

Fastening Systems

Technical Supplement for Canada

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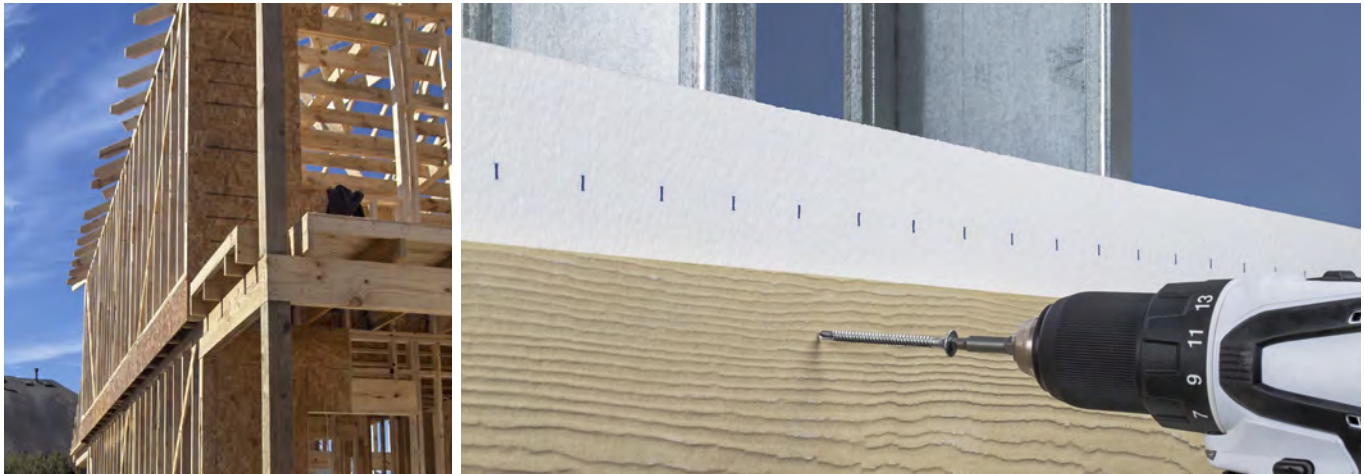
Important Information and General Notes

General Notes

These notes are provided to ensure proper selection and installation of Simpson Strong-Tie Company Inc. products and must be followed carefully.

- a. Simpson Strong-Tie Company Inc. reserves the right to change specifications, designs and models without notice or liability for such changes.
- b. Do not exceed published values, doing so could jeopardize the connection.
- 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 easily and should be evaluated as required. If wood tends to split consider pre-boring holes. See CSA O86-14 and the *CWC Wood Design Manual* for more information.
- d. Fasteners may break if driven into hard materials or if countersunk below the surface of the substrate fastened.
- e. Do not overdrive fasteners. Overdriven fasteners may have a reduction in shear and pull-through capacity.
- f. Use products only in accordance with all instructions.
- g. All specified fasteners must be installed according to the instructions in this catalogue.
- h. There are many choices of fasteners, tools and other products. It is often difficult to determine which type of product is best suited for your application. In some cases, there may be more than one type of product that will work well. The information in this catalogue is intended to guide the Designer toward the product best suited for the specific application, use and environment. The choice of which product to use should be made by a qualified Designer.
- i. All connected members and related elements shall be designed by the Designer.
- j. Select fasteners of a type, size, length, thread, head, coating, material, point and other characteristics suitable for your application, use and environment. Incorrect fastener selection may cause the connection to fail.
- k. If using a fastener from this catalogue with any other Simpson Strong-Tie product, consult the appropriate Simpson Strong-Tie catalogue or strongtie.com for detailed information concerning the other product.
- l. Only use fasteners for their intended purpose as described in this publication. Connection failures can result from inappropriate substitution.
- m. Test drive fasteners to assure fasteners install correctly.
- n. The term “Designer” used throughout this catalogue is intended to mean a licensed/certified building design professional, a licensed professional engineer or licensed architect.
- o. Follow material manufacturer’s installation instructions and fastener recommendations.
- p. Unless otherwise noted, nail “penny size” does not imply specific diameters or load capacities. Design standards must be used in conjunction with fastener material, diameter and length to determine acceptable uses.
- q. Use Quik Drive® tools only with authentic Quik Drive fasteners. Other fasteners will void the warranty and may cause the tool to malfunction and become damaged.
- r. If a Quik Drive product is compatible with a specified tool, do not use the product with any other tool.
- s. Power-driven fasteners may deflect and injure the operator or others. Follow the tool manufacturer’s operating instructions and use appropriate safety equipment.
- t. Choose the proper tool to suit the fastener and applications.
- u. Use proper safety equipment and follow all safety instructions.
- v. Always wear protective eyewear.
- w. With the use of any power or pneumatic tools, follow manufacturer’s safety instructions.
- x. Dissimilar metal combinations should be carefully assessed and avoided if possible.
- y. All carbon steel based fasteners have the potential to corrode and rust.
- z. Some hardened fasteners may have premature failure if exposed to moisture. These fasteners are recommended to be used in interior dry conditions.
- aa. Be aware of special conditions that may increase corrosion risk and select product accordingly.
- ab. Screws made from austenitic stainless steel are generally softer and have less torsional strength than screws made from carbon steel. Simpson Strong-Tie does not assume liability for breakage or damage due to screw breakage during or after installation. Pre-drilling may be necessary in some case. For best results, drive at 2500 RPM or less.
- ac. This catalogue includes all information available as of the effective date of publication. Please consult strongtie.com for current information.

Table of Contents



General Material Safety Data (SDS) Note	4	Strong-Drive® TB WOOD-TO-STEEL Screw	51
General Load Tables	5	Strong-Drive® XE EXTERIOR STRUCTURAL METAL Screw	52
Strong-Drive® SDWS TIMBER Screw	6–13	Strong-Drive® PPSD SHEATHING-TO-CFS Screw	53
Outdoor Accents® Structural Wood Screw	14	Strong-Drive® PHSD FRAMING-TO-CFS Screw	54
Outdoor Accents® Connector Screw	15	Strong-Drive® FPHSD FRAMING-TO-CFS Screw	55
Strong-Drive® SDWS LOG Screw	16	Self-Drilling E Metal Screw	56
Strong-Drive® SDWH TIMBER-HEX Screw	17–22	PC/PCSD Screws	57
Strong-Drive® SDWH TIMBER-HEX HDG Screw	23	Steel-Deck Fastening	58–59
Strong-Drive® SDWH TIMBER-HEX SS Screw	24–25	Strong-Drive® SELF-DRILLING X METAL Screw	60
Fastener Types for Connectors	26–27	Strong-Drive® XL LARGE-HEAD	
Strong-Drive® SDS HEAVY-DUTY CONNECTOR Screw	28–30	and XM MEDIUM-HEAD METAL Screws	61–62
Strong-Drive® SD CONNECTOR Screw	31–33	Steel Deck Diaphragm Calculator	63
Strong-Drive® SCNR RING-SHANK CONNECTOR Nail	34		
Strong-Drive® SCN SMOOTH-SHANK CONNECTOR Nail	35		
Strong-Drive® SDWC TRUSS Screw	36–43		
Strong-Drive® SDW TRUSS-PLY and EWP-PLY Screws	44–49		
Strong-Drive® SDWV SOLE-TO-RIM Screw	50		

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
President,
Chief Executive Officer

General Material Safety Data (SDS) Note

Safety Data Sheets (SDS)

For Fasteners

Simpson Strong-Tie Company Inc. manufactures and sells fasteners, metal connectors and mechanical concrete anchors. Fastener products include and are not limited to nails, screws and staples. For the purpose of hazard communication, fastener products are “Manufactured Articles” as defined in Section 2 of the *Hazardous Products Act*:

“Manufactured Article means any article that is formed to a specific shape or design during manufacture, the intended use of which when in that form is dependent in whole or in part on its shape or design, and that, when being installed, if the intended use of the article requires it to be installed, and under normal conditions of use, will not release or otherwise cause an individual to be exposed to a hazardous product; (*article manufacturé*).”

As Articles, fastener products are exempt from Safety Data Sheet (SDS) requirements under Section 12 and Schedule 1 of the *Hazardous Products Act* and WHMIS 2015. For this reason, Simpson Strong-Tie does not have available MSDS sheets for its fastener products.

This information is current as of the date of this publication and is subject to change without notice. See strongtie.com for possible updates.

General Load Tables

Screw Resistances

Model No.	Screw Size	Nominal Resistance (lb.)		Factored Resistance (lb.)	
		Shear	Tension	Shear	Tension
		P_{SS}	P_{TS}	ϕP_{SS}	ϕP_{TS}
Steel to Steel					
FPHSD34S1016	#10 x ¾"	1710	2215	730	885
FPHSD34S1214	#12 x ¾"	2535	3380	1080	1350
PHSD34S0818	#8 x ¾"	1495	1810	635	770
E1B1414	#14 x 1"	3130	5395	1250	2160
XEQ34B1016	#10 x ¾"	1390	2350	595	1000
Steel Decking					
X1S1016	#10 x 1"	1625	2930	650	1170
X1S1214	#12 x 1"	2525	3750	1010	1500
XMQ114S1224	#12 x 1¼"	3110	4985	1245	1995
XLQ114T1224	#12 x 1¼"	3110	4985	1245	1995
Metal-Roofing Clip to Steel					
PCSD1S1016	#10 x 1"	1705	2380	680	950
PCSD1S1214	#12 x 1"	1760	3180	705	1270
SSPCSD1S1016	#10 x 1"	1892	3045	705	1270
Metal-Roofing Clip to Wood					
PC1BS1012	#10-12 x 1"	1415	2080	565	830
PC1BS1211	#12-11 x 1"	1715	3080	685	1230
Drywall					
DWF114PS	#6 x 1¼"	1255	1575	500	630
DWF158PS	#6 x 1½"	1255	1575	500	630
DWFSDQ114PS	#6 x 1¼"	1260	1720	505	690
DWFSD158PS	#6 x 1½"	1260	1720	505	690
DWFSDQ114PS	#6 x 1¼"	1260	1720	505	690
DWFSD178PS	#6 x 1⅞"	1260	1720	505	690
DWFSD238PS	#8 x 2⅜"	1260	1720	505	690
Wood to Steel					
FHSD114S0818	#8 x 1¼"	1221	1884	490	755
SSFHSD112S1016	#10 x 1½"	2275	3435	910	1375
PPSD11516S0818	#8 x 1⅝"	1565	2160	665	920
TB1445S	#14 x 1¼"	3690	4625	1475	1850
TB1460S	#14 x 2⅜"	3690	4625	1475	1850
TB1475S	#14 x 3"	3690	4625	1475	1850

1. Table based on testing per AISI Standard Test Method S904-08.
2. Resistance Factor (ϕ) is determined per Clause E.4 or Chapter F of CSA S136-12.
3. P_{SS} and P_{TS} are nominal resistances for the screw and are also known as the average (ultimate) values of all tests; determined by independent laboratory testing.

Load Tables, Technical Data and Installation Instructions

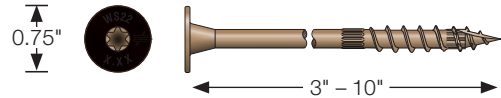
Strong-Drive® SDWS TIMBER Screw

Structural Wood-to-Wood Connections Including Ledgers

Designed to provide an easy-to-install, high-strength alternative to through-bolting and traditional lag screws. The Strong-Drive® SDWS Timber screws are ideal for the contractor and do-it-yourselfer alike.

Double-barrier coating provides corrosion resistance equivalent to hot-dip galvanization, making it suitable for certain exterior and preservative-treated wood applications, as described in the evaluation report.

Codes/Standards: IAPMO-UES ER-192; US Patent 9,523,383



SDWS Timber Screw — Factored Resistances — D.Fir-L Lumber (lb.)

Size Dia. x L (in.)	Model No.	Thread Length TL (in.)	D.Fir-L									Factored Withdrawal Resistance (lb.) (K _D = 1.15)
			Factored Lateral Resistance (lb.) (K _D = 1.00)									
			Wood Side Member Thickness (in.)									
			1.5	2	2.5	3	3.5	4	4.5	6	8	
0.220 x 3	SDWS22300DB	1 ½	340	—	—	—	—	—	—	—	—	485
0.220 x 4	SDWS22400DB	2 ¾	445	455	430	—	—	—	—	—	—	795
0.220 x 5	SDWS22500DB	2 ¾	445	505	540	490	430	—	—	—	—	935
0.220 x 6	SDWS22600DB	2 ¾	460	515	565	565	560	505	445	—	—	935
0.220 x 8	SDWS22800DB	2 ¾	460	515	565	565	565	565	565	505	—	935
0.220 x 10	SDWS221000DB	2 ¾	460	515	565	565	565	565	565	565	505	935

See footnotes below.

SDWS Timber Screw — Factored Resistances — S-P-F Lumber (lb.)

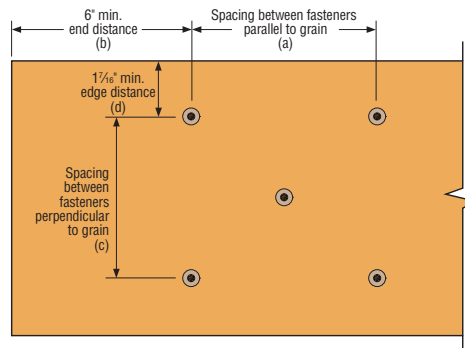
Size Dia. x L (in.)	Model No.	Thread Length TL (in.)	S-P-F									Factored Withdrawal Resistance (lb.) (K _D = 1.15)
			Factored Lateral Resistance (lb.) (K _D = 1.00)									
			Wood Side Member Thickness (in.)									
			1.5	2	2.5	3	3.5	4	4.5	6	8	
0.220 x 3	SDWS22300DB	1 ½	290	—	—	—	—	—	—	—	—	370
0.220 x 4	SDWS22400DB	2 ¾	390	390	380	—	—	—	—	—	—	605
0.220 x 5	SDWS22500DB	2 ¾	395	445	485	430	380	—	—	—	—	620
0.220 x 6	SDWS22600DB	2 ¾	405	455	505	510	495	445	395	—	—	620
0.220 x 8	SDWS22800DB	2 ¾	405	455	505	510	510	510	510	445	—	620
0.220 x 10	SDWS221000DB	2 ¾	405	455	505	510	510	510	510	510	445	620

1. Factored resistances shown have been developed in accordance with 12.11 CSA O86-14 based on testing per ICC-ES AC233. Apply the adjustment factors K_D, K_{SF} and K_T as per 12.11.4.1 when applicable. Do not install in end grain.
2. Factored withdrawal resistances shown are applicable to short-term loads; reduce where other load durations govern.
3. Factored withdrawal resistances shown assume the entire threaded portion of the screw is installed into the main member. Where the penetration into the main member is less than the length of the thread, the factored resistances may be calculated by multiplying the length of penetration of the threads x 355 lb./in. (62 N/mm) for D.Fir-L and 270 lb./in. (47 N/mm) for S-P-F, to a maximum of the tabulated value above.
4. Minimum spacing, edge and end distances shall be in accordance with 12.9.2.1 CSA O86-14 using a diameter value of 0.30". See table below.

Spacing Requirements

Geometry	Minimum Dimensions (in.)	
	D.Fir-L	S-P-F
a = Spacing parallel to grain	6	5
b = End distance parallel to grain	6	6
c = Spacing perpendicular to grain	3	2 ½
d = Edge distance perpendicular to grain	1 ¼	1 ¼

1. Additional screws may be staggered diagonally between rows.



Spacing Requirements

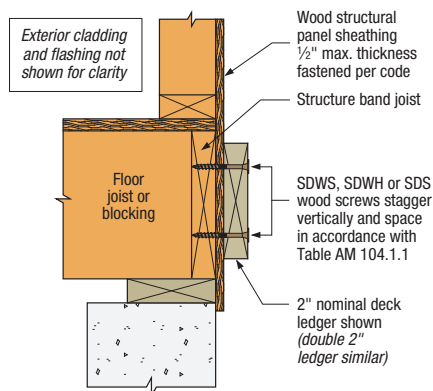
Load Tables, Technical Data and Installation Instructions

Strong-Drive® SDWS TIMBER Screw (cont.)

Maximum Fastener Spacing for Sawn-Lumber-Deck-Ledger-to-Rim-Board Connections (in.)

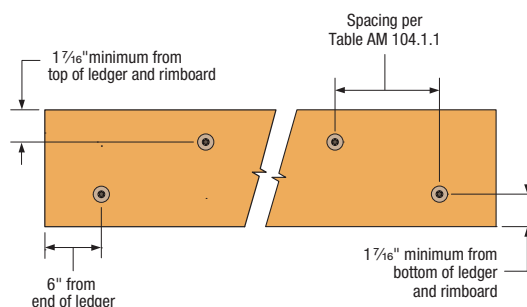
Nominal Ledger Size (in.)	Model No.	Specified Live Load	Rim Board	Maximum On-Centre Spacing of Fasteners (in.)					
				Maximum Deck Joist Span (ft.)					
				6	8	10	12	14	16
2x	SDWS22400DB	40 psf (1.9 kPa)	1" OSB	10	7	6	5	4	3
			1 1/8" OSB	10	8	6	5	4	4
			1 1/4" LSL	11	8	6	5	4	4
			2x SPF	12	9	7	6	5	4
		50 psf (2.4 kPa)	1" OSB	8	6	5	4	3	3
			1 1/8" OSB	9	6	5	4	3	3
			1 1/4" LSL	9	7	5	4	4	3
			2x SPF	10	7	6	5	4	3
		100 psf (4.8 kPa)	1" OSB	4	3	—	—	—	—
			1 1/8" OSB	4	3	—	—	—	—
			1 1/4" LSL	5	3	3	—	—	—
			2x SPF	5	4	3	—	—	—
(2) 2x	SDWS22500DB	40 psf (1.9 kPa)	1" OSB	13	10	8	6	5	5
			1 1/8" OSB	14	10	8	7	6	5
			1 1/4" LSL	14	11	8	7	6	5
			2x SPF	15	11	9	7	6	5
		50 psf (2.4 kPa)	1" OSB	11	8	6	5	4	4
			1 1/8" OSB	11	8	7	5	5	4
			1 1/4" LSL	12	9	7	6	5	4
			2x SPF	12	9	7	6	5	4
		100 psf (4.8 kPa)	1" OSB	6	4	3	3	—	—
			1 1/8" OSB	6	4	3	3	—	—
			1 1/4" LSL	6	4	3	3	—	—
			2x SPF	6	5	4	3	—	—

- Sawn lumber ledger board shall be a minimum of 2x8 or (2) 2x8. Spacings apply to S-P-F, Hem-Fir or D.Fir-L.
- Minimum structural panel thickness shall be 0.30" (7.5 mm) fastened to the rim board per applicable code.
- Multi-ply (2) 2x ledger board must be fastened together to act as one unit independent of the SDWS screws.
- Spacing requirements are based on testing per ICC-ES AC233 and AC13 modified to meet the requirements of 12.11 CSA O86-14 assuming wet service conditions. Spacings may be increased x 1.5 for dry service conditions.
- Tabulated values assume a specified dead load of 10 psf (0.50 kPa).
- For 1 1/4" LVL rim board made with Douglas Fir or Southern Pine veneers, use the values listed for 1 1/4" LSL.
- End screws shall be located 6" from the end and at 1 1/2" to 2" from the bottom of the ledger. For screws located at least 2" but less than 6" from the end, use 50% of the load per screw and 50% of the table spacing between the end screw and the adjacent screw, and for screws located between 2" and 4" from the end, predrill using a 5/16" drill bit.
- Rows of screws shall be vertically offset and evenly staggered. Screws shall be placed 1 1/2" to 2" from the top and bottom of the ledger or the band joist with 3" to 6" between rows and spaced per the table.



Ledger-to-Rim-Board Assembly

(wood-framed lower floor acceptable;
concrete wall shown for illustration purposes)



SDWS Timber Screw Ledger Spacing Detail

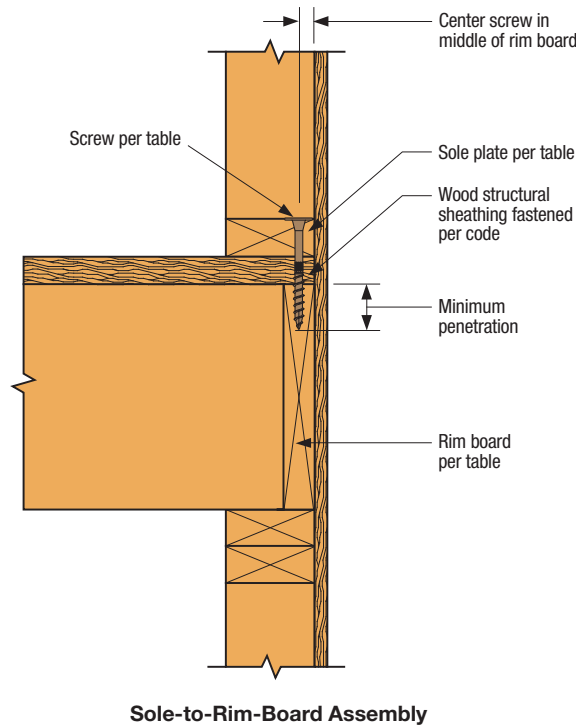
Load Tables, Technical Data and Installation Instructions

Strong-Drive® SDWS TIMBER Screw (cont.)

Factored Lateral Resistances for Sole-to-Rim Connections (lb.)

Screw Size (in.)	Model No.	Sole Plate Nominal Size (in.)	Minimum Penetration into Rim Board (in.)	Factored Lateral Resistance (lb.) per Screw ($K_D = 1.15$)							
				2x D. Fir-L Rim Board		2x S-P-F Rim Board		1 1/4" Min. LVL Rim Board		1 1/4" Min. LSL Rim Board	
				Sole Plate		Sole Plate		Sole Plate		Sole Plate	
				D. Fir-L	S-P-F	D. Fir-L	S-P-F	D. Fir-L	S-P-F	D. Fir-L	S-P-F
0.220 x 4	SDWS22400DB	2x	1.75	510	470	495	455	520	470	520	470
0.220 x 5	SDWS22500DB	2x	2	510	470	495	455	520	470	520	470
0.220 x 6	SDWS22600DB	2x or 3x	2	530	485	505	465	530	490	530	490

1. Factored resistances shown have been developed in accordance with 12.11 CSA O86-14 based on testing per ICC-ES AC233 and are limited to parallel-to-grain loading.
2. Apply the adjustment factors K_D , K_{SF} and K_T as per 12.11.4.1 CSA O86-14 where applicable.
3. Minimum spacing of the SDWS is 6" o.c., minimum end distance is 6", and minimum edge distance is 5/8".
4. Wood structural panel up to 3/32" for the SDWS22400DB or 1/8" for SDWS22500DB and SDWS22600DB is permitted between the sole plate and the rim board provided the wood structural panel is fastened to the rim board per code and the minimum penetration of the screw into the rim board is met.
5. A double 2x sole plate is permitted provided the members of the sole plate are independently fastened per the code and the minimum screw penetration per the table is met.



Load Tables, Technical Data and Installation Instructions

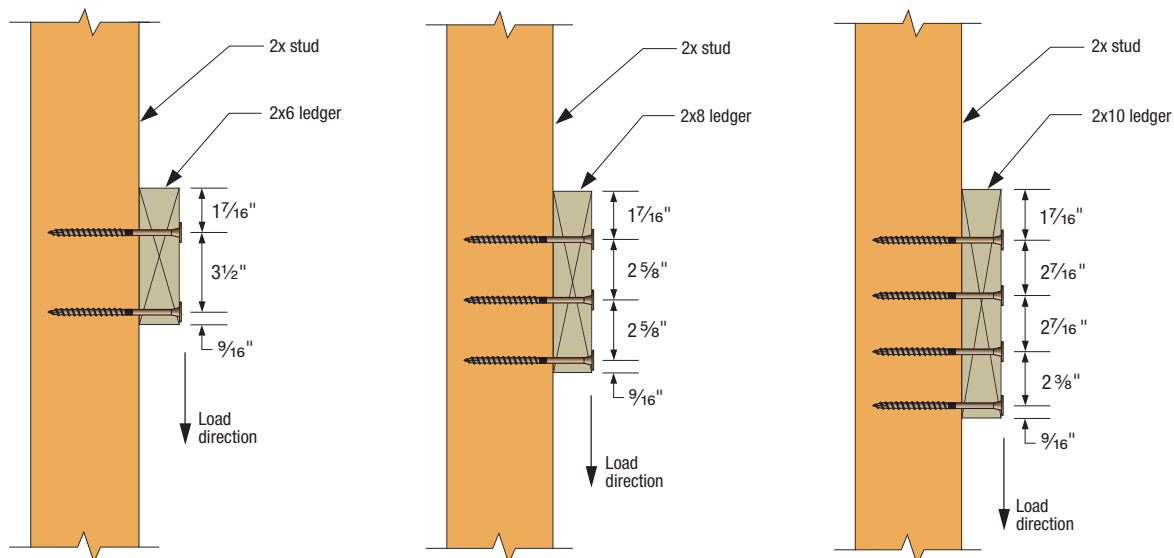
Strong-Drive® SDWS TIMBER Screw in Ledger-to-Stud Applications

Strong-Drive® SDWS Timber screws may be used to attach a ledger to the narrow face of nominal 2x lumber studs according to the following table. Tests and analyses were performed in accordance with ICC-ES Acceptance Criteria AC233.

Factored Lateral Resistance for Ledger Attachment to Studs

Model No.	Length (in.)	Nominal Ledger Size (in.)	Number of Screws per Stud	Factored Resistance (lb.) ($K_D = 1.00$)	
				D.Fir-L	S-P-F
SDWS22400DB	4	2x6	2	890	780
		2x8	3	1335	1170
		2x10	4	1760	1560

1. Factored resistances shown have been developed in accordance with 12.11 CSA O86-14 based on testing per ICC-ES AC233. Apply the adjustment factors K_D , K_{SF} and K_T as per 12.11.4.1 where applicable.
2. Resistances shown are limited to parallel-to-grain loaded solid sawn lumber studs (minimum 2" nominal).
3. Resistances shown assume the same species for ledger and stud. For mixed species applications, use the lower tabulated value for each species.
4. Fasteners shall be centred in the stud and spaced as shown in the figure below. The stud minimum end distance is 6" when loaded toward the end and 2½" when loaded away from the end. The ledger end distance is 6" for full values. For ledger end distances from 2" to < 6", use 50% of the tabulated values. For end distances between 2" and 4", predrill using a 5/16" bit.
5. Screws may be installed through an intermediate layer of wood structural panel between the ledger and studs provided the structural panel is fastened to the main member per code and the minimum screw penetration into the stud is 2½" (excluding the structural panel). Longer-length screws may be used.
6. For 2x8 ledgers with two screws, use 2x6 values. For 2x10 ledgers with 3 screws, use 2x8 values.
7. For loading in the opposite direction shown, multiply the table values by 0.5 for 2x6, 0.67 for 2x8 and 0.75 for 2x10.



Load Tables, Technical Data and Installation Instructions

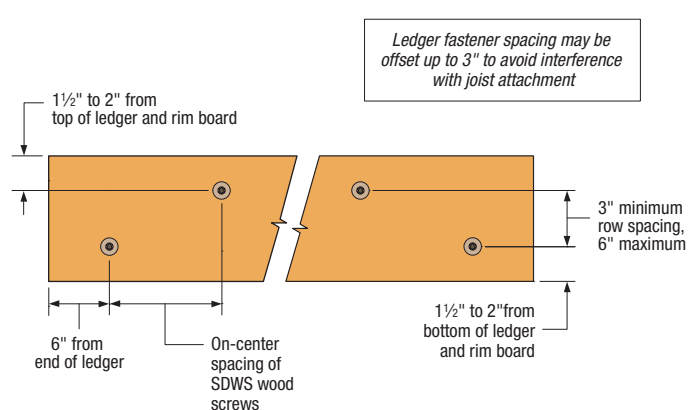
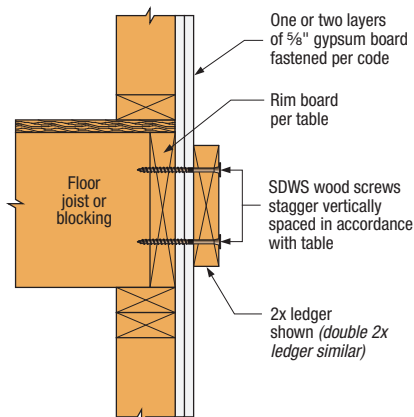
Strong-Drive®

SDWS TIMBER Screw with Gypsum Board Interlayer(s)

Maximum Fastener Spacing for Sawn-Lumber-Ledger-to-Rim-Board Connections with One or Two Layers of 5/8" Gypsum Board Between

Nominal Ledger Size (in.)	Screw Model No.	Specified Live Load	Rim Board	Maximum On-Centre Spacing of Fasteners (in.)					
				Maximum Deck Joist Span (ft.)					
				6	8	10	12	14	16
2x	For one layer of gypsum board, use SDWS22400DB For two layers of gypsum board, use SDWS22500DB	40 psf (1.9 kPa)	1" OSB	13	10	8	6	5	5
			1 1/8" OSB	14	10	8	7	6	5
			1 1/4" LSL	15	11	9	7	6	5
			2x SPF	16	12	10	8	7	6
		50 psf (2.4 kPa)	1" OSB	11	8	6	5	4	4
			1 1/8" OSB	12	9	7	6	5	4
			1 1/4" LSL	12	9	7	6	5	4
			2x SPF	13	10	8	6	5	5
		100 psf (4.8 kPa)	1" OSB	6	4	3	3	—	—
			1 1/8" OSB	6	4	3	3	—	—
			1 1/4" LSL	6	5	4	3	—	—
			2x SPF	7	5	4	3	3	—
(2) 2x	For one or two layers of gypsum board, use SDWS22600DB	40 psf (1.9 kPa)	1" OSB	18	14	11	9	8	7
			1 1/8" OSB	19	14	11	9	8	7
			1 1/4" LSL	20	15	12	10	8	7
			2x SPF	21	16	13	10	9	8
		50 psf (2.4 kPa)	1" OSB	15	11	9	7	6	5
			1 1/8" OSB	16	12	9	8	6	6
			1 1/4" LSL	16	12	10	8	7	6
			2x SPF	18	13	10	9	7	6
		100 psf (4.8 kPa)	1" OSB	8	6	5	4	3	3
			1 1/8" OSB	8	6	5	4	3	3
			1 1/4" LSL	9	6	5	4	3	3
			2x SPF	9	7	5	4	4	3

- Sawn lumber ledger board shall be a minimum of 2x8 or (2) 2x8. Spacings apply to S-P-F, Hem-Fir or D.Fir-L.
- Multi-ply (2) 2x ledger board must be fastened together to act as one unit independent of the SDWS screws.
- Spacing requirements are based on testing per ICC-ES AC233 and AC13 modified to meet the requirements of 12.11 CSA O86-14 and are only applicable in dry service conditions.
- Tabulated values assume a specified dead load of 10 psf (0.50 kPa).
- For 1 1/4" LVL rim board made with Douglas Fir or Southern Pine veneers, use the values listed for 1 1/4" LSL.
- SDWS screws shall be placed no less than 1 1/2" from the top and bottom of the ledger or rim boards. The minimum end distance shall be 6" and the minimum spacing perpendicular to grain shall be 3". See figure below for full details.
- End screws shall be located 6" from the end and at 1 1/2" to 2" from the bottom of the ledger. For screws located at least 2" but less than 6" from the end, use 50% of the load per screw and 50% of the table spacing between the end screw and the adjacent screw, and for screws located between 2" and 4" from the end, predrill using a 5/16" drill bit.
- Rows of screws shall be vertically offset and evenly staggered. Screws shall be placed 1 1/2" to 2" from the top and bottom of the ledger or the band joist with 3" to 6" between rows and spaced per the table.



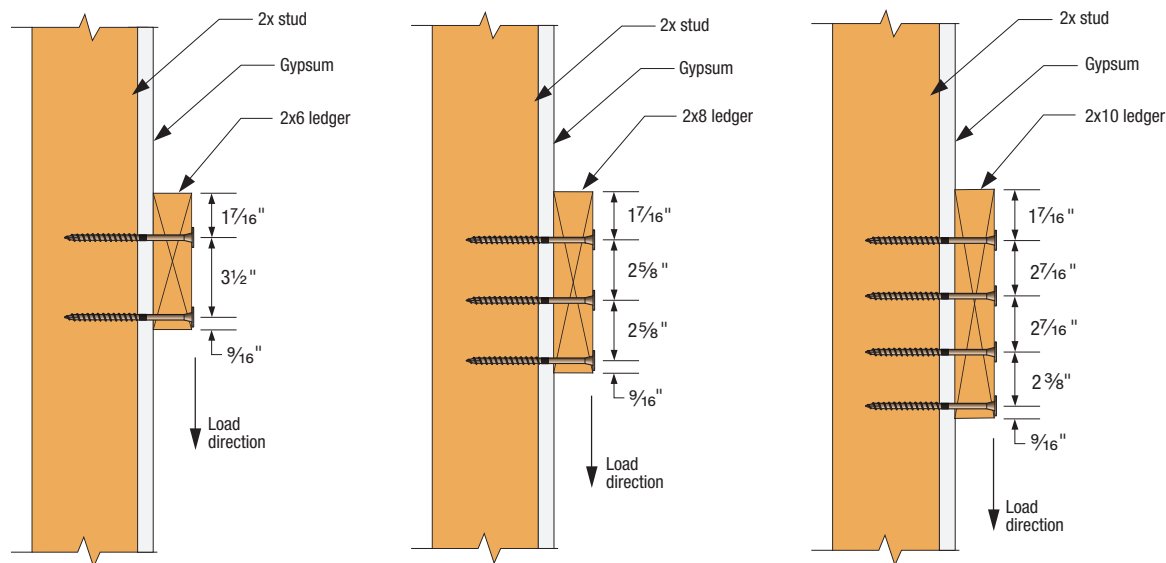
Load Tables, Technical Data and Installation Instructions

Strong-Drive® SDWS TIMBER Screw with Gypsum Board Interlayer(s) (cont.)

Factored Lateral Resistance for Ledger Attachment to Studs
with One or Two Layers of Gypsum Board

Model No.	Length (in.)	Nominal Ledger Size (in.)	Number of Screws per Stud	Factored Resistance (lb.) ($K_D = 1.00$)	
				D.Fir-L	S-P-F
SDWS22600DB	5	2x6	2	880	780
		2x8	3	1225	1170
		2x10	4	1490	1490

1. Factored resistances shown have been developed in accordance with 12.11 CSA O86-14 based on testing per ICC-ES AC233 and are applicable to dry service conditions only under standard term loading. Adjust for other load durations per 5.3.2 CSA O86-14 where applicable.
2. Resistances shown are limited to parallel-to-grain loaded solid sawn lumber studs (minimum 2" nominal).
3. Resistances shown assume the same species for ledger and stud. For mixed species applications, use the lower tabulated value for each species.
4. Fasteners shall be centred in the stud and spaced as shown in the figure below. The stud minimum end distance is 6" when loaded toward the end and 2½" when loaded away from the end. The ledger end distance is 6" for full values. For ledger end distances from 2" to < 6" use 50% of the tabulated values. For end distances between 2" and 4", predrill using a ½" bit.
5. Screws may be installed through an intermediate layer of wood structural panel between the ledger and studs provided the structural panel is fastened to the main member per code and the minimum screw penetration into the stud is 2½" (excluding the structural panel). Longer-length screws may be used.
6. For 2x8 ledgers with two screws, use 2x6 values. For 2x10 ledgers with 3 screws, use 2x8 values. Spacings, edge and end distances shown in the figure below are minimum dimensions.
7. For loading in the opposite direction shown, multiply the table values by 0.5 for 2x6, 0.67 for 2x8 and 0.75 for 2x10.
8. Gypsum board must be attached as per the building code.
9. Tabulated values shown are applicable to one or two layers of ½" or ⅝" gypsum board.



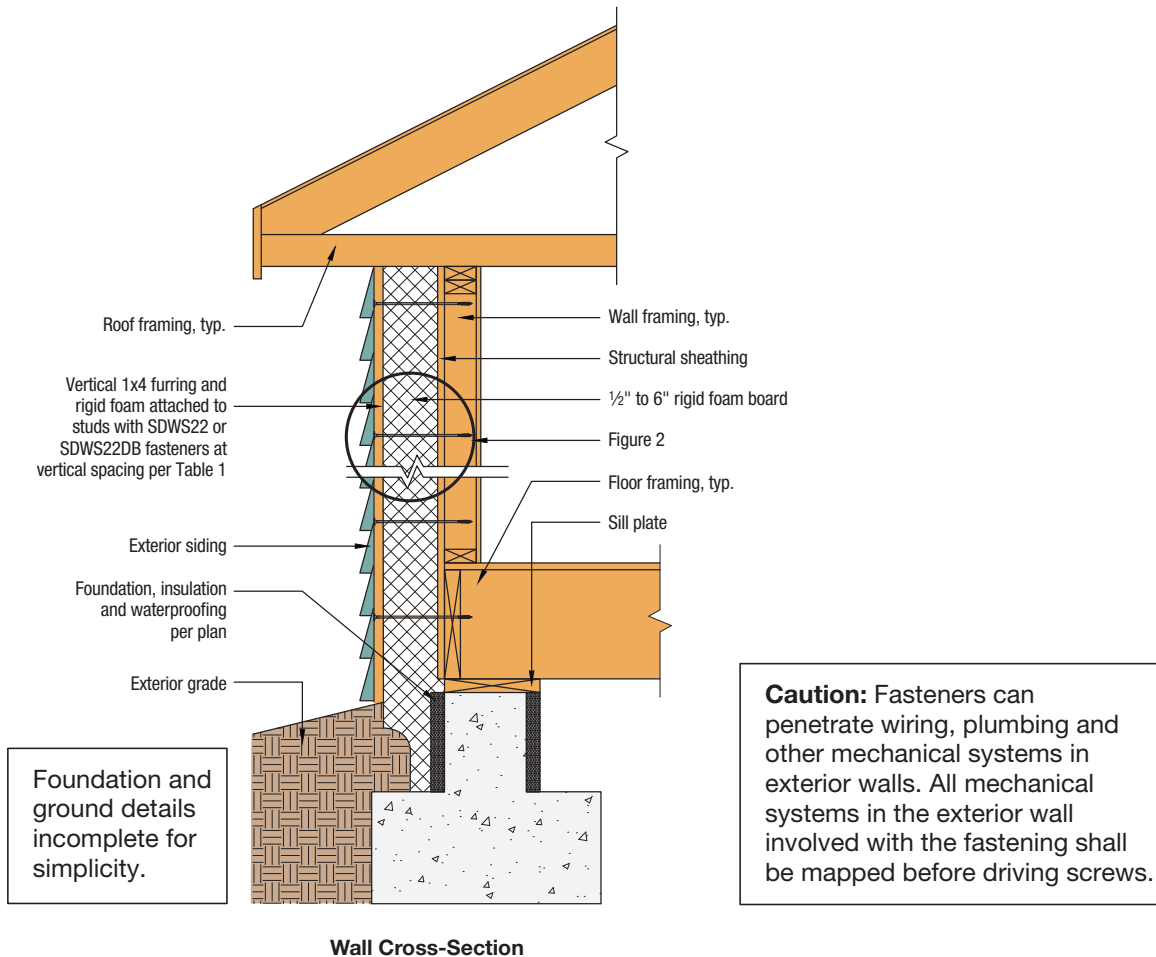
Notes to Installer Regarding the Attachment of Ledgers to Studs:

The screws must be installed into the middle of the stud with a tolerance of ¼" either side of center. Various methods can be used to ensure proper placement of the screws in the stud including snapping a chalk line, using a stud finder or prerocking (attaching only a strip of gypsum at the ledger location until the ledger is fastened to the studs). If proper screw placement into the stud cannot be achieved in the field, blocking should be installed between studs to receive and support the ledger screws.

Load Tables, Technical Data and Installation Instructions

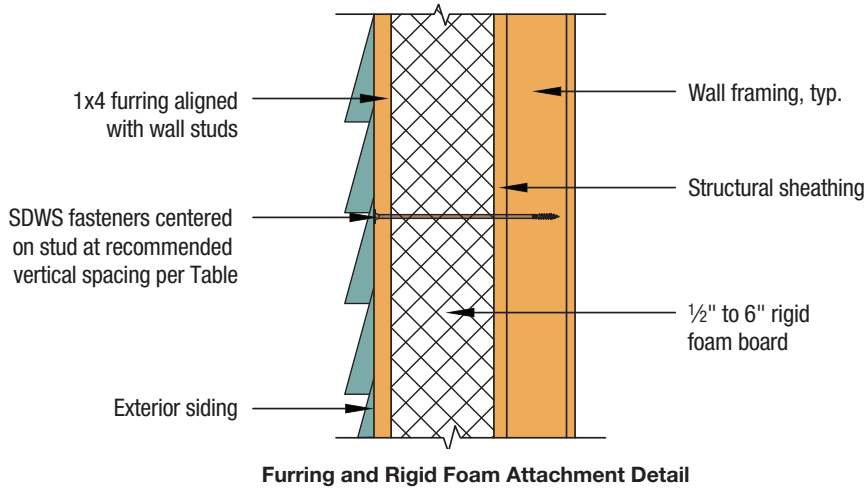
Strong-Drive® SDWS TIMBER Screw for Attaching Exterior Foam Insulation

Simpson Strong-Tie® Strong-Drive® SDWS Timber screws may be used for installing exterior rigid-foam board insulation over wood structural panel (WSP) sheathing. Each fastener installs through furring strips, rigid-foam board and WSP sheathing into the wood wall stud framing. The fasteners do not typically require predrilling. Preservative-treated wood suitable for dry-service (CSA O80 UC1, UC2, UC3.1) and untreated wood may be used depending on the protection needs of the construction. The SDWS products with "DB" in the model number have a double-barrier coating that provides corrosion resistance equivalent to hot-dip galvanization, while the products without "DB" in the model number can only be used in conditions with dry-service and no wood treatment chemicals. The table on p. 13 provides recommended spacing for fastening to vertical furring strips through ½" to 6" of rigid foam insulation board into each wall stud. The SDWS22DB and SDWS22 screws were evaluated as alternate threaded fasteners using ICC-ES AC233 and are the subject of IAPMO-UES ER-192. The Strong Drive SDWS22DB Structural Wood screws were evaluated for corrosion resistance using ICC-ES AC257.



Load Tables, Technical Data and Installation Instructions

Strong-Drive® **SDWS TIMBER** Screw for Attaching Exterior Foam Insulation (cont.)



Recommended Vertical Fastener Spacing (in.) on Each Stud

Model No.	Size Dia. x L (in.)	Foam Thickness (in.)	Stud Spacing (in.)	Maximum Specified Cladding Weight to Be Supported, psf (kPa)				
				≤ 21 (1.0)	26 (1.25)	31 (1.5)		
SDWS22400DB	0.220 x 4	½	16	24" o.c.	24" o.c.	24" o.c.		
			24					
SDWS22500DB	0.220 x 5	1 to 1¼	16					
			24					
SDWS22600DB	0.220 x 6	1½ to 2	16					
			24					
SDWS22800DB SDWS22800	0.220 x 8	4	16					
			24					
SDWS221000DB SDWS221000	0.220 x 10	6	16				18" o.c.	16" o.c.
			24					

- Caution:** Fasteners can penetrate wiring, plumbing, and other mechanical systems in exterior walls. All mechanical systems in the exterior wall involved with the fastening shall be mapped before driving screws.
- Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with CAN/ULC-S701 or CAN/ULC-S704.
- Wood wall framing (studs) shall be a minimum of 2" nominal thickness. Wood framing and furring shall be a minimum Spruce-Pine-Fir species with specific gravity of 0.42 or greater. Table assumes furring strip thickness of ¾ in. and full thread embedment in the framing member.
- Wood framing, furring and WSP sheathing shall meet the design requirements in accordance with the applicable building codes. WSP sheathing shall be fastened to the framing as required by the applicable building code.
- Each fastener is capable of resisting 130 lb. (0.58 kN) of withdrawal due to out-of-plane wind loading ($K_D = 1.15$) with no further increase allowed.
- Spacing recommendations are based on a loading that produced 0.015" of assembly movement with 6"-thick rigid foam board insulation.
- Maximum specified cladding weight shall be the additive weight of furring, cladding including foam insulation, environmental effects (e.g., ice) and other supported materials.
- Metal fasteners conduct heat, and it is recommended that exposed screw heads are covered with foam and sealed.
- Screws shall be installed such that they close gaps between connected components. Furring and sheathing shall provide the required thickness and performance for siding manufacturer installation instructions.

All other information pertaining to the use and installation of Strong-Drive® SDWS22DB and SDWS22 Structural Wood screws is available at strongtie.com.

Load Tables, Technical Data and Installation Instructions

Outdoor Accents® Structural Wood Screw

(Strong-Drive® SDWS TIMBER Screw)

Structural Wood-to-Wood Connections for Outdoor Accents Ornamental Products

Designed to provide an easier and significantly faster installation time compared to through-bolting. The hex-head washer is designed exclusively to help fasten Outdoor Accents post bases, T and L straps, and angles.

Black double-barrier (SDWS22DBB) and Quik Guard® (STN22) coating provides corrosion resistance equivalent to hot-dip galvanization (ASTM A153, Class D), making it suitable for certain exterior and preservative-treated wood applications.

Codes/Standards: IAPMO-UES ER-192



The SDWS22312DBB and SDWS22512DBB can be used in conjunction with the STN22 hex-head washer. When installing SDWS22312DBB and SDWS22512DBB, the STN22 shall be placed onto wood or steel side plate member prior to screw installation.



**SDWS22312DBB with
STN22 Hex-Head Washer**

US Patent Pending



Outdoor Accents Structural Wood Screw with STN22 Hex-Head Washer Factored Lateral Resistance



Size	Model No.	Thread Length (in.)	Factored Lateral Resistance (lb.) (K _D = 1.00)					
			2x Wood Side Member			12 ga. Steel Side Member		
			D.Fir-L	S-P-F	Northern	D.Fir-L	S-P-F	Northern
0.22 x 3 1/2"	SDWS22312DBB with STN22	2	340	290	240	545	500	450
0.22 x 5 1/2"	SDWS22512DBB with STN22	2 3/4"	445	395	340	610	565	515

See footnotes below.

Outdoor Accents Structural Wood Screw Factored Resistances



Size	Model No.	Thread Length (in.)	Factored Resistance (lb.)					
			2x Wood Side Member					
			Lateral (K _D = 1.00)			Withdrawal (K _D = 1.15)		
			D.Fir-L	S-P-F	Northern	D.Fir-L	S-P-F	Northern
0.22 x 3 1/2"	SDWS22312DBB	2	340	290	240	665	505	365
0.22 x 5 1/2"	SDWS22512DBB	2 3/4"	445	395	340	935	620	515

1. Factored resistances have been developed in accordance with 12.11 CSA O86-14, based on testing per ICC-ES AC233, assuming full penetration into the main member. Apply the adjustment factors K_D, K_{SF} and K_T per 12.11.4.1 when applicable.
2. Factored resistances shown for steel side members assume F_U = 45000 psi (310 MPa).
3. Minimum spacing, edge and end distance shall be calculated in accordance with 12.9.2.1 CSA O86-14 assuming a diameter of 0.30".

Load Tables, Technical Data and Installation Instructions

Outdoor Accents® Connector Screw

(Strong-Drive® SD CONNECTOR Screw)

Structural Wood-to-Wood Connections for Outdoor Accents Ornamental Connectors

The Outdoor Accents® Connector Screw reduces installation time by driving easily without predrilling. Designed for installation with the Outdoor Accents APA21 90-degree angle, the screw's black finish accents any outdoor living project. The sharp point of the screw enables fast starts, and the patented serrated threads reduce torque for improved drivability.

Black double-barrier coating provides corrosion resistance equivalent to hot-dip galvanization (ASTM A153, Class D), making it suitable for certain exterior and preservative-treated wood applications.

Features

- Tested and approved for use in many of our best-selling connectors for both interior and most exterior applications
- The single-fastener steel-side-plate lateral resistance of the SD10 exceeds the capacity of a 16D common nail
- Ideal for use in tight spaces where using a hammer is inconvenient
- Optimized heat-treating for ductility and strength
- 1/4" hex drive included
- Head identification
Codes/Standards: ICC-ES ESR-3046

For more information on Outdoor Accents connector products, please see the *Wood Construction Connectors — Canadian Limit States Design* catalogue, C-C-CAN2018



Outdoor Accents Connector Screw Factored Lateral Resistances

Size	Model No.	Thread Length (in.)	Factored Lateral Resistance (lb.) (K _D = 1.00)					
			20 ga. Steel Side Member			12 ga. Steel Side Member		
			D.Fir-L	S-P-F	Northern	D.Fir-L	S-P-F	Northern
#10 x 1½"	SD10112DBB	1	220	200	175	340	320	300

1. Factored resistances have been developed in accordance with 12.11 CSA O86-14, based on testing per ICC-ES AC233, assuming full penetration into the main member. Apply the adjustment factors K_D, K_{SF} and K_T per 12.11.4.1 when applicable.
2. Factored resistances shown assume steel side plates with F_U = 45000 psi (310 MPa).
3. Factored withdrawal resistances may be calculated in accordance with 12.11.5.2 CSA O86-14 assuming a nominal diameter of 0.20" and a head diameter of 0.38".
4. Minimum spacing, edge and end distance shall be calculated in accordance with 12.9.2.1 CSA O86-14 assuming a diameter of 0.20".

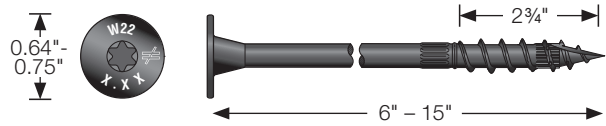


Load Tables, Technical Data and Installation Instructions

Strong-Drive® SDWS LOG Screw

Log Home Construction and General Interior Applications

Codes/Standards: IAPMO-UES ER-192; US Patent 9,523,383



SDWS Log Screw — Factored Resistances for D.Fir-L Lumber

Size Dia. x L (in.)	Model No.	Thread Length (in.)	D.Fir-L													Factored Withdrawal Resistance ^{2,3} (lb.)
			Factored Lateral Resistance ¹ (lb.) (K _D = 1.00)													
			Wood Side Member Thickness (in.)													
			1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	8	9	10	
0.195 x 6	SDWS19600	2¾	390	440	460	460	460	430	375	—	—	—	—	—	—	840
0.195 x 7½	SDWS19712	2¾	390	440	460	460	460	460	460	460	375	—	—	—	—	840
0.220 x 8	SDWS22800	2¾	460	515	565	565	565	565	565	565	505	—	—	—	—	935
0.220 x 9	SDWS22900	2¾	460	515	565	565	565	565	565	565	565	505	—	—	—	935
0.220 x 10	SDWS221000	2¾	460	515	565	565	565	565	565	565	565	565	505	—	—	935
0.220 x 11	SDWS221100	2¾	460	515	565	565	565	565	565	565	565	565	565	505	—	935
0.220 x 12	SDWS221200	2¾	460	515	565	565	565	565	565	565	565	565	565	505	—	935
0.220 x 15	SDWS221500	2¾	460	515	565	565	565	565	565	565	565	565	565	505	—	935

See footnotes below.

SDWS Log Screw — Factored Resistances for S-P-F Lumber

Size Dia. x L (in.)	Model No.	Thread Length (in.)	S-P-F													Factored Withdrawal Resistance ^{2,3} (lb.)
			Factored Lateral Resistance ¹ (lb.) (K _D = 1.00)													
			Wood Side Member Thickness (in.)													
			1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	8	9	10	
0.195 x 6	SDWS19600	2¾	345	390	415	415	415	380	330	—	—	—	—	—	—	620
0.195 x 7½	SDWS19712	2¾	345	390	415	415	415	415	415	415	330	—	—	—	—	620
0.220 x 8	SDWS22800	2¾	405	455	505	510	510	510	510	510	445	—	—	—	—	620
0.220 x 9	SDWS22900	2¾	405	455	505	510	510	510	510	510	445	—	—	—	—	620
0.220 x 10	SDWS221000	2¾	405	455	505	510	510	510	510	510	510	445	—	—	—	620
0.220 x 11	SDWS221100	2¾	405	455	505	510	510	510	510	510	510	510	445	—	—	620
0.220 x 12	SDWS221200	2¾	405	455	505	510	510	510	510	510	510	510	510	445	—	620
0.220 x 15	SDWS221500	2¾	405	455	505	510	510	510	510	510	510	510	510	445	—	620

- Factored resistances shown have been developed in accordance with section 12.11, CSA O86-14 based on testing per ICC-ES AC233. Apply the adjustment factors K_D, K_{SF} and K_T as per section 12.11.4.1, CSA O86-14 when applicable.
- Factored withdrawal resistances shown are for short-term load duration (K_D = 1.15). Reduce where other load durations govern.
- Factored withdrawal resistances shown assume the entire threaded portion of the screw is installed into the main member. Where the penetration into the main member is less than the thread length of the factored resistances may be calculated by multiplying the length of penetration of the threads (inches) with:
 - SDWS19XXX – 305 lb./in. for D.Fir-L and 225 lb./in. for S-P-F
 - SDWS22XXX – 340 lb./in. for D.Fir-L and 225 lb./in. for S-P-F
 to a maximum of the tabulated value above. Apply adjustment factors K_T and K_{SF} per section 12.11.5.2, CSA O86-14.
- Minimum spacing, edge and end distances shall be in accordance with section 12.9.2.1, CSA O86-14 using a diameter value of 0.268" for SDWS19XXX and 0.30" for SDWS22XXX.

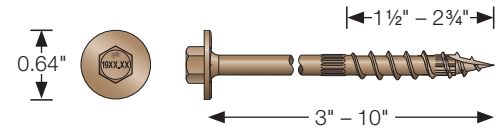
Load Tables, Technical Data and Installation Instructions

Strong-Drive® SDWH TIMBER-HEX Screw

Structural Wood-to-Wood Connections, Including Ledgers

Double-barrier coating provides corrosion resistance equivalent to hot-dip galvanization, making it suitable for certain exterior and preservative-treated wood applications, as described in the evaluation report.

Codes/Standards: IAPMO-UES ER-192; US Patent 9,523,383



SDWH Screw — Factored Resistances for D.Fir-L Lumber

Size Dia. x L (in.)	Model No.	Thread Length TL (in.)	D.Fir-L										Factored Withdrawal Resistance (lb.) (K _D = 1.15)
			Factored Lateral Resistance (lb.) (K _D = 1.00)										
			Wood Side Member Thickness (in.)										
			1.5	2	2.5	3	3.5	4	4.5	6	8		
0.195 x 3	SDWH19300DB	1½	305	—	—	—	—	—	—	—	—	—	440
0.195 x 4	SDWH19400DB	2¾	380	415	370	—	—	—	—	—	—	—	715
0.195 x 6	SDWH19600DB	2¾	390	440	460	460	460	430	375	—	—	—	840
0.195 x 8	SDWH19800DB	2¾	390	440	460	460	460	460	460	430	—	—	840
0.195 x 10	SDWH191000DB	2¾	390	440	460	460	460	460	460	460	430	—	840

See footnotes below.

SDWH Screw — Factored Resistances for S-P-F Lumber

Size Dia. x L (in.)	Model No.	Thread Length TL (in.)	S-P-F										Factored Withdrawal Resistance (lb.) (K _D = 1.15)
			Factored Lateral Resistance (lb.) (K _D = 1.00)										
			Wood Side Member Thickness (in.)										
			1.5	2	2.5	3	3.5	4	4.5	6	8		
0.195 x 3	SDWH19300DB	1½	260	—	—	—	—	—	—	—	—	—	335
0.195 x 4	SDWH19400DB	2¾	335	355	325	—	—	—	—	—	—	—	545
0.195 x 6	SDWH19600DB	2¾	345	390	415	415	415	380	330	—	—	—	620
0.195 x 8	SDWH19800DB	2¾	345	390	415	415	415	415	415	380	—	—	620
0.195 x 10	SDWH191000DB	2¾	345	390	415	415	415	415	415	415	380	—	620

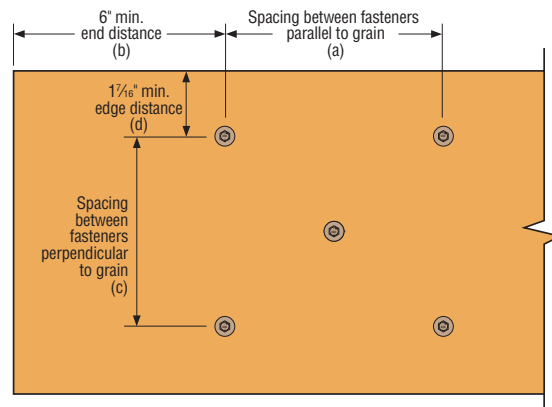
1. Factored resistances shown have been developed in accordance with section 12.11, CSA O86-14 based on testing per ICC-ES AC233. Apply the adjustment factors K_D, K_{SE} and K_T as per section 12.11.4.1 CSA O86-14 when applicable. Do not install in end grain.
2. Factored withdrawal resistances shown are for short-term lead duration (K_D = 1.15). Reduce where other load durations govern.
3. Factored withdrawal resistances shown assume the entire threaded portion of the screw is installed into the main member. Where the

4. Minimum spacing, edge and end distances shall be in accordance with section 12.9.2.1 CSA O86-14 using a diameter value of 0.268". See spacing requirements information below.

Spacing Requirements

Geometry	Minimum Dimensions (in.)	
	D.Fir-L	S-P-F
a - Spacing parallel to grain	5¾	4¾
b - End distance parallel to grain	6	6
c - Spacing perpendicular to grain	2¼	2¾
d - Edge distance perpendicular to grain	1¼	1¾

Additional screws may be staggered diagonally between rows.



Spacing Requirements

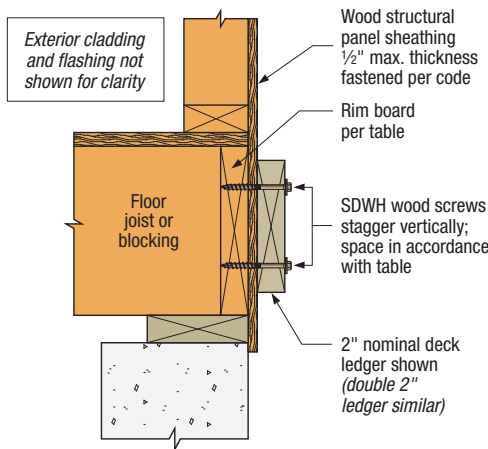
Load Tables, Technical Data and Installation Instructions

Strong-Drive® SDWH TIMBER-HEX Screw (cont.)

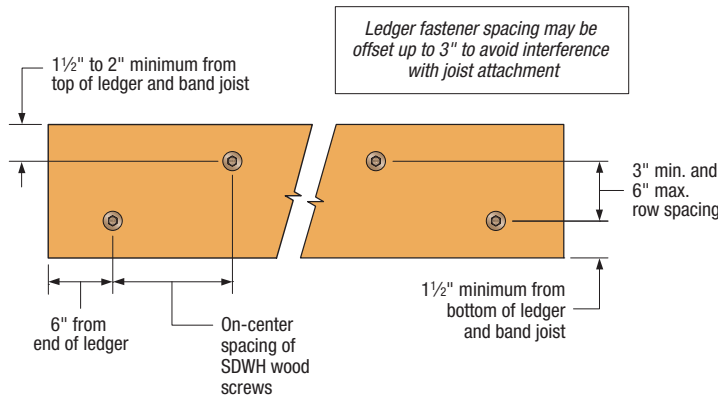
SDWH Screw — Maximum Fastener Spacing
for Solid Sawn Lumber Deck Ledger to Rim Board (in.)

Ledger Size	Model No.	Specified Live Load	Rim Board	Maximum Deck Joist Span (ft.)					
				6	8	10	12	14	16
2x	SDWH19400DB	40 psf (1.9 kPa)	1" OSB	9	7	5	4	4	3
			1½" OSB	9	7	5	4	4	3
			1¼" LSL	10	7	6	5	4	3
			2x SPF	11	8	6	5	4	4
		50 psf (2.4 kPa)	1" OSB	7	5	4	3	3	—
			1½" OSB	8	6	4	4	3	3
			1¼" LSL	8	6	5	4	3	3
			2x SPF	9	6	5	4	3	3
		100 psf (4.8 kPa)	1" OSB	4	3	—	—	—	—
			1½" OSB	4	3	—	—	—	—
			1¼" LSL	4	3	—	—	—	—
			2x SPF	4	3	—	—	—	—

- Solid sawn lumber ledger board shall be a minimum of 2x8 or (2) 2x8. Spacings apply to S-P-F, Hem-Fir or D-Fir-L.
- Maximum structural panel thickness shall be ½" fastened to the rim board per applicable code.
- Multi-ply (2) 2x ledger boards must be fastened together to act as one unit independent of the SDWS screws.
- Spacing requirements are based on testing per ICC-ES AC233 and AC13 modified to meet the requirements of 12.11 CSA O86-14 assuming wet service conditions. For dry service conditions, the tabulated spacing values may be multiplied by 1.5.
- Tabulated values are based on the listed specified live loads in combination with 10 psf (0.50 kPa) specified dead load.
- For 1¼" LVL rim board made with Douglas Fir or Southern Pine veneers, use the values listed for 1¼" LSL.
- End screws shall be located 6" from the end and at 1½" to 2" from the bottom of the ledger. For screws located at least 2" but less than 6" from the end, use 50% of the load per screw and 50% of the table spacing between the end screw and the adjacent screw, and for screws located between 2" and 4" from the end, predrill using a ⅛" drill bit.
- Rows of screws shall be vertically offset and evenly staggered. Screws shall be placed 1½" to 2" from the top and bottom of the ledger or the band joist with 3" to 6" between rows and spaced per the table.



Ledger-to-Rim-Board Assembly
(wood-framed lower floor acceptable, concrete wall shown for illustration purposes)



SDWH Screw Spacing Detail

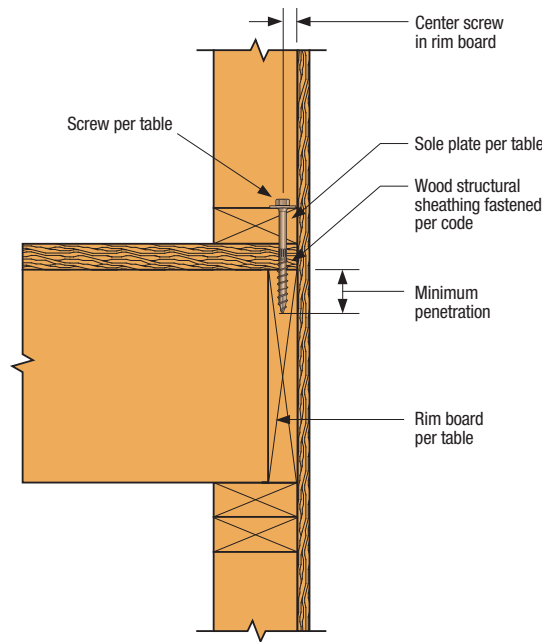
Load Tables, Technical Data and Installation Instructions

Strong-Drive® SDWH TIMBER-HEX Screw (cont.)

SDWH Screw — Factored Lateral Resistances for Sole-to-Rim Connections

Size (in.)	Model No.	Nominal Sole Plate Thickness (in.)	Minimum Penetration into Rim Board (in.)	Factored Lateral Resistance (lb.)							
				2x D.Fir-L Rim Board		2x S-P-F Rim Board		1 1/4" Min. LVL Rim Board		1 1/4" Min. LSL Rim Board	
				D.Fir-L Sole Plate	S-P-F Sole Plate	D.Fir-L Sole Plate	S-P-F Sole Plate	D.Fir-L Sole Plate	S-P-F Sole Plate	D.Fir-L Sole Plate	S-P-F Sole Plate
0.195 x 4	SDWH19400DB	2x	1.75	435	400	425	385	445	440	445	400
0.195 x 6	SDWH19600DB	2x or 3x	2	450	410	430	395	450	415	450	415

1. Factored resistances shown have been developed in accordance with 12.11 CSA O86-14 based on testing per ICC-ES AC233 and are limited to parallel-to-grain loading.
2. Apply the adjustment factors K_D , K_{SF} and K_T as per 12.11.4.1 when applicable.
3. Minimum spacing and end distances shall be per 12.11.2.2 CSA O86-14 using a nominal diameter of 0.268".
4. Minimum spacing of the SDS for LVL and LSL applications is 6" o.c., minimum end distance is 6", and minimum edge distance is 5/8".
5. Wood structural panel up to 1 1/8" thick is permitted between the sole plate and rim board provided it is fastened to the rim board per code and the minimum penetration of the screw into the rim board is met.
6. A double 2x sole plate is permitted provided it is independently fastened per the code and the minimum screw penetration per the table is met.



Sole-to-Rim-Board Assembly

Load Tables, Technical Data and Installation Instructions

Strong-Drive® SDWH TIMBER-HEX and SDWS TIMBER Screw

Maximum Fastener Spacing for Fastening a Sawn Lumber Deck Ledger to Rim Board with ½" Gap

Strong-Drive® SDWS Timber screws and SDWH Timber-Hex screws are suitable for installing ledgers with up to ½" drainage gap between the ledger and the rim board. These fasteners do not require predrilling and have a double barrier coating providing corrosion resistance equivalent to hot-dip galvanization. The gap is formed by stacking hot-dipped galvanized or stainless steel ¼" Type A plain washers (0.625" outside diameter, 0.281" inside diameter) on the shank of the screws between the ledger and the rim board. Weather proofing shall be the responsibility of the installer. The table below lists the maximum on-center spacing of SDWS Timber screws and SDWH Timber-Hex screws when attaching a 2x ledger to the listed rim board of various widths with a maximum ½" gap between them.

Maximum Fastener Spacing for Sawn Lumber Deck Ledger to Rim Board with ½" Gap

Nominal Ledger Size	Specified Live Load	Rim Board Material	Model No.	Maximum Deck Joist Span (ft.)					
				6	8	10	12	14	16
				Maximum On-Centre Spacing of Fasteners (in.)					
2x8 2x10 2x12	40 psf (1.9 kPa)	1½" LSL	SDWH19400DB	10	8	6	5	4	4
			SDWS22400DB	11	8	7	5	5	4
		1¾" LVL	SDWH19400DB	12	9	7	6	5	4
			SDWS22400DB	13	10	8	6	5	5
		2x S-P-F	SDWH19400DB	11	8	6	5	4	4
			SDWS22400DB	12	9	7	6	5	4
	50 psf (1.9 kPa)	1½" LSL	SDWH19400DB	8	6	5	4	—	—
			SDWS22400DB	9	7	5	4	4	—
		1¾" LVL	SDWH19400DB	10	7	6	5	4	—
			SDWS22400DB	11	8	6	5	4	4
		2x S-P-F	SDWH19400DB	9	6	5	4	—	—
			SDWS22400DB	10	7	6	5	4	—

- Solid sawn lumber ledger shall be minimum 2x8. Rim board shall be dry lumber or EWP rim board product (equivalent specific gravity at least 0.42 for nails and screws installed in the face orientation).
- Minimum structural panel thickness shall be 0.30" (7.5 mm) fastened to the rim board per applicable code.
- Spacing requirements are based on testing per ICC-ES AC233 and AC13 modified to meet the requirements of 12.11 CSA O86-14 assuming wet service conditions. Spacings may be increased x 1.5 for dry service conditions.
- Tabulated values assume a specified dead load of 10 psf (0.50 kPa).
- For 1¾" LVL rim board made with Spruce veneers, use the values listed for 2x S-P-F.
- SDWS screws shall be placed no less than 1½" from the top and bottom of the ledger or rim boards. The minimum end distance shall be 6" and the minimum spacing perpendicular to grain shall be 3".
- Maximum ½" gap formed by stacked hot-dip galvanized or stainless-steel Type A plain washers with a nominal outside diameter of 0.625" and inside diameter of 0.281".
- Screws shall be tightened such that the stacked washers are tightly compressed between the ledger and the rim board.

Load Tables, Technical Data and Installation Instructions

Strong-Drive® SDWH TIMBER-HEX and SDWS TIMBER Screw (cont.)

Maximum Fastener Spacing for Fastening a Sawn Lumber Deck Ledger to Rim Board with 1/2" Gap

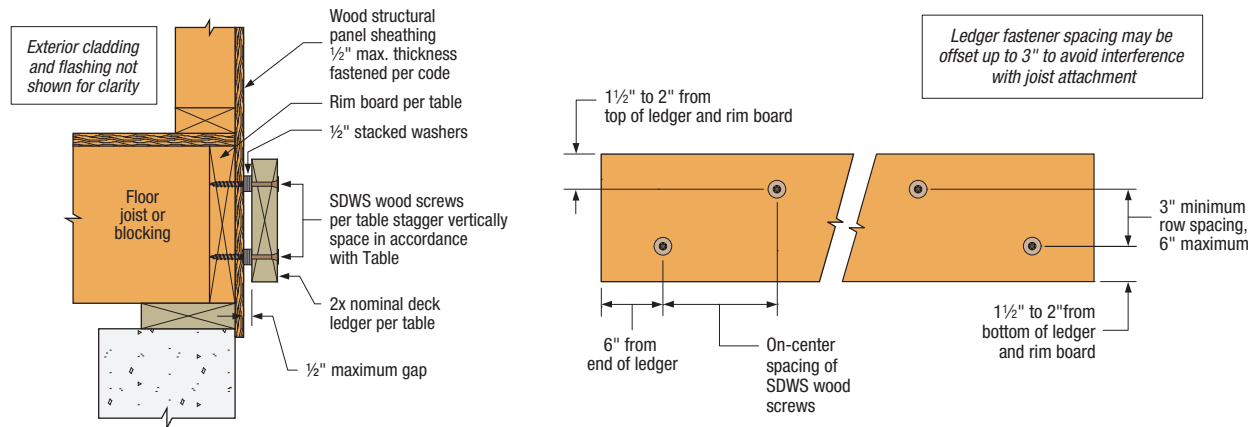


Table below lists the factored lateral resistances for SDWS Timber Screws and SDWH Timber-Hex Screws when attaching a 2x ledger with up to 1/2" thickness of stacked washers to the listed rim board.

Single-Fastener Factored Lateral Resistances for Fastening a Sawn Lumber Deck Ledger to Rim Board with 1/2" Gap

Nominal Ledger Size (in.)	Rim Board	Model No.	Factored Lateral Resistance (lb.)
2x8 2x10 2x12	2x S-P-F	SDWS22400DB	220
		SDWH19400DB	200
	1 1/8" LSL	SDWS22400DB	215
		SDWH19400DB	195
	1 3/4" LVL	SDWS22400DB	250
		SDWH19400DB	230

- Solid sawn lumber ledger shall be minimum 2x8. Rim board shall be dry lumber or EWP rim board product (equivalent specific gravity at least 0.42 for nails and screws installed in the face orientation).
- Minimum structural panel thickness shall be 0.30" (7.5 mm) fastened to the rim board per applicable code.
- Factored resistances are based on testing per ICC-ES AC233 and AC13 modified to meet the requirements of 12.11 CSA O86-14 assuming wet service conditions. Factored resistances may be increased x 1.5 for dry service conditions.
- For 1 3/4" LVL rim board made with Spruce veneers, use the values listed for 2x S-P-F.
- SDWS screws shall be placed no less than 1 1/2" from the top and bottom of the ledger or rim boards. The minimum end distance shall be 6" and the minimum spacing perpendicular to grain shall be 3". See figure 1 for details.
- Maximum 1/2" gap formed by stacked hot-dipped galvanized or stainless steel Type A plain washers with a nominal outside diameter of 0.625" and inside diameter of 0.281".
- Screws shall be tightened such that the stacked washers are tightly compressed between the ledger and the rim board.

Load Tables, Technical Data and Installation Instructions

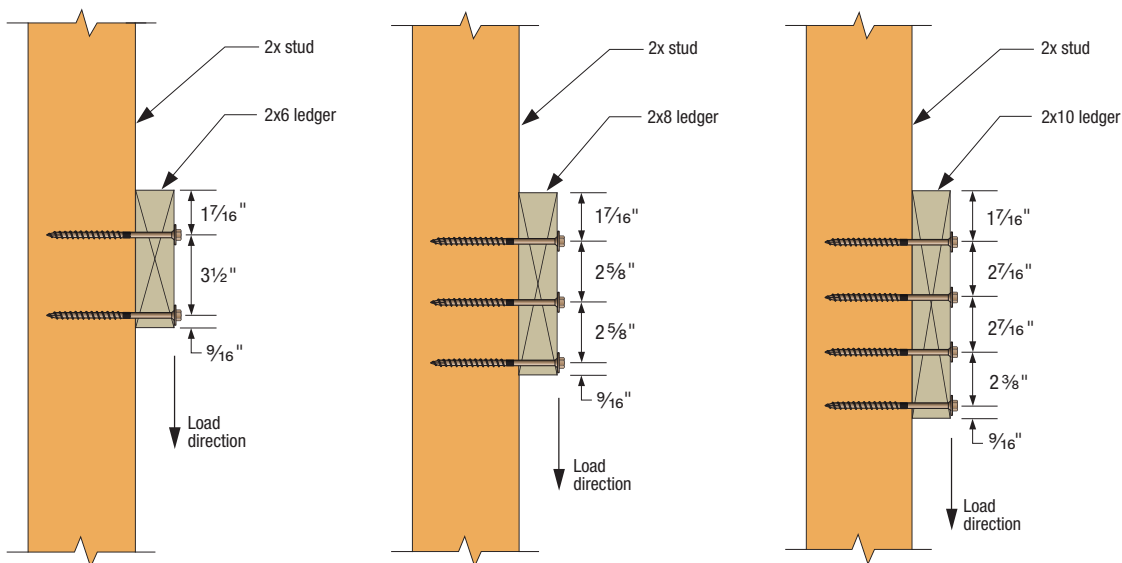
Strong-Drive® SDWH TIMBER-HEX Screw in Ledger-to-Stud Applications

Strong-Drive® SDWH Timber-Hex screws may be used to attach a ledger to the narrow face of nominal 2x lumber studs according to the following table. Tests and analyses were performed in accordance with ICC-ES Acceptance Criteria AC233.

SDWH Screw — Factored Lateral Resistance for Ledger Attachment to Studs

Model No.	Length (in.)	Ledger Size	Number of Screws per Stud	Factored Lateral Resistance (lb.) ($K_D = 1.00$)	
				D.Fir-L	S-P-F
SDWH19400DB	4	2x6	2	760	670
		2x8	3	1140	1005
		2x10	4	1520	1340

1. Factored resistances shown have been developed in accordance with 12.11 CSA O86-14 based on testing per ICC-ES AC233. Apply the adjustment factors K_D , K_{SF} and K_T as per 12.11.4.1 where applicable.
2. Resistances shown are limited to parallel-to-grain loaded solid sawn lumber studs (minimum 2" nominal).
3. Resistances shown assume the same species for ledger and stud. For mixed species applications, use the lower tabulated value for each species.
4. Fasteners shall be centered in the stud and spaced as shown in the figure below. The stud minimum end distance is 6" when loaded toward the end and 2½" when loaded away from the end. The ledger end distance is 6" for full values. For ledger end distances from 2" to <6" use 50% of the tabulated values. For end distances between 2" and 4" predrill using a 5/32" bit.
5. Screws may be installed through an intermediate layer of wood structural panel between the ledger and studs provided the structural panel is fastened to the main member per code and the minimum screw penetration into the stud is 2½" (excluding the structural panel). Longer length screws may be used.
6. For 2x8 ledgers with two screws, use 2x6 values. For 2x10 ledgers with three screws, use 2x8 values. Spacings and edge distances shown in the figure are minimum dimensions.
7. For loads in the opposite direction shown, multiply the table values by 0.5 for 2x6, 0.67 for 2x8 and 0.75 for 2x10.



Load Tables, Technical Data and Installation Instructions

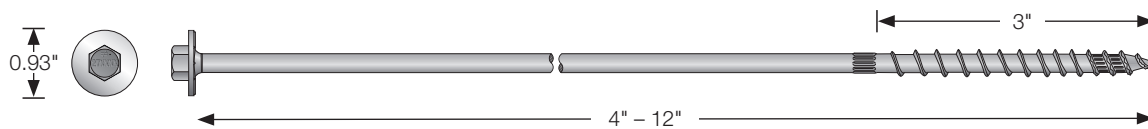
Strong-Drive® SDWH TIMBER-HEX HDG Screw

Structural Wood-to-Wood Connections

The Strong-Drive® line of structural screws includes a 0.276" diameter hot-dip galvanized screw suitable for heavy-duty marine and coastal applications. The SDWH Timber-Hex HDG screw has a SawTooth™ point and oversized integral washer that makes for fast installations; no predrilling or separate washer needed.

Codes/Standards: IAPMO-UES ER-192

US Patent 9,523,383



SDWH Timber-Hex HDG Screw — Factored Resistances for D.Fir-L Members

Size (in.)	Model No.	Thread Length (in.)	D.Fir-L												Factored Withdrawal Resistance (lb.) (K _D = 1.15)
			Factored Lateral Resistance (lb.) (K _D = 1.00)												
			Wood Side Member Thickness (in.)												
			1½"				3"				3½"				
P _r	Q _r	Q _{r1}	Q _{r2}	P _r	Q _r	Q _{r1}	Q _{r2}	P _r	Q _r	Q _{r1}	Q _{r2}				
0.270 x 4	SDWH27400G	3	345	155	235	265	—	—	—	—	—	—	—	—	1070
0.270 x 6	SDWH27600G	3	455	265	355	300	565	265	450	345	460	240	405	290	1070
0.270 x 8	SDWH27800G	3	455	265	390	300	580	335	455	370	580	360	455	395	1070
0.270 x 10	SDWH271000G	3	455	265	390	300	580	335	455	370	580	360	455	395	1070
0.270 x 12	SDWH271200G	3	455	265	390	300	580	335	455	370	580	360	455	395	1070

See footnotes below.

SDWH Timber-Hex HDG Screw — Factored Resistances for S-P-F Members

Size (in.)	Model No.	Thread Length (in.)	S-P-F												Factored Withdrawal Resistance (lb.) (K _D = 1.15)
			Factored Lateral Resistance (lb.) (K _D = 1.00)												
			Wood Side Member Thickness (in.)												
			1½"				3"				3½"				
P _r	Q _r	Q _{r1}	Q _{r2}	P _r	Q _r	Q _{r1}	Q _{r2}	P _r	Q _r	Q _{r1}	Q _{r2}				
0.270 x 4	SDWH27400G	3	295	130	200	225	—	—	—	—	—	—	—	—	815
0.270 x 6	SDWH27600G	3	410	225	305	270	505	225	385	315	415	205	360	265	815
0.270 x 8	SDWH27800G	3	410	240	350	270	535	300	420	335	535	310	420	355	815
0.270 x 10	SDWH271000G	3	410	240	350	270	535	300	420	335	535	320	420	355	815
0.270 x 12	SDWH271200G	3	410	240	350	270	535	300	420	335	535	320	420	355	815

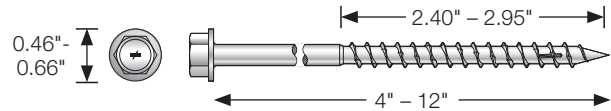
1. P_r — both members are parallel-to-grain loading.
2. Q_r — both members are perpendicular-to-grain loading.
3. Q_{r1} — main member is perpendicular and side member is parallel-to-grain loading.
4. Q_{r2} — side member is perpendicular and main member is parallel-to-grain loading.
5. Factored withdrawal resistances have been increased 15% for short-term load duration. Reduce where other durations govern.
6. Factored withdrawal resistances assume full thread penetration into the main member.
7. For wet service conditions, multiply the tabulated values x 0.67 for single fastener applications. When groups of fasteners are used, see 12.2.1.6 CSA O86-14 for the applicable reduction factor (K_{SF}).
8. Factored lateral resistances shown have been developed in accordance with Clause 12.6 CSA O86-14 based on testing per ICC-ES AC233. Apply the adjustment factors K_D, K_{SF}, K_T and J_G where applicable.

Load Tables, Technical Data and Installation Instructions

Strong-Drive® SDWH TIMBER-HEX SS Screw

Structural Wood-to-Wood Connections Including Ledgers

Type 316 stainless steel for maximum corrosion protection.



SDWH Timber-Hex SS Screw — Factored Resistances for D.Fir-L Members

Size (in.)	Model No.	Thread Length (in.)	D.Fir-L												Factored Withdrawal Resistance (lb.) (K _D = 1.15)	
			Factored Lateral Resistance (lb.) (K _D = 1.00)													
			Wood Side Member Thickness (in.)													
			1½"				3"				3½"					
P _r	Q _r	Q _{r1}	Q _{r2}	P _r	Q _r	Q _{r1}	Q _{r2}	P _r	Q _r	Q _{r1}	Q _{r2}	P _r	Q _r	Q _{r1}	Q _{r2}	
0.188 x 4	SDWH19400SS	2.4	300				250				—				720	
0.188 x 4½	SDWH19450SS	2.75	300				300				250				825	
0.188 x 5	SDWH19500SS	2.4	300				300				300				720	
0.188 x 6	SDWH19600SS	2.4	300				300				300				720	
0.188 x 8	SDWH19800SS	2.4	300				300				300				720	
0.276 x 4	SDWH27400SS	2.95	330	145	225	210	—	—	—	—	—	—	—	—	—	1000
0.276 x 5	SDWH27500SS	2.95	380	210	305	240	245	140	210	155	—	—	—	—	—	1000
0.276 x 6	SDWH27600SS	2.95	380	215	330	240	430	260	335	285	375	210	295	230	—	1000
0.276 x 8	SDWH27800SS	2.95	380	215	330	240	430	285	335	310	430	285	335	335	—	1000
0.276 x 10	SDWH271000SS	2.95	380	215	330	240	430	285	335	310	430	285	335	335	—	1000
0.276 x 12	SDWH271200SS	2.95	380	215	330	240	430	285	335	310	430	285	335	335	—	1000

1. P_r — both members are parallel-to-grain loading.
2. Q_r — both members are perpendicular-to-grain loading.
3. Q_{r1} — main member is perpendicular and side member is parallel-to-grain loading.
4. Q_{r2} — side member is perpendicular and main member is parallel-to-grain loading.
5. Factored lateral resistances shown have been developed in accordance with Clause 12.6 CSA O86-14 for SDWH27 and Clause 12.11 CSA O86-14 for SDWH19 based on testing per ICC-ES AC233. Apply the adjustment factors K_D, K_{SF}, K_T and J_G where applicable.
6. Factored withdrawal resistances assume full penetration into the main member and have been increased 15% for short-term load duration. Reduce where other durations govern.
7. Factored withdrawal resistances shown do not include head pull-through resistances of the side member. Head pull-through resistances are 255 lb. for side member thickness = 1.5", 510 lb. for side member thickness = 3" and 600 lb. for side member thickness = 3.5". Values have been calculated in accordance with Clause 12.11.5.3 CSA O86-14.
8. For wet service conditions, multiply the tabulated values x 0.67 for single fastener applications. When groups of fasteners are used, see 12.2.1.6 CSA O86-14 for the applicable reduction factor (K_{SF}).

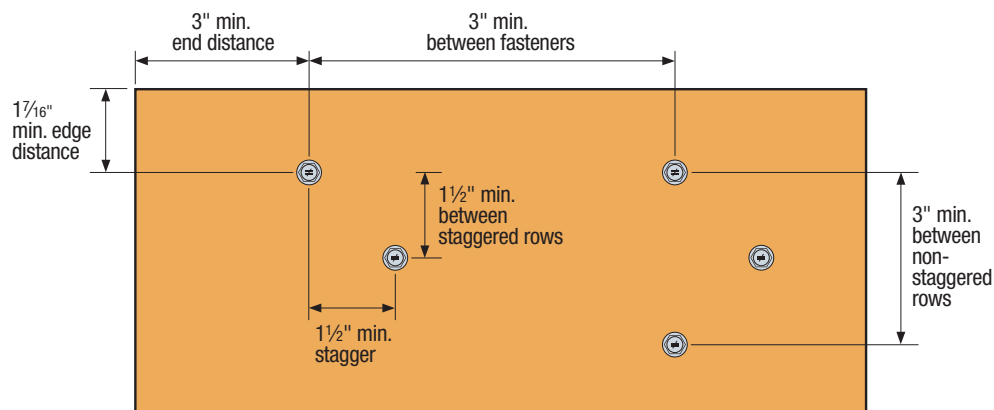
Load Tables, Technical Data and Installation Instructions

Strong-Drive® SDWH TIMBER-HEX SS Screw (cont.)

SDWH Timber-Hex SS Screw — Factored Resistances for S-P-F Members

Size (in.)	Model No.	Thread Length (in.)	S-P-F												Factored Withdrawal Resistance (lb.) (K _D = 1.15)
			Factored Lateral Resistance (lb.) (K _D = 1.00)												
			Wood Side Member Thickness (in.)												
			1½"				3"				3½"				
			P _r	Q _r	Q _{r1}	Q _{r2}	P _r	Q _r	Q _{r1}	Q _{r2}	P _r	Q _r	Q _{r1}	Q _{r2}	
0.188 x 4	SDWH19400SS	2.4	265				220				—				545
0.188 x 4½	SDWH19450SS	2.75	265				265				220				625
0.188 x 5	SDWH19500SS	2.4	265				270				265				545
0.188 x 6	SDWH19600SS	2.4	265				270				270				545
0.188 x 8	SDWH19800SS	2.4	265				270				270				545
0.276 x 4	SDWH27400SS	2.95	285	125	195	190	—	—	—	—	—	—	—	—	760
0.276 x 5	SDWH27500SS	2.95	340	180	260	215	220	120	190	140	—	—	—	—	760
0.276 x 6	SDWH27600SS	2.95	340	195	295	215	400	225	310	255	335	185	275	210	760
0.276 x 8	SDWH27800SS	2.95	340	195	295	215	400	255	310	280	400	265	310	300	760
0.276 x 10	SDWH271000SS	2.95	340	195	295	215	400	255	310	280	400	265	310	300	760
0.276 x 12	SDWH271200SS	2.95	340	195	295	215	400	255	310	280	400	265	310	300	760

1. P_r — both members are parallel-to-grain loading.
2. Q_r — both members are perpendicular-to-grain loading.
3. Q_{r1} — main member is perpendicular and side member is parallel-to-grain loading.
4. Q_{r2} — side member is perpendicular and main member is parallel-to-grain loading.
5. Factored lateral resistances shown have been developed in accordance with Clause 12.6 CSA O86-14 for SDWH27 and Clause 12.11 CSA O86-14 for SDWH19 based on testing per ICC-ES AC233. Apply the adjustment factors K_D, K_{SF}, K_T and J_G where applicable.
6. Factored withdrawal resistances assume full penetration into the main member and have been increased 15% for short-term load duration. Reduce where other durations govern.
7. Factored withdrawal resistances shown do not include head pull-through resistances of the side member. Head pull-through resistances are 255 lb. for side member thickness = 1.5", 510 lb. for side member thickness = 3" and 600 lb. for side member thickness = 3.5". Values have been calculated in accordance with Clause 12.11.5.3 CSA O86-14.
8. For wet service conditions, multiply the tabulated values x 0.67 for single fastener applications. When groups of fasteners are used, see 12.2.1.6 CSA O86-14 for the applicable reduction factor (K_{SF}).



SDWH SS Screw Spacing Detail

Fastener Types

Fastener Types and Sizes Specified for Simpson Strong-Tie® Connectors

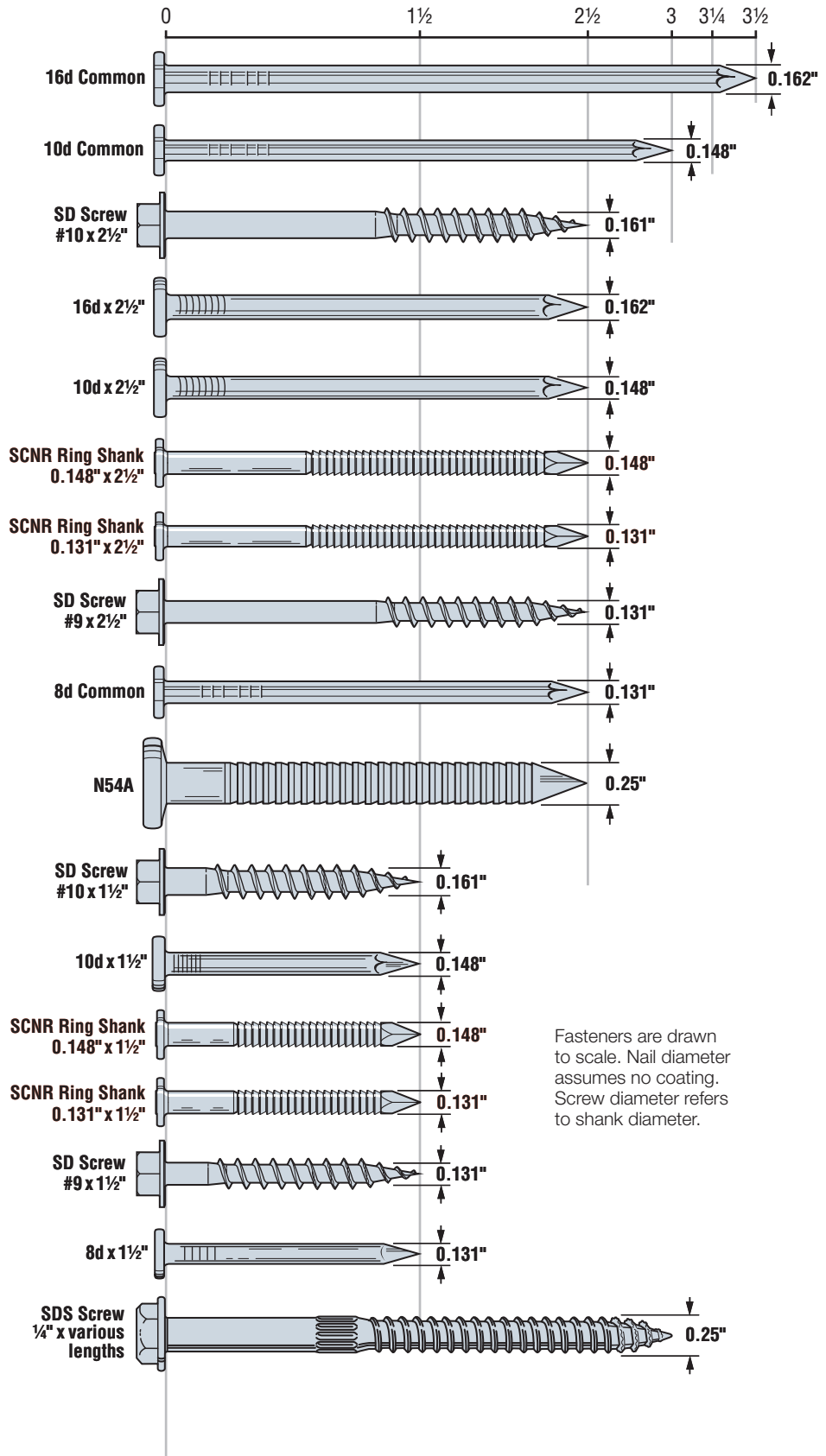
Many Simpson Strong-Tie connectors have been designed and tested for use with specific types and sizes of fasteners. The specified quantity, type and size of fastener must be installed in the correct holes on the connector to achieve published values. Other factors such as fastener material and finish are also important. Incorrect fastener selection or installation can compromise connector performance and could lead to failure. For more information about fasteners, see our *Fastening Systems* catalogue at strongtie.com or access our Fastener Finder software at strongtie.com/software.



The Simpson Strong-Tie® Strong-Drive® SD Connector screw is the only screw approved for use with our connectors. See pp. 31–33 for more information.



The factored resistances of stainless-steel connectors match those of carbon-steel connectors when installed with Simpson Strong-Tie® stainless-steel, SCNR ring-shank nails. For more information, refer to engineering letter L-F-SSNAILS at strongtie.com.



Fasteners are drawn to scale. Nail diameter assumes no coating. Screw diameter refers to shank diameter.

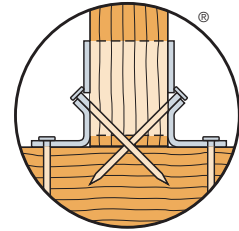
Fastener Design Information

In some cases, it is desirable to install Simpson Strong-Tie face-mount joist hangers and straight straps with nails that are a different type or size than what is called out in the load table. In these cases, these reduction factors must be applied to the factored resistances listed for the connector.

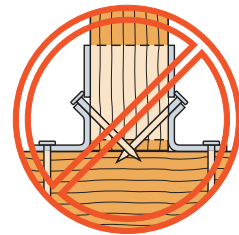
Resistance Adjustment Factors for Optional Fasteners Used with Face-Mount Hangers and Straight Straps

Specified Catalogue Nail	Replacement Nail	Face-Mount Hangers	Straight Straps
16d common (0.162" x 3½")	10d common (0.148" x 3")	0.83	0.83
	12d common (0.148" x 3¼")		
16d common (0.162" x 3½")	16d x 2½" (0.162" x 2½")	1.00	1.00
16d common (0.162" x 3½")	10d x 1½" (0.148" x 1½")	0.64	0.77
16d common (0.162" x 3½")	16d spiral (0.152" x 3½")	0.91	0.91
16d common (0.162" x 3½")	10d spiral (0.122" x 3")	0.61	0.61
	12d spiral (0.122" x 3¼")		
10d common (0.148" x 3")	10d x 2½" (0.148" x 2½")	0.85	1.00
10d common (0.148" x 3")	8d common (0.131" x 2½")	0.80	0.80
10d common (0.148" x 3")	10d x 1½" (0.148" x 1½")	0.77	0.92
10d common (0.148" x 3")	10d spiral (0.122" x 3")	0.74	0.74
8d common (0.131" x 2½")	8d x 1½" (0.131" x 1½")	0.85	0.98
8d common (0.131" x 2½")	8d spiral (0.110" x 2½")	0.64	0.75

For LUS, HUS, LJS26DS, HHUS and HGUS hangers



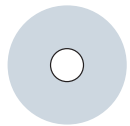
Double-shear nailing shall use full length common nails



Shorter nails may not be used as double-shear nails

- Resistance adjustment factors shown in the table are based on calculated reduction factors and are applicable for all face mount hangers and straight straps throughout this catalogue, except as noted in the footnotes below.
- Some products have been tested specifically with alternate fasteners and have reduced capacities published on the specific product page which may differ from the values calculated using this table. The values on the product page shall be used in lieu of the values calculated using this table.
- This table does not apply to SUR/SUL/HSUR/HSUL hangers or to hangers modified per allowed options or to connectors made from steel thicker than 10 gauge.
- Unless noted otherwise, 10d x 1½", 10d x 2½" or 16d x 2½" nails may not be substituted for joist nails in double-shear hangers (i.e. LUS, HUS, HHUS, HGUS). For applications involving pneumatic nails, refer to strongtie.com for additional information.
- Do not substitute 10d x 1½" nails for face nails on slope and skew combinations or skewed only LSU and LSSU.
- For straps installed over sheathing use a 2½" long nail minimum.

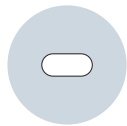
Fastening Identification



Round Holes

Purpose: To fasten a connector.

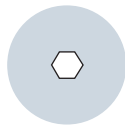
Fill Requirements: Always fill, unless noted otherwise.



Obround Holes

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

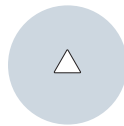
Fill Requirements: Always fill.



Hexagonal Holes

Purpose: To fasten a connector to concrete or masonry.

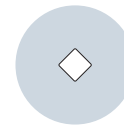
Fill Requirements: Always fill when fastening a connector to concrete or masonry.



Triangular Holes

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

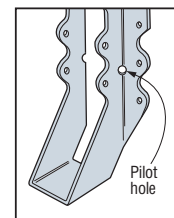
Fill Requirements: When the Designer specifies max. nailing.



Diamond Holes

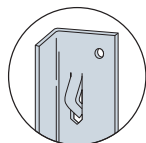
Purpose: To temporarily fasten a connector to make installing it easier.

Fill Requirements: None.



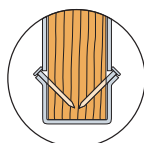
Pilot Holes

Tooling holes for manufacturing purposes. No fasteners required.



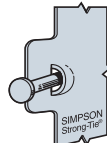
Speed Prongs

Used to temporarily position and secure the connector for easier and faster installation.



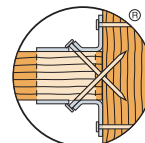
Positive Angle Nailing (PAN)

Provided when wood splitting may occur, and to speed installation.



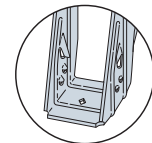
Dome Nailing

This feature guides the nail into the joist and header at a 45° angle. US Patent 5,603,580



Double-Shear Nailing

The nail is installed into the joist and header, distributing the load through two points on each joist nail for greater strength. Double-shear nailing must be full-length catalogue nail.



ITS/IUS Strong-Grip™

The Strong-Grip™ seat allows the I-joist to "snap" in securely without the need for joist nails.

Load Tables, Technical Data and Installation Instructions

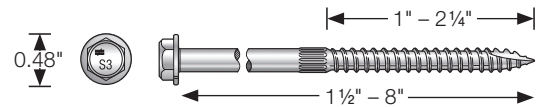
Strong-Drive® SDS HEAVY-DUTY CONNECTOR Screw

Heavy-Duty Simpson Strong-Tie® Connectors

The Simpson Strong-Tie® Strong-Drive® SDS screw is a 1/4" diameter high-strength structural wood screw ideal for various connector installations as well as wood-to-wood and EWP fastening applications.

Install Tips: A low-speed 1/2" drill with a 3/8" hex driver (BITHEXR38-134) is the recommended tool for installation.

Codes/Standards: ICC-ES ESR-2236; US Patent 9,523,383



SDS Screw — Factored Resistances — Steel Side-Plate Applications

Size (in.)	Thread Length (in.)	Coating/ Material	Model No.	Factored Resistance (lb.)									
				D.Fir-L					S-P-F				
				Lateral (K _D = 1.00)				Withdrawal (K _D = 1.15)	Lateral (K _D = 1.00)				Withdrawal (K _D = 1.15)
				Steel Side Plate Thickness, in. (ga.)					Steel Side Plate Shear, in. (ga.)				
0.054 (16 ga.)	0.068 (14 ga.)	0.123 (10 ga.)	0.241 (3 ga.)	0.054 (16 ga.)	0.068 (14 ga.)	0.123 (10 ga.)	0.241 (3 ga.)						
1/4 x 1 1/2	1	Double-barrier coating	SDS25112	310	340	465	545	280	285	315	435	435	215
1/4 x 2	1 1/4		SDS25200	370	400	530	655	355	340	370	455	455	270
1/4 x 2 1/2	1 1/2		SDS25212	435	465	590	825	425	395	420	550	590	320
1/4 x 3	2		SDS25300	495	525	655	840	565	445	475	590	590	430
1/4 x 3 1/2	2 1/4		SDS25312	550	585	715	840	635	500	525	590	590	485
1/4 x 4 1/2	2 3/4		SDS25412	550	585	720	840	775	500	530	590	590	590
1/4 x 5	2 3/4		SDS25500	550	585	720	840	775	500	530	590	590	590
1/4 x 6	3 1/4		SDS25600	550	585	720	840	915	500	530	590	590	700
1/4 x 8	3 1/4	SDS25800	550	585	720	840	915	500	530	590	590	700	
1/4 x 1 1/2	1	Type 316 stainless steel	SDS25112	310	340	465	545	280	285	315	435	435	215
1/4 x 2 1/2	1 1/2		SDS25212	435	465	590	825	425	395	420	550	590	320
1/4 x 3	2		SDS25300	495	525	655	840	565	445	475	590	590	430
1/4 x 3 1/2	2 1/4		SDS25312	550	585	715	840	635	500	525	590	590	485

- Factored resistances shown have been developed in accordance with 12.11 CSA O86-14. Apply the adjustment factors K_D, K_{SP} and K_T as per 12.11.4.1 CSA O86-14 when applicable.
- Factored lateral resistances shown assume steel side plates with a minimum F_u = 45000 psi (310 MPa).
- Factored lateral resistances shown assume full penetration into the main member.
- Factored withdrawal resistances shown are applicable to short-term loads, reduce for other load durations where applicable.
- Factored withdrawal resistances shown assume the entire threaded portion of the screw is installed into the main member. Where the penetration into the main member is less than the length of the thread, the factored resistance may be calculated by multiplying the length of penetration of the threads x 280 lb./in. (49 N/mm) for D.Fir-L and 215 lb./in. (38 N/mm) for S-P-F.
- Factored withdrawal resistances shown are for penetration into the main member. Head pull-through resistance may govern and must be calculated in accordance with 12.11.5.3 CSA O86-14 using a washer diameter d_w = 0.480".
- Minimum spacing, edge and end distances shall be in accordance with 12.9.2.1 CSA O86-14 using a fastener diameter of 0.250" (6.4 mm).
- Screws may be provided with the 4CUT™ or Type-17 point
- Strong-Drive® SDS Heavy-Duty Connector screws install best with a low speed 1/2" drill with a 3/8" hex head driver.
- Where predrilling is required for SDS, use a 5/32" bit.

Load Tables, Technical Data and Installation Instructions

Strong-Drive®

SDS HEAVY-DUTY CONNECTOR Screw (cont.)

SDS Screw — Factored Lateral Resistances – D.Fir-L Lumber

Size (in.)	Model No.	D.Fir-L Factored Lateral Resistances (lb.)										
		Wood Side Plate Thickness (in.)										
		¾	7/8	1	1⅛	1¼	1½	1¾	2½	3	3½	4½
¼ x 2	SDS25200	239	—	—	—	—	—	—	—	—	—	—
¼ x 2½	SDS25212	302	300	299	297	296	—	—	—	—	—	—
¼ x 3	SDS25300	364	362	361	359	358	370	270	—	—	—	—
¼ x 3½	SDS25312	367	381	395	409	420	435	435	—	—	—	—
¼ x 4½	SDS25412	367	381	395	409	424	475	510	540	475	—	—
¼ x 5	SDS25500	367	381	395	409	424	475	510	580	540	477	—
¼ x 6	SDS25600	367	381	395	409	424	475	510	580	580	581	477
¼ x 8	SDS25800	367	381	395	409	424	475	510	580	581	581	581

See footnotes below.

SDS Screw — Factored Lateral Resistances – S-P-F Lumber

Size (in.)	Model No.	S-P-F Factored Lateral Resistances (lb.)										
		Wood Side Plate Thickness (in.)										
		¾	7/8	1	1⅛	1¼	1½	1¾	2½	3	3½	4½
¼ x 2	SDS25200	205	—	—	—	—	—	—	—	—	—	—
¼ x 2½	SDS25212	258	257	256	255	254	—	—	—	—	—	—
¼ x 3	SDS25300	312	310	309	308	307	319	319	—	—	—	—
¼ x 3½	SDS25312	327	339	351	361	360	372	372	—	—	—	—
¼ x 4½	SDS25412	327	339	351	363	375	421	448	399	399	—	—
¼ x 5	SDS25500	327	339	351	363	375	421	448	523	399	399	—
¼ x 6	SDS25600	327	339	351	363	375	421	448	523	523	523	399
¼ x 8	SDS25800	327	339	351	363	375	421	448	523	523	523	523

1. Factored resistances shown have been developed in accordance with 12.11 CSA O86-14. Apply the adjustment factors K_D , K_{SF} and K_T per 12.11.4.1 CSA O86-14 where applicable.

2. Values shown assume side and main members are the same species. For side plate thicknesses less than 1½" values are based on Douglas Fir Plywood (DFP) for D.Fir-L and OSB or Canadian Softwood Plywood (CSP) for S-P-F. For mixed species applications, use the lower of values shown in both tables.

3. Factored lateral resistances shown assume full penetration into the main member.

4. Minimum spacing, edge and end distances shall be in accordance with 12.9.2.1 CSA O86-14 using a fastener diameter of 0.25".

5. Where predrilling is required use a 5/32" bit.

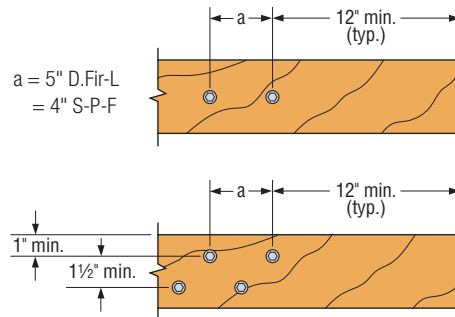
Load Tables, Technical Data and Installation Instructions

Strong-Drive® SDS HEAVY-DUTY CONNECTOR Screw (cont.)

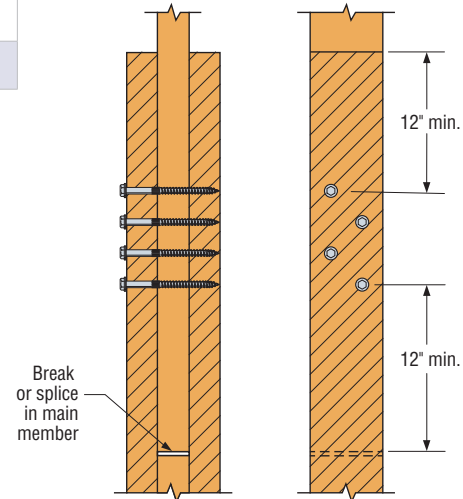
SDS Screw — Factored Lateral Resistances — Double-Shear Connections (lb.)

Size (in.)	Model No.	Side Members	Factored Lateral Resistance (lb.) (K _D = 1.00)	
			D.Fir-L	S-P-F
¼ x 3	SDS25300	¾" wood structural panel rated sheathing	725	650
¼ x 4½	SDS25412	2x solid sawn lumber	575	575

1. Factored resistances shown have been developed in accordance with 12.11 CSA O86-14. Apply the adjustment factors K_D, K_{GF} and K_T per 12.11.4.1 CSA O86-14 where applicable.
2. Factored resistances are based on 1½" thick main members and assume no gap between the side and main members.
3. For applications with 2x side members and mixed species, use the factored resistance based on the lower of the side member or the main member species.
4. The Designer is responsible for the design of wood members.



SDS Spacing Details

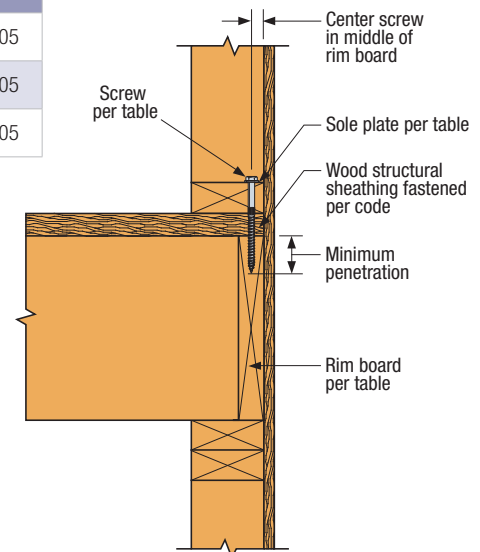


Typical SDS Double-Shear Installation

SDS Screw — Factored Lateral Resistances — Sole-to-Rim Connections (lb.)

Screw Size (in.)	Model No.	Minimum Penetration into Rim Board (in.)	Factored Lateral Resistances (lb.) per Screw (K _D = 1.15)							
			2x D.Fir-L Rim Board		2x S-P-F Rim Board		1¼" LVL Rim Board		1¼" LSL Rim Board	
			Sole Plate		Sole Plate		Sole Plate		Sole Plate	
			D.Fir-L	S-P-F	D.Fir-L	S-P-F	D.Fir-L	S-P-F	D.Fir-L	S-P-F
¼" x 4.5	SDS25412	2	545	505	520	485	510	505	550	505
¼" x 5	SDS25500	2	545	505	530	485	510	505	550	505
¼" x 6	SDS25600	2	545	505	530	485	510	505	550	505

1. Factored resistances shown have been developed in accordance with 12.11 CSA O86-14 based on testing per ICC-ES AC233 and are limited to parallel-to-grain loading.
2. Apply the adjustment factors K_D, K_{GF} and K_T as per 12.11.4.1 CSA O86-14 when applicable.
3. Minimum spacing and end distances shall be per 12.11.2.2 CSA O86-14.
4. Minimum spacing of the SDS for LVL and LSL applications is 6" o.c., minimum end distance is 6", and minimum edge distance is ¾".
5. Wood structural panel up to 1½" thick is permitted between the sole plate and rim board provided it is fastened to the rim board per code and the minimum penetration of the screw into the rim board is met.
6. A double 2x sole plate is permitted provided it is independently fastened per the code and the minimum screw penetration per the table is met.



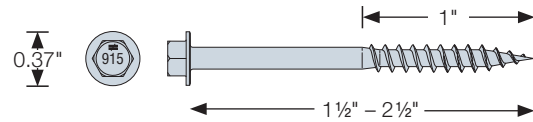
Sole-to-Rim Board Assembly

Load Tables, Technical Data and Installation Instructions

Strong-Drive® SD CONNECTOR Screw

Simpson Strong-Tie® Connectors

Codes/Standards: ICC-ES ESR-3046; US Patent 9,523,383



SD Screw — Factored Resistances — Steel Side Plates

Size (in.)	Model No.	Thread Length (in.)	Factored Resistance (lb.)					
			D.Fir-L			S-P-F		
			Lateral (K _D = 1.00)		Withdrawal (K _D = 1.15)	Lateral (K _D = 1.00)		Withdrawal (K _D = 1.15)
			Steel Side Plate Thickness (in.) (ga.)			Steel Side Plate Thickness (in.) (ga.)		
0.035 (20 ga.)	0.103 (12 ga.)		0.035 (20 ga.)	0.103 (12 ga.)				
#9 x 1 1/2	SD9112	1	195	295	220	175	280	170
#9 x 2 1/2	SD9212	1	285	390	220	250	360	170
#10 x 1 1/2	SD10112	1	220	340	245	200	320	185
#10 x 2 1/2	SD10212	1	325	445	245	290	395	185

See footnotes below.

SD Screw — Factored Resistances — Wood Side Plates

Size (in.)	Model No.	Thread Length (in.)	Factored Lateral Resistance (lb.) (K _D = 1.00)					
			D.Fir-L			S-P-F		
			Wood Side Plate Thickness (in.)			Wood Side Plate Thickness (in.)		
			1/2	3/4	1 1/2	1/2	3/4	1 1/2
#9 x 1 1/2	SD9112	1	150	—	—	130	—	—
#9 x 2 1/2	SD9212	1	240	245	230	205	210	195
#10 x 1 1/2	SD10112	1	—	—	—	—	—	—
#10 x 2 1/2	SD10212	1	—	270	265	—	235	225

1. Factored resistances shown have been developed in accordance with 12.11 CSA O86-14. Apply the adjustment factors K_D, K_{SF} and K_T as per 12.11.4.1 CSA O86-14 to the tabulated values shown when applicable. Resistances assume full penetration into the main member.
2. Factored resistances shown assume steel side plates with F_u = 45000 psi (310 MPa).
3. Factored resistances shown for 1/2" wood side plates is applicable to structural panel side members (OSB, DFP and CSP) as per 12.11.4.2 CSA O86-14.

4. Factored withdrawal resistances shown are for full penetration to the main member. Head pull-through resistance may govern and must be calculated in accordance with 12.11.5.3 CSA O16-14 using a washer diameter of 0.378".
5. Minimum spacing edge and end distances shall be in accordance with 12.9.2.1 CSA O86-14 using the nominal diameter, 0.177" for SD9 and 0.200" for SD10.

Load Tables, Technical Data and Installation Instructions

Strong-Drive®

SD CONNECTOR Screw (cont.)

Connectors Approved for Use with the Strong-Drive® SD Structural-Connector Screw

These connectors are approved for use when installed with the SD screw, but may contain load reductions. Check with your local building department to determine whether the correct size of SD structural-connector screw may be used as a suitable substitute for nails.

Since testing of the SD structural-connector screw is ongoing, Simpson Strong-Tie will continue to add newly-approved connectors to this list. For the most current list of approved connectors, load values and applications, visit strongtie.com/sd.

Model No.	SD9 Qty.		SD10 Qty.		Model No.	SD9 Qty.		SD10 Qty.		Model No.	SD9 Qty.		SD10 Qty.	
	1½"	2½"	1½"	2½"		1½"	2½"	1½"	2½"		1½"	2½"	1½"	2½"
A21	(4)	—	—	—	HGUS26-4	—	—	—	(28)	HSUR/L46	—	(16)	—	—
A23	(8)	—	—	—	HGUS28-4	—	—	—	(48)	HSUR/L410	—	(26)	—	—
A33	(8)	—	—	—	HGUS210-4	—	—	—	(62)	HSUR/L414	—	(34)	—	—
A34	(8)	—	—	—	HGUS212-4	—	—	—	(76)	HSUR/L4.12/9	(12)	(2)	—	—
A35	(12)	—	—	—	HGUS214-4	—	—	—	(88)	HSUR/L4.12/11	(16)	(2)	—	—
A44	(8)	—	—	—	HGUS46	—	—	—	(28)	HSUR/L4.12/14	(20)	(2)	—	—
ABA44Z	(6)	—	—	—	HGUS48	—	—	—	(48)	HSUR/L4.12/16	(24)	(2)	—	—
ABA44RZ	(6)	—	—	—	HGUS410	—	—	—	(62)	HSUR/L4.28/9	(12)	(2)	—	—
ABA46Z	—	—	(8)	—	HGUS412	—	—	—	(76)	HSUR/L4.28/11	(16)	(2)	—	—
ABA66Z	—	—	(8)	—	HGUS414	—	—	—	(88)	HSUR/L4.28/11	(16)	(2)	—	—
ABA66RZ	—	—	(8)	—	HGUS2.75/10	—	—	—	(62)	HSUR/L4.75/9	(12)	(2)	—	—
ABU44Z	—	—	(12)	—	HGUS2.75/12	—	—	—	(76)	HSUR/L4.75/11	(16)	(2)	—	—
ABW44Z	(8)	—	—	—	HGUS2.75/14	—	—	—	(88)	HSUR/L4.75/14	(20)	(2)	—	—
ABW44RZ	(8)	—	—	—	HGUS3.25/10	—	—	—	(62)	HSUR/L4.75/16	(24)	(2)	—	—
ABW46Z	(10)	—	—	—	HGUS3.25/12	—	—	—	(76)	HSUR/L5.12/9	(12)	(2)	—	—
ABW46RZ	(10)	—	—	—	HGUS5.25/10	—	—	—	(62)	HSUR/L5.12/11	(16)	(2)	—	—
ABW66Z	(12)	—	—	—	HGUS5.25/12	—	—	—	(76)	HSUR/L5.12/14	(20)	(2)	—	—
ABW66RZ	(12)	—	—	—	HGUS5.50/8	—	—	—	(48)	HSUR/L5.12/16	(24)	(2)	—	—
AC4	—	—	(28)	—	HGUS5.50/10	—	—	—	(62)	HTT4	—	—	(18)	—
AC6	—	—	(28)	—	HGUS5.50/12	—	—	—	(76)	HTT5	—	—	(26)	—
BC4	—	—	(12)	—	HGUS5.50/14	—	—	—	(88)	HTU26	(31)	—	—	—
BC40	—	—	(10)	—	HGUS5.62/10	—	—	—	(62)	HTU26 (Min.)	(34)	—	—	—
BC60	—	—	(10)	—	HGUS5.62/12	—	—	—	(76)	HTU26 (Max.)	(40)	—	—	—
BCS2-2/4	—	(14)	—	—	HGUS5.62/14	—	—	—	(88)	HTU28 (Min.)	(40)	—	—	—
CTS218	(24)	—	—	—	HGUS6.88/10	—	—	—	(62)	HTU28 (Max.)	(52)	—	—	—
DJT14Z	—	—	—	(8)	HGUS6.88/12	—	—	—	(76)	HTU210 (Min.)	(46)	—	—	—
DPT5Z¹	(5)	—	—	—	HGUS6.88/14	—	—	—	(88)	HTU210 (Max.)	(64)	—	—	—
DPTZZ¹	(5)	—	—	—	HGUS7.25/8	—	—	—	(48)	HTU26-2 (Min.)	(34)	—	—	—
EPB44	—	—	(8)	—	HGUS7.25/10	—	—	—	(62)	HTU26-2 (Max.)	(40)	—	—	—
EPB44PHDG	—	—	(8)	—	HGUS7.25/12	—	—	—	(76)	HTU28-2 (Min.)	(40)	—	—	—
EPC4Z	(18)	—	—	—	HGUS7.25/14	—	—	—	(88)	HTU28-2 (Max.)	(52)	—	—	—
EPC6Z	(18)	—	—	—	HHUS26-2	—	—	—	(20)	HTU210-2 (Min.)	(46)	—	—	—
EPC8Z	(18)	—	—	—	HHUS28-2	—	—	—	(30)	HTU210-2 (Max.)	(64)	—	—	—
FB24Z¹	(5)	—	—	—	HHUS210-2	—	—	—	(40)	HUS26	—	—	—	(20)
FB24R¹	(5)	—	—	—	HHUS210-3	—	—	—	(40)	HUS28	—	—	—	(30)
FB26¹	(6)	—	—	—	HHUS210-4	—	—	—	(40)	HUS210	—	—	—	(40)
FBFZ¹	(4)	—	—	—	HHUS46	—	—	—	(20)	HUS26-2	—	—	—	(8)
FBR24Z¹	(5)	—	—	—	HHUS48	—	—	—	(30)	HUS28-2	—	—	—	(12)
FPBM44¹	(8)	—	—	—	HHUS410	—	—	—	(40)	HUS210-2	—	—	—	(16)
FWH2¹	(16)	—	—	—	HHUS5.50/10	—	—	—	(40)	HUS212-2	—	—	—	(20)
GA1	(4)	—	—	—	HHUS7.25/10	—	—	—	(40)	HUS46	—	—	—	(8)
GA2	(6)	—	—	—	HHRC2-2	—	—	—	(62)	HUS48	—	—	—	(12)
H1	(10)	—	—	—	HHRC42-2	—	—	—	(62)	HUS410	—	—	—	(16)
H2.5	(10)	—	—	—	HHRC4/1.81	—	—	—	(62)	HUS412	—	—	—	(20)
H2.5A	(10)	—	—	—	HHRC44	—	—	—	(62)	HUS1.81/10	—	—	—	(40)
H4	(8)	—	—	—	HHRC5.25/3.25	—	—	—	(62)	KBS1Z	(12)	—	—	—
H8	(10)	—	—	—	HHRC5.37/3.12	—	—	—	(62)	L30	(4)	—	—	—
H10A	(18)	—	—	—	HHRC5.37/3.56	—	—	—	(62)	L50	(6)	—	—	—
H10A-2	(18)	—	—	—	HHRC5.25/3.62	—	—	—	(62)	L70	(8)	—	—	—
HGUS26	—	—	—	(28)	HHRC64	—	—	—	(67)	L90	(10)	—	—	—
HGUS28	—	—	—	(48)	HHRC66	—	—	—	(67)	LCE4	—	—	(24)	—
HGUS26-2	—	—	—	(28)	HPTZ	—	—	(8)	—	LPC4Z	(16)	—	—	—
HGUS28-2	—	—	—	(48)	HRS6	(6)	—	—	—	LRU26Z	—	—	—	(9)
HGUS210-2	—	—	—	(62)	HRS8	(10)	—	—	—	LRU28Z	—	—	—	(10)
HGUS26-3	—	—	—	(28)	HRS12	(14)	—	—	—	LRU210Z	—	—	—	(12)
HGUS28-3	—	—	—	(48)	HTP37Z	(20)	—	—	—	LRU212Z	—	—	—	(13)
HGUS210-3	—	—	—	(62)	HSUR/L26-2	—	(16)	—	—	LSCZ	(17)	—	—	—
HGUS212-3	—	—	—	(76)	HSUR/L210-2	—	(26)	—	—	LSTA9	(8)	—	—	—
HGUS214-3	—	—	—	(88)	HSUR/L214-2	—	(34)	—	—	LSTA12	(10)	—	—	—

Load Tables, Technical Data and Installation Instructions

Strong-Drive®

SD CONNECTOR Screw (cont.)

Connectors Approved for Use with the Strong-Drive® SD Structural-Connector Screw

These connectors are approved for use when installed with the SD screw, but may contain load reductions. Check with your local building department to determine whether the correct size of SD structural-connector screw may be used as a suitable substitute for nails.

Since testing of the SD structural-connector screw is ongoing, Simpson Strong-Tie will continue to add newly-approved connectors to this list. For the most current list of approved connectors, load values and applications, visit strongtie.com/sd.

Model No.	SD9 Qty.		SD10 Qty.		Model No.	SD9 Qty.		SD10 Qty.		Model No.	SD9 Qty.		SD10 Qty.	
	1½"	2½"	1½"	2½"		1½"	2½"	1½"	2½"		1½"	2½"	1½"	2½"
LSTA15	(12)	—	—	—	LSSU2.1	(7)	(10)	—	—	RTT22Z	(10)	—	—	—
LSTA18	(14)	—	—	—	LSSUI35	(7)	(10)	—	—	ST9	—	—	(8)	—
LSTA21	(14)	—	—	—	LSSUH310	—	(30)	—	—	ST12	—	—	(10)	—
LSTA24	(14)	—	—	—	LSSU210-2	—	(30)	—	—	ST18	—	—	(12)	—
ST292	—	—	(12)	—	LSSU410	—	(30)	—	—	ST22	—	—	(12)	—
ST2122	—	—	(12)	—	LSU4.12	—	(40)	—	—	ST292	—	—	(12)	—
ST2115	—	—	(6)	—	LSU4.28	—	(40)	—	—	ST2115	—	—	(6)	—
ST2215	—	—	(14)	—	LSU3510-2	—	(40)	—	—	ST2122	—	—	(12)	—
LSTA30	(14)	—	—	—	LSU5.12	—	(40)	—	—	ST2215	—	—	(14)	—
LSTA36	(14)	—	—	—	MST27	—	—	(30)	—	ST6215	—	—	(16)	—
LSTI49	(16)	—	—	—	MST37	—	—	(40)	—	ST6224	—	—	(20)	—
LSTI73	(16)	—	—	—	MST48	—	—	(52)	—	ST6236	—	—	(28)	—
LTP4	(12)	—	—	—	MST60	—	—	(68)	—	SUR/L24	(8)	—	—	—
LU24 (10d)	(6)	—	—	—	MST72	—	—	(70)	—	SUR/L26	(12)	—	—	—
LU26 (10d)	(10)	—	—	—	MSTA12	(12)	—	—	—	SUR/L210	(20)	—	—	—
LU28 (10d)	(10)	—	—	—	MSTA15	(10)	—	—	—	SUR/L214	(24)	—	—	—
LU210 (10d)	—	—	(10)	—	MSTA18	(14)	—	—	—	SUR/L1.81/9	(14)	—	—	—
LUC26Z (10d)	(14)	—	—	—	MSTA21	(14)	—	—	—	SUR/L1.81/11	(18)	—	—	—
LUC26Z (16d)	(16)	—	—	—	MSTA24	(14)	—	—	—	SUR/L1.81/14	(22)	—	—	—
LUC210Z (10d)	(16)	—	—	—	MSTA30	(16)	—	—	—	SUR/L2.06/9	(16)	—	—	—
LUC210Z (16d)	—	—	(16)	—	MSTA36	(16)	—	—	—	SUR/L2.06/11	(18)	—	—	—
LUS24	(4)	(2)	—	—	MSTA49	(16)	—	—	—	SUR/L2.06/14	(20)	—	—	—
LUS26	(4)	(4)	—	—	MSTA9	(8)	—	—	—	SUR/L2.06/14	(20)	—	—	—
LUS28	(6)	(4)	—	—	MSTC28	(36)	—	—	—	SUR/L2.1/9	(16)	—	—	—
LUS210	(8)	(4)	—	—	MSTC40	(46)	—	—	—	SUR/L2.1/11	(18)	—	—	—
LUS36	(4)	(4)	—	—	MSTC52	(42)	—	—	—	SUR/L2.1/14	(20)	—	—	—
LUS310	(6)	(4)	—	—	MSTC66	(44)	—	—	—	SUR/L2.1/14	(20)	—	—	—
LUS24-2	(4)	(2)	—	—	MSTC78	(44)	—	—	—	SUR/L2.37/9	(16)	—	—	—
LUS26-2	(4)	(4)	—	—	MSTI26	(26)	—	—	—	SUR/L2.37/11	(18)	—	—	—
LUS28-2	(6)	(4)	—	—	MSTI36	(36)	—	—	—	SUR/L2.37/14	(20)	—	—	—
LUS210-2	(8)	(6)	—	—	MSTI48	(38)	—	—	—	SUR/L2.37/14	(20)	—	—	—
LUS214-2	(10)	(6)	—	—	MSTI60	(38)	—	—	—	SUR/L2.56/9	(16)	—	—	—
LUS26-3	(4)	(4)	—	—	MSTI72	(60)	—	—	—	SUR/L2.56/11	(18)	—	—	—
LUS28-3	(6)	(4)	—	—	MTS12	(14)	—	—	—	SUR/L2.56/14	(20)	—	—	—
LUS210-3	(8)	(6)	—	—	MTS16	(14)	—	—	—	SUR/L2.56/14	(20)	—	—	—
LUS44	(4)	(2)	—	—	MTS20	(14)	—	—	—	SUR/L26-2	(12)	—	—	—
LUS46	(4)	(4)	—	—	NS1 ¹	(2)	—	—	—	SUR/L210-2	(20)	—	—	—
LUS48	(6)	(4)	—	—	NS2 ¹	(2)	—	—	—	SUR/L214-2	(26)	—	—	—
LUS410	(8)	(6)	—	—	PA51	(10)	—	—	—	SUR/L46	(12)	—	—	—
LUS414	(10)	(6)	—	—	PA68	(10)	—	—	—	SUR/L410	(20)	—	—	—
LSU26	(11)	—	—	—	PBS44A	—	—	(14)	—	SUR/L414	(26)	—	—	—
LSSU28	(15)	—	—	—	PC4Z	(18)	—	—	—	THASR/L29	(7)	(12)	—	—
LSSU210	(7)	(10)	—	—	PC6Z	(18)	—	—	—	THASR/L29-2	—	(20)	—	—
LSSUI25	(7)	(10)	—	—	PC8Z	(18)	—	—	—	THASR/L422	—	(20)	—	—
LSSUI2.06	(7)	(10)	—	—	PBS44A	—	—	(14)	—	TJC57	(24)	—	—	—
LSSU2.1	(7)	(10)	—	—	PF24	—	(6)	—	—	TP15 ¹	Varies	—	—	—
LSSUI35	(7)	(10)	—	—	PF26	—	(4)	—	—	TP311 ¹	Varies	—	—	—
LSSUH310	—	(30)	—	—	PSPN58Z ¹	—	—	(4)	—	TP35 ¹	Varies	—	—	—
LSSU210-2	—	(30)	—	—	RR	(8)	—	—	—	TP37 ¹	Varies	—	—	—
LSSU410	—	(30)	—	—	RSP4	(8)	—	—	—	TP39 ¹	Varies	—	—	—
LSU4.12	—	(40)	—	—	RTA12	(16)	—	—	—	TP411 ¹	Varies	—	—	—
LSU4.28	—	(40)	—	—	RTA2Z	(8)	—	—	—	TP45 ¹	Varies	—	—	—
LSU3510-2	—	(40)	—	—	RTA4	(12)	—	—	—	TP47 ¹	Varies	—	—	—
LSU5.12	—	(40)	—	—	RTB22	(8)	—	—	—	TP57 ¹	Varies	—	—	—
LSU26	(11)	—	—	—	RTC22Z	(11)	—	—	—	TP49 ¹	Varies	—	—	—
LSSU28	(15)	—	—	—	RTC2Z	(12)	—	—	—	TPA37 ¹	Varies	—	—	—
LSSU210	(7)	(10)	—	—	RTC42	—	—	(22)	—	TPA39 ¹	Varies	—	—	—
LSSUI25	(7)	(10)	—	—	RTC44	—	—	(29)	—	TPA57 ¹	Varies	—	—	—
LSSUI2.06	(7)	(10)	—	—	RTF2Z	(13)	—	—	—	VTCR	(7)	—	—	—

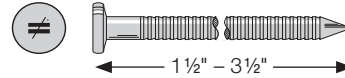
These connectors are not load rated.

Load Tables, Technical Data and Installation Instructions

Strong-Drive® SCNR RING-SHANK CONNECTOR Nail

Simpson Strong-Tie® Connectors

Strong Drive® SCNR Ring-Shank Connector nails are the best choice for achieving maximum load capacity in stainless-steel connectors.



When installing galvanized connectors and straps, use an SCN that is zinc galvanized. If the connectors and straps are stainless steel, then stainless-steel SCNRs shall be used.

Stainless Steel Nails

The USDA Forest Service, Forest Products Laboratory showed that stainless-steel nails with smooth shanks do not have the same withdrawal resistance as smooth-shank carbon steel nails (Withdrawal strength and bending yield strength of stainless-steel nails, 2015, *Journal of Structural Engineering*). In addition, Simpson Strong-Tie conducted an extensive series of withdrawal testing with stainless-steel nails made from Type 304, Type 305 and Type 316 stainless steels to assess the stainless-steel ring-shank nail withdrawal performance over a wide range of nail diameters (0.072 in. to 0.238 in.) and wood specific gravities (0.42 to 0.55). The withdrawal tests were conducted in accordance with ASTM D1761 using wood conditioned to 12-percent moisture content. Further, the referenced withdrawal resistance for each of the tested nails was calculated using the withdrawal calculation for post-frame ring-shank nails in NDS-12, equation 11.2-4 (NDS-15, equation 12.2-4),

$$W = 1800 G^2 D$$

The withdrawal loads for Simpson Strong-Tie stainless-steel ring-shank nails with a safety factor of 5.0 were at or above the calculated reference withdrawal resistance for post-frame ring-shank nails. As a result, the post-frame ring-shank nail equation for reference withdrawal design values can be safely used for Simpson Strong-Tie stainless-steel ring-shank nails of all diameters across the specific gravity range of 0.42 to 0.55. This finding and recommendation are specific to Simpson Strong-Tie stainless-steel ring-shank nails and shall not be applied to stainless-steel ring-shank nails made by other manufacturers.

The bending yield strength of Simpson Strong-Tie stainless-steel nails (smooth and ring-shank) meet the bending yield strength specifications of ASTM F1667, which are the same as those in CSA O86-14.

Stainless Steel Nails for Connectors

Simpson Strong-Tie stainless-steel connectors are required to be installed using stainless-steel fasteners. Recent testing at Simpson Strong-Tie indicates that capacities for some Simpson Strong-Tie stainless-steel connectors have changed when smooth-shank stainless-steel nails are used. Refer to strongtie.com/products/categories/zmax.html for a list of connectors available in stainless-steel, which includes links to load tables for carbon steel and stainless-steel smooth-shank nail installations as applicable.

In cases where these load tables indicate stainless-steel smooth-shank nail installations have reduced values, full capacities listed for the same carbon-steel connector may be achieved if the stainless-steel connector is installed with the correct replacement stainless-steel Simpson Strong-Tie® Strong Drive® SCNR Ring-Shank Connector nails as shown in the following Nail Substitution Chart.

Nail Substitution Chart

Replacement Ring-Shank Stainless-Steel Nails, Type 316 Stainless Steel

Catalogue-Specified Carbon-Steel Smooth-Shank Nail		Replacement Stainless-Steel Strong-Drive SCNR® Ring-Shank Connector Nail	
Type	Size (in.) (Dia. x Length)	Hand-Drive	Collated
N8	0.131 x 1.5	SSNA8	T10A150MCN
8d common	0.131 x 2.5	SSA8D	T10A250MCN
N10	0.148 x 1.5	SSNA10D	T9A150MCN
10d x 2.5"	0.148 x 2.5	—	T9A250MCN
10d common	0.148 x 3.0	SSA10D	—
16d common	0.162 x 3.5	SSA16D	—

1. Collated nails listed are available in 33° paper tape strips.

Over-Driven Nails in Connectors and Straps

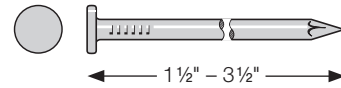
A nail that is installed such that the head deforms the steel of the connector or strap is considered over-driven. Extra care to prevent over-driven nails should be taken when installing power-driven nails. Simpson Strong-Tie has evaluated the effect of over-driven nails in connectors and straps. No load reductions for connectors or straps apply as a result of over-driven nails if all of the following conditions are met:

- Connectors and straps are 14-, 16-, or 18-gauge steel.
- The top of the nail head is not driven past flush with the face of the metal hardware.
- The nail goes through an existing fastener hole without enlarging it.
- The steel around the hole is not torn or damaged other than denting caused by the nail head.

Load Tables, Technical Data and Installation Instructions

Strong-Drive® SCN SMOOTH-SHANK CONNECTOR Nail

Simpson Strong-Tie® Connectors



Simpson Strong-Tie connectors have been designed and tested with specific types of nails, which are generally referred to as Structural Connector Nails (SCN). The specified nail size, type and quantity must be installed in the correct holes of the connector or strap to achieve the published loads for the hardware. The dimensions and bending yield strength characteristics needed for nails used in Simpson Strong-Tie connectors and hardware are given in the table below. The designer and installer must be sure that the correct fastener is specified and installed. In cases where the installed nail matches the criteria of the nail specified for the hardware, full hardware design values result.

SCN Smooth-Shank Connector Nails and Common Nails Approved for Use with Simpson Strong-Tie Connectors^{1,2,3}

Fastener	Diameter (in.)	Length (in.)	Head Style	Head Diameter (in.)	Minimum Bending Yield Strength (psi) ^{4,6}
N8	0.131	1.5	Round	0.281	100000
8d common	0.131	2.5	Round	0.281	100000
N10	0.148	1.5	Round	0.281	90000
N10D	0.148	2.5	Round	0.281	90000
10d common	0.148	3	Round	0.281 ⁵	90000
N16	0.162	2.5	Round	0.281	90000
16d common	0.162	3.5	Round	0.281 ⁵	90000

1. Tolerance on diameter and length per ASTM F1667.
2. Tolerance on head diameter (± 0.0015 in.)
3. All dimensions are prior to coating.
4. Tested in accordance with ASTM F1575.
5. Minimum head diameter shown; actual head diameters on 10d and 16d common nails are larger.
6. Minimum bending yield strengths applicable to SCNR nails of the same diameter.

Power-driven SCNs are often used to install Simpson Strong-Tie connectors and straps. Power-driven nails must have the same dimensions and bending yield strength as hand-driven nails. Dedicated power nailers are designed to drive nails of specific lengths that may be less than the length required to achieve full design values for the connector or strap hardware. When connectors and straps are installed with power-driven nails or hand-driven nails that are a different type or size than those called out in the connector and strap specifications, adjustment factors as given on strongtie.com must be applied to the factored resistances for the connector or strap.

Over-Driven Nails in Connectors and Straps

A nail that is installed such that the head deforms the steel of the connector or strap is considered over-driven. Extra care to prevent over-driven nails should be taken when installing power-driven nails. Simpson Strong-Tie has evaluated the effect of over-driven nails in connectors and straps. No load reductions for connectors or straps apply as a result of over-driven nails if all of the following conditions are met:

- Connectors and straps are 14-, 16-, or 18-gauge steel.
- The top of the nail head is not driven past flush with the face of the metal hardware.
- The nail goes through an existing fastener hole without enlarging it.
- The steel around the hole is not torn or damaged other than denting caused by the nail head.

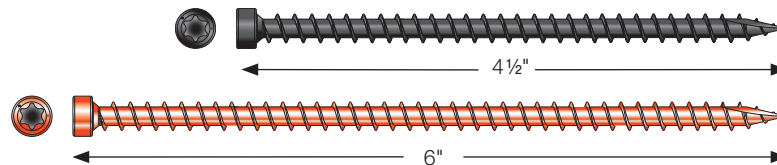
Load Tables, Technical Data and Installation Instructions

Strong-Drive® SDWC TRUSS Screw

Truss/Rafter-to-Plate and Stud-to-Plate Connections

The SDWC screw is tested in accordance with ICC-ES AC233 (screw) and AC13 (wall assembly and roof-to-wall assembly) for uplift and lateral loads between wall plates and vertical wall framing and between the top plate and the roof rafters or trusses. SDWC15450 is recognized for use in chemically-treated wood as described in the evaluation report.

Codes/Standards: IAPMO-UES ER-262



SDWC TRUSS Screw — Factored Lateral Resistances

Model No.	Fastener Length (in.)	Side Member	Main Member	Factored Lateral Resistance (lb.) (K _D = 1.00)	
				D.Fir-L	S-P-F
SDWC15450	4½	2x	2x (End grain)	240	215
SDWC15600	6	2x	2x (End grain)	240	215
		(2) 2x	2x (End grain)	240	215
		(2) 2x	2x ³	350	320

1. Factored resistances shown have been developed in accordance with 12.11 CSA O86-14 based on testing per ICC-ES AC233 assuming full penetration of the screw into the main member and are applicable to dry service condition only.
2. Factored resistances may be increased 15% for short-term load duration (K_D = 1.15). Reduce where other load durations govern.
3. For this application, 2x main member assumes installation into the narrow edge of the lumber.

SDWC TRUSS Screw — Factored Withdrawal Resistances

Model No.	Fastener Length (in.)	Thread Length (in.)	Main Member	Factored Withdrawal Resistance (lb./in.) (K _D = 1.00)	
				D.Fir-L	S-P-F
SDWC15450	4½	4¼	2x (End grain)	254	159
			2x	355	247
SDWC15600	6	5¾	2x (End grain)	254	159
			2x	355	247

1. Factored withdrawal resistances shown in lb./in. requires a minimum penetration into the main member and a minimum side member thickness of 1½". See also Factored Pull-Through Resistance table.
2. Factored resistances may be increased 15% for short-term load duration (K_D = 1.15). Reduce where other load durations govern.
3. The factored tensile resistance of the screw (φP_{ts}) is 1390 lb., per Chapter F CSA S136-12.

Load Tables, Technical Data and Installation Instructions

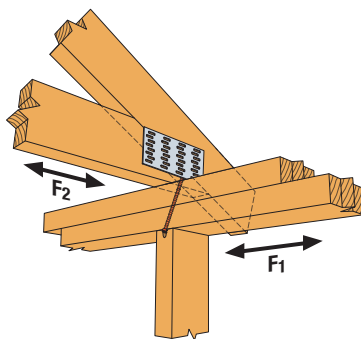
Strong-Drive® SDWC TRUSS Screw (cont.)

SDWC TRUSS Screw — Factored Pull-Through Resistances

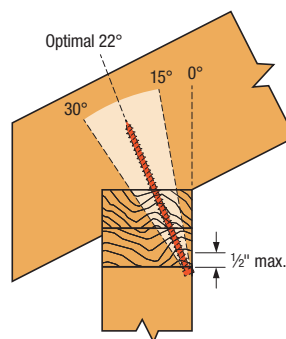
Model No.	Fastener Length (in.)	Thread Length (in.)	Side Member	Factored Pull-Through Resistance (lb.) ($K_D = 1.00$)	
				D.Fir-L	S-P-F
SDWC15450	4½	4¼	2x	355	320
			(2) 2x	860	725
SDWC15600	6	5¾	2x	355	320
			(2) 2x	860	725

1. Factored resistances may be increased 15% for short-term load duration ($K_D = 1.15$).
Reduce where other load durations govern.
2. See also Factored Withdrawal Resistance table.

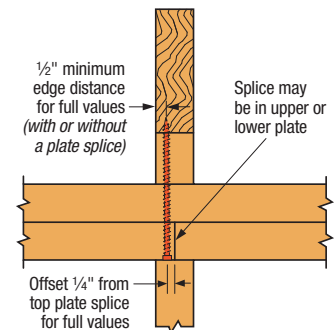
Typical Roof-to-Wall Connection



**Typical SDWC Installation —
Truss Aligned w/Stud**
(offset truss similar)

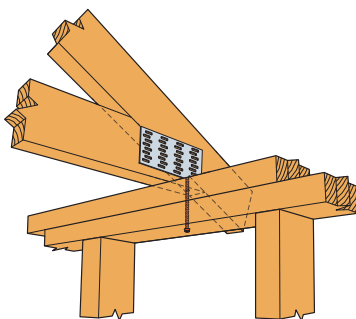


Installation Angle Limit

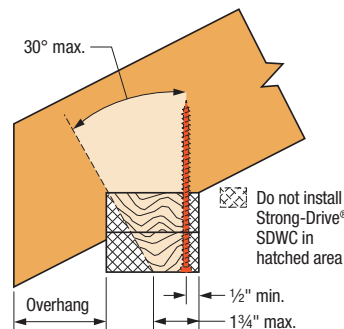


**Min. Edge Distance for
Top Plate Splice**

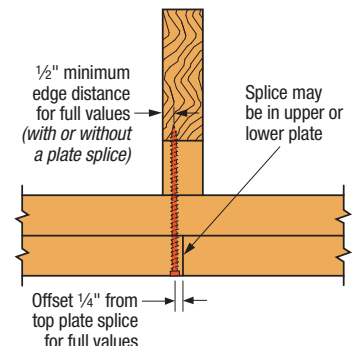
Optional Roof-to-Wall Connection



**Optional SDWC Installation —
Truss Offset from Stud**



Allowable Installation Range
(truss offset from stud only)



**Min. Edge Distance for
Top Plate Splice**

Load Tables, Technical Data and Installation Instructions

Strong-Drive® SDWC TRUSS Screw for Truss/Rafter-to-Top-Plate Connections

SDWC Truss/Rafter-to-Top-Plate Connections Utilizing Two-Screw Configurations

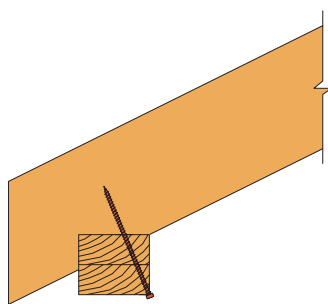
Factored resistances for the SDWC Truss screws when installed from the underside of the top plate and from the face of the truss/rafter using a two-screw configuration per the detail configurations shown on following page.

SDWC TRUSS Screw – Factored Roof-to-Wall Connection Resistances

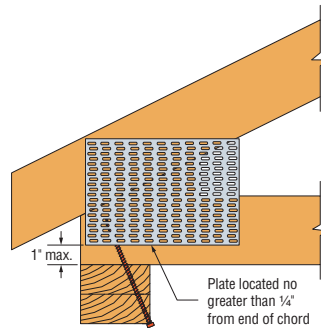
Model No.	Fastener Length (in.)	Installation Detail	Factored Resistance (lb.) ($K_D = 1.15$)					
			D.Fir-L			S-P-F		
			Uplift	F ₁	F ₂	Uplift	F ₁	F ₂
SDWC15600	6	1	930	260	340	625	235	305
		2	830	260	340	625	235	305
		3	510	260	340	510	235	305

- Factored resistances have been increased 15% for short-term load duration ($K_D = 1.15$). Reduce where other load durations govern.
- An SDWC screw may be used in each ply of a two- or three-ply girder truss or rafter. The factored uplift resistance shall be as tabulated above, but may be limited to the capacity of the plate or the connection between the top plates and the framing below. For loading in the F₁ or F₂ direction use the factored resistance shown for one screw only. Do not multiply the F₁ or F₂ resistances times the number of screws.
- Factored resistances shown are for either "Typical" or "Optional" installation instructions. The SDWC is to be installed through a double 2x top plate into a minimum 2x4 truss bottom chord or rafter.
- For uplift connection load path, the designer shall verify complete continuity of the uplift load path.
- When a screw is loaded simultaneously in more than one direction, the factored resistance must be evaluated using the unity equation:

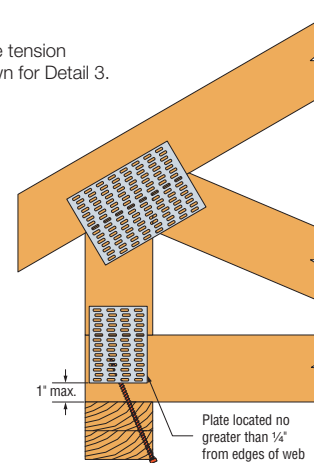
$$\text{Factored Uplift} / \text{Factored Uplift Resistance} + \text{Factored } F_1 / \text{Factored } F_1 \text{ Resistance} + \text{Factored } F_2 / \text{Factored } F_2 \text{ Resistance} \leq 1.0$$
 The three terms of the unity equation represent the possible generated force direction. The number of terms that must be considered is at the sole discretion of the Designer and depends on the method of calculating wind forces and the utilization of the screws within the structural system.
- Tabulated values do not apply to trusses with end-grain bearing.
- Installation details 1, 2 and 3 are applicable to the common applications shown in the details below. Where tension perpendicular-to-grain stresses in the bottom chord cannot be resisted by reinforcing, use the values shown for Detail 3. Note, the details are applicable to both installation methods where the truss/rafter is either aligned with or between the studs.



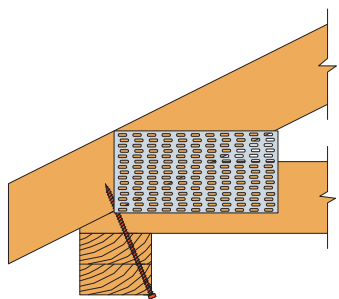
Detail 1A – Rafter



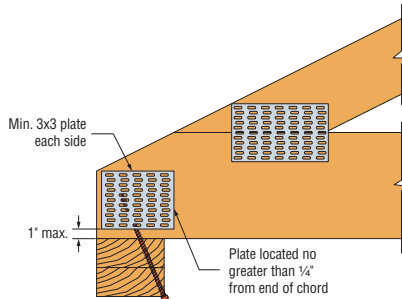
Detail 2A – Raised Heel



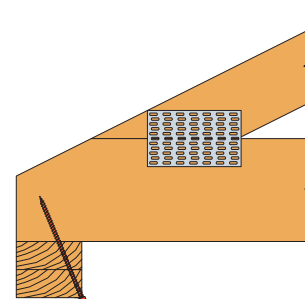
Detail 2C – High Heel



Detail 1B – Standard Heel



Detail 2B – Girder Heel with Tie Plate



Detail 3A – Girder Heel No Tie

Note: For applications not shown, use values for Detail 3.

Load Tables, Technical Data and Installation Instructions

Strong-Drive® SDWC TRUSS Screw (cont.)

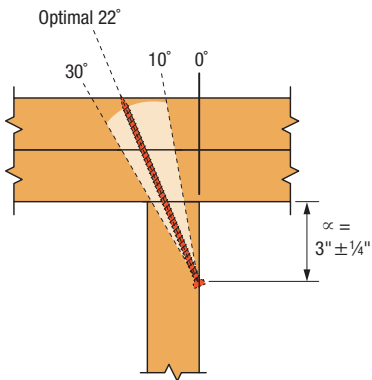
SDWC TRUSS Screw — Factored Toe-Screw Stud-to-Plate Connection Resistances

Model No.	Fastener Length (in.)	Thread Length (in.)	Plate Size	No. of Screws Installed	Factored Resistance (lb.) (K _D = 1.15)			
					D.Fir-L		S-P-F	
					Uplift	F ₂	Uplift	F ₂
SDWC15450	4½	4¼	2x	1	430	230	290	205
				2	860	460	580	410
				3	1290	690	870	615
SDWC15600	6	5¾	2x	1	485	230	325	205
				2	970	460	650	410
				3	1455	690	975	615
			(2) 2x	1	640	230	510	205
				2	1280	460	1020	410
				3	1920	690	1530	615

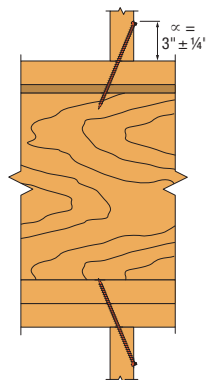
- Factored resistances may be increased 15% for short-term load duration (K_D = 1.15). Reduce where other load durations govern.
- Factored resistances are for SDWC installed per the installation instructions only.
- The SDWC15450 is to be installed through the face of a 2x stud into a single 2x bottom plate over a concrete or masonry foundation.
- The SDWC15600 is to be installed through the face of a 2x stud into a single 2x bottom plate over a wood floor system or through the face of a 2x stud into a double 2x top or bottom plate.
- Double top plates shall be fastened together per the applicable building code.
- When a screw is loaded simultaneously in more than one direction, the factored resistance must be evaluated using the unity equation:

$$\text{Factored Uplift} / \text{Factored Uplift Resistance} + \text{Factored } F_2 / \text{Factored } F_2 \text{ Resistance} \leq 1.0$$
 The two terms of the unity equation represent the possible generated force directions. The number of terms that must be considered is at the sole discretion of the Designer and depends on the method of calculating wind forces and the utilization of the screws within the structural system.

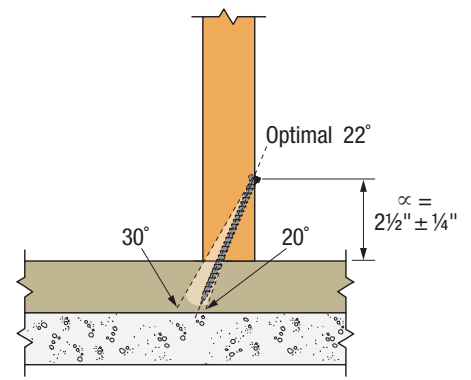
Stud-to-Plate Connections



Stud-to-Top Plate Connection
(This application requires SDWC15600)

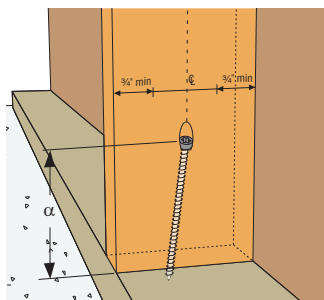


Stud-to-Bottom Plate Connection Over Wood Floor
(This application requires SDWC15600)

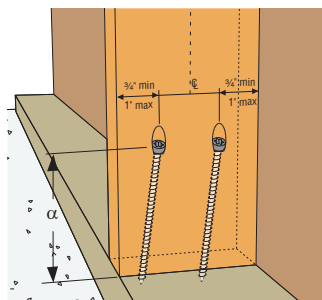


Stud-to-Bottom Plate Connection Over Concrete/Masonry Foundation
(This application requires SDWC15450)

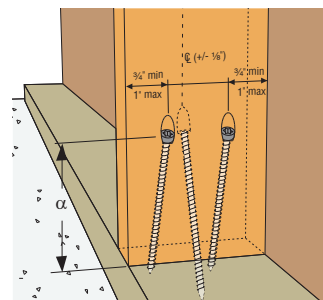
Spacing Requirements



One Screw
One fastener driven in wide face of 2x4, 2x6 or 2x8; maintain minimum edge distance of ¾".



Two Screws
Two fasteners driven into same wide face of 2x4, 2x6 or 2x8. Maintain minimum edge distance of ¾" and maximum edge distance of 1" for proper spacing between fasteners.



Three Screws
Two fasteners driven into same wide face of 2x4, 2x6 or 2x8. Maintain minimum edge distance of ¾" and maximum edge distance of 1" for proper spacing between fasteners.
One fastener driven within 1/8" of centerline of 2x4, 2x6 or 2x8 on OPPOSITE wide face.

Load Tables, Technical Data and Installation Instructions

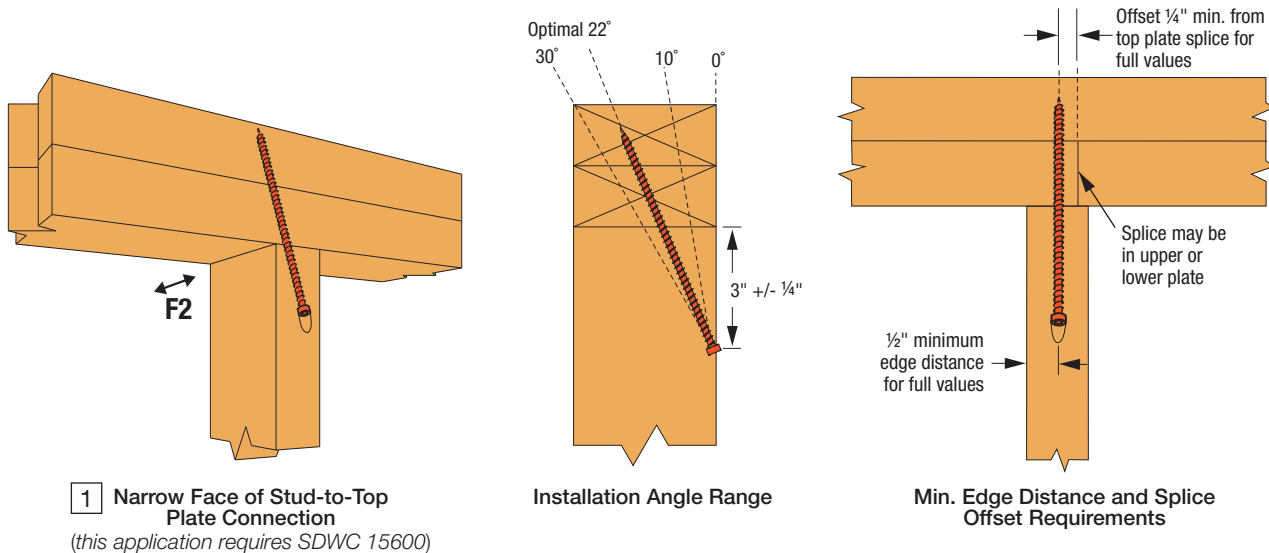
Strong-Drive® SDWC TRUSS Screw for Narrow Face of Stud-to-Plate Connections

The Strong-Drive SDWC Truss screw provides an easy-to-install, high-capacity solution for stud-to-bottom plate or stud-to-top plate(s) connections. This table provides additional factored resistances for the SDWC screws when installed through the narrow face of the stud. The factored resistances are for SDWC screws installed per the details shown below and on p. 43.

SDWC TRUSS Screw — Factored Narrow Face of Stud-to-Plate Connection Resistances

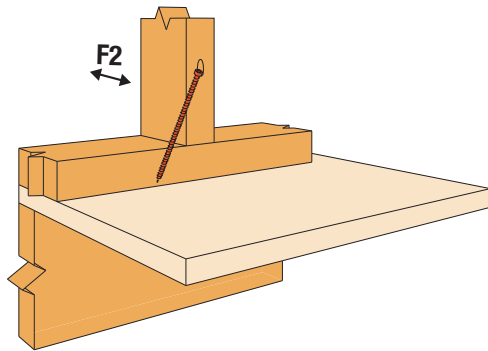
Model No.	Fastener Length (in.)	Thread Length (in.)	Plate Size	Factored Resistance (lb.) ($K_D = 1.15$)			
				D.Fir-L		S-P-F	
				Uplift	F ₂	Uplift	F ₂
SDWC15450	4½	4¼	2x	470	250	325	275
SDWC15600	6	5¾	2x	540	250	340	275
			(2) 2x	540	250	340	275

1. Factored resistances may be increased 15% for short-term load duration ($K_D = 1.15$). Reduce where other load durations govern.
2. Factored resistances are for SDWC installed per the installation instructions only.
3. Double top plates shall be fastened together per the applicable building code.
4. When a screw is loaded simultaneously in more than one direction, the factored resistance must be evaluated using the unity equation:
Factored Uplift / Factored Uplift Resistance + Factored F₂ / Factored F₂ Resistance ≤ 1.0. The two terms of the unity equation represent the possible generated force directions. The number of terms that must be considered is at the sole discretion of the Designer and depends on the method of calculating wind forces and the utilization of the screws within the structural system.
5. One SDWC screw per stud maximum when installed in the narrow face of the stud. Where SDWC screws are installed on multiple adjacent studs, the minimum spacing between screws shall be 1½". The factored resistance for each screw shall be multiplied by 0.9, but may be limited by the capacity of the plate.
6. For Uplift Continuous Load Path, connections in the same area (i.e. truss to plate connector and plate to stud connector) must be on the same side of the wall.

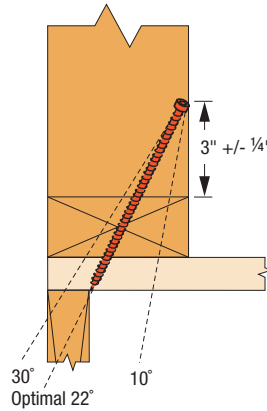


Load Tables, Technical Data and Installation Instructions

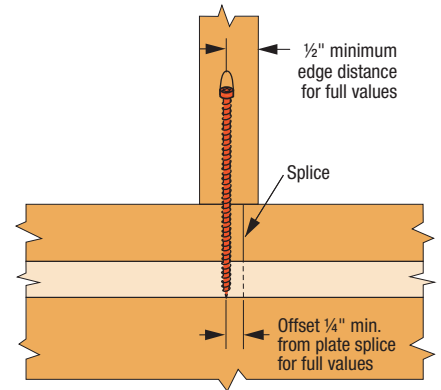
Strong-Drive® **SDWC TRUSS** Screw for Narrow Face of Stud-to-Plate Connections (cont.)



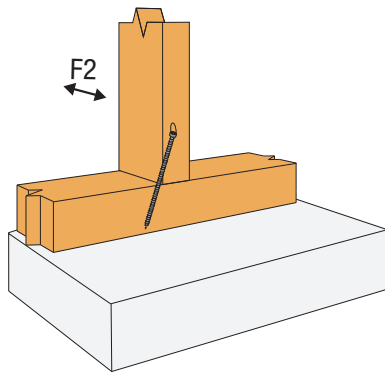
2 Narrow Face of Stud-to-Bottom Plate Connection Over Wood Floor
(SDWC 15600 shown)



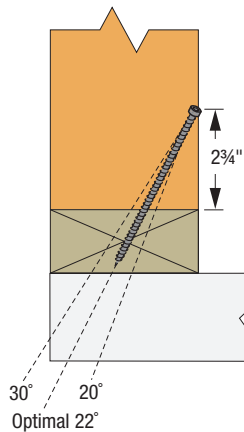
Installation Angle Range



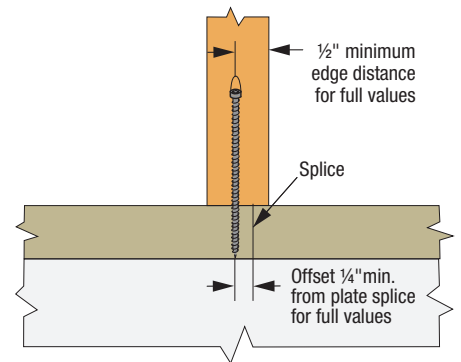
Min. Edge Distance and Splice Offset Requirements



3 Narrow Face of Stud-to-Bottom Plate Connection Over Masonry/Concrete Foundation
(the application requires SDWC15450)



Installation Angle Range



Min. Edge Distance and Splice Offset Requirements

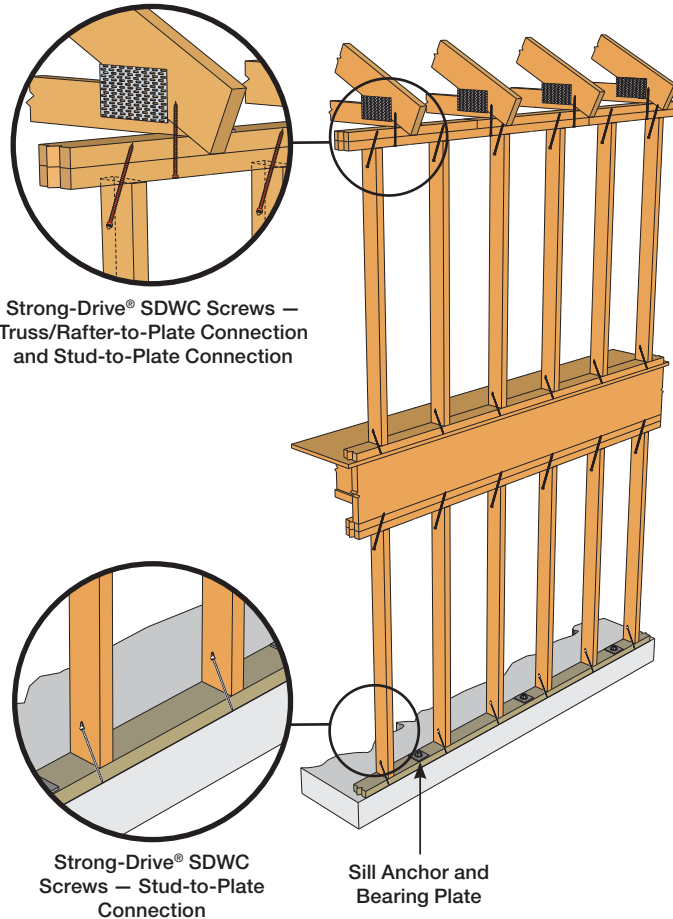
Load Tables, Technical Data and Installation Instructions

Strong-Drive® SDWC TRUSS Screw (cont.)

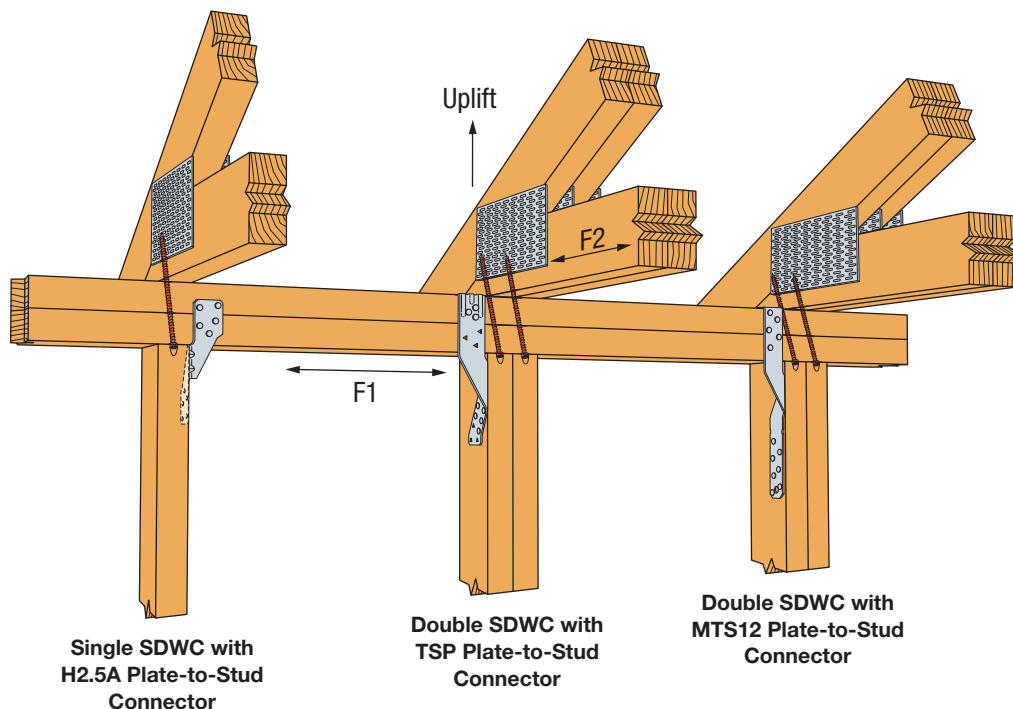
Continuous Load Path Considerations with the SDWC

Building codes require structures to be designed to create a continuous load path. Forces must be transferred from their point of origin to the building elements that are designed to resist them. When uplift forces act on a roof, the roof must be tied to the wall, and the wall must be tied to the foundation or wall below.

Like many common hurricane ties, the SDWC screw fastens the rafter or truss directly to the top plate of the wall below. The wall top plate alone does not offer sufficient resistance to roof uplift forces, and therefore must be tied to the studs or framing of the wall. This connection may be made with structural sheathing designed for uplift or a metal connector installed on the same side of the wall as the SDWC screw; however, the fasteners of the sheathing or connector must not interfere with the SDWC screw. The Simpson Strong-Tie® H2.5A, TSP, and MTS12 are ideal metal connectors for this application.



For illustrative purposes only. See installation specifications.



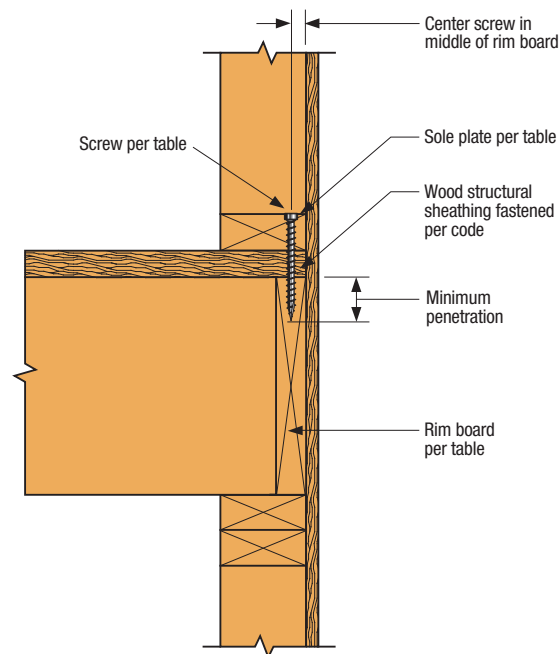
Load Tables, Technical Data and Installation Instructions

Strong-Drive® SDWC TRUSS Screw (cont.)

SDWC TRUSS Screw — Factored Lateral Resistances for Sole-to-Rim-Board Connections

Model No.	Fastener Length (in.)	Min Penetration Into Rim Board (in.)	Sole Plate	Factored Resistance (lb.) ($K_D = 1.15$)			
				D.Fir-L Rim Board		S-P-F Rim Board	
				Sole Plate		Sole Plate	
				D.Fir-L	S-P-F	D.Fir-L	S-P-F
SDWC15450	4½	2¼	2x	410	380	385	370
SDWC15600	6	2¼	2x	410	380	385	370
			(2) 2x	410	380	385	370

1. Factored resistances may be increased 15% for short-term load duration ($K_D = 1.15$). Reduce where other load durations govern.
2. Factored resistances shown are based on testing per ICC-ES AC233 and calculations per 12.11 CSA O86-14 and are applicable to loads parallel to the wall plates only.
3. The minimum spacing permitted is 6" o.c. The minimum edge distance is 5/8" and the minimum end distance shall be 6".
4. Wood structural panel up to 1 1/8" thick is permitted between the sole plate and the rim board provided it is fastened to the rim board per code and the minimum penetration into the rim board is met.
5. A double 2x sole plate is permitted provided it is independently fastened together to act as one unit and the minimum screw penetration is met.



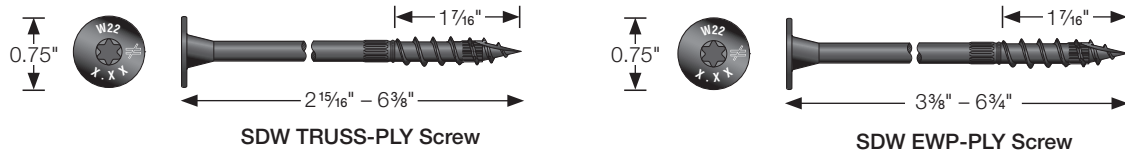
Load Tables, Technical Data and Installation Instructions

Strong-Drive® SDW TRUSS-PLY and EWP-PLY Screws

Truss-Ply Fastening, Multi-Ply Wood Members, Engineered-Lumber Products and Solid-Sawn Lumber

Codes/Standards: IAPMO-UES ER-192

US Patent 9,523,383



Installation:

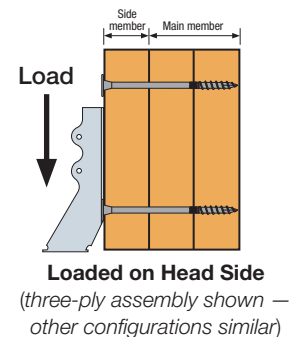
- SDW screws install best with a low-speed ½" drill motor and a T-40 6-lobe bit. The matched bit included with the screws is recommended for best results.
- Predrilling is typically not required. SDW screws may be installed through metal truss plates as approved by the Truss Designer, (predrilling required through the plate using a maximum of 5/32" bit).
- Screw heads that are countersunk flush to the wood surface are acceptable if the screw has not spun out.

Notes to the Designer:

1. Factored lateral and withdrawal resistances are based on testing per ICC-ES AC233 and Clause 12.11 of CSA O86-14.
2. Factored lateral resistances may be increased 15% for short-term load duration ($K_D = 1.15$). For load durations other than standard or short-term, see 5.3.2 of CSA O86-14 for reduction values.
3. Fastener spacing, end and edge distances shall conform to Table 12.9.2.1 CSA O86-14 using a diameter value of 0.30" (see table 9 on p. 49).
4. Maximum fastener spacing is recommended not to exceed 24" on-centre except as approved by a qualified Designer.
5. Structural composite lumber (SCL) is laminated veneer lumber (LVL), parallel strand lumber (PSL) or laminated strand lumber (LSL). Verify the effective specific gravity (SG) with structural composite lumber manufacturer for selection of tabulated values.
6. Factored resistances are based on the capacity of the Simpson Strong-Tie Strong-Drive® SDW22 fasteners. The capacity of the multi-ply assembly must be checked by a qualified Designer using the reduced cross-sectional area per Clause 12.2.2.5 CSA O86-14.
7. For a top-loaded, solid sawn 2x, multi-ply assembly that is evenly loaded across the entire assembly width, the recommended fastener detail is two rows of SDW screws where the spacing between fasteners in a row is 32". For a top-loaded, SCL (1 ¾") multi-ply assembly that is evenly loaded across the entire assembly width, the recommended spacing between SDW screws in a row is 24" o.c.; use two rows for up to 18"-deep members and three rows for members deeper than 18".

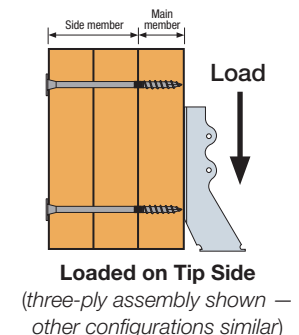
SDW TRUSS-PLY Screw — Factored Lateral Resistances for Solid Sawn and 2x Truss Loaded on Head Side

Assembly	Model No.	Nominal Length (in.)	Side Member Thickness (in.)	Factored Lateral Resistance (lb.)	
				D.Fir-L	S-P-F
2-ply 2x/Truss	SDW22300	3	1 ½	335	290
3-ply 2x/Truss	SDW22458	4 5/8	1 ½	455	405
4-ply 2x/Truss	SDW22600	6	1 ½	455	405
4-ply 2x/Truss	SDW22638	6 3/8	1 ½	455	405



SDW TRUSS-PLY Screw — Factored Lateral Resistances for Solid Sawn and 2x Truss Loaded on Tip Side

Assembly	Model No.	Nominal Length (in.)	Side Member Thickness	Factored Lateral Resistance (lb.)	
				D.Fir-L	S-P-F
2-ply 2x/Truss	SDW22300	3	1 ½	305	260
3-ply 2x/Truss	SDW22458	4 5/8	3	410	365
4-ply 2x/Truss	SDW22600	6	4 ½	410	365
4-ply 2x/Truss	SDW22638	6 3/8	4 ½	410	365

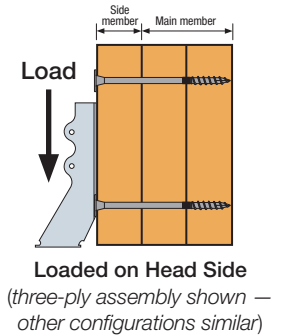


Load Tables, Technical Data and Installation Instructions

Strong-Drive® SDW TRUSS-PLY and EWP-PLY Screws (cont.)

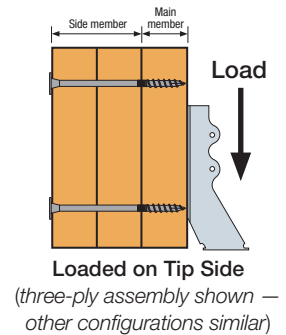
SDW EWP-PLY Screw — Factored Lateral Resistances for SCL Loaded on Head Side

Assembly	Model No.	Nominal Length (in.)	Side Member Thickness (in.)	Factored Lateral Resistance (lb.)	
				SG = 0.50	SG = 0.42
2-ply 1¾" SCL	SDW22338	3¾	1¾	390	325
3-ply 1¾" SCL	SDW22500	5	1¾	495	430
4-ply 1¾" SCL	SDW22634	6¾	1¾	495	430
2-ply 3½" SCL	SDW22634	6¾	3½	570	505



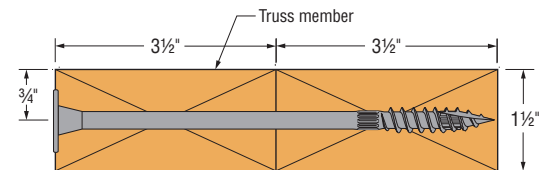
SDW EWP-PLY Screw — Factored Lateral Resistances for SCL Loaded on Tip Side

Assembly	Model No.	Nominal Length (in.)	Side Member Thickness (in.)	Factored Lateral Resistance (lb.)	
				SG = 0.50	SG = 0.42
2-ply 1¾" SCL	SDW22338	3¾	1¾	340	285
3-ply 1¾" SCL	SDW22500	5	3½	415	365
4-ply 1¾" SCL	SDW22634	6¾	5¼	415	365
2-ply 3½" SCL	SDW22634	6¾	3½	570	490

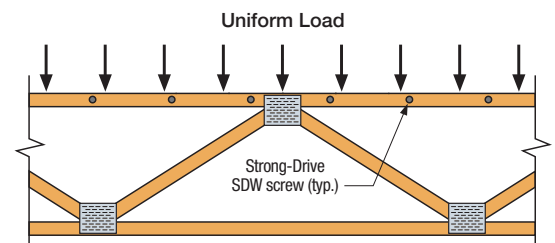
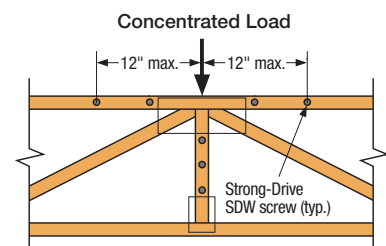


SDW EWP-PLY Screw — Factored Lateral Resistances for 3x2 and 4x2 Parallel-Chord Trusses

Assembly	Model No.	Nominal Length (in.)	Side Member Thickness (in.)	Factored Lateral Resistance (lb.)	
				D.Fir-L	S-P-F
2-ply 3x2 PCT	SDW22500	5	2½	405	290
2-ply 4x2 PCT	SDW22634	6¾	3½	405	290



SDW Screw Position in Two-Ply 4x2 Truss
(two-ply 3x2 similar)



- To transfer uniform loads applied to simply supported spans on assembly top chord:
 - Space screws as required to transfer half the load into the supporting truss.
 - Minimum screw spacing shall be 4" o.c.
- To transfer concentrated loads applied to simply supported spans on an assembly top chord or vertical web:
 - Concentrated loads must be applied at the panel points.
 - Screws to be installed within 12" of the concentrated load on top-chord assembly.
- Gap between the trusses shall not exceed ½".
- Floor sheathing shall be screwed or nailed to each top-chord ply. (Fastener spacing per the applicable Code requirements, or 12" o.c.)
- SDW screws shall not be installed in areas where lumber wane exceeds ¼".
- Truss members must be evaluated using a reduced cross-sectional area due to the 0.22"-diameter SDW screw.
- Other configurations acceptable as approved by Truss Designer.

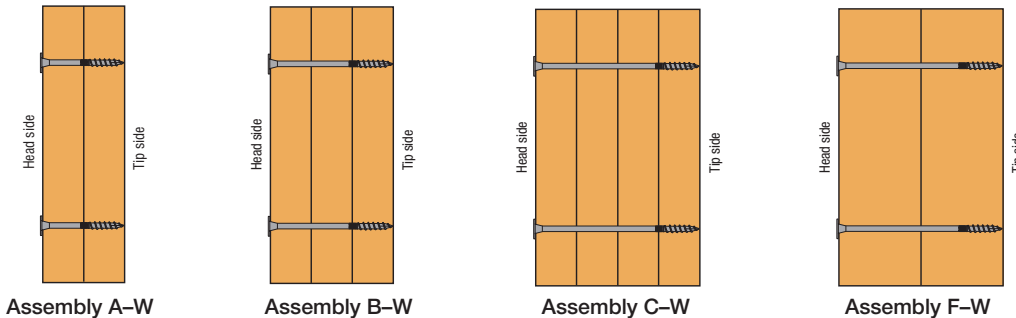
Load Tables, Technical Data and Installation Instructions

Strong-Drive® SDW TRUSS-PLY and EWP-PLY Screws (cont.)

SDW TRUSS-PLY Screw — Side-Loaded Multi-Ply Assemblies — Factored Uniform Load Applied to Either Outside Member (plf)

Multiple Members		Nominal Length (in.)	Loaded Side	D.Fir-L						S-P-F					
Assembly	Component			SDW @ 12" o.c.		SDW @ 16" o.c.		SDW @ 24" o.c.		SDW @ 12" o.c.		SDW @ 16" o.c.		SDW @ 24" o.c.	
				2 Rows	3 Rows	2 Rows	3 Rows	2 Rows	3 Rows	2 Rows	3 Rows	2 Rows	3 Rows	2 Rows	3 Rows
A-W	2-ply 2x truss	3	Head	1340	2010	1005	1508	670	1005	1160	1740	870	1305	580	870
			Tip	1220	1830	915	1373	610	915	1040	1560	780	1170	520	780
B-W	3-ply 2x truss	4%	Head	1364	2046	1023	1535	682	1023	1214	1822	911	1366	607	911
			Tip	1229	1844	922	1383	615	922	1094	1642	821	1231	547	821
C-W	4-ply 2x truss	6	Head	1213	1820	910	1365	607	910	1080	1620	810	1215	540	810
			Tip	1093	1640	820	1230	547	820	973	1460	730	1095	487	730
		6%	Head	1213	1820	910	1365	607	910	1080	1620	810	1215	540	810
			Tip	1093	1640	820	1230	547	820	973	1460	730	1095	487	730

- Each ply is assumed to carry same proportion of load.
- Loads may be applied to the head side and tip side concurrently, provided neither published capacity is exceeded. (Example: a four-ply D.Fir-L assembly with a head side load of 1300 plf and tip side load of 1200 plf may be fastened together with three rows of 6" SDW at 16" o.c.)
- When hangers are installed on tip side, hanger face fasteners must be a minimum of 3" long.
- Hanger load spacing on the multi-ply assembly should not exceed 24" o.c. unless approved by the Designer.



SDW EWP-PLY Screw — Side-Loaded Multi-Ply SCL Assemblies — Factored Uniform Load Applied to Either Outside Member (plf)

Multiple Members		Nominal Length (in.)	Loaded Side	SCL (SG=0.5)						SCL (SG=0.42)					
Assembly	Component			SDW @ 12" o.c.		SDW @ 16" o.c.		SDW @ 24" o.c.		SDW @ 12" o.c.		SDW @ 16" o.c.		SDW @ 24" o.c.	
				2 Rows	3 Rows	2 Rows	3 Rows	2 Rows	3 Rows	2 Rows	3 Rows	2 Rows	3 Rows	2 Rows	3 Rows
A-W	2-ply 1¾" SCL	3%	Head	1560	2340	1170	1755	780	1170	1300	1950	975	1463	650	975
			Tip	1360	2040	1020	1530	680	1020	1140	1710	855	1283	570	855
B-W	3-ply 1¾" SCL	5	Head	1484	2226	1113	1670	742	1113	1289	1934	967	1451	645	967
			Tip	1244	1867	933	1400	622	933	1094	1642	821	1231	547	821
C-W	4-ply 1¾" SCL	6%	Head	1320	1980	990	1485	660	990	1147	1720	860	1290	573	860
			Tip	1107	1660	830	1245	553	830	973	1460	730	1095	487	730
F-W	2-ply 3½" SCL	6%	Head	2280	3420	1710	2565	1140	1710	2020	3030	1515	2273	1010	1515
			Tip	2280	3420	1710	2565	1140	1710	1960	2940	1470	2205	980	1470

- Each ply is assumed to carry same proportion of load.
- Loads may be applied to the head side and tip side concurrently, provided neither published capacity is exceeded. (Example: a three-ply assembly (SG = 0.5) with a head side load of 1600 plf and tip side load of 1300 plf may be fastened together with three rows of SDW at 16" o.c.)
- When hangers are installed on tip side, hanger face fasteners shall be a minimum of 3" long.

Load Tables, Technical Data and Installation Instructions

Strong-Drive® SDW TRUSS-PLY and EWP-PLY Screws (cont.)

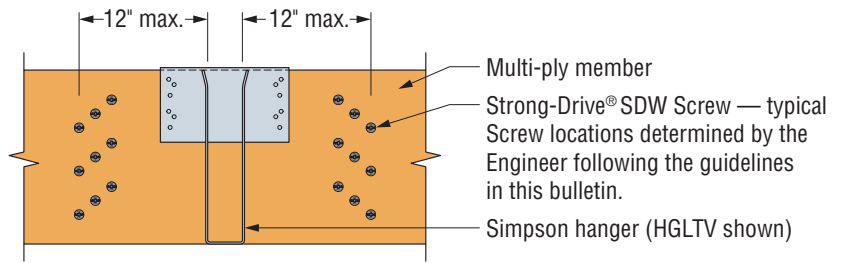
Factored Resistances for Side-Loaded Multi-Ply Beam Assemblies per Screw

For side-loaded assemblies of structural composite lumber or sawn lumber, factored resistances in a single fastener format can be calculated from the information on pp. 46–47.

As an example calculation, a three-ply beam or truss is to be fastened where the plies are of the same material and vertically-screw-laminated. The beam or truss is loaded on one face with a 2400 lb. tip load via a face-mount hanger. It is assumed that the face ply carries one-third of the load (800 lb.), and the remaining two-thirds of the load is transferred to the next two plies via the fasteners. The calculation for the number of fasteners required to transfer the load from the outside ply of a multi-ply beam or truss is:

$$n_F = \frac{N_f}{N_r} \left(\frac{n-1}{n} \right) \quad \text{Equation 1}$$

- n_F = number of fasteners required to transfer the applied load between plies
- N_f = factored load applied to the outer ply of the assembly
- N_r = factored lateral resistance of the screw
- n = number of plies in the assembly



Maximum Fastener Spacing from Tip Load

Factored Withdrawal Resistances

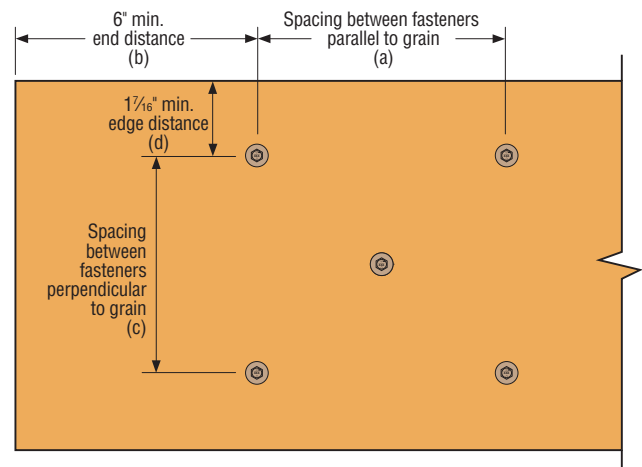
Model No.	Nominal Length (in.)	Thread Length (in.)	Factored Withdrawal Resistance (lb.)	
			D.Fir-L	S-P-F
SDW TRUSS-PLY Screw				
SDW22300	3	1 ⁷ / ₁₆	485	370
SDW22458	4 ⁵ / ₈	1 ⁷ / ₁₆	485	370
SDW22600	6	1 ⁷ / ₁₆	485	370
SDW22638	6 ³ / ₄	1 ⁷ / ₁₆	485	370
SDW EWP-PLY Screw				
SDW22338	3 ³ / ₈	1 ⁹ / ₁₆	530	405
SDW22500	5	1 ⁹ / ₁₆	530	405
SDW22634	6 ³ / ₄	1 ⁹ / ₁₆	530	405

1. Factored withdrawal resistances are for short-term load duration ($K_D = 1.15$). Reduce where other load durations govern.

Spacing Requirements

Geometry	Minimum Dimensions (in.)	
	D.Fir-L	S-P-F
a – Spacing parallel to grain	6	5
b – End distance parallel to grain	6	6
c – Spacing perpendicular to grain	3	2 ¹ / ₂
d – Edge distance perpendicular to grain	1 ¹ / ₈	1 ¹ / ₈

1. Additional screws may be staggered diagonally between rows.



Spacing Requirements
(see table 9)

Load Tables, Technical Data and Installation Instructions

Strong-Drive® SDW TRUSS-PLY Screw

SDW-Built-Up Column Assemblies

Built-up column assemblies using SDW screws, as shown in this section, can be used to replace the prescriptive nailing or bolting requirements outlined in 6.5.6.4 CSA O86-14. When installing SDW screws from one side only, the capacity of a built-up column can develop 60% of the capacity of a solid column of the same size and material properties. When installing SDW screws from both sides, the capacity of a built-up column can develop 70% of the capacity of a solid column of the same size and material properties.

Design parameters for built-up columns using SDW screws:

- Solid column reduction factor
 - 0.60 for SDW installed on one side
 - 0.70 for SDW installed on both sides
- $l_e/d \leq 50$
- Each lamination (ply) has a rectangular cross-section and is at least 1 1/2" thick
- All laminations have same face width, d_1
- Faces of adjacent laminations are in contact
- All laminations are full length
- Number of laminations: two to four

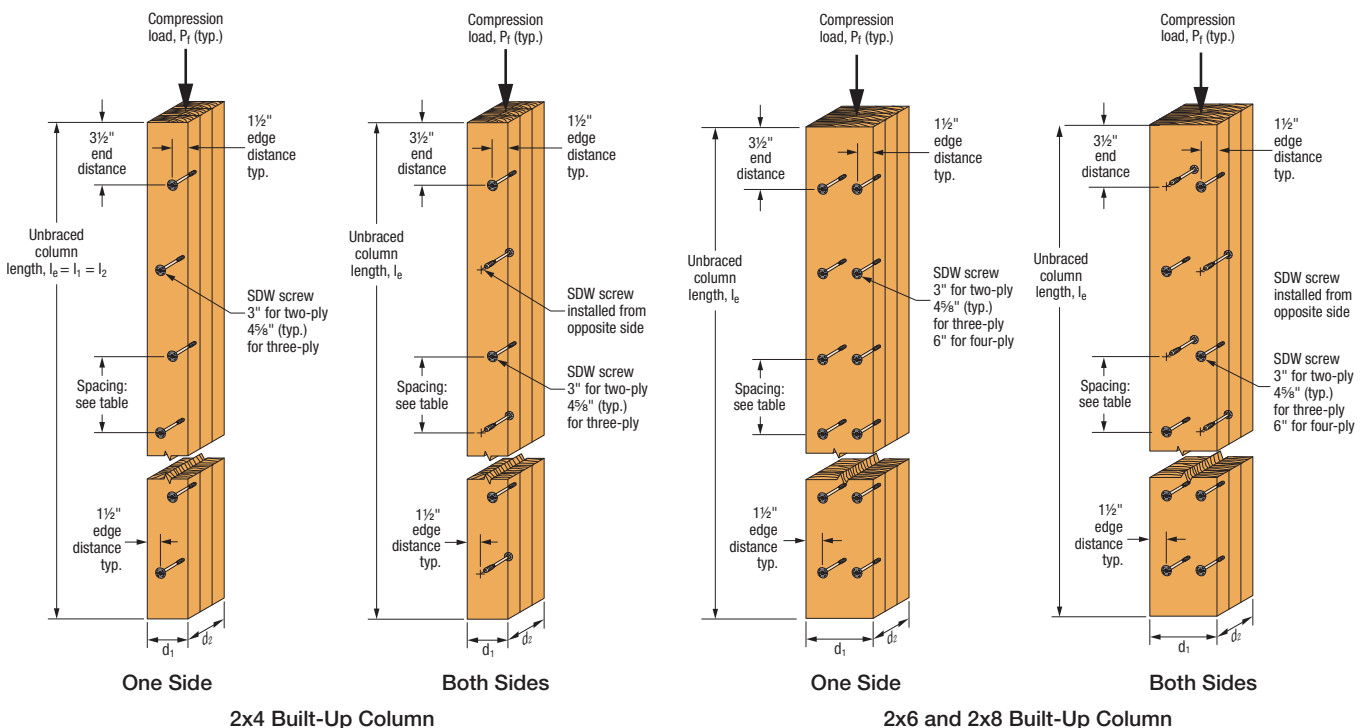
US Patent 9,523,383

SDW TRUSS-PLY Screw Substitution Table for CSA O86-14 Specifications

No. of Plies	Nominal Lumber Size	CSA O86-14 Specification				SDW Truss-Ply Screw Substitution			
		Fastener	CSA Reference	Installation	Spacing (in.)	Model No.	Description	Installation	Spacing (in.)
2	2x4, 2x6, 2x8	10d common	6.5.6.4.2	Both sides	9	SDW22300	0.22" dia. x 3"-long screw	One side	6
								Both sides	6
3	2x4, 2x6, 2x8	30d common	6.5.6.4.2	Both sides	9	SDW22458	0.22" dia. x 4 5/8"-long screw	One side	8
								Both sides	8
4	2x4	60d common	6.5.6.4.2	Both sides	9	SDW22600	0.22" dia. x 6"-long screw	One side	6
		1/2" bolts	6.5.6.4.3					Both sides	8
	2x6, 2x8	60d common	6.5.6.4.2	Both sides	9	SDW22600	0.22" dia. x 6"-long screw	One side	8
		1/2" bolts	6.5.6.4.3					Both sides	8

1. Nails listed in the table above are common wire per ASTM F1667 and are as follows: 10d common = 0.148" diameter x 3" long; 30d common = 0.207" diameter x 4 1/2" long; 60d common = 0.262" diameter x 6" long.

2. 1/2"-diameter bolts are ASTM A307 Grade A or equivalent with a standard cut washer between the head/nut and the wood.



Load Tables, Technical Data and Installation Instructions

Strong-Drive® SDW TRUSS-PLY and EWP-PLY Screws (cont.)

SDW-Built-Up Column Assemblies

Factored Compression Resistance Parallel to Grain for Built-Up Columns

Lumber		Fastener			Factored Compressive Resistance Parallel to Grain, P _r (lb.)														
Size	No. of Plies	Model No.	Spacing (in.)	Installation	D.Fir-L					S-P-F					Hem-Fir				
					Effective Length, L _e (ft.)					Effective Length, L _e (ft.)					Effective Length, L _e (ft.)				
					8	9	10	11	12	8	9	10	11	12	8	9	10	11	12
2x4	2	SDW22300	6	One side	3850	2955	2295	1800	1430	3445	2670	2085	1645	1310	4105	3160	2450	1925	1530
				Both sides	4490	3450	2675	2100	1670	4015	3115	2430	1915	1530	4790	3685	2860	2245	1785
	3	SDW22458	8	One side	11540	9790	8235	6595	5330	9965	8545	7255	5960	4840	12270	10420	8775	7045	5695
				Both sides	13040	10345	8235	6595	5330	11510	9220	7395	5960	4840	13900	11035	8790	7045	5695
	4	SDW22600	6	One side	17390	13795	10980	8795	7105	15345	12290	9860	7950	6450	18530	14715	11720	9395	7595
				Both sides	17390	13795	10980	8795	7105	15345	12290	9860	7950	6450	18530	14715	11720	9395	7595
2x6	2	SDW22300	6	One side	6055	4650	3610	2830	2250	5415	4195	3275	2585	2060	6460	4970	3855	3030	2410
				Both sides	7060	5425	4210	3305	2625	6320	4895	3820	3015	2405	7535	5795	4500	3535	2810
	3	SDW22458	8	One side	18155	15405	12955	10845	9075	15675	13440	11410	9635	8120	19300	16395	13800	11565	9685
				Both sides	21180	17970	15110	12650	10585	18285	15680	13315	11240	9470	22515	19125	16100	13495	11300
	4	SDW22600	8	One side	31985	29090	26135	23250	20530	27005	24765	22440	20130	17915	33920	30880	27770	24725	21855
				Both sides	37315	33940	30490	27125	23955	31505	28890	26180	23485	20905	39575	36025	32395	28845	25495
2x8	2	SDW22300	6	One side	7955	6115	4740	3720	2960	7120	5515	4305	3395	2710	8490	6530	5070	3980	3165
				Both sides	9280	7130	5530	4340	3450	8305	6435	5025	3960	3160	9905	7620	5915	4645	3695
	3	SDW22458	8	One side	23860	20245	17025	14255	11925	20600	17665	15000	12665	10670	25365	21545	18140	15200	12730
				Both sides	27835	23620	19860	16630	13915	24030	20610	17500	14775	12450	29590	25140	21160	17735	14850
	4	SDW22600	8	One side	42040	38235	34350	30560	26985	35495	32545	29490	26455	23550	44580	40585	36495	32495	28720
				Both sides	49045	44605	40075	35650	31480	41410	37970	34405	30865	27475	52010	47345	42575	37915	33510

1. Factored resistances shown are based on standard term load duration ($K_D = 1.00$). Additional adjustment factors (K_H , K_{SC} , K_T) = 1.00. See 6.5.6 CSA O86-14 for additional information.
2. All SDW screws have an E-coat™. Simpson Strong-Tie has conducted testing per Acceptance Criteria AC257, showing in dry conditions E-coat™ performs equivalent to hot-dip galvanized (HDG) coating.
3. The values shown do not include compression perpendicular-to-grain or bearing resistance of the supporting member.
4. For fire-retardant-treated (FRT) wood, reduce the values shown based on the manufacturers recommendations.
5. The column capacities shown are based on the effective length (L_e) in both the strong and weak axis for buckling.
6. Factored resistances shown assume No. 1/No. 2 grade lumber graded per NLGA standards.
7. Loading is assumed to be concentric ($e = 0$).

Load Tables, Technical Data and Installation Instructions

Strong-Drive® SDWV SOLE-TO-RIM Screw

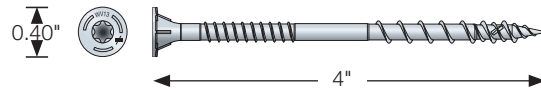
Sole-to-Rim Attachment

The Simpson Strong-Tie® SDWV Sole-to-Rim structural wood screws may be used to attach a sole plate to a rim board according to the following table.

Features:

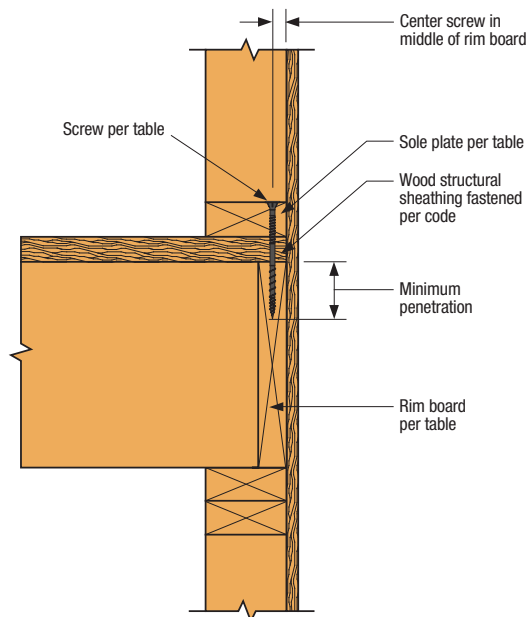
- Large 0.400 diameter head for increased holding power
- Fast start point with helical ridge for fast, easy, low torque installation
- Variable thread design, optimized for 2x nominal dimension lumber

SDWV Screw — Factored Lateral Resistances for Sole-to-Rim Connections



Size (in.)	Model No.	Sole Plate Nominal Size	Minimum Penetration into Rim Board (in.)	Factored Lateral Resistance per Screw (lb.) ($K_D = 1.15$)					
				Rim Board					
				2x D.Fir-L		2x S-P-F		1 1/4" LVL/LSL (G = 0.50)	
				Sole Plate		Sole Plate		Sole Plate	
				D.Fir-L	S-P-F	D.Fir-L	S-P-F	D.Fir-L	S-P-F
0.135 x 4	SDWV13400Z	2x	1.75	240	225	225	215	240	225

1. Factored resistances shown have been developed in accordance with 12.11 CSA O86-14 based on testing per ICC-ES AC233.
2. Apply the adjustment factors K_D , K_{SF} and K_T as per 12.11.4.1 when applicable.
3. Minimum spacing, edge and end distances shall be in accordance with 12.9.2.1 CSA O86-14 using a diameter value of 0.183".



Load Tables, Technical Data and Installation Instructions

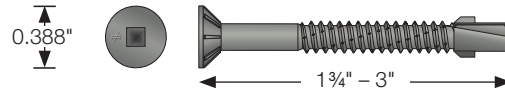
Strong-Drive® TB WOOD-TO-STEEL Screw

Common Applications:

Wood to hot-rolled steel (maximum recommended thickness: 5/16")

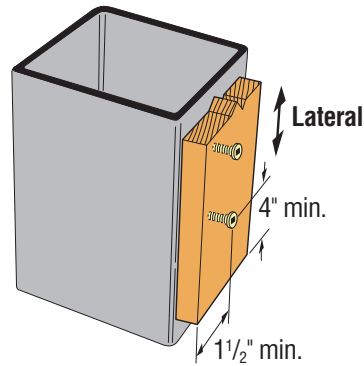
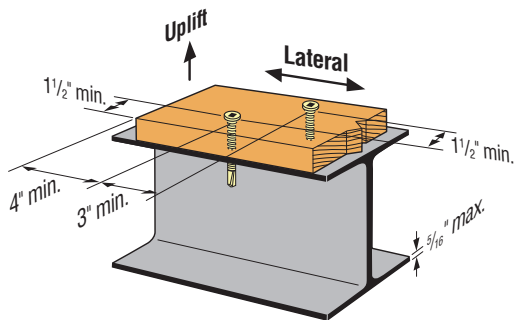
Standard product available in black phosphate, yellow zinc or N2000 coating for additional corrosion protection.

TB Screw – Factored Resistances for 2x Lumber Attached to Steel Members



Model No.	Length (in.)	Nominal Wood Thickness	Steel Thickness	Factored Resistance (lb.)					
				D.Fir-L			S-P-F		
				Lateral		Uplift	Lateral		Uplift
				K _D = 1.00	K _D = 1.15	K _D = 1.15	K _D = 1.00	K _D = 1.15	K _D = 1.15
TB1460S	2 3/4	2x	16 ga.	270	280	195	245	280	195
			14 ga.	280	280	245	275	280	245
			12 ga. – 5/16"	340	340	255	330	340	255
TB1475S	3	2x	16 ga.	270	280	195	245	280	195
			14 ga.	280	280	245	275	280	245
			12 ga. – 5/16"	340	340	255	330	340	255

1. Factored resistances shown are for structural steel members up to 5/16" thick or cold-formed steel members 16 ga. (54 mil) or thicker with a minimum tensile strength of 45 ksi (310 MPa).
2. For use with 2x (1 1/2" thick) D.Fir-L or S-P-F lumber only.
3. For use with QD HSD60 or HSD75 Tool.
4. For standard term loading, reduce the uplift values by 15%.
5. Factored resistances have been developed based on testing in accordance with Chapter F of CSA S136-12 and Clause 12.11 of CSA O86-14.

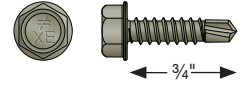


Load Tables, Technical Data and Installation Instructions

Strong-Drive®

XE EXTERIOR STRUCTURAL METAL Screw

Structural Metal Connectors



Cold-Formed Steel Member Connection Resistances, Steel to Steel

Model No.	Screw Size (gauge x length)	Nominal Dia. (in.)	Resistance	Shear (lb.)						Pull-Over (lb.)						Pull-Out (lb.)					
				Steel Thickness: mil (ga.)						Steel Thickness: mil (ga.)						Steel Thickness: mil (ga.)					
				27	33	43	54	68	97	27	33	43	54	68	97	27	33	43	54	68	97
				(22)	(20)	(18)	(16)	(14)	(12)	(22)	(20)	(18)	(16)	(14)	(12)	(22)	(20)	(18)	(16)	(14)	(12)
XEQ34B1016	#10 x 3/4"	0.19	Factored	240	310	485	595	595	595	430	550	790	1000	1000	1000	85	125	165	295	400	655
			Nominal	425	535	830	1290	1290	1290	805	1035	1485	2065	2195	2195	165	235	350	555	750	1225

1. Screws and their connections have been tested per AISI Standard Test Method S904-08 and S905-08 in accordance with CSA S136-12.
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.

XE Screw Resistance

Model No.	Screw Size (gauge x length)	Nominal Dia. (in.)	Washer Dia. (in.)	Resistance (lb.)			
				Nominal		Factored	
				Shear	Tension	Shear	Tension
				P_{ss}	P_{ts}	ϕP_{ss}	ϕP_{ts}
XEQ34B1016	#10 x 3/4"	0.19	0.4	1390	2350	595	1000

Load Tables, Technical Data and Installation Instructions

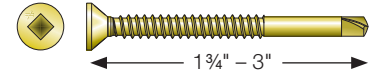
Strong-Drive® PPSD SHEATHING-TO-CFS Screw

Common Application:

Wood structural panel/sheathing to cold-formed steel
(#8 – maximum thickness: 54 mil/16 ga.; #10 – maximum thickness: 97 mil/12 ga.)

Codes/Standards: ASTM C1513 compliant, ICC-ES ESR-3006

PPSD Screw — Pull-Out Resistances — Steel Connections



Model No.	Screw Size (gauge)	Resistance	Pull-Out (lb.)					
			Steel Thickness: mil (ga.)					
			27 (22)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)
PPSD11516S0818 PPSDQ11516S0818	#8	Factored	80	115	155	240	—	—
		Nominal	155	215	290	450	—	—
PPSD134S1016 PPSDQ134S1016	#10	Factored	100	165	255	410	555	625
		Nominal	225	325	480	765	1045	1205
PPSD3S1016 PPSDQ3S1016	#10	Factored	100	165	255	410	555	625
		Nominal	225	325	480	765	1045	1205

- Screws and connections have been tested per AISI Standard Methods S904-08 and S905-08 in accordance with CSA S136-12.
- 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.).

- 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 thickness as specified in CSA S136-12, Section A2.4.
- A minimum of three exposed screw threads are required to achieve the loads in the Table.

PPSD — Factored Pull-Through Resistances — Panel Sheathing (lb.)

Model No.	Screw Size (gauge)	Factored Pull-Through Resistance (lb.) ($K_D = 1.15$)								
		Minimum Nominal Panel Thickness (in.)								
		OSB			Plywood					
		15/32	19/32	23/32	DFP			CSP		
			1/2	5/8	23/32	1/2	5/8	23/32		
PPSD11516S0818 PPSDQ11516S0818	#8	60	100	120	85	105	125	60	105	125
PPSD134S1016 PPSDQ134S1016	#10	60	100	120	85	105	125	60	105	125
PPSD3S1016 PPSDQ3S1016	#10	60	100	120	85	105	125	60	105	125

- Factored head pull-through resistances are based on testing per ICC-ES AC233 and Clause 12.11.5.3 CSA O86-14, under short-term load duration ($K_D = 1.15$). Reduce where other load durations govern.
- Values shown are applicable to Douglas Fir Plywood manufactured in accordance with CSA O121, Canadian Softwood Plywood manufactured in accordance with CSA O151 and OSB manufactured in accordance with CSA O325.

Load Tables, Technical Data and Installation Instructions

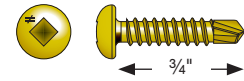
Strong-Drive® PHSD FRAMING-TO-CFS Screw

Common Applications:

Cold-formed steel framing and sheet-steel sheathing to cold-formed steel

Codes/Standards: ASTM C1513 compliant

PHSD Screw — Cold-Formed Steel Member Connection Resistances, Steel to Steel (lb.)



Model No.	Screw Size (ga. — tpi x length)	Nominal Dia. (in.)	Resistance	Shear (lb.)			Pull-Over (lb.)			Pull-Out (lb.)		
				Steel Thickness: mil (ga.)			Steel Thickness: mil (ga.)			Steel Thickness: mil (ga.)		
				27	33	43	27	33	43	27	33	43
				(22)	(20)	(18)	(22)	(20)	(18)	(22)	(20)	(18)
PHSD34S0818	#8 — 18 x 3/4"	0.164	Factored	240	285	395	285	375	505	85	165	175
			Nominal	410	550	760	540	700	950	165	310	325

- Screws and screw connections have been tested per AISI Standard Test Method S904-08 and S905-08 per CSA S136-12. This screw is not recommended for 16 gauge and thicker steel. Provide a 1/8"-diameter predrilled hole in 16 gauge and thicker steel, if this screw should be used.
- The tabulated resistances 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 CSA S136-12 Section E4.
- The resistance factor is based on CSA S136-12 Chapter F for tested connections.
- The average ultimate/nominal values listed should not be used for design loads.
- 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.).
- 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 CSA S136-12 Section A2.4.
- Screw diameters per AISI S200-07 General Provision Commentary Table D1.1.
- Minimum required screw length is the lesser of 3/4" or the minimum length required for the screw to extend through the steel connection a minimum of three exposed threads per AISI S200-07 General Provisions Standard Section D1.3.
- Screw head or washer diameter, d_w is 0.307".
- The lower of the pull-over and pull-out resistances should be used for tension design.
- 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.
- See the general load table on p. 7 for screw strength.

Load Tables, Technical Data and Installation Instructions

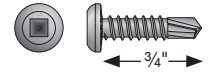
Strong-Drive® FPHSD FRAMING-TO-CFS Screw

Common Application:

Cold-formed steel framing and sheet-steel sheathing to cold-formed steel

Codes/Standards: ASTM C1513 compliant, ICC-ES ESR-3006

FPHSD Screw — Cold-Formed Steel Member Connection Resistances, Steel to Steel



Model No.	Screw Size (ga. — tpi x length)	Nominal Dia. (in.)	Resistance	Shear (lb.)						Pull-Over (lb.)						Pull-Out (lb.)					
				Steel Thickness: mil (ga.)						Steel Thickness: mil (ga.)						Steel Thickness: mil (ga.)					
				27	33	43	54	68	97	27	33	43	54	68	97	27	33	43	54	68	97
				(22)	(20)	(18)	(16)	(14)	(12)	(22)	(20)	(18)	(16)	(14)	(12)	(22)	(20)	(18)	(16)	(14)	(12)
FPHSD34S1016	#10 — 16 x 3/4"	0.19	Factored	230	310	500	730	730	730	365	480	635	885	885	885	100	135	205	310	445	660
			Nominal	395	535	860	1305	1305	1305	685	900	1190	1705	2215	2215	205	260	385	585	840	1235
FPHSD34S1214	#12 — 14 x 3/4"	0.216	Factored	270	345	540	805	805	805	315	435	560	820	1090	1350	100	125	210	315	450	690
			Nominal	485	610	930	1385	1385	1385	595	815	1050	1540	2045	2865	190	230	390	590	845	1295

- Screws and connections have been tested per AISI Standard Method S904-08 and S905-08 per CSA S136-12.
- The tabulated resistances 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 CSA S136-12 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.).
- 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 CSA S136-12 Section A2.4.
- Screw diameters per AISI S200-07 General Provision Commentary Table D1.1.
- Minimum required screw length is the lesser of 3/4" or the minimum length required for the screw to extend through the steel connection a minimum of three exposed threads per AISI S200-07 General Provisions Standard Section D1.3.
- Screw head d_w for #10 and #12 screws is 0.357".
- The lower of the pull-over and pull-out resistances should be used for tension design.
- 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.
- See the general load table on p. 7 for screw strength.

Load Tables, Technical Data and Installation Instructions

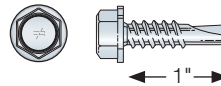
Self-Drilling E Metal Screw

Common Application:

Cold-formed steel framing

- Recommended for use with certain Simpson Strong-Tie® connectors
- #3 drill point (Max. total drilling thickness 0.35")

Codes/Standards: ASTM C1513 compliant



E Screw — Resistance (lb.)

Model No.	Screw Size (gauge x length)	Nominal Dia. (in.)	Washer Dia. (in.)	Resistance (lb.)			
				Nominal		Factored	
				Shear	Tension	Shear	Tension
				P_{ss}	P_{ts}	ϕP_{ss}	ϕP_{ts}
E1B1414	#14 x 1"	0.242	0.5	3130	5395	1335	2300

E Screw — Cold-Formed Steel Member Connection Resistances, Steel to Steel

Model No.	Screw Size (ga. x length)	Nominal Dia. (in.)	Resistance	Shear (lb.)					Pull-Over (lb.)					Pull-Out (lb.)				
				Steel Thickness: mil (ga.)					Steel Thickness: mil (ga.)					Steel Thickness: mil (ga.)				
				33	43	54	68	97	33	43	54	68	97	33	43	54	68	97
				(20)	(18)	(16)	(14)	(12)	(20)	(18)	(16)	(14)	(12)	(20)	(18)	(16)	(14)	(12)
E1B1414	#14 x 1"	0.242	Factored	240	355	725	1020	1335	465	610	1105	1390	1985	130	165	305	380	545
			Nominal	600	890	1810	2555	3130	1170	1520	2760	3475	4960	320	415	755	955	1360

1. Screws shall extend through the connection with a minimum of three exposed threads per AISI General Provisions Standard Section D1.3.

2. Tabulated loads are based on calculations per CSA S136-12 using the thinner steel member in the connection. A resistance factor $\phi = 0.4$ was used to determine factored resistances.

3. Resistances 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.

Load Tables, Technical Data and Installation Instructions

PC/PCSD Standing-Seam-Roofing Panel Clip Screws

Common Application:

PC — Standing-seam-roofing panel clips to wood

PCSD — Standing-seam-roofing panel clips to steel or sheet-steel sheathing to cold-formed steel

Features:

- Pancake head
- #2 square drive (drive bit in each box; replacement bit model BIT25)
- Straight collation
- PC — Type-17 point
- PCSD — Drill point
- PCSD available in bulk for hand-drive installation

Codes/Standards: ASTM C1513 compliant (PCSD)

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.



Cold-Formed Steel Member Connection Resistances, Steel to Steel (lb.)

Model	Model No.	Screw Size (gauge — tpi x length)	Nominal Dia. (in.)	Resistance	Shear						Pull-Over						Pull-Out						
					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)	22 (24)	27 (22)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)
PCSD	PCSD1S1016	#10 — 16 x 1"	0.19	Factored	215	335	535	680	680	680	220	330	585	—	—	—	60	85	125	190	330	405	—
				Nominal	410	575	920	1465	1645	1705	410	740	1285	—	—	—	115	160	235	355	625	760	—
	PCSD1S1214	#12 — 14 x 1"	0.216	Factored	200	395	585	705	705	705	270	420	700	—	—	—	60	85	115	180	330	415	—
				Nominal	390	700	1005	1625	1760	1760	505	790	1310	—	—	—	115	160	240	335	620	785	—
PC	PC1BS1012	#10 — 12 x 1"	0.19	Factored	155	210	—	—	—	—	215	325	650	—	—	—	80	100	—	—	—	—	—
				Nominal	390	530	—	—	—	—	465	770	1260	—	—	—	205	250	—	—	—	—	—
	PC1BS1211	#12 — 11 x 1"	0.216	Factored	165	225	—	—	—	—	260	395	615	—	—	—	95	115	—	—	—	—	—
				Nominal	420	565	—	—	—	—	490	740	1160	—	—	—	235	285	—	—	—	—	—

Load Tables, Technical Data and Installation Instructions

Steel-Deck Fastening

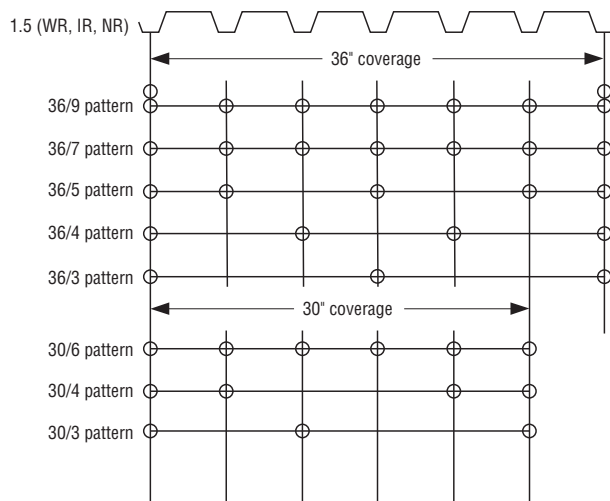
Steel decks may be classified into roof decks, form decks and composite decks. The primary purpose of these decks is to support vertical loads, but they can also be used as a horizontal diaphragm to resist lateral loads from wind or earthquake forces. The strength of the diaphragm can be limited by fastener connection strength, local panel buckling, or even plate buckling of the entire diaphragm.

Steel-deck panels are available in different geometries and thicknesses and steel properties from different manufacturers. Common deck panel profiles are narrow rib (NR, commonly referred to as Type A deck), intermediate rib (IR, commonly referred to as Type F deck) and wide rib (WR, commonly referred to as Type B deck). Illustrations of these can be found in Canadian Sheet Steel Building Institute (CSSBI) or Steel Deck Institute (SDI) publications. The CSSBI design recommendations are limited to deck panels that are in the thickness range of 0.030" to 0.060", and panel depths 1½" to 3".

Steel-deck fastening is categorized into two groups — structural fastening and side-lap or stitch fastening. Structural fasteners connect the steel-deck panels to the structural framing, while side-lap fasteners connect the panels together along the free edges between the supports. The most important information for any steel-deck fastener is the connection strength and connection flexibility that is developed using the fastener.

Steel-Deck Fastening

Based on the deck profile, width and the design load, a structural fastening pattern and the number of side-lap fasteners or side-lap spacing can be determined. The fastening pattern provides the number of structural fasteners needed to attach the decking panel to support steel. The structural fastening pattern is given by the deck width followed by the number of fasteners. e.g., 36/7 pattern means 36"-wide panel attached with seven fasteners. The most typical fastener patterns for steel deck profiles are shown here.



Typical Fastener Layout

(From SDI, DDM03 2004, 3rd Edition, Appendix IV; DDM04 2015, 4th Edition)

The number of side-lap fasteners required at the over-lapping panel edges are per deck span between structural supports. For example, five side laps for a 6'-deck span would represent six even spaces with side-lap fasteners at 12" on center. The side-lap fastener spacing can range between 3" and 36" o.c.

Structural fastening can be done with puddle welds, power-actuated pins, or screws. Each type of fastening has its advantages and disadvantages in terms of installation cost, installation effort, capacity, energy dissipation and behavior at ultimate load. All of the fasteners would be called out in a fastener pattern using nomenclature similar to that shown in the figure.

Load Tables, Technical Data and Installation Instructions

Steel-Deck Fastening (cont.)

Evaluation Reports and Approvals

Steel-deck diaphragms can be designed and constructed following code-recognized design procedures and provisions. At the same time, the codes provide for alternate design methods and materials to be recognized by the authority having jurisdiction. Some deck and fastener manufacturers have gone the alternate route and in that process have secured evaluation reports that can be used by the engineering design community for design of steel diaphragms and by the local building officials as the basis for approval. ICC-ES and IAPMO UES provide criteria that can be used to secure evaluation reports for steel diaphragm products.

The insurance industry also has a form of compliance that it uses as the basis for risk management. Factory Mutual (FM) provides an Approval for deck products and systems as well as fasteners used for fastening the deck panels.

Simpson Strong-Tie Steel-Deck Fasteners

Simpson Strong-Tie holds evaluation reports and FM Approvals for all of its steel-deck diaphragm fasteners. These reports and approvals are available on line at no cost from the issuing agency or at strongtie.com.

The Simpson Strong-Tie self-tapping X metal screws have been qualified for compliance with ASTM C1513 and some of these screws are included in the CSSBI B13-06 Addendum and SDI DDM03 and DDM04, Appendix VII and Appendix IX. In those documents, diaphragm design values are provided in tabular format for typical fastening patterns and for a range of common deck thicknesses.

In addition, the strength and flexibility of connections with Simpson Strong-Tie X-series screws used in steel decks were evaluated per IAPMO UES Evaluation Criteria EC007 (2013), which is based on AISI S310, North American Standard for the Design of Profiled Steel Panels. The connection strengths and flexibilities can be used to calculate the nominal diaphragm shear strength and diaphragm stiffness per Sections 2 and 3 of SDI DDM03.

The Simpson Strong-Tie steel-deck diaphragm calculator, which is available as a web app, can be used to do the diaphragm strength and stiffness calculations, investigate alternative fastening strategies and ultimately produce the required submission documents.

The available Simpson Strong-Tie fasteners for steel-deck applications are listed on pp. 60–62 of this catalogue. They are available in bulk or collated forms. The collated forms are driven using Quik Drive® Systems. For more up-to-date information on steel-deck diaphragm fasteners, evaluation reports, approvals and appropriate Quik Drive tools including some products not found in the print catalogue, see strongtie.com.

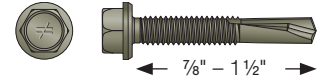
Load Tables, Technical Data and Installation Instructions

Strong-Drive® SELF-DRILLING X METAL Screw

Common Application:

Steel decking to structural steel; cold-formed steel framing; steel stitching

Codes/Standards: ICC-ES ESR-3006, ASTM C1513 compliant, IAPMO UES ER326, FM Approval #3045651, CSSBI B13-06A-SST, SDI DDM03, Appendix VII, IAPMO-UES ER-326, SDI DDM04



X Metal Screw — Cold-Formed Steel Connection Resistances

Model No.	Screw Size (ga. — tpi x length)	Nominal Dia. (in.)	Resistance	Shear (lb.)						Pull-Over (lb.)						Pull-Out (lb.)					
				Steel Thickness: mil (ga.)						Steel Thickness: mil (ga.)						Steel Thickness: mil (ga.)					
				27	33	43	54	68	97	27	33	43	54	68	97	27	33	43	54	68	97
(22)	(20)	(18)	(16)	(14)	(12)	(22)	(20)	(18)	(16)	(14)	(12)	(22)	(20)	(18)	(16)	(14)	(12)				
XQ1S1016 X1S1016	#10 — 16 x 1"	0.19	Factored	255	320	475	690	690	690	430	520	615	845	1205	1435	95	115	170	260	350	580
			Nominal	440	550	820	1290	1680	1680	805	990	1160	1585	2265	2305	175	215	315	490	660	1095
XQ1S1214 X1S1214	#12 — 14 x 1"	0.216	Factored	230	310	505	785	970	970	385	490	685	1025	1365	1580	95	125	190	280	425	650
			Nominal	400	535	870	1350	2120	2270	720	920	1285	1925	2565	2965	180	235	360	520	795	1220

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 CSA S136-12 Section E4.
2. The tabulated resistances 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 CSA S136-12.
3. The resistance factor ϕ used to determine the factored resistances are based on CSA S136-12 Section F.
4. The nominal resistances 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 1/8" 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

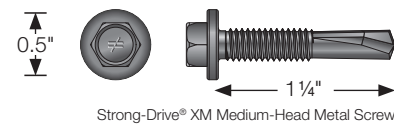
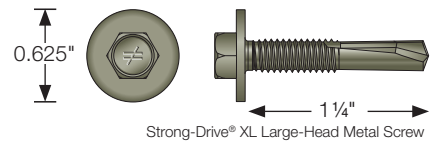
7. Screw diameters per AISI S207-07 General Provisions Commentary Table D1-1.
8. Minimum required screw length is the lesser of 3/4" or the minimum length required for the screw to extend through the steel connection a minimum of three exposed threads per 2004 AISI General Provisions Standard Section D1.3.
9. Screw head or washer diameter, d_w , for #10 and #12 screws is 0.398".
10. The lower of the pull-over and pull-out resistances should be used for tension design.
11. The tabulated shear values are based on the thinner steel member in connection. Steel thickness for both member must be in the range of 1/2" – 22 gauge.
12. The XQ-S1224 screws are recommended for 16-gauge and thicker steel.
13. See p. 7 for information on screw strength.

Load Tables, Technical Data and Installation Instructions

Strong-Drive® XL LARGE-HEAD and XM MEDIUM-HEAD METAL Screws

High-Performance Screw Alternative to Welds and Pins

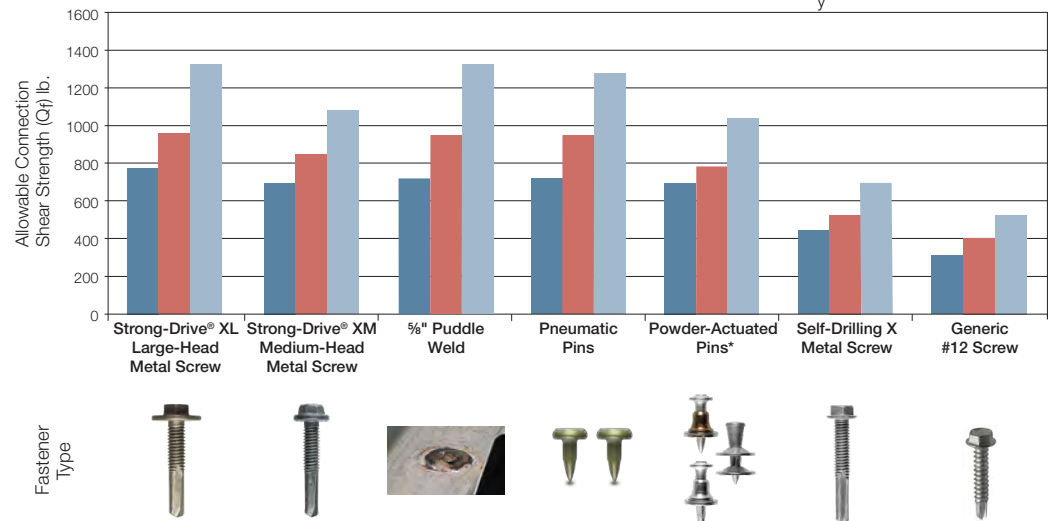
Strong-Drive metal screws are load-tested and code-listed, allowing you to get the maximum load values for installation. Strong-Drive XL Large-Head Metal screws are the perfect choice when high shear or uplift resistance is required. Strong-Drive XM Medium-Head Metal screws, with their 1/2" washer head, are designed for narrow flutes commonly found on interlocking deck profiles. In high-strength decks ($F_y = 345$ MPa), 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.



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 230 MPa and 345 MPa steel decking.

For Standard SDI DDM03 and DDM04 Decks with $F_y = 230$ MPa

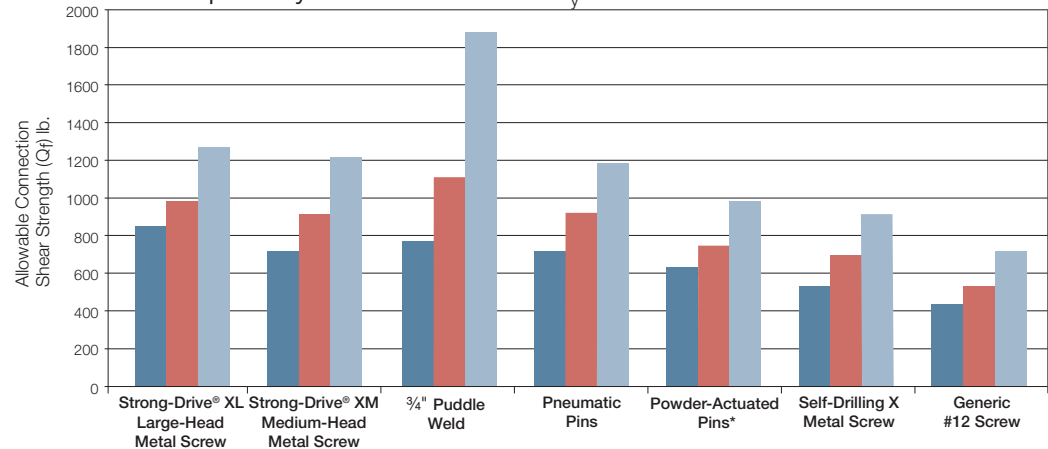


Wind Load

- Standard screw based on AISI Eq.
- PAF values based on SDI DDM03 and DDM04 Manuals
- Values based on 1/4" support thickness
- Safety factors per DDM03 and DDM04

*Average

For Proprietary Steel Decks with $F_y = 345$ MPa



Seismic Load

- Standard screw based on AISI Eq.
- PAF values based on SDI DDM03 and DDM04 Manuals
- Values based on 1/4" support thickness
- Safety factors per DDM03 and DDM04

*Average

Load Tables, Technical Data and Installation Instructions

Strong-Drive® XL LARGE-HEAD and XM MEDIUM-HEAD METAL Screws (cont.)

XL and XM Screw Resistances (lb.)

Model	Size (gauge — tpi x length)	Nominal Dia. (in.)	Washer Dia. (in.)	Resistance (lb.)			
				Nominal		Factored	
				Shear	Tension	Shear	Tension
				P_{ss}	P_{ts}	ϕP_{ss}	ϕP_{ts}
XL	#12 x 1¼"	0.216	0.625	3110	4985	1245	1995
XM	#12 x 1¼"	0.216	0.483	3110	4985	1245	1995

- P_{ss} and P_{ts} are nominal shear resistance and nominal tension resistance for the screw itself, respectively, and are the average (ultimate) value of all tests determined by independent laboratory testing.
- The factored resistances are based on a resistance factor of $\phi = 0.4$ per E4 CSA S136-12. For the factored shear resistance to be used in diaphragm design, see table D-5 CSA S136-12 for applicable resistance factors.
- For tension connections, use the smallest of the screw tension resistance, pull-over resistance and the pull-out resistance for design.

XL and XM Screw Connection Pull-Over and Pull-Out Resistances (lb.)

Model	Size (gauge — tpi x length)	Model No.	Resistance	Pull-Over (lb.)				Pull-Out (lb.)			
				Deck Thickness: ga (in.)				Support Thickness (in.)			
				22	20	18	16	1/8"	3/16"	1/4"	3/8"
				(0.0295")	(0.0358")	(0.0474")	(0.0598")				
XL	#12 — 24 x 1¼"	XLQ114T1224 XLQ114B1224-2K	Factored	520	680	995	1110	595	895	1160	1790
			Nominal	1295	1705	2490	2775	1490	2240	2895	4475
XM	#12 — 24 x 1¼"	XMQ114S1224 XMQ114B1224-2K	Factored	300	410	560	770	595	895	1160	1790
			Nominal	750	1020	1400	1930	1490	2240	2895	4475

- Values are based on steel deck with a minimum yield strength of $F_y = 230$ MPa and tensile strength of $F_u = 310$ MPa.
- The values for Strong-Drive® XL Large-Head Metal screws are based on tests per AISI Standard Test Method S905-08.
- The factored resistances are based on a resistance factor of $\phi = 0.4$ per E4 CSA S136-12.
- Tabulated Pull-Out values are based on the tensile strength of the supporting member $F_u = 450$ MPa. For other steel strengths, see E4.4.1 CSA S136-12.

Load Tables, Technical Data and Installation Instructions

Steel-Deck Diaphragm Calculator

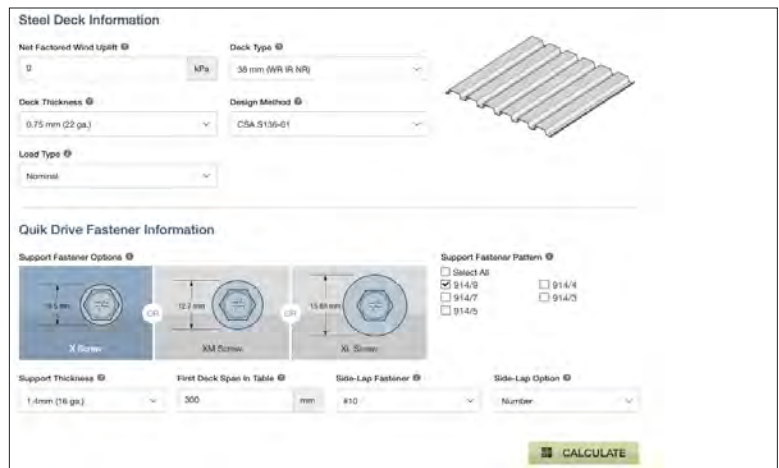
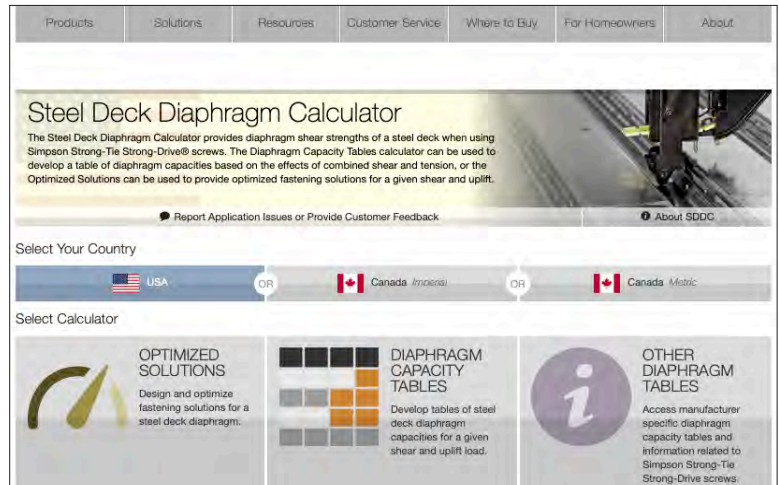
The Steel-Deck Diaphragm Calculator web app offers optimized steel-deck design solutions based on fastener and labor costs for a given shear and uplift. It can provide calculations for any solution generated. Generate diaphragm tables for various roof and floor decks using Simpson Strong-Tie fasteners. The app can also generate a submittal package that includes fastener information, code reports, Factory Mutual reports, CSSBI B13-06A-SST Appendix VII and IX of DDM03 (also reference DDM04), 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, LRFD or LSD
- 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 for wind or seismic applications in accordance with AISI S100 and CSA S136
- Design for loads using the Strong-Drive® XL Large-Head Metal screw (included in the optimization calculator)
- Design for additional structural patterns not covered in CSSBI or SDI literature
- Access proprietary deck tables with the Strong-Drive XM Medium-Head Metal screw

Steel-Deck Diaphragm Load Tables for Interlocking Decks

Load tables are available on our website application for using Strong-Drive XM Medium-Head Metal screws on frequently used interlocking decks with proprietary side-lap connections.

For more information regarding Strong-Drive XM Medium-Head Metal screw shear tables, refer to strongtie.com/diaphragmcalc.



Example of Steel-Deck Diaphragm Calculator Web Application

CALCULATION RESULTS		STEEL DECK DIAPHRAGM CALCULATOR		APRIL 08, 2019									
<p>Diaphragm Shear Strength Tables: 1.4mm (16 ga.) Support Steel Thickness 38 mm (WR IR NR) x 0.75 mm (22 ga.) (t = design thickness = 0.75 mm)</p>													
Support Fasteners		Resistance Factor ϕ											
Collated Models	X114S1224, X0114S1224, X0112S1224	CSA Standard	Wind	Earthquake	Other								
Bulk Models	X114B1224, X0114B1224, X0112B1224	CSA S136-01	0.5	0.5	0.5								
Side Lap Fasteners		CSA S136S1-04	0.5	0.5	0.5								
Collated Models	X1S1016, XQ1S1016	CSA S136-07	0.65	0.6	0.6								
Bulk Models	X34B1016, X1B1016, XQ1B1016	CSA S136-12	0.65	0.6	0.6								
Nominal Shear Strength (kN/m)													
Support Fastener Layout	Side Lap Fasteners Per Span	Deck Span (mm)								K1			
		300	450	600	750	900	1050	1200	1350		1500	1650	1800
914/9	0	28.55	24.14	20.40	17.45	15.14	13.32	11.87	10.51	9.39			1.239
	25	29.95	26.13	22.62	19.67	17.27	15.32	13.72	12.40	11.24	10.15	9.24	1.019
	50	30.93	27.66	24.44	21.58	19.16	17.14	15.45	14.03	12.83	11.80	10.79	0.865
	75	31.65	28.84	25.93	23.22	20.84	18.79	17.04	15.55	14.27	13.17	12.21	0.751
	100	32.18	29.76	27.15	24.61	22.31	20.27	18.50	16.96	15.62	14.46	13.45	0.664
	125	32.58	30.50	28.15	25.80	23.60	21.61	19.83	18.27	16.90	15.69	14.62	0.595
	150	32.89	31.08	28.98	26.81	24.73	22.80	21.05	19.48	18.09	16.85	15.74	0.539
	175	33.14	31.55	29.67	27.68	25.72	23.86	22.15	20.59	19.19	17.93	16.80	0.492
200	33.34	31.94	30.25	28.42	26.58	24.81	23.15	21.62	20.22	18.95	17.80	0.453	

Example of Steel-Deck Diaphragm Load Table

Nothing else drives this easy.

Simpson Strong-Tie® fasteners are precision engineered and rigorously tested to meet your most demanding applications. Our unique, patented features deliver speed and ease of installation, as well as exceptional performance.

Drive faster. Drive stronger. Drive easier.

SIMPSON

Strong-Tie

®



6-Lobe

Deep six-lobe recessed head provides a secure bit retention for fewer cam-outs



No Predrilling

SawTooth™ point design for fast starts and no predrilling



Flush Finish

Ribbed-head design countersinks easily and provides a clean, finished appearance



Low Torque

Low-torque threads allow up to 35% more screws to be driven on a battery charge



Stainless Steel

Type 316 stainless steel for maximum corrosion protection



Strong-Drive® SDWH TIMBER-HEX HDG Screw



Deck-Drive™ DSV WOOD Screw



Strong-Drive WSV SUBFLOOR Screw



Strong-Drive SDWH TIMBER-HEX SS Screw

