

ICC-ES Evaluation Report

ESR-1472

Reissued September 2023



This report also contains:

Subject to renewal September 2024

- LABC Supplement

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<p>DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES</p> <p>Section: 06 05 23— Wood, Plastic, and Composite Fastenings</p>	<p>REPORT HOLDER: SIMPSON STRONG-TIE COMPANY INC.</p> 	<p>EVALUATION SUBJECT: SIMPSON STRONG-TIE® WSNTL AND WSV SCREWS</p>	
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1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021, 2018, 2015, 2012 and 2009 [International Building Code® \(IBC\)](#)
- 2021, 2018, 2015, 2012 and 2009 [International Residential Code® \(IRC\)](#)

For evaluation for compliance with codes adopted by [Los Angeles Department of Building and Safety \(LADBS\)](#), see [ESR-1472 LABC and LARC Supplement](#).

Property evaluated:

Structural

2.0 USES

The Simpson Strong-Tie® WSNTL and WSV screws are used in engineered horizontal wood structural panel (WSP) diaphragms; in engineered diagonally sheathed lumber diaphragms; for prescriptive attachment of WSP to wood framing; and for prescriptive connections described in this report. WSV screws are also used in wood-to-wood connections that are designed in accordance with the IBC. The WSNTL and WSV screws may be used under the IRC when an engineered design is submitted in accordance with IRC Section [R301.1.3](#).

3.0 DESCRIPTION

3.1 Screws:

3.1.1 WNSTL Screws: See [Table 1](#) for dimensions and other descriptions for the WSNTL screws. The screws are No. 8 screws which comply with [ANSI/ASME B18.6.1](#), except that the screw diameters are slightly larger than what is prescribed. The screws have a countersunk flat head with four equally spaced nibs and a #3 square drive recess, and are partially threaded with 11.5 threads per inch. The screws have either a yellow zinc coating; an [ASTM B695](#), Class 55 mechanical galvanization, designated as 'MG'; or a proprietary coating, designated as Quik Guard®, as shown in [Table 1](#). See [Figure 1](#) for a depiction of a typical WNSTL screw.

3.1.2 WSV Screws: The screws are proprietary No. 9 screws. See [Table 2A](#) for dimensions and other descriptions of the WSV screws. The screws have a countersunk flat head with four equally spaced nibs and a T25 drive recess and are partially threaded with a hi-low thread pattern of 5.5 and 11.5 threads per inch. The screws have either a yellow zinc coating or a proprietary coating, as shown in [Table 2A](#). See [Figure 2](#) for a depiction of a typical WSV screw.

3.2 Wood Members:

For engineered wood-to-wood connections using WSV screws designed in accordance with Section [4.1.3](#), wood main members may be either sawn lumber or engineered wood (e.g. LVL, PSL, LSL). Wood side members may be either solid-sawn lumber, wood structural panel (OSB or plywood) or engineered wood. Engineered wood must have a minimum E value of 1.3E for lateral loading and 1.55E for withdrawal loading. The engineered wood must be addressed in an ICC-ES evaluation report and must have a minimum equivalent specific gravity (ESG) of 0.50.

For purposes of connection design, the assigned specific gravity (G) for sawn lumber and wood structural panels must be determined in accordance with Tables 12.3.3A and 12.3.3B, respectively, of the ANSI/AWC National Design Specification (NDS) for Wood Construction (Tables 11.3.3A and 11.3.3B of [NDS-12](#) for the 2012 IBC; Tables 11.3.2A and 11.3.2B of NDS-05 for the 2009 IBC). Sawn lumber members must have a moisture content of less than 19 percent both at time of screw installation, and in service.

For the purposes of connection design, structural glued laminated timber (GL) must have a Specific Gravity for Fastener Design (addressed in Tables 5A through 5D of the NDS Supplement), as indicated in the tables in this report. Unless otherwise noted, GL must have a moisture content of less than 16 percent.

When designing connections with screws installed into the face of cross-laminated timber (CLT) panels fabricated with sawn lumber laminations, all of the laminations must have a minimum assigned specific gravity in accordance with the NDS as indicated in the tables in this report. Moisture content must be less than 16 percent.

For engineered wood, the moisture content at the time of screw installation and in service must be in accordance with the applicable ICC-ES evaluation report on the engineered wood product.

For wood-to-wood connections, the tabulated side member thickness is an absolute value (not a minimum or maximum value). The thickness of the wood main member must be equal to or greater than the screw length less the thickness of the side member.

Where the WSNTL and WSV screws are used as substitutes for fasteners prescribed in the code, the wood members must comply with the code. Wood members used in engineered diaphragms must comply with the [2021 AWC Special Design Provisions for Wind and Seismic \(SDPWS\) for the 2021 IBC \(SDPWS-15 for the 2018 and 2015 IBC, SDPWS-08 for the 2012 and 2009 IBC\)](#).

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 Diaphragm Design - General: Framing members and wood structural panel sheathing must be selected based on the spacing of the framing and the anticipated loads in accordance with the applicable code. Diaphragms described in this report have been evaluated for use in all Seismic Design Categories.

4.1.1.1 Engineered Horizontal WSP Diaphragms: The WSNTL and WSV screws may be used to attach WSP sheathing to sawn lumber framing to create floor diaphragms as shown in [Table 3](#). WSNTL and WSV screws may also be used to attach WSP sheathing to sawn lumber framing to create high load diaphragms as shown in [Table 4](#). Refer to [Table 3](#) and [4](#) for the required screw penetration. Allowable shear values for horizontal diaphragms consisting of WSP attached to Douglas fir–larch or Southern pine lumber framing are shown in [Table 3](#) and [4](#) based on the values for 8d and 10d common nails in Tables 4.2A, 4.2B and 4.2C of [SDPWS](#). Allowable shear values for other wood species must be determined in accordance with the footnotes to each table. The allowable shear capacities shown in [Table 3](#) and [4](#) are permitted to be increased by 40 percent for wind design. Diaphragm deflections must be calculated in accordance with SDPWS-21 Section 4.2.3 (SDPWS-15 and SDPWS-08 Section 4.2.2), using the applicable G_a value given in Tables 4.2A, 4.2B and 4.2C of SDPWS.

4.1.1.2 Engineered Diaphragms Diagonally Sheathed with One Layer of Lumber: The WSNTL and minimum 2-inch-long WSV screws may be substituted for the 8d common nails prescribed in SDPWS Table 4.2D. Diaphragm deflections must be calculated in accordance with SDPWS-21 Section 4.3.2 (SDPWS-15 Section 4.2.2), using the applicable G_a value given in SDPWS Table 4.2D.

4.1.2 Prescriptive Fastening:

4.1.2.1 Prescriptive Attachment of Sheathing: The WSNTL and minimum 2-inch-long WSV screws may be used as substitutes for the 8d and 10d common nails prescribed in Items 30 through 32 and 35 to 37 of 2021 IBC Table [2304.10.2](#) (Items 30 through 32 and 35 through 37 of 2018 IBC Table [2304.10.1](#), Items 31 through 33 and 36 through 38 of 2015 IBC Table [2304.10.1](#); similar in earlier code editions) and in Items 31 through 33 and 38 through 40 of 2021 IRC Table R602.3(1) [Items 30 through 32 and 37 through 39 of 2018 and 2015 IRC Table [R602.3](#)(1), similar in earlier code editions] for the attachment of subflooring to framing; provided the penetration into the framing members is a minimum of $1\frac{3}{8}$ inches (35 mm).

4.1.2.2 Prescriptive Framing Connections: Prescriptive fastening requirements for select framing connections, which are alternatives to what is shown in 2021 IBC Table 2304.10.2 (2018 and 2015 IBC Table 2304.10.1, similar for IRC and earlier code editions), are described in [Table 5](#).

4.1.3 Wood-to-wood Connection Design for WSV Screws:

4.1.3.1 General: The design values in this report are intended to aid the designer in meeting the requirements of IBC Section [1604.2](#). For connections not completely described in this report, determination of the suitability of the WSV screws for the specific application is the responsibility of the designer and is outside the scope of this report. The designer is responsible for determining the available strengths for the connection, considering all applicable limit states, and for considering serviceability issues.

4.1.3.2 Screw Strength: Allowable screw shear and tension strengths (ASD), design screw shear and tension strengths (LRFD) and specified bending yield strength for the WSV screws are shown in Table 2B.

4.1.3.3 Reference Withdrawal and Pull-through Design Values: Reference withdrawal (W) design values for screws installed perpendicular to the face of the wood member and reference head pull-through values (W_H) are shown in Table 7.

4.1.3.4 Lateral Connections in Accordance with the NDS: Select reference lateral design values based on calculation in accordance with the NDS are shown in Table 6. For other connection configurations, the reference lateral design strength for connections made with WSV screws may be determined in accordance with the NDS and the following:

1. The applicable specified bending yield strength from Table 2B must be used for design.
2. The specified root diameter must be used where 'D' is referenced in Tables 12.3.1A, 12.3.1B and 12.3.3 of the NDS (Tables 11.3.1B, 11.3.3 and 11.3.1 A of the 2012 NDS for the 2012 IBC; Tables 11.3.1B, 11.3.2 and 11.3.1A of the 2005 NDS for the 2009 IBC).
3. Assigned specific gravity must be 0.55 or less, in accordance with Table 12.3.3A of the NDS (Table 11.3.3A of the 2012 NDS for the 2012 IBC, Table 11.3.2A of the 2005 NDS for the 2009 IBC).
4. The side member thickness must be a minimum of $19/32$ inch (15.1 mm).
5. The penetration into the main member must be a minimum of 1 inch (25.4 mm).
6. The dowel bearing length in the main member is the length of fastener penetration, less half the tip length ($E/2$), where E is shown in Table 2A.
7. Spacing, edge and end distance must be in accordance with Table 8, and as needed to prevent splitting of the wood.

4.1.3.5 Adjustments to Reference Design Values: Reference design values in the report must be adjusted in accordance with the requirements for dowel-type fasteners in Section 11.3 of the NDS (Section 10.3 of the NDS for the 2012 and 2009 IBC, except that reference head pull-through design values must be adjusted in accordance with Section 11.3 of the 2018 NDS under all editions of the IBC), to determine allowable loads for use with ASD and/or design loads for use with LRFD. The reference design values must also be adjusted in accordance with Section 12.5 of the NDS (Section 11.5 of the NDS for the 2012 and 2009 IBC), as applicable. When the capacity of a connection is controlled by the fastener strength, the allowable connection strength must not be increased by the adjustment factors specified in the NDS.

4.1.3.6 Governing Design Values: The allowable load for a single-screw connection in which the screw is subject to tension is the least of: (a) the reference withdrawal design value given in [Table 7](#), adjusted by all applicable adjustment factors; (b) the reference head pull-through design value given in [Table 7](#), adjusted by all applicable adjustment factors; and (c) the allowable screw tension strength given in [Table 2B](#).

The allowable lateral load for a two-member, single-screw connection is the lesser of: (a) the reference lateral design value given in [Table 6](#), adjusted by all applicable adjustment factors, and (b) the allowable screw shear strength given in [Table 2B](#).

4.1.3.7 Capacity Requirements for Wood Members: When designing a connection, the structural members must be checked for load-carrying capacity in accordance with Section 11.1.2 of the NDS (Section 10.1.2 of the NDS for the 2012 and 2009 IBC), and local stresses within multiple-fastener connections must be checked in accordance with Appendix E of the NDS to ensure the capacity of the connection and fastener group.

4.1.3.8 Connections with Multiple Screws: Connections containing multiple screws must be designed in accordance with Sections 11.2.2 and 12.6 of the NDS (Sections 10.2.2 and 11.6 of the NDS for the 2012 and 2009 IBC).

4.1.3.9 Combined Loading: Where the WSV screws are subjected to combined lateral and withdrawal loads, connections shall be designed in accordance with Section 12.4.1 of the NDS (Section 11.4.1 of the NDS for the 2012 and 2009 IBC).

4.2 Installation:

The screws must be installed in accordance with Section 12.1.5 of the NDS (Section 11.1.5 of the NDS for the 2012 IBC; Section 11.1.4 of the NDS for the 2009 IBC), with the exception that no predrilling is required.

The WSNTL and WSV screws used in diaphragms must be installed with minimum panel edge and end distances of $\frac{3}{8}$ inch (9.5 mm). The use of adhesive between the connected members is not required.

The WSV screws used in wood-to-wood connections must be installed perpendicular to the face of the wood side member. The top of the screw head must be flush with the surface of the wood side member. Minimum connection geometries must comply with [Table 8](#), or be as needed to prevent splitting of the wood.

4.3 Special Inspection:

When special inspections are required by 2021 IBC Section [1705.12](#) (2018 and 2015 IBC Section [1705.11](#), 2012 IBC Section [1705.10](#), 2009 IBC Section [1706.1](#)), periodic special inspection of the installation of the WSNTL and WSV screws in diaphragms is required when the screw spacing is 4 inches (102 mm) or less, in accordance with 2021 IBC Section [1705.12.1](#) (2018 and 2015 IBC Section [1705.11.1](#), 2012 IBC Section [1705.10.2](#), 2009 IBC Section [1706.2](#)).

When special inspections are required by 2021 IBC Section [1705.13](#) (2018 and 2015 IBC Section [1705.12](#), 2012 IBC Section [1705.11](#), 2009 IBC Section [1707.1](#)), periodic special inspection of installation of the WSNTL and WSV screws in diaphragms installed in Seismic Design Category C, D, E or F is required when the screw spacing is 4 inches (102 mm) or less, in accordance with 2021 IBC Section [1705.13.2](#) (2018 and 2015 IBC Section [1705.12.2](#), 2012 IBC Section [1705.11.2](#), 2009 IBC Section [1707.3](#)).

Special inspection of the construction of high-load diaphragms is required in accordance with IBC Section [1705.5.1](#) (2009 IBC Section [1704.6.1](#)).

5.0 CONDITIONS OF USE

The Simpson Strong-Tie WSNTL and WSV wood screws described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section [1.0](#) of this report, subject to the following conditions:

- 5.1 Screws must be installed in accordance with Simpson Strong-Tie's installation instructions and this report. In the case of conflict between this report and the installation instructions, this report governs.
- 5.2 Shear loads applied to horizontal wood structural panel diaphragms must be less than or equal to the allowable loads shown in [Table 3](#) and [4](#), as applicable.
- 5.3 Shear loads applied to diagonally sheathed lumber diaphragms must be less than or equal to the applicable allowable loads indicated in SDPWS.
- 5.4 Use of the screws is limited to dry-service conditions where the moisture content of the wood members complies with Section [3.2](#).
- 5.5 The screws are manufactured under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

- 6.1 Data in accordance with the [ICC-ES Acceptance Criteria for Dowel-type Threaded Fasteners Used in Wood \(AC233\)](#), dated October 2020 (editorially revised December 2020).
- 6.2 Data in accordance with the [ICC-ES Acceptance Criteria for Wood-frame Horizontal Diaphragms, Vertical Shear Walls and Braced Walls with Alternative Fasteners \(AC120\)](#), dated February 2017 (editorially revised January 2021).

7.0 IDENTIFICATION

- 7.1 Packages of screws bear a label noting the Simpson Strong-Tie Company, Inc., name and address; the product size; and the evaluation report number (ESR-1472). In addition, each screw is identified by "≠" (the "no equal" sign) and a letter designating the screw length.
- 7.2 The report holder's contact information is the following:

SIMPSON STRONG-TIE COMPANY INC.
5956 WEST LAS POSITAS BOULEVARD
PLEASANTON, CALIFORNIA 94588
(800) 999-5099
www.strongtie.com

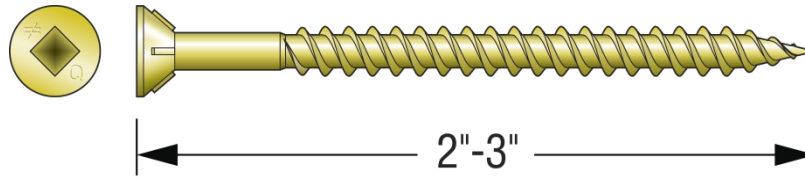


FIGURE 1—WSNTL SCREW

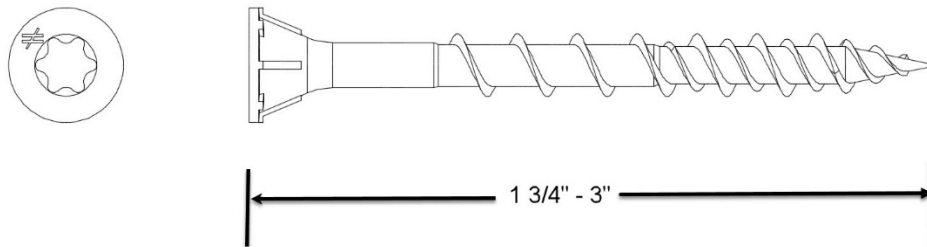


FIGURE 2—WSV SCREW

TABLE 1—CHARACTERISTICS OF WSNTL SCREWS

FASTENER MODEL NAME ¹	LENGTH (inches)	THREAD LENGTH (inches)	HEAD MARK	HEAD DIAMETER (inch)	SHANK DIAMETER (inch)	OUTSIDE THREAD DIAMETER (inch)	ROOT DIAMETER (inch)	THREAD PITCH (threads per inch)	TIP STYLE	FINISH ²
WSNTL2L	2	1½	M	0.333	0.137	0.182	0.121	11.5	Standard	Yellow Zinc
WSNTL2L-17			None						Type 17	Yellow Zinc
WSNTLG2			M						Standard	MG
WSNTL212	2½	2	Q	0.333	0.137	0.182	0.121	11.5	Standard	Yellow Zinc
WSNTLG212									Standard	MG
WSNTLQ212									Standard	Quik Guard®
WSNTL3	3	2³/₁₆	U	0.333	0.137	0.182	0.121	11.5	Standard	Yellow Zinc
WSNTLG3									Standard	MG
WSNTLQ3									Standard	Quik Guard®

For SI: 1 inch = 25.4 mm

¹The model name may end in the designation S, R or B, indicating the screws are packaged in a collated, loose or bulk form, respectively.

²Finish denoted as "MG" complies with [ASTM B695](#), Class 55.

TABLE 2A—WSV SCREW SPECIFICATIONS

FASTENER DESIGNATION	COATING	SCREW DIMENSIONS (inches)								
		Screw Length	Thread Length ¹	Head Mark	Minor Thread (root) Diameter, D _r	Shank Diameter	Outside Thread Diameter		Head Diameter	Tip Length, E
							High Thread	Low Thread		
WSV134	Zinc	1.75	1.20	K	0.121 / 0.109 ⁽²⁾	0.132	0.182	0.151	0.333	0.268
WSV200	Zinc	2.00	1.45	M						
WSVF200	Proprietary									
WSV212	Zinc	2.50	1.95	Q						
WSVF212	Proprietary									
WSV300	Zinc	3.00	2.17	U						
WSVF300	Proprietary									

For SI: 1 inch = 25.4 mm.

¹ Length of thread includes tip.

² This screw has a stepped shank design, as shown in Figure 2. For lateral connection design in accordance with Section 4.1.3.4, use a value of 0.113 inch for 'D' described in Section 4.1.3.4 Item 2.

TABLE 2B—WSV SCREW STRENGTHS

FASTENER DESIGNATION	SPECIFIED BENDING YIELD STRENGTH ¹ , F _{vb} (psi)	ALLOWABLE SCREW STRENGTH (ASD)		DESIGN SCREW STRENGTH (LRFD)	
		Tensile (lbf)	Shear (lbf)	Tensile (lbf)	Shear (lbf)
WSV134	200,000	710	460	1,065	690
WSV200					
WSVF200					
WSV212					
WSVF212					
WSV300					
WSVF300					

For SI: 1 psi = 6.89 kPa, 1 lbf = 4.45 N.

¹Bending yield strength determined in accordance with [ASTM F1575](#) using the minor thread (root) diameter, D_r.

TABLE 3—ALLOWABLE SHEAR (POUNDS PER FOOT) FOR WOOD STRUCTURAL PANEL DIAPHRAGMS UTILIZING WSNTL AND WSV SCREWS WITH FRAMING OF DOUGLAS FIR–LARCH OR SOUTHERN PINE FOR WIND OR SEISMIC LOADING^{1,2,3,4}

PANEL GRADE	MINIMUM WSNTL OR WSV SCREW PENETRATION IN FRAMING (inches)	MINIMUM NOMINAL PANEL THICKNESS (inches)	MINIMUM NOMINAL WIDTH OF FRAMING MEMBERS AT ADJOINING PANEL EDGES AND BOUNDARIES (inches)	BLOCKED DIAPHRAGMS				UNBLOCKED DIAPHRAGMS	
				Screw spacing (inches) at diaphragm boundaries (all cases), at continuous panel edges parallel to load (Cases 3 and 4), and at all edges (Cases 5 and 6)				Screws spaced 6 inches maximum, at support edges	
				6	4	2 1/2	2	Case 1 (no unblocked edges or continuous joints parallel to load)	All other configurations (Cases 2, 3, 4, 5, and 6)
				Screw spacing (inches) at other panel edges					
				6	6	4	3		
Structural I		3/8	2	270	360	530	600	240	180
			3	300	400	600	675	265	200
		15/32	2	320	425	640	730	285	215
			3	360	480	720	820	320	240
Sheathing and single floor	1 1/4	3/8	2	240	320	480	545	215	160
			3	270	360	540	610	240	180
		7/16	2	255	340	505	575	230	170
			3	285	380	570	645	255	190
		15/32	2	290	385	575	655	255	190
			3	325	430	650	735	290	215
		19/32	2	320	425	640	730	285	215
			3	360	480	720	820	320	240

For SI: 1 inch = 25.4 mm, 1 pound per foot = 14.6 N/m.

¹For framing of other species, the allowable diaphragm shear capacity is found by: (1) Determining the specific gravity for the applicable species of lumber in the NDS. (2) Finding the allowable diaphragm shear value from the table above and multiplying this value by the Specific Gravity Adjustment Factor = [1-(0.5-SG)], where SG = Specific Gravity of the framing lumber. This adjustment factor must not be greater than 1.0.

²For shear loads of normal or permanent load duration as defined by the NDS, the values in the table above must be multiplied by 0.63 or 0.56, respectively.

³Diaphragm construction must be in accordance with Sections 4.2.7 and 4.2.8 of SDPWS-21 (Sections 4.2.6 and 4.2.7 of [SDPWS-15 for the 2018 and 2015 IBC and of SDPWS-08 for the 2012 and 2009 IBC](#)), as applicable.

⁴See Figure 3 for Case diagrams.

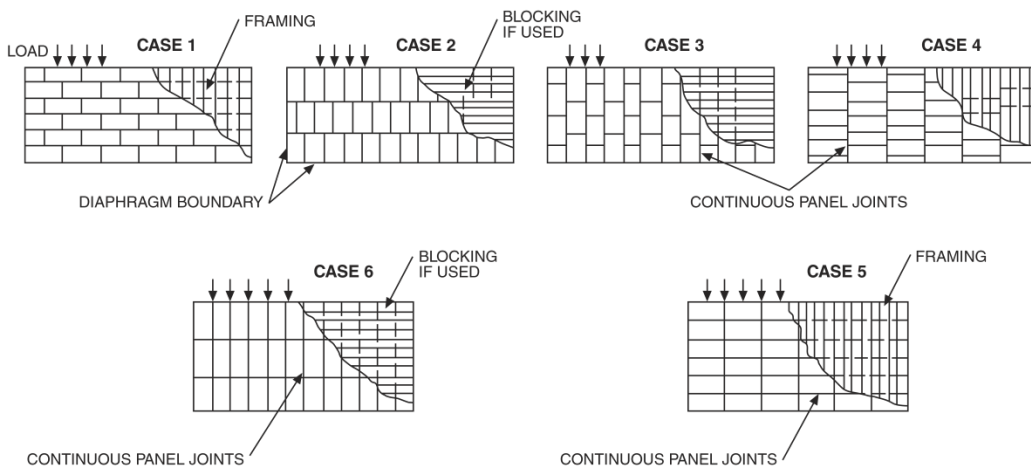


FIGURE 3—DIAPHRAGM CASES

TABLE 4—ALLOWABLE SHEAR (POUNDS PER FOOT) FOR WOOD STRUCTURAL PANEL BLOCKED DIAPHRAGMS UTILIZING MULTIPLE ROWS OF WSNTL AND WSV SCREWS (HIGH LOAD DIAPHRAGMS) WITH FRAMING OF DOUGLAS FIR–LARCH OR SOUTHERN PINE FOR WIND OR SEISMIC LOADING^{1,2,3}

PANEL GRADE	MINIMUM WSNTL OR WSV SCREW PENETRATION IN FRAMING (inches)	MINIMUM NOMINAL PANEL THICKNESS (inches)	MINIMUM NOMINAL WIDTH OF FRAMING MEMBERS AT ADJOINING PANEL EDGES AND BOUNDARIES (inches)	LINES OF SCREWS	BLOCKED DIAPHRAGMS			
					Cases 1 and 2 ^{4,5}			
					Screw Spacing Per Line at Boundaries (inches)			
					4		2 ¹ / ₂	
					Screw Spacing Per Line at Other Panel Edges (inches)			
6		4		4		3		
Structural I	1 ¹ / ₄	15 ¹ / ₃₂	3	2	605	815	875	1,150
			4	2	700	915	1,005	1,290
			4	3	875	1,220	1,285	1,395
		19 ¹ / ₃₂	3	2	670	880	965	1,255
			4	2	780	990	1,110	1,440
			4	3	965	1,320	1,405	1,790
		23 ¹ / ₃₂	3	2	730	955	1,050	1,365
			4	2	855	1,070	1,210	1,565
			4	3	1,050	1,430	1,525	1,800
Sheathing and single floor	1 ¹ / ₄	15 ¹ / ₃₂	3	2	525	725	765	1,010
			4	2	605	815	875	1,105
			4	3	765	1,085	1,130	1,195
		19 ¹ / ₃₂	3	2	650	860	935	1,225
			4	2	755	965	1,080	1,370
			4	3	935	1,290	1,365	1,485
		23 ¹ / ₃₂	3	2	710	935	1,020	1,335
			4	2	825	1,050	1,175	1,445
			4	3	1,020	1,400	1,480	1,565

For SI: 1 inch = 25.4 mm, 1 pound per foot = 14.6 N/m.

¹For framing of other species, the allowable diaphragm shear capacity is found by: (1) Determining the specific gravity for applicable species of lumber in the NDS. (2) Finding the allowable diaphragm shear value from the table above multiplying this value by the Specific Gravity Adjustment Factor = [1-(0.5-SG)], where SG = Specific Gravity of the framing lumber. This adjustment factor must not be greater than 1.0.

²For shear loads of normal or permanent load duration as defined by the NDS, the values in the table above must be multiplied by 0.63 or 0.56, respectively.

³Diaphragm construction must be in accordance with Sections 4.2.7 and 4.2.8 of [SDPWS-21](#) (Sections 4.2.6 and 4.2.7 of SDPWS-15 for the 2018 and 2015 IBC and of SDPWS-08 for the 2012 and 2009 IBC), as applicable.

⁴This table gives shear values for Cases 1 and 2. The values shown are applicable to Cases 3 and 4, provided screws at all continuous panel edges are spaced in accordance with the boundary screw spacing; and are applicable to Cases 5 and 6, provided screws at all panel edges are spaced in accordance with the boundary screw spacing.

⁵See [Figure 3](#) for Case diagrams.

TABLE 5—IBC EQUIVALENT PRESCRIPTIVE FASTENING SCHEDULE FOR WSNTL AND WSV SCREWS

CONNECTION	FASTENING ¹	LOCATION
2021 IBC Table 2304.10.2 and 2018 IBC Table 2304.10.1		
18. 1" brace to each stud and plate	2 screws	face
20. 1" x 8" and wider sheathing to each bearing	3 screws	face
23. 1" x 6" subfloor or less to each joist	2 screws	face
2015 IBC Table 2304.10.1		
19. 1" brace to each stud and plate	2 screws	face
21. 1" x 8" and wider sheathing to each bearing	3 screws	face
24. 1" x 6" subfloor or less to each joist	2 screws	face
2012 and 2009 IBC Table 2304.9.1		
3. 1" X 6" subfloor or less to each joist	2 screws	face
4. Wider than 1" x 6" subfloor to each joist	3 screws	face
20. 1" diagonal brace to each stud and plate	2 screws	face
21. 1" x 8" sheathing to each bearing	3 screws	face
22. Wider than 1" x 8" sheathing to each bearing	3 screws	face

For SI: 1 inch = 25.4 mm.

¹For WSNTL screws, the penetration into the supporting member must be a minimum of 1³/₁₆ inch. WSV screws must be a minimum of 2 inches long.

TABLE 6—REFERENCE LATERAL DESIGN VALUES (Z) FOR SINGLE SHEAR WOOD-TO-WOOD CONNECTIONS WITH WSV SCREWS (lbf)^{1,2}

SCREW	SIDE MEMBER THICKNESS (inches)	REFERENCE LATERAL DESIGN VALUE, Z (lbf)	
		0.42 ≤ G < 0.50	0.50 ≤ G/ESG
WSV212, WSVF212	1 1/2	72	92
WSV300, WSVF300		87	102

For SI: 1 inch = 25.4 mm, 1 lbf = 4.45 N.

¹Tabulated values are based on attachment of the side member to a minimum 1 1/2-inch-thick main member of the same species.

²Tabulated lateral design values (Z) must be multiplied by all applicable adjustment factors, including the load duration factor, C_D, from the NDS as referenced in the IBC or IRC.

TABLE 7—REFERENCE PULL THROUGH AND WITHDRAWAL DESIGN VALUES FOR WSV SCREWS INSTALLED IN THE SIDE GRAIN OF WOOD MEMBERS^{1,2,3}

SCREW	NOMINAL SCREW LENGTH (inch)	MINIMUM EMBEDDED THREAD LENGTH (inch)	REFERENCE PULL-THROUGH DESIGN VALUES, W _{PT} (lbf)						REFERENCE WITHDRAWAL DESIGN VALUE, W			
			Nominal OSB/Plywood Rated Sheathing Panel Thickness (inch)				Solid Sawn Wood Min. Thickness (inch)		0.42 ≤ G < 0.50		0.50 ≤ G/ESG	
			7/16	15/32	19/32	23/32	1 1/2	1 1/2	W (lbf/inch)	W _{max} (lbf)	W (lbf/inch)	W _{max} (lbf)
WSV134	1.75	1.20	66	66	96	109	141	195	98	117	123	147
WSV200	2.00	1.45							99	144	128	185
WSV212	2.50	1.95							117	233	128	256
WSV300	3.00	2.17							121	266	141	311

For SI: 1 inch = 25.4 mm, 1 lbf = 4.45 N.

¹Use the lower of the pull-through or withdrawal values to determine axial design value.

²Reference 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.

³Tabulated design values must be multiplied by all applicable adjustment factors, including the load duration factor, C_D, from the NDS as referenced in the IBC or IRC.

TABLE 8—WSV CONNECTION GEOMETRY^{1,2,3}

CONDITION	DIRECTION OF LOAD TO GRAIN	ID	MINIMUM DISTANCE OR SPACING (in.)	
			G < 0.50	G ≥ 0.50
Edge Distance	Perpendicular	①	1 1/2	1 1/2
	Parallel	①	1	1 1/2
End Distance	Perpendicular	②	2	2 3/4
	Parallel	②	2 3/4	3
Spacing Between Fasteners in a Row	Perpendicular	③	1	1 1/2
	Parallel	④	2 3/4	2 3/4
Spacing Between Rows of Fasteners	Perpendicular	⑤	2	2
	Parallel	⑥	1	1 1/2
Spacing Between Staggered Rows	Perpendicular or Parallel	⑦	1/2	3/4

For SI: 1 inch = 25.4 mm.

¹Edge distances, end distances and spacing of the screws must be sufficient to prevent splitting of the wood, or as required by this table, whichever is the more restrictive. See Figure 4 for a depiction of the requirements.

²Values for spacing between staggered rows apply where screws in adjacent rows are offset by 1/2 inch for G < 0.50 or 3/4 inch when G ≥ 0.50.

³For screws which are axially loaded, edge distance, measured in the direction perpendicular to grain, must be a minimum of 3/4 inch; end distance, measured in the direction of grain, must be a minimum of 2 inches; the minimum perpendicular to grain spacing between screws must be 3/4 inch, and the minimum parallel to grain spacing between screws must be 1 1/2 inches.

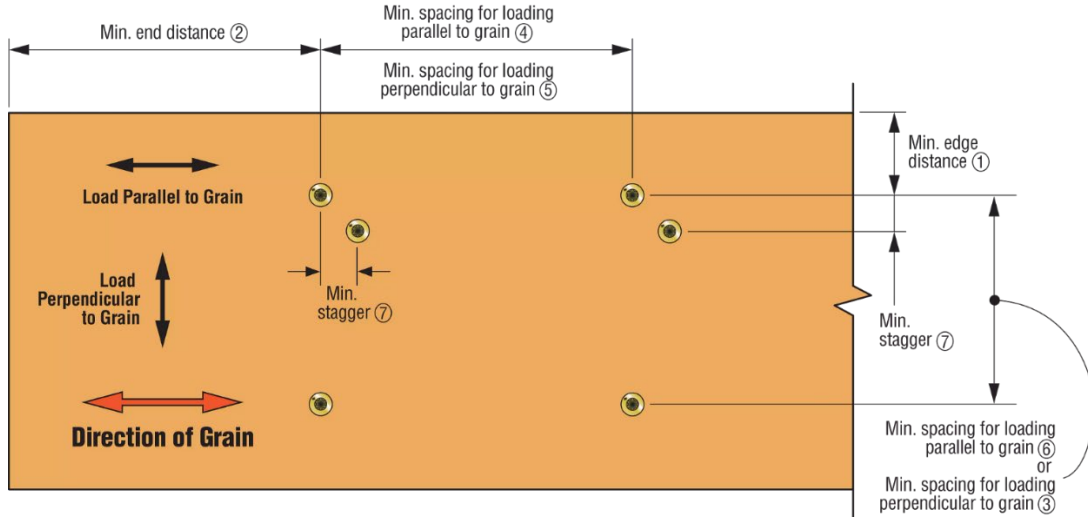


FIGURE 4—WSV CONNECTION GEOMETRY
Circled numbers refer to information in Table 8

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 05 23—Wood, Plastic, and Composite Fastenings

REPORT HOLDER:

SIMPSON STRONG-TIE COMPANY INC.

EVALUATION SUBJECT:

SIMPSON STRONG-TIE® WSNTL AND WSV SCREWS

1.0 REPORT PURPOSE AND SCOPE**Purpose:**

The purpose of this evaluation report supplement is to indicate that Simpson Strong-Tie® WSNTL and WSV screws, described in ICC-ES evaluation report [ESR-1472](#), have also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2023 *City of Los Angeles Building Code* (LABC)
- 2023 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

The Simpson Strong-Tie WSNTL and WSV screws, described in Sections 2.0 through 7.0 of the evaluation report [ESR-1472](#), comply with the LABC Chapter 23, and the LARC, and are subjected to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The Simpson Strong-Tie WSNTL and WSV screws described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report [ESR-1472](#).
- The design, installation, conditions of use and identification of the WSNTL and WSV screws are in accordance with the 2021 *International Building Code*® (2021 IBC) provisions noted in the evaluation report [ESR-1472](#).
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16, 17 and Section 2304.10.6, as applicable.
- Wood diaphragms supporting concrete or masonry walls in Seismic Design Category D, E or F, must comply with the requirements outlined in LABC Section 1613.5.3 items 1 and 2.
- The seismic design provisions for hillside buildings referenced in LABC Section 2301.1 have not been considered and are outside of the scope of this supplement.
- In accordance with LABC Section 2306.2, wood structural panel diaphragms used to resist seismic forces in structures assigned to Seismic Design Category D, E, or F must be applied directly to the framing members. Fastening of wood structural panels over solid lumber planking or laminated decking is permitted when structural panel joints and lumber planking or decking joints are offset.

This supplement expires concurrently with the evaluation report, reissued September 2023.