

Subfloor and Sheathing Fastening

Strong-Drive® WSV SUBFLOOR Screw

For more information: see p. 192, C-F-2025 *Fastening Systems* catalog

1 3/4"-3" WSV Fasteners Meet Code Requirements

As listed in ICC-ES ESR-1472, WSV screws meet code requirements for the 2021 and 2018 International Building Code (IBC) and International Residential Code (IRC). Evaluation report recognized uses of WSV screws include the following applications:

- Substitute for 8d and 10d common nails in horizontal diaphragms per AWC SDPWS 2021 and 2015 Tables 4.2A, 4.2B and 4.2C.
- Single, diagonally-sheathed lumber diaphragms per AWC SDPWS 2021 and 2015, Table 4.2D.
- Select code prescribed framing and sheathing connections per 2021 IBC Table 2304.10.2 and 2018/2015 IBC Table 2304.10.1.
- Select code prescribed sheathing connections per 2021/2018/2015 IRC Table R602.3(1) and in structures regulated by the IRC where the engineered design is submitted in accordance with IRC R301.1.3.

Guidelines for Fastening Diaphragms Without Glue

The design of wood floor systems constructed with wood structural panel (WSP) sheathing fastened to framing considers the diaphragm performance of the system as presented in the codes (as affected by framing, sheathing thickness, sheathing layout and fastening) and may also consider the composite action of the sheathing with the framing system for bending performance (composite action is the combined stiffness of the joist with the sheathing in bending). The framing systems can be grouped into two classes: (1) sawn lumber and parallel-chord wood trusses, and (2) wood I-joists. WSV screws may be used as alternate fasteners to common nails in each floor class subject to certain constraints.

For Diaphragms with a Framing System That Is Sawn Lumber or Parallel-Chord Wood Trusses

Simpson Strong-Tie WSV screws may be used as one-for-one substitutes for 10d common and smaller nails that are specified for horizontal diaphragm design in accordance with the AWC SDPWS 2021 and 2015, and IBC and IRC 2024/2021/2018.



For Diaphragms with Wood I-Joist Framing Systems

I-joist manufacturers use the extra stiffness resulting from composite action when developing allowable floor joist span tables. Therefore, I-joist floor span tables generally assume glued-nailed construction.

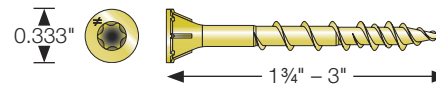
1. For floor systems designed or intended to be glued-nailed:
 - WSV screws may be substituted one-for-one for common nails, without glue, provided the maximum allowable I-joist span is reduced by 12" compared to the I-joist manufacturer's glued-nailed spans. The screws shall have at least 1 1/4" penetration into the I-joist flange (or full penetration for flanges less than 1 1/4" thick).
 - Where glue is used with the screws, no reduction in span is required.
 - Check with the I-joist manufacturer for any additional diaphragm and framing requirements.
2. For floor systems designed or intended to be nailed-only:
 - WSV screws may be substituted one-for-one for common nails, with no reduction in span, provided at least 1 1/4" penetration into the I-joist flange is achieved (or full penetration for flanges less than 1 1/4" thick).
 - Check with the I-joist manufacturer for any additional diaphragm and framing requirements.

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Codes/Standards: ICC-ES ESR-1472 (including City of LA Supplement)

For more information: see p. 229, C-F-2025 Fastening Systems catalog



WSV Subfloor Screw — Allowable Lateral Loads for DFL/SP and SPF/HF

Size x Length (in.)	Model No.	Thread Length (in.)	Side Member Thickness (in.)	Reference Allowable Lateral Load (lb.)	
				$0.42 \leq G < 0.50$	$0.50 \leq G$
#9 x 2½	WSV212, WSVF212	1.95	1½	72	92
#9 x 3	WSV300, WSVF300	2.17		87	102

- Table values are based on attachment of a 1½" side member to a 1½" main member of the same species and grade.
- Table values are based on the 2024 NDS, $C_D = 1.0$. Values shall be multiplied by all applicable factors, such as duration of load, etc., except where noted.
- Specific Gravities (G) assumed: DFL G = 0.50, SP G = 0.55, SPF G = 0.42.
- The spacing of applied uniform loads to a multi-ply member shall not exceed 24" on center.
- For minimum fastener spacing requirements for both side and main members, see the Spacing Requirements Figure and Table on next page.

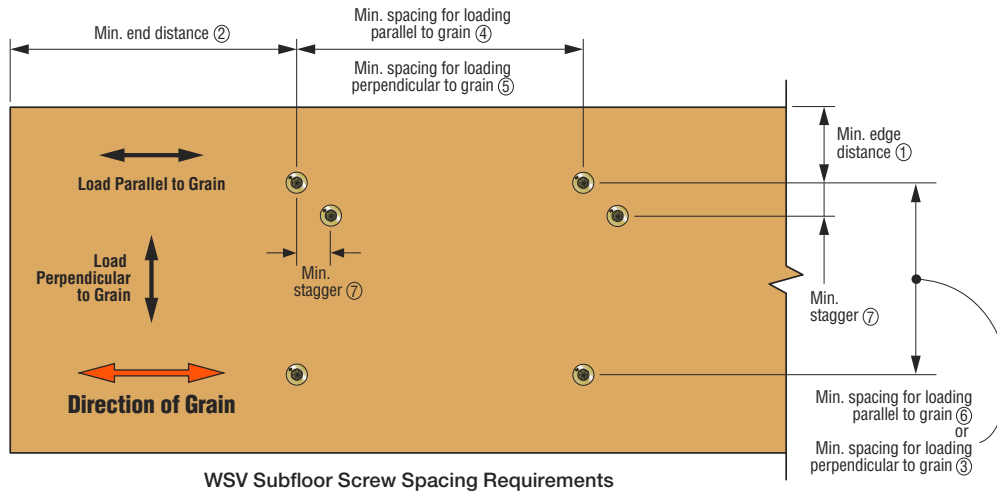
WSV Subfloor Screw — Allowable Pull-Through and Withdrawal Loads

Size x Length (in.)	Model No.	Thread Length (in.)	Reference Allowable Pull-Through Loads (lb.)						Reference Allowable Withdrawal Loads (lb.)			
			Minimum Nominal Panel Thickness (in.)				Minimum Thickness (in.)		DFL/SP (lb./in.) W	DFL/SP (lb.) W _{max}	SPF/HF (lb./in.) W	SPF/HF (lb.) W _{max}
			OSB/Plywood Rated Sheathing, Exposure 1				DFL/SP	SPF/HF				
			7/16	15/32	19/32	23/32	1 1/2	1 1/2				
#9 x 1 3/4	WSV134	1.20	66	66	96	109	195	141	123	147	98	117
#9 x 2	WSV200	1.45							128	185	99	144
#9 x 2 1/2	WSV212	1.95							128	256	117	233
#9 x 3	WSV300	2.17							141	311	121	266

- Use the lower of the pull-through or withdrawal values to determine axial design value.
- Screws must be installed normal to the side grain of the wood main member with the screw axis at a 90° angle to the wood fibers.
- The main framing member must be wood having a minimum specific gravity of 0.50 for DFL and SP main members, and 0.42 for SPF and HF main members. DFL is Douglas fir-larch. SP is southern pine. SPF is spruce-pine-fir. HF is hem-fir.
- Withdrawal values, W, are in pounds per inch of the thread penetration in to the main member. W_{max} is the maximum reference withdrawal value.
- Allowable loads are shown at the wood load duration factor of $C_D = 1.0$. Loads may be increased for load duration up to $C_D = 1.6$.

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WSV Subfloor Screw Spacing Requirements

Condition	Direction of Load to Grain	ID	Minimum Distance or Spacing (in.)	
			G < 0.50	G ≥ 0.50
Edge Distance	Perpendicular	①	1½	1½
	Parallel	①	1	1½
End Distance	Perpendicular	②	2	2¾
	Parallel	②	2¾	3
Spacing Between Fasteners in a Row	Perpendicular	③	1	1½
	Parallel	④	2¾	2¾
Spacing Between Rows of Fasteners	Perpendicular	⑤	2	2
	Parallel	⑥	1	1½
Spacing Between Staggered Rows	Perpendicular or Parallel	⑦	½	¾

1. For axial loading only, use the following minimum dimensions: end distance = 1½", edge distance = ¾", spacing parallel to grain = 1¾", spacing perpendicular to grain = ¾".