



Designation: D 3890 – 01

Standard Test Method for Number of Strokes to Prime a Mechanical Pump Dispenser¹

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1. Scope

1.1 This test method covers the determination of the number of actuations required to prime a pump dispenser (spray and flow types) with a consumer-type product.

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.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 996 Terminology of Packaging and Distribution Environments²

3. Significance and Use

3.1 This test method can be used to visually compare priming characteristics of different pump dispensers for the purpose of establishing use instructions for a specific product.

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

4. Apparatus

4.1 No apparatus is required, although a mechanical device for actuating the pump dispenser may be used.

4.2 **Warning:** Appropriate handling consideration should be given to flammable, toxic, caustic, or other potentially hazardous materials used in this determination.

5. Sampling

5.1 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.

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 9.1.

7. Test Specimens

7.1 For each test specimen, select a container to which the pump dispenser will be attached during the test. Since the dip tube length affects the number of strokes to prime, the actual bottle of the final package is recommended for testing.

8. Procedure

8.1 Fill each container with the product to be tested at the actual level of the final package target weight.

8.2 Attach the pump dispenser securely to the container. Take care not to actuate the pump dispenser during this step.

NOTE 1—If the actuator is placed onto the pump after the pump has been secured onto the container, then report this additional stroke in the final results in 9.1.

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

8.4 If the pump dispenser has a variable output-per-stroke feature, make an appropriate adjustment to achieve the desired output-per-stroke at this time. Report this desired dosage in 9.1.

8.5 Actuate the pump dispenser to its fullest extent with smooth, firm, and even pressure. Allow the pump mechanism to fully return before beginning the next stroke.

NOTE 2—Depending on the venting system, some mechanical pump dispensers can have variation in the number of strokes-to-prime due to the time that the priming vent is opened. It is suggested that a rate of 90 ± 15 strokes per minute be used. For some viscous products, this rate may be too fast for the mechanical pump dispenser to fully return. If the rate of actuation is outside of this range—faster or slower, report in 9.1.

8.6 Record the number of full strokes until the first full discharge of product is observed.

NOTE 3—If the visual determination of the first full stroke is not accurate enough, the amount of product dispensed by the mechanical pump dispenser may be weighed after each stroke, and the amount

¹ This test method is under the jurisdiction of ASTM Committee D10 on Packaging and is the direct responsibility of Subcommittee D10.32 on Mechanical Dispensers.

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² *Annual Book of ASTM Standards*, Vol 15.09.