



Designation: D 3474 – 90 (Reapproved 2002)

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:*²

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

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 Practice

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 concentrically 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. Conditioning

7.1 Prior to calibration, the torque meter and weights shall be allowed to come to ambient room conditions.

8. Calibration Procedures (see Fig. 1)

8.1 *Spring-Loaded Type Testers* :

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

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

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

8.1.4 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.

8.1.5 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.

8.1.6 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

¹ This practice is under the jurisdiction of ASTM Committee D10 on Packaging and is the direct responsibility of Subcommittee D10.31 on Child Resistant Packaging.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.