately
- Gloves

Options:

- Extension pole tool for the PTP-27S available in 6' and 8' lengths.
  6' Tool: PET-6PKT
  8' Tool: PET-8PKT
- Single shot conversion kit (PTP-27SCON)

PTP-27S

PTP-27SMAGR

Adjustable power increases versatility

The patent-pending quick-disconnect baseplate makes it easy to convert the PTP-27SMAGR from a magazine to a single-shot tool

Anchors

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PTP-27S and PTP-27SMAGR Premium Tools

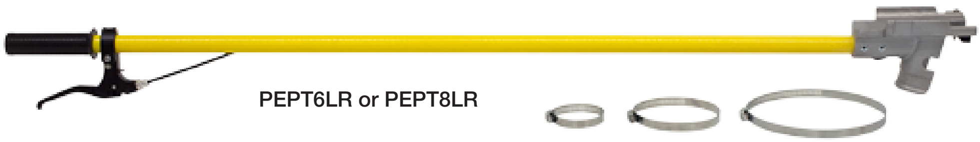
Common Repair Parts — PTP-27S

Description	Model No.
Baseplate	PTP-273800
Nosepiece	PTP-273820
Piston	PTP-273320
Piston Disc	PTP-273306
Rubber Returner	PTP-273305

1. Complete tool schematics and parts list available at **strongtie.com**.

Common Repair Parts — PTP-27SMAGR

Description	Model No.
Magazine Body	PTP-741000
Nosepiece	PTP-740001
Nosepiece Screw	PTP-750002
Piston	PTP-842001
Piston Disc	PTP-730071CH
Rubber Returner	PTP-742101



PEPT6LR or PEPT8LR

Extension Pole Tool (for the PTP-27S)

Rotating magazine allows for installation flexibility

Collated pins for fully automatic fastening and quick loading

Simpson Strong-Tie® Powder-Actuated Fasteners are featured on pp. 232–233.

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Powder-Actuated Fasteners

0.300" Headed Fasteners with 0.157" Shank Diameter

Length (in.)	Model No.	Description	Pack Qty.	Carton Qty.	Compatible Tools	
					Simpson Strong-Tie	Others
½	PDPA-50	0.157 x ½"	100	1,000	PTP-27L PTP-27S PT-27 PT-27HD PT-22 PT-22GS PT-22P PT-22H	721, D-60, U-2000 and most other low-velocity tools.
½ knurled	PDPA-50K	0.157 x ½" knurl	100	1,000		
⅝ knurled	PDPA-62K	0.157 x ⅝" knurl	100	1,000		
¾	PDPA-75	0.157 x ¾"	100	1,000		
1	PDPA-100	0.157 x 1"	100	1,000		
1 ¼	PDPA-125	0.157 x 1 ¼"	100	1,000		
1 ½	PDPA-150	0.157 x 1 ½"	100	1,000		
1 ⅞	PDPA-187	0.157 x 1 ⅞"	100	1,000		
2	PDPA-200	0.157 x 2"	100	1,000		
2 ½	PDPA-250	0.157 x 2 ½"	100	1,000		
2 ⅞	PDPA-287	0.157 x 2 ⅞"	100	1,000		

This model available in mechanically galvanized finish (PDPA-287MG)

PDPA

0.300" Headed Fasteners with 0.157" Shank Diameter 10 Pin Collation

Length (in.)	Model No.	Description	Pack Qty.	Carton Qty.	Compatible Tools	
					Simpson Strong-Tie	Others
½	PDPAS-50	0.157 x ½"	100	1,000	PTP-27L PTP-27S PT-27 PT22, PT-22GS PT-22P PT-22H	721, D-60, U-2000 and most other low-velocity tools.
½ knurled	PDPAS-50K	0.157 x ½" knurl	100	1,000		
⅝ knurled	PDPAS-62K	0.157 x ⅝" knurl	100	1,000		
¾	PDPAS-75	0.157 x ¾"	100	1,000		
1	PDPAS-100	0.157 x 1"	100	1,000		
1 1⁄16	PDPAS-106	0.157 x 1 1⁄16"	100	1,000		
1 ¼	PDPAS-125	0.157 x 1 ¼"	100	1,000		
1 5⁄16	PDPAS-131	0.157 x 1 5⁄16"	100	1,000		
1 ½	PDPAS-150	0.157 x 1 ½"	100	1,000		
1 ⅞	PDPAS-187	0.157 x 1 ⅞"	100	1,000		
2	PDPAS-200	0.157 x 2"	100	1,000		
2 ½	PDPAS-250	0.157 x 2 ½"	100	1,000		
2 ⅞	PDPAS-287	0.157 x 2 ⅞"	100	1,000		

PDPAS

0.300" Headed Tophat Fasteners with 0.157" Shank Diameter

Length (in.)	Model No.	Description	Pack Qty.	Carton Qty.	Compatible Tools	
					Simpson Strong-Tie	Others
½ knurled	PDPAT-50K	0.157 x ½" knurl	100	1,000	PTP-27L PTP-27S PT-27 PT-27HD PT-22 PT-22GS PT-22P PT-22H	DX-460, 721, D-60, U-2000 and most other low-velocity tools.
⅝ knurled	PDPAT-62K	0.157 x ⅝" knurl	100	1,000		
⅝ knurled	PDPAT-62KP	0.157 x ⅝" knurl	100	1,000		
¾	PDPAT-75	0.157 x ¾"	100	1,000		
1	PDPAT-100	0.157 x 1"	100	1,000		

GTH

PDPAT-62KP
(point protrusion for hole spotting)

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Powder-Actuated Fasteners

SIMPSON Strong-Tie®

Pre-Assembled Ceiling Clips — 0.300" Headed Fasteners with 0.157" Shank Diameter

Length (in.)	Model No.	Description	Pack Qty.	Carton Qty.	Compatible Tools	
					Simpson Strong-Tie	Others
⅞	PCLDPA-87	Ceiling clip with ⅞" pin	100	1,000	PTP-27L PTP-27S PT-27 PT22 PT-22GS PT-22P PT-22H	DX-350, DX-460, System 1 721 and most other tools.
1 1⁄16	PCLDPA-106	Ceiling clip with 1 1⁄16" pin	100	1,000		
1 5⁄16	PCLDPA-131	Ceiling clip with 1 5⁄16" pin	100	1,000		
1 1⁄16	PECLDPA-106	Compact ceiling clip with 1 1⁄16" pin	100	1,000		
1 5⁄16	PECLDPA-131	Compact ceiling clip with 1 5⁄16" pin	100	1,000		

PCLDPA

PECLDPA

PCLDPA and PECLDPA Series Ceiling Clips — Tension and Oblique Loads in Sand-Lightweight Concrete over Metal Deck[1]

Model No.	Shank Diameter in. (mm)	Minimum Embedment in. (mm)	Installed through Lower Flute of Metal Deck into Concrete			
			3"-Deep Deck with 2½" Concrete Fill[2]		1½"-Deep Deck with 2" Concrete Fill[3]	
			Allowable Tension Load lb. (kN)	Allowable Oblique Load lb. (kN)	Allowable Tension Load lb. (kN)	Allowable Oblique Load lb. (kN)
PCLDPA-87	0.157 (4.0)	¾ (19)	115 (0.51)	155 (0.69)	60 (0.27)	175 (0.78)
PCLDPA-106		1 (25)	140 (0.63)	175 (0.78)	160 (0.72)	240 (1.08)
PCLDPA-131		1¼ (32)	160 (0.72)	185 (0.83)	180 (0.81)	280 (1.25)
PECLPDA-106		⅞ (22)	80 (0.36)	110 (0.49)	95 (0.42)	110 (0.49)
PECLPDA-131		1 (25)	120 (0.54)	145 (0.65)	135 (0.60)	175 (0.78)

1. Fasteners shall not be driven until the concrete has reached a minimum concrete compressive strength of 3,000 psi.
2. The steel deck must have a minimum thickness of 20 gauge (0.0359-inch-thick-base-steel thickness) and a minimum yield strength of 38,000 psi. Oblique loads are applied at a 45-degree angle to the fastener. The fastener must be a minimum of 1½" from the edge of the deck web and 4" from the end of the deck. The minimum fastener spacing is 4".
3. The steel deck must have a minimum thickness of 20 gauge (0.0359-inch-thick-base-steel thickness) and a minimum yield strength of 38,000 psi. Oblique loads are applied at a 45-degree angle to the fastener. The fastener must be a minimum of ⅞" from the edge of the deck web and 4" from the end of the deck. The minimum fastener spacing is 4".

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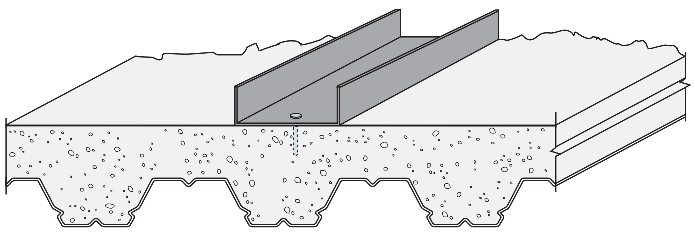
Powder-Actuated Fasteners

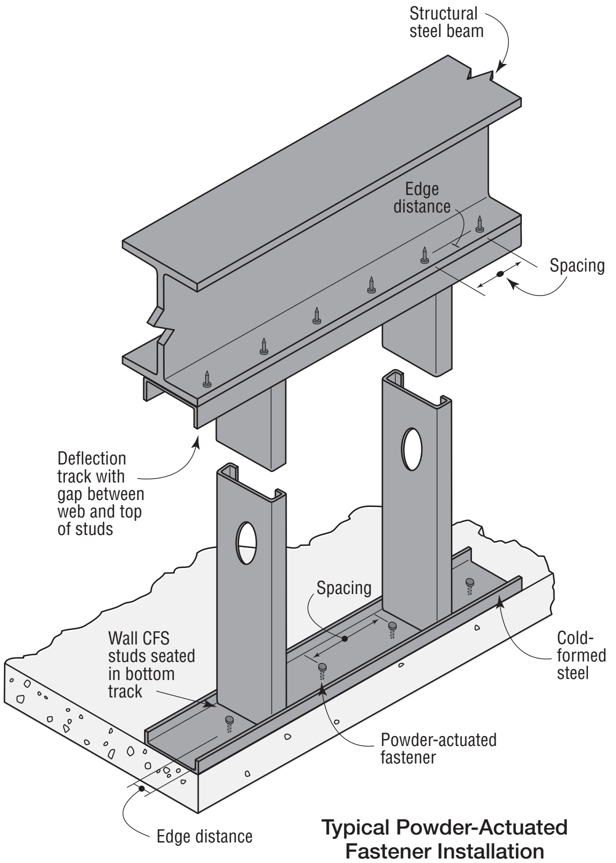
PDPA and PDPAT Pins — Shear and Tension Loads

Model Type	Dia. (in.)	Pin Spacing	Base Material											Attached Material		
			Normal Weight Concrete[1]			Sand-Lightweight Concrete Filled Steel Deck[6,7]			A36 Steel[2]					Cold-Formed Steel[3]		
			Emb. Depth (in.)	2,500 psi	4,000 psi	Emb. Depth (in.)	Concrete[1] (Top)	Lower Flute[8] (Bottom)	3/16"	1/4"	3/8"	1/2"	3/4"	33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)
	Allowable Shear Load[4,5,13] (lb./ft.)															
PDPA PDPAT	0.157	0'-6"	1	570	620	1	450	560	820	730	770[10]	770[10]	650[9]	760[12]	990[12]	1,800[12]
			1¼	720	840	1¼	840	640								
		0'-8"	1	430	465	1	340	420	615	550	580[10]	580[10]	490[9]	570[12]	745[12]	1,350[12]
			1¼	540	630	1¼	630	480								
		1'-0"	1	285	310	1	225	280	410	365	385[10]	385[10]	325[9]	380[12]	495[12]	900[12]
			1¼	360	420	1¼	420	320								
		2'-0"	1	145	155	1	115	140	205	185	195[10]	195[10]	165[9]	190[12]	250[12]	450[12]
			1¼	180	210	1¼	210	160								
		3'-0"	1	95	105	1	75	95	135	120	130[10]	130[10]	110[9]	125[12]	165[12]	300[12]
			1¼	120	140	1¼	140	105								
	Allowable Tension Load[4,5] (lb.)															
	0.157	—	1	210	310	1	150	145	260	370	380[10]	530[10]	195[9]	225[11]	295[11]	535[11]
			1¼	320	380	1¼	320	170								

1. For concrete the minimum edge distance and spacing is 3½" and 5" respectively.
2. For A36 steel, the minimum edge distance and spacing is 0.5" and 1" respectively. Entire pointed portion of the fastener must fully penetrate steel base material unless noted otherwise.
3. Cold-formed steel (CFS) values are based on AISI-S100, Section E4. Reference General Notes for CFS properties.
4. Governing load is the lesser of the base material and CFS.
5. Allowable loads are based on ICC-ES ESR-2138.
6. Concrete shall have a minimum compressive strength of f'_c = 3,000 psi.
7. For steel deck, the minimum depth and thickness is 3" and 33 mil (20 ga.) respectively. Steel deck must have a minimum yield strength of 38,000 psi.
8. For installation through steel deck, the minimum edge and end distance is 1½" and 4" respectively with 4" minimum spacing.
9. Based upon a minimum penetration depth of 0.46" (11.7 mm).
10. For applications to structural steel, the fastener must be driven to where at least some of the point of the fastener penetrates through the steel substrate.
11. The following CFS allowable tension loads may be used for PDPAT: 390 lb. (33 mil), 505 lb. (42 mil), 915 lb. (54 mil).
12. CFS allowable shear load may be multiplied by 1.15 for PDPAT fastener.
13. Shear loads listed do not account for indirect tension due to eccentricity of load at the deflection track. Designer to evaluate combined loading as needed.



PDPAT In Lightweight Concrete Over Steel Deck



Typical Powder-Actuated Fastener Installation

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Powder-Actuated Fasteners

SIMPSON Strong-Tie®

PDPA in 4,000 psi Normal-Weight Concrete

Fastener	Shank Diameter (in.)	Fastener Length (in.)	Edge Distance (in.)	Spacing in Load Dir. (in.)	Track Width (in.)	Number of Fasteners	Allowable Shear Load (lb.)
PDPA-100	0.157	1	2¼	—	3⅝	1	240
				¾		2	310
				—	6	1	240
				2¼		2	510
PDPA-125		1.25	2¼	—	3⅝	1	325
				¾		2	490
				—	6	1	325
				2¼		2	590

1. Alllowable loads are based on fasteners installed through 16 ga. cold-formed steel (F_y > 33 ksi).
2. Minimum concrete thickness must be three times the fastener length.
3. Edge distance and spcaing are shown in figures below.

PDPA in 3,000 psi Sand-Lightweight Concrete

Fastener	Shank Diameter (in.)	Fastener Length (in.)	Edge Distance (in.)	Spacing in Load Dir. (in.)	Track Width (in.)	Number of Fasteners	Allowable Shear Load (lb.)
PDPA-100	0.157	1	2¼	—	3⅝	1	235
				¾		2	310
				—	6	1	235
				2¼		2	445
PDPA-125		1.25	2¼	—	3⅝	1	245
				¾		2	455
				—	6	1	245
				2¼		2	530
PDPA-150		1.5	2¼	—	3⅝	1	245
				¾		2	470
				—	6	1	245
				2¼		2	530

1. Alllowable loads are based on fasteners installed through 16 ga. cold-formed steel (F_y > 33 ksi).
2. Minimum concrete thickness must be three times the fastener length.
3. Edge distance and spcaing are shown in figures below.

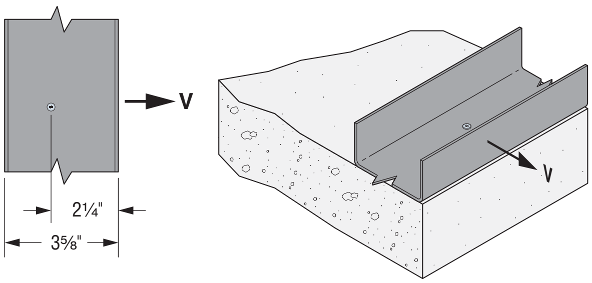

Figure 1: 3⅝" Track – One Fastener

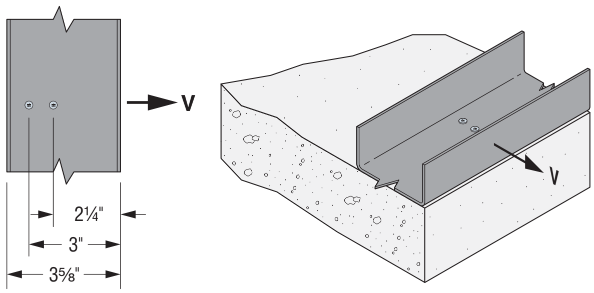

Figure 2: 3⅝" Track – Two Fasteners

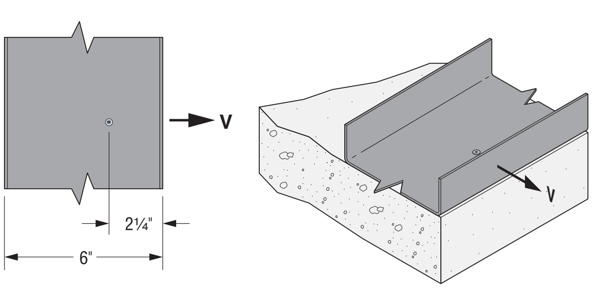

Figure 3: 6" Track – One Fastener

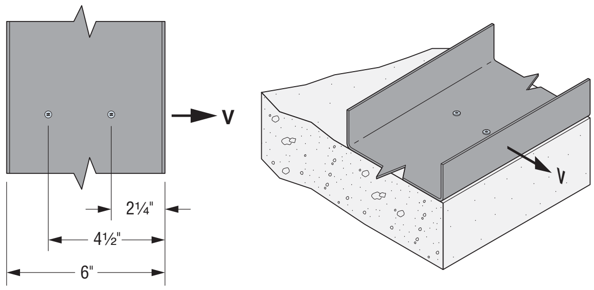

Figure 4: 6" Track – Two Fasteners

Anchors

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SB Anchor Bolt

SIMPSON Strong-Tie®

The SB⅝x24 anchor bolt offers a load-tested anchorage solution that exceeds the capacity of all of our holdowns that call for a ⅝"-diameter anchor. Similarly, the SB1x30 covers holdowns utilizing a 1"-diameter anchor that exceed the capacity of our SSTB bolts. The SB⅞x24 is designed to maximize performance with minimum embedment for holdowns utilizing a ⅞"-diameter anchor.

SB anchor bolts are code listed by ICC-ES under the 2009, 2012 and 2015 IBC and IRC to meet the requirements of ICC-ES acceptance criteria — AC 399. ICC-ES ESR-2611 is the industry's first code report issued for proprietary anchor bolts evaluated to the criteria of AC 399.

Special Features:

- Identification on the bolt head showing embedment angle and model
- Sweep geometry to optimize position in form
- Rolled thread for higher tensile capacity
- Hex nuts and plate washer fixed in position
- Available in HDG for additional corrosion resistance

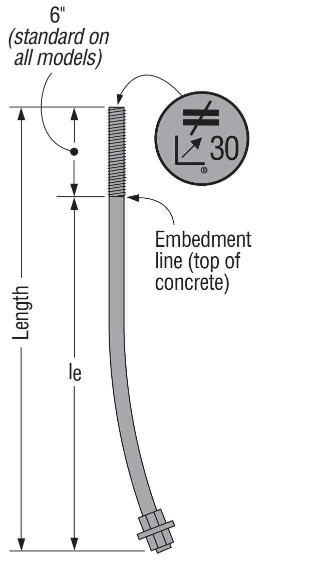
Material: ASTM F-1554, Grade 36

Finish: None. May be ordered HDG. Contact Simpson Strong-Tie.

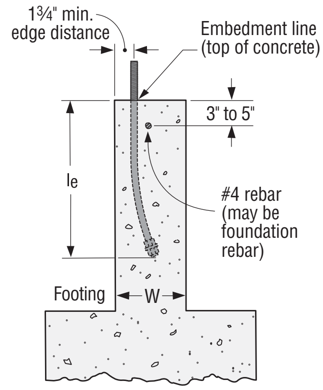
Installation:

- SB is only for concrete applications poured monolithically except where noted.
- Top nuts and washers for holdown attachment are not supplied with the SB; install standard nuts, couplers and/or washers as required.
- On HDG SB anchors, chase the threads to use standard nuts or couplers or use overtapped products in accordance with ASTM A563 — for example, Simpson Strong-Tie® NUT⅝-OST, NUT⅞-OST, NUT1-OST, CNW⅝-OST, CNW⅞-OST and CNW1-OST.
- Install SB before the concrete pour using AnchorMates®. Install the SB per the plan view detail.
- Minimum concrete compressive strength is 2,500 psi.
- When rebar is required it does not need to be tied to the SB.

Codes: See p. 11 for Code Reference Key Chart



SB1x30
(Other models similar)



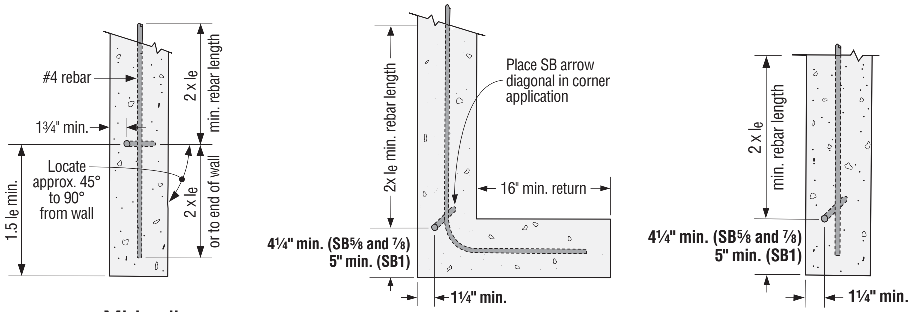
Typical SB Installation

SB Bolts at Stemwall

Model No.	Dimensions (in.)				Allowable Tension Load (lb.)						Code Ref.
	Stemwall Width	Dia.	Length	Min. Embed. (le)	Wind and SDC A&B			SDC C–F			
					Midwall	Corner	End Wall	Midwall	Corner	End Wall	
SB⅝x24	6	⅝	24	18	6,675	6,675	6,675	6,675	5,730	5,730	I5, FL, L5
SB⅞x24	8	⅞	24	18	10,470	9,355	6,820	8,795	7,855	5,730	
SB1x30	8	1	30	24	13,655	9,905	7,220	11,470	8,315	6,065	

These products are available with additional corrosion protection. Additional products on this page may also be available with this option. Check with Simpson Strong-Tie for details.

1. For other SB anchorage conditions, reference p. 56 of C-C-2017.

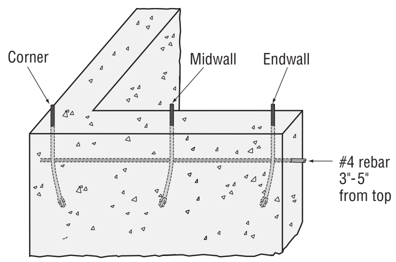


Midwall

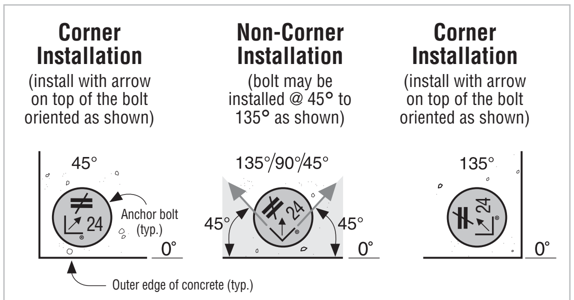
Corner

End Wall

Stemwall Plan Views



Perspective View



Plan View of SB Placement in Concrete

Anchors

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SSTB® Anchor Bolt

This product is preferable to similar connectors because of a) easier installation, b) higher loads, c) lower installed cost, or a combination of these features.

The SSTB® anchor bolt is designed for maximum performance as an anchor bolt for holdowns and Simpson Strong-Tie® Strong-Wall® shearwalls. Extensive testing has been done to determine the design load capacity of the SSTB when installed in many common applications.

The Simpson Strong-Tie SSTB anchor bolts are now code listed by ICC-ES under the 2009, 2012 and 2015 IBC® and IRC® to meet the requirements of ICC-ES acceptance criteria AC 399. ICC-ES ESR-2611 is the industry's first code report issued for proprietary anchor bolts evaluated to the criteria of AC 399.

Special Features:

- Identification on the bolt head showing embedment angle and model
- Offset angle reduces side bursting, and provides more concrete cover
- Rolled thread for higher tensile capacity
- Stamped embedment line aids installation
- Available in HDG for additional corrosion resistance

Material: ASTM F-1554, Grade 36

Finish: None. May be ordered HDG; contact Simpson Strong-Tie.

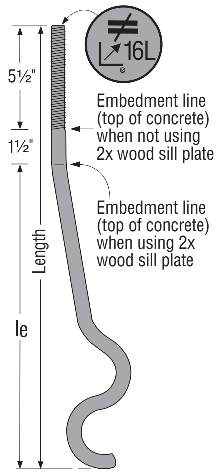
Installation:

- SSTB is suitable for monolithic and two-pour concrete applications.
- Nuts and washers for holdown attachment 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 — for example Simpson Strong-Tie NUT⅝-OST, NUT⅞-OST, CNW⅝-OST, CNW⅞-OST.
- Install SSTB before the concrete pour using AnchorMates®. Install the SSTB per the plan view detail.
- Minimum concrete compressive strength is 2,500 psi.
- When rebar is required, it does not need to be tied to the SSTB.
- Order SSTBL models (example: SSTB16L) for longer thread length (16L= 5½", 20L = 6½", 24L = 6", 28L = 6½"). SSTB and SSTBL load values are the same. SSTB34 and SSTB36 feature 4½" and 6½" of thread respectively and are not available in "L" versions.

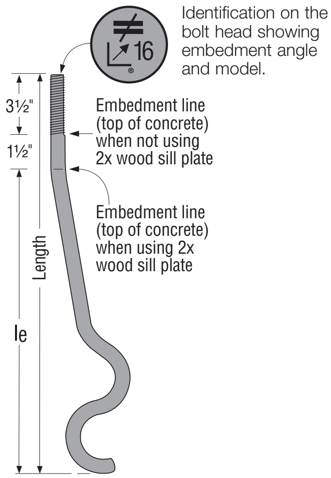
CMU

- One horizontal #4 rebar in the second course
- One vertical #4 rebar in adjacent cell for ⅝" diameter SSTB
- One vertical #4 rebar in an adjacent cell and additional vertical #4 rebar(s) at 24" o.c. max. for ⅞" diameter SSTBs (two total vertical rebars for end-wall corner, three total vertical rebars for midwall)

Codes: See p. 11 for Code Reference Key Chart

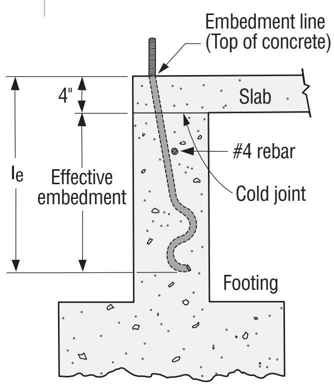


SSTB16L
(other models similar)



SSTB16
(other models similar)

See pp. 238–239 for additional installation details.



For two-pour (4" slab) installation loads:

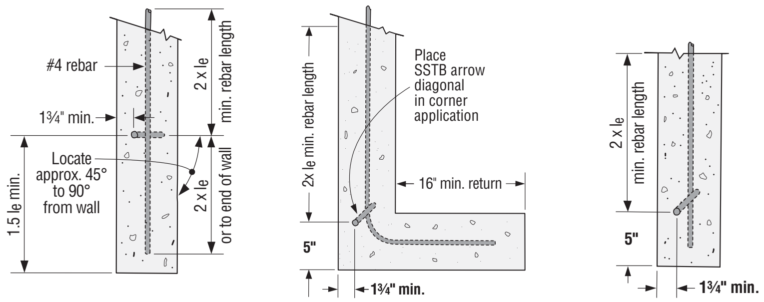
- When using the SSTB20, use the equivalent loads of the SSTB16
- When using the SSTB24, use the equivalent loads of the SSTB20
- When using the SSTB34 or 36, use the equivalent loads of the SSTB28

SSTB Bolts at Stemwall

Model No.	Dimensions (in.)				Allowable Tension Load (lb.)						Code Ref.
					Wind and SDC A&B			SDC C–F			
	Stemwall Width	Dia.	Length	Min. Embed. (le)	Midwall	Corner	End Wall[2]	Midwall	Corner	End Wall[2]	
SSTB16	6	⅝	17⅝ (16L = 19⅝)	12⅝	3,610	3,610	3,610	2,550	2,550	2,550	I5, FL, L5
SSTB20	6	⅝	21⅝ (20L = 24⅝)	16⅝	4,315	4,040	4,040	3,145	2,960	2,960	
SSTB24	6	⅝	25⅝ (24L = 28⅛)	20⅝	5,025	4,470	4,470	3,740	3,325	3,325	
SSTB28	8	⅞	29⅞ (28L = 32⅞)	24⅞	9,900	8,710	7,615	8,315	7,315	6,395	
SSTB34	8	⅞	34⅞	28⅞	9,900	8,710	7,615	8,315	7,315	6,395	
SSTB36	8	⅞	36⅞	28⅞	9,900	8,710	7,615	8,315	7,315	6,395	

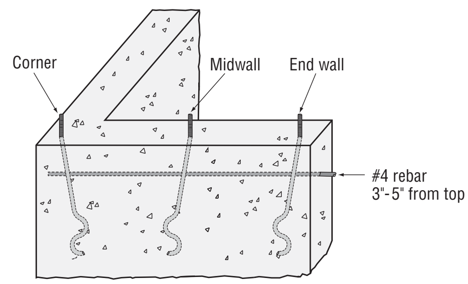
These products are available with additional corrosion protection. Additional products on this page may also be available with this option. Check with Simpson Strong-Tie for details.

1. See p. 14 for notes to the Designer.
2. SSTB28, SSTB34 and SSTB36 with 3⅞" end distance allowable loads are 6,605 lb.(Wind and SDC A&B) and 5,550 lb. (SDC C–F).



Midwall   Corner   End Wall

Stemwall Plan Views



Perspective View

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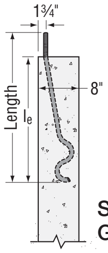
SSTB® Anchor Bolt

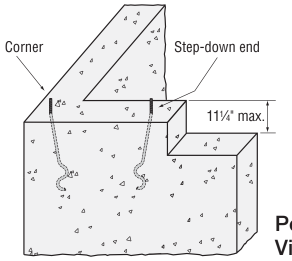
SIMPSON Strong-Tie®

SSTB Bolts at Stemwall: Garage Front

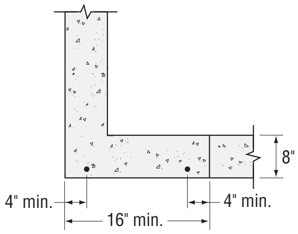
Model No.	Dimensions (in.)				Allowable Tension Load (lb.)				Code Ref.
	Stemwall Width	Dia.	Length	Min. Embed. (l_e)	Wind and SDC A&B		SDC C–F		
					Step-Down End	Corner	Step-Down End	Corner	
SSTB28	8	⅞	29⅞	24⅞	7,015	7,045	5,895	5,920	I5, FL, L5



Stemwall Garage Front



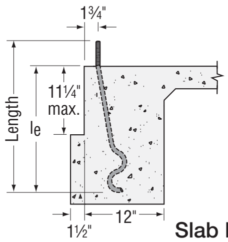
Perspective View



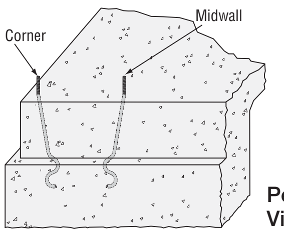
Plan View

SSTB Bolts at Slab on Grade: Edge

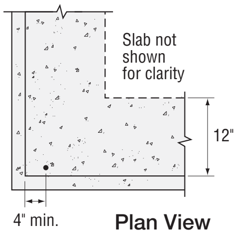
Model No.	Dimensions (in.)				Allowable Tension Load (lb.)				Code Ref.
	Footing Width	Dia.	Length	Min. Embed. (l_e)	Wind and SDC A&B		SDC C–F		
					Midwall	Corner	Midwall	Corner	
SSTB16	12	⅝	17⅝	12⅝	5,355	5,355	3,780	3,780	I5, FL, L5
SSTB20	12	⅝	25⅝	16⅝	6,550	6,550	4,785	4,785	
SSTB24	12	⅝	25⅝	20⅝	6,675	6,675	5,790	5,790	
SSTB28	12	⅞	29⅞	24⅞	13,080	13,080	11,060	11,645	
SSTB34	12	⅞	34⅞	28⅞	13,080	13,080	11,060	11,645	
SSTB36	12	⅞	36⅞	28⅞	13,080	13,080	11,060	11,645	



Slab Edge



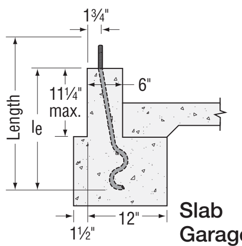
Perspective View



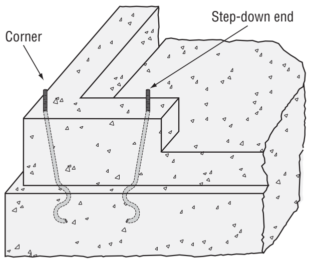
Plan View

SSTB Bolts at Slab on Grade: Garage Curb

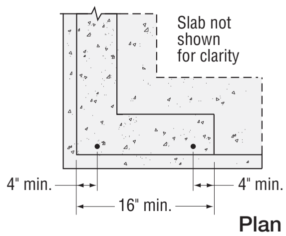
Model No.	Dimensions (in.)				Allowable Tension Load (lb.)				Code Ref.
	Curb Width	Dia.	Length	Min. Embed. (l_e)	Wind and SDC A&B		SDC C–F		
					Step-Down End	Corner	Step-Down End	Corner	
SSTB28	6	⅞	29⅞	24⅞	10,085	12,375	8,475	10,395	I5, FL, L5



Slab Garage Curb



Perspective View



Plan View

Notes to the Designer:

1. Rebar is required at top of stemwall foundations but is not required for Slab-on-Grade Edge and Garage Curb, or Stemwall Garage Front installations.
2. Minimum end distances for SSTB bolts are as shown in graphics.
3. To obtain LRFD values for cast-in-place bolts, multiply ASD seismic load values by 14 and wind load values 1.6 (1.67 for 2015 IBC).
4. Per Section 1613 of the IBC, detached one- and two-story dwellings in SDC C may use "Wind and SDC A&B" allowable loads.
5. See ESR-2611 for additional information.
6. Midwall loads apply when anchor is 1.5 l_e or greater from the end. For bolts acting in tension simultaneously, the minimum bolt center-to-center spacing is 3 l_e.

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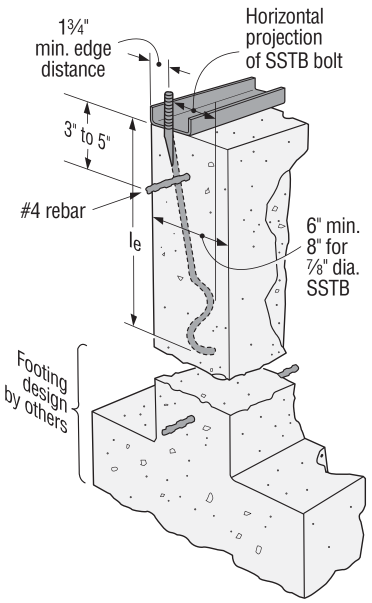
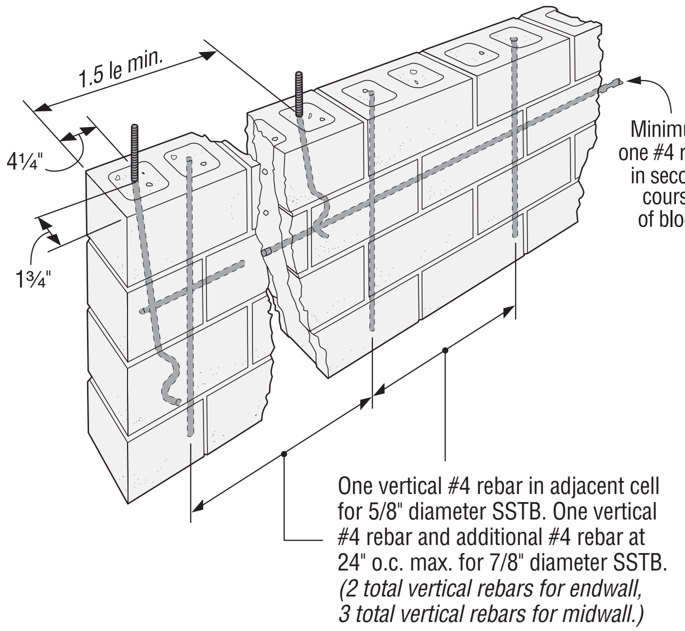
SSTB® Anchor Bolt



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



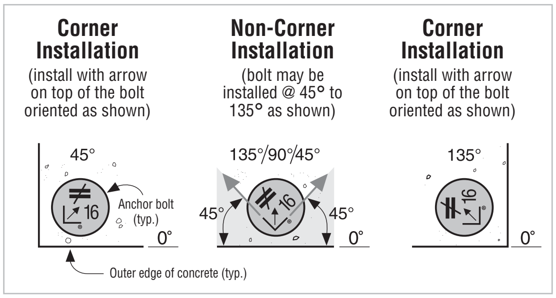
Typical SSTB Installation in Grouted Concrete Block

SSTB Bolts in 8" GFCMU

Model No.	Dimensions (in.)			Allowable Tension Load (lb.)		Code Ref.
	Dia.	Length	Min. Embed. (le)	Midwall	Corner/ End Wall	
SSTB16	⅝	17⅝ (16L = 19⅝)	12⅝	2,865	1,220	170
SSTB20	⅝	21⅝ (20L = 24⅝)	16⅝	2,865	1,220	
SSTB24	⅝	25⅝ (24L = 28⅛)	20⅝	2,865	1,220	
SSTB28	⅞	29⅞ (28L = 32⅞)	24⅞	4,185	3,000	
SSTB34	⅞	34⅞	28⅞	4,185	3,000	
SSTB36	⅞	36⅞	28⅞	4,185	3,000	

These products are available with additional corrosion protection. Additional products on this page may also be available with this option. Check with Simpson Strong-Tie for details.

1. Loads are based on a minimum CMU compressive strength, f'_m, of 1,500 psi.
2. Minimum end distance required to achieve midwall table loads is 1.5 l_e.
3. Minimum end distance for corner/end wall loads is 4¼".
4. Loads may not be increased for duration of load.
5. Allowable loads are based on the average ultimate load with a safety factor of 5.0 per ACI 530.



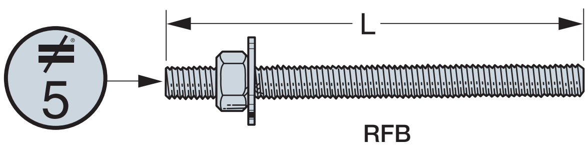
Plan View of SSTB Placement in Concrete

RFB Retrofit Bolts

RFBs are clean, oil-free, pre-cut threaded rod, supplied with nut and washer. Offers a complete engineered anchoring system when used with Simpson Strong-Tie® adhesive. Inspection is easy; the head is stamped with rod length and No-Equal symbol for identification after installation.

Material: ASTM F1554 Grade 36

Finish: Zinc-Plated (unless noted otherwise), available in HDG (per ASTM A153); stainless steel (RFB#5x8SS only)



RFB

Model No.	Length L (in.)	Bolt Diameter (in.)
RFB#4X4	4	½
RFB#4X5	5	½
RFB#4X6	6	½
RFB#4X7	7	½
RFB#4X10	10	½
RFB#4x8HDG-R	8	½
RFB#5X5	5	⅝
RFB#5X8	8	⅝
RFB#5X10	10	⅝
RFB#5X12HDG-R	12	⅝
RFB#5X16	16	⅝
RFB#6X10.5	10½	¾

These products are available with additional corrosion protection. Additional products on this page may also be available with this option. Check with Simpson Strong-Tie for details.

1. RFB#4X8HDG-R and RFB#5X12HDG-R are only available with a hot-dip galvanized coating. They are retail packaged and are sold 10 per carton.
2. Washer provided on all RFB (except RFB#5x8SS).

Anchors

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PAB Pre-Assembled Anchor Bolt

The PAB anchor bolt is a versatile cast-in-place anchor bolt ideal for high-tension-load applications, such as rod systems and shearwalls. It features a plate washer at the embedded end sandwiched between two fixed hex nuts and a head stamp for easy identification after the pour.

- Available in diameters from ½" to 1¼" in lengths from 12" to 36" (in 6" increments)
- Available in standard and high-strength steel
- Head stamp contains the No Equal sign, diameter designation and an "H" on high-strength rods

Material:

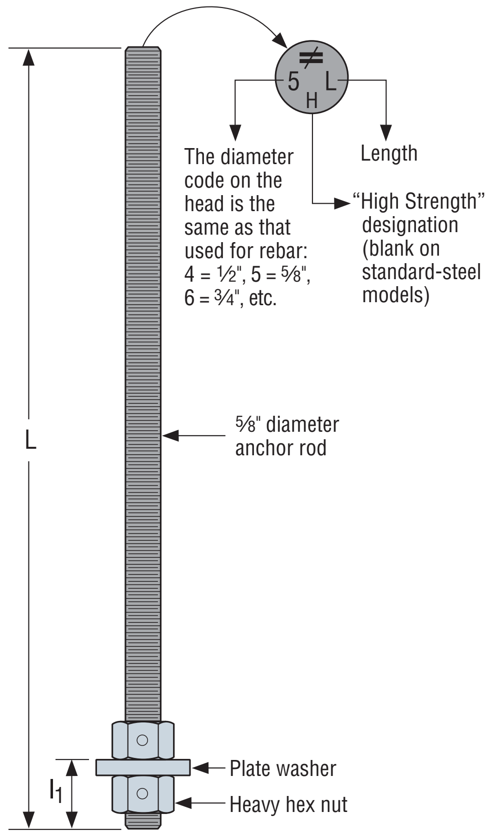
Standard Steel — ASTM F1554 Grade 36, A36 or A307 — F_u = 58 ksi
High-Strength Steel (up to 1" dia.) — ASTM A449 — F_u = 120 ksi
High-Strength Steel (1⅛" and 1¼" dia.) — ASTM A193 B7 or F1554 Grade 105 — F_u = 125 ksi

Finish: None. May be ordered in HDG; contact Simpson Strong-Tie.

Installation:

- On HDG PABs, chase the threads to use standard nuts or couplers or use overtapped products in accordance with ASTM A563; for example, Simpson Strong-Tie® NUT ⅝-OST, NUT ⅞-OST, CNW ⅝-OST, CNW ⅞-OST. Some OST couplers are typically oversized on one end of the coupler nut only and will be marked with an "O" on oversized side. Couplers may be oversized on both ends. Contact Simpson Strong-Tie.

Codes: See p. 11 for Code Reference Key Chart



PAB

The Simpson Strong-Tie® Anchor Designer™ Software analyzes and suggests anchor solutions using the ACI 318-14 strength-design methodology (or CAN/CSA A23.3 Annex D Limit States Design methodology). It provides cracked- and uncracked-concrete anchorage solutions for numerous Simpson Strong-Tie mechanical and adhesive anchors as well as the PAB anchor bolt. With its easy-to-use graphical user interface, the software makes it easy for the Designer to identify anchorage solutions without having to perform time-consuming calculations by hand.

Naming Legend

PAB5H-12

PAB Anchor Bolt — **Diameter* and Grade** — **Length (12", 18", 24", 30" or 36")**

***Units in ⅛" Increments (Ex: 9 = 9⁄8" or 1⅛")**

How to specify and order:

When calling out PAB anchor bolts, substitute the desired length for the "XX" in the Root Model Number.

For a ⅝"x18" anchor bolt, the model number would be PAB5-18 (or PAB5H-18 for high strength).

PAB Anchor Bolt – Standard Steel

Diameter (in.)	Plate Washer Size (in.)	l_1 (in.)	Root Model No.	Lengths (in.)
½	⅜ x 1½ x 1½	1⅛	PAB4-XX	12" to 36" (in 6" increments)
⅝	½ x 1¾ x 1¾	1⅜	PAB5-XX	
¾	½ x 2¼ x 2¼	1½	PAB6-XX	
⅞	½ x 2½ x 2½	1⅝	PAB7-XX	
1	⅝ x 3 x 3	1⅞	PAB8-XX	
1⅛	⅝ x 3½ x 3½	2	PAB9-XX	
1¼	¾ x 3½ x 3½	2¼	PAB10-XX	

PAB Anchor Bolt – High-Strength Steel

Diameter (in.)	Plate Washer Size (in.)	l_1 (in.)	Root Model No.	Lengths (in.)
½	⅜ x 1½ x 1½	1⅛	PAB4H-XX	12" to 36" (in 6" increments)
⅝	½ x 1¾ x 1¾	1⅜	PAB5H-XX	
¾	½ x 2¼ x 2¼	1½	PAB6H-XX	
⅞	½ x 2½ x 2½	1⅝	PAB7H-XX	
1	⅝ x 3 x 3	1⅞	PAB8H-XX	
1⅛	⅝ x 3½ x 3½	2	PAB9H-XX	
1¼	¾ x 3½ x 3½	2¼	PAB10H-XX	

1. Lengths longer than 36" available as special order.
2. Plate washers are designed to develop the capacity of the bolt.

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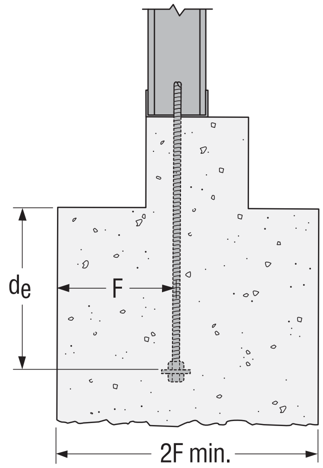
PAB Pre-Assembled Anchor Bolt

SIMPSON Strong-Tie®

PAB Anchor Bolt — Anchorage Solutions

Design Criteria	Diameter (in.)	Anchor Bolt	2,500 psi Concrete				3,000 psi Concrete				Code Ref.
			Dimensions (in.)		Tension Load (lb.)		Dimensions (in.)		Tension Load (lb.)		
			d_e	F	ASD	LRFD	d_e	F	ASD	LRFD	
Wind	½	PAB4	4½	7	4,270	6,405	4	6	4,270	6,405	200
	⅝	PAB5	4	6	4,030	6,720	4	6	4,415	7,360	
			6	9	6,675	10,010	5½	8½	6,675	10,010	
	¾	PAB6	5½	8½	6,500	10,835	5	7½	6,175	10,290	
			7½	11½	9,610	14,415	7	10½	9,610	14,415	
	⅞	PAB7	6	9	7,405	12,345	5½	8½	7,120	11,870	
			9	13½	13,080	19,620	8½	13	13,080	19,620	
		PAB7H	9	13½	13,610	22,680	8½	13	13,680	22,805	
			14	21	27,060	40,590	13½	20½	27,060	40,590	
	1	PAB8	8	12	11,405	19,005	7½	11½	11,340	18,900	
			10½	16	17,080	25,565	10	15	17,080	25,560	
		PAB8H	10½	16	17,150	28,580	10	15	17,460	29,100	
			16½	25	35,345	53,015	15½	23½	35,345	53,015	
	1⅛	PAB9	9	13½	13,610	22,680	8	12	12,495	20,820	
			12½	19	21,620	32,430	12	18	21,620	32,430	
	1¼	PAB10	14	21	26,690	40,035	13½	20½	26,690	40,035	
Seismic	½	PAB4	5	7½	4,270	6,405	4½	7	4,270	6,405	
	⅝	PAB5	6½	10	6,675	10,010	6	9	6,675	10,010	
	¾	PAB6	7½	11½	9,060	12,940	7	10½	8,945	12,780	
			8	12	9,610	14,415	7½	11½	9,610	14,415	
	⅞	PAB7	9	13½	11,905	17,010	8½	13	11,970	17,100	
			10	15	13,080	19,620	9½	14½	13,080	19,620	
		PAB7H	14½	22	25,350	36,215	13½	20½	24,650	35,215	
			15½	23½	27,060	40,590	14½	22	27,060	40,590	
	1	PAB8	11	16½	15,996	22,850	10½	16	16,435	23,480	
			11½	17½	17,080	25,625	11	16½	17,080	25,625	
		PAB8H	17	25½	33,045	47,205	16	24	32,720	46,740	
			18	27	35,345	53,015	17	25½	35,345	53,015	
	1⅛	PAB9	12½	19	19,795	28,275	12	18	20,255	28,940	
			13½	20½	21,620	32,430	12½	19	21,620	32,430	
	1¼	PAB10	14½	22	25,350	36,215	14	21	26,190	37,415	
			15	22½	26,690	40,035	14½	22	26,690	40,035	

1. Anchorage designs conform to ACI 318-14 and assume cracked concrete with no supplementary reinforcement.
2. Seismic indicates Seismic Design Category C through F and designs comply with ACI 318-14 Section 17.2.3.4. Per Section 1613 of the IBC, detached one- and two-family dwellings in SDC C may use wind values.
3. Wind includes Sesmic Design Category A and B.
4. Foundation dimensions are for anchorage only. Foundation design (size and reinforcement) by Designer. The registered design professional may specify alternate embedment, footing size, and anchor bolt.
5. Where tension loads are governed by anchor steel, the design provisions from AISC 360-10 are used to determine the tensile steel limit. LRFD values are calculated by multiplying the nominal AISC steel capacity by a 0.75 phi factor and allowable values are calculated by dividing the AISC nominal capacity by a 2.0 omega factor.
6. Where tension loads are governed by an Appendix D concrete limit, the allowable Stress Design (ASD) values are obtained by multiplying Load Factor Resistance Design (LRFD) capacities by 0.7 for Seismic and 0.6 for Wind.



Design loads are calculated using a full shear cone. Coverage on each side of the bolt shall be a minimum of F or reductions must be taken.

Anchors

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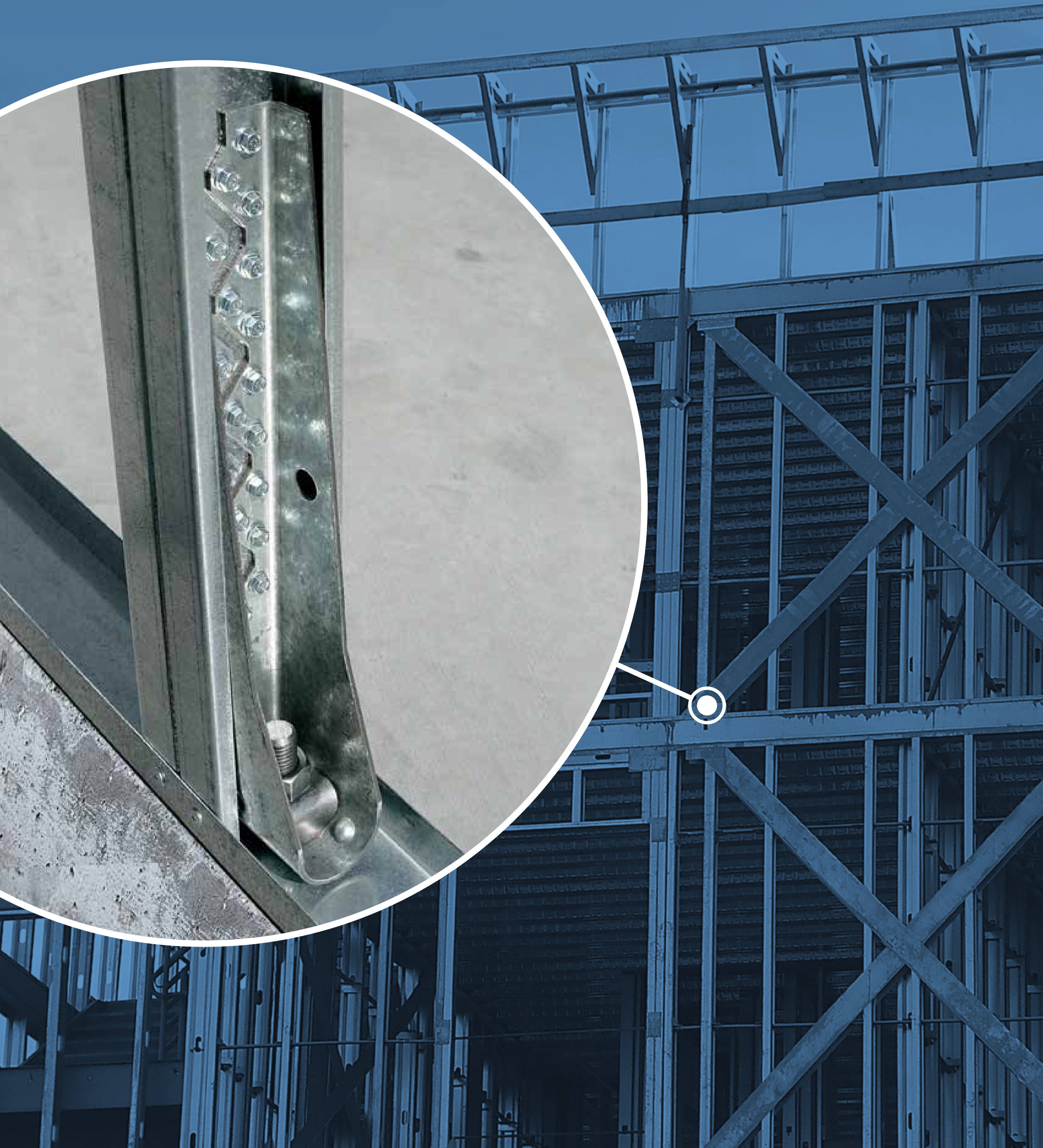
Holdowns and Tension Ties



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.

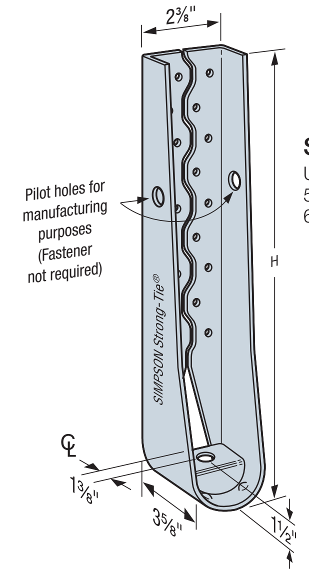
Material: 118 mil (10 ga.)

Finish: Galvanized

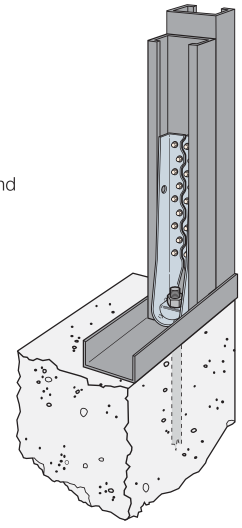
Installation:

- Use all specified fasteners; see General Notes
- Use standard #14 self-drilling screws to fasten to studs
- Anchor bolt washer is not required
- See SB, SSTB and PAB anchor bolts on pp. 236–241 for cast-in-place anchorage options
- See SET-XP® and AT-XP® adhesive products for anchor bolt retrofit options

Codes: See p. 11 for Code Reference Key Chart



S/HDU
U.S. Patents 5,979,130 and 6,112,495



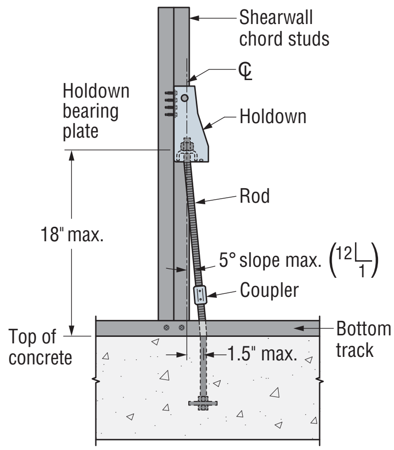
Typical S/HDU Installation

Model	H (in.)	Fasteners: Anchor Bolt Diameter[1] (in.)	Fasteners: Stud Fasteners[7]	Stud Member Thickness[2] mil (ga.)	ASD (lb.): Tension Load	ASD (lb.): Deflection at ASD Load[5]	LRFD (lb.): Tension Load	LRFD (lb.): Deflection at LRFD Load[5]	Nominal Tension Load[6] (lb.)	Code Ref.
S/HDU4	7⅞	⅝	(6) #14	2–33 (2–20)	2,320	0.093	3,705	0.149	5,685	IP1, L2, FL
				2–43 (2–18)	3,825	0.115	6,105	0.190	9,365	
				2–54 (2–16)	3,970	0.093	6,345	0.156	9,730	
				Steel fixture	4,470	0.063	7,165	0.103	12,120	
S/HDU6	10⅜	⅝	(12) #14	2–33 (2–20)	4,895	0.125	8,495	0.250	10,470	
				2–43 (2–18)	6,125	0.119	9,690	0.250	15,460	
				2–54 (2–16)	6,125	0.108	9,785	0.234	15,005	
				Steel fixture	5,995	0.060	9,580	0.136	14,695	
S/HDU9	12⅞	⅞	(18) #14	2–33 (2–20)	6,965	0.103	11,125	0.189	13,165	
				2–43 (2–18)	9,255	0.125	15,485	0.250	21,810	
				2–54 (2–16)	9,990	0.106	15,960	0.225	24,480	
				Steel fixture	12,715	0.125	20,510	0.177	31,455	
S/HDU11	16⅝	⅞	(27) #14	2–33 (2–20)	6,965	0.103	11,125	0.189	13,165	
				2–43 (2–18)	9,595	0.096	15,330	0.162	23,515	
				2–54 (2–16)	9,675	0.110	15,460	0.158	23,710	
		⅞ with heavy hex nut	(27) #14	2–43 (2–18)[6]	11,100	0.125	17,500	0.250	24,955	
				2–54 (2–16)[6]	12,175	0.125	19,445	0.243	29,825	
				Steel fixture[6]	12,945	0.111	20,680	0.163	31,715	

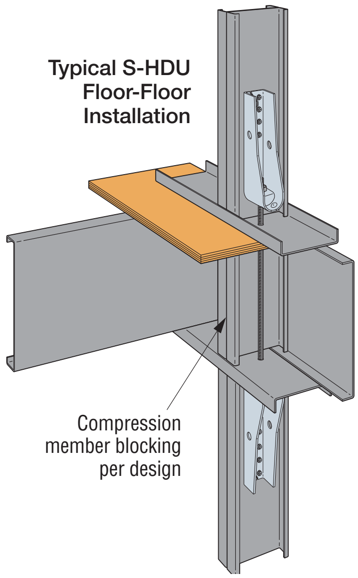
(S/HDU4 and S/HDU6 are marked with the corrosion-protection symbol.)

These products are available with additional corrosion protection. Additional products on this page may also be available with this option. Check with Simpson Strong-Tie for details.

1. The Designer shall specify the foundation anchor material type, embedment and configuration. Some of the tabulated holdown tension loads exceed the tension strength of typical ASTM A36 or A307 anchor bolts.
2. Stud design by Specifier. Tabulated loads are based on a minimum stud thickness for fastener connection.
3. ¼" self-drilling screws may be substituted for #14 self-tapping screws.
4. A heavy hex nut for the anchor bolt is required to achieve the table loads for S/HDU11.
5. Deflection at ASD or LRFD includes fastener slip, holdown deformation and anchor rod elongation for holdowns installed up to 4" above top of concrete. Holdowns may be installed raised, up to 18" above top of concrete, with no load reduction provided that additional elongation of the anchor rod is accounted for.
6. The Nominal Tension Load is based on the tested average ultimate (peak) load and is provided for design in accordance with section C5 of AISI S213 that requires a holdown to have a nominal strength to resist the lesser of the amplified seismic load or the maximum force the system can deliver.
7. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



Holdown Raised Off CFS Bottom Track



Typical S-HDU Floor-Floor Installation

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S/LTT, S/DTT and HTT Tension Ties

SIMPSON Strong-Tie®

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

S/DTT2Z tension tie is suitable for lighter-duty hold-down applications on single or back-to-back studs, and installed easily with #14 self-drilling screws.

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

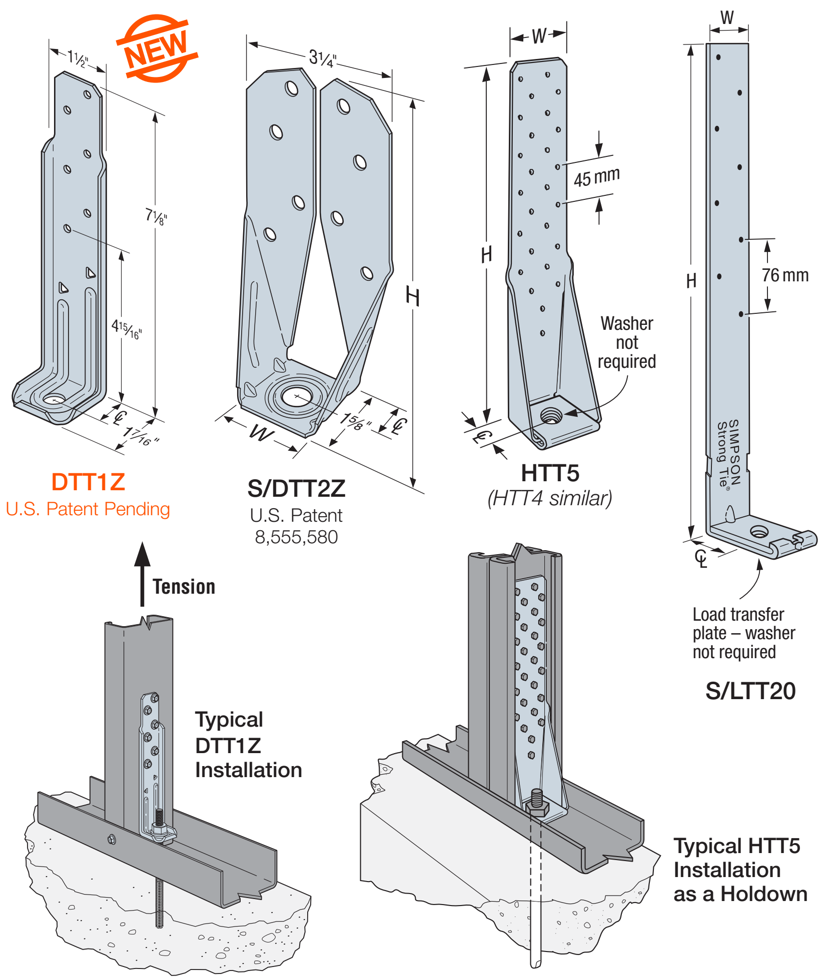
Material: HTT — 111 mil (11 ga.)
DTT1Z, S/DTT2Z — 68 mil (14 ga.)
S/LTT20B — Strap: 97 mil (12 ga.);
Plate: 229 mil (3 ga.)

Finish: HTT, S/LTT — Galvanized;
DTT1Z, S/DTT2Z — ZMAX® coating

Installation:

- Use all specified fasteners.
- Use the specified number of 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.
- S/DTT2Z requires a standard cut washer (included) be installed between the nut and the seat.
- Do not install S/LTT20B raised off of the bottom track.
- See SB and SSTB Anchor Bolts on pp. 236–239 for anchorage options.
- See SET-XP® and AT-XP® adhesive products for anchor bolt retrofit options.

Codes: See p. 11 for Code Reference Key Chart



Model	Dimensions (in.) W	Dimensions (in.) H	Dimensions (in.) ℄	Fasteners: Anchor Bolt Diameter[1] (in.)	Fasteners: Stud Fasteners[5]	Stud Member Thickness mil (ga.)	ASD (lb.) Tension Load	ASD (lb.) Deflection at ASD Load[3]	LRFD (lb.) Tension Load	LRFD (lb.) Deflection at LRFD Load[3]	Nominal Tension Load[4] (lb.)	Code Ref.
DTT1Z	1½	7⅛	¾	⅜	(6) #10	33 (20)	905	0.156	1,270	0.250	3,485	IP1, L2, FL
S/LTT20	2	20	1½	½	(8) #10	33 (20)	1,200	0.125	1,890	0.250	4,625	
S/DTT2Z	1⅝	6¹⁵⁄₁₆	¹³⁄₁₆	½	(8) #14	33 (20)	1,570	0.138	2,200	0.250	4,265	
						43 (18)	1,685	0.151	2,355	0.250	5,570	
						2–33 (2–20)	1,735	0.153	2,430	0.250	5,735	
HTT4	2½	12⅜	1⅜	⅝	(18) #10	33 (20)	3,180	0.104	4,770	0.187	8,215	
						2–33 (2–20)	4,395	0.125	6,675	0.250	11,835	
HTT5	2½	16	1⅜	⅝	(26) #10	43 (18)	4,240	0.125	6,505	0.250	11,585	
						2–43 (2–18)	4,670	0.125	6,970	0.250	12,195	
						1–54 (1–16)	4,150	0.125	6,425	0.250	12,365	

These products are available with additional corrosion protection. Additional products on this page may also be available with this option. Check with Simpson Strong-Tie for details.

1. The Designer shall specify the foundation anchor material type, embedment and configuration.
2. Stud design by Specifier. Tabulated loads are based on a minimum stud thickness for fastener connection.
3. Deflection at ASD or LRFD includes fastener slip, holdown deformation and anchor rod elongation for holdowns installed up to 4" above top of concrete. Holdowns may be installed raised, up to 18" above top of concrete, with no load reduction provided that additional elongation of the anchor rod is accounted for. See bottom of p. 243 for installation detail.
4. The Nominal Tension Load is based on the tested average ultimate (peak) load and is provided for design in accordance with section C5 of AISI S213 that requires a tension tie to have a nominal strength to resist the lesser of the amplified seismic load or the maximum force the system can deliver.
5. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.

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S/HDS and 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 prepunch the bolt holes.

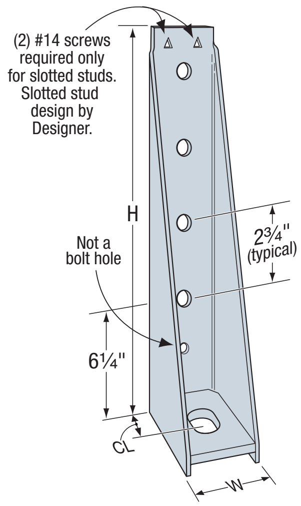
Material: See table

Finish: Simpson Strong-Tie® gray paint. Hot-dip galvanized is available; see Corrosion-Information, pp. 18–21.

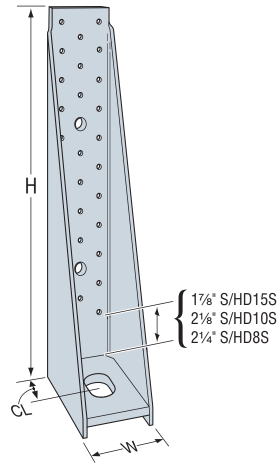
Installation:

- 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.
- Boundary members (back-to-back studs) design shall be by Designer.
- 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. 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 AISI S100 Specification Section E2.
- See SB, SSTB and PAB Anchor Bolts on pp. 236–241 for anchorage options.
- See SET-XP® and AT-XP® adhesive products for anchor bolt retrofit options.

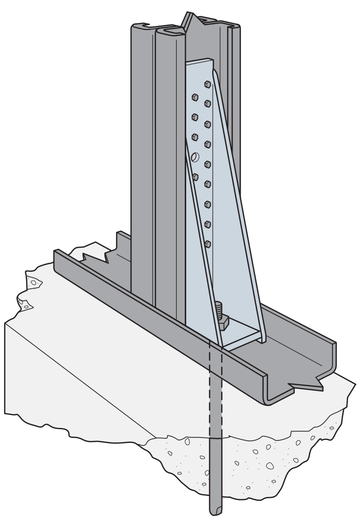
Codes: See p. 11 for Code Reference Key Chart



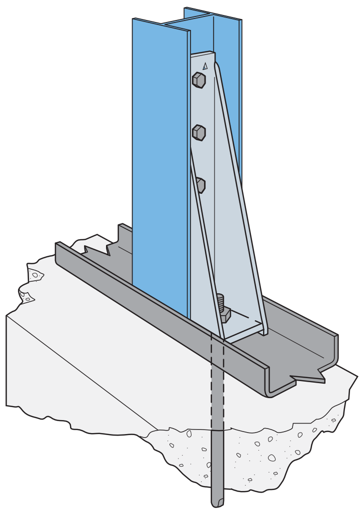
S/HD15B



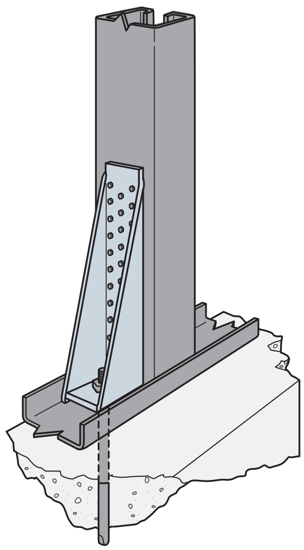
S/HD15S
(S/HD8S and S/HD10S similar)



Typical S/HD10S Back-to-Back Stud Installation



Typical S/HD10B PACO Column Installation
See Code Report



Typical S/HD10S Heavy-Duty (Large Flange) Stud Application
See Code Report

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S/HDS and S/HDB Holdowns

Model No.	Mil (Ga.)	H (in.)	W (in.)	℄ (in.)	Fasteners: Anchor Bolt Dia.[1] (in.)	Fasteners: Stud Fasteners[7]	Stud Member Thickness mil (ga.)	ASD (lb.): Tension Load	ASD (lb.): Deflection at ASD Load[4]	LRFD (lb.): Tension Load	LRFD (lb.): Deflection at LRFD Load[4]	Nominal Tension Load (lb.)	Code Ref.
S/HD8S	118 (10)	11	2 5/16	1 1/2	7/8	(17) #14[7]	2–33 (2–20)	7,335	0.12	11,715	0.204	13,720	IP1, L2, FL
							2–43 (2–18)	8,750	0.086	13,975	0.146	21,435	
							2–54 (2–16)	8,855	0.106	14,145	0.162	21,700	
							Steel fixture	10,840	0.053	17,335	0.072	32,525	
S/HD10S	118 (10)	13 1/2	2 5/16	1 1/2	7/8	(22) #14[7]	2–33 (2–20)	7,400	0.122	11,815	0.192	13,835	
							2–43 (2–18)	11,120	0.112	17,755	0.124	20,795	
							2–54 (2–16)	12,220	0.096	19,520	0.145	29,940	
							Steel fixture	12,375	0.043	19,820	0.061	33,535	
S/HD15S	171 (7)	17	2 5/16	1 9/16	1	(30) #14[7]	2–43 (2–18)	12,110	0.096	19,340	0.164	22,645	
							2–54 (2–16)	13,500	0.11	21,565	0.13	33,075	
							Steel fixture	15,810	0.043	25,320	0.065	42,845	
S/HD8B	171 (7)	11	2 5/16	1 1/2	7/8	(2) 3/4" dia.	2–33 (2–20)	3,895	0.081	5,620	0.144	8,645	
							2–43 (2–18)	5,345	0.098	7,710	0.146	11,865	
							2–54 (2–16)	8,950	0.082	14,280	0.141	20,310	
							Steel fixture	9,080	0.069	14,545	0.104	22,975	
S/HD10B	118 (10)	13 1/2	2 5/16	1 1/2	7/8	(3) 3/4" dia.	2–33 (2–20)	5,840	0.070	8,430	0.124	12,970	
							2–43 (2–18)	8,015	0.087	11,565	0.12	17,795	
							2–54 (2–16)	12,090	0.125	19,720	0.23	28,050	
							Steel fixture	15,635	0.102	24,955	0.123	35,495	
S/HD15B	171 (7)	17	2 5/16	1 9/16	1	(4) 3/4" dia.	2–43 (2–18)	16,020	0.118	15,425	0.179	22,165	
							2–54 (2–16)	16,020	0.090	25,565	0.121	36,360	
							Steel fixture	18,690	0.104	29,825	0.139	42,425	

These products are available with additional corrosion protection. Additional products on this page may also be available with this option. Check with Simpson Strong-Tie for details.

1. The Designer shall specify the foundation anchor material type, embedment and configuration. Some of the tabulated holdown tension loads exceed the tension strength of typical ASTM A36 or A307 anchor bolts.
2. Stud design by Specifier. Tabulated loads are based on a minimum stud thickness for fastener connection.
3. 1/4" self-drilling screws may be substituted for #14 self-tapping screws.
4. Deflection at ASD or LRFD includes fastener slip, holdown deformation and anchor rod elongation for holdowns installed up to 4" above top of concrete. Holdowns may be installed raised, up to 18" above top of concrete, with no load reduction provided that additional elongation of the anchor rod is accounted for. See bottom of p. 243 for installation detail.
5. The Nominal Tension Load is based on the tested average ultimate (peak) load and is provided for design in accordance with section C5 of AISI S213 that requires a holdown to have a nominal strength to resist the lesser of the amplified seismic load or the maximum force the system can deliver.
6. Not all fastener holes for S/HDS holdowns need to be filled, as additional fastener holes provided. Install fasteners symmetrically.
7. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.

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SIMPSON Strong-Tie®

PA/HPA Purlin Anchors

PA/HPA purlin anchors offer solutions for CFS to concrete and concrete block connections which satisfy code requirements. The PAs dual embedment line allows installation in concrete or concrete block.

Material: PA — 12 gauge; HPA — 10 gauge

Finish: Galvanized. PAs available in HDG or ZMAX® coating.

Installation:

- Use all specified fasteners; some models have extra fastener holes. See General Notes.
- Purlin anchor must hook around rebar.
- Allowable loads are for a horizontal installation into the side of a concrete or masonry wall.
- Strap may be bent one full cycle. (Bent vertical 90° then bent horizontal.)

Edge Distance — Minimum concrete edge distance is 5". Minimum concrete block left-to-right edge distance is 20".

Concrete Block Wall — 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.

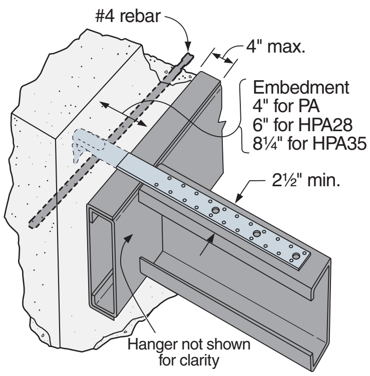
D Minimum masonry compressive strength, f'_m = 1,500 psi.

Options: See S/LTT and HTT Tension Ties for alternate retrofit solutions

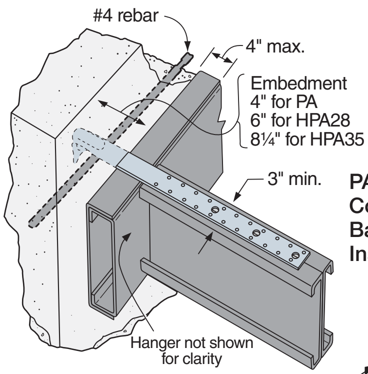
Codes: See p. 11 for Code Reference Key Chart

The ASCE 7-10 12.11.2.2.5 states:

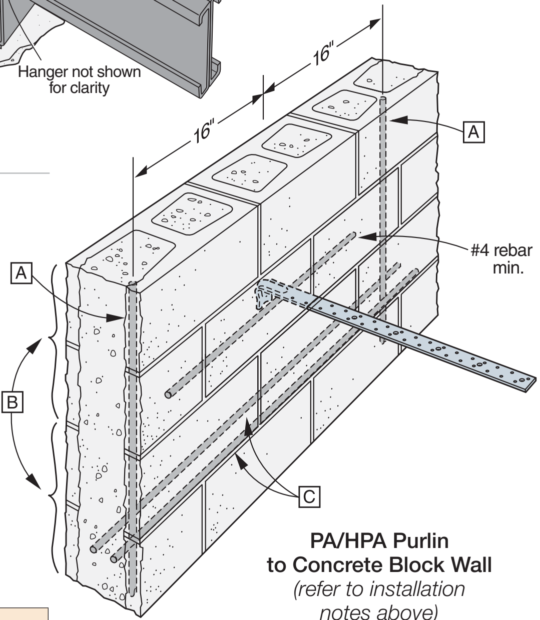
... Diaphragm to structural wall anchorage using embedded straps shall be attached to, or hooked around the reinforcing steel or otherwise terminated so as to effectively transfer forces to the reinforcing steel.



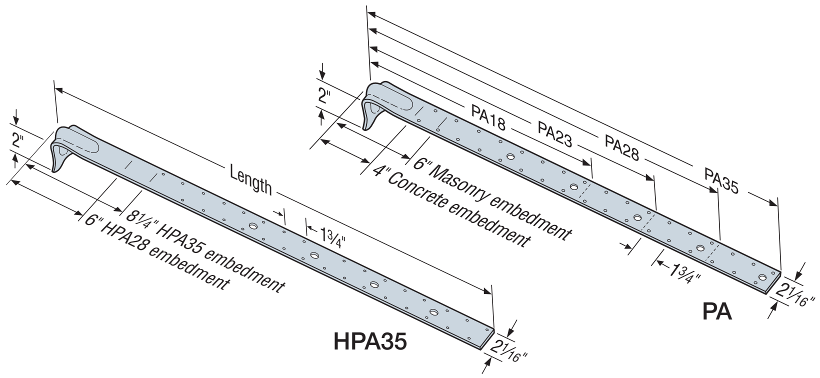
PA/HPA Purlin to Concrete Wall Single C-Shape Joist Installation



PA/HPA Purlin to Concrete Wall Back-to-Back Joist Installation



PA/HPA Purlin to Concrete Block Wall
(refer to installation notes above)



Model No.	Strap Length L (in.)	l_e (in.)	Fasteners[8] Rafter/Stud /Joist Thickness 33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)	Non Cracked Tension Load	Cracked Tension Load	Max. Allowable Strap Tensile Capacity	Masonry Installation Tension Load	Code Ref.
Wind and SDC A&B — Allowable Load (lb.)										
PA18	18½	4	(16) #10	(16) #10	(8) #10	2,830	2,360	NA	1,895	
PA23	23¾	4	(22) #10	(16) #10	(8) #10	3,220	2,360	NA	2,815	
PA28	29	4	(22) #10	(16) #10	(8) #10	3,370	2,360	NA	2,815	
PA35	35	4	(22) #10	(16) #10	(8) #10	3,370	2,360	NA	2,815	
HPA28	32½	6	(28) #10	(20) #10	(10) #10	4,845	4,845	NA	—	
HPA35	38½	8¼	(32) #10	(22) #10	(12) #10	5,145	5,145	NA	—	
SDC C–F — Allowable Load (lb.)										I8
PA18	18½	4	(16) #10	(16) #10	(8) #10	2,830	1,980	3,220	1,895	
PA23	23¾	4	(22) #10	(16) #10	(8) #10	2,830	1,980	3,220	2,815	
PA28	29	4	(22) #10	(16) #10	(8) #10	2,830	1,980	3,935	2,815	
PA35	35	4	(22) #10	(16) #10	(8) #10	2,830	1,980	3,935	2,815	
HPA28	32½	6	(28) #10	(20) #10	(10) #10	4,845	4,090	5,145	—	
HPA35	38½	8¼	(32) #10	(22) #10	(12) #10	5,145	5,145	5,145	—	

These products are available with additional corrosion protection. Additional products on this page may also be available with this option. Check with Simpson Strong-Tie for details.

1. Loads may not be increaed for short-term loading.
2. For concrete installs, the minimum compressive strength, f'_c = 3,000 psi.
3. Multiply Seismic and Wind ASD load values by 1.4 or 1.6 respectively to obtain LRFD capacities.
4. In accordance with 2006 and 2009 IBC Section 1613.1, detached one- and two-family dwellings in Seismic Design Category (SDC) C may use “Wind and SDC A&B” allowable loads.
5. Minimum center-to-center spacing is 3 times the required embedment ($S_{min} = 3 \times l_e$) for PA/HPAs acting in tension simultaneously, where l_e = embedment depth. Standard installation is based on minimum 5" end distance.
6. Install fasteners symmetrically and with a minimum of 4 of the required fasteners between the embedment line and the first tooling hole. In some cases, not all of the fastener holes will need to be filled.
7. Per ASCE7-10, 12.11.2.2.2, for diaphragms in structures assigned to SDC C–F, maximum allowable strap tensile capacity shall be no less than 1.4 times the design load. Not applicable (NA) for Wind and SDC A&B designs.
8. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.

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STHD/LSTHD Strap Tie Holdowns

This product is preferable to similar connectors because of a) easier installation, b) higher loads, c) lower installed cost, or a combination of these features.

The STHD is an embedded strap-tie holdown offering high-load capacity. The STHD incorporates many features that aid correct installation and improve performance. When installed on the forms with the StrapMate® strap holder, the unique design of the STHD delivers enhanced stability before and during the pour to help prevent both parallel and perpendicular movement (relative to the form). This results in accurate positioning of the strap and reduced possibility of spalling.

Features

- The fastener pattern allows for fastening to the edges of back-to-back studs
- Strap nail slots are countersunk to provide a lower nail head profile
- The slots below the embedment line enable increased front-to-back concrete bond and help to reduce spalling
- Rim joist models accommodate up to a 17" clear span without any loss of strap fastening

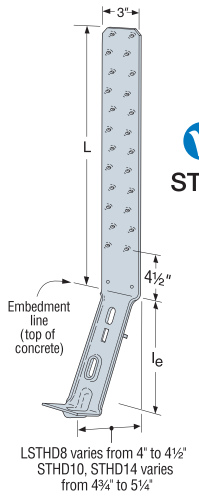
Material: LSTHD8, LSTHD8RJ — 14 gauge, all others — 12 gauge

Finish: Galvanized

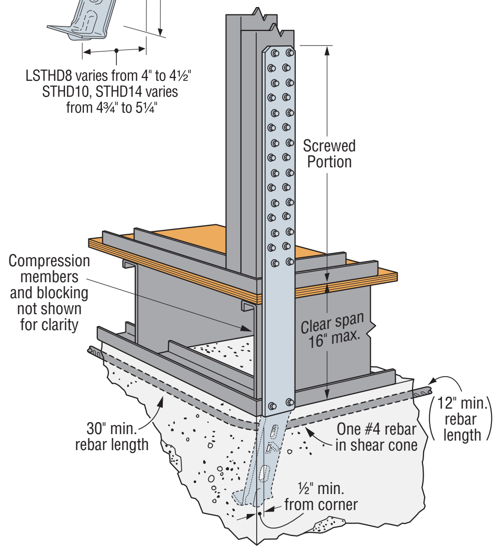
Installation: • Use all specified fasteners; see General Notes.

- Use table below for both standard concrete and post-tension slab installations.
- Install before concrete pour with a StrapMate® or other holding device.
- Fasten strap from the bottom up.
- Strap may be bent one full cycle (bent horizontal 90° then bent vertical) to aid wall placement, but 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. 1" to 4" spalls for LSTHD8 achieve 0.9 times table loads. STHD10 and STHD14 achieve full load for spalls less than 4". Any portion of the strap left exposed should be protected against corrosion.
- Other than where noted in the two-pour detail, 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.
- Additional studs attached to the shearwall studs or post may be required by the Designer for wall sheathing fastening.
- For installation in severe corrosion environments, refer to **strongtie.com** for additional considerations.

Codes: See p. 11 for Code Reference Key Chart



STHD



Typical STHD14RJ Rim Joist Application

Allowable Stress Design (ASD) Loads for STHD Strap Style Hold-Down on CFS — 2,500 psi Concrete

Min. Stem Wall (in.)	Model No. Standard	Model No. Rim Joist	Strap Length (L) Standard (in.)	Strap Length (L) Rim Joist (in.)	l_e (in.)	Non-Cracked Req'd Screws[5]	Non-Cracked Mid Wall	Non-Cracked Corner	Non-Cracked End Wall	Cracked Req'd Screws[5]	Cracked Mid Wall	Cracked Corner	Cracked End Wall	Code Ref.
Wind and SDC A&B — Allowable Tension Load (lb.) — 33 mil (20 ga.) Studs														
6	LSTHD8	LSTHD8RJ	18⅝	32⅛	8	(20) #10	3,115	2,700	1,690	(16) #10	2,675	2,320	1,455	I8, FL
	STHD10	STHD10RJ	24⅝	38⅛	10	(24) #10	3,690	3,820	2,050	(22) #10	3,140	3,140	1,705	
	STHD14	STHD14RJ	26⅛	39⅝	14	(30) #10	5,150	5,150	3,200	(30) #10	5,150	5,150	3,200	
8	LSTHD8	LSTHD8RJ	18⅝	32⅛	8	(20) #10	3,115	2,700	2,230	(16) #10	2,675	2,320	1,915	
	STHD10	STHD10RJ	24⅝	38⅛	10	(28) #10	4,755	4,120	3,145	(26) #10	4,195	3,500	2,585	
	STHD14	STHD14RJ	26⅛	39⅝	14	(30) #10	5,300	5,300	4,210	(30) #10	5,300	5,300	4,210	
SDC C–F — Allowable Tension Load (lb.) — 33 mil (20 ga.) Studs														
6	LSTHD8	LSTHD8RJ	18⅝	32⅛	8	(16) #10	2,270	2,090	1,220	(14) #10	2,250	1,950	1,220	
	STHD10	STHD10RJ	24⅝	38⅛	10	(18) #10	2,750	2,750	1,615	(18) #10	2,640	2,640	1,435	
	STHD14	STHD14RJ	26⅛	39⅝	14	(22) #10	3,695	3,695	2,685	(22) #10	3,695	3,695	2,685	
8	LSTHD8	LSTHD8RJ	18⅝	32⅛	8	(16) #10	2,615	2,125	1,635	(14) #10	2,250	1,820	1,610	
	STHD10	STHD10RJ	24⅝	38⅛	10	(20) #10	3,400	2,940	2,295	(20) #10	3,400	2,940	2,175	
	STHD14	STHD14RJ	26⅛	39⅝	14	(24) #10	3,815	3,815	3,500	(24) #10	3,815	3,815	3,500	

For SI: 1 in. = 25.4 mm, 1 lb. = 4.45 N, 1 psi = 6.895 kPa.

1. Deflection at highest allowable loads for install over CFS double studs are as follows: LSTHD8 = 0.065", STHD8 = 0.071", STHD10 = 0.096" and STHD14 = 0.115".
2. Multiply Seismic and Wind ASD load values by 1.4 or 1.6 respectively to obtain LRFD capacities.
3. Per 2009 and 2013 IBC Section 1613, detached one- and two-family dwellings in Seismic Design Category (SDC) C may use "Wind and SDC A&B" allowable loads.
4. Minimum center-to-center spacing is three times the required embedment ($S_{min} = 3xl_e$) for STHD's acting in tension simultaneously. Mid wall install is based on 1.5xle end distance.
5. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.

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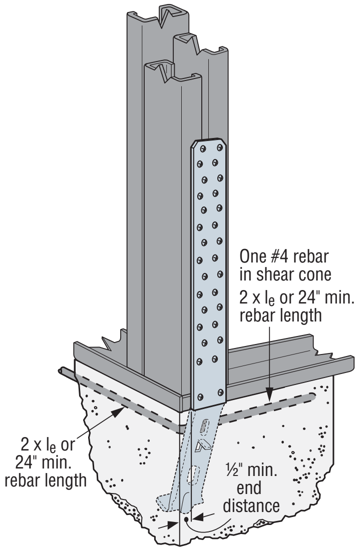
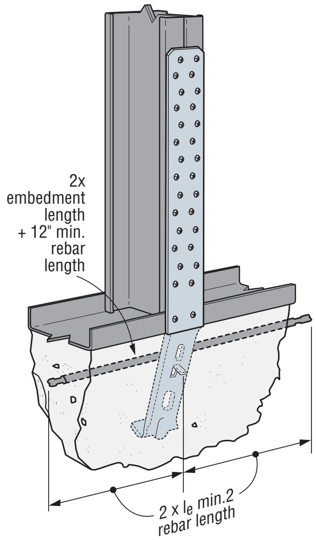
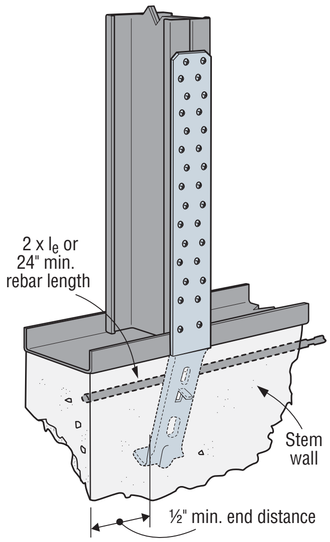
STHD/LSTHD Strap Tie Holdowns



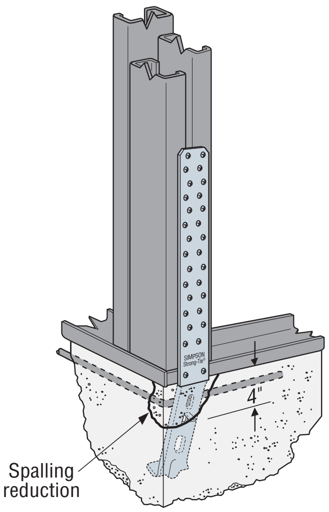
Typical STHD14 Corner Installation on Three Studs
(end of wall similar)



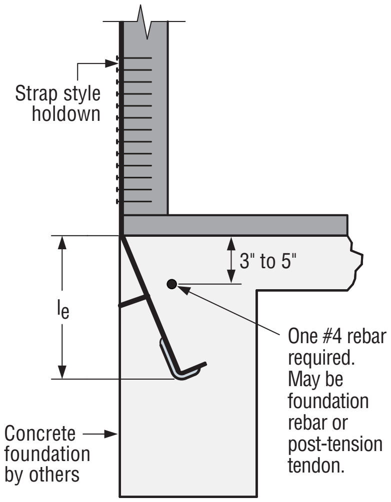
Typical STHD14 Mid-Wall Installation



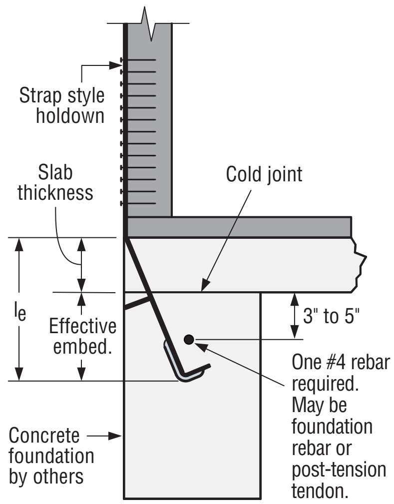
Typical STHD End Installation



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.



Single-Pour Rebar Installation
**Maintain minimum rebar cover, per ACI-318 concrete code requirements.*



Two-Pour Installation for Downturn Footings

Spall Reduction System for STHD Holdown

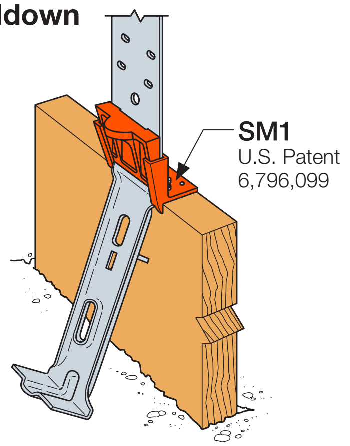
Features
- Built-in tab
- StrapMate® locator line
- Additional diamond hole in RJ versions

Benefits

Built-in Tab:
- Reduces spalling and costly retrofits.
- No additional labor to install.
- Holds 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.



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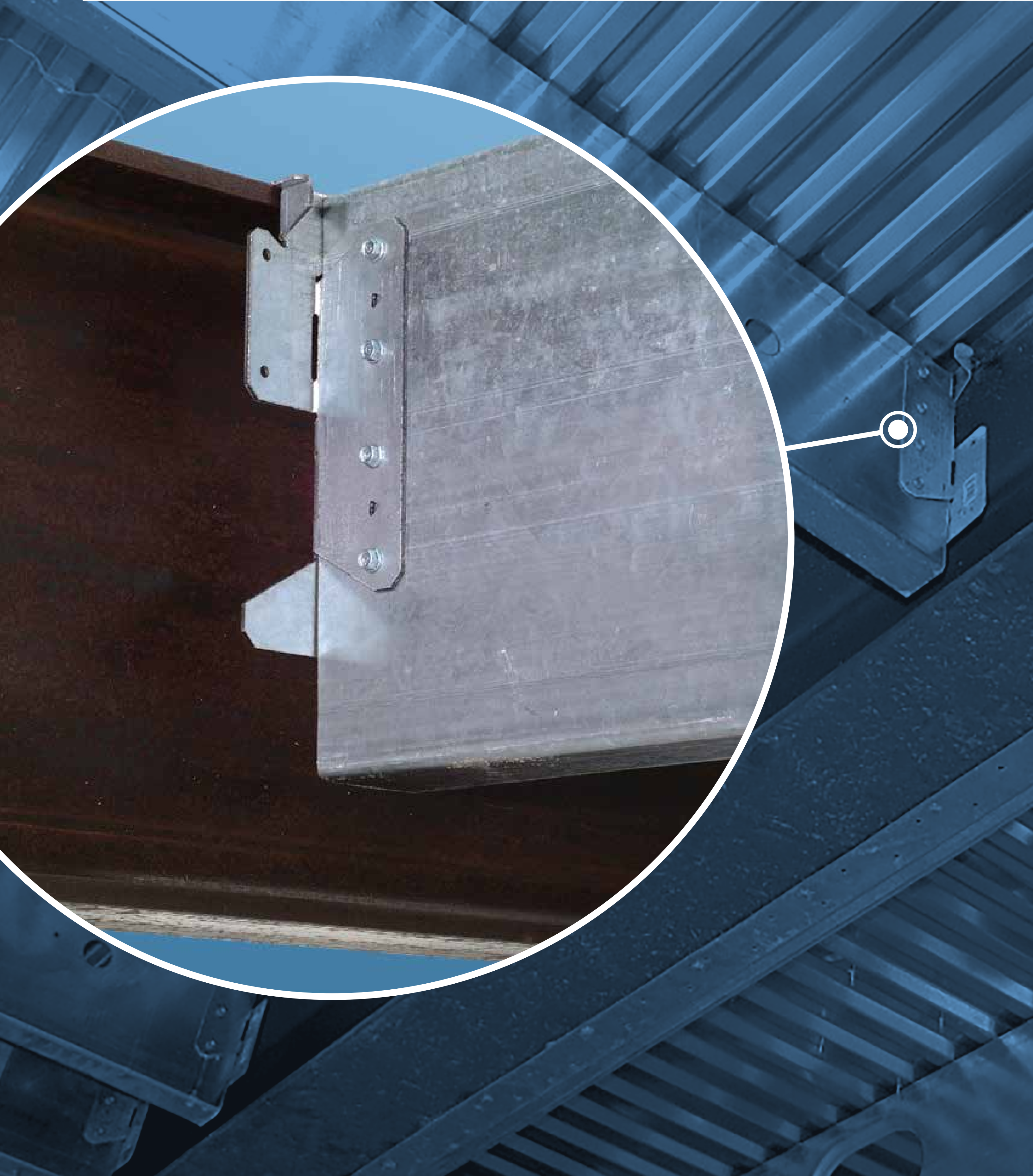
Joist Framing Connectors

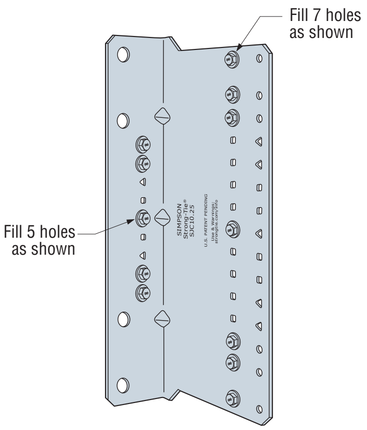


SJC Steel-Joist Connectors

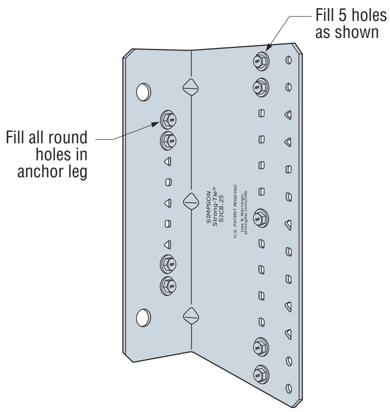
SJC Connectors: Steel-to-Steel

Model No.	Connector Material Thickness mil (ga.)	L (in.)	Framing Member Depth[5] (in.)	Fasteners[6]			Allowable F_4 Load (lb.)[3]			Code Ref.
				Pattern[2]	Carried Member	Carrying Member	Minimum Member Thickness		Maximum Connector Load[4]	
							54 mil (16 ga.)	68 mil (14 ga.)		
SJC8.25	68 (14)	8¼	10	Min.	(4) #10	(4) #10	980	980	2,930	IP2
				Max.	(9) #10	(7) #10	1,005	1,490		
				Inner	(5) #10	(4) #10	1,345	2,005		
MSJC8.25	97 (12)	8¼	10	Min.	(4) #10	(4) #10	1,005	1,710	2,930	
				Max.	(9) #10	(7) #10	1,135	1,765		
				Inner	(5) #10	(4) #10	1,535	2,220		
SJC10.25	68 (14)	10¼	12	Min.	(6) #10	(4) #10	1,170	1,625	3,935	
				Max.	(11) #10	(7) #10	1,265	1,625		
				Inner	(7) #10	(5) #10	1,620	2,170		
MSJC10.25	97 (12)	10¼	12	Min.	(6) #10	(4) #10	1,200	2,045	3,935	
				Max.	(11) #10	(7) #10	1,265	2,045		
				Inner	(7) #10	(5) #10	1,730	2,635		

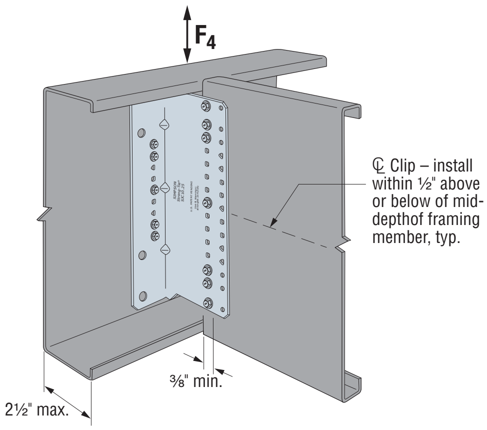
1. See p. 82 for product information.
2. Min. fastener quantity and load values — fill all round holes; Max. fastener quantity and load values — fill all round and triangular holes; Inner fastener quantity and load values — see illustrations for fastener placement.
3. Allowable loads are based on bracing of the members located within 12" of the connection.
4. Maximum allowable load for connector that may not be exceeded when designing custom installations. Designer is responsible for member and fastener design.
5. For 6" and 8" joists, SSC connectors are recommended.
6. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



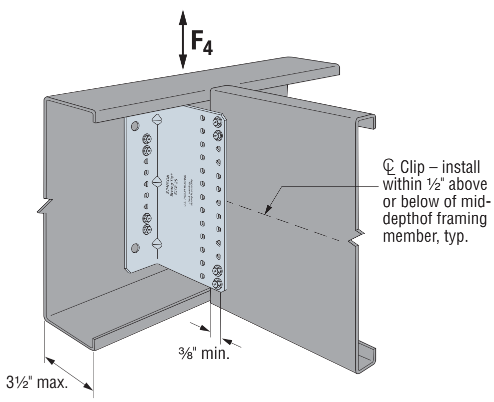
SJC10.25-Inner Fastener Pattern
(MSJC10.25 similar)



SJC8.25-Inner Fastener Pattern
(MSJC8.25 similar)



SJC Installation with Carried Member Fasteners in Inner Row



SJC Installation with Carried Member Fasteners in Outer Row
(for min./max. load values)

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SIMPSON Strong-Tie®

S/JCT and S/HJCT Steel-Joist Connectors

This product is preferable to similar connectors because of a) easier installation, b) higher loads, c) lower installed cost, or a combination of these features.

The S/JCT and S/HJCT are unique, skewable steel-joist framing connectors that combine strength, versatility and low installed cost. The connectors can be used with CFS headers, wood headers, steel I-beams (with welds or PAF fasteners) and masonry walls. Installed cost is minimized since these products are shear rather than bearing connectors, eliminating the need for web stiffeners. The connectors also feature horizontal tabs that facilitate top flange alignment and joist support during screw installation.

Material: S/JCT — 68 mil (14 ga.); S/HJCT — 97 mil (12 ga.)

Finish: Galvanized

Features:

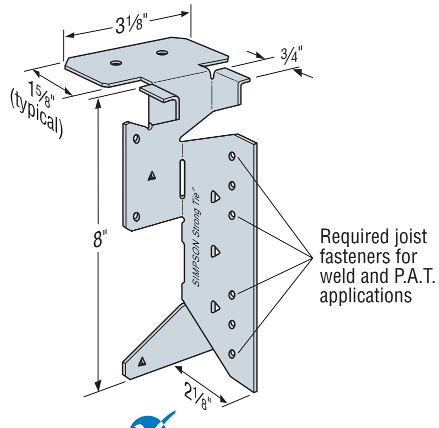
- Uni-directional: Joist can be attached from left or right
- One size fits joists 8" through 14" deep
- Optional holes for additional load capacity
- Simplicity of design
- Quick and easy installation
- Field skewable up to 45° left or right

Installation:

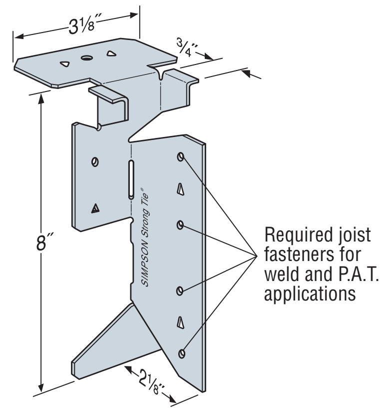
- Attach hanger with specified fasteners. Use round holes for minimum load, use round and triangle holes for maximum load.
- May be used for weld-on applications. The minimum required weld to the top flange is ⅛" x 2½" fillet weld to each side of top flange. Consult the code for special considerations when welding galvanized steel.
- May be installed using PDPAT-62KP (0.157" x ⅝") powder-actuated fasteners. Steel headers with thicknesses between ¼" and ¾" having a minimum F_y = 36 ksi. A Red (level 5) or Purple (level 6) powder load may be required to achieve specified penetration (p). See illustration on p. 253.

Codes: See p. 11 for Code Reference Key Chart

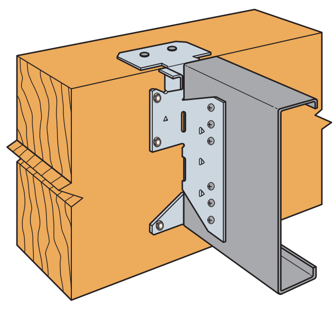
Ordering Information: The S/JCT is sold in cartons of 50. The S/HJCT is sold in kits as the S/HJCT-KT and contains five (5) connectors and (95) #14 screws.



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



S/JCT



S/HJCT Installation with a 4x10 Wood Header

Model No.	Fasteners[7]			Allowable Load[1]		Code Ref.
	Top	Face	Joist	Uplift	Down	
Attached to CFS Header: 54 mil (16 ga.)[3] — Straight Hanger						
S/JCT (min.)	(1) #10	(2) #10	(4) #10	940	1,195	IP1 L2 FL
S/JCT (max.)	(1) #10	(4) #10	(6) #10	1,435	2,105	
S/HJCT (min.)	(2) #10	(4) #14	(6) #14	1,510	2,920	
S/HJCT (max.)	(2) #10	(8) #14	(9) #14	1,670	3,855	
Attached to CFS Header: 54 mil (16 ga.)[3] — Skewed Hanger						
S/JCT (min.)	(1) #10	(2) #10	(4) #10	940	1,135	
S/JCT (max.)	(1) #10	(4) #10	(6) #10	940	1,185	
S/HJCT (min.)	(2) #10	(4) #10	(6) #14	1,510	2,305	
Attached to Steel Header[4] — Straight and Skewed Hanger						
S/JCT (min.)	⅛" x 2½" fillet weld to each side of top flange		(4) #10	145	940	
S/HJCT (min.)			(4) #14	195	1,450	
S/HJCT (min.) Skew			(4) #14	195	1,235	
S/JCT (min.)	(2) 0.157" x ⅝" powder-actuated fastener[8]		(4) #10	145	750	170
S/HJCT (min.)			(4) #14	195	1,185	
Attached to Masonry — Straight and Skewed Hanger						
S/HJCT (min.)	(2) ¼" x 2¼" Titen	(4) ¼" x 2¼" Titen	(6) #14	710	1,785	
S/HJCT (min.) Skew				710	1,410	

Model No.	Fasteners[7]			Allowable Load[1,2]		Code Ref.
	Top	Face	Joist	Uplift (160)	Down (100)	
Attached to 4x DF/SP Wood Header — Straight Hanger						
S/JCT (min.)	(1) 10d	(2) 10d	(4) #10	555	945	IP1 L2 FL
S/JCT (max.)	(1) 10d	(4) 10d	(6) #10	945	1,465	
S/HJCT (min.)	(2) 10d	(4) ¼"x3" SDS	(6) #14	1,210	2,625	
S/HJCT (max.)	(2) 10d	(8) ¼"x3" SDS	(9) #14	1,475	2,980	
Attached to 4x DF/SP Wood Header — Skewed Hanger						
S/JCT (min.)	(1) 10d	(2) 10d	(4) #10	390	845	
S/JCT (max.)	(1) 10d	(4) 10d	(6) #10	775	1,300	
S/HJCT (min.)	(2) 10d	(4) ¼" x 3" SDS	(6) #14	1,210	1,935	

1. Allowable loads are based on on a minimum of single 54 mil (16 ga.) CFS joist member. CFS joist shall be laterally braced per Designer specification.
2. Allowable loads for wood header are based on 4x DF/SP minimum, for SPF/HF wood species use an adjustment factor of 0.72.
3. CFS header must be braced to prevent web buckling per Designer specification and header must have full bearing of 1⅝" flange-depth.
4. Backing in the steel beam cavity is not required behind the hanger for load listed.
5. Screws shall be installed using joist hanger holes screwing through the hanger into the joist.
6. CFS joists with up to a 0.50" gap (short cut), use an adjustment factor of 0.87 and joists with a 0.50" to 0.90" gap (short cut), use an adjustment factor of 0.75.
7. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.
8. See p. 253 for more information.

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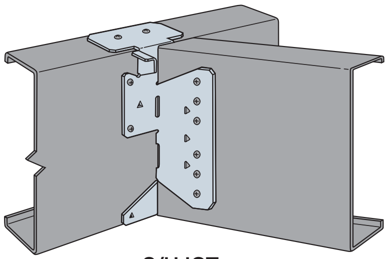
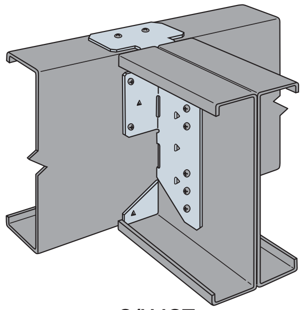
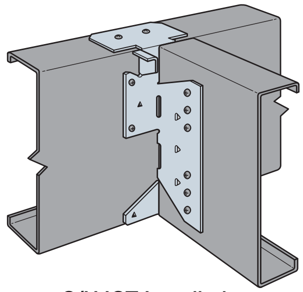
S/JCT and S/HJCT Steel-Joist Connectors



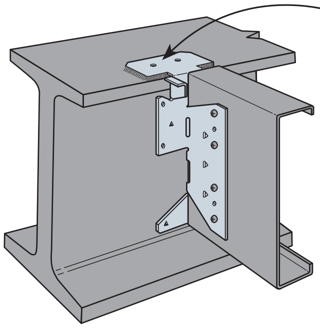
S/HJCT
Skewed 45° Installation

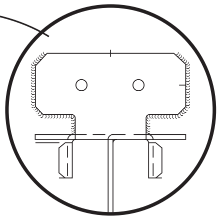


S/HJCT
Double-Joist Installation

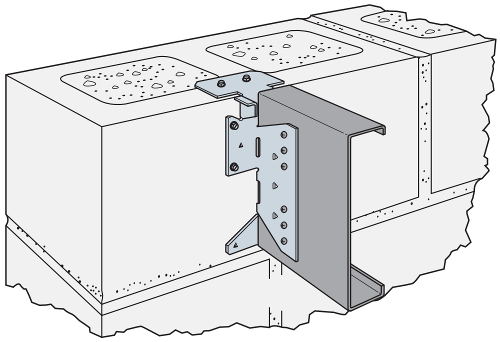


S/HJCT Installation
with a CFS Steel Header

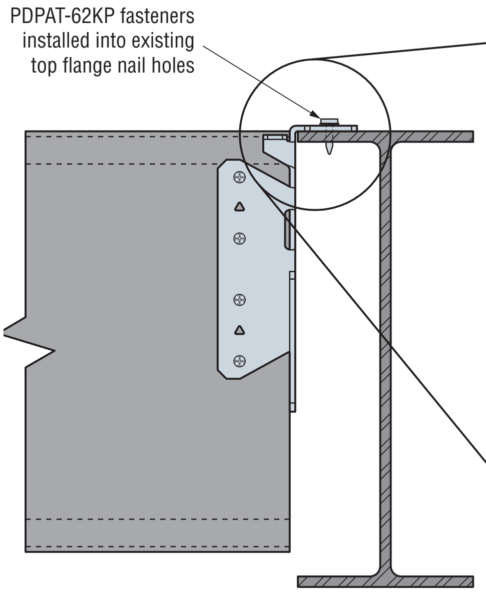


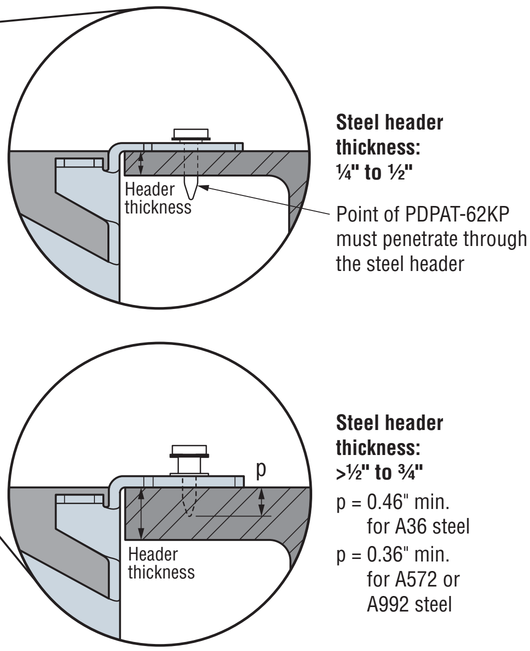


S/HJCT Weld-On
Installation with
an I-Beam.
Apply 5" of total
weld at left and right
edges, as shown.



S/HJCT Installation
on Masonry Header





S/JCT Installed on a Steel Header
with Powder-Actuated Fasteners

Joist Framing Connectors

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SIMPSON Strong-Tie®

S/LBV, S/B and S/BA Hangers

The S/BA is a cost-effective alternative to heavier, special-order hangers. It is value engineered and tested to achieve higher allowable loads and increased performance. It may be fastened with screws or powder-actuated fasteners or welded to the header, providing more design options and greater versatility.

S/LBV and S/B top-flange hangers are manufactured with precision forming and quality control, providing dimensional accuracy and helping to ensure proper bearing area and connection.

Material: S/LBV, S/BA — 68 mil (14 ga.); S/B — 97 mil (12 ga.)

Finish: Galvanized

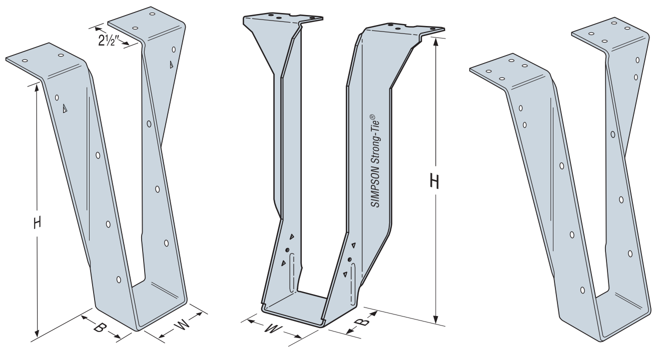
Installation:

- S/LBV, S/B, and S/BA may be used for weld-on applications; a minimum of ⅛" x 2" fillet weld on each top flange is required. Distribute the weld equally on both top flanges. Consult the code for special consideration when welding galvanized steel. Uplift loads do not apply.
- S/BA may be installed using PDPAT-62KP (0.157" x ⅝") powder-actuated fasteners. Steel headers with thicknesses between ¼" and ¾" having minimum F_y – 36 ksi. A Red (level 5) or Purple (level 6) powder load may be required to achieve specified penetration (p).

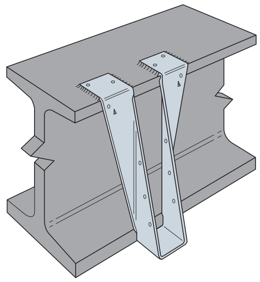
Options: Skew only:

- S/LBV and S/B series (max. width = 5½") can be skewed to a maximum of 45 degrees

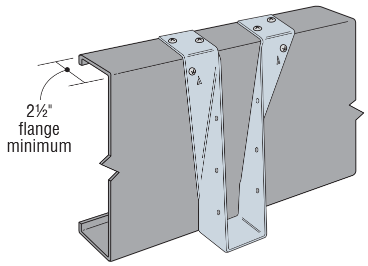
Codes: See p. 11 for Code Reference Key Chart



S/LBV S/BA S/B



S/LBV, S/B, and S/BA Are Acceptable for Weld-on Applications
(S/LBV shown)



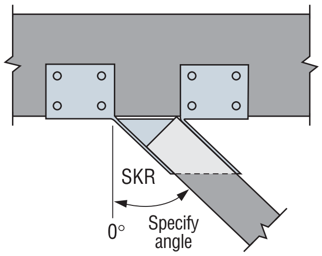
S/LBV Installation with a CFS Steel Header

Model	Dimensions (in.)			Fasteners[6]			Allowable ASD Load[5]		Code Ref.
	W	H	B	Top	Face	Joist	Uplift	Down	
Cold-Formed Steel Header — Straight Hanger									
S/LBV	See table	6 to 20	2¼	(4) #10	(2) #10	(3) #10	1,010	3,150	IP1, FL, L2
S/B		6 to 30	3	(8) #10	(4) #14	(3) #14	1,855	5,970	
S/BA		See table	3	(6) #10	—	(1) #10	—	3,475	
Cold-Formed Steel Header — Skewed Hanger									
S/LBV	See table	6 to 20	2¼	(4) #10	(2) #10	(3) #10	1,010	2,220	IP1, FL, L2
S/B		6 to 30	3	(8) #10	(4) #14	(3) #14	1,855	4,195	
Powder-Actuated Fastener or Welded to Steel Header — Straight Hanger									
S/LBV	See table	6 to 20	2¼	(4) ⅛" x 2" fillet weld to each side of top flange	—	(3) #10	—	2,965	IP1, FL, L2
S/B		6 to 30	3		—	(3) #14	—	5,755	
S/BA		See table	3		—	(1) #10	—	2,920	
S/BA			3	(6) 0.157" x ⅝" PAT	—	(1) #10	—	2685[4]	

1. Designer shall ensure that the joist member adequately transfers load to hanger.
2. Cold-formed steel / steel-beam header must be braced to prevent buckling per Designer specification.
3. Powder-actuated fasteners may be installed in up to ⅜" steel headers having a minimum F_y = 36,000 psi.
4. Load is based on the Simpson Strong-Tie® PDPAT-62KP powder-actuated fastener and a minimum Red (level 5) powder load.
5. Tabulated loads are based on testing with full bearing of 2½" flange-depth minimum with 68 mil (14 ga.) CFS for S/LBV and S/BA hanger and 97 mil (12 ga.) CFS for S/B hanger.
6. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.

S/LBV Series Model No.	S/B Series Model No.	W (in.)
S/LBV1.56X	S/B1.56X	1 9/16
S/LBV1.68X	S/B1.68X	1 11/16
S/LBV1.81X	S/B1.81X	1 13/16
S/LBV2.06X	S/B2.06X	2 1/16
S/LBV2.37X	S/B2.37X	2⅜
S/LBV2.56X	S/B2.56X	2 9/16
S/LBV2.68X	S/B2.68X	2 11/16
S/LBV3.12X	S/B3.12X	3⅛
S/LBV3.56X	S/B3.56X	3 9/16
S/LBV3.62X	S/B3.62X	3⅝
S/LBV4.06X	S/B4.06X	4 1/16
S/LBV4.12X	S/B4.12X	4⅛
S/LBV4.28X	S/B4.28X	4¼
S/LBV4.75X	S/B4.75X	4¾
—	S/B5.25X	5¼
S/LBV5.5X	S/B5.5X	5½
—	S/B5.56X	5 9/16
—	S/B6.06X	6 1/16
—	S/B7.12X	7⅛
—	S/B7.25X	7¼
—	S/B7.5X	7½

S/BA Series Model No.	S/B Series Model No.	S/LBV Series Model No.	W (in.)	H (in.)
S/BA2.12/8	—	—	2⅛	8
S/BA2.12/10	—	—		10
S/BA2.12/12	—	—		12
S/BA2.12/14	—	—		14
—	S/B2.56/8	S/LBV2.56/8	2 9/16	8
—	S/B2.56/10	S/LBV2.56/10		10
—	S/B2.56/12	S/LBV2.56/12		12
—	S/B3.12/8	S/LBV3.12/8	3⅛	8
—	S/B3.12/10	S/LBV3.12/10		10
—	S/B3.12/12	S/LBV2.56/12		12
S/BA4.18/8	—	—	4 3/16	8
S/BA4.18/10	—	—		10
S/BA4.18/12	—	—		12
S/BA4.18/14	—	—		14



Top View S/B Hanger Skewed Right

Joist Framing Connectors

C-CF-2017 ©2017 SIMPSON STRONG-TIE COMPANY INC.

S/DHUTF Drywall Hangers

SIMPSON Strong-Tie®

The S/DHUTF top-mount hanger is designed to carry joist loads to a CFS stud wall through two layers of ⅝" gypsum board (drywall). This hanger installs after the drywall is in place and comes in sizes that accommodate most typical joists used in multi-family and commercial construction.

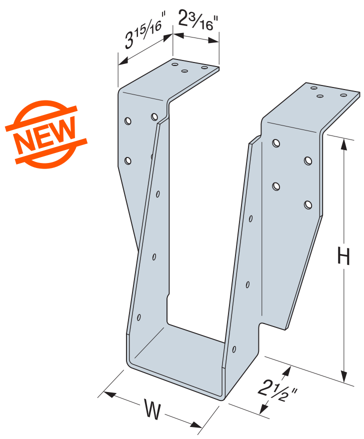
Material: 112 mil (12 ga.)

Finish: Galvanized (G90)

Installation:

- Use all specified fasteners; see General Notes
- Hanger to be framed in-line with vertical wall stud
- Drywall is installed first
- Wall top track must be restrained to counteract load eccentricity from hanger

Codes: See p. 11 for Code Reference Key Chart

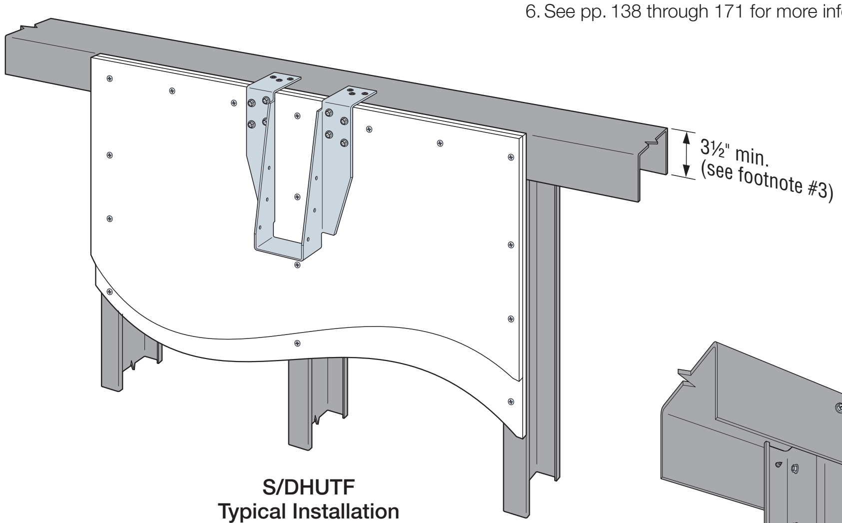


S/DHUTF
U.S. Patent 9,394,680

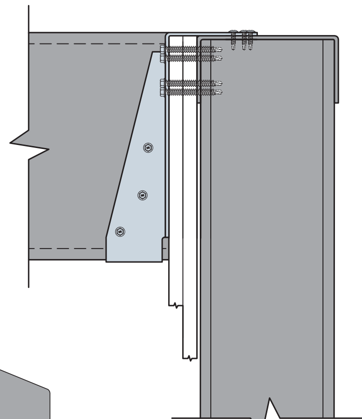
Model No.	Dimensions (in.)	
	W	H
S/DHU1.68/8TF	1 11/16	8
S/DHU1.68/10TF		10
S/DHU1.68/12TF		12
S/DHU2.1/8TF	2⅛	8
S/DHU2.1/10TF		10
S/DHU2.1/12TF		12
S/DHU2.56/8TF	2 9/16	8
S/DHU2.56/10TF		10
S/DHU2.56/12TF		12

Model	Fasteners[6]			Allowable Load (lb.)		Code Ref.
	Top	Face	Joist	Uplift	Down	
S/DHUTF	(6) #10	(8) #14 x 2"	(3) #10	1,230	1,700	170

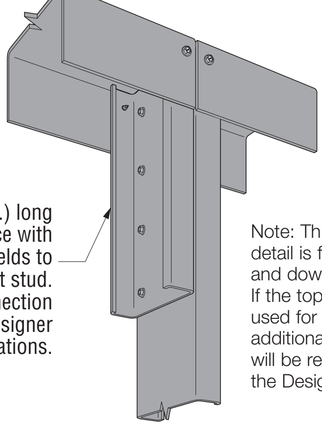
1. Designer shall ensure that the joist member adequately transfers load to the hanger.
2. Tabulated loads assume (2x) ⅝" Type X drywall attached per IBC.
3. Wall studs designed per Designer specifications. At a minimum, the assembly must consist of 600T350-68, Gr. 50 ksi top track and 600S162-43, Gr. 33 ksi wall studs spaced at a maximum of 24" o.c.
4. Tabulated loads are based on testing with full bearing of 3 15/16" hanger top flange. The minimum joist gauge is 54 mil (16 ga.).
5. S/DHUTF hanger can be installed ¾" max. from the center of the vertical stud per the in-line framing specifications of the AISI General Provisions without load adjustment.
6. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



S/DHUTF
Typical Installation



Typical Installation Over (2) Layers of ⅝" Drywall



Typical Top Track Splice

Joist Framing Connectors

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SIMPSON Strong-Tie®

W/WP Hangers

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

Material: Stirrup — 97 mil (12 ga.)

Finish: Simpson Strong-Tie® gray paint. Some models available hot-dip galvanized; specify HDG; see Corrosion Information on pp. 18–21.

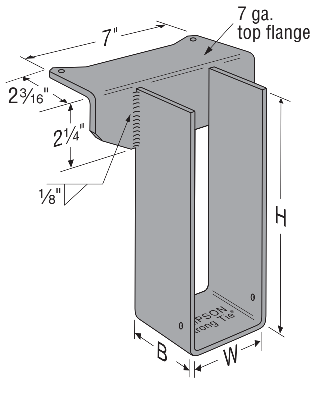
Installation: Hangers may be welded to steel headers with ⅛" for W and 3⁄16" for WP by 1½"-fillet welds located at each end of the top flange

Options: • W and H dimensions are modifiable

Sloped and/or Skewed Seat

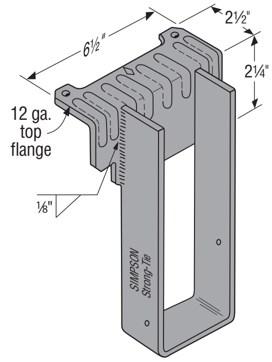
- W/WP series may be skewed to a maximum of 84° and/or sloped to a maximum of 45°.
- For slope only, skew only, or slope and skew combinations, the allowable load is 100% of the table load.
- Specify the slope up or down in degrees from the horizontal plane and/or the skew right or left in degrees from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

Codes: See p. 11 for Code Reference Key Chart



WP

Some model configurations may differ from those shown. Call Simpson Strong-Tie for details.



W

Model No.	Dimensions (in.)			Fasteners[4]		Allowable Down Load (lb.)	Code Ref.
	W	H	B	Header	Joist		
W	1½ – 4	4˚ – 30	2½ – 5	Weld	(1) #10	2,335	170
WP	1 9⁄16 – 7½	4˚ – 30	2½ – 5	Weld	(1) #10	3,650	

1. For hanger heights exceeding the joist height, the allowable load is 0.50 of the table value.
2. The Designer shall ensure that the joist member adequately transfers load to the hanger.
3. Not all combinations of W, H, and B dimensions are available. Contact Simpson Strong-Tie.
4. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.

HUC Hangers

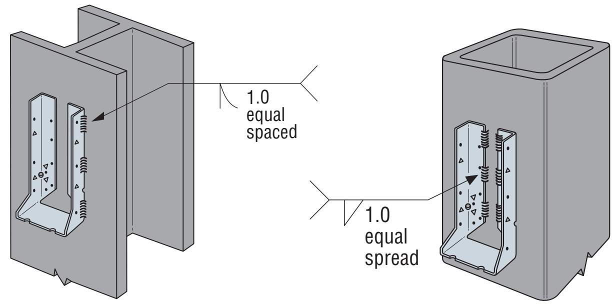
Material: 68 mil (14 ga.)

Finish: Galvanized

Installation:

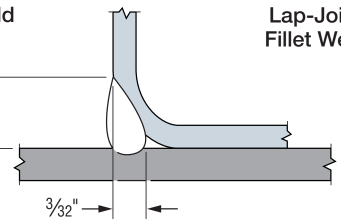
- HUC series hangers may be welded to supporting structural steel members
- Use 1" weld segments equally spaced top and bottom, with half the segments on each side of hanger
- Welds may be either lap joint (on outside edge of flanges) or flare-bevel groove (on flange bend line)

Codes: See p. 11 for Code Reference Key Chart



Flare-Bevel Groove Weld
(see detail)

Lap-Joint
Fillet Weld

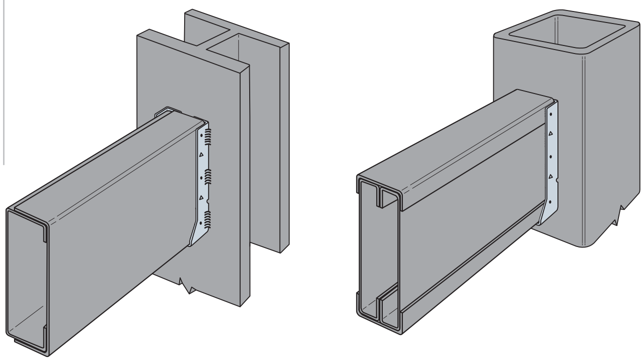


Flare-Bevel
Groove Weld
Detail

Model Series	Connection Type		Maximum Allowable Down Load (lb.)	Code Ref.
	Joist	Structural Steel		
	Fastener[5,6]	Weld		
HUC	#10	(4) 1" segments	3,280	170
	#10	(6) 1" segments	4,855	

1. Loads assume E-70S-6 (60 ksi) filler rod.
2. Welds must conform to the current A.W.S. D1.3 structural welding code for sheet steel and must be performed by a certified welder.
3. Designer shall ensure that the joist member adequately transfers load to hanger.
4. Hanger-to-joist connection shall be made using screws on the side of the hanger where it meets the web of the joist.
5. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.
6. The number of screws is per Designer specifications.

Installation for CFS Built-Up Beam
The Designer is responsible for design of beam member.



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L, LS and S/LS Utility Clips and Skewable Angles

L, LS, and S/LS angles are load rated, providing the correct thickness and number of fasteners for the specifier compared with field fabricated clip angles. These angles also have well-defined fastener locations, and testing ensures that the tabulated load values account for connection eccentricities. The connectors are general utility reinforcing angles with multiple uses. S/LS and LS connectors are skewable and can be used to attach members intersecting at angles.

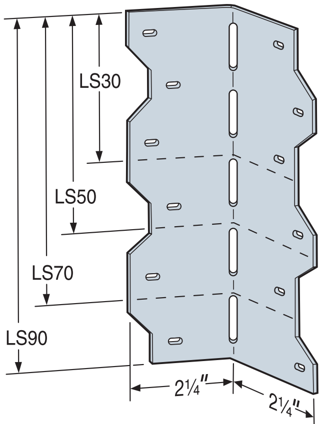
Material: L — 54 mil (16 ga.); S/LS and LS — 43 mil (18 ga.)

Finish: Galvanized (G90)

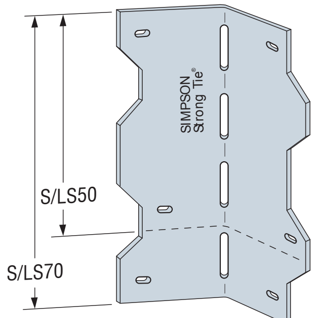
Installation:

- Use all specified fasteners
- S/LS and LS — Field-skewable; bend one time only
- CFS framing must be constrained against rotation when using a single S/LS or LS per connection

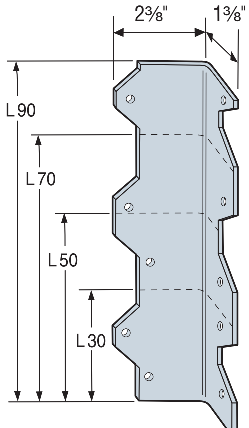
Codes: See p. 11 for Code Reference Key Chart



LS



S/LS
U.S. Patent 4,230,416

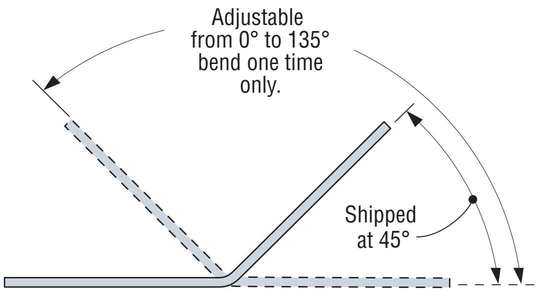


L90

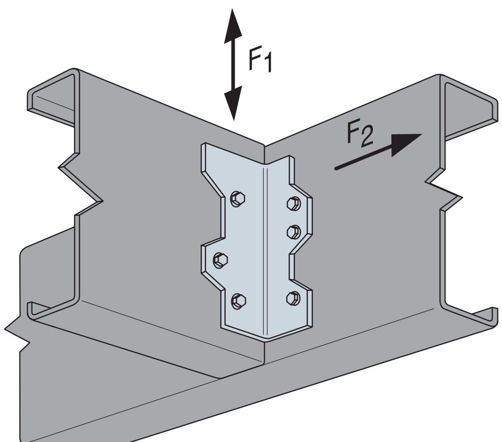
Model No.	Length (in.)	Fasteners[2]	Allowable Load (lb.) 33 mil (20 ga.) F_1	33 mil (20 ga.) F_2	43 mil (18 ga.) F_1	43 mil (18 ga.) F_2	54 mil (16 ga.) F_1	54 mil (16 ga.) F_2	Code Ref.
L30	3	(4) #10	200	60	315	85	610	—	170
L50	5	(6) #10	475	—	675	90	750	110	
L70	7	(8) #10	705	—	760	110	1,100	110	
L90	9	(10) #10	795	—	945	110	1,740	110	
LS30	3⅜	(6) #10	200	—	370	—	500	—	
S/LS50	4⅞	(4) #10	200	—	370	—	500	—	
S/LS70	6⅜	(6) #10	465	—	575	—	715	—	
LS90	7⅞	(12) #10	465	—	895	—	915	—	

These products are available with additional corrosion protection. Additional products on this page may also be available with this option. Check with Simpson Strong-Tie for details.

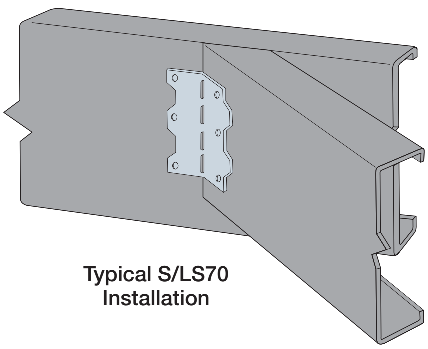
1. Loads are for one part only.
2. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



S/LS Top View



Typical L50 Installation



Typical S/LS70 Installation

Joist Framing Connectors

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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 (G90)

Installation:

ICFVL in ICF

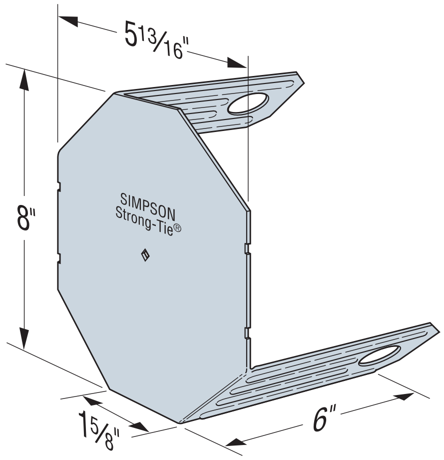
- Snap a chalk line for the bottom of the ledger
- Mark required on-center spacing
- Use ICFVL to mark kerfs locations
- Cut kerfs as marked
- Insert ICFVL flush to the face of the ICF
- Pour concrete

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

CFS Ledger Attachment

- Position the ledger level to the chalk line and against the ICFVL
- Attach with four #14 x ¾", #3 drill point screws (not provided)
- All screws should be located at least ½" from the edge of the ICFVL
- Space screws evenly

Codes: See p. 11 for Code Reference Key Chart



ICFVL
Patent pending

Model No.	Fasteners	Allowable ASD Load (lb.) 54 mil (16 ga.) 68 mil (14 ga.)		Code Ref.
		Download	Lateral F_1	
ICFVL	(4) #14 x ¾"[3]	1,660	1,525	170

1. Fasteners for CFS ledger are not provided.
2. Loads apply to ICF foam thicknesses of 2¾" or less. Contact Simpson Strong-Tie for allowable loads on thicker walls.
3. Alternately, ¼" x ¾" fasteners may be used.
4. Concrete f'_c = 2,500 psi minimum.
5. When combining download and lateral loads, the Designer shall use the following interaction equation: Design Download/Allowable Download + Design Lateral Load/Allowable Lateral Load ≤ 1.

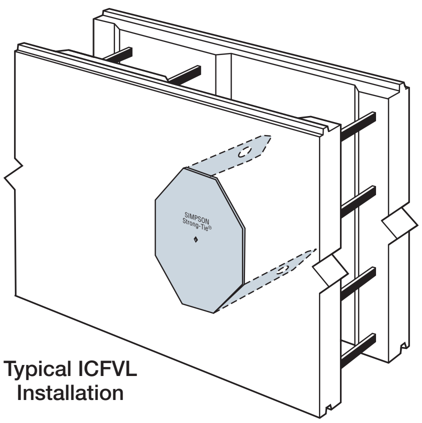
Reduce the chance of mis-installations using the wrong size screws; specify Simpson Strong-Tie® #14 Self-Drilling E Metal screw (Model No. E1B1414) with the ICFVL Ledger Connector System. See p. 142 for details.

Available in 100 ct. and 2,500 ct. cartons.

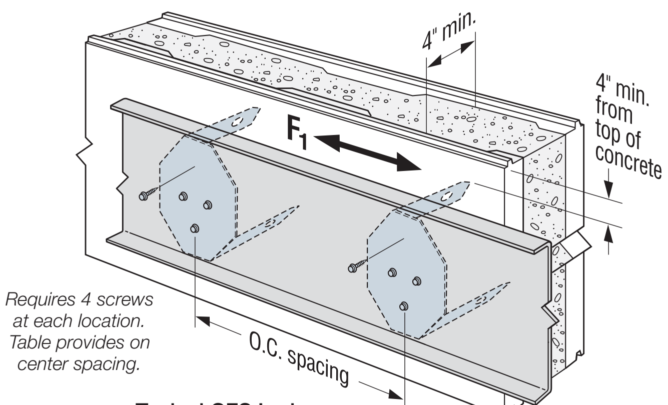
These tables address vertical load applications only

Ledger Material Thickness mil (ga.)	Connector Type	ICFVL Spacing to Replace Anchor Bolts on a CFS Ledger (in.)[1,2]							
		½"-Diameter Anchors at				⅝"-Diameter 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)	ICFVL	11	22	33	44	9	18	27	36
54 (16)	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.



Typical ICFVL Installation



Typical CFS Ledger Installation with ICFVL
(minimum 54 mil)

Joist Framing Connectors

C-CF-2017 ©2017 SIMPSON STRONG-TIE COMPANY INC.

TB and LTB Bridging

TB and LTB bridging connectors are a cost-effective solution for bracing between floor joists when compared with field fabricated blocking and clip angles.

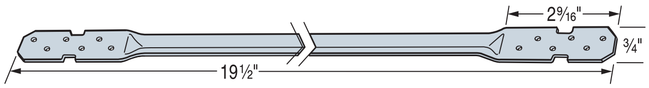
Material: LTB — 27 mil (22 ga.); TB — 33 mil (20 ga.)

Finish: Galvanized (G90)

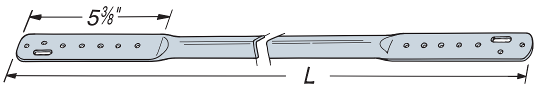
Installation:

- Use (2) #10 screws at each end

Codes: See p. 11 for Code Reference Key Chart

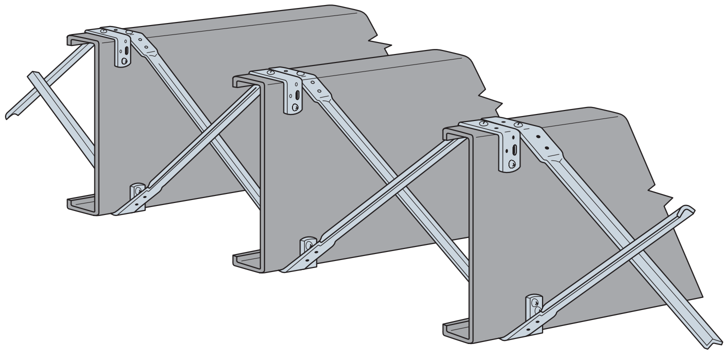


LTB20



TB

Web Height (in.)	Spacing (in.)	TB Model No.	TB L (in.)	LTB Model No.	Code Ref.
6	12	TB20	20	LTB20	180
8		TB20	20	LTB20	
10		TB20	20	—	
12		TB27	27	—	
14		TB27	27	—	
6	16	TB27	27	—	
8		TB27	27	—	
10		TB27	27	—	
12		TB27	27	—	
14		TB27	27	—	
10	24	TB36	36	—	
12		TB36	36	—	
14		TB36	36	—	



Typical TB Installation

CS Coiled Strap

CS coiled utility straps are an ideal solution when it is desired to brace floor joist flanges with flat strap. These products are packaged in lightweight cartons (about 40 lb.) and can be cut to length on the jobsite.

Material: See table

Finish: Galvanized (G90)

Installation:

- Use all specified fasteners
- Refer to the applicable code for minimum edge and end distance

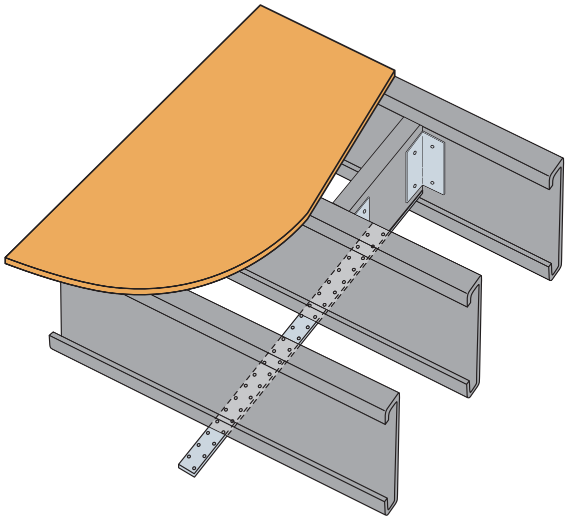
Codes: See p. 11 for Code Reference Key Chart

Model No.	Total Length (ft.)	Connector Material Thickness mil (ga.)	Width (in.)	Fasteners[4] (At Blocking) Framing Thickness mil (ga.) 33 (20 ga.)	43 (18 ga.)	54 (16 ga.)	Allowable Tension Load (lb.)	Code Ref.
CS16	150	54 (16)	1¼	(9) #10	(6) #10	(4) #10	1,550	IP1, L2, FL
CS18	200	43 (18)	1¼	(7) #10	(5) #10	(3) #10	1,235	
CS20	250	33 (20)	1¼	(6) #10	(4) #10	(3) #10	945	
CS22	300	27 (22)	1¼	(5) #10	(3) #10	(3) #10	775	

1. In order to achieve the tabulated loads in the strap, attach each strap to the blocking with the tabulated number of screws.
2. Strap length at blocking to achieve tabulated load = number of tabulated screws + 1".
3. Calculate the strap value for a reduced number of screws to the blocking as follows:

$$\text{Allowable Load} = \frac{\text{No. of Screws Used}}{\text{No. of Screws in Table}} \times \text{Table Load}$$

4. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



Typical CS Installation for Block and Strap Joist Bridging

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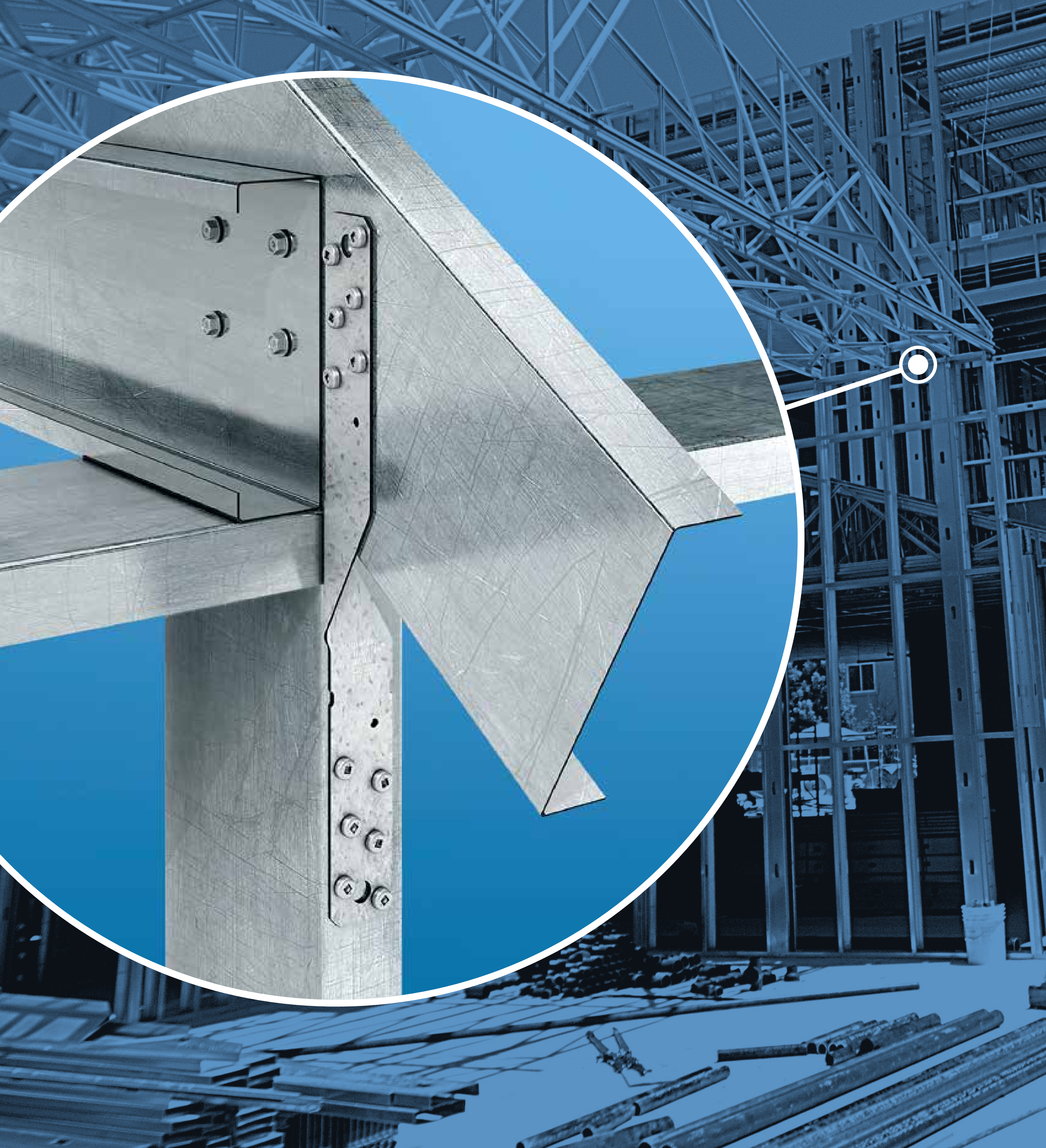
Roof, Truss and Rafter Connectors, Ties and Straps



SIMPSON Strong-Tie®

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.)

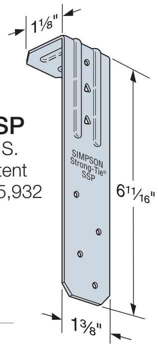
Finish: Galvanized. Some products available in ZMAX®; see Corrosion Information, pp. 18–21.

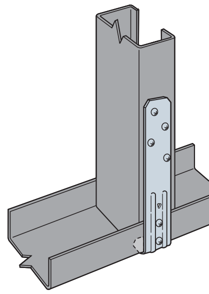
Installation: • Use all specified fasteners; see General Notes

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

Codes: See p. 11 for Code Reference Key Chart

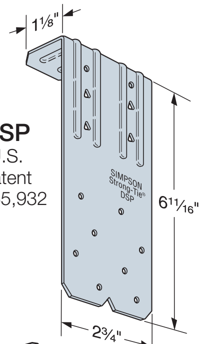
SSP
U.S. Patent 7,065,932

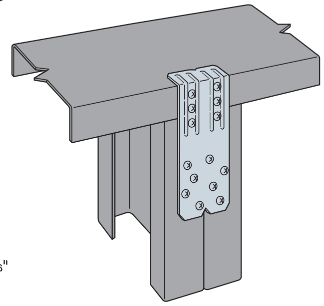




Typical SSP Installed to Bottom Track *(DSP similar for double stud)*

DSP
U.S. Patent 7,065,932



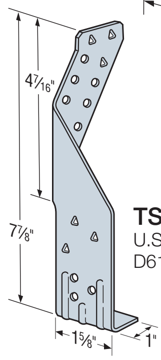


Typical DSP Installed to Top Track *(SSP similar for single stud)*

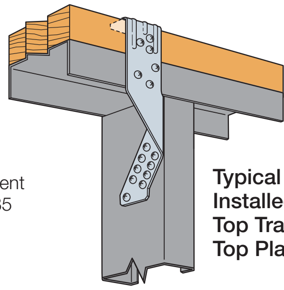
Model No.	Fasteners[4] Studs CFS	Top Track Wood	Top Track CFS	Bottom Track CFS	Allowable Uplift Load (lb.) 33 mil (20 ga.)	43 mil (18 ga.)	Code Ref.
SSP	(4) #10	—	—	(2) #10	355	625	IP1, L2, FL
		—	(2) #10	—	340	600	
		(2) #10[3]	(1) #10	—	4,051	7,151	
		(2) 10d	(1) #10	—	4,801	8,401	
DSP	(8) #10	—	—	(4) #10	430	695	
		—	(4) #10	—	475	775	
		(4) #10[3]	(2) #10	—	5,851	9,551	
		(4) 10d	(2) #10	—	7,301	12,001	
TSP	(6) #10	—	—	(3) #10	345	645	
		—	(3) #10	—	370	700	
	(9) #10	(3) #10[3]	(3) #10	—	3,601	6,851	
		(3) 10d	(3) #10	—	4,801	9,051	

These products are available with additional corrosion protection. Additional products on this page may also be available with this option. Check with Simpson Strong-Tie for details.

1. For wood plates, noted values only apply to DF/SP members where wood top plates are used. For SPF values, multiply by 0.86.
2. For wood plates, when cross-grain tension cannot be avoided, mechanical reinforcement to resist such forces should be considered.
3. Screws installed into wood plates with a minimum #10 x ¾" self-drilling screw.
4. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



TSP
U.S. Patent D618,085



Typical TSP Installed to Top Track with Top Plate

SP Stud Plate Ties

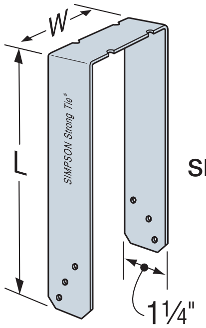
The SP stud plate tie is a plate-to-stud connection providing uplift resistance.

Material: See table.

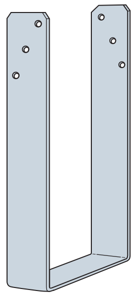
Finish: Galvanized. Available with ZMAX® coating; see Corrosion Information, pp. 18–21.

Installation: • Use all specified fasteners

Codes: See p. 11 for Code Reference Key Chart



SP4

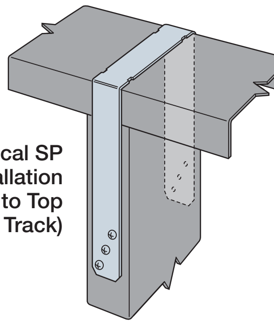


SPH6

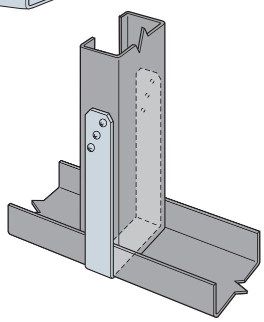
Model No.	Connector Material Thickness mil (ga.)	Dimensions (in.) W	L	Stud Fasteners[1]	Allowable Uplift Load 33 mil (20 ga.) (lb.)	Code Ref.
SP4	33 (20)	3 9/16	7 1/4	(6) #10	825	IP1, L2, FL
SP6	33 (20)	5 9/16	7 3/4	(6) #10	825	
SP8	43 (18)	7 9/16	8 5/16	(6) #10	930	170
SPH4	43 (18)	3 9/16	8 3/4	(12) #10	1,490	
SPH4R	43 (18)	4 1/16	8 1/4	(12) #10	1,490	
SPH6	43 (18)	5 9/16	9 1/4	(12) #10	1,490	
SPH6R	43 (18)	6 1/16	8 3/4	(12) #10	1,490	
SPH8	43 (18)	7 5/16	8 3/8	(12) #10	1,490	

These products are available with additional corrosion protection. Additional products on this page may also be available with this option. Check with Simpson Strong-Tie for details.

1. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



Typical SP Installation (Wall to Top Track)



Typical SP Installation (Wall to Bottom Track) *(SPH similar)*

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SIMPSON Strong-Tie®

S/H and H Seismic and 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.

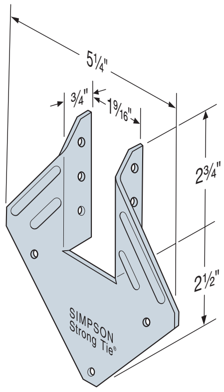
Material: See table

Finish: Galvanized. Available with ZMAX® coating; see Corrosion Information, pp. 18–21.

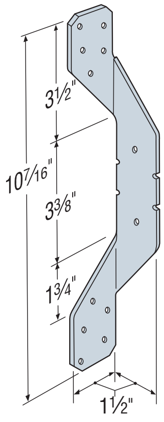
Installation: • Use all specified fasteners

- 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

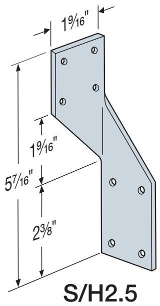
Codes: See p. 11 for Code Reference Key Chart



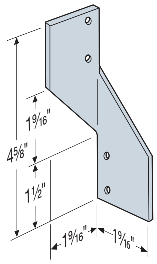
S/H1



H2A



S/H2.5

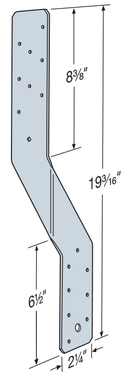


S/H3

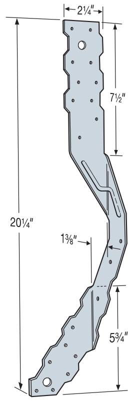
Model No.	Connector Material Thickness mil (ga.)	Fasteners[5]			Allowable Load (lb.) 33 mil (20 ga.)			Code Ref.
		To Rafters /Truss	To Top Track	To Stud	Uplift	Lateral		
						F_1	F_2	
S/H1	43 (18)	(3) #10	(2) #10	(1) #10	305	100	115	170
H2A	43 (18)	(5) #10	(1) #10	(5) #10	450	90	100	
S/H2.5	43 (18)	(4) #10	—	(4) #10	390	90	125	
S/H3	43 (18)	(2) #10	(2) #10	—	375	90	125	
H6	54 (16)	—	(8) #10	(8) #10	950	—	—	
H7Z	54 (16)	(4) #10	(2) #10	(8) #10	985	—	—	
H10S[4]	43 (18)	(8) #10	—	(8) #10	930[3]	—	—	

These products are available with additional corrosion protection. Additional products on this page may also be available with this option. Check with Simpson Strong-Tie for details.

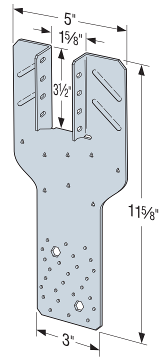
1. Loads are based on attachment of cold-formed steel members having a minimum thickness of 33 mil (20 ga.).
2. Hurricane ties are shown installed on the outside of wall for clarity. Installation inside of wall is acceptable. For Continuous Load Path, connections in the same area must be on same side of wall.
3. For H10S connectors with CFS members having a minimum thickness of 43 mil (18 ga.), the allowable load is 1,260 lb.
4. H10S connectors can be installed ¾" (max.) from the center of the vertical stud per the in-line framing specifications of the AISI General Provisions for reduced uplift of 890 lb., provided that the screw edges are met.
5. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



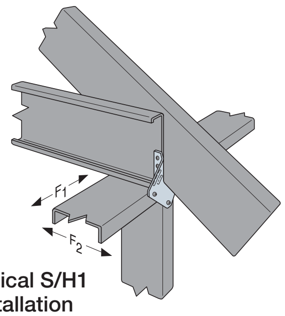
H6



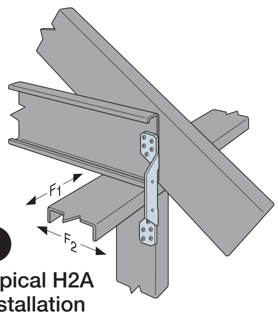
H7Z



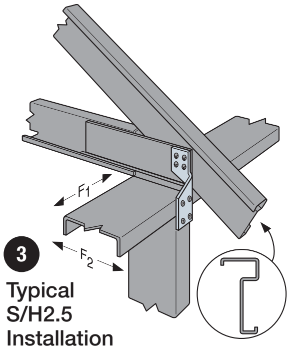
H10S



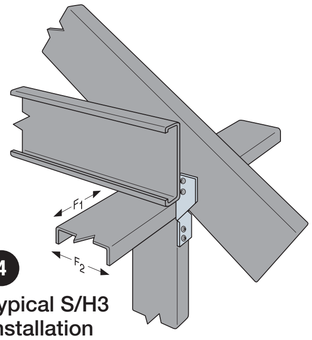
1 Typical S/H1 Installation



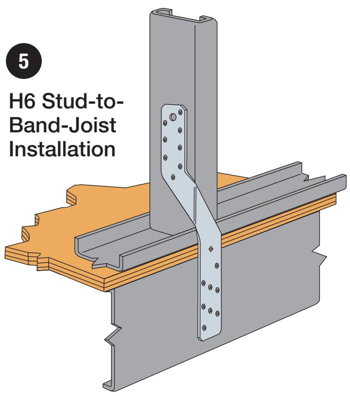
2 Typical H2A Installation



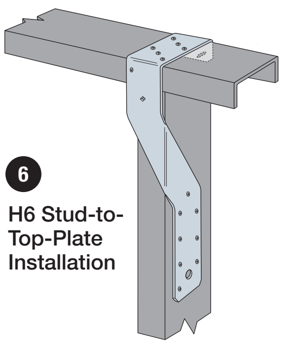
3 Typical S/H2.5 Installation



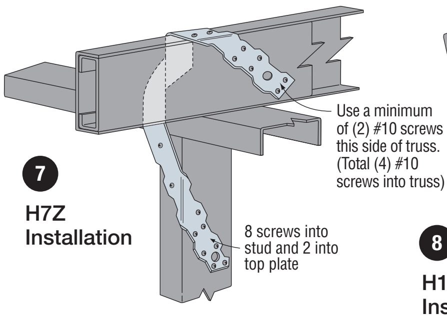
4 Typical S/H3 Installation



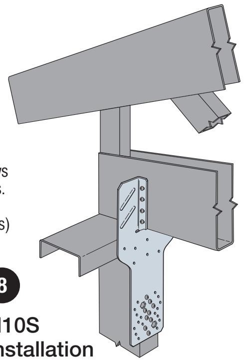
5 H6 Stud-to-Band-Joist Installation



6 H6 Stud-to-Top-Plate Installation



7 H7Z Installation



8 H10S Installation

C-CF-2017 ©2017 SIMPSON STRONG-TIE COMPANY INC.

SIMPSON Strong-Tie®

H Hybrid Connectors Seismic and 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.

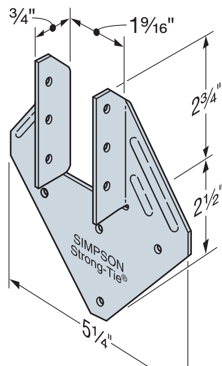
Material: See table

Finish: Galvanized. Selected products available in stainless steel or ZMAX® coating. See Corrosion Information, pp. 18–21.

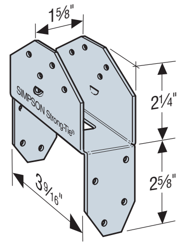
Installation: • Use all specified fasteners; see General Notes

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

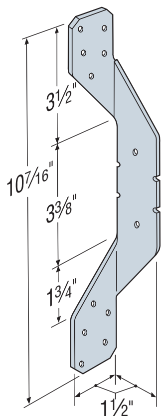
Codes: See p. 11 for Code Reference Key Chart



H1



HS24
U.S. Patent
5,603,580

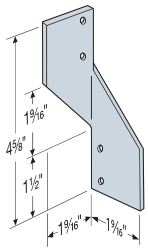


H2A

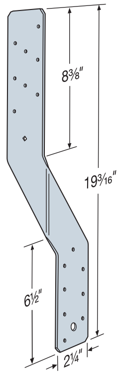
Model No.	Connector Material Thickness mil (ga.)	Fasteners[5]			Allowable Uplift Load 33 mil (20 ga.) (160) (lb.)		Code Ref.
		To Rafters/ Truss	To Top Track	To Stud	DF/SP	SPF/HF	
H1	43 (18)	(6) 8d x 1½"	(3) #10	(1) #10	600	500	170
H2A	43 (18)	(5) 8d x 1½"	(1) #10	(5) #10	550	460	
H3	43 (18)	(4) 8d x 1½"	(4) #10	—	365	305	
H6	54 (16)	—	(8) 8d	(8) #10	950	820	
H7Z	54 (16)	(4) 8d x 1½"	(2) #10	(8) #10	985	845	
HS24	43 (18)	(8) 8d x 1½"	(4) #10	(4) #10	625	520	
H10S[5]	43 (18)	(8) 8d x 1½"	—	(8) #10	930	780	

These products are available with additional corrosion protection. Additional products on this page may also be available with this option. Check with Simpson Strong-Tie for details.

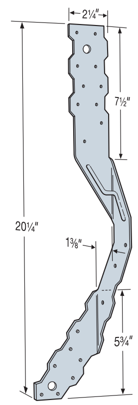
1. Allowable loads on wood have been increased 60% for wind or earthquake loading with no further increase allowed; reduce where other load duration factors govern.
2. Hurricane Ties are shown installed on the outside of wall for clarity. Installation inside of wall is acceptable. For Continuous Load Path, connections must be on same side of wall.
3. When cross-grain bending or cross-grain tension cannot be avoided, mechanical reinforcement to resist such force should be considered.
4. H10S connectors can be installed ¾" (max.) from the center of the vertical stud per the in-line framing specifications of the AISI General Provisions for reduced uplift of 890 lb., provided that the screw edges are met.
5. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



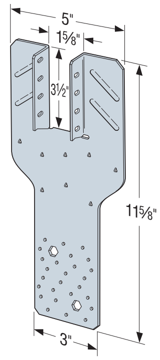
H3



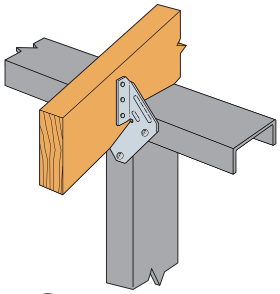
H6



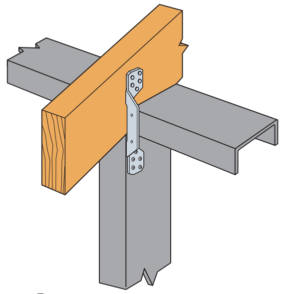
H7Z



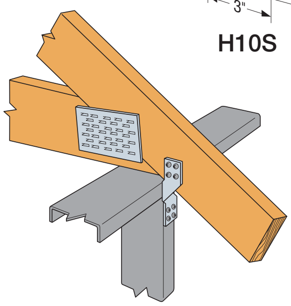
H10S



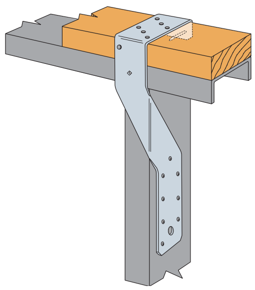
1 H1 Installation



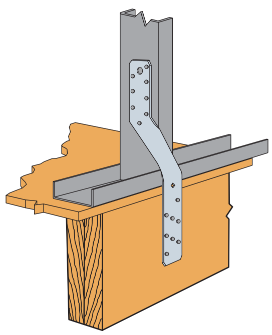
2 H2A Installation



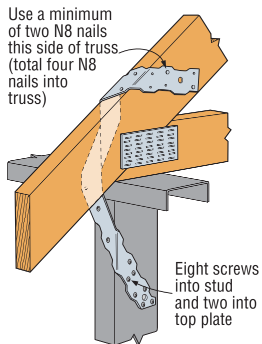
3 H3 Installation



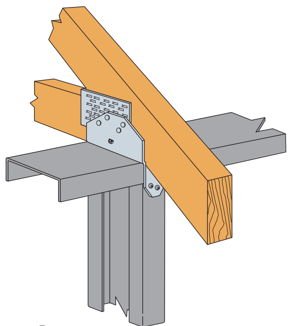
4 H6 Stud-to-Top-Plate Installation



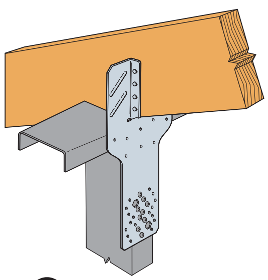
5 H6 Stud-to-Band-Joist Installation



6 H7Z Installation



7 HS24 Installation



8 H10S Installation

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S/H1A Seismic and Hurricane Ties

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

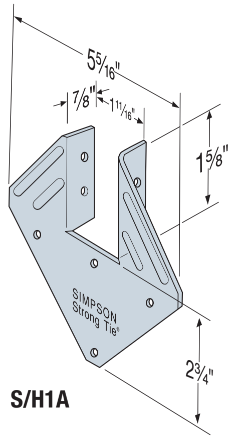
Material: 43 mil (18 ga.)

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 truss sections. Contact material supplier for specific installation details.

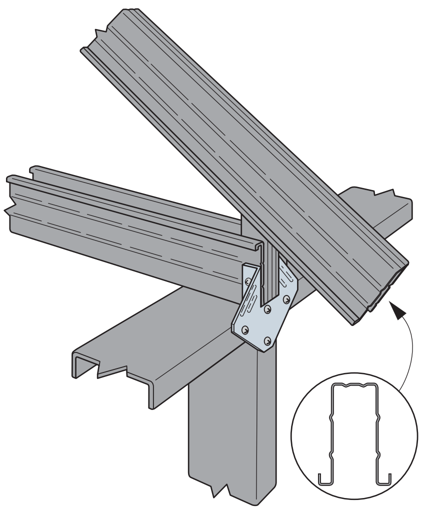
Codes: See p. 11 for Code Reference Key Chart



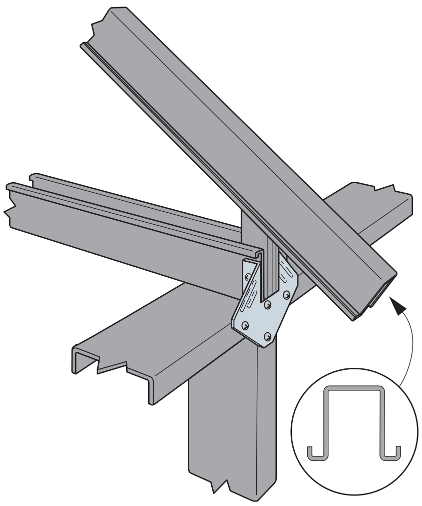
S/H1A

Model No.	Fasteners[2]			Truss Thickness mil (ga.)	Allowable Uplift Load (lb.)			Code Ref.
					Plate/Wall Stud Thickness mil (ga.)			
	Truss	Top Track	Stud		33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)	
S/H1A	(4) #10	(3) #10	(1) #10	27 (22)	470	470	470	IP1, FL, L2
	(4) #10	(3) #10	(1) #10	33 (20)	510	550	690	
	(4) #10	(3) #10	(1) #10	43 (18)	510	550	690	
	(4) #10	(3) #10	(1) #10	54 (16)	520	675	850	

1. Tabulated loads based on truss members with yield strength, F_y, of 50 ksi and tensile strength, F_u, of 65 ksi. Reduce tabulated load proportionally for lower truss member steel strength. For example: 43 mil (18 ga.) truss member with a yield strength, F_y, of 33 ksi and a tensile strength, F_u, of 45 ksi is connected to 43 mil top track and wall stud. The adjusted allowable load is then 550 lb. x minimum [33/ 50 or 45/ 60] = 363 lb.
2. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



Typical S/H1A Installation



Typical S/H1A Installation

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MTSM/HTSM Twist Straps

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

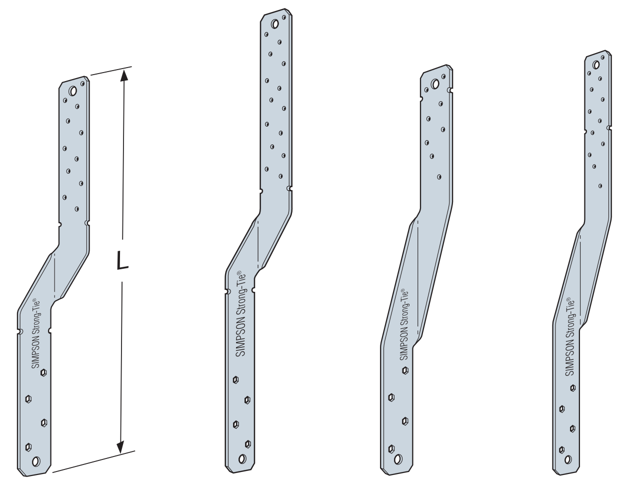
Material: See table.

Finish: Galvanized. Some products available in stainless steel and ZMAX®; see Corrosion Information, pp. 18–21.

Installation:

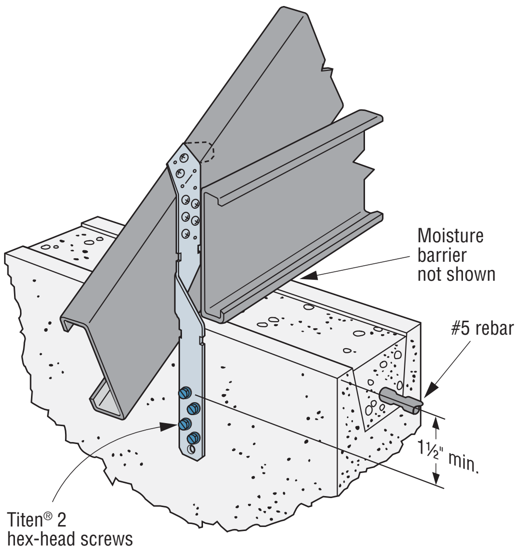
- Use all specified fasteners; see General Notes.
- May be attached to either side of a grouted block wall. A minimum of one #5 horizontal rebar shall be installed in the top course of this wall.

Codes: See p. 11 for Code Reference Key Chart



Model No.	Connector Material Thickness mil (ga.)	L (in.)	Fasteners[6]					Allowable Load 33 mil (20 ga.) (lb.)	Code Ref.
			Rafter/Stud/Joist Thickness			CMU[5]	Concrete[3,5]		
			33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)				
MTSM16	54 (16)	16	(5) #10	(4) #10	(3) #10	(4) ¼" x 2¼" Titen 2	(4) ¼" x 1¼" Titen 2	860	170
MTSM20		20	(5) #10	(4) #10	(3) #10	(4) ¼" x 2¼" Titen 2	(4) ¼" x 1¼" Titen 2	860	
HTSM16	68 (14)	16	(7) #10	(5) #10	(3) #10	(4) ¼" x 2¼" Titen 2	(4) ¼" x 1¼" Titen 2	1,175	
HTSM20		20	(7) #10	(5) #10	(3) #10	(4) ¼" x 2¼" Titen 2	(4) ¼" x 1¼" Titen 2	1,175	

1. All straps have additional fastener holes.
2. Twist straps do not have to be wrapped over the truss to achieve the load.
3. Minimum edge distance in concrete block for Titen® 2 screws is 1½".
4. Straps can be installed on the inside face of the wall.
5. Min. f'_m = 1,500 psi and f'_c = 2,500 psi.
6. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



Typical MTSM20 Installation

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META/HETA/HHETA Embedded Truss Anchors

The embedded truss anchor series provides an engineered method to properly attach roof trusses to concrete and masonry walls. Information regarding the use of two anchors on single- and multi-ply trusses is included below.

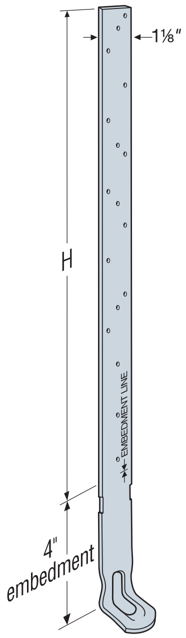
Material: HHETA — 14 gauge; HETA — 16 gauge; META — 18 gauge

Finish: Galvanized. Some products available in ZMAX® coating; see Corrosion Information on pp. 18–21

Installation:

- Use all specified fasteners; see General Notes.
- The META, HETA and HHETA are embedded 4" into a 6" minimum concrete beam or 8" nominal grouted block wall.
- For mislocated truss anchors which are greater than ⅛" but less than 1½" from the face of the truss, a shim must be provided. Shim design by Truss Engineer. When gap is greater than 1½", install retrofit anchors.
- In double embedded anchor installations, do not install fasteners where the straps overlap when wrapped over the truss heel.

Codes: See p. 11 for Code Reference Key Chart



HETA20
(META/HHETA similar)

Single Embedded Anchor Installation

Model No.	H (in.)	Fastener[9]	Allowable Uplift Load (lb.)			Lateral Load[8]		Code Ref.
		Rafter/Stud/Truss Thickness	Rafter/Stud/Truss Thickness			F_1	F_2	
		33 mil, 43 mil and 54 mil (20 ga., 18 ga. and 16 ga.)	33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)	54 mil (16 ga.)		
META12	8	(7) #10	1,240	1,450	1,450			
META16	12	(9) #10	1,450	1,450	1,450			
META18	14	(9) #10	1,450	1,450	1,450			
META20	16	(9) #10	1,450	1,450	1,450	340	725	
META22	18	(9) #10	1,450	1,450	1,450			
META24	20	(9) #10	1,450	1,450	1,450			
META40	36	(9) #10	1,450	1,450	1,450			
HETA12	8	(7) #10	1,240	1,780	1,780			
HETA16	12	(9) #10	1,595	1,810	1,810			170
HETA20	16	(9) #10	1,595	1,810	1,810	340	725	
HETA24	20	(9) #10	1,595	1,810	1,810			
HETA40	36	(9) #10	1,595	1,810	1,810			
HHETA12	8	(7) #10	1,240	1,820	1,820			
HHETA16	12	(10) #10	1,770	2,235	2,235			
HHETA20	16	(10) #10	1,770	2,235	2,235	340[5]	815	
HHETA24	20	(10) #10	1,770	2,235	2,235			
HHETA40	36	(10) #10	1,770	2,235	2,235			

These products are available with additional corrosion protection. Additional products on this page may also be available with this option. Check with Simpson Strong-Tie for details.

1. Allowable loads may not be increased for wind or seismic load.
2. Minimum f'_c = 2,500 psi. Minimum f'_m = 1,500 psi.
3. For simultaneous loads in more than one direction, the connector must be evaluated as described in Note d, p. 14 under Instructions to the Designer.
4. It is acceptable to use a reduced number of fasteners provided that there is a reduction in uplift load capacity. Lateral loads do not apply when fewer fasteners are used.
5. The HHETA allowable F_1 load can be increased to 435 lb. if the strap is wrapped over the truss and a minimum of 12 fasteners are installed.
6. Minimum spacing for multiple anchor installation is two times the embedment depth for full load. See Double Embedded Anchor Installation table on p. 267 for loads on closer spaced anchors.
7. Minimum edge distance is 1½" for concrete and 2" masonry.
8. Lateral loads are limited to 54 mil (16 ga.) CFS members.
9. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.

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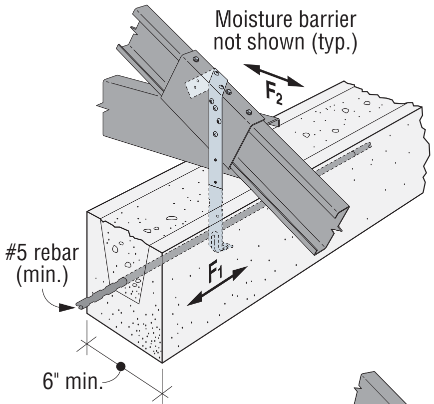
META/HETA/HHETA Embedded Truss Anchors

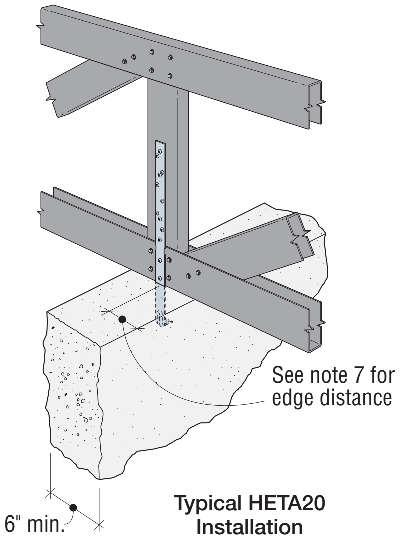
Double Embedded Anchor Installation

Model No.	Qty.	Application	Fasteners[8] Rafter/Stud/Truss Thickness 33 mil, 43 mil and 54 mil (20 ga., 18 ga. and 16 ga.)	Allowable Uplift Load (lb.) 33 mil (20 ga.)	Allowable Uplift Load (lb.) 43 mil (18 ga.)	Allowable Uplift Load (lb.) 54 mil (16 ga.)	Lateral Load[7] 54 mil (16 ga.) F_1	Lateral Load[7] 54 mil (16 ga.) F_2
1½" Width Minimum of Rafter/Stud/Truss								
META	2	CMU	(10) #10	1,770	1,985	1,985	340	725
		Concrete	(10) #10	1,770	1,985	1,985		
HETA	2	CMU	(10) #10	1,770	2,035	2,035	340	725
		Concrete	(10) #10	1,770	2,035	2,035		
HHETA	2	CMU	(10) #10	1,770	2,035	2,035	340	815
		Concrete	(10) #10	1,770	2,235	2,235		
3" Width Minimum of Rafter/Stud/Truss								
META	2	CMU	(14) #10	1,900	1,900	1,900	1,210	1,160
		Concrete	(14) #10	2,480	2,565	2,565		
HETA	2	CMU	(12) #10	2,480	2,500	2,500	1,225	1,520
		Concrete	(12) #10	2,480	2,700	2,700		
HHETA	2	CMU	(12) #10	2,480	2,500	2,500	1,225	1,520
		Concrete	(12) #10	2,480	3,050	3,050		
		Concrete	(14) #10	2,480	3,350	3,350		

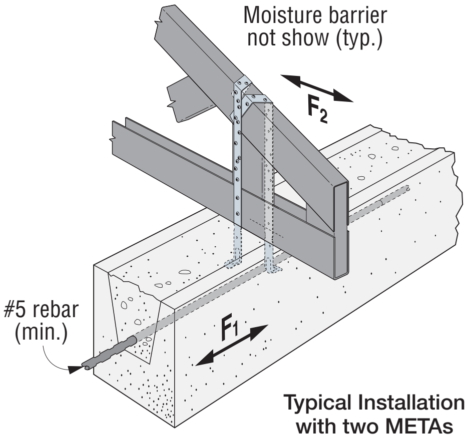
1. Allowable loads may not be increased for wind or seismic load.
2. Minimum f'_c = 2,500 psi. Minimum f'_m = 1,500 psi.
3. For simultaneous loads in more than one direction, the connector must be evaluated as described in Note d, p. 14 under Instructions to the Designer.
4. Minimum spacing for multiple anchor installation is two times the embedment depth for full load. See Double Embedded Anchor Installation table for loads on closer spaced anchors.
5. Install with spoons facing outward and straps spaced no more than ⅛" wider than the truss width.
6. F_1 lateral loads listed may cause an additional 1⁄16" deflection beyond the standard ⅛" limit there the straps are installed not wrapped over the heel as shown.
7. Lateral loads are limited to 54 mil (16 ga.) CFS members.
8. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



Typical META Installation



Typical HETA20 Installation



Typical Installation with two METAs

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LTS/MTS/HTS Twist Straps

Twist straps provide a tension connection between two members. They resist uplift at the heel of a truss economically. LTS/ MTS have a 2"-bend section and HTS has a 3¾"-bend section that eliminates interference at the transition points between the two members.

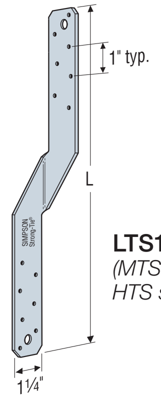
Material: See table

Finish: Galvanized. Some products available in stainless steel and ZMAX®; see Corrosion Information, pp. 18–21

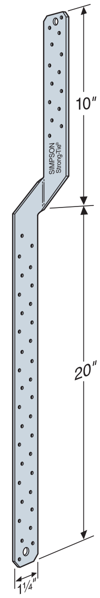
Installation:

- Use all specified fasteners; see General Notes.
- LTS, MTS and HTS are available with the bend reversed. Specify "–REV" after the model number, such as MTS16-REV.

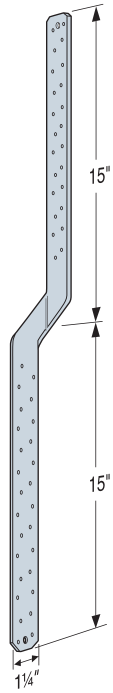
Codes: See p. 11 for Code Reference Key Chart



LTS12
(MTS and HTS similar)



MTS30
(HTS30 similar)

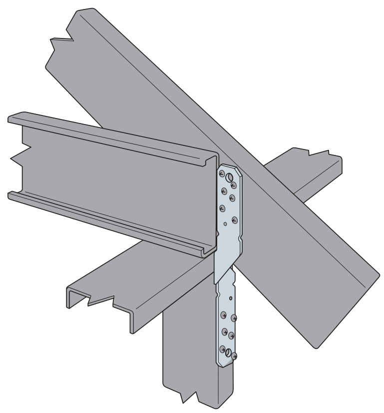


MTS30C
(HTS30C similar)

Model No.	Connector Material Thickness mil (ga.)	L (in.)	Fasteners[6] (Total) Rafter/Stud/Joist Thickness			Allowable Tension Load (lb.) 33 mil (20 ga.) 43 mil (18 ga.) 54 mil (16 ga.)	Code Ref.
			33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)		
LTS12	43 (18)	12	(10) #10	(6) #10	(6) #10	775	IP1, FL, L2
LTS16		16	(10) #10	(6) #10	(6) #10	775	
LTS18		18	(10) #10	(6) #10	(6) #10	775	
LTS20		20	(10) #10	(6) #10	(6) #10	775	
MTS12	54 (16)	12	(12) #10	(8) #10	(6) #10	995	
MTS16		16	(12) #10	(8) #10	(6) #10	995	
MTS18		18	(12) #10	(8) #10	(6) #10	995	
MTS20		20	(12) #10	(8) #10	(6) #10	995	
MTS30		30	(12) #10	(8) #10	(6) #10	995	
MTS24C		24	(12) #10	(8) #10	(6) #10	995	
MTS30C		30	(12) #10	(8) #10	(6) #10	995	
HTS16	68 (14)	16	(16) #10	(12) #10	(6) #10	1,415	
HTS20		20	(18) #10	(12) #10	(6) #10	1,450	
HTS24		24	(18) #10	(12) #10	(6) #10	1,450	
HTS30		30	(18) #10	(12) #10	(6) #10	1,450	
HTS30C		30	(18) #10	(12) #10	(6) #10	1,450	

These products are available with additional corrosion protection. Additional products on this page may also be available with this option. Check with Simpson Strong-Tie for details.

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. All straps except the MTS30 and HTS30 have the twist in the center of the strap.
4. Twist straps do not have to be wrapped over the truss to achieve the load.
5. May be installed on the inside face of the stud.
6. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



Typical MTS Installation Truss to Steel Studs

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VGT and SVGT2.5 Variable-Pitch Girder Tiedown

The variable-pitch girder tiedown, S/VGT2.5, is a high-capacity tiedown for single- or multi-ply CFS girder trusses. It attaches with self-drilling screws from the side of the truss. The VGT uses Simpson Strong-Tie® Strong-Drive® SDS Heavy-Duty Connector screws for wood truss applications. They both feature a predeflected crescent washer that allows them to accommodate top-chord pitches up to 8/12.

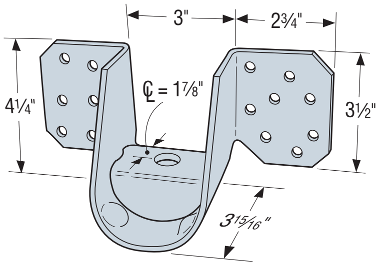
Material: 171 mil (7 ga.)

Finish: Galvanized

Installation:

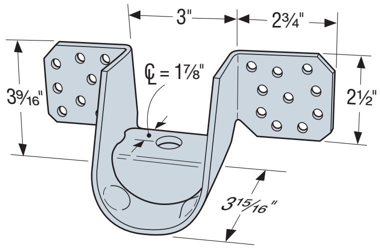
- Use all specified fasteners
- Screw holes are configured to allow for double installation on multi-member girders
- Install washer component (provided) so that top of washer is horizontal and parallel with top of wall

Codes: See p. 11 for Code Reference Key Chart



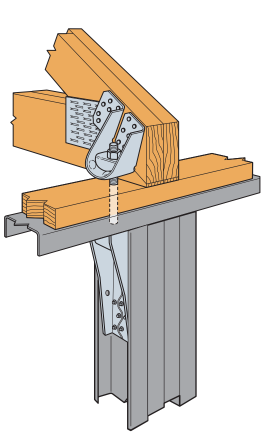
VGT

U.S. Patent 7,707,785

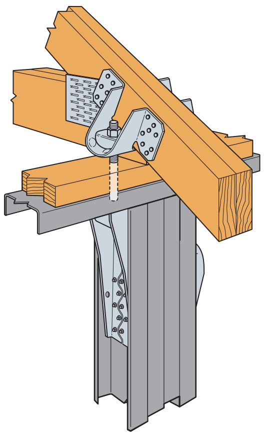


S/VGT2.5

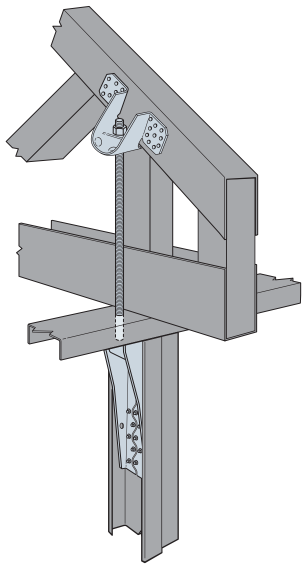
U.S. Patent 7,707,785



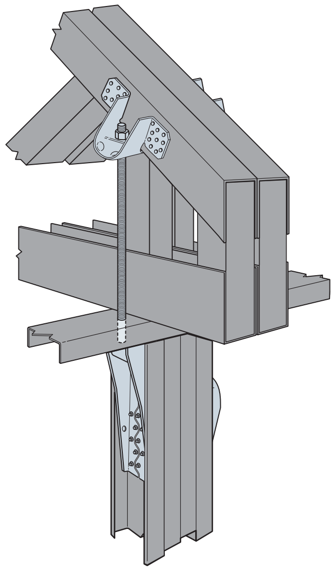
Typical Hybrid VGTR Single Installation with S/HDU4



Typical Hybrid VGT Double Installation with S/HDU6



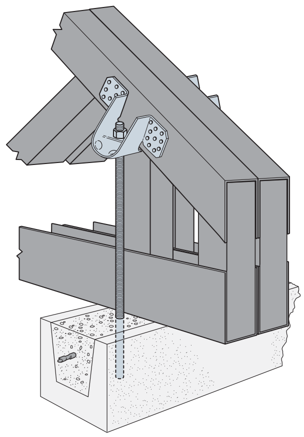
Typical S/VGT2.5 Single Installation with HDU6



Typical S/VGT2.5 Double Installation with S/HDU6

Model No.	Quantity	No. of Truss Plies	Fasteners[5] Anchor Dia.	Fasteners[5] Girder Truss	Allowable Uplift Load[2] (lb.) 3/12	Allowable Uplift Load[2] (lb.) 8/12	Code Ref.
Cold-Formed Steel Connection					54 mil (16 ga.)		
S/VGT2.5 (min.)[4]	1	1	(1) ⅝	(16) #14	3,050	2,620	170
	2	2	(2) ⅝	(32) #14	6,100	5,240	
S/VGT2.5 (max.)	1	1	(1) ⅝	(20) #14	3,860	3,130	
	2	2	(2) ⅝	(40) #14	7,720	6,260	
Hybrid Connection					Allowable Uplift Load[3] up to 8/12 (lb.) DF/SP (160)	Allowable Uplift Load[3] up to 8/12 (lb.) SPF/HF (160)	Code Ref.
VGT	1	2	(1) ⅝	(16) ¼" x 3" SDS	4,940	3,555	FL
	2	2	(2) ⅝	(32) ¼" x 3" SDS	7,185	5,175	
	2	3	(2) ⅝	(32) ¼" x 3" SDS	8,890	6,400	
VGTR/L	1	2	(1) ⅝	(16) ¼" x 3" SDS	2,230	1,605	
	2	2	(2) ⅝	(32) ¼" x 3" SDS	5,545	3,990	

1. Designer shall insure attached members are adequately designed to resist applied loads.
2. Straight-line interpolation can be used to determine allowable loads for pitches between 3/12 and 8/12.
3. Allowable loads on wood have been increased 60% for wind or earthquake loading with no further increase allowed; reduce where other load duration factors govern.
4. For (min.) tabulated values, not all screw holes need to be filled. Install screws symmetrically.
5. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



Typical S/VGT2.5 Installation in CMU

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LTA2, S/HGAM10 and H10S Seismic and Hurricane Ties

SIMPSON Strong-Tie®

The LTA2 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 block and the four embedded hooks provide for a positive bond in the concrete grout.

The H10S and the S/HGAM10 attaches to truss joist and provides good uplift resistance.

Material: See table

Finish: Galvanized

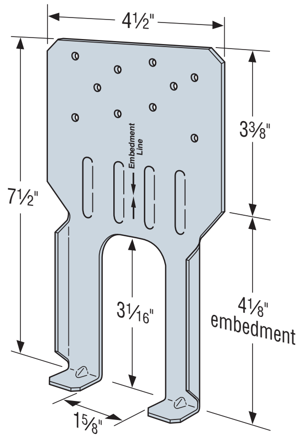
Installation:

- Use all specified fasteners; see General Notes.
- S/HGAM10 can be installed into grouted concrete block
- Titen® 2 screws are provided
- Hurricane ties do not replace solid blocking
- Attach to grouted concrete block with a minimum one #5 rebar horizontal in the top lintel block

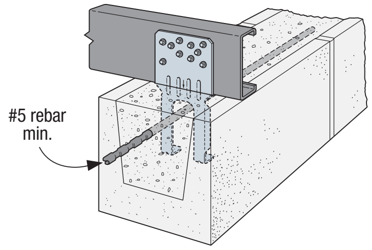
Codes: See p. 11 for Code Reference Key Chart

Ordering Information:

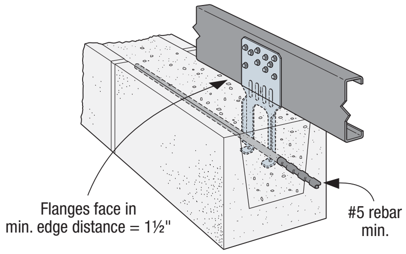
- The HGAM10KT is a kit of (10) connectors with (40) ¼"x 2¾" Titen 2 screws.



LTA2
U.S. Patent 6,560,943



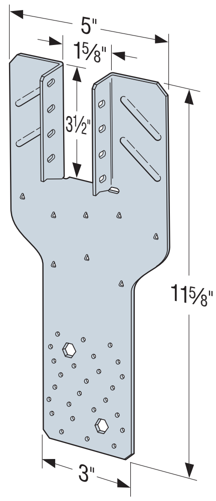
Typical LTA2 Installation
(perpendicular to wall)



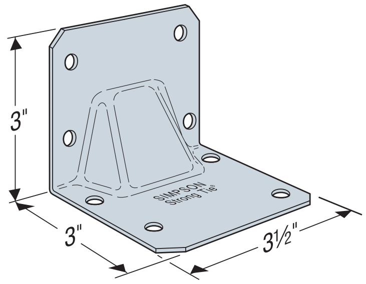
Typical LTA2 Installation
(parallel to wall)

Model No.	Connector Material Thickness mil (ga.)	Fasteners			Allowable Uplift Load (lb.)		Code Ref.
		To Rafter/ Truss[5]	To CMU	To Concrete	33 mil (20 ga.)	43 mil (18 ga.)	
LTA2 perpendicular-to-wall installation	43 (18)	(10) #10	Embed	Embed	1,295	1,425	170
LTA2 parallel-to-wall installation	43 (18)	(10) #10	Embed	Embed	1,295	1,390	
S/HGAM10KT	68 (14)	(4) #14	(4) ¼" x 2¾" Titen 2	(4) ¼" x 1¾" Titen 2	810	850	IP1, L2, FL
H10S	43 (18)	(8) #10	(2) ⅜" x 4" Titen HD	(2) ⅜" x 4" Titen HD	915	1,245	

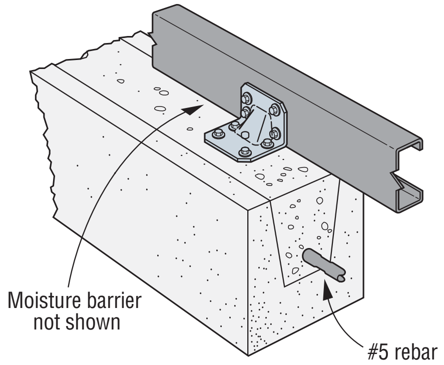
1. Min. f'_m = 1,500 psi and f'_c = 2,500 psi.
2. Minimum edge distance is 1½" for Titen® 2 screws.
3. The products shall be installed such that the Titen 2 screws and Titen HD® anchors are not exposed to the weather.
4. See p. 204 for Titen 2 screw information and p. 189 for Titen HD information.
5. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



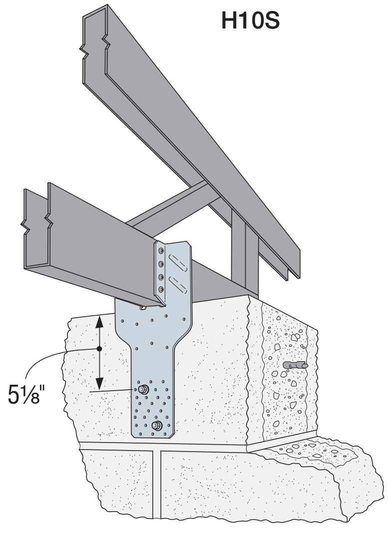
H10S



S/HGAM10



Typical S/HGAM10 Installation



H10S Installation

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TJC Jack Truss and Rafter Connector

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

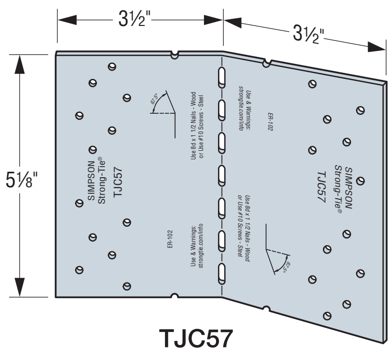
Material: 54 mil (16 ga.)

Finish: Galvanized

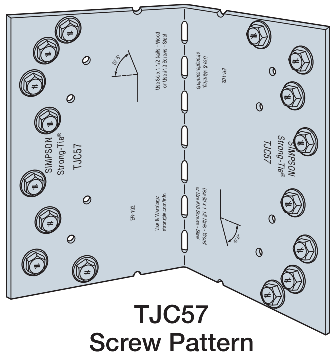
Installation:

- Use all specified fasteners; see General Notes
- Position the skewed member on the inside of the bend line with the end of the member flush with the bend line
- Bend the TJC to the desired position (one bend cycle only)

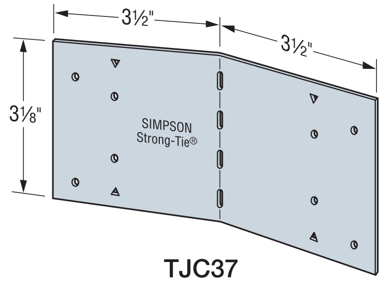
Codes: See p. 11 for Code Reference Key Chart



TJC57



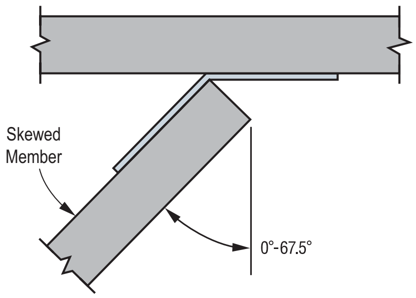
TJC57
Screw Pattern



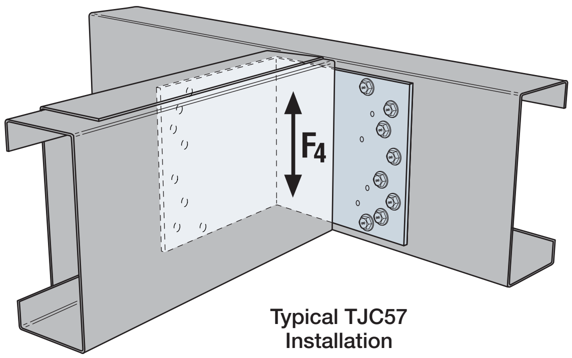
TJC37

Model No.	Fasteners[2]		Member Thickness mil (ga.)	Allowable Load F_4 (lb.)			Code Ref.
	Carrying Member	Carried Member		0°	1°–60°	61°–67.5°	
TJC37 (min.)	(4) #10	(4) #10	43 (18)	660	565	475	IP1, L2, FL
TJC37 (max.)	(6) #10	(6) #10	43 (18)	680	630	530	
TJC57 (min.)	(8) #10	(8) #10	43 (18)	1,295	1,215	1,235	170
TJC57 (max.)	(8) #10	(8) #10	54 (16)	1,790	1,790	1,790	

1. Reference the illustration for the required screw pattern of the TJC57.
2. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



Top View Installation



Typical TJC57
Installation

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SIMPSON Strong-Tie®

LS and S/LS Skewable Angles

LS and S/LS skewable angles are a cost effective method for connecting roof rafters to hip rafters.

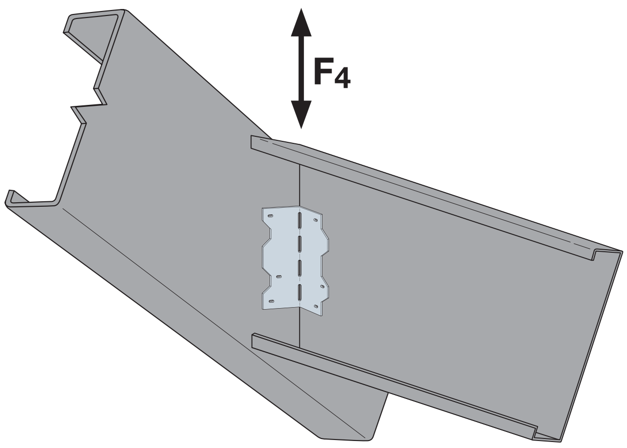
Material: 43 mil (18 ga.)

Finish: Galvanized (G90)

Installation:

- Use all specified fasteners
- Field-skewable; bend one time only

Codes: See p. 11 for Code Reference Key Chart



Typical Installation Between Roof Rafter and Hip Rafter

Model No.	Length (in.)	Fasteners[2]	Allowable Load (lb.)			Code Ref.
			33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)	
			F_4	F_4	F_4	
LS30	3⅞	(8) #10	200	370	500	170
S/LS50	4⅞	(4) #10	200	370	500	
S/LS70	6⅜	(6) #10	465	575	715	
LS90	7⅞	(12) #10	465	895	915	

1. Loads are for one part only.
2. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.

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.

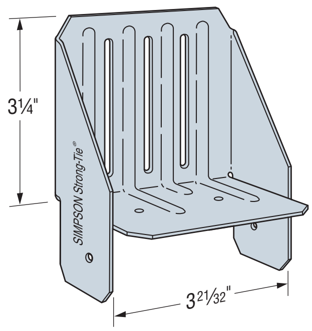
Material: 43 mil (18 ga.)

Finish: Galvanized

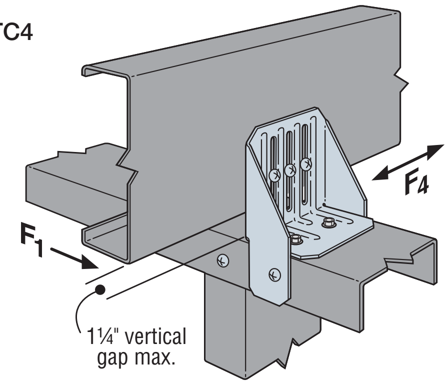
Installation:

- Use all specified fasteners
- Screws in vertical slots shall not be driven completely flush against the connector when vertical movement is desired

Codes: See p. 11 for Code Reference Key Chart



S/HTC4



Typical S/HTC4 Installation

Model No.	Fasteners[3]		Allowable Load 43 mil (18 ga.) (lb.)				Code Ref.
	Top Track	Truss	Without Gap[1]		With 1¼" Gap[2]		
			F_1	F_4	F_1	F_4	
S/HTC4	(4) #8	(3) #8	320	460	85	175	170

1. Truss or rafter must be bearing on top plate to achieve the allowable loads under "Without Gap."
2. Installed with maximum 1¼" space between rafter or truss and top plate under "With 1¼" Gap." Where loads are not required, space is not limited to 1¼".
3. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.

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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.

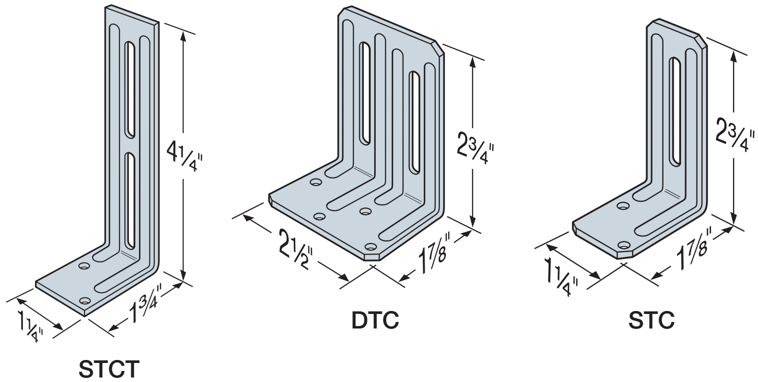
Material: 43 mil (18 ga.)

Finish: Galvanized

Installation:

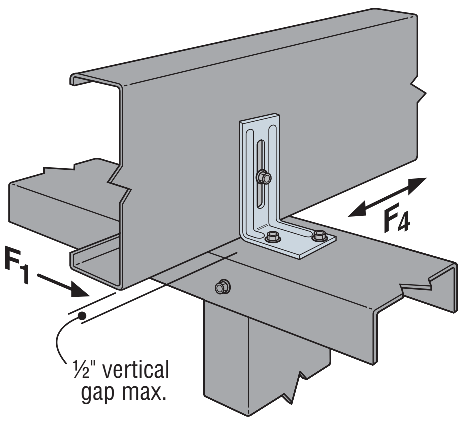
- Use all specified fasteners; see General Notes
- Use STC or DTC depending on required loads
- STC / STCT / DTC may be used with proprietary material sections. Contact material supplier for specific installation details
- Use STCT where truss or rafter is separated from the top plate of the nonbearing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

Codes: See p. 11 for Code Reference Key Chart



Model No.	Fasteners[3]		Allowable Load 33 mil (20 ga.) (lb.)						Code Ref.
	Base	Slot	Without Gap		¼" Max. Gap		¼"< Gap ≤ ½"		
			F_1	F_4	F_1	F_4	F_1	F_4	
STC	(2) #8	(1) #8	185	35	135	35	75	35	IP1, L2, FL
STCT	(2) #8	(1) #8	—	—	—	—	—	—	180
DTC	(4) #8	(2) #8	200	160	200	160	145	160	IP1, L2, FL

1. Truss or rafter must be bearing on top plate to achieve the allowable loads under "Without Gap."
2. Clips are required on both sides of the truss to achieve F_1 loads in both directions (stagger parts to avoid screw interferences).
3. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



To allow for vertical truss movement, screws into the truss or rafter should not be driven completely flush against the connector.

Typical STC Installation

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AHEP Adjustable Hip-End Purlin

The Simpson Strong-Tie AHEP is a structural purlin that also serves as an installation aid during the truss-erection process. The AHEP attaches to the step-down hip trusses at the leading edge, eliminating the need for drop top chords and C-stud fillers. The AHEP installs linearly, aligned with the end jacks, to maintain sheathing spacing from eave to hip or peak. Roof sheathing/decking attaches directly to the purlin. Adjustable in length, the AHEP is designed to accommodate a pitch range of 3/12 to 9/12.

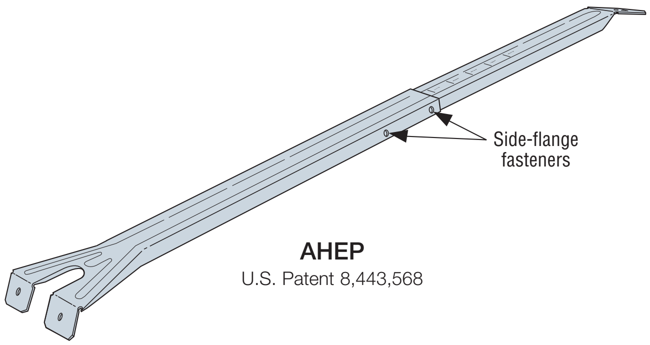
Material: 33 mil (20 ga.)

Finish: Galvanized

Installation:

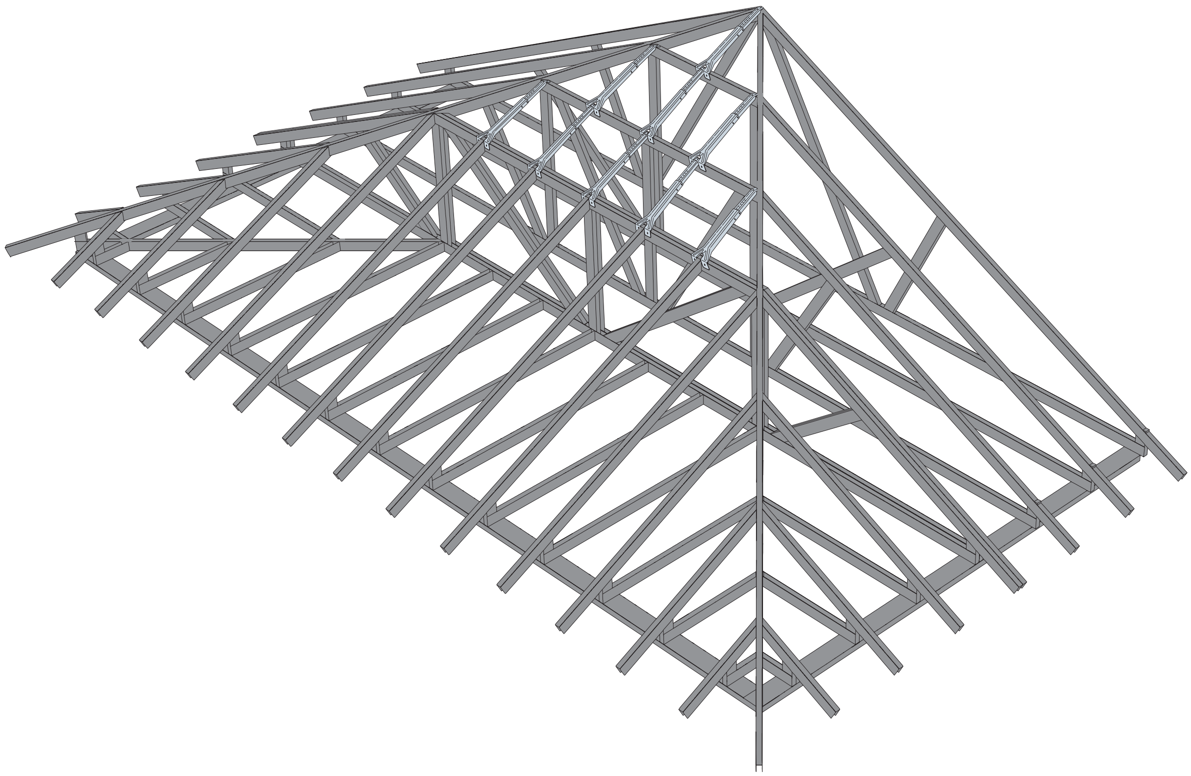
- Use all specified fasteners; see General Notes

Codes: See p. 11 for Code Reference Key Chart



Model No.	Fasteners[3]		Sheathing Option	Allowable Down Load 33 mil (20 ga.) (lb.)				Code Ref.
	Side Flanges	Truss Ends		3/12 Pitch		9/12 Pitch		
				L/180	3/16"	L/180	3/16"	
AHEP	(4) #10	(4) #10	None	285	360	160	175	170
			½" wood sheathing	285	360	205	225	

1. Designer shall ensure attached members are adequately designed to resist applied loads.
2. Straight-line interpolation can be used to determine allowable loads for pitches between 3/12 and 9/12.
3. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



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TBD22 Truss Brace Diagonal

The TBD22 diagonal truss brace offers a time-saving substitute for hat channel or C-stud diagonal bracing that helps meet the prescriptive recommendations of CFSBCSI. The TBD22 travels in a box like a flat strap (160 feet per carton), and is formed into an A-shape as it is pulled from the carton to provide rigidity and prevent sagging between trusses during installation. As it is fastened to the trusses the brace flattens, allowing sheathing to be installed over it, saving the time typically needed to remove bracing prior to applying the sheathing or decking.

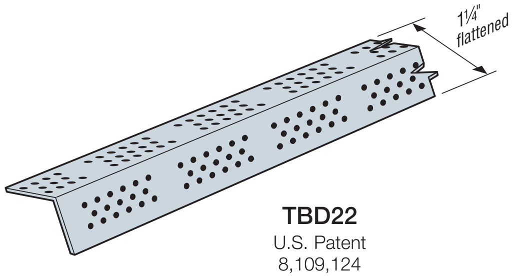
Material: 27 mil (22 ga.)

Finish: Galvanized

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

- Strap does not have holes for fasteners. Screws shall be installed in the dimpled areas and placed to maintain a minimum of ¼" strap edge distance and a minimum of ½" center-to-center distance.
- TBD22 strap span diagonally at approximately 45°.
- Strap shall not be slack, but tight and ready to engage in tension.
- To resist construction forces, diagonal X-bracing is required at each end and every ten truss spaces (20' max.). Refer to SBCA CFS-BCSI for additional information.
- At the end of the TBD22 braces, trusses shall be laterally restrained to resist out-of-plane forces.
- Bracing locations shown in the drawing are recommendations for temporary bracing only. Installation of TBD22 for permanent bracing shall be by the Building Designer or Engineer of Record.

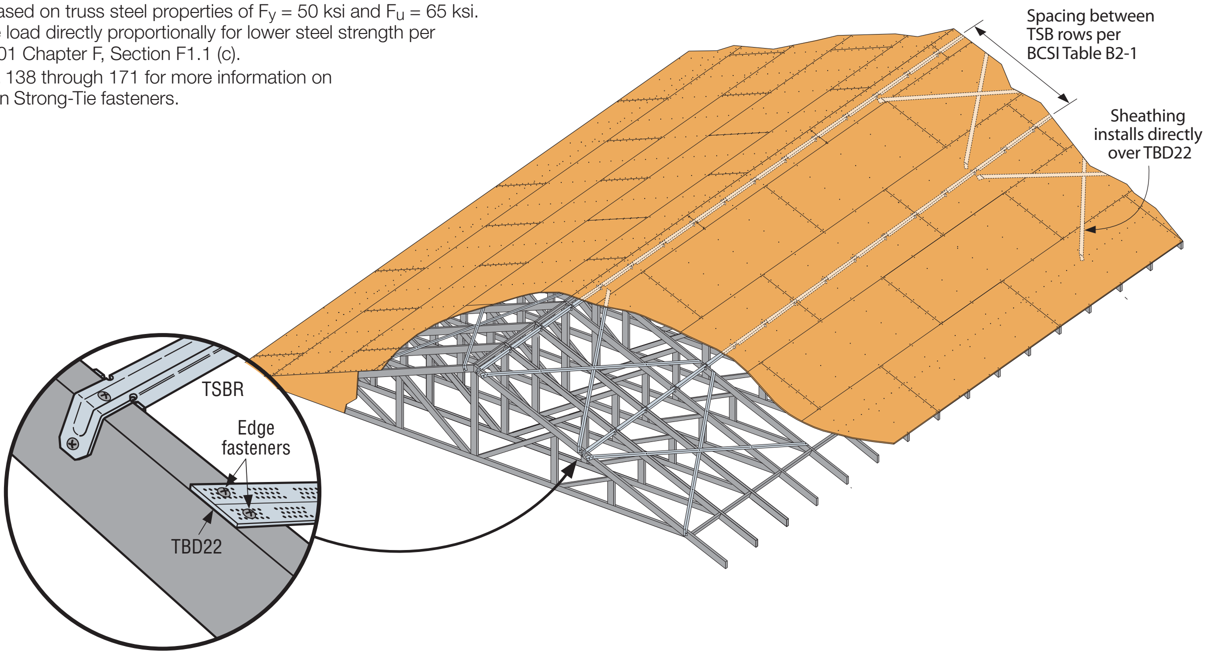
Codes: See p. 11 for Code Reference Key Chart



TBD22
U.S. Patent 8,109,124

Model No.	Fasteners[2]		Allowable Tension Load (lb.)		Code Ref.
			Truss Member Thickness		
	Strap Ends	Intermediate Trusses	27 mil (22 ga.)	33 mil (20 ga.)	
TBD22	(2) #10	(2) #10	380	510	IP1, L2, FL

1. Load based on truss steel properties of F_y = 50 ksi and F_u = 65 ksi. Reduce load directly proportionally for lower steel strength per AISI 2001 Chapter F, Section F1.1 (c).
2. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



Typical TBD22 Top Chord Installation

Roof, Truss and Rafter Connectors, Ties and Straps

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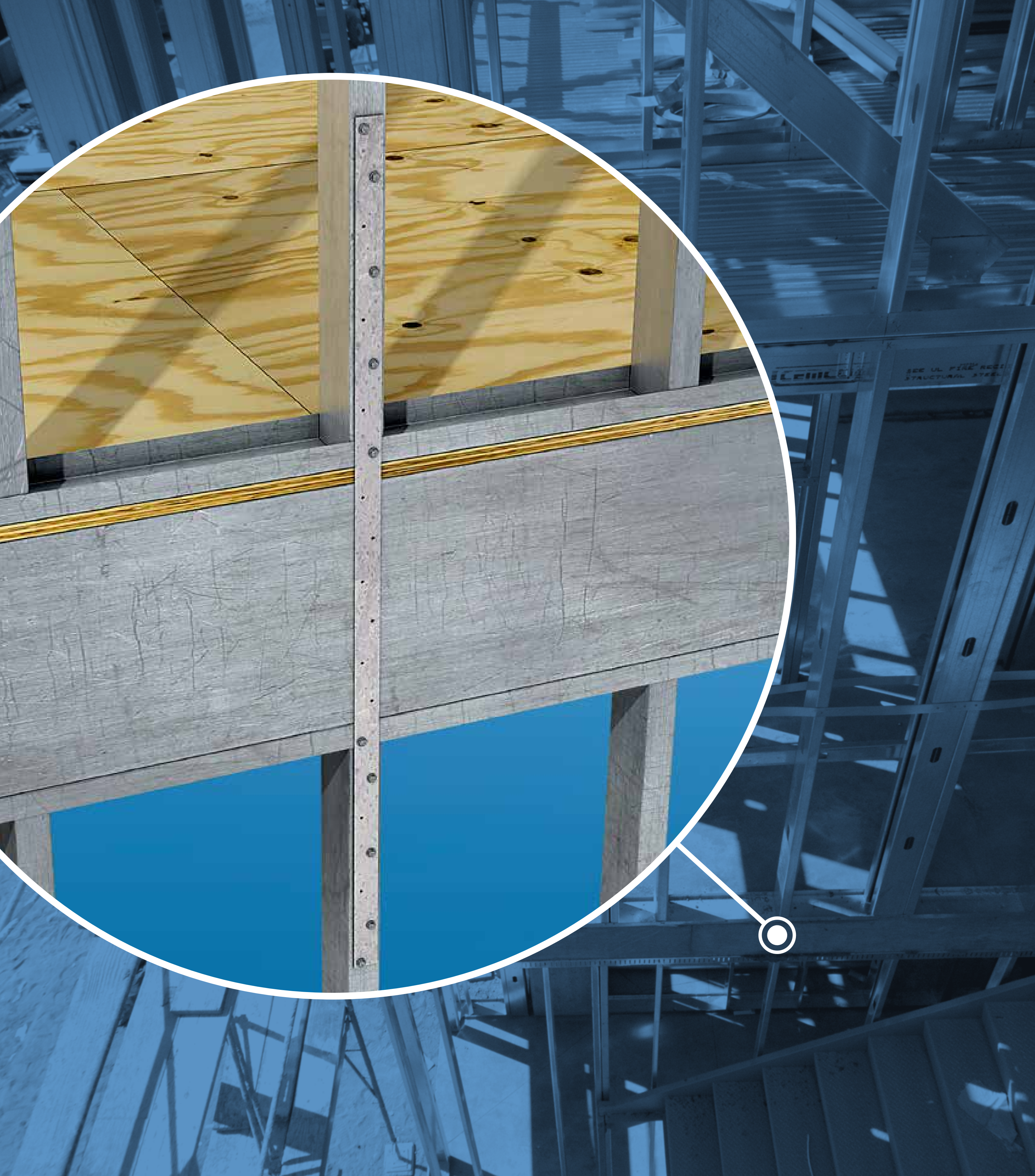
Lateral Connectors, Ties and Straps



TSBR Truss Spacer Restraint

The TSBR captures the on-center spacing of CFS truss chords and webs and laterally restrains the truss members, allowing quicker, easier and safer installations. The tubular shape provides strength in both compression and tension.

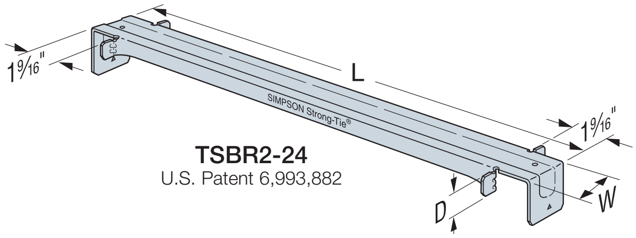
Material: 27 mil (22 ga.)

Finish: Galvanized

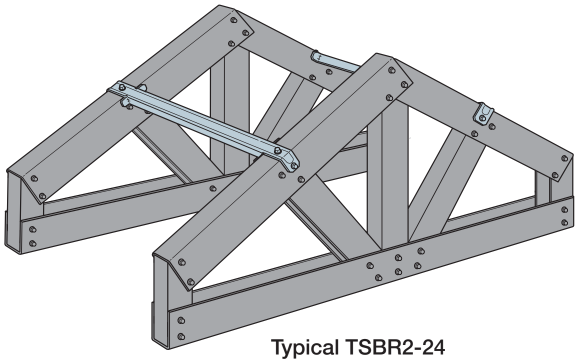
Installation:

- Use all specified fasteners; see General Notes

Codes: See p. 11 for Code Reference Key Chart



TSBR2-24
U.S. Patent 6,993,882



Typical TSBR2-24 Installation

Model No.	Dimensions (in.)				Fasteners[3]		Allowable Load (lb.)		Code Ref.
	W	L[2]	H	B	Bend End	Straight End	Compression 33 mil (20 ga.)	Tension 33 mil (20 ga.)	
TSBR2-24	1½	25½	1	1¾	(1) #10	(1) #10	455	215	170
					(2) #10	(2) #10	455	575	

1. Designer shall ensure attached members are adequately designed to resist applied loads.
2. Length, L, equals the effective out-to-out dimension of the braced trusses.
3. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.

S/DSC Drag Strut Connector

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

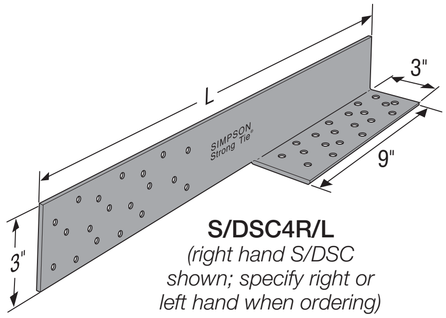
Material: 229 mil (3 ga.)

Finish: Simpson Strong-Tie® gray paint

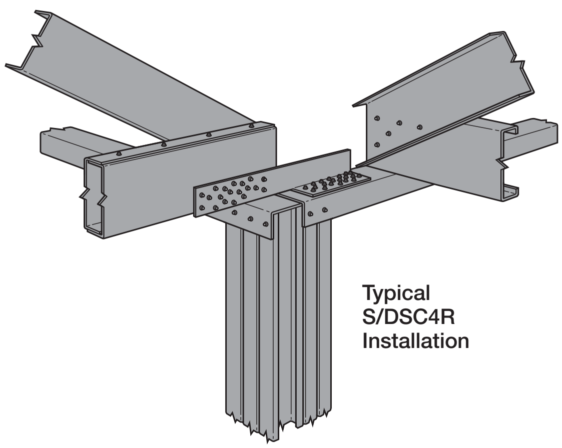
Installation:

- Use all specified fasteners; see General Notes

Codes: See p. 11 for Code Reference Key Chart



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



Typical S/DSC4R Installation

Model No.	L (in.)	Fasteners[1]	Allowable Load (lb.) 43 mil (18 ga.)		Code Ref.
			Compression	Tension	
S/DSC4R/L	22	(40) #10	3,220	4,025	170

1. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.

Lateral Connectors, Ties and Straps

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HRS/ST/FHA/PS/LSTA/LSTI/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.

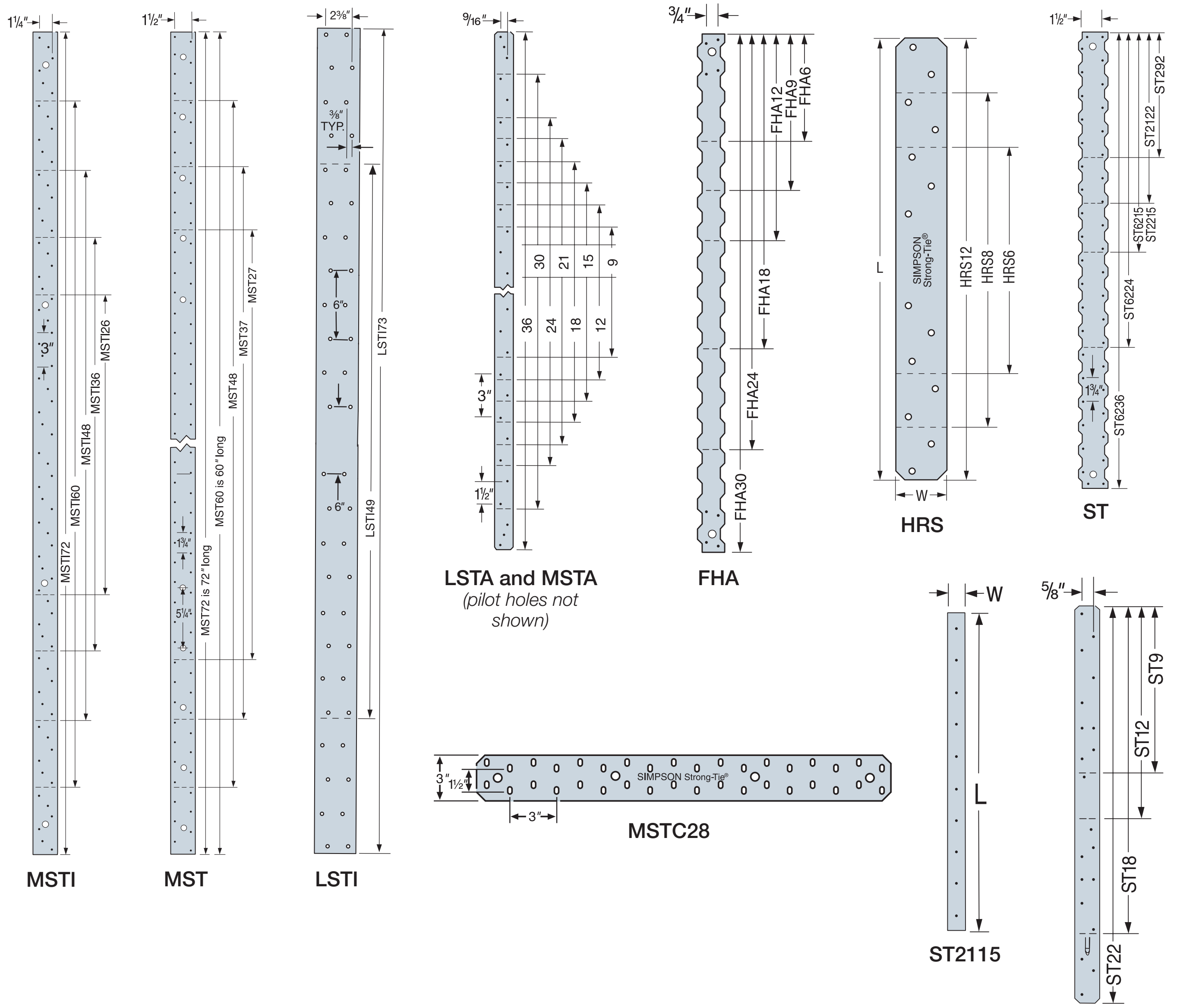
Install strap ties where top or bottom plates are cut, at wall intersections, and as ridge ties. Reduce the allowable load based on the size and quantity of fasteners used.

Refer to applicable code for minimum edge and end distances.

Finish: PS — hot-dip galvanized (HDG); all others — galvanized. Some products are available in stainless steel or ZMAX®; see Corrosion Information, pp. 18–21.

Installation: Use all specified fasteners; see General Notes

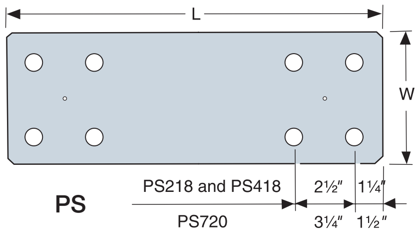
Codes: See p. 11 for Code Reference Key Chart



MSTI | MST | LSTI | LSTA and MSTA *(pilot holes not shown)* | FHA | HRS | ST | MSTC28 | ST2115 | ST9, ST12, ST18, ST22

Model No.	Connector Material Thickness mil (ga.)	Dimensions (in.)		Bolts		Code Ref.
		W	L	Qty.	Dia. (in.)	
PS218	171 (7)	2	18	4	⅝	180
PS418		4	18	4	⅝	
PS720		6¾	20	8	½	

1. 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.



PS

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

Codes: See p. 11 for Code Reference Key Chart

Model No.	Connector Material Thick. mil (ga.)	Dimensions (in.)		Fasteners[4] (Total)			Allowable ASD Tension Load (lb.)			Code Ref.
				Rafter/Stud/Joist Thickness						
		W	L	33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)	33 mil (20 ga.)	43 mil (18 ga.)	54 mil (16 ga.)	
LSTA9	33 (20)	1 1/4	9	(8) #10	(8) #10	(8) #10	705	1,120	1,190	IP1, L2, FL
LSTA12		1 1/4	12	(10) #10	(10) #10	(8) #10	885	1,190	1,190	
LSTA15		1 1/4	15	(12) #10	(12) #10	(10) #10	1,060	1,190	1,190	
LSTA18		1 1/4	18	(14) #10	(12) #10	(10) #10	1,190	1,190	1,190	
LSTA21		1 1/4	21	(14) #10	(12) #10	(10) #10	1,190	1,190	1,190	
LSTA24		1 1/4	24	(14) #10	(12) #10	(10) #10	1,190	1,190	1,190	
ST292		2 1/16	9 5/16	(12) #10	(10) #10	(10) #10	1,060	1,240	1,240	
ST2122		2 1/16	12 13/16	(16) #10	(12) #10	(10) #10	1,415	1,502	1,502	
ST2115		3/4	16 5/16	(8) #10	(6) #10	(4) #10	630	630	630	
ST2215		2 1/16	16 5/16	(20) #10	(14) #10	(10) #10	1,765	1,825	1,825	
LSTA30	43 (18)	1 1/4	30	(18) #10	(12) #10	(10) #10	1,555	1,555	1,555	
LSTA36		1 1/4	36	(18) #10	(16) #10	(14) #10	1,555	1,555	1,555	
LSTI49		3 3/4	49	(32) #10	(32) #10	(20) #10	2,830	4,050	4,050	
LSTI73		3 3/4	73	(46) #10	(32) #10	(20) #10	4,050	4,050	4,050	
MSTA9		1 1/4	9	(8) #10	(8) #10	(8) #10	705	1,050	1,555	
MSTA12		1 1/4	12	(10) #10	(10) #10	(8) #10	885	1,315	1,555	
MSTA15		1 1/4	15	(12) #10	(12) #10	(10) #10	1,060	1,555	1,555	
MSTA18		1 1/4	18	(14) #10	(12) #10	(10) #10	1,235	1,555	1,555	
MSTA21		1 1/4	21	(16) #10	(12) #10	(10) #10	1,415	1,555	1,555	
MSTA24		1 1/4	24	(18) #10	(12) #10	(10) #10	1,555	1,555	1,555	
MSTA30	54 (16)	1 1/4	30	(22) #10	(16) #10	(12) #10	1,945	1,950	1,950	
MSTA36		1 1/4	36	(24) #10	(18) #10	(16) #10	1,950	1,950	1,950	
ST6215		2 1/16	16 5/16	(20) #10	(16) #10	(10) #10	1,765	2,025	2,025	
ST6224		2 1/16	23 5/16	(28) #10	(20) #10	(12) #10	2,455	2,455	2,455	
ST9		1 1/4	9	(8) #10	(8) #10	(8) #10	705	1,050	1,350	
ST12		1 1/4	11 5/8	(10) #10	(10) #10	(8) #10	885	1,315	1,350	
ST18		1 1/4	17 3/4	(14) #10	(12) #10	(12) #10	1,235	1,350	1,350	
ST22		1 1/4	21 5/8	(20) #10	(20) #10	(20) #10	1,350	1,350	1,350	
MSTC28		3	28 1/4	(36) #10	(36) #10	(30) #10	3,180	4,600	4,600	
MSTC40		3	40 1/4	(52) #10	(46) #10	(46) #10	4,595	4,600	4,600	
MSTC52		3	52 1/4	(54) #10	(42) #10	(42) #10	4,600	4,600	4,600	
MSTC66	68 (14)	3	65 3/4	(66) #10	(46) #10	(30) #10	5,795	5,795	5,795	
MSTC78		3	77 3/4	(66) #10	(46) #10	(30) #10	5,795	5,795	5,795	
ST6236		2 1/16	33 13/16	(40) #10	(30) #10	(18) #10	3,535	3,760	3,760	
HRS6	97 (12)	1 3/8	6	(6) #10	(6) #10	(6) #10	530	790	1,600	
HRS8		1 3/8	8	(10) #10	(10) #10	(10) #10	885	1,315	2,670	
HRS12		1 3/8	12	(14) #10	(14) #10	(12) #10	1,235	1,840	2,710	
FHA6		1 7/16	6 3/8	(8) #10	(8) #10	(8) #10	705	1,050	2,045	
FHA12		1 7/16	11 5/8	(8) #10	(8) #10	(8) #10	705	1,050	2,045	
FHA18		1 7/16	17 3/4	(8) #10	(8) #10	(8) #10	705	1,050	2,045	
FHA24		1 7/16	23 7/8	(8) #10	(8) #10	(8) #10	705	1,050	2,045	
FHA30		1 7/16	30	(8) #10	(8) #10	(8) #10	705	1,050	2,045	
MSTI26		2 1/16	26	(26) #10	(26) #10	(22) #10	2,300	3,420	5,025	
MSTI36		2 1/16	36	(36) #10	(36) #10	(22) #10	3,180	4,735	5,025	
MSTI48		2 1/16	48	(48) #10	(40) #10	(22) #10	4,240	5,025	5,025	
MSTI60		2 1/16	60	(58) #10	(40) #10	(22) #10	5,025	5,025	5,025	
MST27		2 1/16	27	(30) #10	(30) #10	(22) #10	2,650	3,945	5,025	170
MST37		2 1/16	37	(42) #10	(40) #10	(34) #10	3,710	5,025	5,025	
MST48		2 1/16	48	(54) #10	(54) #10	(46) #10	4,770	5,155	5,155	
MST60	118 (10)	2 1/16	60	(68) #10	(68) #10	(62) #10	5,820	6,420	6,650	
MST72		2 1/16	72	(80) #10	(72) #10	(64) #10	6,650	6,650	6,650	

These products are available with additional corrosion protection. Additional products on this page may also be available with this option. Check with Simpson Strong-Tie for details.

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. Not all fastener holes need to be filled, as additional fastener holes are provided. Install fasteners symmetrically.
4. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.

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SIMPSON Strong-Tie®

CS/CMST Coiled Straps

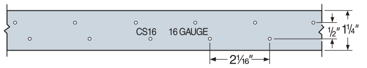
CMSTC provides countersunk fastener slots that provide a lower screw head profile. CS, CMST and CMSTC are continuous utility straps which can be cut to length on the job site. Packaged in lightweight cartons (about 40 lb.).

Finish: Galvanized. Some products available in ZMAX® coating; see Corrosion Information, pp. 18–21.

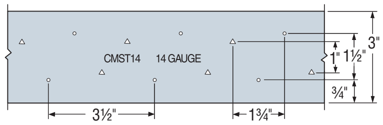
Installation:

- 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.

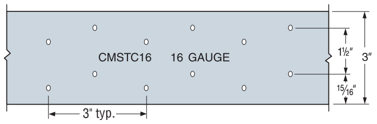
Codes: See p. 11 for Code Reference Key Chart



CS16 Hole Pattern
(all other CS straps similar)

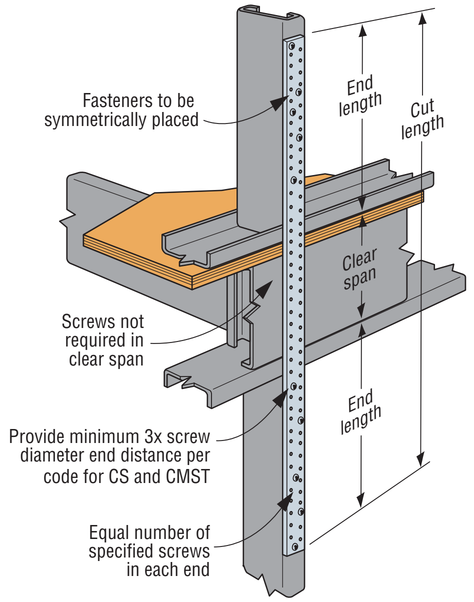


CMST14 Hole Pattern
(CMST12 similar)



CMSTC16 Hole Pattern

Gauge stamped on part for easy identification.



Typical CS Installation as a Floor-to-Floor Tie

Model No.	Total Length	Connector Material Thickness mil (ga.)	Width (in.)	Fasteners[8] (Total)			Allowable Tension Load (lb.)	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.)		
CMST12[2]	40'–3"	97 (12)	3	(104) #10	(70) #10	(40) #10	9,080	
CMST14[2]	52'–6"	68 (14)	3	(72) #10	(50) #10	(28) #10	6,365	
CMSTC16[3]	54'	54 (16)	3	(54) #10	(36) #10	(30) #10	4,600	
CS14	100'	68 (14)	1¼	(28) #10	(18) #10	(12) #10	2,305	
CS16	150'	54 (16)	1¼	(18) #10	(12) #10	(8) #10	1,550	IP1, L2, FL
CS18S	100'	43 (18)	1¼	(14) #10	(10) #10	(6) #10	1,235	
CS18	200'		1¼	(14) #10	(10) #10	(6) #10	1,235	
CS20	250'	33 (20)	1¼	(12) #10	(8) #10	(6) #10	945	
CS22	300'	27 (22)	1¼	(10) #10	(6) #10	(6) #10	775	

These products are available with additional corrosion protection. Additional products on this page may also be available with this option. Check with Simpson Strong-Tie for details.

1. Use half of the fasteners in each member being connected to achieve the listed loads.
2. For CMST straps: End Length (inches) = ½ total fasteners x ⅞" + 1" when all holes filled. Double length if only round holes filled.
3. For CMSTC16 straps: End Length (inches) = ½ total fasteners x ¾" + 1" when all holes filled. Double length if only round holes filled.
4. For CS straps: End Length (inches) = ½ total fasteners + 1".
5. Total Cut Length = End Length + Clear Span + End Length.
6. Calculate the connector value for a reduced number of screws as follows: $\text{Allowable Load} = \dfrac{\text{No. of Screws Used}}{\text{No. of Screws in Table}} \times \text{Table Load}$

   Example: CMSTC16 on 54 mil with 24 screws: $\dfrac{\text{24 Screws (Used)}}{\text{30 Screws (Table)}} \times 4{,}600\text{ lb.} = 3{,}680\text{ lb.}$
7. Loads are based on lesser of steel strap capacity and AISI S100 fastener calculation.
8. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.

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LTP5 Framing Anchor

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

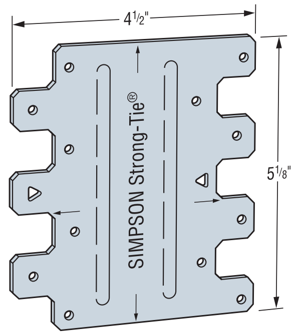
Material: 33 mil (20 ga.)

Finish: Galvanized

Installation:

- Use all specified fasteners; see General Notes

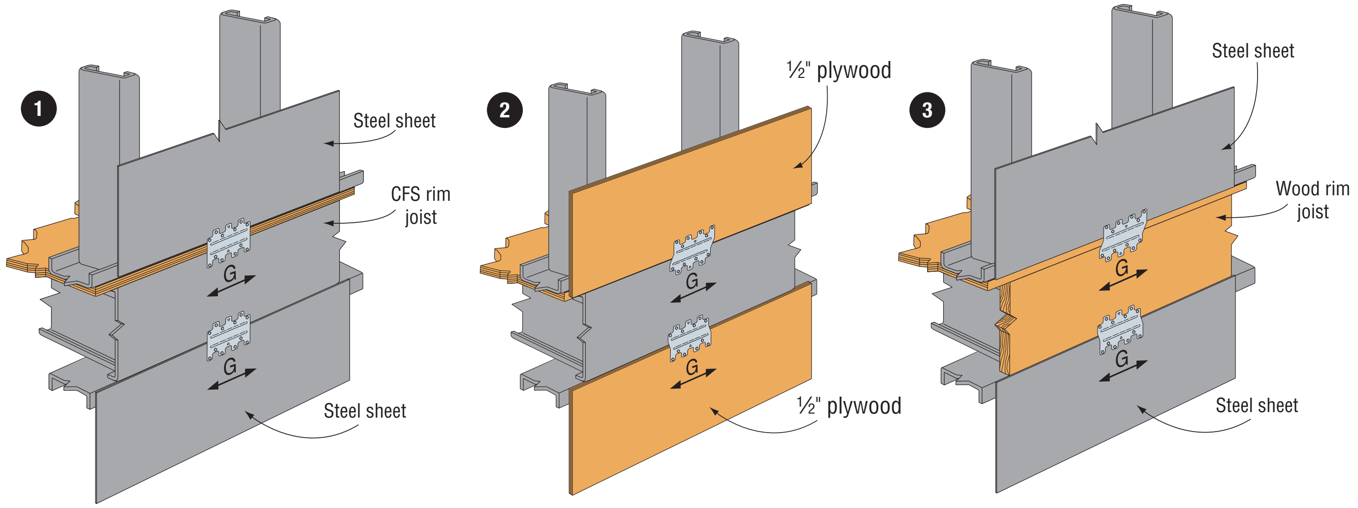
Codes: See p. 11 for Code Reference Key Chart



LTP5

Model No.	Type of Connection	Direction of Load	Fasteners[4]		Allowable Load 43 mil (18 ga.) (lb.)	Code Ref.
			To Rim Joist	To Sheathing and Track		
LTP5	1	G	(7) #10	(7) #10	1,045	IP1, L2, FL
	2		(7) #10	(7) #10	1,110	
	3		(7) 8d x 1½"	(7) #10	730	

1. Allowable loads are for one anchor.
2. Allowable loads are based on steel (stud and sheet) of 43 mil (18 ga.) minimum.
3. Allowable load for Type 3 connection assumes C_D = 1.60.
4. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.



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

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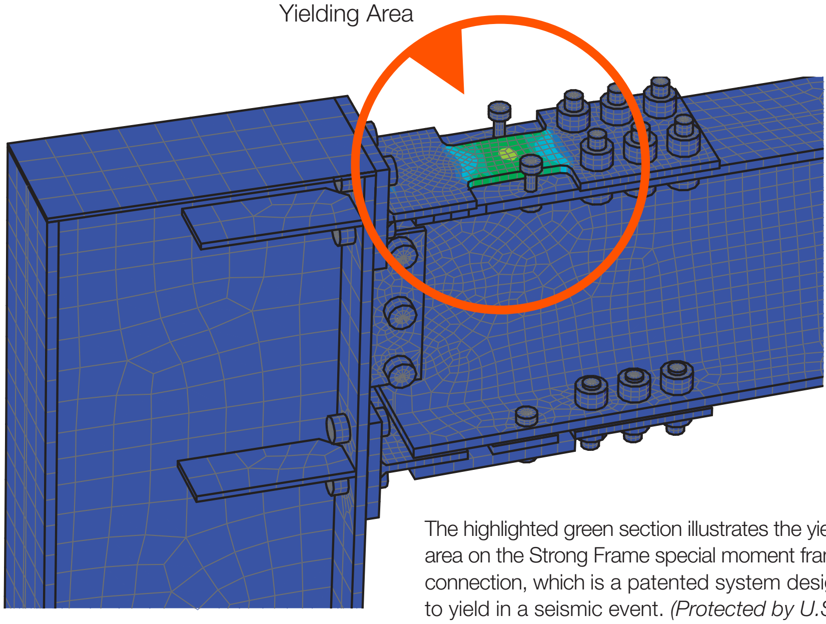
Lateral Systems

Strong Frame® Moment Frames

For years, moment frames have been a common method of providing high lateral-force resistance when limited wall space and large openings control the structural design. Traditionally, the disadvantage with moment frames has been that they are time-intensive to design and labor-intensive to install. Simpson Strong-Tie has taken these factors into consideration and has created a cost-effective alternative to traditional frames — the Strong Frame. For CFS applications, the Strong Frame is available without the pre-installed wood nailers.

The “Special” Behind the Special Moment Frame

The new Strong Frame® Special Moment Frame provides high lateral-force resistance to seismic events. Our innovative Yield-Link® structural fuse is designed so the connection response remains ductile under load, providing more predictable performance. Little, if any, deformation is expected from the members.



The highlighted green section illustrates the yielding area on the Strong Frame special moment frame connection, which is a patented system designed to yield in a seismic event. *(Protected by U.S. and other pending and granted foreign patents.)*

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Strong Frame® Moment Frames

SIMPSON Strong-Tie®

Features:

- **100% Bolted Connections**
  Install frames faster with no field welding required. No need to have a welder on site, or a welding inspector.
- **Most Frames Fit in a Standard 2x6 or 2x8 Wall**
  No thicker-wall additional framing or furring required.
- **Greater Quality Control**
  Frames are manufactured in a quality-controlled environment and all specialty field-bolted connections are inspected in the factory.
- **Convenient to Store, Ship and Handle**
  Disassembled frames are more compact, minimizing deliveries and simplifying handling on the jobsite. Assembled frames available.
- **Preassembled Anchor-Bolt Assemblies**
  Anchor bolts are preassembled on a shear-lug plate that mounts on the form. This helps ensures correct anchor placement and creates more efficient anchor performance.
- **Streamlined Anchorage Design**
  No more tedious anchorage calculations — select an anchorage solution for your footing geometry from the Strong Frame Selector Software.
- **Multi-Story, Multi-Bay, and Retrofit Solutions Are Available**
  Contact Simpson Strong-Tie for more information.
- **Code Listed**
  SMF — ICC-ES ESR-2802; AISC-ANSI 358-16, Chapter 12

Strong Frame® Design Guide

All of the information you need on our latest lateral force-resisting solution is contained in the *Strong Frame Design Guide* (F-L-SF). Frame and anchorage design information, installation instructions, prescriptive wall bracing requirements and installation details are all included in this useful tool. Visit **strongtie.com** to download or request a copy or call (800) 999-5099.

Strong Frame® Selector Software

The Simpson Strong-Tie® Strong Frame® Selector software is designed to help the Designer select an appropriate frame for their given geometry and loading. Only minimum inputs are required for the software to select an appropriate frame for the available space. Based on input geometry, the Strong Frame Selector software will narrow down from the more than 500 available stock frames to a handful of possible solutions. It can also help with custom frame designs. Download your free copy at **strongtie.com/strongframe**.

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Steel Strong-Wall® Shearwall

Working with specifiers, builders and contractors has given Simpson Strong-Tie insight into the needs of the various players in the design and construction process. This insight has enabled Simpson Strong-Tie to design a composite shearwall that features some of the highest allowable loads in the industry while offering the easiest and fastest installation: The Steel Strong-Wall shearwall.

Code Listed
New ICC-ES ESR-1679 code report evaluated to the 2015 IRC/IBC

Less Labor = Increased Production
Fewer anchor bolts and fasteners coupled with easy access to the top and bottom of the wall result in more efficient installation

Easier for All Trades
An easy-to-use anchor-bolt template for concrete contractors, available pre-attached CFS studs and predrilled holes where electricians need them for wiring

Support and Service
Simpson Strong-Tie provides the best engineering technical support and experienced field representation available

The Steel Strong-Wall product line has grown to address more applications:

- Standard installations on concrete
- Garage portal system
- Anchorage solutions
- Raised floor solutions
- Two-story stacked shearwalls
- Cold-formed steel applications

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Steel Strong-Wall® Cold-Formed Steel on Concrete Foundations

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

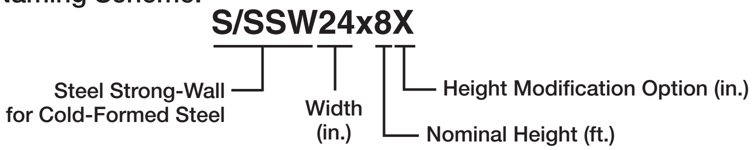
Material: Vertical Panel — 118 mil (10 ga.)

Finish: Vertical Panel — Galvanized
Top and Base Plates — Simpson Strong-Tie® gray paint (cold galvanizing available, contact Simpson Strong-Tie)

Notes: For top-of-wall attachment, use ¼" or #14 self-drilling screws (not provided) extended through the connection with three exposed threads minimum. Fill all screw holes.

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

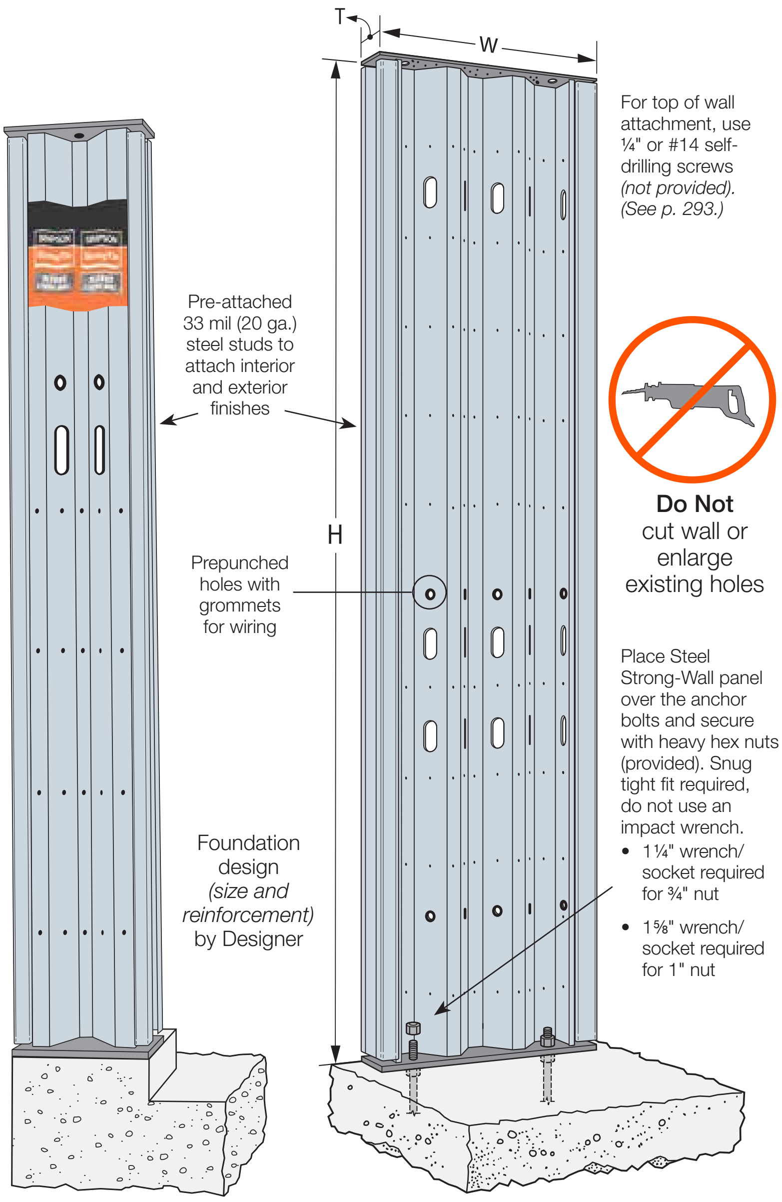
Naming Scheme:



Steel Strong-Wall® for Cold-Formed Steel Product Data

Model No.	Dimensions (in.)			Anchor Bolts		Number of Screws in Top of Wall
	W	H	T	Qty.	Dia.	
S/SSW12x8	12	96⅝	3½	2	¾"	4
S/SSW15x8	15	96⅝	3½	2	1"	6
S/SSW18x8	18	96⅝	3½	2	1"	9
S/SSW21x8	21	96⅝	3½	2	1"	12
S/SSW24x8	24	96⅝	3½	2	1"	14
S/SSW12x9	12	108⅝	3½	2	¾"	4
S/SSW15x9	15	108⅝	3½	2	1"	6
S/SSW18x9	18	108⅝	3½	2	1"	9
S/SSW21x9	21	108⅝	3½	2	1"	12
S/SSW24x9	24	108⅝	3½	2	1"	14
S/SSW15x10	15	120⅝	3½	2	1"	6
S/SSW18x10	18	120⅝	3½	2	1"	9
S/SSW21x10	21	120⅝	3½	2	1"	12
S/SSW24x10	24	120⅝	3½	2	1"	14

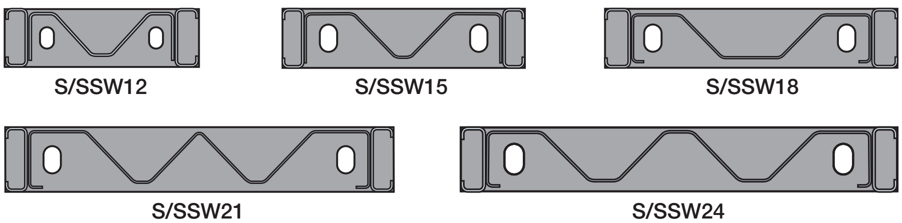
1. S/SSW models may be ordered in custom heights. To order, add "X" to model and specify height (example: S/SSW12x8X, H = 95").



S/SSW12x8
U.S. Patent 8,281,551
Canadian Patent 2,489,845

S/SSW24x10
U.S. Patent 8,281,551
Canadian Patent 2,489,845

Wall Profiles



Lateral Systems

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2015 International Building Code®

S/SSW Model	Max. H (in.)	Allowable Axial Load (lb.)	Seismic[2]			Wind		
			Allowable ASD Shear Load V (lb.)	Drift at Allowable Shear (in.)	Anchor Tension at Allowable Shear[6] (lb.)	Allowable ASD Shear Load V (lb.)	Drift at Allowable Shear (in.)	Anchor Tension at Allowable Shear[6] (lb.)
S/SSW12x8	96⅝	1,000	645	0.42	7,710	820	0.54	10,360
		4,000	645	0.42	7,710	775	0.51	9,640
		7,500	610	0.40	7,220	610	0.40	7,220
S/SSW15x8	96⅝	1,000	1,280	0.42	12,390	1,415	0.47	14,090
		4,000	1,250	0.41	12,025	1,250	0.41	12,025
		7,500	1,070	0.35	9,955	1,070	0.35	9,955
S/SSW18x8	96⅝	1,000	2,140	0.41	16,895	2,785	0.54	24,565
		4,000	2,140	0.41	16,895	2,680	0.52	23,130
		7,500	2,140	0.41	16,895	2,460	0.48	20,400
S/SSW21x8	96⅝	1,000	3,265	0.41	21,905	3,870	0.48	27,930
		4,000	3,265	0.41	21,905	3,765	0.47	26,790
		7,500	3,265	0.41	21,905	3,460	0.43	23,715
S/SSW24x8	96⅝	1,000	4,540	0.39	26,335	4,985	0.43	30,045
		4,000	4,540	0.39	26,335	4,890	0.42	29,220
		7,500	4,540	0.39	26,335	4,555	0.39	26,455
S/SSW12x9	108⅝	1,000	545	0.48	7,255	695	0.61	9,735
		4,000	545	0.48	7,255	605	0.53	8,210
		7,500	445	0.39	5,755	445	0.39	5,755
S/SSW15x9	108⅝	1,000	1,090	0.48	11,725	1,180	0.52	12,955
		4,000	1,025	0.45	10,875	1,025	0.45	10,875
		7,500	850	0.37	8,720	850	0.37	8,720
S/SSW18x9	108⅝	1,000	1,835	0.47	16,105	2,365	0.61	22,835
		4,000	1,835	0.47	16,105	2,365	0.61	22,835
		7,500	1,835	0.47	16,105	2,150	0.55	19,890
S/SSW21x9	108⅝	1,000	2,800	0.46	20,855	3,275	0.54	25,900
		4,000	2,800	0.46	20,855	3,025	0.50	23,140
		7,500	2,735	0.45	20,220	2,735	0.45	20,220
S/SSW24x9	108⅝	1,000	4,005	0.46	26,025	4,220	0.48	27,970
		4,000	3,950	0.45	25,540	3,950	0.45	25,540
		7,500	3,630	0.41	22,855	3,630	0.41	22855
S/SSW15x10	120⅝	1,000	945	0.53	11,185	990	0.56	11,845
		4,000	835	0.47	9,645	835	0.47	9,645
		7,500	665	0.37	7,425	665	0.37	7,425
S/SSW18x10	120⅝	1,000	1,605	0.53	15,515	2,045	0.67	21490
		4,000	1,605	0.53	15,515	1,960	0.64	20,225
		7,500	1,605	0.53	15,515	1,715	0.56	16,890
S/SSW21x10	120⅝	1,000	2,440	0.52	19,970	2,650	0.56	22,275
		4,000	2,405	0.51	19,600	2,405	0.51	19,600
		7,500	2,120	0.45	16,730	2,120	0.45	16,730
S/SSW24x10	120⅝	1,000	3,425	0.50	24,275	3,425	0.50	24,275
		4,000	3,160	0.46	21,875	3,160	0.46	21,875
		7,500	2,855	0.42	19,275	2,855	0.42	19,275

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

1. Allowable shear loads and anchor tension forces are applicable to installation on concrete with minimum f'_c = 2,500 psi using the ASD basic (Section 1605.3.1) or the alternative basic (Section 1605.3.2) load combinations. Load values include evaluation of bearing stresses.
2. For seismic designs based on the 2015 IBC using R = 6.5. For other codes, use the seismic coefficients corresponding to light-frame bearing walls with wood structural panels or sheet steel panels.
3. Top-of-wall screws for the S/SSW shall be approved ¼" or #14 self-drilling screws (see p. 142) with a minimum nominal shear strength (P_{SS}) of 2,000 lb. Top of panel shall be connected to a minimum 43 mil (18 ga.) thick steel member typical. S/SSW18 and wider panels up to 97 inches tall require connection to a minimum 54 mil (16 ga.) thick steel member. When connected to a minimum 43 mil (18 ga.) thick steel member, the allowable load shall be limited to 2,720 lb. for S/SSW18, 3,625 lb. for S/SSW21, and 4,230 lb. for S/SSW24.
4. Allowable shear, drift and anchor tension values may be interpolated for intermediate height or axial loads. See example on p. 288.
5. High-strength anchor bolts are required for anchor tension forces exceeding the allowable load for standard-strength bolts tabulated on pp. 296–297. High-strength anchor bolts are required for S/SSW12 when seismic shear X panel height exceeds 61.6k-in. See pp. 296–303. for SSWAB anchor bolt information and anchorage solutions.
6. Tabulated anchor tension loads assume no resisting axial load. For anchor tension loads at design shear values and including the effect of axial load, refer to the Strong-Wall Selector™ software or use the equations on p. 289. Drifts at lower design shear may be linearly reduced.
7. See p. 288 for allowable out-of-plane loads and axial loads.

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Steel Strong-Wall® Cold-Formed Steel on Concrete Foundations

SIMPSON Strong-Tie®

Allowable Out-of-Plane Loads (PSF)[1,3]

Model Width	Axial Load (lb.)[2,4]	Nominal Height of Panel (ft.)		
		8	9	10
12" wide	1,000	195	140	100
	4,000	145	100	70
	7,500	85	50	25
15" wide	1,000	160	125	100
	4,000	130	95	70
	7,500	90	65	45
18" wide	7,500	300	210	155
21" wide	7,500	255	180	130
24" wide	7,500	265	190	135

1. Loads shown are at ASD level in pounds per square foot (psf) of wall with no further increase allowed and are applicable to either the ASD Basic or Alternative 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.

Allowable Axial Loads on Concrete

Model Width	Compression Capacity (lb.) with No Lateral Load[1,2,3]			
	Nominal Height of Panel (ft.)			
	7	8	9	10
12" wide	20,200	16,300	13,700	11,100
15" wide	25,300	21,800	19,200	16,600
18" wide	42,500	36,000	31,400	27,000
21" wide	43,700	35,800	30,300	25,100
24" wide	51,600	42,900	36,900	31,100

1. Allowable compression is lesser of wall-buckling capacity or 2,500 psi uniform concrete bearing.
2. Allowable compression 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. Loads are applicable to either the ASD Basic or Alternative Basic load combinations.

S/SSW Shear Load Interpolation Example

Given:

Seismic, 2,500 psi Concrete

Shear Load = 2,000 lb.

Axial = 4,000 lb.

S/SSW Wall Height Required: 8'–6" = 102"

Interpolate (See table on p. 287):

S/SSW18x8 $V_1 = 2{,}140$ lb., $h_1 = 96\frac{5}{8}$"

S/SSW18x9 $V_2 = 1{,}835$ lb., $h_2 = 108\frac{5}{8}$"

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

$$V_{allow} \left(\frac{2{,}140 \text{ lb.} - 1{,}835 \text{ lb.}}{96\frac{5}{8}" - 108\frac{5}{8}"}\right)(102" - 96\tfrac{5}{8}") + 2{,}140 \text{ lb.} = 2{,}003 \text{ lb.} @ 102"$$

$V_{allow} = 2{,}003$ lb. > 2,000 lb. OK

➡ **Use S/SSW18x9X H = 102"**

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Equations for Calculating Uplift Forces at Base of First-Story Wall

(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 1st-story wall to aid Designers in developing anchorage solutions other than those shown on pp. 296–300.

12 in. wall $$T = \left[11.2f'_c - \sqrt{126f'^2_c - 2.38f'_c(3.44P + Vh)}\right] - \text{P}$$

15 in. wall $$T = \left[14.4f'_c - \sqrt{208f'^2_c - 2.38f'_c(4.63P + Vh)}\right] - \text{P}$$

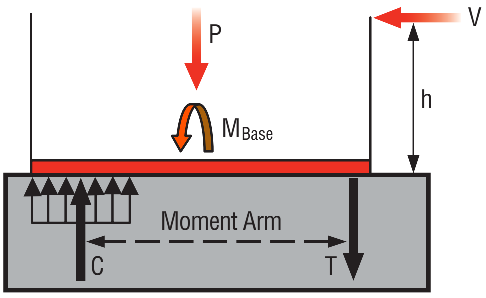
18 in. wall $$T = \left[18.0f'_c - \sqrt{324f'^2_c - 2.38f'_c(6.13P + Vh)}\right] - \text{P}$$

21 in. wall $$T = \left[21.6f'_c - \sqrt{465f'^2_c - 2.38f'_c(7.63P + Vh)}\right] - \text{P}$$

24 in. wall $$T = \left[25.1f'_c - \sqrt{632f'^2_c - 2.38f'_c(9.13P + Vh)}\right] - \text{P}$$

Notes:

1. Equations may be used to calculate uplift forces at the base of first-story walls on concrete foundations.
2. Equations are based on the design methodology contained in AISC Steel Design Guide 1 – Base Plate and Anchor Rod Design, second edition using a rectangular compression stress block.



Forces at Base of Wall

T = Resulting anchorage tension (uplift) force (kips)

V = Design shear (kips)

P = Total vertical load (kips)

h = Wall height (inches)

f'_C = Concrete compressive strength (ksi)

For two-story stacked applications, substitute M_{base} for V_h:

$$Vh = M_{base}\left(\frac{12}{1{,}000}\right)\text{kip-in}$$

Where M_{base} = Design moment at base of wall (ft.-lb.)

EXAMPLE 1 – Single-Story S/SSW

Given:

- S/SSW18x9X wall on 2.5 ksi concrete
- Seismic
- Design Shear (V) = 1.5 kips < 1.835 kips ($V_{allowable}$)
- P (Vertical Load) = 1.0 kip
- h = Wall height = 109"

$$\mathbf{T = \left[18.0\ f'c - \sqrt{324\ f'c^2 - 2.38\ f'c\ (6.13P + Vh)}\right] - P}$$

$$\mathbf{T = \left[18.0\ (2.5) - \sqrt{324\ (2.5)^2 - 2.38\ (2.5)\ (6.13 \times 1 + 1.5 \times 109)}\right] - 1.0 = \underline{\underline{12.1\ kips}}}$$

EXAMPLE 2 – Two-Story Stacked S/SSW Condition

Given:

- See Two-Story Design Example on p. 295
- S/SSW18x9X-STK wall on 2.5 ksi concrete
- Wind
- M_{base} = 17,550 ft.-lb. (Moment at base of two-story stacked wall)
- $Vh = 17{,}550 \times \left(\frac{12}{1{,}000}\right)$ kip-in. = 210.6 kip-in.
- P (Vertical Load) = 2.0 kips

$$\mathbf{T = \left[18.0\ f'c - \sqrt{324\ f'c^2 - 2.38\ f'c\ (6.13P + Vh)}\right] - P}$$

$$\mathbf{T = \left[18.0\ (2.5) - \sqrt{324\ (2.5)^2 - 2.38\ (2.5)\ (6.13 \times 2 + 210.6)}\right] - 2 = \underline{\underline{16.6\ kips}}}$$

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Steel Strong-Wall® Cold-Formed Steel 1st-Story Floor Systems

SIMPSON Strong-Tie®

Steel Strong-Wall panels designed for use on concrete foundations can be used with cold-formed steel floor systems by extending the anchor bolts and installing compression nuts and stud blocking below the wall.

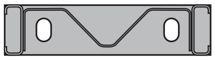
Material and Finish: See p. 286

For product data and naming scheme information, see p. 286.

CFS First-Floor Wall Connection Kit

Wall Width (in.)	Model No.	Contents
12	SSW12-1KT	(1) Shear-transfer plate (with #14 self-drilling screws) (2) ¾" or 1" x 18" threaded rods F1554 Grade 36 (2) Coupler nuts (2) Heavy hex nuts Installation instructions
15	SSW15-1KT	
18	SSW18-1KT	
21	SSW21-1KT	
24	SSW24-1KT	

1. Two heavy hex nuts included with each wall.

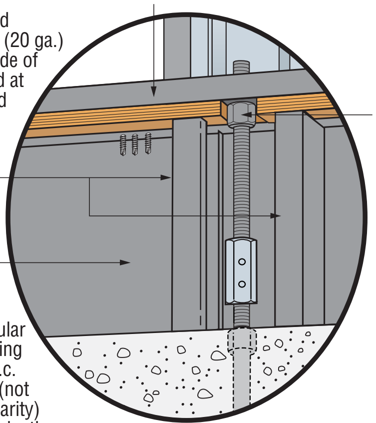


For a complete set of wall profile drawings, see p. 286.

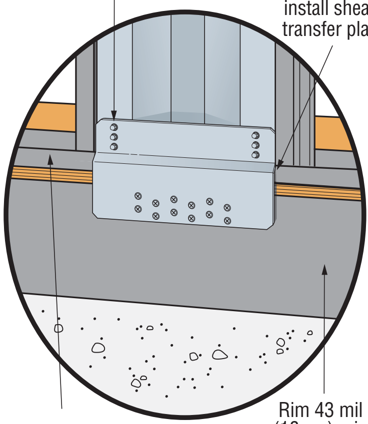
DO NOT cut wall or enlarge existing holes

Shear-Transfer Plate Fasteners for Raised-Floor Applications

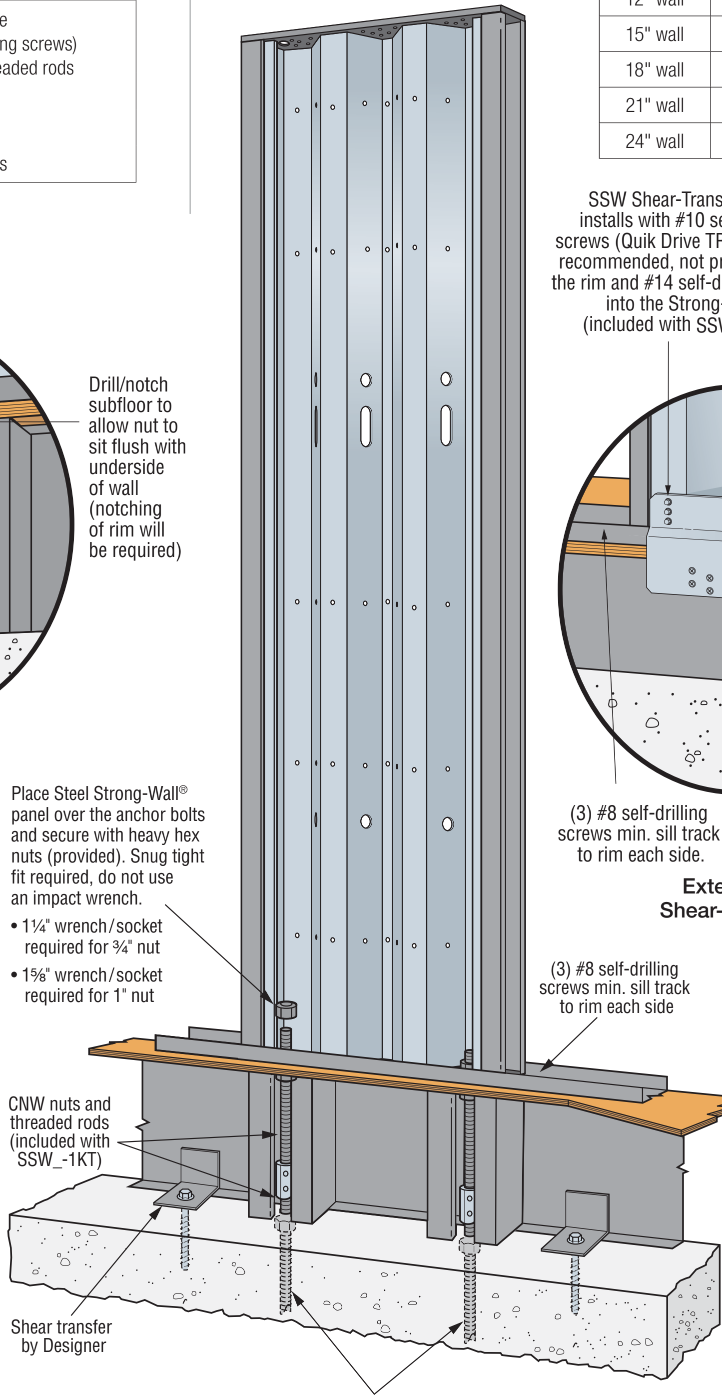
Strong-Wall Width	Fastener #14 Screws	Quantity #10 Screws
12" wall	4	6
15" wall	4	10
18" wall	6	12
21" wall	6	16
24" wall	7	18



Blocking/ Connection Detail

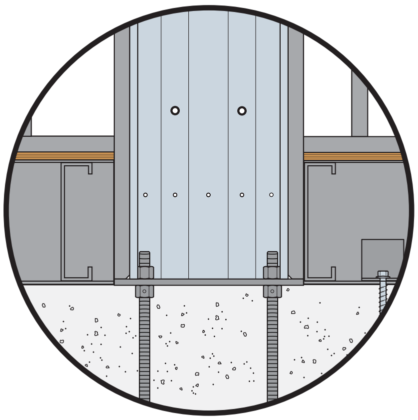


Exterior View of Shear-Transfer Plate



Cold-Formed Steel 1st-Story Floor System

U.S. Patent 8,281,551; Canadian Patent 2,489,845



Alternate 1st-Floor Installation

Specify taller wall model to allow for floor framing and use load values for installation on concrete; see pp. 286–287.

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Steel Strong-Wall® Cold-Formed Steel 1st-Story Floor Systems

2015 International Building Code®

S/SSW Model	Seismic[2]			Wind		
	Allowable ASD Shear Load V (lb.)	Drift at Allowable Shear (in.)	Anchor Tension at Allowable Shear[4] (lb.)	Allowable ASD Shear Load V (lb.)	Drift at Allowable Shear (in.)	Anchor Tension at Allowable Shear[4] (lb.)
S/SSW12x8	435	0.40	6,135	435	0.40	6,135
S/SSW15x8	1,050	0.42	11,010	1,150	0.46	12,060
S/SSW18x8	1,525	0.36	12,075	1,525	0.36	12,075
S/SSW21x8	1,900	0.29	12,085	1,900	0.29	12,085
S/SSW24x8	2,270	0.24	12,065	2,270	0.24	12,065
S/SSW12x9	390	0.47	6,185	390	0.47	6,185
S/SSW15x9	900	0.48	10,605	1,025	0.54	12,080
S/SSW18x9	1,355	0.42	12,055	1,355	0.42	12,055
S/SSW21x9	1,690	0.34	12,080	1,690	0.34	12,080
S/SSW24x9	2,020	0.28	12,065	2,020	0.28	12,065
S/SSW15x10	785	0.53	10,270	925	0.63	12,100
S/SSW18x10	1,220	0.48	12,050	1,220	0.48	12,050
S/SSW21x10	1,520	0.39	12,060	1,520	0.39	12,060
S/SSW24x10	1,820	0.32	12,065	1,820	0.32	12,065

1. Loads are applicable to 1st-Story Cold-Formed Steel Raised-Floor installations supported on concrete or masonry foundations using the ASD basic (Section 1605.3.1) or the alternative basic (Section 1605.3.2) load combinations. Load values include evaluation of anchor rod compression capacity and do not require further evaluation by the Designer.
2. For seismic designs based on the 2015 IBC using R = 6.5. For other codes, use the seismic coefficients corresponding to light-frame bearing walls with wood structural panels or sheet steel panels.
3. Minimum standard-strength anchor bolts required. See pp. 296–303 for SSWAB anchor bolt information and anchorage solutions. Tabulated anchor tension loads assume no resisting axial load. Anchor rod tension at design shear load and including the effect of axial load may be determined using the Strong-Wall Selector™ software or the following equation:
   T = [(V x h) / B] – P/2, where: T = Anchor rod tension load (lb.)
   V = design shear load (lb.)
   h = Strong-Wall® height per page 146 (in.)
   P = applied axial load (lb.)
   B = Anchor bolt centerline dimension (in.)
   (6⅞" for S/SSW12, 9¼" for S/SSW15, 12¼" for S/SSW18, 15¼" for S/SSW21, and 18¼" for S/SSW24)
4. Allowable shear loads assume a maximum first-floor joist depth of 12".
5. Allowable shear loads are based on 1,000 lb. total uniformly distributed axial load acting on the entire panel in combination with the shear load. For allowable shear loads at 2,000 lb. uniformly distributed axial load, multiply table values by 0.92 for S/SSW12x models, and 0.96 for other S/SSW widths.
6. Top-of-wall screws for the S/SSW shall be approved ¼" or #14 self-drilling screws with a minimum nominal shear strength (P_{SS}) of 2,000 lb. Top of panel shall be connected to a minimum 43 mil (18 ga.) thick steel member typical.

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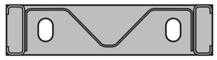
Steel Strong-Wall® Cold-Formed Steel Two-Story Stacked on Concrete Foundation

A complete stacked-wall solution for two-story applications. The Steel Strong-Wall option for two-story cold-formed steel installations combines simplified installation with superior performance.

- Some of the highest loads in the industry, and design procedures that account for cumulative overturning
- Complete concrete anchorage designs for two-story applications (foundation design by Designer)
- No bearing plates to install. Walls can be placed flush against a corner
- Same anchor bolt template as single-story installation
- Compression loads transferred by nut/rod

Material and Finish: See p. 286



For a complete set of wall profile drawings, see p. 286.

Naming Scheme:

Top Wall: **S/SSW18x8**

- S/SSW — Steel Strong-Wall for Cold-Formed Steel
- 18 — Width (in.)
- 8 — Nominal Height (ft.)

Bottom Wall: **S/SSW18x10-STK**

- S/SSW — Steel Strong-Wall for Cold-Formed Steel
- 18 — Width (in.)
- 10 — Nominal Height (ft.)
- STK — Stacked Wall (For bottom walls only)

Cold-Formed Steel Two-Story Stacked-Wall Product Data — Bottom Wall

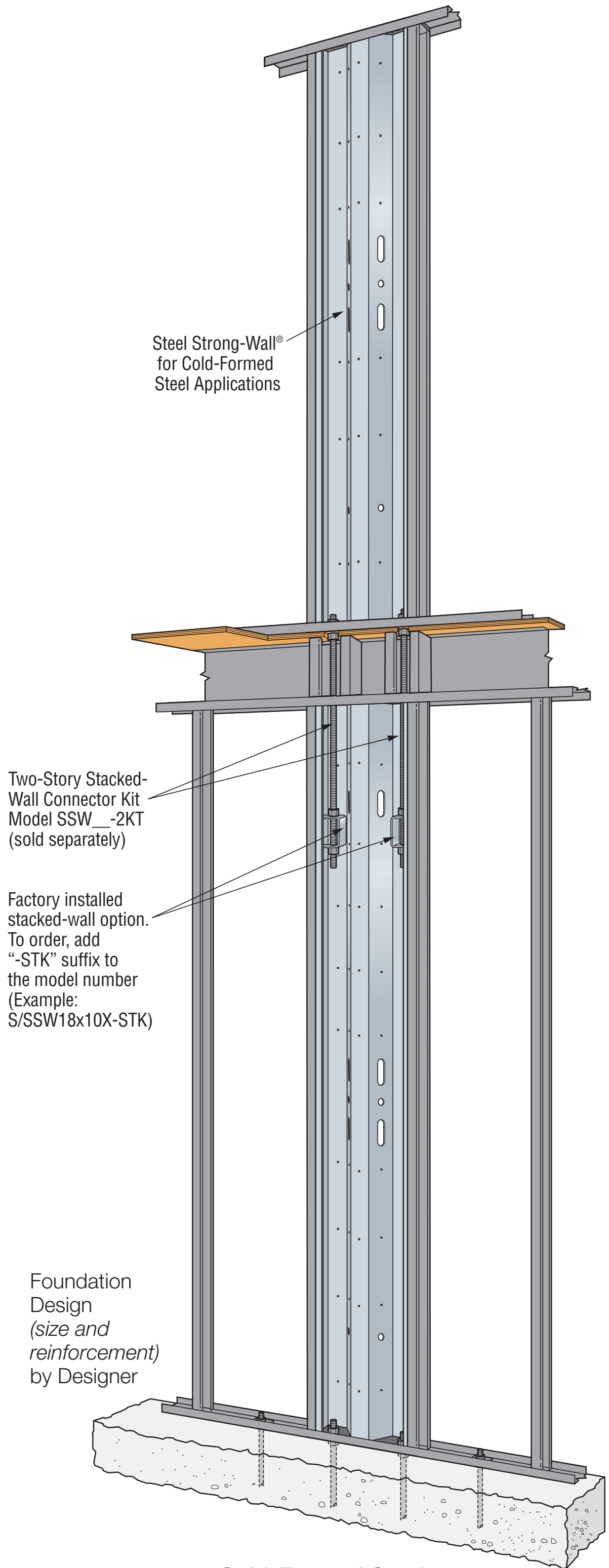
Model No.	Dimensions (in.)			Anchor Bolts		Number of Screws in Top of Wall
	W	H	T	Qty.	Dia.	
S/SSW15x8-STK	15	96⅝	3½	2	1"	6
S/SSW18x8-STK	18	96⅝	3½	2	1"	9
S/SSW21x8-STK	21	96⅝	3½	2	1"	12
S/SSW24x8-STK	24	96⅝	3½	2	1"	14
S/SSW15x9-STK	15	108⅝	3½	2	1"	6
S/SSW18x9-STK	18	108⅝	3½	2	1"	9
S/SSW21x9-STK	21	108⅝	3½	2	1"	12
S/SSW24x9-STK	24	108⅝	3½	2	1"	14
S/SSW15x10-STK	15	120⅝	3½	2	1"	6
S/SSW18x10-STK	18	120⅝	3½	2	1"	9
S/SSW21x10-STK	21	120⅝	3½	2	1"	12
S/SSW24x10-STK	24	120⅝	3½	2	1"	14

1. Specify height when ordering “X-STK” models.
2. See p. 286 for product data on top wall.

Two-Story Stacked-Wall Connection Kit

Wall Width (in.)	Model No.	Contents
15	SSW15-2KT	(1) Shear-transfer plate (with #14 self-drilling screws, included) (2) 1" x 48" threaded rods F1554 Grade 36 (6) Heavy hex nuts Installation instructions
18	SSW18-2KT	
21	SSW21-2KT	
24	SSW24-2KT	

1. Two heavy hex nuts included with each wall.



Cold-Formed Steel Two-Story Stacked on Concrete Foundation

U.S. Patents 8,281,551 and 8,689,518; Canadian Patent 2,489,845

Lateral Systems

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Steel Strong-Wall® Cold-Formed Steel Two-Story Stacked on Concrete Foundation

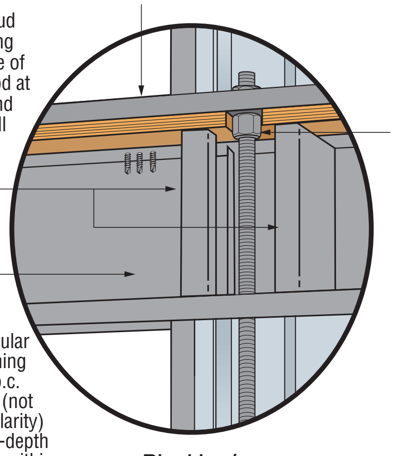
SIMPSON Strong-Tie®

Installation

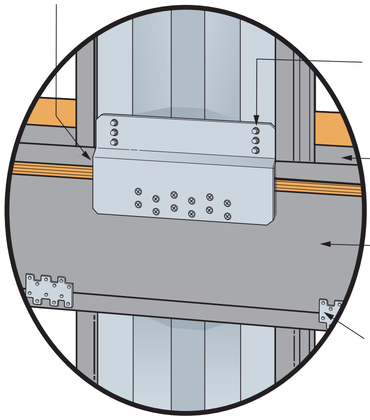
- Do not cut the Steel Strong-Wall or enlarge existing holes. Doing so will compromise the performance of the wall.
- Do not use an impact wrench to tighten nuts on the anchor bolts.
- Drill or notch the subfloor to allow the compression nut to sit flush with the underside of the 2nd-story wall (notching of the rim will be required).

Shear-Transfer Plate Fasteners

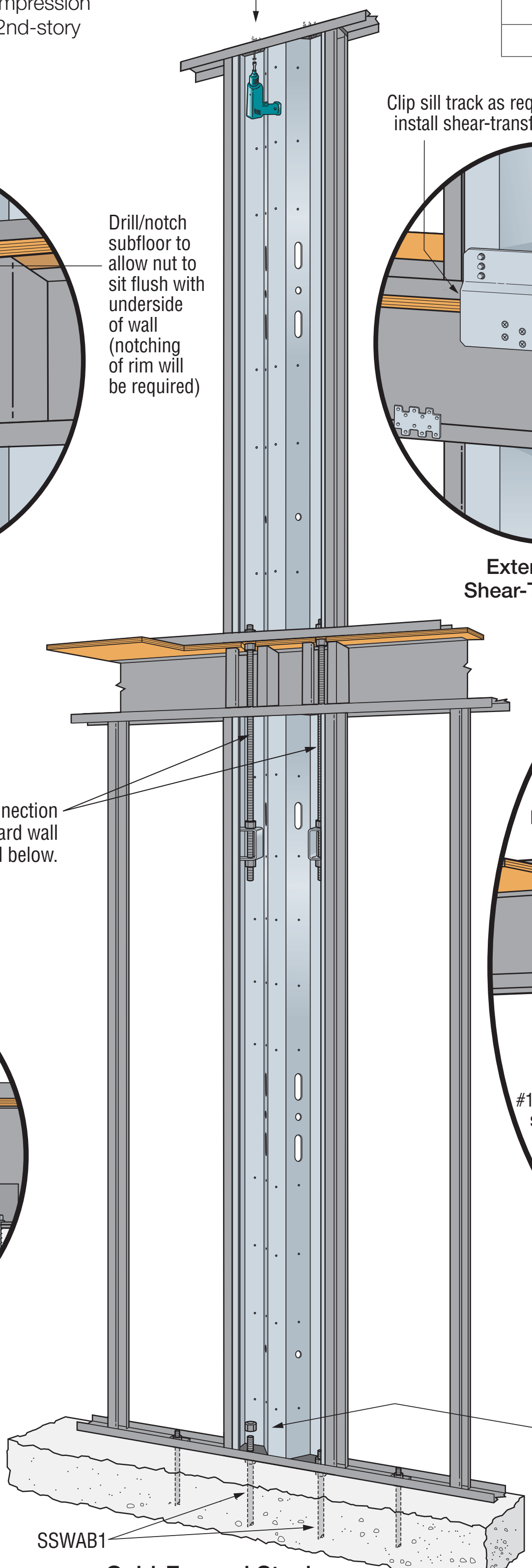
Strong-Wall Width	Fastener Quantity	
	#14 Screws	#10 Screws
15" wall	4	10
18" wall	6	12
21" wall	6	16
24" wall	7	18



Blocking/ Connection Detail

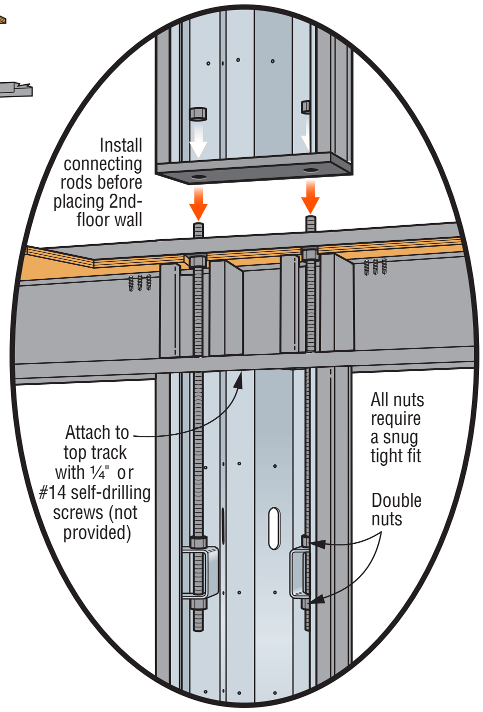


Exterior View of Shear-Transfer Plate

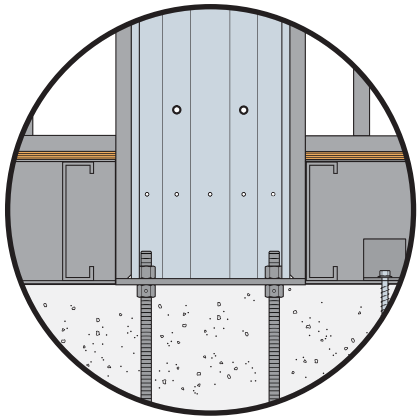


Cold-Formed Steel Two-Story Stacked on Concrete Foundation

U.S. Patents 8,281,551 and 8,689,518; Canadian Patent 2,489,845



Two-Story Stacked-Wall Connection Detail



Alternate 1st-Floor Installation

Specify taller wall model to allow for floor framing and use load values for installation on concrete; see p. 287.

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Steel Strong-Wall® Cold-Formed Steel Two-Story Stacked on Concrete Foundation

SIMPSON Strong-Tie®

Second-Story Walls[6,8]

Second-Story Wall Models	Seismic[2]		Wind	
	Allowable ASD Shear Load V (lb.)	Drift at Allowable Shear (in.)	Allowable ASD Shear Load V (lb.)	Drift at Allowable Shear (in.)
S/SSW15x8	550	0.29	550	0.29
S/SSW18x8	995	0.31	1,275	0.39
S/SSW21x8	1,515	0.30	1,650	0.33
S/SSW24x8	1,970	0.27	1,970	0.27
S/SSW15x9	510	0.35	510	0.35
S/SSW18x9	940	0.38	1,180	0.47
S/SSW21x9	1,435	0.37	1,465	0.38
S/SSW24x9	1,755	0.31	1,755	0.31
S/SSW15x10	475	0.41	475	0.41
S/SSW18x10	890	0.45	1,060	0.54
S/SSW21x10	1,300	0.42	1,300	0.42
S/SSW24x10	1,580	0.36	1,580	0.36

1. Allowable base moment and anchor tension forces are applicable to installation on concrete foundations with minimum f'_c = 2,500 psi using the ASD basic (Section 1605.3.1) or the alternative basic (Section 1605.3.2) load combinations. Load values include evaluation of anchor rod compression at second story and bearing stresses at foundation.
2. For seismic designs based on the 2015 IBC using R = 6.5. For other codes, use the seismic coefficients corresponding to light-frame bearing walls with wood structural panels or sheet steel panels.
3. Two-Story Stacked-Wall installations may consist of any height combination of equal width wall models listed in these tables.
4. Loads are based on a 1,000 lb. maximum uniformly distributed total axial load acting on the second-story panel and a 2,000 lb. maximum uniformly distributed total axial load acting on the first-story panel in combination with the tabulated shear load and base moment.
5. The designer must verify that the cumulative overturning moment at the base of the first-story Steel Strong-Wall does not exceed the allowable base moment capacity. See design example on p. 295 for procedure.
6. The allowable second-story shear loads assume a maximum floor joist depth of 14".
7. Allowable shear, drift and base moment values may be interpolated for intermediate heights.
8. Minimum ASTM F 1554 Grade 36 threaded rods are required at the second-story wall anchorage.
9. High-strength anchor bolts are required at the first-story wall for anchor tension forces exceeding the allowable load for standard strength bolts tabulated on pp. 296–297. See pp. 296–303 for SSWAB anchor bolt information and anchorage solutions.
10. Tabulated anchor tension loads assume no resisting axial load. For anchor tension loads at design shear values and including the effect of axial load, refer to the Strong-Wall Selector software or use the equations on p. 289. Drifts at lower design shear or base moment may be linearly reduced.
11. Top-of-wall screws for the S/SSW shall be approved ¼" or #14 self-drilling screws with a minimum nominal shear strength (P_{SS}) of 2,000 lb. Top of panel shall be connected to a minimum 43 mil (18 ga.) thick steel member typical. First-story S/SSW 24x8-STK requires connection to a minimum 54 mil (16 ga.) thick steel member where the total applied shear load exceeds 4,230 lb.

First-Story Walls on Concrete Foundations[5,9,11]

First-Story Wall Models	Seismic[2]			Wind		
	Allowable ASD Base Moment (ft.-lb.)	Drift at Allowable Base Moment (in.)	Anchor Tension at Allowable Base Moment[10] (lb.)	Allowable ASD Base Moment (ft.-lb.)	Drift at Allowable Base Moment (in.)	Anchor Tension at Allowable Base Moment[10] (lb.)
S/SSW15x8-STK	10,130	0.41	12,065	10,130	0.41	12,065
S/SSW18x8-STK	17,300	0.41	16,895	22,230	0.53	24,075
S/SSW21x8-STK	26,390	0.41	21,905	31,000	0.48	27,545
S/SSW24x8-STK	36,700	0.39	26,335	40,040	0.43	29,770
S/SSW15x9-STK	9,705	0.47	11,440	9,945	0.48	11,790
S/SSW18x9-STK	16,670	0.47	16,110	21,480	0.61	22,835
S/SSW21x9-STK	25,435	0.46	20,855	28,990	0.53	24,950
S/SSW24x9-STK	36,210	0.45	25,860	37,515	0.47	27,145
S/SSW15x10-STK	9,160	0.51	10,665	9,460	0.53	11,090
S/SSW18x10-STK	16,185	0.53	15,515	20,335	0.66	21,060
S/SSW21x10-STK	24,485	0.52	19,845	25,895	0.55	21,355
S/SSW24x10-STK	33,645	0.49	23,460	33,645	0.49	23,460

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Steel Strong-Wall Two-Story Design Example

Example: Cold-Formed Steel Two-Story Wall Design

Given:

Wind, f'_c = 2,500 psi

$V_{2nd\text{-}story\ wall}$ = 650 lb.

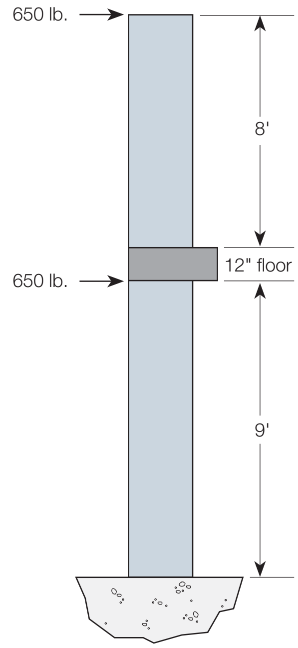
$V_{1st\text{-}story\ wall}$ = 650 lb.

V_{total} = 650 lb. + 650 lb. = 1,300 lb.

M_{allow} = Allowable ASD Base Moment (ft.-lb.)
(See Cold-Formed Steel Two-Story Stacked tables)

V_{allow} = Allowable ASD Shear Load V (lb.)
(See Cold-Formed Steel Two-Story Stacked tables)

Applied Loads



Step 1 — Select First-Story Wall (See tables on p. 294)

M_{base} = (650 lb. x 18 ft.) + (650 lb. x 9 ft.) = 17,550 ft.-lb.

Using First-Story Wall table, select a 9' wall with $M_{allow} \geq M_{base}$

Select S/SSW18x9-STK

M_{allow} = 21,480 ft.-lb. > 17,550 ft.-lb. **OK**

Step 2 — Check Second-Story Wall

Using the Second-Story Wall Table on p. 294, check the capacity of an 8' wall with the same width as the First-Story Wall selected in Step 1:

Select S/SSW18x8

V_{allow} = 1,275 lb. > 650 lb. **OK**

➡ **Use S/SSW18x8 over S/SSW18x9-STK**

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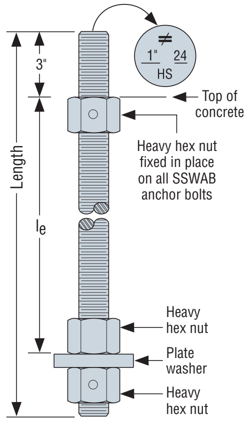
SSWAB Anchor Bolts

SSWAB anchor bolts in ¾" 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 F1554 Grade 36; High-strength (HS) ASTM A449

An additional nut for template installation is provided with each SSWAB. It may also be used for SSW installation.

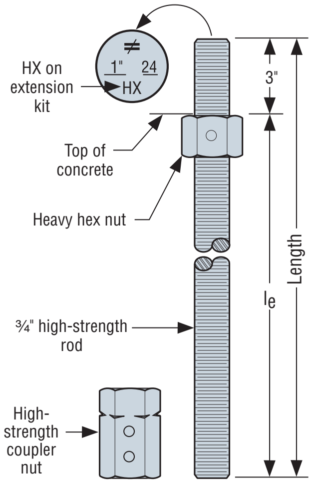


SSWAB

Steel Strong-Wall Width (in.)	Model No.	Dia. (in.)	Total Length (in.)	le (in.)
12" model	SSWAB¾x24	¾	24	19
	SSWAB¾x24HS	¾	24	19
	SSWAB¾x30	¾	30	25
	SSWAB¾x30HS	¾	30	25
	SSWAB¾x36HS	¾	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

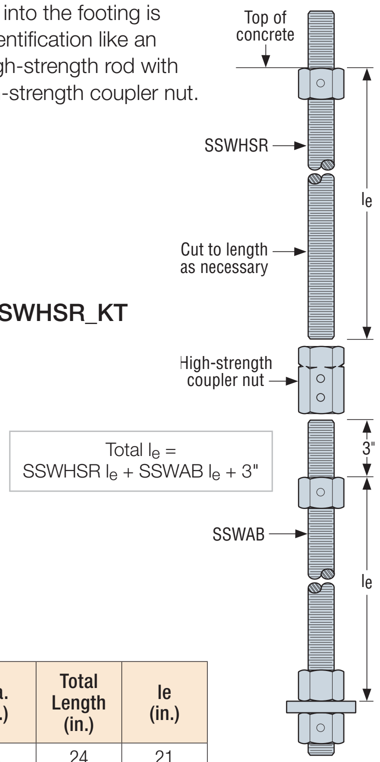
SSWHSR Extension Kit

SSWHSR allows for anchorage in tall stemwall applications where full embedment of an SSWAB into the footing is required. The head is stamped for identification like an SSWAB. Kit includes ASTM A449 high-strength rod with heavy hex nut fixed in place and high-strength coupler nut. Do not use in place of SSWAB.



SSWHSR_KT

Steel Strong-Wall Width (in.)	Model No.	Dia. (in.)	Total Length (in.)	le (in.)
12" model	SSWHSR¾x2KT	¾	24	21
	SSWHSR¾x3KT	¾	36	33
15", 18", 21", 24" models	SSWHSR1x2KT	1	24	21
	SSWHSR1x3KT	1	36	33



SSWHSR and SSWAB Assembly

Steel Strong-Wall Anchorage Solutions — 2,500 psi Concrete[1,2,6]

Design Criteria	Concrete Condition	Anchor Strength[3]	SSWAB ¾" Anchor Bolt ASD Allowable Tension (lb.)	SSWAB ¾" W (in.)	SSWAB ¾" d_e (in.)	SSWAB 1" Anchor Bolt ASD Allowable Tension (lb.)	SSWAB 1" W (in.)	SSWAB 1" d_e (in.)
Seismic[4]	Cracked	Standard	8,800	22	8	16,100	33	11
			9,600	24	8	17,100	35	12
		High strength	18,500	36	12	33,000	51	17
			19,900	38	13	35,300	54	18
	Uncracked	Standard	8,800	19	7	15,700	28	10
			9,600	21	7	17,100	30	10
		High strength	18,300	31	11	32,300	44	15
			19,900	33	11	35,300	47	16
Wind[5]	Cracked	Standard	5,100	14	6	6,200	16	6
			7,400	18	6	11,400	24	8
			9,600	22	8	17,100	32	11
		High strength	11,400	24	8	21,100	36	12
			13,600	27	9	27,300	42	14
			15,900	30	10	31,800	46	16
			19,900	35	12	35,300	50	17
	Uncracked	Standard	5,000	12	6	6,400	14	6
			7,800	16	6	12,500	22	8
			9,600	19	7	17,100	28	10
		High strength	12,500	22	8	21,900	32	11
			14,300	24	8	26,400	36	12
			17,000	27	9	31,500	40	14
			19,900	30	10	35,300	43	15

1. See pp. 299–300 for foundation illustrations showing W and d_e dimensions.
2. Anchorage designs conform to ACI 318-14 with no supplement edge reinforcement and cracked or uncracked concrete as noted.
3. Anchor strength indicates required grade of SSWAB anchor bolt. Standard or high-strength (HS).
4. Seismic indicates Seismic Design Category C through F. Detached one- and two-family dwellings in SDC C may use wind anchorage solutions. Seismic anchorage designs conform to ACI 318-14 Section 17.2.3.4.3.
5. Wind includes Seismic Design Category A&B.
6. Foundation dimensions are for anchorage only. Foundation design (size and reinforcement) by Designer. The registered design professional may specify alternate embedment, footing size or anchor bolt.

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SIMPSON Strong-Tie®

Steel Strong-Wall Anchorage Solutions — 3,500 psi Concrete[1,2,6]

Design Criteria	Concrete Condition	Anchor Strength[3]	SSWAB ¾" Anchor Bolt			SSWAB 1" Anchor Bolt		
			ASD Allowable Tension (lb.)	W (in.)	d_e (in.)	ASD Allowable Tension (lb.)	W (in.)	d_e (in.)
Seismic[4]	Cracked	Standard	9,000	20	7	15,700	29	10
			9,600	21	7	17,100	31	11
		High strength	18,200	32	11	32,900	46	16
			19,900	34	12	35,300	48	16
	Uncracked	Standard	8,800	17	6	15,700	25	9
			9,600	19	7	17,100	27	9
		High strength	18,600	28	10	32,600	40	14
			19,900	30	10	35,300	42	14
Wind[5]	Cracked	Standard	6,000	14	6	7,300	16	6
			7,300	16	6	13,500	24	8
			9,600	20	7	17,100	29	10
		High strength	11,800	22	8	22,700	34	12
			13,500	24	8	27,400	38	13
			17,000	28	10	32,300	42	14
			19,900	32	11	35,300	45	15
	Uncracked	Standard	6,000	12	6	7,500	14	6
			7,500	14	6	12,800	20	7
			9,600	17	6	17,100	25	9
		High strength	12,800	20	7	21,300	28	10
			14,800	22	8	26,000	32	11
			16,900	24	8	31,300	36	12
			19,900	27	9	35,300	39	13

1. See pp. 299–300 for foundation illustrations showing W and d_e dimensions.
2. Anchorage designs conform to ACI 318-14 with no supplement edge reinforcement and cracked or uncracked concrete as noted.
3. Anchor strength indicates required grade of SSWAB anchor bolt. Standard or high-strength (HS).
4. Seismic indicates Seismic Design Category C through F. Detached one- and two-family dwellings in SDC C may use wind anchorage solutions. Seismic anchorage designs conform to ACI 318-14 Section 17.2.3.4.3.
5. Wind includes Seismic Design Category A&B.
6. Foundation dimensions are for anchorage only. Foundation design (size and reinforcement) by Designer. The registered design professional may specify alternate embedment, footing size or anchor bolt.

Steel Strong-Wall Anchorage Solutions — 4,500 psi Concrete[1,2,6]

Design Criteria	Concrete Condition	Anchor Strength[3]	SSWAB ¾" Anchor Bolt			SSWAB 1" Anchor Bolt		
			ASD Allowable Tension (lb.)	W (in.)	d_e (in.)	ASD Allowable Tension (lb.)	W (in.)	d_e (in.)
Seismic[4]	Cracked	Standard	8,700	18	6	16,000	27	9
			9,600	20	7	17,100	29	10
		High strength	17,800	29	10	32,100	42	14
			19,900	32	11	35,300	45	15
	Uncracked	Standard	9,100	16	6	15,700	23	8
			9,600	17	6	17,100	25	9
		High strength	17,800	25	9	32,500	37	13
			19,900	27	9	35,300	39	13
Wind[5]	Cracked	Standard	5,400	12	6	6,800	14	6
			8,300	16	6	11,600	20	7
			9,600	18	6	17,100	26	9
		High strength	11,600	20	7	21,400	30	10
			13,400	22	8	25,800	34	12
			17,300	26	9	31,000	38	13
			19,900	29	10	35,300	42	14
	Uncracked	Standard	6,800	12	6	6,800	12	6
			8,500	14	6	12,400	18	6
			9,600	16	6	17,100	23	8
		High strength	12,400	18	6	21,600	26	9
			14,500	20	7	26,700	30	10
			16,800	22	8	32,200	34	12
			19,900	25	9	35,300	36	12

1. See pp. 299–300 for foundation illustrations showing W and d_e dimensions.
2. Anchorage designs conform to ACI 318-14 with no supplement edge reinforcement and cracked or uncracked concrete as noted.
3. Anchor strength indicates required grade of SSWAB anchor bolt. Standard or high-strength (HS).
4. Seismic indicates Seismic Design Category C through F. Detached one- and two-family dwellings in SDC C may use wind anchorage solutions. Seismic anchorage designs conform to ACI 318-14 Section 17.2.3.4.3.
5. Wind includes Seismic Design Category A&B.
6. Foundation dimensions are for anchorage only. Foundation design (size and reinforcement) by Designer. The registered design professional may specify alternate embedment, footing size or anchor bolt.

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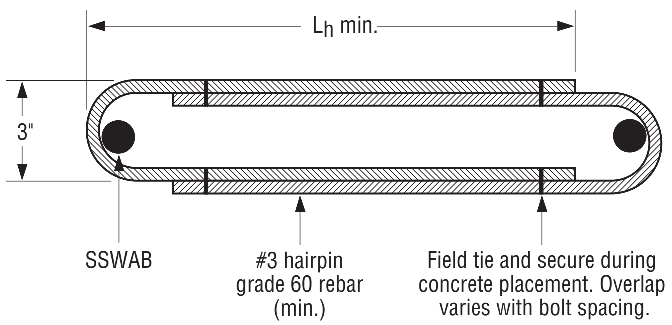
Steel Strong-Wall Shear Anchorage

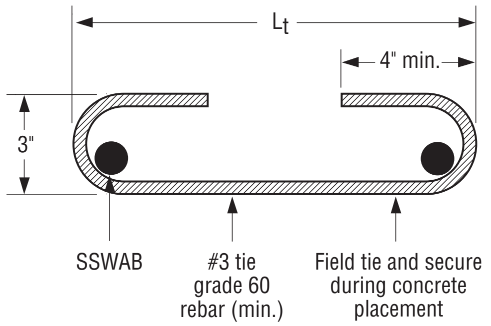
Foundation shear reinforcement to resist shear forces from Strong-Wall® panels located at the edge of concrete is shown in the table below. The S/SSW12 and S/SSW15 used in wind applications do not require shear reinforcement when the panel design shear force is less than the anchorage allowable shear load shown in the table below.

Model No.	L_t or L_h (in.)	Seismic[3]		Wind[4]					
		Shear Reinforcement	Minimum Curb/Stemwall Width (in.)	Shear Reinforcement	Minimum Curb/Stemwall Width (in.)	ASD Allowable Shear Load V[6] (lb.)			
						6" Minimum Curb/Stemwall		8" Minimum Curb/Stemwall	
						Uncracked	Cracked	Uncracked	Cracked
S/SSW12	9	(1) #3 tie	6	See note 6	—	1,230	880	1,440	1,030
S/SSW15	12	(2) #3 ties	6	See note 6	—	1,590	1,135	1,810	1,295
S/SSW18	14	(1) #3 hairpin	8[5]	(1) #3 hairpin	6	Hairpin reinforcement achieves maximum allowable shear load of the Steel Strong-Wall panel.			
S/SSW21	15	(2) #3 hairpins	8[5]	(1) #3 hairpin	6				
S/SSW24	17	(2) #3 hairpins	8[5]	(1) #3 hairpin	6				

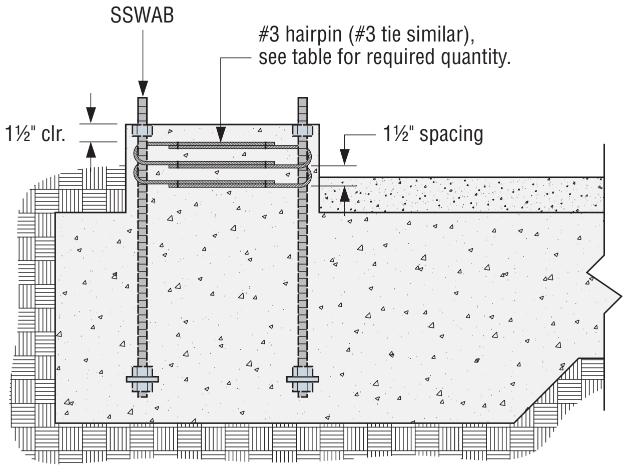
1. Shear anchorage designs conform to ACI 318-14 and assume minimum f'_c = 2,500 psi concrete. See pp. 296–297 for tension anchorage.
2. Shear reinforcement is not required for panels installed on a cold-formed steel floor, interior foundation applications (panel installed away from edge of concrete) or braced-wall panel applications.
3. Seismic indicates Seismic Design Category C through F. Detached 1 and 2 family dwellings in SDC C may use wind anchorage solutions. Seismic shear reinforcement designs conform to ACI 318-14 Section 17.2.3.5.3.
4. Wind includes Seismic Design Category A&B.
5. Where noted, minimum curb/stemwall width is 6" when standard-strength SSWAB is used.
6. Use (1) #3 tie for S/SSW12 and S/SSW15 when the Steel Strong-Wall® panel design shear force exceeds the tabulated anchorage allowable shear load.
7. The registered design professional may specify alternate shear anchorage.



Hairpin Shear Reinforcement



Tie Shear Reinforcement



Hairpin Installation
(garage curb shown, other footing types similar)

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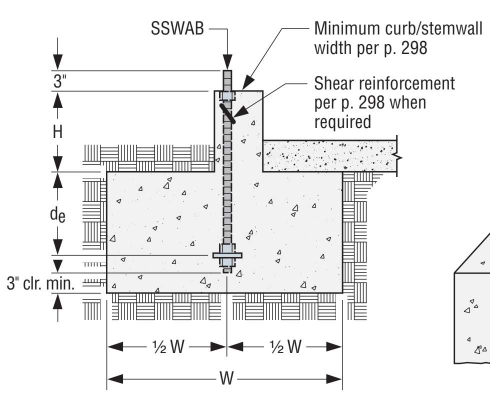
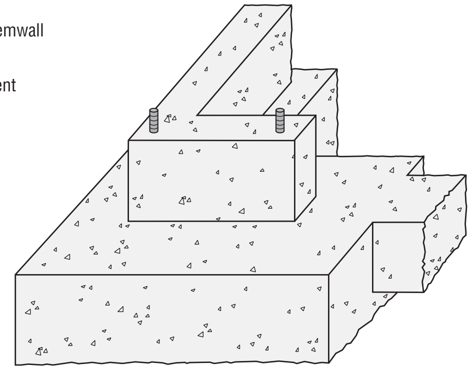
Steel Strong-Wall® Anchorage Solutions

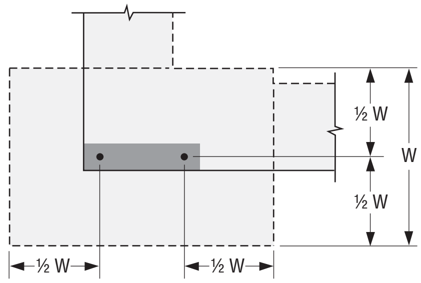
Curb or Stemwall Installation



Curb or Stemwall Section View

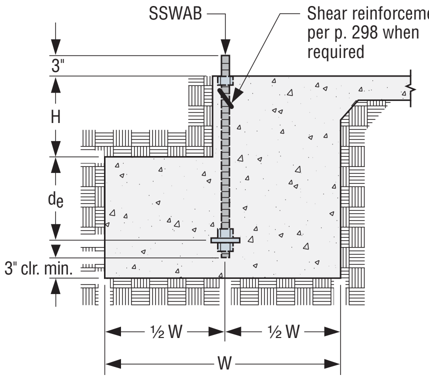


Perspective View
(slab not shown for clarity)

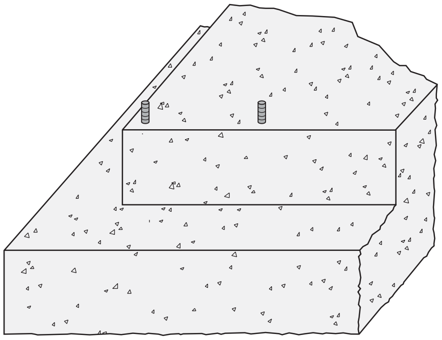


Footing Plan

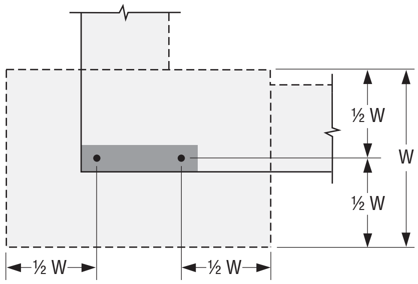
Slab-On-Grade Installation



Slab-on-Grade Section View

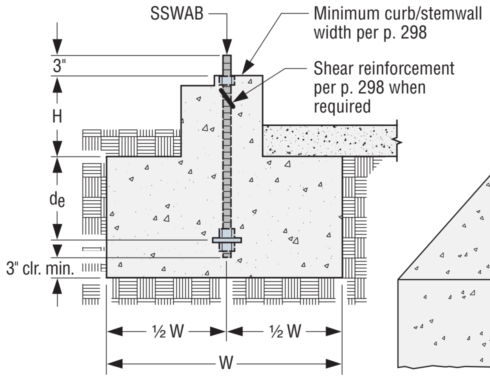


Perspective View

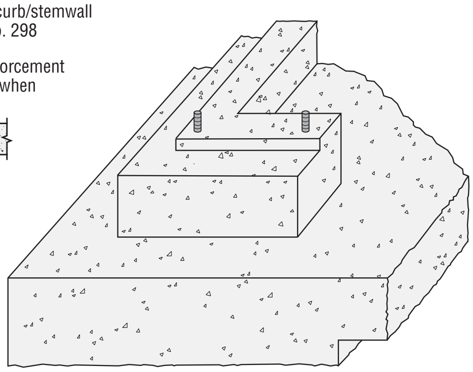


Footing Plan

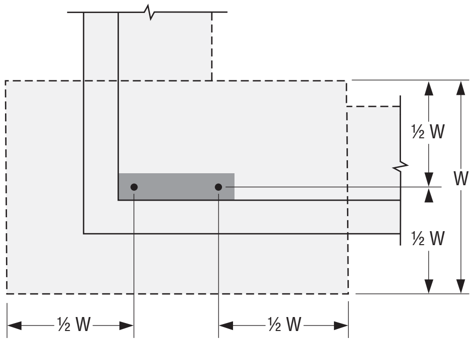
Brick Ledge Installation



Brick Ledge Section View



Perspective View



Footing Plan

Anchorage Solutions General Notes

1. The Designer may specify alternate embedment, footing size or bolt grade.
2. Footing dimensions and rebar requirements are for anchorage only.

Foundation design
(size and reinforcement) by Designer.

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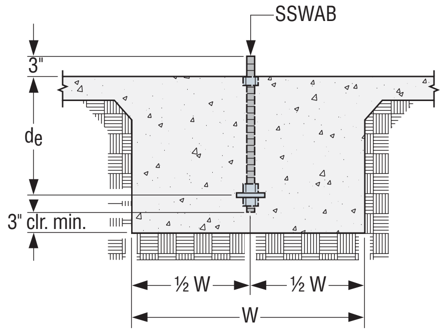
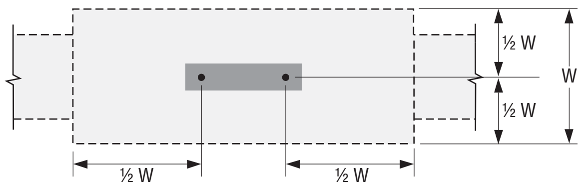
Steel Strong-Wall® Anchorage Solutions

SIMPSON Strong-Tie®

Interior Installation

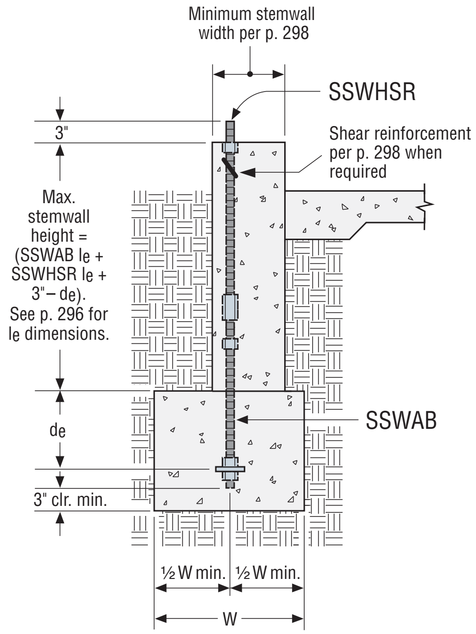


Interior Section View



Footing Plan

Stemwall Extension Installation



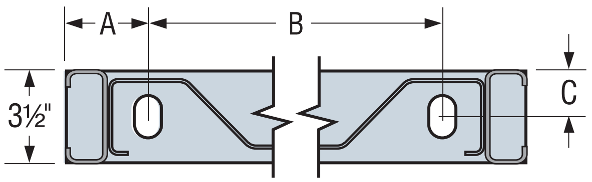
Section at Stemwall SSWAB and SSWHSR Extension Application

Anchorage Solutions General Notes

1. The Designer may specify alternate embedment, footing size or bolt grade.
2. Footing dimensions and rebar requirements are for anchorage only.

Steel Strong-Wall Anchor Bolt Layout

Wall Model	Distance From End of Wall to Center of SSWABs (A)	Distance From Center to Center of SSWABs (B)	Distance From Exterior Face of Wall to Center of All SSWABs (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"



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Steel Strong-Wall® Grade Beam Anchorage Solutions

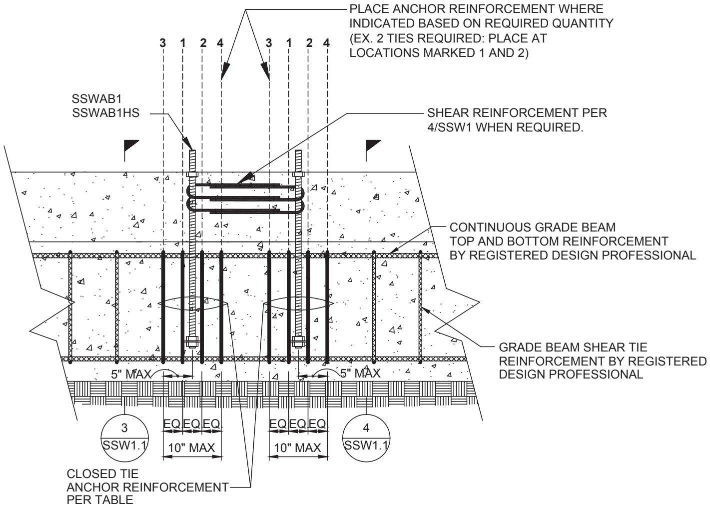
Simpson Strong-Tie now provides grade beam anchorage solutions for the Steel Strong-Wall®, which have been calculated to conform to ACI 318-14. Through funding from the Structural Engineers Association of Northern California, initial testing at Scientific Construction Laboratories Inc. confirmed the need to comply with ACI 318 requirements to prevent plastic hinging at anchor locations. Follow-on testing at the Simpson Strong-Tie Tyrell Gilb Research Laboratory was then used to confirm these findings and validate performance. The testing consisted of specimens with closed tie anchor reinforcement, non-closed u-stirrups and control specimens without anchor reinforcement. Flexural and shear reinforcement were designed to resist amplified anchorage forces and compared to test beams designed for non-amplified strength level forces. The test program has proven the performance of the anchor reinforcement details developed by Simpson Strong-Tie.

Grade Beam Test

Significant Findings From Testing:

Grade beam flexural and shear capacity is critical to anchor performance and must be designed to exceed the demands created by the attached structure. In wind load applications, this demand includes the factored demand from the Steel Strong-Wall (S/SSW) shearwall. In seismic applications, testing and analysis has shown that in order to achieve the anchor performance expected by ACI 318 design methodologies, the concrete member design strength needs to resist the amplified anchor design demand from ACI 318-14 Section 17.2.3.4.3 and ACI 318-11 Appendix D Section D.3.3.4.3. To help designers achieve this, Simpson Strong-Tie recommends Designers apply the seismic design moment listed in the table below at the S/SSW location when evaluating the grade beam design strength under seismic loads. The tabulated moment correlates to the lowest of the anchor tension design limits defined in the sections listed above as they relate to each S/SSW model.

Closed tie anchor reinforcement is critical to maintain the integrity of the reinforced core where the anchor is located. Testing with u-stirrups that did not include complete closed ties showed premature splitting failure of the grade beam.



S/SSW Grade Beam Anchorage Detail

See **strongtie.com** for additional grade-beam anchor reinforcement details and requirements.

Steel Strong-Wall Grade Beam Anchorage Solutions

Steel Strong-Wall Model	Anchor Bolt Model No.	Anchor Diameter (in.)	Anchor Reinforcement for Wind and Seismic		LRFD Applied Seismic Design Moment for Grade Beam Design (ft.-lb.)	
			Standard-Strength SSWAB	High-Strength SSWABHS	Standard-Strength SSWAB	High-Strength SSWABHS
S/SSW12	SSWAB¾	¾	(2) #4 closed ties / wall	(5) #4 closed ties / wall	16,700	23,000
S/SSW15	SSWAB1	1	(4) #4 closed ties / wall	(7) #4 closed ties / wall	37,000	44,000
S/SSW18			(2) #4 closed ties / anchor	(4) #4 closed ties / anchor	48,700	61,000
S/SSW21					60,300	77,000
S/SSW24					72,000	87,000

1. Anchor reinforcement conforms to ACI 318-14, Section 17.4.2.9 and ACI 318-11, Section D.5.2.9. Full-scale testing was used to validate anchor reinforcement configuration and placement.
2. Minimum concrete compressive strength, f'_c = 2,500 psi.
3. Closed tie anchor reinforcement to be ASTM A615 Grade 60 (min.) #4 rebar.
4. Grade beam longitudinal and tie reinforcement shall be specified by the registered design professional for flexure and shear loading. Design should consider project specific design loads and allowable soil pressure.
5. Simpson Strong-Tie recommends using the tabulated minimum LRFD-applied seismic design moment to ensure grade-beam design flexure and shear strength is adequate to prevent plastic hinge formation under demands associated with anchorage forces corresponding to ACI 318-14, Section 17.2.3.4.3 and ACI 318-11, Section D.3.3.4.3.
6. Designer may use reduced moment due to applied S/SSW lateral load. Minimum moment shall be the lesser of the tabulated moment or the amplified LRFD design moment for seismic: (ASD Shear/0.7) x Ω_o x S/SSW height for grade-beam design.
7. Minimum grade beam design moment for wind and seismic in Seismic Design Category A and B and detached one- and two-family dwellings in SDC C: (ASD Shear/0.6) x S/SSW height.
8. Closed tie may be single-piece hoop or two-piece assembly with a u-stirrup with 135° hooks and a top-cross tie cap.
9. Closed-tie anchor reinforcement quantity is per wall for the 12"- and 15"-wall models, and per anchor for the 18", 21" and 24" models.

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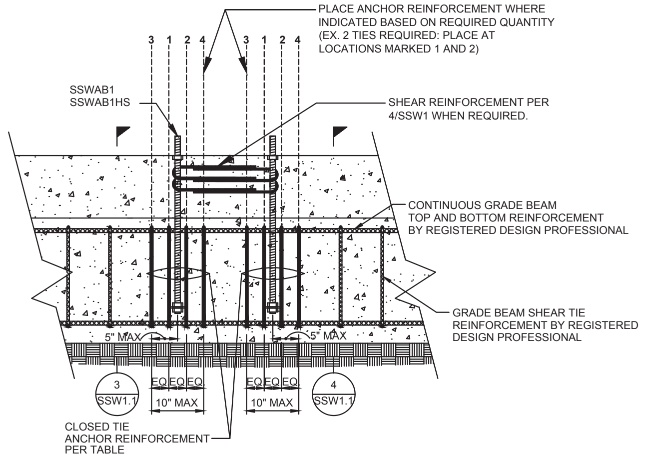
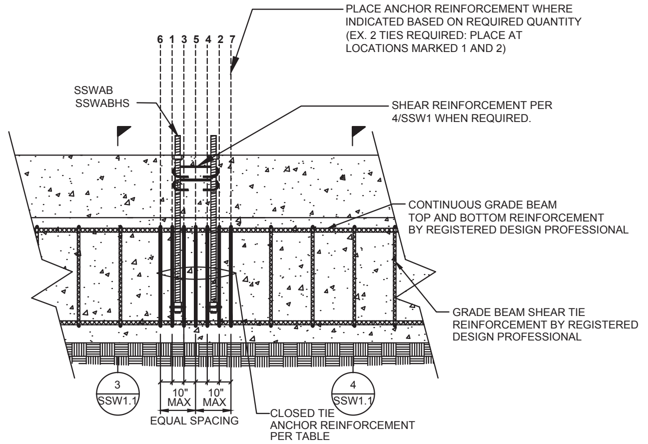
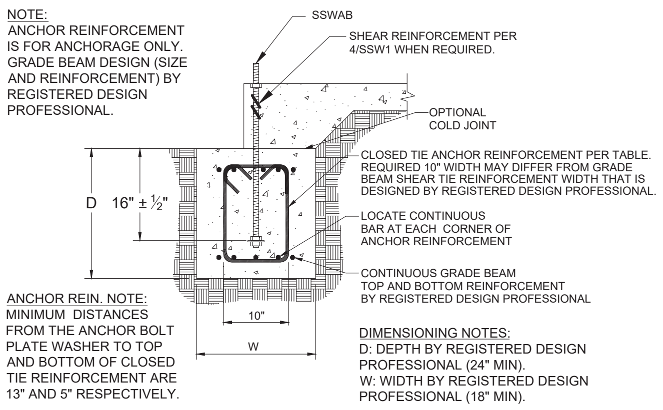
Steel Strong-Wall® Anchorage Details



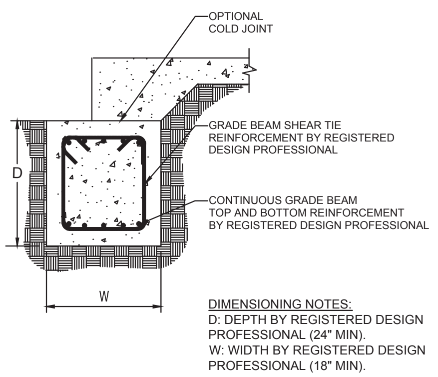
GRADE BEAM ELEVATION AT 18", 21" AND 24" WALL MODELS | 1/SSW1.1



GRADE BEAM ELEVATION AT 12" AND 15" WALL MODELS | 2/SSW1.1



GRADE BEAM SECTION AT ANCHOR REINFORCEMENT | 3/SSW1.1



GRADE BEAM SECTION AWAY FROM ANCHOR REINFORCEMENT | 4/SSW1.1

SSW GRADE BEAM ANCHOR REINFORCEMENT

STEEL STRONG-WALL WIDTH (in.)	ANCHOR MODEL NO.	ANCHOR DIAMETER (in.)	ANCHOR REINFORCEMENT FOR WIND AND SEISMIC [3,8,9]		LRFD APPLIED DESIGN SEISMIC MOMENT (ft.-lb.) [4,5,6,7]	
			STANDARD STRENGTH SSWAB	HIGH STRENGTH (HS) SSWAB	STANDARD STRENGTH SSWAB	HIGH STRENGTH (HS) SSWAB
12" MODEL	SSWAB3/4 SSWAB3/4HS	3/4	2- #4 CLOSED TIES PER 2/SSW1.1	5- #4 CLOSED TIES PER 2/SSW1.1	16,700	23,000
15" MODEL	SSWAB1 SSWAB1HS	1	4- #4 CLOSED TIES PER 2/SSW1.1	7- #4 CLOSED TIES PER 2/SSW1.1	37,000	44,000
18" MODEL			2- #4 CLOSED TIES PER 1/SSW1.1	4- #4 CLOSED TIES PER 1/SSW1.1	48,700	61,000
21" MODEL					60,300	77,000
24" MODEL					72,000	87,000

NOTES:
1. ANCHOR REINFORCEMENT CONFORMS TO ACI 318-14 SECTION 17.4.2.9 AND ACI 318-11 SECTION D.5.2.9 AND PERFORMANCE WAS VALIDATED THROUGH FULL SCALE TESTING.
2. MINIMUM CONCRETE COMPRESSIVE STRENGTH, f'c = 2,500 psi.
3. CLOSED TIE ANCHOR REINFORCEMENT TO BE ASTM A615 GRADE 60 (MIN) #4 REBAR.
4. GRADE BEAM LONGITUDINAL AND TIE REINFORCEMENT SHALL BE SPECIFIED BY THE REGISTERED DESIGN PROFESSIONAL FOR FLEXURE AND SHEAR LOADING. DESIGN SHOULD CONSIDER PROJECT SPECIFIC DESIGN LOADS AND ALLOWABLE SOIL PRESSURE.
5. SIMPSON STRONG-TIE RECOMMENDS USING THE TABULATED MINIMUM LRFD APPLIED SEISMIC DESIGN MOMENT TO ENSURE GRADE BEAM DESIGN FLEXURE AND SHEAR STRENGTH IS ADEQUATE TO PREVENT PLASTIC HINGE FORMATION UNDER DEMANDS ASSOCIATED WITH ANCHORAGE FORCES CORRESPONDING TO ACI 318-14 SECTION 17.2.3.4.3 AND ACI 318-11 SECTION D.3.3.4.3.
6. DESIGNER MAY USE REDUCED MOMENT DUE TO APPLIED SSW LATERAL LOAD. MINIMUM MOMENT SHALL BE THE LESSER OF THE TABULATED MOMENT OR THE AMPLIFIED LRFD DESIGN MOMENT FOR SEISMIC: (ASD SHEAR/0.7) x Ωo x SSW HEIGHT FOR GRADE BEAM DESIGN.
7. MINIMUM GRADE BEAM DESIGN MOMENT FOR WIND AND SEISMIC IN SEISMIC DESIGN CATEGORY A AND B AND DETACHED 1 AND 2 FAMILY DWELLINGS IN SDC C: (ASD SHEAR/0.6) x SSW HEIGHT.
8. CLOSED TIE MAY BE SINGLE PIECE HOOP OR TWO PIECE ASSEMBLY WITH A U-STIRRUP WITH STANDARD 135 DEGREE HOOKS AND A TOP CROSS TIE CAP. SEE DETAIL 6/SSW1.1.
9. SEE DETAILS FOR GRADE BEAM ANCHOR REINFORCEMENT PLACEMENT, INSTALLATION AND SPACING REQUIREMENTS. CLOSED TIE ANCHOR REINFORCEMENT QUANTITY IS PER WALL FOR THE 12" AND 15" WALL MODELS, AND PER ANCHOR FOR THE 18", 21" AND 24" MODELS.

SSWAB ANCHOR GRADE BEAM REINFORCEMENT AND DESIGN MOMENTS | 5/SSW1.1

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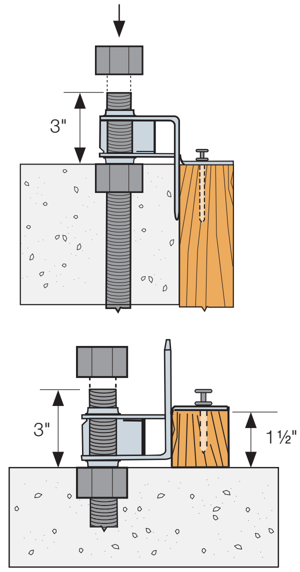
Steel Strong-Wall® Anchor Bolt Templates

Simpson Strong-Tie now offers anchor bolt stabilizers that may be used with all anchor template models. The bolt stabilizer enables the Steel Strong-Wall anchorage to be installed without being tied to the footing rebar cage by helping to eliminate movement of the anchor bolts during concrete placement. Two bolt stabilizers are used for each SSW anchor assembly; one at the embedded plate washer and the other above the template. Half-inch-diameter dowels (not supplied) are then driven down through the bolt stabilizers and into the ground to ensure plumb installation of the anchors and prevent movement during concrete placement. Immediately following concrete placement, the dowels are removed and reused in other locations.

An additional nut for template installation is provided with each SSWAB. It may also be used for SSW installation.

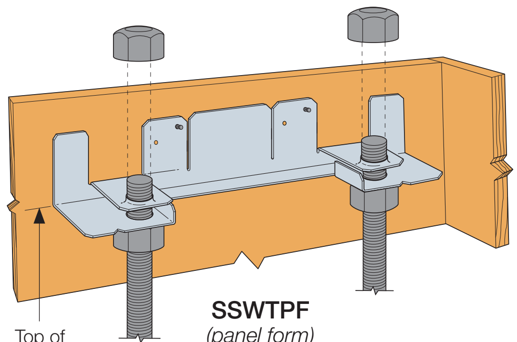


Anchor Bolt Height

Steel Strong-Wall Anchor Bolt Templates

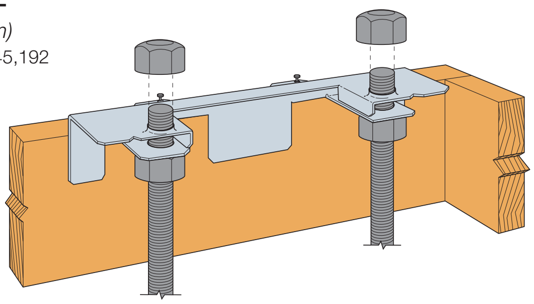
Steel Strong-Wall Model	Width (in.)	Anchor Bolt Stabilizer Model	Steel Strong-Wall Template Model			
			Reversible	Panel Form	Brick Ledge	Extended Leg
S/SSW12	12	SSWBS12	SSWT12	SSWTPF12	SSWTBL12	SSWTEL12
S/SSW15	15	SSWBS15	SSWT15	SSWTPF15	SSWTBL15	SSWTEL15
S/SSW18	18	SSWBS18	SSWT18	SSWTPF18	SSWTBL18	SSWTEL18
S/SSW21	21	SSWBS21	SSWT21	SSWTPF21	SSWTBL21	SSWTEL21
S/SSW24	24	SSWBS24	SSWT24	SSWTPF24	SSWTBL24	SSWTEL24

1. The height of the garage curb above the garage slab is critical for rough header opening at garage return walls.
2. Templates are recommended and are required in some jurisdictions.
3. Foundation design by Designer.
4. Reversible, panel form and bridge ledge templates are the same for 4" or 6" thick walls.

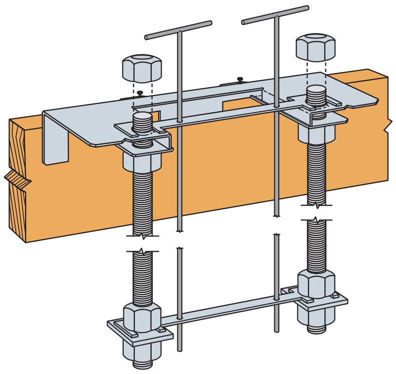


SSWTPF
(panel form)
U.S. Patent 7,445,192

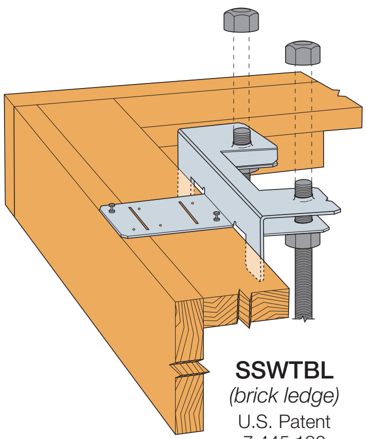
*SSWT templates are reversible. Use the same template for interior or exterior applications.



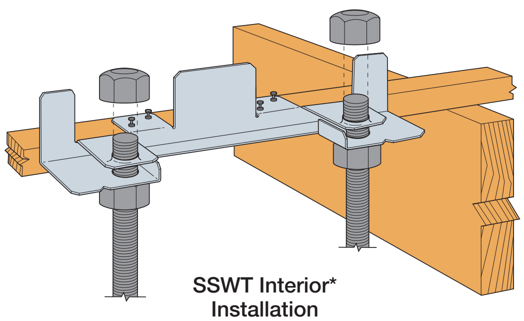
SSWT Exterior Installation*
(may be used for steel form systems)
U.S. Patent 7,445,192



SSWTEL with Anchor Bolt Stabilizers
(extended leg)
Allows for placement of Steel Strong-Wall flush with inside face of 2x6 framed exterior wall
U.S. Patent 7,445,192



SSWTBL
(brick ledge)
U.S. Patent 7,445,192



SSWT Interior* Installation
U.S. Patent 7,445,192

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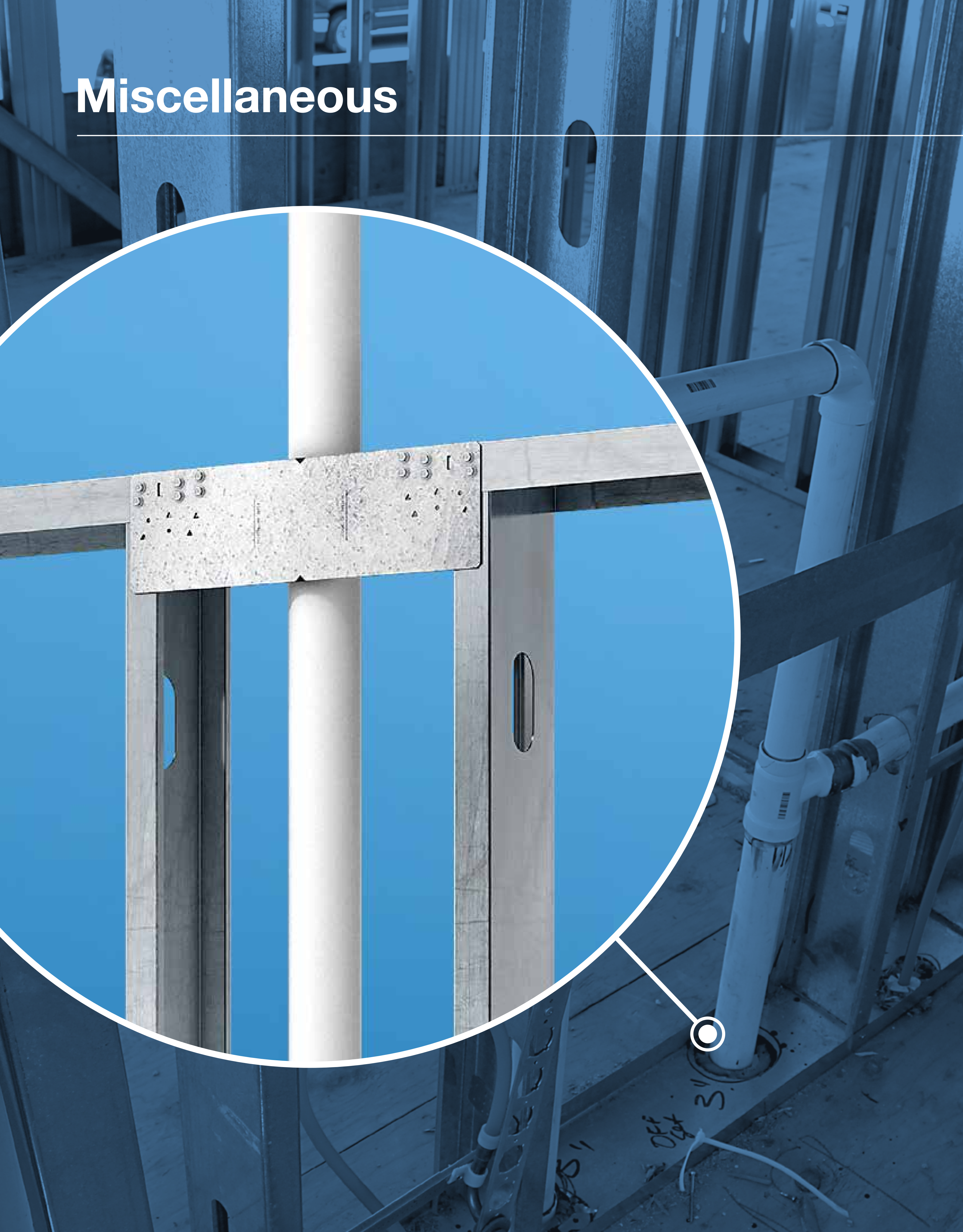
Miscellaneous



LCE Post Cap

The universal design of the LCE4 provides high capacity while eliminating the need for rights and lefts. For use with 3½" to 6" framing members.

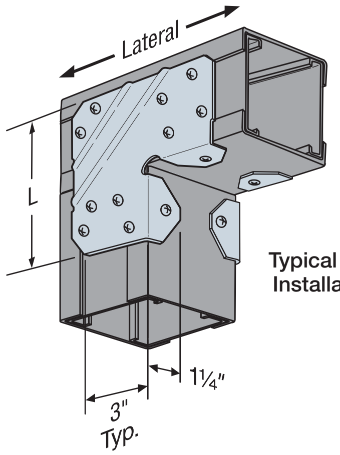
Material: LCE4 — 33 mil (20 ga.)

Finish: Galvanized, ZMAX® coating or stainless steel: see Corrosion Information, pp. 18–21

Installation:

- Use all specified fasteners; see General Notes
- Install in pairs

Codes: See p. 11 for Code Reference Key Chart



Typical LCE Installation

Installation for Cold-Formed Steel Built-Up Column

Note: The Designer is responsible for design of column and beam member.

Model No.	Dimensions (in.)		Fasteners[1] (Total)		Allowable Load (lb.)				Code Ref.
					Uplift		Lateral		
	W	L	Beam	Post	33 mil (20 ga.)	43 mil (18 ga.)	33 mil (20 ga.)	43 mil (18 ga.)	
LCE4	—	5⅜	(14) #10	(10) #10	1,700	2,355	1,420	2,150	170

These products are available with additional corrosion protection. Additional products on this page may also be available with this option. Check with Simpson Strong-Tie for details.

1. See pp. 138 through 171 for more information on Simpson Strong-Tie fasteners.

TP/TPA Tie Plates

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

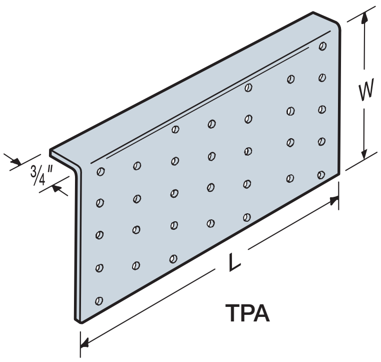
Material: 33 mil (20 ga.)

Finish: Galvanized

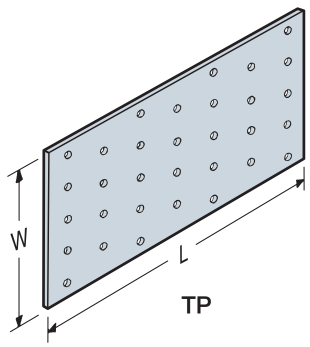
Installation:

- Holes are sized for #8 or #10 screw

Codes: See p. 11 for Code Reference Key Chart



TPA



TP

Model No.	Dimensions (in.)		Number of Nail Holes	Code Ref.
	W	L		
TP15	1 13⁄16	5	13	180
TPA37	3½	7	32	
TPA39	3½	9	41	
TP35	3⅛	5	23	
TP37	3⅛	7	32	
TP39	3⅛	9	41	
TP311	3⅛	11	50	
TP45	4⅛	5	30	
TP47	4⅛	7	42	
TP49	4⅛	9	54	
TP411	4⅛	11	66	
TP57	5⅜	7	60	
TPA57	5	7	49	

1. Connectors are not load rated.

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PSPN Protecting Shield Plate

PSPN58 and PSPN516 protecting shield plate fastener stoppers meet IRC, IBC and the International Plumbing Code. 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® coating

Installation:

- Flatten prongs with hammer as needed
- Use #10 screws

Codes: See p. 11 for Code Reference Key Chart

PSPN516 at top plates

- International Residential Code® — 2006/2009/2012 P2603.2.1
- International Plumbing Code — 2006/2009/2012 305.8

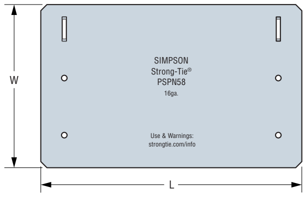
PSPN516 at bottom plate.

- International Plumbing Code — 2006/2009/2012 305.8

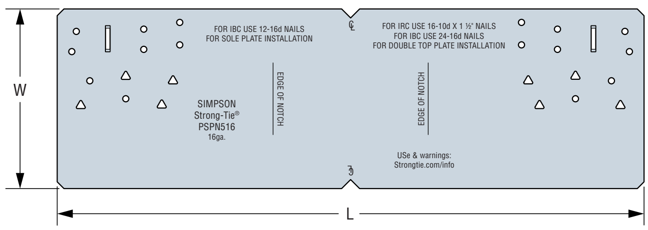
PSPN58 at top plates and bottom plate.

- International Plumbing Code — 2006/2009/2012 305.8

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 (e.g., screws in lieu of nails) to be used for the same condition in a CFS top or bottom track.



PSPN58

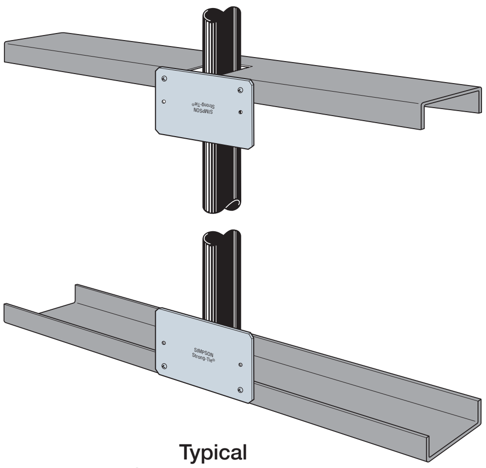


PSPN516

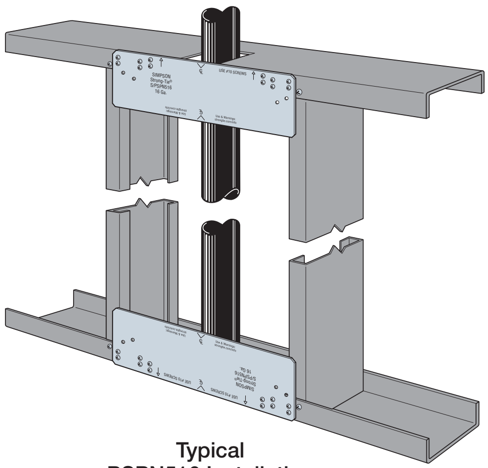
Model No.	W (in.)	L (in.)	Code Ref.
PSPN58	5	8	190
PSPN516	5	$16\frac{5}{16}$	

These products are available with additional corrosion protection. Additional products on this page may also be available with this option. Check with Simpson Strong-Tie for details.

1. #10 self-tapping screws may be used to attach PSPN to CFS framing with quantity determined by Designer.
2. PSPN516 with (6) #10 self-tapping screws each side achieves an allowable shear capacity of 1,060 lb. and 1,580 lb. to 33 mil (20 ga.) track and to 43 mil (18 ga.) track, respectively.



Typical
PSPN58 Installation



Typical
PSPN516 Installation

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PSCL/PSCA Panel Sheathing Clips

Simpson Strong-Tie® panel sheathing clips are used to brace unsupported sheathing edges and provide a ⅛" gap to address shrinkage and expansion of roof sheathing.

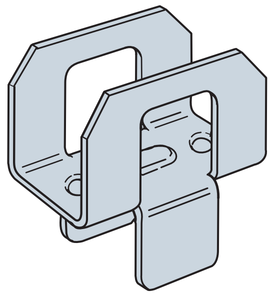
Material: 33 mil (20 ga.)

Finish: Galvanized

Installation:

- Use the same size sheathing clip as the panel thickness
- Maximum spans may be reduced for low slopes or high uniform loads; refer to manufacturer's installation instructions

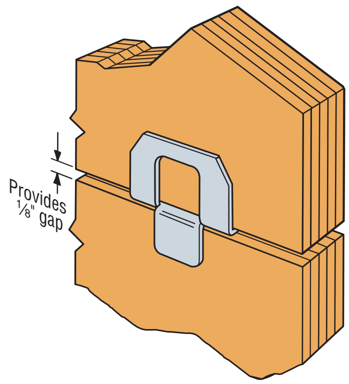
Codes: See p. 11 for Code Reference Key Chart



PSCL
(PSCA similar)

Span Rating	Panel Thickness (in.)	Model No.	Maximum Roof Sheathing Span		No. of Clips Per Span	Code Ref.
			With Clip	Without Clip		
24/0	⅜	PSCL⅜	24	20	1	180
24/16	7⁄16	PSCA7⁄16	24	24	1[2]	
24/16	7⁄16	PSCL7⁄16	24	24	1	
32/16	15⁄32	PSCA15⁄32	32	28	1[2]	
32/16	15⁄32	PSCL15⁄32	32	28	1	
32/16	½	PSCA½	32	28	1[2]	
32/16	½	PSCL½	32	28	1	
40/20	⅝	PSCL⅝	40	32	1	
40/20	19⁄32	PSCL19⁄32	40	32	1	
48/24	¾	PSCL¾	48	36	2	

1. Span rating and Maximum Roof Sheathing Spans are for reference only, refer to 2015 IBC Table 2304.8 (3) for additional important information.
2. Maximum roof sheathing span with single PSCA is 24". For spans > 24" use two PSCAs.



Typical PSCL Installation

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Loads of Anchoring Options

You now have tabulated design values for anchorage. The new SCHA slide-clip connector is designed and tested to accommodate several different methods of anchoring to concrete or steel, which helps you easily account for the buckling capacity of the anchored leg and mitigate risk. The SCHA also features a wider support leg to decrease eccentricity on anchors and provide a variety of anchorage options.

With prepunched holes to accommodate ¼"-diameter Titen HD® concrete screw anchors or 0.157" PDPAT pins for attachment to steel, the SCHA connector is easy to specify and to install. To learn more, call (800) 999-5099 or visit **strongtie.com/scha**.

SIMPSON Strong-Tie®

C-CF-2017 Effective 6/1/2017 Expires 12/31/2019

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