

**Standard Method of Test for
Rotational Capacity of High Strength Short Steel Bolt
Assemblies**

SCDOT Designation: SC-T-151 (9/08)

1. SCOPE

- 1.1. This method covers the procedure for determining the rotational capacity of ASTM A 325 structural steel bolts too short to fit the Tension Measuring Device.

2. REFERENCED DOCUMENT

- 2.1. ASTM A 325

3. SIGNIFICANCE AND USE

- 3.1. The purpose of this procedure is to verify the rotational capacity of structural steel bolts and to evaluate the compatibility of assemblies selected for testing.

4. APPARATUS

- 4.1. Calibrated torque wrench that has the capability to measure the torque produced by the particular bolt assembly being tested.
- 4.2. Spacers and/or washers with hole sizes no larger than 1/16 inch greater than the bolt being tested.
- 4.3. Steel section with a hole large enough to install the bolt.
- 4.4. A spud wrench or equivalent.

5. PROCEDURE

- 5.1. Install the nut on the bolt and measure the stick-out of the bolt when 3 to 5 threads of the bolt are located between the bearing face of the nut and the bolt head. Measure the bolt length, the distance from the end of the threaded shank to the underside of the bolt head.
- 5.2. Install the bolt into the hole and install the required number of shim plates and/or washers (minimally, one washer under the nut must always be used) to produce the thread stick-out determined in 5.1.
- 5.3. Snug the bolt using a hand wrench. The snug condition is the normal effort applied to a 12 inch long spud wrench.
- 5.4. Match mark the nut, bolt, and plate. Mark off a vertical line at 1/3 of a turn, 120 degrees; 1/2 of a turn, 180 degrees; and 2/3 of a turn, 240 degrees; from vertical in a clockwise direction on the plate.

- 5.5. Using the calibrated manual torque wrench, tighten the bolt to the rotation listed in the table below. A second wrench must be used to prevent rotation of the bolt head during tightening. Record the torque required to reach this rotation. Measure the torque with the nut in motion

Rotation for ASTM A 325 Bolts	
Bolt Length	4 x bolt diameters or less
Required Rotation	1/3 Turn

- 5.6. Further tighten the bolt to the rotation listed in the table below. Measure the rotation from the initial marking. Record the bolt tension.

Rotation for ASTM A325 Bolts	
Bolt Length	4 x bolt diameters or less
Required Rotation	2/3 Turn

- 5.7. Remove the fastener assembly from the steel section. Ensure that there are no signs of thread shear failure, stripping, or torsion failure of the bolt. Check for stripping by running the nut on the bolt threads to where it was during the test. Accomplish this without the use of tools.

Note the torques at the required turns, the appearance quality, the lubricant quality, and the final torque at the required turn.

6. REPORT

- 6.1. None