

Structural and General Fastening

Strong-Drive® SDWS FRAMING Screw

Multipurpose Wood-to-Wood Including Framing, Indoor/Outdoor Projects

The framing connections with the SDWS FRAMING screws are designed for common framing connections, per the 2021 and 2018 IRC and IBC code requirements, and are based on engineering analysis.

Codes/Standards: IAPMO UES ER-192, State of Florida FL13975

US Patent 9,523,383

For more information, see p. 58, C-F-2023 Fastening Systems catalog



SDWS Framing Screw — Allowable Shear Loads for Sawn Lumber

Length (in.)	Model No.	Side Member Thickness (in.)	Main Member Penetration (in.)	Reference Allowable Shear Loads (lb.)		
				SP	DFL	SPF/HF
2½	SDWS16212	1½	0.90	131	106	99
3	SDWS16300	1½	1.40	229	150	150
		2	0.90	129	129	89
3½	SDWS16312	1½	2.0	254	254	199
4	SDWS16400	1½	2.5	254	254	199
		2	2.0	262	262	199

- All applications are based on full penetration into the main member. Full penetration is the screw length minus the side member thickness.
- Allowable loads are shown at the wood load duration factor of $C_D = 1.0$. Loads may be increased for load duration per the building code up to a $C_D = 1.6$. Tabulated values must be multiplied by all applicable adjustment factors per the NDS.
- For minimum fastener spacing requirements for both side and main members, see the Spacing Requirements Figure and Table on the next page.
- For in-service moisture content greater than 19%, use $C_M = 0.70$.
- Screws must be installed straight into the side grain of the wood main member with the screw axis at a 90° angle to the wood fibers.

SDWS Framing Screw — Allowable Withdrawal Load in Sawn Lumber

Model No.	Length (in.)	Thread Length (in.)	Reference Withdrawal Loads, W (lb./in.)			Max. Reference Withdrawal Loads, W_{max} (lb.)		
			SP	DFL	SPF/HF	SP	DFL	SPF/HF
SDWS16212	2.40	1.125	177	132	103	199	149	116
SDWS16300	2.90	1.625	192	127	122	310	205	200
SDWS16312	3.50	2.000	181	169	127	345	300	200
SDWS16400	4.00	2.500	181	169	127	345	300	200

- The tabulated reference withdrawal values (W) are in pounds per inch of the thread penetration into the main member.
- The tabulated reference withdrawal values (W_{max}) are in pounds where the entire thread length must penetrate into the main member.
- Tabulated reference withdrawal values (W) and (W_{max}) are shown at a $C_D = 1.0$. Loads may be increased for load duration per the building code up to a $C_D = 1.6$. Tabulated values must be multiplied by all applicable adjustment factors from the NDS as referenced in the IBC or IRC.
- Values are based on the lesser of withdrawal from the main member or pull-through of a 1½" side member. For in-service moisture content greater than 19%, use $C_M = 0.65$.

SDWS Framing Screw — Allowable Shear Loads for Wood Structural Panel Side Member

Model No.	Side Member Thickness (in.)	Min. Main Member Penetration (in.)	Reference Allowable Shear Loads (lb.)		
			SP	DFL	SPF/HF
SDWS16	1½/32	1.93	143	143	143
	2³/32	1.68	200	187	138

- Allowable loads are shown at the wood load duration factor of $C_D = 1.0$. Loads may be increased for load duration per the building code up to a $C_D = 1.6$. Tabulated loads must be multiplied by all applicable adjustment factors per the NDS.
- WSP side members for tests were oriented strand board (equivalent specific gravity = 0.50).
- All applications are based on full penetration into the main member. Full penetration is the screw length minus the side member thickness.
- Screws must be installed straight into the side grain of the wood main member with the screw axis at a 90° angle to the wood fibers.

SDWS Framing Screw — Allowable Pull-Through Loads for Wood Structural Panel Side Member

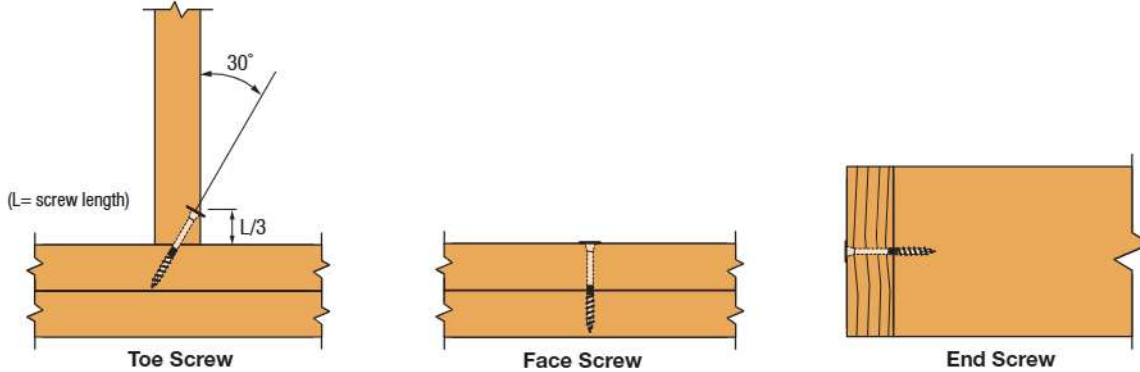
Model No.	Side Member Thickness (in.)	Reference Allowable Pull-Through Loads (lb.)
SDWS16	1½/32	84
	2³/32	169

- Allowable loads are shown at the wood load duration factor of $C_D = 1.0$. Loads may be increased for load duration per the building code up to a $C_D = 1.6$. Tabulated loads must be multiplied by all applicable adjustment factors per the NDS.
- WSP side members for tests were oriented strand board (equivalent specific gravity = 0.50).
- For connections with 1½/32" and 2³/32" thick OSB side members, the lesser of withdrawal loads from the main and pull-through loads from WSP side member shall be used in design.

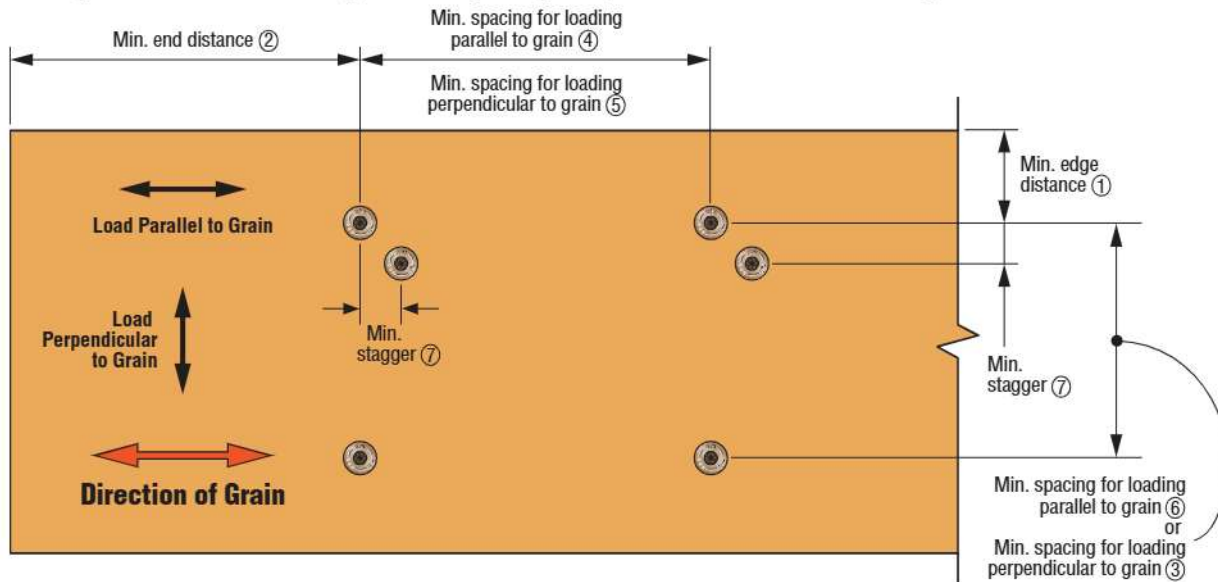
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Strong-Drive® SDWS FRAMING Screw (cont.)

Typical Conventional Framing Connections



Strong-Drive SDWS Framing Screw Spacing Requirements for Non-Prescriptive Construction



SDWS Framing Screw Spacing Requirements

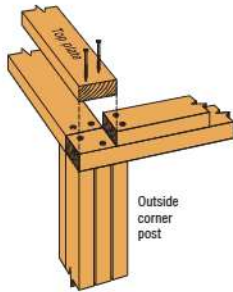
Condition	Direction of Load to Grain	ID	Minimum Distance or Spacing (in.)	
			SDWS16212	SDWS16300 SDWS16312 SDWS16400
Edge Distance	Perpendicular	①	1	1
	Parallel	①	½	1
End Distance	Perpendicular	②	3½	4
	Parallel	②	2	3
Spacing Between Fasteners in a Row	Perpendicular	③	2	2
	Parallel	④	2	2
Spacing Between Rows of Fasteners	Perpendicular	⑤	1¹	1²
	Parallel	⑥	1¹	1²
Spacing Between Staggered Rows	Perpendicular or Parallel	⑦	⅞	⅞

1. Table loads must be multiplied by adjustment factor of 0.93.
 2. Table loads must be multiplied by adjustment factor of 0.91.
 3. For axial loading only, use the following minimum dimensions: end distance = 2¼", edge distance = ⅞", spacing parallel to grain = 1½", spacing perpendicular to grain = ⅞".

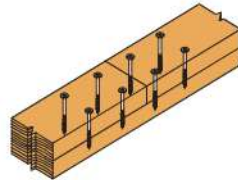
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Strong-Drive® SDWS FRAMING Screw (cont.)

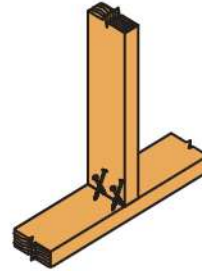
Walls



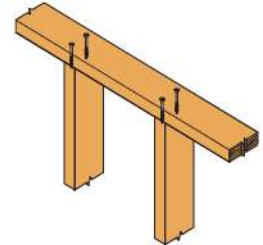
Double Top Plate at Corners



Double Top Plate Laps (Face Screw)



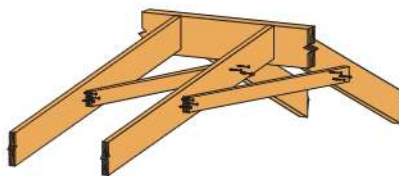
Stud to Sole Plate (Toe Screw)



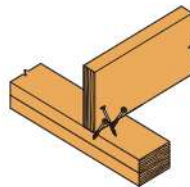
Top or Sole Plate to Stud (End Screw)

Connection Application	Fastening Schedule				Location
	2021 IRC		2021 IBC		
	Table R602.3 (1) Item	Equivalent SDWS Framing Screws	Table 2304.10.2 Item	Equivalent SDWS Framing Screws	
Top or bottom plate to stud	17	(2) SDWS16300	16	(2) SDWS16300	End screw
Stud-to-sole plate	17	(4) SDWS16212	16	(4) SDWS16212	Toe screw
Double top-plate splice	14	(8) SDWS16300	13	(8) SDWS16300	Face screw
Top plates, laps at corners and intersections	18	(2) SDWS16300	17	(2) SDWS16300	Face screw
Stud to stud (not at braced wall panels)	8	SDWS16300 24" o.c.	8	SDWS16300 24" o.c.	Face screw

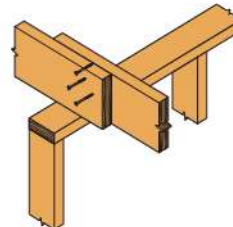
Ceiling



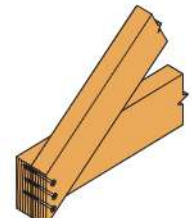
Collar Tie to Rafter (Face Screw)



Ceiling Joist to Plate (Toe Screw)



Ceiling Joist, Laps Over Partitions (Face Screw)



Ceiling Joist to Parallel Rafter (Face Screw)

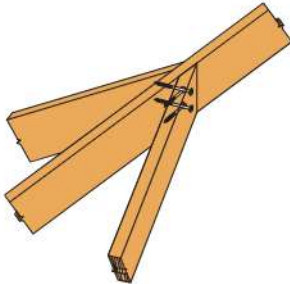
Connection Application	Fastening Schedule				Location
	2021 IRC		2021 IBC		
	Table R602.3 (1) Item	Equivalent SDWS Framing Screws	Table 2304.10.2 Item	Equivalent SDWS Framing Screws	
Ceiling joist-to-top plate	2	(3) SDWS16212	2	(3) SDWS16212	Toe screw
Ceiling joist not attached to parallel rafter, laps over partitions	3	(3 min.*) SDWS16300	3	(3) SDWS16300	Face screw
Collar tie to rafter	5	(3) SDWS16300	5	(3) SDWS16300	Face screw
Ceiling joist attached to parallel rafter (heel joint)	4	(3 min.*) SDWS16300	4	(3 min.*) SDWS16300	Face screw

*Quantities vary based on project conditions. Refer to the IRC or IBC for additional information. The SDWS16212 is a 1-for-1 replacement for 8d common nails and SDWS16300 is a 1-for-1 replacement for 10d and 16d common nails.

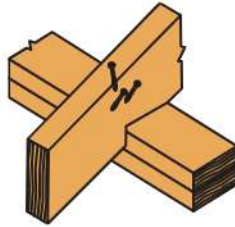
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Strong-Drive® SDWS FRAMING Screw (cont.)

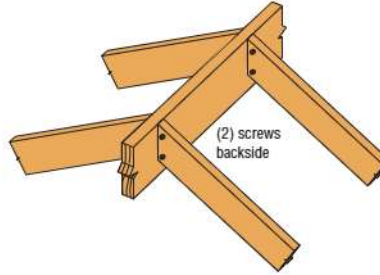
Roof



Jack Rafter to Hip
(Toe Screw)



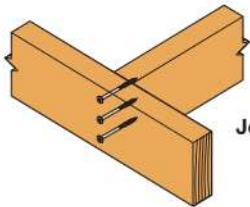
Roof Rafter to Plate
(Toe Screw)



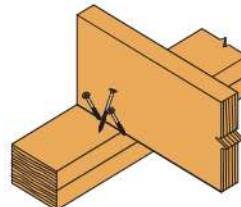
Roof Rafter to 2x Ridge Board
(Toe Screw)

Connection Application	Fastening Schedule				Location
	2021 IRC		2021 IBC		
	Table R602.3 (1) Item	Equivalent SDWS Framing Screws	Table 2304.10.2 Item	Equivalent SDWS Framing Screws	
Rafter or roof truss to plate	6	(3) SDWS16300	6	(3) SDWS16300	Toe screw
Roof rafter to 2x ridge beam	7	(3) SDWS16300	7	(3) SDWS16300	Toe screw
Jack rafter to hip	7	(3) SDWS16300	7	(3) SDWS16300	Toe screw

Floor



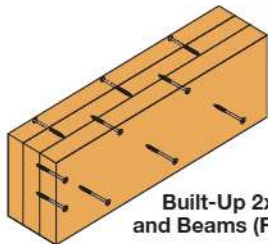
Joist to Rim Board
(End Screw)



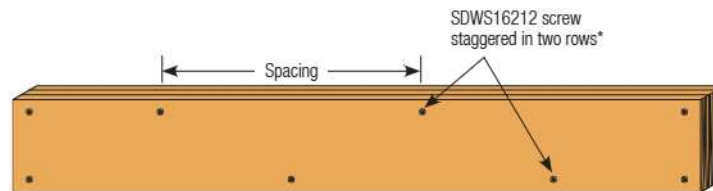
Joist to Sill or Girder
(Toe Screw)

Connection Application	Fastening Schedule				Location
	2021 IRC		2021 IBC		
	Table R602.3 (1) Item	Equivalent SDWS Framing Screws	Table 2304.10.2 Item	Equivalent SDWS Framing Screws	
Band or rim joist to joist	27	(3) SDWS16300	28	(3) SDWS16300	End screw
Joist to sill, top plate or girder	22	(3) SDWS16212	21	(3) SDWS16212	Toe screw

Beam



Built-Up 2x Girders
and Beams (Face Screw)



Beam Assembly Detail*

Connection Application	Fastening Schedule				Location
	2021 IRC		2021 IBC		
	Table R602.3 (1) Item	Equivalent SDWS Framing Screws	Table 2304.10.2 Item	Equivalent SDWS Framing Screws	
Built-up 2x girders and beams	28	SDWS16212 24" o.c. staggered and (3) SDWS16212 at ends and splice	26	SDWS16212 24" o.c. staggered and (3) SDWS16212 at ends and splice	Face screw

*Fastening pattern shown applies to each ply of the built-up 2x beam.