Designation: D3968 – 97 (Reapproved 2007)

Standard Test Method for Monitoring of Rotational Torque of Type IIIA Child-Resistant Closures[1]

This standard is issued under the fixed designation D3968; 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 (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers the measurement of rotational torques of Type IIIA child-resistant closures as a means of monitoring normal functioning of the child-resistant package.

1.2 This test method is not intended to supplant preexisting closure or package specifications or preexisting incoming material test procedures.

1.3 *This standard does not purport to address 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]

D3474 Practice for Calibration and Use of Torque Meters Used in Packaging Applications

D3475 Classification of Child-Resistant Packages

E105 Practice for Probability Sampling of Materials

E122 Practice for Calculating Sample Size to Estimate, With Specified Precision, the Average for a Characteristic of a Lot or Process

3. Terminology

3.1 *Definitions:*

3.1.1 *rotational torque*—the moment of force or system of forces tending to cause rotation of a Type IIIA closure on the finish of its container.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *Type III child-resistant closure*[3]—a reclosable snap closure requiring an alignment of two points on closure and container followed by a pushing off of the closure top or lip to remove the closure (taken from Classification D3475).

4. Summary of Test Method

4.1 Representative samples of packages with Type IIIA child-resistant closures are evaluated for closure rotational torques by using an appropriate torque meter.

5. Significance and Use

5.1 The application of this test method provides a means for evaluating one of the variables affecting the ability of the closure-container system to function as specified.

5.2 Variability in rotational torque measurements is probably due to the use of the torque meter to measure relatively small torque values, differences in critical package dimensions, and the aging of components.

6. Apparatus

6.1 *Torque Meter*— Select a torque meter with a scale having the smallest range that will span the torque range expected to be measured (for example, use a 0 to 10-lbf·in. torque meter for readings under 10 lbf·in., not a 0 to 25 lbf·in. torque meter).

NOTE 1—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 print out formats.

7. Sampling, Test Specimens, and Test Units

7.1 Sampling of package specimens for this test method shall be in accordance with statistically valid procedures. Refer to Practices E105 and E122 for more specific information.

7.2 Use package specimens whose component containers and closures are within their respective specifications.

7.3 Use package specimens with a known number of closure applications.

7.4 Use a sufficient number of package specimens for the desired statistical correlation.

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[1] This test method is under the jurisdiction of ASTM Committee D10 on Packaging and is the direct responsibility of Subcommittee D10.32 on Consumer, Pharmaceutical, Medical, and 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.

[3] Examples are the Bristol-Myers, Brockway (Celluplastics), Calmar, Plastic Research, and Stull Closures.

8. Calibration

8.1 Calibrate the torque meter in accordance with Practice D3474.

NOTE 2—Follow calibration procedure of manufacturer if a digital or automated torque instrument is to be used.

9. Conditioning

9.1 Conduct the testing of assembled packages at standard conditions of 23 ± 2°C (73.4 ± 3.4°F) and 50 ± 5 % relative humidity after their conditioning under these same standards or other specified temperature and relative humidity combinations.

9.2 The atmosphere conditions in Table 1 may be used when special conditioning is appropriate. Other atmosphere conditions may be used as appropriate.

10. Procedure

10.1 Select sample packages to be tested.

10.2 Condition the sample packages, if desired.

10.3 Measure rotational torques of test closures used on the sample packages in pounds-force-inches or Newton-metres.

TABLE 1 Special Atmospheres

Environment	Temperature	Relative Humidity
Cryogenic	−55 ± 3°C (−67± 6°F)	...
Frozen food storage	−18 ± 2°C (0 ± 4°F)	...
Refrigerated storage	5 ± 2°C (41 ± 4°F)	85 ± 5 %
Temperature high humidity	20 ± 2°C (68 ± 4°F)	85 ± 5 %
Tropical	40 ± 2°C (104 ± 6°F)	85 ± 5 %
Desert	60 ± 3°C (140 ± 6°F)	15 ± 2 %

10.3.1 For closures that can be rotated through 360°, measure the maximum and minimum torque through one complete revolution.

10.3.2 For closures that cannot be rotated through 360°, measure the maximum and minimum torque through the maximum possible arc from stop to alignment point.

11. Report

11.1 Report the following information:

11.1.1 Closure and container description,

11.1.2 Sampling quantity,

11.1.3 Preconditioning time, temperature, and relative humidity,

11.1.4 Temperature and relative humidity of test area,

11.1.5 Compilation of torques measured, and

11.1.6 Statement that testing was done in accordance with ASTM Test Method D3968 or that testing was done with indicated changes.

12. Precision and Bias

12.1 *Precision*—Based on limited testing from one laboratory, the within-laboratory or repeatability standard deviation is about 0.43 in.-lb or the coefficient of variation is about 0.12 in.-lb. Repeatability is dependent on the specific package being tested. Some packages would be expected to be higher or lower than this. Between-laboratory reproducibility is being determined by the subcommittee.

12.2 *Bias*—No justifiable statement can be made on the bias of this test method since a true or absolute value cannot be established by an accepted reference method.

13. Keywords

13.1 rotational torque; Type IIIA child-resistant closure