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ESR-1472

Reissued 09/2017

This report is subject to renewal 09/2018

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
SECTION: 06 05 23—WOOD, PLASTIC AND COMPOSITE FASTENINGS

REPORT HOLDER:

SIMPSON STRONG-TIE COMPANY INC.

**5956 WEST LAS POSITAS BOULEVARD
PLEASANTON, CALIFORNIA 94588**

EVALUATION SUBJECT:

SIMPSON STRONG TIE® WSNTL WOOD SCREWS



"2014 Recipient of Prestigious Western States Seismic Policy Council (WSSPC) Award in Excellence"



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

REPORT HOLDER:

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(800) 925-5099
www.strongtie.com

EVALUATION SUBJECT:

SIMPSON STRONG-TIE® WSNTL WOOD SCREWS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2015, 2012, 2009 and 2006 *International Building Code*® (IBC)
- 2015, 2012, 2009 and 2006 *International Residential Code*® (IRC)

Property evaluated:

Structural

2.0 USES

The Simpson Strong-Tie® WSNTL wood screws are used in engineered horizontal wood structural panel (WSP) diaphragms; in engineered diagonally sheathed lumber diaphragms and for prescriptive attachment of WSP to wood framing.

3.0 DESCRIPTION

See [Table 1](#) for dimensions and other descriptions for the WSNTL wood screws. The screws are No. 8 wood 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 fastener.

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 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 are recognized for use in all Seismic Design Categories.

4.1.2 Engineered Horizontal WSP Diaphragms: The WSNTL wood screws may be used to attach WSP sheathing to sawn lumber framing to create floor diaphragms. Refer to [Tables 2](#) and [3](#) for the required fastener penetration. Allowable shear values for horizontal diaphragms consisting of WSP attached to Douglas fir-larch or Southern pine lumber framing are shown in [Tables 2](#) and [3](#), based on the values for 8d and 10d common nails in Tables 4.2A, 4.2B and 4.2C of the ANSI/AWC Special Design Provisions for Wind and Seismic (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 [Tables 2](#) and [3](#) are permitted to be increased by 40 percent for wind design. For applications under the 2015, 2012 and 2009 IBC, the diaphragm deflections must be calculated in accordance with [SDPWS](#) Section 4.2.2, using the applicable G_a value given in Tables 4.2A, 4.2B and 4.2C of SDPWS. For applications under the 2006 IBC, the diaphragm deflections must be calculated in accordance with Sections 2305.2.2 of the 2006 IBC, using the e_n values for the 10d common nail shown in 2006 IBC Table 2305.2.2(1), as applicable.

4.1.3 Engineered Diaphragms Diagonally Sheathed with One Layer of Lumber: The WSNTL screws may be substituted for the 8d common nails prescribed in Table 4.2D of SDPWS and in 2006 IBC Table 2306.3.3. For applications under the 2015, 2012 and 2009 IBC, the diaphragm deflections must be calculated in accordance with SDPWS Section 4.2.2, using the applicable G_a value given in Table 4.2D. For applications under the 2006 IBC, the diaphragm deflections must be calculated in accordance with Sections 2305.2.2 of the 2006 IBC, using the e_n values for the 8d common nail shown in 2006 IBC Table 2305.2.2(1), as applicable.

4.1.4 Prescriptive Attachment of Sheathing: The WSNTL wood screws may be used as substitutes for the 8d and 10d common nails prescribed in Items 31 through 33 and 36 through 38 of 2015 IBC Table 2304.10.1; and in Items 30 through 32 and 37 through 39 of 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 1³/₈ inches (35 mm).

4.1.5 Prescriptive Framing Connections: Prescriptive fastening requirements for select framing connections, which are alternatives to what is shown in 2015 IBC Table

2304.10.1 (similar for IRC and earlier code editions), are described in [Table 4](#).

4.1.6 Use with Treated Lumber: The fasteners with a coating designated as MG, may be used under the IRC in treated lumber, in accordance with 2015, 2012 and 2009 IRC Sections R317.3.1 and R317.3.3 (2006 IRC Section R319.3). Use of fasteners with coatings other than MG in treated lumber in structures regulated under the IRC, and use of all fasteners in treated lumber in structures regulated under the IBC, is outside the scope of this report.

4.2 Installation:

The screws must be installed in accordance with Section 12.1.5 of the 2015 ANSI/AWC National Design Specification (NDS) for Wood Construction (Section 11.1.5 of [NDS-12](#) for the 2012 IBC; Section 11.1.4 of [NDS-05](#) for the 2009 and 2006 IBC), with the exception that no predrilling is required. The screws must be installed with minimum panel edge and end distances of 3/8 inch (9.5 mm). The use of adhesive between the connected members is not required.

4.3 Special Inspection:

When special inspections are required by 2015 IBC Section 1705.11 (2012 IBC Section 1705.10, 2009 IBC Section 1706.1), periodic special inspection of the installation of the WSNTL fasteners in diaphragms is required when the fastener spacing is 4 inches (102 mm) or less, in accordance with 2015 IBC Section 1705.11.1 (2012 IBC Section 1705.10.2, 2009 IBC Section 1706.2).

When special inspections are required by 2015 IBC Section 1705.12 (2012 IBC Section 1705.11, 2009 and 2006 IBC Section 1707.1), periodic special inspection of installation of the WSNTL fasteners in diaphragms installed in Seismic Design Category C, D, E or F is required when the fastener spacing is 4 inches (102 mm) or less, in accordance with 2015 IBC Section 1705.12.2 (2012 IBC Section 1705.11.2, 2009 and 2006 IBC Section 1707.3).

Special inspection of the construction of high-load diaphragms is required in accordance with 2015 and 2012 IBC Section 1705.5.1 (2009 and 2006 IBC Section 1704.6.1).

5.0 CONDITIONS OF USE

The Simpson Strong-Tie WSNTL 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** Fasteners 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 [Tables 2](#) and [3](#), as applicable.
- 5.3** Use of fasteners with preservative-treated or fire-retardant-treated lumber must be in accordance with Section 4.1.6 of this report.
- 5.4** Shear loads applied to diagonally sheathed lumber diaphragms must be less than or equal to the allowable loads indicated in SDPWS (2015, 2012 and 2009 IBC), or Section 2306.3.4 of the 2006 IBC, as applicable.

6.0 EVIDENCE SUBMITTED

- 6.1** Data in accordance with the ICC-ES Acceptance Criteria for Alternate Dowel Type Threaded Fasteners (AC233), dated August 2015.
- 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.

7.0 IDENTIFICATION

Fastener packages 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 fastener is identified by “≠” (the “no equal” sign) and a letter designating the screw length.

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 | 2¾/16 | 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 2—ALLOWABLE SHEAR (POUNDS PER FOOT) FOR WOOD STRUCTURAL PANEL DIAPHRAGMS WITH FRAMING OF DOUGLAS FIR–LARCH OR SOUTHERN PINE FOR WIND OR SEISMIC LOADING^{1,2,3}

| PANEL GRADE | MINIMUM 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 |
| | | | 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 | 421 | 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.

³ Diaphragm construction must be in accordance with Sections 4.2.6 and 4.2.7 of the SPDWS, as applicable.

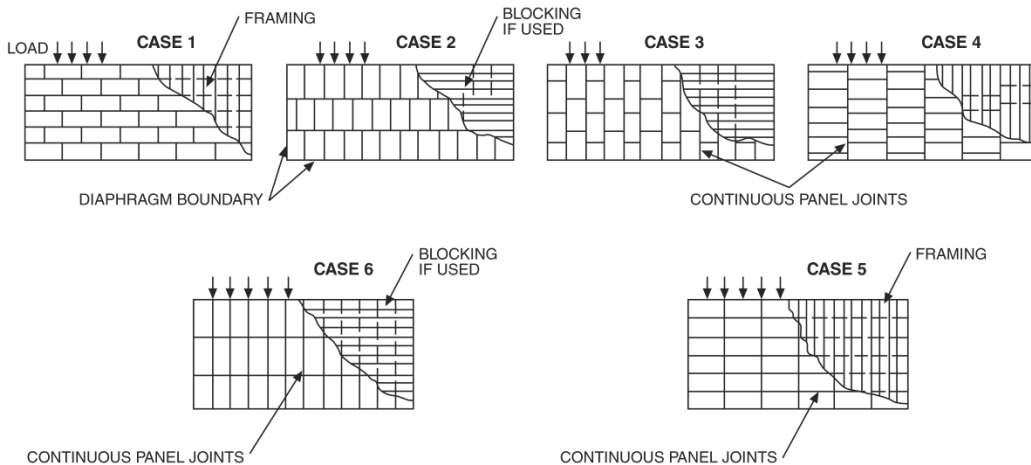


TABLE 3—ALLOWABLE SHEAR (POUNDS PER FOOT) FOR WOOD STRUCTURAL PANEL BLOCKED DIAPHRAGMS UTILIZING MULTIPLE ROWS OF FASTENERS (HIGH LOAD DIAPHRAGMS) WITH FRAMING OF DOUGLAS FIR–LARCH OR SOUTHERN PINE FOR WIND OR SEISMIC LOADING^{1,2,3}

| PANEL GRADE | MINIMUM 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 FASTENERS | BLOCKED DIAPHRAGMS | | | |
|----------------------------|---|--|---|--------------------|---|-------|-------------------------------|-------|
| | | | | | Cases 1 and 2 ⁴ | | | |
| | | | | | Fastener Spacing Per Line at Boundaries (inches) | | | |
| | | | | | 4 | | 2 ¹ / ₂ | |
| | | | | | Fastener 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 4.2.6 and 4.2.7 of the SPDWS, as applicable.

⁴This table gives shear values for Cases 1 and 2 as defined in [Table 2](#). The values shown are applicable to Cases 3 and 4, provided fasteners at all continuous panel edges are spaced in accordance with the boundary fastener spacing; and are applicable to Cases 5 and 6, provided fasteners at all panel edges are spaced in accordance with the boundary fastener spacing..

TABLE 4—IBC EQUIVALENT PRESCRIPTIVE FASTENING SCHEDULE¹

| CONNECTION | FASTENING | LOCATION |
|--|-----------|----------|
| 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, 2009 and 2006 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.

¹Fastener penetration into the supporting member must be a minimum of ¹³/₁₆ inch.

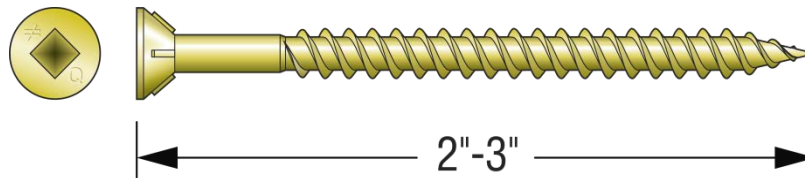


FIGURE 1—WSNTL FASTENER