Designation: ~~D6633 – 05 (Reapproved 2010)~~ D6633 – 18

Standard ~~Test Method~~ Practice for Basic Functional Stability of a Mechanical Pump Dispenser[1]

This standard is issued under the fixed designation D6633; 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~~ practice covers the determination of the basic functional stability of a mechanical pump dispenser with a product.

1.2 This ~~test method~~ practice covers accelerated usage evaluations of mechanical pump dispensers (spray or flow types) with a product.

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~~ safety, health, and ~~health~~environmental practices and determine the applicability of regulatory limitations prior to use.*Specific precautions are given in Section 5.

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D2063 Test Methods for Measurement of Torque Retention for Packages with Continuous Thread Closures

D3890 Practice for Number of Strokes to Prime a Mechanical Pump Dispenser

D4336 Practice for Determination of the Output Per Stroke of a Mechanical Pump Dispenser

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

3. Significance and Use

3.1 This ~~test method~~ practice is used for determining the accelerated usage of a mechanical pump dispenser for consumer usage.

4. Apparatus

4.1 *Containers,* that will allow the mechanical pump dispenser to be affixed to them (Note 1) and also be capable of containing product for a period of time at various environmental conditions (Note 2).

NOTE 1—If possible, the actual container to be marketed should be used.

4.2 *Product,* a sufficient amount to fill the number of containers in accordance with 4.1, reference 10.2.

4.3 *Balance,* with direct reading to 0.01 g. Top loading or analytical style is recommended.

4.4 *Environments,* where the mechanical pump dispenser and product will be kept during the test period.

4.4.1 *Ambient Area,* maintained at 23 ± 3°C (73 ± 5.4°F).

4.4.2 *Oven* (45°C) , maintained at 45 ± 3°C (113 ± 5.4°F).

NOTE 2—The oven temperature can be changed according to product formulation. If different temperatures are used, this should be noted in the test report discussed in 11.

4.4.3 *Cycle Chamber,* optional, alternating 5 to 50°C (41 to 122°F) every 24 h.

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[1] This ~~test method~~ practice is under the jurisdiction of ASTM Committee F02 on ~~Flexible~~Primary Barrier Packaging and is the direct responsibility of Subcommittee F02.30 on Mechanical ~~Pump~~ Dispensers.

Current edition approved ~~Oct. 1, 2010~~May 1, 2018. Published ~~March 2011~~June 2018. Originally approved in 2001. Last previous edition approved in ~~2005~~2010 as ~~D6633 – 05~~.D6633 – 05(2010). DOI: ~~10.1520/D6633-05R10.~~10.1520/D6633-18.

[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.

4.5 *Oven-Safe Tray,* with absorbent paper towels laid in the tray.

4.6 *Food Coloring or Dye,* optional.

5. Precautions

5.1 Appropriate handling considerations should be given to flammable, toxic, caustic, or other potentially hazardous material used. When testing at any temperature, safety should be the number one consideration and special attention should be used on the flash points of the products tested.

6. Sampling

6.1 Based upon the desired precision, sampling shall be performed in accordance with Practice E122.

6.2 In the absence of any special sampling plan, performance shall be based on not less than the number of representative specimens exposed to any of the environmental conditions as specified in Section 9.

7. Test Specimen

7.1 Test specimens shall be clean, dry and previously unused mechanical pump dispensers.

8. Conditioning

8.1 If possible, condition the test specimens at 23 ± 3°C (73 ± 5.4°F) for not less than 4 h. If the test specimens are not conditioned at the recommended temperature, this should be noted in the test report discussed in 11.

8.2 Test pumps should be tested no sooner than 24 h after assembly when possible. If pumps are not conditioned at the recommended time, this should be noted in the test report discussed in 11.

9. Test Specimen Preparation

9.1 Prepare a minimum of 12 mechanical pump dispensers with product and containers to be used for accelerated usage evaluation.

9.1.1 Affix the mechanical pump dispensers to containers at the minimum recommended torque load in accordance with Test Method D2063.

9.1.2 Label all of the assembled units with the product name, any safety hazards for the product, name of the technician completing the test, and the test number or means of identifying the test along with the following:

9.1.2.1 Minimum 3 units labeled, “Upright, Ambient.”

9.1.2.2 Minimum 3 units labeled, “Upright, Oven 45°C.”

9.1.2.3 Optional: Minimum 3 units labeled, “Upright, Cycle Chamber.”

9.1.2.4 Minimum 3 units labeled “On-Side, Ambient.”

9.1.2.5 Minimum 3 units labeled, “On-Side, Oven 45°C).”

9.1.2.6 Optional: Minimum 3 units labeled “On-Side, Cycle Chamber.”

10. Procedure

10.1 Test each mechanical pump dispenser for strokes to prime in accordance with Test Method D3890. Report the findings in 11.1.

10.2 Test each mechanical pump dispenser for output per stroke in accordance with Test Methods D4336. Visually inspect the spray or flow of the product to ensure that no obstructions are present.

10.3 Place all of the test specimens as prepared in 9.1 in their respective environments as indicated by the appropriate label on each unit. Except for trigger sprayers, place specimens labeled “On-Side” with the orifice facing down. Trigger sprayers may have the orifice oriented to the side while in the “on-side” position. If the mechanical pump dispensers use a protective hood or overcap, these test specimens should be stored with their protective devices in place. If the mechanical pump dispensers have a locking feature, these test specimens should be stored in the locked position during storage and unlocked for testing.

10.4 Except for trigger sprayers, remove all of the test samples from their respective environments three times per week, (preferably Monday, Wednesday, and Friday), over a four week period for a total of 12 test days.

10.5 For trigger sprayers, remove all of the test specimens from their respective environments once every two weeks for a duration of 12 weeks for a total of 7 test days.

10.6 Allow the temperature of the test specimens to equilibrate (generally 4 to 6 h) to ambient temperature prior to the actual evaluations.

10.7 Evaluate the primed mechanical pump dispensers for each of the following parameters:

10.7.1 *Leakage*—Visually inspect for the presence of product on the outside of either the mechanical pump dispenser or the container. If any test specimen exhibits a high degree of leakage, discontinue any additional testing with that particular mechanical pump dispenser and report the findings in 11.1.