



## Standard Test Methods for Determination of the Output Per Stroke of a Mechanical Pump Dispenser<sup>1</sup>

This standard is issued under the fixed designation D 4336; 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 cover the measurement of the mean quantity-by-weight of liquids dispensed from a mechanical pump dispenser (spray or flow type) with a consumer-type product on each actuation.

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.*

1.3 **Warning:** Appropriate handling considerations should be given to flammable, toxic, caustic, or other hazardous materials used in these determinations.

### 2. Referenced Documents

#### 2.1 ASTM Standards:

D 3890 Test Method for Number of Strokes to Prime a Mechanical Pump Dispenser<sup>2</sup>

### 3. Significance and Use

3.1 This test method can be used to compare the output per stroke of different pump dispensers for the purpose of establishing dosage and use instructions for products of consumer usage.

3.2 This test method is suitable for establishing specifications for both the pump dispenser and the final package.

### 4. Sampling

4.1 Select an appropriate number of dry, unused pump dispensers at random for the precision and accuracy desired. A number of ten test specimens are recommended, but a minimum of three is acceptable.

### 5. Test Specimens

5.1 Test specimens shall be clean, dry, and previously unused pump dispensers with dip tubes assembled in the same manner as in production.

### 6. Conditioning

6.1 If possible, condition the test specimens at  $23 \pm 3^\circ\text{C}$  ( $73 \pm 5.4^\circ\text{F}$ ) 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 12.1.

6.2 If the test specimens have been newly-made at the time of the test, it is recommended that the test specimens age at  $23 \pm 3^\circ\text{C}$  ( $73 \pm 5.4^\circ\text{F}$ ) for 24 h before beginning the test.

#### GRAVIMETRIC METHOD #1

This method is to be used when taring of the package weight is wanted or possible.

### 7. Apparatus

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

NOTE 1—For applications requiring greater accuracy, a top-loading or analytical style balance with direct reading to 0.001 g is recommended.

7.2 *Container*, an appropriate container for the pump dispenser under test; however, the actual container to be used on the final package is recommended.

### 8. Procedure

8.1 Fill the container with product to the level to be seen in the final package and secure the mechanical pump dispenser to the container.

8.2 If the pump dispenser is equipped with an overcap or locking feature, remove or release to permit the pump dispenser to be in the operable mode.

8.3 If the pump dispenser has a variable dosage feature, make an appropriate adjustment to the desired dosage at this time.

8.4 Prime the pump dispenser in accordance with Test Method D 3890 by actuating it until a full discharge of product occurs.

8.5 Place the package on the balance and tare the weight to zero.

8.6 Actuate the pump dispenser ten times by hand at the rate of 60 to 120 ( $90 \pm 15$  preferred) strokes per minute.

NOTE 2—Care must be taken to use the full stroke on each actuation.

8.7 Reweigh the package and record the value to the nearest 0.01 or 0.001 g as appropriate for the balance used and record

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