



Legacy report on the 1997 *Uniform Building Code*™

**DIVISION: 06 00 00—WOOD AND PLASTICS**  
**Section: 06 09 00—Wood and Plastic Fastenings**

**SAF-T ANGLE BRACE AND SAF-T-TEE BRACE WALL BRACING AND SAF-T-STRAPS**

**SAF-T CORPORATION**

**1.0 SUBJECT**

Saf-T Angle Brace and Saf-T-Tee Brace Wall Bracing and Saf-T-Straps

**2.0 DESCRIPTION**

**2.1 Saf-T Angle Brace:**

**2.1.1 General:** Saf-T angle brace is used to brace wood-frame wall construction with a single brace, and is considered equivalent to one wood let-in brace as described in Item 1 of Section 2320.11.3 of the 1997 *Uniform Building Code*™ (UBC). The braces can resist both tension and compression loads.

**2.1.2 Materials:** The braces are manufactured from steel conforming to ASTM A653-96 SS specifications, and having a minimum yield strength of 40,000 psi (276 MPa) and a minimum ultimate strength of 55,000 psi (379 MPa). The cross section is a 90-degree angle, having minimum 0.925- and 0.885-inch-long (23.5 and 22.5 mm) legs cold-rolled from galvanized steel having a minimum base-metal thickness of 0.0359 inch (No. 20 gage) (0.91 mm). The ends of the legs are rolled under 0.272 inch (6.9 mm). One leg of the brace has score marks to facilitate the driving of nails through the brace during installation. They are manufactured in lengths of 8 to 22 feet (2438 to 6706 mm). See Figure 1 for additional details.

**2.1.3 Installation Requirements:** The Saf-T angle brace is installed at an angle of 45 to 60 degrees from the horizontal, on walls with 2x6 studs for exterior walls and interior load bearing walls or 2x4 studs for interior nonload-bearing walls spaced a maximum of 24 inches (610 mm) on center. A saw kerf made in the studs and plates must comply with Section 2320.11.9 of the 1997 UBC, for installation of one leg of the Saf-T angle brace. Vertical brace legs must be pointed downward. The braces are attached using one 8d common nail at each stud and two 8d common nails at both the top and bottom plates. The nails are installed through the leg of the Saf-T angle brace at the scored marks. The nails must have a minimum bending yield strength of 100 ksi (689 MPa).

**2.2 Saf-T-Tee Brace:**

**2.2.1 General:** The Saf-T-Tee brace is intended for use in stud wall construction to resist tension and compression

loads. The brace is considered equivalent to the brace described in Item 1 of Section 2320.11.3 of the UBC.

**2.2.2 Materials:** The Saf-T-Tee brace is manufactured from steel conforming to ASTM A653-96 CS Type A specifications, and having a minimum yield strength of 33,000 psi (220 MPa) and a minimum ultimate strength of 45,000 psi (310 MPa). The Saf-T-Tee brace is made of galvanized steel having a minimum base-metal thickness of 0.0239 inch (No. 24 gage) (0.61 mm), cold-rolled into the shape of a “T”. The web is of double thickness and the edges of the top flange are rolled under 1/8 inch (3.2 mm). The top flange width is a minimum of 1 inch (25.4 mm), and the web depth is 1 1/16 inch (17.5 mm). The brace is manufactured in lengths of 8 to 22 feet (2438 to 6706 mm). See Figure 2 for the cross section of the brace.

**2.2.3 Installation Requirements:** The Saf-T-Tee brace is installed on walls with 2x6 studs for exterior walls and interior load bearing walls or 2x4 studs for interior nonload-bearing walls, spaced not more than 24 inches (610 mm) on center. The angle of the brace must not exceed 60 degrees when measured from the horizontal. After the angle of the diagonal bracing has been established, a straight edge is used to delineate a straight line across the wall studs and plates. A saw kerf made along the straight line must comply with Section 2320.11.9 of the 1997 UBC. The web of the Saf-T-Tee brace is inserted into the saw kerf. The brace is nailed to the top and bottom plates using two 8d common nails, and at each intermediate stud using one 8d common nail. The nails are to be driven through the web of the Saf-T-Tee brace at the studs, and through the web and flange at the plates. The nails must have a minimum bending yield strength of 100 ksi (689 MPa). See Figure 3 for additional installation information.

**2.3 Saf-T-Strap:**

**2.3.1 General:** Saf-T-Straps are for use as tension tie straps. They are flat galvanized steel straps coiled into dispenser packs. Straps are field-cut to the required length.

**2.3.2 Materials:** Saf-T-Straps are manufactured from steel conforming to ASTM A653-96 SS Grade 40 specifications. Saf-T-Strap ST100 straps are manufactured in 100-foot (30 480 mm) lengths from 1 1/4-inch-wide (31.7 mm), No. 18 gage steel having a minimum base-metal thickness of 0.0451 inch (1.15 mm). See Figure 4 for hole size and location.

Saf-T-Strap ST150 is a 1 1/4-inch-wide (31.7 mm), No. 16 gage [0.0598-inch (1.52 mm) base-metal thickness], flat, galvanized steel strap manufactured in 150-foot (45 720 mm) lengths. See Figure 5 for hole size and location.

Saf-T-Strap ST200 is a 2<sup>1</sup>/<sub>16</sub>-inch-wide (52.4 mm), No. 18 gage [0.0478-inch (1.21 mm) base-metal thickness], flat, galvanized steel strap manufactured in 50-foot (15 240 mm) lengths. See Figure 6 for hole size and location.

**2.3.3 Installation Requirements:** Saf-T-Straps are used as tension tie straps in wood-frame construction, and have allowable loads noted in Table 1. The straps are attached to nominal 2-inch-thick lumber having sufficient depth to provide the minimum nail penetration specified in the code.

**2.4 Identification:**

**2.4.1** The product name and the evaluation report number (ER-4461) are stamped on each Saf-T angle and Saf-T-Tee Brace. The Saf-T-Straps are identified by a stamp indicating “Saf-T-Strap ST100,” “Saf-T-Strap ST150” or “Saf-T-Strap ST200.”

**2.4.2** The report holder’s contact information is the following:

**SAF-T CORPORATION  
302 WASHINGTON STREET, SUITE 847  
SAN DIEGO, CALIFORNIA 92103**

**3.0 EVIDENCE SUBMITTED**

Calculations and reports of racking shear tests.

**4.0 FINDINGS**

**That the wall bracing and straps described in this report comply with the 1997 Uniform Building Code™, provided they are identified and installed in accordance with this report.**

**This report is subject to re-examination in one year.**

**TABLE 1—ALLOWABLE LOADS FOR SAF-T-STRAPS<sup>1</sup>**

STRAP TYPE	NAIL SIZE <sup>2</sup>	NAIL TO WOOD END DISTANCE (inch)	TOTAL NUMBER OF NAILS PER STRAP	ALLOWABLE TENSION LOAD <sup>3</sup> (pounds)	ALLOWABLE WIND OR SEISMIC TENSION LOAD <sup>4</sup> (pounds)
ST100	10d	1 <sup>3</sup> / <sub>16</sub>	20	1,080	1,440
ST150	8d	3/4	34	1,567	2,084
	10d	1 <sup>3</sup> / <sub>16</sub>	28	1,567	2,084
ST200	10d	1 <sup>3</sup> / <sub>16</sub>	40	2,147	2,855
	16d	7/8	32	2,147	2,855

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 ksi = 6.89 MPa.

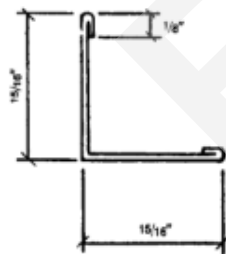
<sup>1</sup>Tabulated loads are based on the assumption that one half of the specified number of nails are installed in each of the two members connected.

<sup>2</sup>Nails are common nails. The 10d and 16d must have a minimum bending yield strength of 90 ksi; the 8d nails must have a minimum 100-ksi bending yield strength.

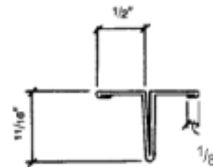
<sup>3</sup>Values are for nails installed with steel side plates into Douglas fir-larch solid-sawn lumber having a specific gravity of 0.50, or southern pine solid-sawn lumber having a specific gravity of 0.55. For other species, values must be adjusted in accordance with UBC Chapter 23. Adjustments noted in the code for moisture, temperature and wood treatment must be considered when applicable.

<sup>4</sup>Values have been increased 33<sup>1</sup>/<sub>3</sub> percent for duration of load due to wind or seismic forces in accordance with Section 2316 of the UBC. No other increases are permit

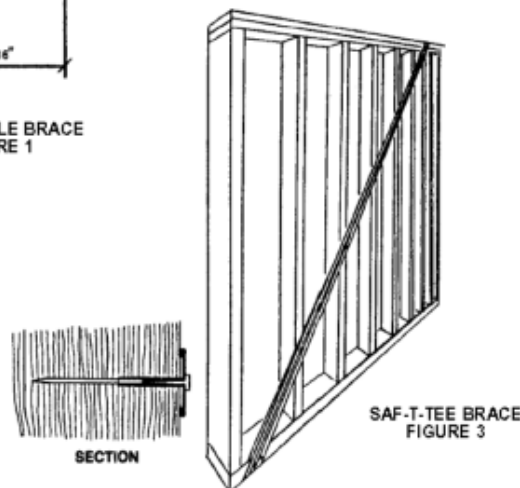
20 GAGE GALVANIZED STEEL



SAF-T ANGLE BRACE  
FIGURE 1



SAF-T-TEE BRACE  
FIGURE 2



SAF-T-TEE BRACE  
FIGURE 3