

# ICC-ES Evaluation Report

**ESR-2690**

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**EVALUATION SUBJECT:**
**EXTERIOR/PERIMETER SILL AND INTERIOR PLATE  
FASTENERS**
**1.0 EVALUATION SCOPE**
**Compliance with the following codes:**

- 2006 *International Building Code*® (IBC)
- 2006 *International Residential Code*® (IRC)
- Other Codes (see Section 8.0)

**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 2308.6 and IRC Section R403.1.6 for the anchorage of naturally durable wood sill plates to uncracked, normal-weight concrete foundations.

**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, normal-weight concrete foundations. Fastener dimensions are as indicated in Table 1. The fasteners are manufactured from steel conforming to ASTM A 108 Grade

1060/1062 and austempered to a Rockwell “C” hardness of 52 to 55, and are 0.146-inch-diameter-by-2<sup>7</sup>/<sub>8</sub>-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 A 108 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, normal-weight concrete complying with IBC Section 1905 or IRC 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 are nominally 2-inch-thick lumber that is naturally durable in accordance with the applicable code. See footnotes to Table 1 for specific gravity requirements.

**4.0 DESIGN AND INSTALLATION**
**4.1 General:**

The use of the fasteners to attach wood sill plates to the concrete must be under the following conditions:

1. No cold joint exists, between the slab and foundation, below the sill plate.
2. The sill plate is not installed on slabs supported by concrete-block foundation walls.
3. The fasteners are used to attach naturally durable wood to concrete.
4. Where sill plates are installed on foundation walls with unbalanced soil conditions, the fasteners are not used to provide lateral support at the top of the foundation wall, and are not an alternate to the bolting required by IRC Section R404.1.

**4.2 Design:**

Table 1 specifies the allowable fastener spacings for attachment of wood sill plates to concrete foundations in Seismic Design Category A or B, and in areas assigned basic wind speeds up to 100 mph (161 km/h). These seismic and wind limitations may be waived for interior nonshear walls.

#### 4.3 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 2,000 psi (13.8 MPa) prior to installation of the fasteners. The fasteners must be installed through the sill plate. Minimum edge distance is 1<sup>3</sup>/<sub>4</sub> 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 manufacturer's published installation instructions. In the event of conflict between this report and the manufacturer's published installation instructions, this report governs.
- 5.3 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.
- 5.4 The minimum concrete thickness must be three times the fastener embedment in concrete.
- 5.5 Installation is limited to dry, interior locations.
- 5.6 Use is limited to installation in naturally durable wood sill plates.
- 5.7 When the sill plates are supported by foundation walls with unbalanced soil conditions, the sill plate fasteners are not used to transfer lateral load from the wall to the sill plate and are not alternates to the anchor bolts required by IRC Section R404.1.
- 5.8 Seismic load resistance is outside the scope of this report, except as described in Section 4.2.

#### 6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Fasteners Power-driven into Concrete, Steel and Masonry Elements (AC70), dated October 2006.

#### 7.0 IDENTIFICATION

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 manufacturer's name (ITW Ramset or ITW Brands-Duo-Fast) and address, the fastener type and size, and the evaluation report number (ESR-2690).

#### 8.0 OTHER CODES

##### 8.1 Scope:

In addition to the codes referenced in Section 1.0, the products described in this report were evaluated for compliance with the 1997 *Uniform Building Code*<sup>TM</sup> (UBC).

##### 8.2 Uses:

The exterior/perimeter sill and interior plate fasteners are used as alternatives to the cast-in-place anchors described in UBC Section 1806.6 for the anchorage of wood sill plates to uncracked, normal-weight concrete foundations.

##### 8.3 Description:

**8.3.1 Fasteners:** See Section 3.1.

**8.3.2 Concrete:** The concrete must be uncracked, stone aggregate, normal-weight concrete complying with UBC Section 1905. Concrete must have a minimum compressive strength at 28 days ( $f'_c$ ) of 2,000 psi (13.8 MPa).

**8.3.3 Sill plates:** See Section 3.3.

**8.3.4 Design and Installation:**

**8.3.5 General:** See Section 4.1.

**8.3.6 Design:** Table 1 specifies the allowable fastener spacings for attachment of wood sill plates to concrete foundations in Seismic Zones 0, 1, 2 and 3 (UBC), and in areas assigned basic wind speeds up to 85 mph (137 km/h). These seismic and wind limitations may be waived for interior nonshear walls.

**8.3.7 Installation:** See Section 4.3.

##### 8.4 Conditions of Use:

See Section 5.0.

##### 8.5 Evidence Submitted:

See Section 6.0.

##### 8.6 Identification:

See Section 7.0.

TABLE 1—SPACING REQUIREMENTS FOR SILL PLATE ANCHORAGE

CATALOG NUMBER	SHANK LENGTH (inches)	HEAD DIAMETER (inch)	SHANK DIAMETER (inch)	MAXIMUM SPACING (feet) <sup>1,4,6,7</sup>		
				Interior Shear Walls <sup>3,5</sup>	Interior Nonshear Walls <sup>2</sup>	Exterior Shear and Nonshear Walls <sup>3,5</sup>
1524 SDB	2.875	0.300	0.146	1.5	3	1.5
1524 SDP	2.875	0.300	0.146	1.5	3	1.5

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

<sup>1</sup>Spacings are based on the attachment of nominally 2-inch-thick naturally durable wood with a specific gravity of 0.5 or greater to normal-weight concrete floor slabs or footings. For other species of lumber, the required spacing of fasteners requires special calculations complying with the NDS.

<sup>2</sup>Walls must have fasteners placed 6 inches from ends of sill plates, with maximum spacing between, as shown in this table.

<sup>3</sup>Walls must have two fasteners, placed 6 inches and 10 inches, respectively, from each end of sill plates, with maximum spacing between, as shown in this table.

<sup>4</sup>Fasteners must not be installed until the normal-weight concrete has reached a minimum compressive strength of 2,000 psi.

<sup>5</sup>Bearing walls must have bracing in accordance with IBC Section 2308.9.3, IRC Section R602.10 or UBC Section 2320.11.3, as applicable. Interior and nonbearing partitions are not assumed to be braced.

<sup>6</sup>Fasteners must not be used to attach shear walls having a unit shear exceeding 100 pounds per foot to other building elements.

<sup>7</sup>Fasteners must be installed with the supplied washers described in Section 3.1.

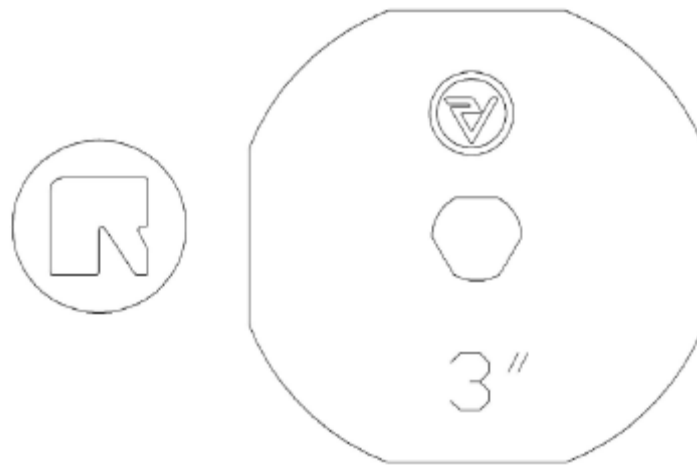
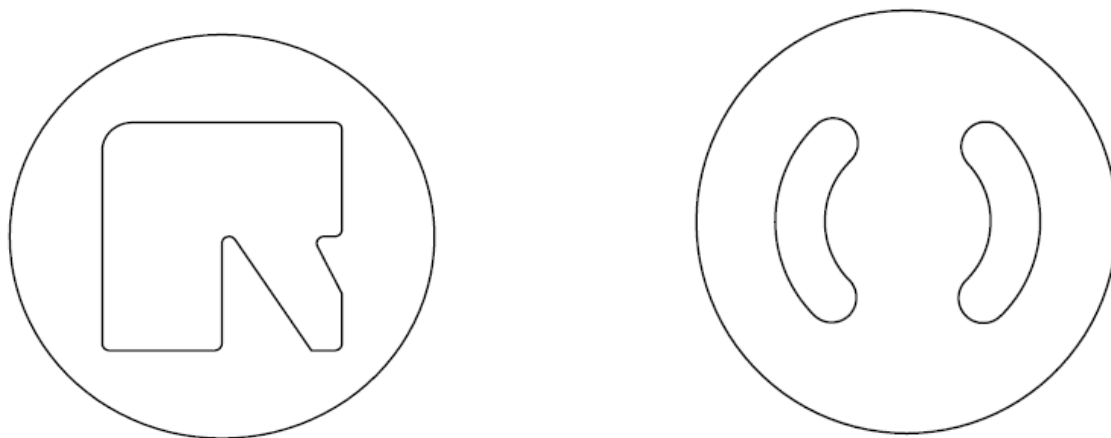


FIGURE 1—HEAD AND WASHER MARKINGS



ITW RAMSET

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FIGURE 2—FASTENER MARKING