



## Standard Test Method for Application and Removal Torque of Threaded or Lug-Style Closures<sup>1</sup>

This standard is issued under the fixed designation D 3198; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This test method covers the application with a given torque of a threaded or lug-style closure to a container, and measures the torque required to unscrew the closure from a container.

1.2 The values stated in SI units are to be regarded as the standard. The inch-pound units given in parentheses are for information only.

1.3 *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 3474 Practice for The Calibration and Use of Torque Meters Used in Packaging Applications<sup>2</sup>
- E 105 Practice for Probability Sampling of Materials<sup>3</sup>
- E 122 Practice for Choice of Sample Size to Estimate a Measure of Quality for a Lot or Process<sup>3</sup>

### 3. Terminology

#### 3.1 Definitions of Terms Specific to This Standard:

3.1.1 *application torque*—the moment of a force or system of forces tending to cause rotation of a closure over the neck finish of an appropriate container, causing the closure to be applied and secured to the container.

3.1.2 *removal torque*—the moment of a force or system of forces tending to cause rotation of an appropriate closure in a direction opposite to that of application, causing the closure to be unsecured from its position on the neck finish of an appropriate container.

### 4. Summary of Test Method

4.1 Representative specimens of a threaded or lug-style container are held in a torque-measuring device and either the predetermined amount of torque is applied to its closure, or the amount of torque necessary to loosen the closure is determined, or both.

### 5. Significance and Use

5.1 These torque measurements are of value in:

- 5.1.1 Rating the performance of automatic capping machines,
- 5.1.2 Measuring any tendency for threaded or lug-style closures to loosen during storage or shipment of the package, and
- 5.1.3 Measuring the force required to break hard plastic and overturn or “strip” soft plastic and metal closures.

5.2 The method may be used to establish performance specifications.

### 6. Apparatus

6.1 *Torque Meter*<sup>4,5</sup> with a scale that will read with the maximum point reading accuracy within the torque range expected to be measured (use a 0 to 25 torque inch pounds-force (T.I.P.) torque meter for readings under 25 T.I.P., not a 0 to 100 T.I.P. torque meter).

### 7. Sampling, Test Specimens, and Test Units

7.1 The number of samples will depend on the desired purpose for which this test is being run. However, for a given set of samples, sufficient measurements shall be taken in accordance with established statistical sampling procedures in order to obtain consistent results.<sup>6</sup>

7.2 Select unused closures, complete with liners, if appropriate, and unused containers, with the correct corresponding

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 15.09.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 14.02.

<sup>4</sup> Owens-Illinois Torque Meters, or their equivalent, have been found satisfactory for this test method. Available from Secure-Pak, Inc., 4009 Beachway Blvd., Toledo, OH 43614.

<sup>5</sup> A digital or automated torque instrument, if used, will have an appropriate design and scale capacity for the container/closure system to be evaluated. Torque results will be available in either electronic display or printout formats.

<sup>6</sup> Refer to Practices E 105 and E 122 for more specific information.