Designation: D3469 – 97 (Reapproved 2007)

Standard Test Methods for Measurement of Vertical Downward Forces to Disengage Type IIA Lug-Style Child-Resistant Closures[1]

This standard is issued under the fixed designation D3469; 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 These test methods[2] measure the downward forces during the disengagement of lug-style caps from their respective containers.

1.2 These test methods measure the maximum torque developed while the cap is further disengaged by turning of the container.

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:*[3]

D3475 Classification of Child-Resistant Packages

D3481 Test Method for Manual Shelling Two-Piece Child-Resistant Closures That Are Activated by Two Simultaneous Dissimilar Motions

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 *type IIA child-resistant closure*—a lug finish closure requiring a random push down while turning. (See Classification D3475.)

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *vertical force to disengagement*—the amount of downward force required to release the lugs from a locked position (disengagement) so rotational movement can be achieved.

4. Summary of Test Method

4.1 The average downward force to disengage lugs of the cap from the several receptacles on the containers is obtained. The standard deviation may be determined for a given lot of packages. These measurements of force are recorded including torque generated in removal of the cap.

4.2 Test Methods A and B use a force-measuring device to determine the downward force required to disengage the lugs on the cap from the corresponding receptacles on the container with the downward travel being controlled through a specific distance. Test Methods A and B use different measuring devices. The correlation of results between the two test methods has not been evaluated.

4.3 *Test Method B*—This procedure uses the apparatus as shown in Fig. 1. The downward force is measured by a gage that is lowered onto the cap of the specimen. The vertical movement is controlled and the twisting of the cap is minimized while the vertical force is applied. The torque may be measured during this removal procedure when the test specimen is clamped in a suitable torque meter.

5. Significance and Use

5.1 These test methods may be used in establishing and confirming quality control standards.

5.2 These test methods may be used to establish performance standards for Type IIA child-resistant packages.

6. Apparatus

6.1 *Force-Measuring Scale (Test Method A),*[4] with a supporting stand maintaining the appropriate force gage in a vertical position similar to the design in Fig. 1 and incorporating an indicator for travel. A controlled vertical movement is desirable.

[1] These test methods are under the jurisdiction of ASTM Committee D10 on Packaging and are the direct responsibility of Subcommittee D10.32 on Consumer, Pharmaceutical, Medical, and Child Resistant Packaging.

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[2] These test methods may provide a supplemental procedure to Test Method D3471 that similarly require a random push-down while turning to open. Data generated may not be comparable to Test Method D3471 procedure.

[3] 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.

[4] One force-measuring scale that has been found satisfactory is the Accuforce Cadet (0-20# scale), Ametek/Mansfield & Green Vision, Largo, FL 34643. Other force scales may or may not be satisfactory.

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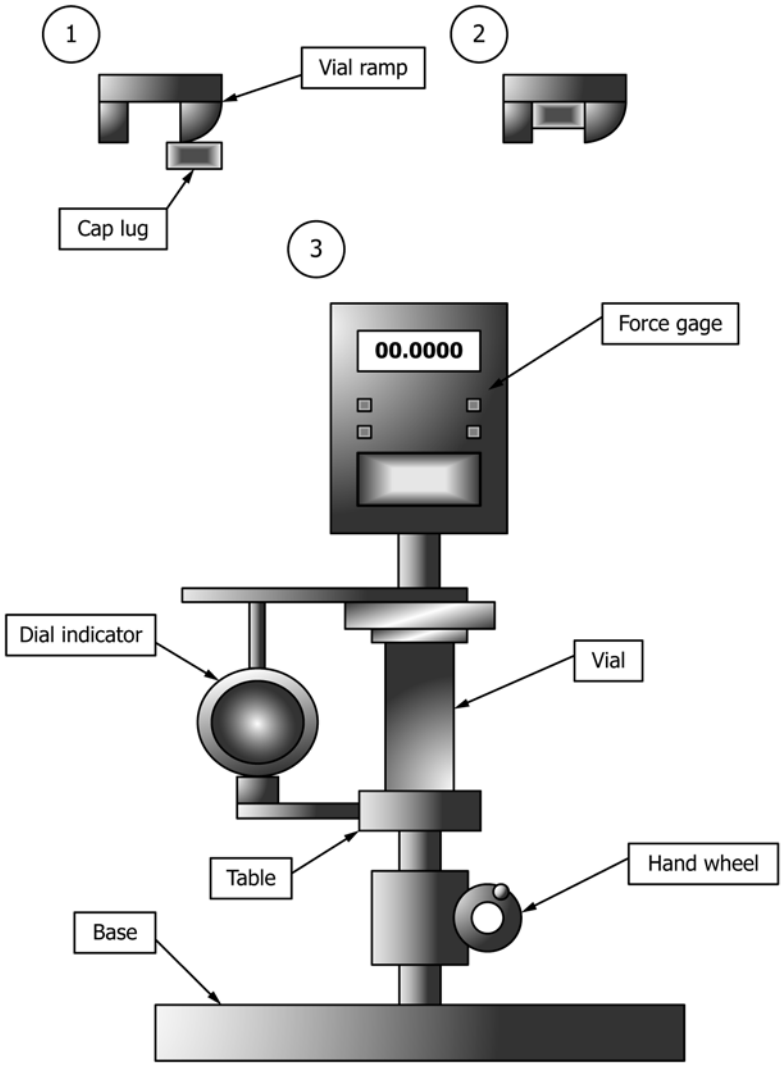

FIG. 1 Test Method A—Suggested Apparatus for Measuring Vertical Force to Disengage Closures with Simultaneous Torque Measurement

6.2 *Force-Measurement Machine (Test Method B),* [5]electronic compression tester.

7. Sampling

7.1 The sample size will depend upon the particular objective of the test. For a given set of samples, sufficient measurements should be taken in accordance with established statistical sampling procedures.

NOTE 1—Refer to Practices E105 and E122 for more specific information.

8. Calibration

8.1 Calibrate the vertical force measuring devices based on recommendations of the manufacturer.

9. Conditioning

9.1 Store the unassembled sample specimens for 24 h at 23 ± 2°C and 50 ± 5 % relative humidity, where applicable.

9.2 After assembly of the cap and container components, store at 23 ± 2°C and 50 ± 5 % relative humidity for an additional 24 h.

9.3 The atmosphere conditions in Table 1 shall otherwise

TABLE 1 Atmospheric Conditions for Package Testing[A]

Temperature,° C	Relative Humidity, %
−55	...
−18	...
5	85
20	65
23	50
20	90
38	85
60	30

[A] Taken from ISO 2233.

[5] One compression tester that has been found satisfactory is the Thwing-Albert Instrument Co., 10960 Dutton Road, Philadelphia, PA 19154, Catalog No. 1274 Electronic Compression Tester. Other compression testers may or may not be satisfactory.

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