



Standard Practice for The Calibration and Use of Torque Meters Used in Packaging Applications¹

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1. Scope

1.1 This practice covers the calibration and use of torque meters of the type normally used in packaging applications.

1.2 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 3198 Test Method for Application and Removal Torque of Threaded or Lug-Style Closures²

3. Terminology

3.1 *Definitions*—For definitions of *application torque* and *removal torque*, see Test Method D 3198.

3.2 *stripping torque*—a force or system of forces acting in a tightening direction that causes overrunning of the threads or rotation of an overshell with respect to its supporting member.

4. Summary of Practices

4.1 *Calibration*—Reference torque values are obtained by means of vertically suspended dead weights acting at specific distances from the axis of the mounting platform of the tester.

4.2 *Use*—Torque values to apply or remove closures are obtained by mounting containers on the platform and either applying or removing the closures. In some applications, the closure is mounted on the platform and the container is rotated.

5. Significance and Use

5.1 This practice can be used to check devices used to measure the application and removal torques of continuous or intermittent thread and lug closures.

5.2 This practice can be used to determine the amount of torque to either apply or remove a closure.

6. Apparatus

6.1 *Adapter*—A circular plate that can be mounted concen-

trically on the platform of the tester. If the platform itself is suitable, an adapter is not necessary. The adapter should be of such diameter that its radius multiplied by appropriate weights will give torque values equal to $\frac{1}{4}$, $\frac{1}{2}$, and full-scale meter readings. (Typical devices for packaging applications have ranges from: 0 to 10, 0 to 25, 0 to 50, and 0 to 100 lbf-in. (0 to 1.13, 0 to 2.8, 0 to 5.7, and 0 to 11.3 N-m, respectively).

6.2 *Connecting Means*—A very flexible, thin filament, such as a wire or fishing line that transmits the force of hanging weights to the circumference of the adapter.

6.3 *Pulley*, low friction, used to change the direction of the connecting means from horizontal to vertical.

6.4 *Appropriate Dead Weights*, for example: 2, 4, and 7-lb (0.9, 1.8, and 3.2-kg) for a torque meter with a 7 in. (178 mm) diameter plate or platform and a range of 0 to 25 in-lbs (0 to 2.8 N-m).

7. Calibration Procedures

7.1 *Spring-Loaded Type Testers (See Fig. 1)* :

7.1.1 Verify that the meter needle moves freely throughout its entire range and rests on zero when not loaded. Adjust if necessary.

7.1.2 If an adapter is used, fasten it securely and concentrically to the tester platform or spindle.

7.1.3 Secure the torque meter to a table or work surface.

7.1.4 Secure one end of the connecting means to a point on the circumference of the adapter or rotating platform and wrap it at least halfway around the circumference.

7.1.5 Run the connecting means over a low friction pulley located near the edge of a bench or table, and let it hang vertically for the attachment of weights.

7.1.6 Sequentially, attach dead weights appropriately to give torque values equal to $\frac{1}{4}$, $\frac{1}{2}$, and full-scale meter readings. Make certain that the weights are hanging freely. Record the weight, radius and the meter reading at each test point, making certain that the needle returns to zero when the weights are removed.

7.1.7 If the difference between the measured and indicated readings differ from the manufacturers' specification (usually $\pm 4\%$ of full scale), the user will need to generate a calibration chart or have the instrument repaired.

7.1.8 For torque meters that measure both clockwise and counterclockwise, repeat 7.1.6, but with the platform rotation in the opposite direction.

¹ This practice is under the jurisdiction of ASTM Committee D-10 on Packaging and is the direct responsibility of Subcommittee D10.32 on Consumer Packages.

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² *Annual Book of ASTM Standards*, Vol 15.09.