

# ESR-2320

Used for Florida State Wide Product Approval #

# FL10007

Products on this Report which are approved:

<u>Product</u>	<u>FL#</u>
CTUD55	10007.1
CTUD75	10007.1
CTUD77	10007.1
CTUD97	10007.1
CTUD99	10007.1
TUD9	10007.2
TUD10	10007.2



®

**SIMPSON STRONG-TIE COMPANY, INC.**

# ICC-ES Evaluation Report

**ESR-2320\***
*Issued August 1, 2007*
*This report is subject to re-examination in one year.*
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**DIVISION: 06—WOOD AND PLASTICS**  
**Section: 06060—Connections and Fasteners**

**REPORT HOLDER:**

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**EVALUATION SUBJECT:**

**COUPLING TAKE-UP DEVICE (CTUD) AND TAKE-UP  
 DEVICE (TUD)**

**1.0 EVALUATION SCOPE**
**Compliance with the following codes:**

- # 2006 *International Building Code*® (IBC)
- # 2006 *International Residential Code*® (IRC)

For legacy codes and earlier editions of the International Codes, see Section 8.0.

**Property evaluated:**

Structural

**2.0 USES**

The Coupling Take-Up Devices and Take-Up Devices described in this report are used in conjunction with continuous tie-down systems. They serve as part of a restraint system in wood-frame construction, to remove slack from the system by compensating for wood shrinkage and building settlement.

**3.0 DESCRIPTION**
**3.1 General:**

**3.1.1 Coupling Take-Up Device (CTUD):** The CTUD is an in-line, internally threaded coupling device that connects threaded rods together between floor levels, and removes slack in the continuous tie-down system when wood shrinkage or building settlement occurs. The device can be installed at any height in the wall, and has a rated compensation capacity of 1 inch (25 mm), to accommodate shrinkage and settlement from the story level in which it is installed. Each end of the CTUD is manufactured to create a positive stop for the threaded rod. The CTUD has witness holes to allow for inspection of proper thread engagement. The CTUD75 and CTUD97 are reducing CTUD models, allowing transition

between different rod diameters. See Table 1 for recognized models and dimensions.

**3.1.2 Take-Up Device (TUD):** The TUD is an in-line device utilized at floor levels to remove slack in the continuous tie-down system when wood shrinkage or building settlement occurs. The device bears on a steel bearing plate at the top of the wood sole plate, and has a rated compensation capacity of 1 inch (25 mm), to accommodate wood shrinkage and building settlement. Since the rod is continuous through the TUD, the CTUD or TUD above it must compensate for slack in the continuous tie-down system resulting from the cumulative shrinkage and settlement in the wood framing below it. See Table 2 for recognized models and dimensions of the TUD.

**3.2 Materials:**

**3.2.1 CTUD and TUD:** The CTUD and TUD bodies are fabricated from ASTM A 311-04 Class B, Grade 1144, steel, with a minimum tensile strength of 126,000 psi (869 MPa), and a minimum yield strength of 105,000 psi (724 MPa). The bodies are coated with a corrosion-resistant finish specified in the approved quality documentation. The springs are fabricated from ASTM A 313-03, Type 631, stainless steel torsional wire.

**3.2.2 Threaded Rod:** Threaded rod used with the CTUD and TUD must comply with the applicable code. Rods used with the CTUD must meet the diameter and thread specifications given in Table 1, and ends of rods must be cut square. Maximum diameters for threaded rod used with the TUD are given in Table 2.

**4.0 DESIGN AND INSTALLATION**
**4.1 Design:**

Allowable design loads and dimensions for CTUD and TUD models are given in Tables 1 and 2, respectively. Drawings and design details for the continuous tie-down system, including threaded rods, bearing plates, anchors, and wood framing members, must comply with the code and be submitted to the code official for approval. The continuous tie-down system must also be designed such that the slack in the system due to wood shrinkage and building settlement is less than the rated compensation capacity for each CTUD and TUD within the system.

**4.2 Installation:**

The CTUD and TUD must be installed in accordance with the details in this report, the manufacturer's published installation instructions, and the drawings and

\*Revised June 2009

design details approved by the code official. Threaded rod used with the CTUD or TUD must comply with the requirements of Section 3.2.2. The activation pin on the CTUD must remain in place until both threaded rods are installed, and the nut at the sole plate above it is secured in accordance with the manufacturer's installation instructions. The activation pin on the TUD must remain in place until the plate washer and nut above it are secure. Figures 1 and 2 show installation details for the CTUD and TUD, respectively.

## 5.0 CONDITIONS OF USE

The Coupling Take-Up Device (CTUD) and Take-Up Device (TUD) 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 devices must be installed in accordance with this report, the manufacturer's published installation instructions and the drawings and design details approved by the code official. In the event of a conflict between this report and the manufacturer's published installation instructions, this report governs.
- 5.2 The design values given in this report are for the CTUD and TUD alone. No further increase in allowable capacity is permitted. Calculations, demonstrating that the design loads do not exceed the allowable loads and that the expected slack due to wood shrinkage and building settlement does not exceed the rated compensation capacity for each CTUD and/or TUD in the continuous tie-down system, must be submitted to the code official for approval. The calculations must be prepared by a registered design professional when required by the statutes of the jurisdiction in which the project is to be constructed.

- 5.3 The devices are limited to installations in dry, interior locations.
- 5.4 The CTUD and TUD must not be used to support dead loads other than their own weight.
- 5.5 Use of the CTUD and TUD in contact with fire-retardant-treated wood or preservative-treated wood is outside of the scope of this report.

## 6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Shrinkage Compensating Devices (AC316), dated October 2005 (editorially revised June 2007).

## 7.0 IDENTIFICATION

The CTUD and TUD bear a label with the model number, evaluation report holder name (Simpson Strong-Tie Company, Inc.), and the evaluation report number (ESR-2320). The reducing CTUDs are scored at the reducing end around the outside.

## 8.0 OTHER CODES

In addition to the codes referenced in Section 1.0, the products in this report were evaluated for compliance with the requirements of the following legacy codes and earlier editions of the International Codes:

- # 2003 *International Building Code*<sup>®</sup>
- # 2003 *International Residential Code*<sup>®</sup>
- # 2000 *International Building Code*<sup>®</sup>
- # 2000 *International Residential Code*<sup>®</sup>
- # 1997 *Uniform Building Code*<sup>™</sup> (UBC)

The CTUD and TUD described in this report comply with, or are suitable alternatives to what is specified in, the codes listed above, subject to the provisions of Sections 2.0 through 7.0 of this report.

TABLE 1—COUPLING TAKE-UP DEVICE (CTUD) SPECIFICATIONS<sup>1</sup>

MODEL NUMBER	THREADED ROD DIAMETER <sup>2</sup> (in)	W (in)	L (in)	ALLOWABLE TENSION CAPACITY <sup>3,4</sup> (lbs)
CTUD55	$\frac{5}{8}$ - $\frac{5}{8}$	$1\frac{7}{8}$	5	15,520
CTUD77	$\frac{7}{8}$ - $\frac{7}{8}$	2	$5\frac{1}{2}$	31,795
CTUD75 <sup>5</sup>	$\frac{7}{8}$ - $\frac{5}{8}$	2	$5\frac{1}{2}$	31,795
CTUD99	$1\frac{1}{8}$ - $1\frac{1}{8}$	$2\frac{1}{2}$	$6\frac{1}{8}$	55,955
CTUD97 <sup>5</sup>	$1\frac{1}{8}$ - $\frac{7}{8}$	$2\frac{1}{2}$	$6\frac{1}{8}$	55,955

For SI: 1inch = 25.4 mm, 1 pound = 4.45 N

<sup>1</sup>Coupling Take-Up Devices (CTUD) compensate for up to 1 inch (25 mm) of wood shrinkage or building settlement.

<sup>2</sup>Thread specification for threaded rod used with the CTUD must be UNC Class 2A, per ANSI/ASME B1.1.

<sup>3</sup>Allowable tension capacities are for the CTUD only. The attached components (including anchors, tension rods, bearing plates, wood framing members, etc.) must be designed to resist design loads in accordance with the applicable code.

<sup>4</sup>No further increase in allowable tension capacity is permitted.

<sup>5</sup>The CTUD75 and CTUD97 models are reducing CTUD models, allowing transition between different rod diameters.

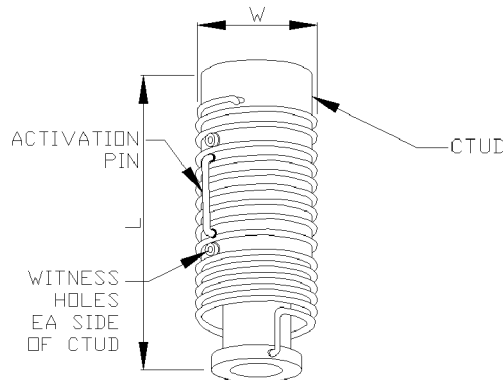


TABLE 2—TAKE-UP DEVICE (TUD) SPECIFICATIONS<sup>1</sup>

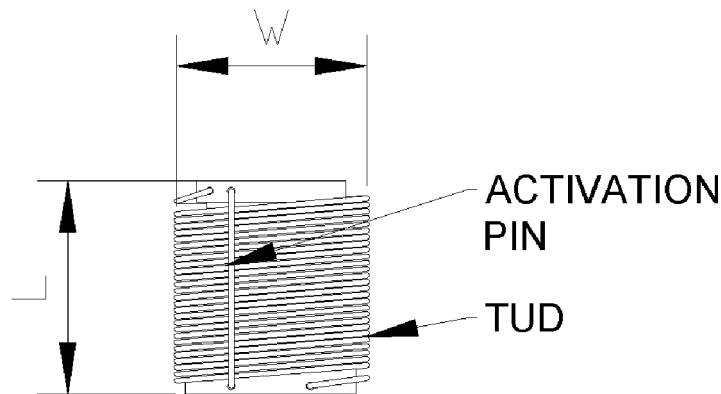
MODEL NUMBER	MAXIMUM THREADED ROD DIAMETER (in)	W (in)	L (in)	ALLOWABLE CAPACITY <sup>2,3</sup> (lbs.)
TUD9	$1\frac{1}{8}$	$2\frac{1}{8}$	$2\frac{1}{4}$	34,655
TUD10	$1\frac{1}{4}$	$2\frac{3}{8}$	$2\frac{1}{4}$	45,400

For SI: 1inch = 25.4mm, 1 pound = 4.45 N

<sup>1</sup>Take-Up Devices compensate for up to 1 inch (25 mm) of shrinkage or settlement due to dead load and construction loading.

<sup>2</sup>Allowable capacities are for the TUD only. The attached components (including anchors, tension rods, bearing plates, wood framing members, etc.) must be designed to resist design loads in accordance with the applicable code.

<sup>3</sup>No further increase in allowable capacity is permitted.



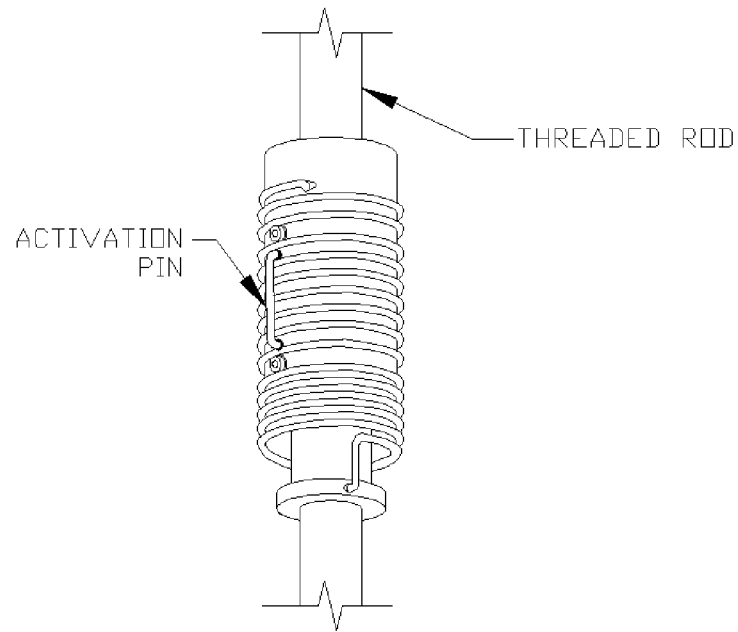


FIGURE 1—TYPICAL CTUD INSTALLATION

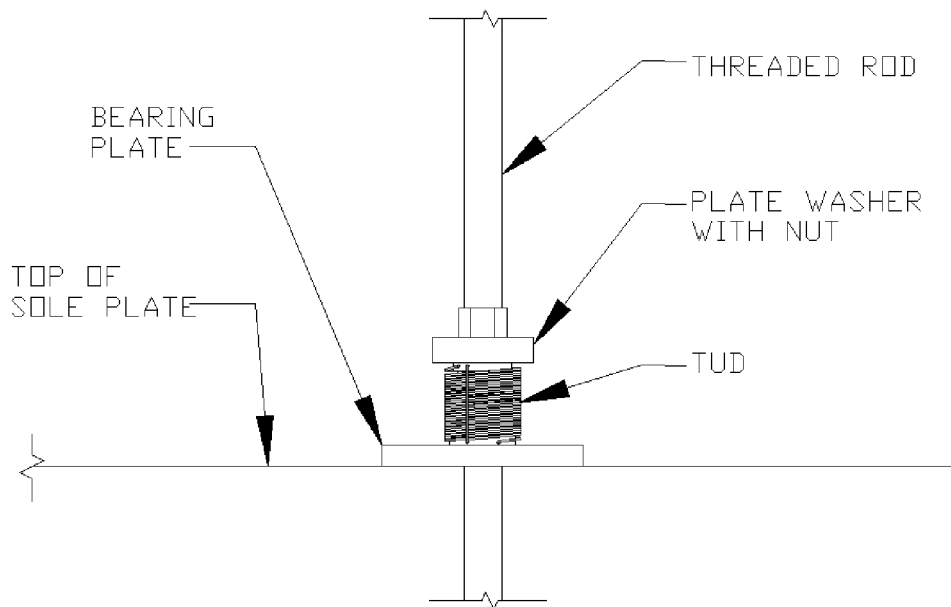


FIGURE 2—TYPICAL TUD INSTALLATION