



Standard Test Method for the Determination of the Component Retention of a Mechanical Pump Dispenser¹

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1. Scope

1.1 This test method covers the evaluation of the force required to remove the hood and the actuator from a mechanical dispensing pump.

1.2 *This standard may involve hazardous materials, operations, and equipment. 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 consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

D 618 Practice for Conditioning Plastics and Electrical Insulating Materials for Testing²

3. Significance and Use

3.1 This test method may be used to establish performance specifications.

3.2 This test method may be used to establish quality control assessment.

4. Apparatus

4.1 *Test Stand*—The test apparatus shall be capable of applying a smoothly increasing load to the test specimen until the component is separated from the pump assembly.

NOTE 1—The condition of 4.1 is fulfilled by most motor driven tensile strength testers including constant rate of elongation testers.

NOTE 2—The test standard should be equipped with a maximum-force indicator.

4.2 *Fixtures*, to hold the mechanical pump dispenser.

4.2.1 The fixtures must allow no slippage between the test specimen and the fixture, so that distortion is avoided.

4.2.2 The fixtures for the test apparatus may be custom-made for this test.

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 *Annual Book of ASTM Standards*, Vol 08.01.

5. Sampling

5.1 Select an appropriate number of dry, unused pump dispensers at random for precision and accuracy desired. Use of 10 test specimens is recommended, but a minimum of three is acceptable.

6. Test Specimen

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

7. Conditioning

7.1 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 (see 9.1).

8. Procedure

8.1 Attach fixtures to the test stand in accordance with the manufacturer's instructions or in a manner consistent with the pump's geometry.

8.2 Adjust the test stand so that there is no force acting on the specimen.

NOTE 3—At this time, there should be a zero reading on the force gage.

8.3 Manual Method:

8.3.1 Place the pump assembly into the fixture.

8.3.2 Grasp the component to be separated in the hand.

8.3.3 Pull the component as slowly as possible, avoiding quick, jerking actions.

8.3.4 Continue to pull the component until it separates from the assembly.

8.3.5 Observe and record the maximum force, N (lb), required to separate the component from the assembly.

8.4 Machine Method:

8.4.1 Place the pump assembly into the fixture.

8.4.2 Secure the other component to the movable crosshead.

8.4.3 Operate the test stand at a rate of 250 mm/min (10 in./min).

8.4.4 Stop the machine when the component has separated from the assembly.

8.4.5 Observe and record the maximum force, N (lb),