



ICC-ES Evaluation Report ESR-2690

Reissued June 2021

Revised September 2021

This report is subject to renewal June 2023.

DIVISION: 03 00 00—CONCRETE

Section: 03 16 00—Concrete Anchors

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES

Section: 06 05 23—Wood, Plastic and Composite Fastenings

REPORT HOLDER:

ITW RAMSET

ADDITIONAL LISTEE:

ITW BRANDS

EVALUATION SUBJECT:

EXTERIOR/PERIMETER SILL AND INTERIOR PLATE FASTENERS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021, 2018, 2015, 2012, 2009 and 2006 *International Building Code*® (IBC)
- 2021, 2018, 2015, 2012, 2009 and 2006 *International Residential Code*® (IRC)

For evaluation for compliance with codes adopted by the Los Angeles Department of Building and Safety (LADBS), see [ESR-2690 LABC and LARC Supplement](#).

Property evaluated:

Structural

2.0 USES

The exterior/perimeter sill and interior plate fasteners are used as alternatives to the cast-in-place anchors described in IBC Section 2308.3.1 (2012, 2009 and 2006 IBC Section 2308.6) and IRC Section R403.1.6 for the anchorage of naturally durable wood sill plates to uncracked, normalweight concrete foundations. For structures regulated under the IRC, the fasteners may be used when an engineered design is submitted in accordance with IRC Section R301.1.3.

3.0 DESCRIPTION

3.1 Fasteners:

The 1524 SDB and 1524 SDP fasteners are power-actuated fasteners used for attachment of exterior and interior wall, naturally durable wood sill plates to uncracked, normalweight concrete foundations. Fastener dimensions are as indicated in Table 1. The fasteners are manufactured from steel conforming to ASTM A108 Grade 1060/1062 and austempered to a Rockwell “C” hardness of 52 to 55, and are 0.146-inch-diameter-by-2⁷/₈-inch-long (3.7 mm by 73 mm) pins. The 1524 SDB fastener has a proprietary black finish and the 1524 SDP fastener has a zinc-chromate finish. The pins are assembled with a premounted 0.062-inch-thick-by-0.790-inch-square (1.6 mm by 20 mm square) steel washer with truncated corners. The zinc-coated steel washer is manufactured from hot- or cold-rolled steel conforming to ASTM A108 Grade 1010. A plastic guidance tip is mounted on the pin to provide alignment and guidance inside the power-actuated tool.

3.2 Concrete:

The concrete must be uncracked, stone aggregate, normalweight concrete complying with IBC Chapter 19 or IRC Section R402.2, as applicable. Concrete must have a minimum compressive strength (f'_c) of 2,500 psi (17.2 MPa) at 28 days.

3.3 Sill plates:

The sill plates must be nominally 2-inch-thick lumber that is naturally durable in accordance with IBC Section 202 (2009 and 2006 IBC Section 2302) and IRC Section R202. See footnotes to Table 2 for specific gravity requirements.

4.0 DESIGN AND INSTALLATION

4.1 Design:

The fasteners may be used to attach wood sill plates to concrete for structural walls in Seismic Design Categories A and B. Allowable loads (ASD) for the fasteners, based on shear and tension testing of fasteners installed in concrete, are provided in Table 1. Bearing area and thickness of the washers are also given in Table 1. For shear loads, spacing of fasteners must be determined considering the lesser of allowable shear load from Table 1 and allowable load on the wood sill plate, determined in accordance with the NDS, with a fastener bending yield strength $F_{yb} = 90,000$ psi (621 MPa) and a concrete dowel

bearing strength $F_e = 7,500$ psi (52 MPa). For tension loads, spacing of fasteners must be determined considering the lesser of allowable tension load from Table 1 and pull-through capacity of the wood sill plate, determined in accordance with Section 3.10 of the NDS, using the washer bearing area from Table 1.

Allowable loads for fasteners subjected to combined shear and tension forces, based on fastener performance in concrete, must be determined by the following formula:

$$(p/P_a) + (v/V_a) \leq 1$$

where:

- p = Actual applied tension load on fastener, lbf (N).
- P_a = Allowable tension load on fastener, lbf (N).
- v = Actual applied shear load on fastener, lbf (N).
- V_a = Allowable shear load on fastener, lbf (N).

ITW Ramset fasteners listed in Table 2 may be used to attach wood sill plates to concrete for interior, nonstructural walls [maximum horizontal transverse load on the wall must not exceed 5 psf (0.24 kN/m²)] in Seismic Design Categories A through F, when installed as described in Table 2.

4.2 Installation:

The fasteners must be installed in accordance with this report and the manufacturer's published installation instructions. A copy of these instructions must be available on the jobsite at all times during installation.

The concrete must attain a minimum compressive strength of 2,500 psi (17.2 MPa) prior to installation of the fasteners. The fasteners must be installed through the sill plate. Minimum edge distance is 1³/₄ inches (44 mm). Concrete thickness must be a minimum of three times the embedment depth of the fastener into the concrete.

5.0 CONDITIONS OF USE

The exterior/perimeter sill and interior plate fasteners 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 The fasteners are manufactured and identified in accordance with this report.
- 5.2 Fastener installation complies with this report and the ITW Ramset or ITW Brands instructions. In the event of conflict between this report and the ITW Ramset or ITW Brands published instructions, this report governs.
- 5.3 Calculations demonstrating that the applied loads are less than the allowable loads described in Section 4.1 must be submitted to the code official for approval. These calculations must be prepared by a registered design professional, where required by the statutes of the jurisdiction in which the project is constructed. Exception: Fasteners used in nonstructural walls in accordance with Table 2.

5.4 The fasteners may be used to attach wood sill plates to concrete for structural walls in Seismic Design Categories A and B. The fasteners may be used to attach wood sill plates to concrete for interior, nonstructural walls in Seismic Design Categories A through F.

5.5 The use of fasteners is limited to installation in uncracked, normal-weight concrete. Cracking occurs when $f_t > f_r$ due to service loads or deformations.

5.6 The minimum concrete thickness must be three times the fastener embedment in concrete.

5.7 Installation is limited to dry, interior locations, which include exterior walls which are protected by an exterior wall envelope.

5.8 Use is limited to installation in naturally durable wood sill plates.

5.9 The fasteners are manufactured under a quality-control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Power-Actuated Fasteners Driven into Concrete, Steel and Masonry Elements (AC70), dated December 2019 (Editorially revised January 2021).

7.0 IDENTIFICATION

7.1 Each fastener is identified with either an "R", or an "R" enclosed by a circle stamped into the head. Each steel washer is stamped with a circled "rocking R" and a "3". See Figure 1 for markings. Each package of fasteners is identified with the report holder or listee name (ITW Ramset or ITW Brands) and address, the brand name (Ramset, Duo-Fast or Tapcon), the fastener type and size, and the evaluation report number (ESR-2690).

7.2 The report holder's contact information is the following:

ITW RAMSET
155 HARLEM AVENUE
GLENVIEW, ILLINOIS 60025
(800) 848-5611
www.ramset.com
techsupport@itwccna.com

7.3 The Additional Listee's contact information is the following:

ITW BRANDS
Brand names: Duo-Fast, Tapcon
155 HARLEM AVENUE, N3E
GLENVIEW, ILLINOIS 60025
(847) 489-2726
brandscs@itwbrands.com

TABLE 1—ALLOWABLE LOADS FOR FASTENERS DRIVEN INTO MINIMUM 2,500 psi NORMALWEIGHT CONCRETE¹

CATALOG NUMBER	NOMINAL FASTENER SHANK DIAMETER (inch)	SHANK LENGTH (inches)	HEAD DIAMETER (inch)	WASHER THICKNESS (inch)	WASHER BEARING AREA (in ²)	EMBEDMENT	ALLOWABLE LOAD (lbf)	
							Shear	Tension
1524 SDB	0.146	2.875	0.300	0.062	0.790	1.375	150	125
1524 SDP	0.146	2.875	0.300	0.062	0.790	1.375	150	125

For **SI**: 1 inch = 25.4 mm, 1 psi = 6.89 kPa, 1 lbf = 4.45 N.

¹Wood members connected to the concrete substrate must be investigated for compliance with the applicable code in accordance with referenced design criteria, for both lateral resistance and fastener pull-through.

TABLE 2—SPACING REQUIREMENTS FOR WOOD SILL PLATE ANCHORAGE OF INTERIOR NONSTRUCTURAL WALLS^{1,2,3,4,5,6,7}

CATALOG NUMBER	NOMINAL FASTENER SHANK DIAMETER (inch) ²	SHANK LENGTH (inches)	EMBEDMENT	CONCRETE EDGE DISTANCE (inches)	MAXIMUM SPACING (feet)	MAXIMUM WALL HEIGHT (feet)
1524 SDB	0.146	2.875	1.375	1.750	3	14
1524 SDP	0.146	2.875	1.375	1.750	3	14

For **SI**: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 plf = 14.6 N/m, 1 psi = 6.89 kPa.

¹Interior nonstructural walls are limited to locations where bearing walls, shear walls or braced walls are not required by the approved plans.

²Fasteners must be driven into the center of the sill plate and be at least 1³/₄ inch from the concrete edge.

³Walls must have fasteners placed at 6 inches from ends of sill plates with maximum spacing between, as shown in this table.

⁴Walls must be laterally supported at the top and the bottom.

⁵Sill or bottom plates must comply with IBC Section 2304.1 and be of lumber with a specific gravity of 0.50 or greater.

⁶Minimum fastener spacing must be 4 inches on center or must comply with Section 12.1.6 of the 2018 and 2015 NDS (Section 11.1.6 of NDS-12 for the 2012 IBC, Section 11.1.5 of NDS-05 for the 2009 and 2006 IBC) to prevent splitting of wood.

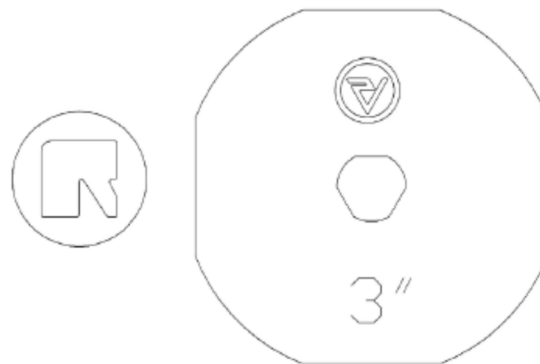


FIGURE 1—HEAD AND WASHER MARKINGS



FIGURE 2—FASTENER MARKING

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ITW RAMSET

EVALUATION SUBJECT:**EXTERIOR/PERIMETER SILL AND INTERIOR PLATE FASTENERS****1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that the exterior/perimeter sill and interior plate fasteners, described in ICC-ES evaluation report [ESR-2690](#), 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:

- 2020 *City of Los Angeles Building Code* (LABC)
- 2020 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

The exterior/perimeter sill and interior plate fasteners, described in Sections 2.0 through 7.0 of the evaluation report [ESR-2690](#), comply with the LABC Chapters 19 and 23, and the LARC, and are subject to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The exterior/perimeter sill and interior plate fasteners described in this evaluation report must comply with all of the following conditions:

- All applicable sections in the evaluation report [ESR-2690](#).
- The design, installation, conditions of use and identification of the fasteners are in accordance with the 2018 *International Building Code*® provisions noted in the evaluation report [ESR-2690](#).
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 17, as applicable.
- The allowable values listed in the evaluation report and tables are for the fasteners only. Connected members shall be checked for their capacity (which may govern)
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.

This supplement expires concurrently with the evaluation report, reissued June 2021 and revised September 2021.