



Designation: D 6534 – 00

Standard Test Method for Determining the Peak Force-to-Actuate a Mechanical Pump Dispenser¹

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1. Scope

1.1 This test method covers the determination of the peak force-to-actuate, sometimes called force-to-actuate (FTA), of a mechanical pump dispenser.

1.2 The values stated in SI units are to be regarded as the standard. The inch-pound units given in parentheses are for information only.

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.* Specific precautionary statements are given in Section 5.

2. Referenced Documents

2.1 *ASTM Standards:*

D 3890 Test Method for the Number of Strokes to Prime a Mechanical Pump Dispenser²

3. Significance and Use

3.1 This test method can be used to compare the peak force-to-actuate performance of different mechanical pump dispensers.

3.2 This test method can be used to determine the ease of use of a mechanical pump dispenser.

3.3 This test method can be used to determine the peak force-to-actuate of a mechanical pump dispenser.

4. Apparatus

4.1 *Motorized Compression Tester*, with the capability to actuate the mechanical pump dispenser at a constant velocity while accurately measuring the resulting force (that is, load cell).

NOTE 1—Since the velocity during actuation will affect the FTA of certain mechanical pump dispenser designs, care must be taken in selecting the correct type of equipment with the sufficient actuation velocity.

4.2 A device connected to the compression tester that can display the resulting force in newtons (N) or pounds force (lbf) of 0.1 accuracy.

4.3 A means to rigidly hold the mechanical pump dispenser during testing (that is, glass bottle or a holding fixture; see Fig. 1).

5. Precautions

5.1 Appropriate handling considerations should be given to flammable, toxic, caustic, or other potentially hazardous materials used.

5.2 Appropriate operating considerations should be taken with pinch points on the motorized compression tester.

5.3 Ensure that the exit orifice of the mechanical pump dispenser is pointed away from the operator and other people.

5.4 Ensure that the motorized compression tester is properly calibrated.

5.5 Care should be taken when selecting the travel speed of the ram. For some mechanical pump dispenser styles, the speed of actuation and length of stroke can affect the peak force to actuate. As a rule of thumb, mechanical pump dispensers with a stroke length of 7 mm or greater should use an actuation velocity of 35 to 75 mm per second, while mechanical pump dispensers with a stroke length of less than 7 mm should use an actuation velocity of 35 mm per second or less.

6. Sampling

6.1 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.

7. Specimens

7.1 Test specimens shall be clean, dry, and previously unused pump dispensers assembled in the manner as in production.

¹ This test method is under the jurisdiction of ASTM Committee D10 on Packaging and is the direct responsibility of Subcommittee D10.33 on Mechanical Dispensers.

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² Discontinued; see 1994 *Annual Book of ASTM Standards*, Vol 15.09.