

ICC-ES Evaluation Report

ESR-1999

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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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EVALUATION SUBJECT:
FLAT JACK™ ROOF MOUNT
1.0 EVALUATION SCOPE
Compliance with the following codes:

- 2009 and 2006 *International Building Code*® (IBC)
- BOCA® *National Building Code*/1999 (BNBC)

Properties evaluated:

- Structural
- Water penetration

2.0 USES

The Flat Jack Roof Mount is a mounting bracket used to attach solar panel mounting systems to the rafters of roofs with asphalt shingle roof coverings.

3.0 DESCRIPTION
3.1 Flat Jack Roof Mount:

The Flat Jack Roof Mount has three components: a roof mount base plate and threaded rod, an aluminum spacer block and a flashing plate. The roof mount base and $\frac{3}{8}$ -inch-diameter (9.5 mm) UNC threaded rod are fabricated from Type 304 stainless steel complying with ASTM A 240. The base plate is 0.196 inch (5 mm) thick by 1.626 inches wide (41.3 mm) by 5.157 inches long (131 mm). The base plate includes predrilled holes used for fastening the base plate to the roof rafter. The roof mount threaded rod is friction-fitted to the base plate. The flashing plate measures 8 inches (203 mm) wide by 10 inches (254 mm) long and is formed from 0.019-inch-thick (0.5 mm) steel conforming to ASTM A 653, including a G90 galvanized coating designation. The aluminum spacer block measures 1.375 inches (35 mm) deep by 2.165 inches (55 mm) long. See Figure 1 for an illustration of the Flat Jack Roof Mount.

3.2 Fasteners:

Fasteners used to connect the base plate to the roof rafter must be $\frac{5}{16}$ -inch-diameter (7.9 mm), corrosion-resistant lag bolts complying with ANSI/ASME B18.2.1. The lag bolt must be long enough to penetrate the rafter a minimum of 2.5 inches (64 mm). Alternative fasteners may be used provided the uplift and shear capacity, determined in accordance with the NDS, is equivalent to that of the lag bolt described above.

4.0 DESIGN AND INSTALLATION
4.1 Design:

The tabulated allowable loads shown in this report are based on allowable stress design (ASD) and include the load duration factor, C_D , corresponding with the applicable loads in accordance with NDS.

Where the roof mounts are exposed to temperatures exceeding 100°F (37.8°C), uplift allowable loads shown in Table 1 must be adjusted by the temperature factor, C_t , in accordance with Section 10.3.4 of the NDS temperature factor, C_t , which applies to the roof mount connected to supporting wood members where sustained temperatures are greater than 100°F (37.8°C). When products are attached to wood framing having a moisture content greater than 19 percent (16 percent for engineered wood products), or where wet service is expected, the allowable loads must be adjusted by the wet service factor, C_M , specified in Section 10.3.3 of the NDS. Connected wood members must be analyzed for load-carrying capacity at the connection in accordance with the NDS.

4.2 Installation:

The Flat Jack Roof Mount must be installed to the rafter using two lag screws, one at each predrilled hole, as described in Section 3.2 of this report. The minimum specific gravity of the wood member is as noted in Table 1. The flashing plate must be placed underneath the shingle in the row above and over the roof mount base in a weather-lap fashion. The spacer block is then placed over the threaded rod, where the solar panels' mounting frame will rest, and then the nut is placed to secure the mounting frame to the roof mount. Installation of the Flat Jack Roof Mount is limited to roofs having minimum and maximum slopes of 2:12 (16.7 percent) and 24:12 (200 percent), respectively.

5.0 CONDITIONS OF USE

The Flat Jack Roof Mount described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 The Flat Jack Roof Mount must be installed in accordance with this report and the manufacturer's published installation instructions. In the event of a conflict between this report and the manufacturer's published installation instructions, this report governs.
- 5.2 Calculations showing compliance with this report must be submitted to the code official. The calculations must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

6.0 EVIDENCE SUBMITTED

- 6.1 Load test data in accordance with the ICC-ES Acceptance Criteria for Joist Hangers and Similar Devices (AC13), dated October 2006.

- 6.2 Rain test data in accordance with the ICC-ES Acceptance Criteria for Roof Flashing for Pipe Penetrations (AC286), dated February 2008.
- 6.3 Quality documentation and installation instructions.

7.0 IDENTIFICATION

The Flat Jack Roof Mount is identified with a label bearing the report holder's name (Thompson Technology Industries, Inc.), the product name or designation, and the evaluation report number (ESR-1999).

TABLE 1—FLAT JACK ROOF MOUNT ALLOWABLE UPLIFT AND LATERAL LOADS^{1,2,3}

LOAD DIRECTON ⁴	SPECIFIC GRAVITY OF LUMBER RAFTER	ALLOWABLE LOAD (lbf)
Uplift	0.51	1010 ⁵
Uplift	0.42	750 ⁵
Lateral	0.51	160
Lateral	0.42	160

For SI: 1 lbf = 4.48 N.

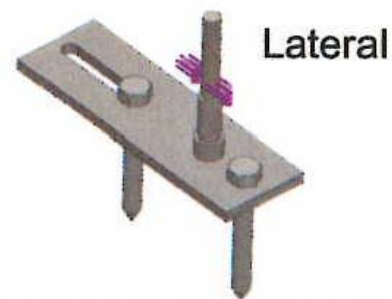
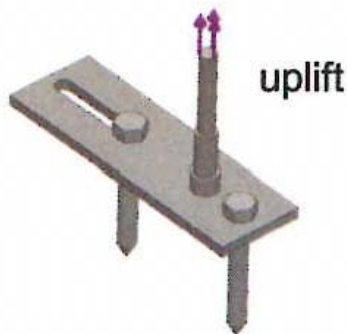
¹Allowable loads have been adjusted for the NDS load duration factor of 1.6; no further increases are permitted.

²Two 5/16-inch Ø (7.9 mm) lag bolts must be installed into the rafter to a minimum embedment of 2 1/2 inches (64 mm) and satisfy edge distance specified by NDS.

³Design forces must be determined in accordance with the applicable code and must not exceed the tabulated values.

⁴Uplift load is perpendicular to the plane of the roof. Lateral load is parallel to the rafter. Lateral load perpendicular to the rafter is outside the scope of this report. See illustrations below for a description of the load direction.

⁵Where the temperatures in the vicinity of the roof framing exceed 100°F (37.8°C), the tabulated uplift allowable loads must be multiplied by the temperature factor, C_t, set forth in Section 10.3.4 of the NDS.



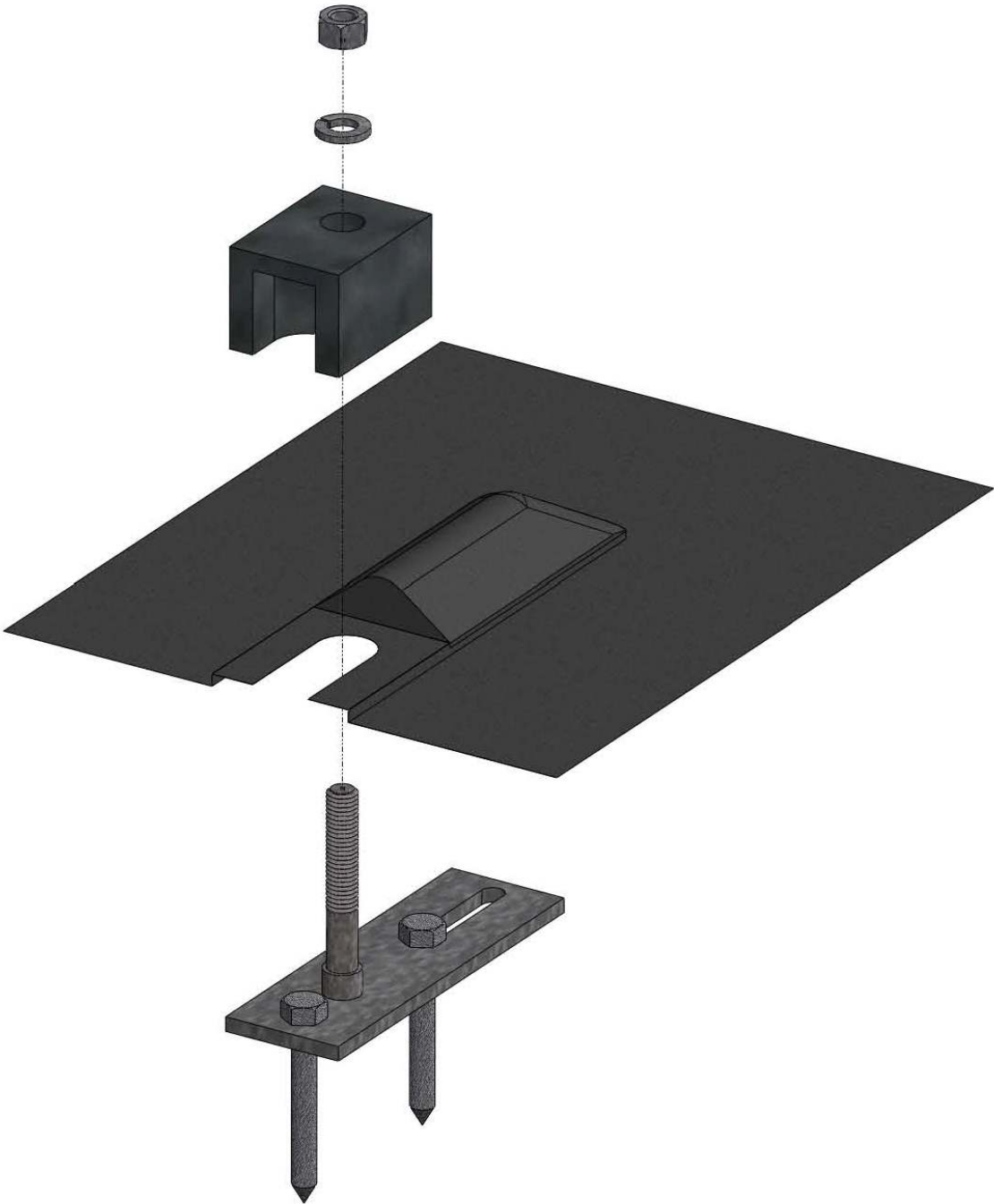


FIGURE 1—FLAT JACK ROOF MOUNT