Designation: D 3070 – 00

Standard Test Method of Rapid Pressure Determination of Pressurized Products[1]

This standard is issued under the fixed designation D 3070; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This test method covers rapid pressure determination for pressurized products.

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 whoever uses 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 3060 Test Method for Pressure Drop Rate of Compressed Gas-Propelled Products[2]

D 3074 Test Methods for Pressure in Metal Aerosol Containers[2]

3. Significance and Use

3.1 This test method is a rapid technique for quality control, formula development, etc., where speed is necessary and a high degree of accuracy is not essential.

4. Apparatus

4.1 *Pressure Gage*, stainless steel construction, with a range from 0 to 160 psi (0 to 1.1 MPa), and preferably with one number graduations. The gage should be attached to a ⅛-in. Hoke needle valve, with all of the connections leak proof. Attach an adaptor[3] to the needle valve to fit the aerosol valves on the cans to be tested (Fig. 1).

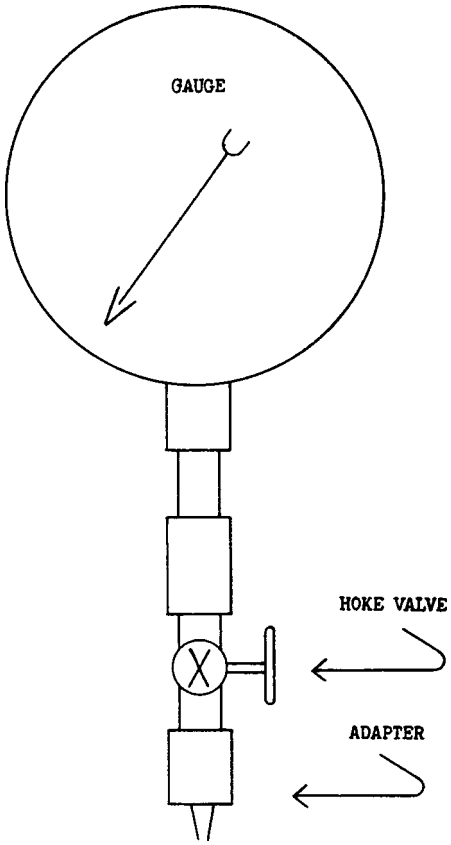

FIG. 1 Pressure Gage Apparatus

NOTE 1—Take care that there are no leaks in the gage apparatus. This can be checked by occasionally making a measurement with the attachment under water.

4.1.1 Care should be taken to clean the gage daily by repeated injection and venting of an approved cleaning solution containing a bacteriastat. After cleaning, rinse the gage and apparatus with clean water and purge them with the prepressurizing gas prior to use.

4.1.2 For nonfood products, the gage apparatus may be cleaned between product uses by forcing suitable solvents into the gage, then venting it. This should be repeated several times until the gage is free of contamination.

NOTE 2—When changing from chlorinated solvents to water-base products, and vice versa, the above is particularly important to avoid possible contamination.

4.1.3 Use a separate gage apparatus for food products only.

4.2 *Water Bath*, constant-temperature, accurate to at least ±1°F (±0.5°C).

5. Reagents

5.1 *Pressurizing Gas*:

[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. Originally developed by the Chemical Specialties Manufacturers Assn.

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

[3] Adaptors designed for use in measuring pressure in glass aerosols, available from Modern Machine Shop, 123 N. Hazel St., Danville, IL 61832, have been found satisfactory for this test method.

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5.1.1 For nonfood products the following are recommended:

5.1.1.1 *Carbon Dioxide* (CO_2).

5.1.1.2 *Compressed Air*.

5.1.1.3 *Nitrogen* (N_2).

5.1.2 For food products the following are recommended:

5.1.2.1 *Carbon Dioxide* (CO_2).

5.1.2.2 *Nitrogen* (N_2).

5.1.2.3 *Nitrous Oxide* (N_2O).

NOTE 3—Suitable pressurizing gases for food products should be limited to those that are not liquefiable at the temperatures and pressures used. Compressed air is not recommended because of its oxygen content.

6. Sampling

6.1 Normal production or laboratory samples shall be used for this test.

7. Calibration

7.1 A suitable standard check, accurate to ±0.5 psi (3.4 kPa), should be set up in the laboratory for quick calibration of the test gage.

7.2 Gages in constant use should be checked approximately once each week, or at any time after the gage has been subjected to accidental shock, such as dropping.

8. Procedure

8.1 Immerse the can in the constant-temperature water bath. The immersion time required depends on the initial can temperature. If the can temperature is roughly within ±10°F (±5.5°C) of the bath temperature, immerse the can for 15 min, agitating it every 5 min. For water base products having higher specific heat, large cans (over 12 oz (30 cm^3)), or cans varying widely in temperature, immerse for at least 45 min (preferably 60 min).

NOTE 4—Care should be taken to avoid handling the cans with bare hands after they have reached constant temperature, since the pressure is a function of the can temperature.

8.2 Prepressurize the gage as nearly as possible to the anticipated can pressure.

8.3 Agitate the can and attach the gage to the valve on the can, press it open, and open the Hoke valve.

NOTE 5—"Bleeding" or removal of gas from the vapor phase before checking the pressure is not permissible if the true pressure in the can is desired.

8.4 Record the reading and exact bath temperature.

8.5 Close and remove the Hoke valve.

8.6 Repeat 8.1-8.6 twice again, and average the results.

9. Report

9.1 Report the following information:

9.1.1 Product being tested,

9.1.2 Exact bath temperature,

9.1.3 Results of the three pressure readings, and

9.1.4 Average of the three pressure readings.

10. Precision and Bias

10.1 *Precision*—The precision of Test Method D 3070 is highly dependent on the contents being tested. One laboratory has investigated two products with three replicate tests, yielding the following results:

Product A	Can Pressure (psig)
Can #1	56
Can #2	55
Can #3	55
Mean value	55.3
Standard deviation	0.6

Product B	Can Pressure (psig)
Can #1	59
Can #2	59
Can #3	60
Mean value	59.3
Standard deviation	0.6

10.1.1 Both groups of test samples had been conditioned in a water bath of 70.5°F prior to testing.

10.1.2 Other products in aerosol packages may have values different than the values disclosed in 10.1. The results of this test are dependent on variations in filling, the contents – both propellent and concentrate, the partial pressures of the propellent used, the head space in the particular can, as well as the level of the product in the can at the time of testing. Users of this test method are suggested to reference historical files of previous tests of similar aerosol packaging contents for an estimate of within-laboratory repeatability. The Committee believes that because of this strong product and component material dependency,further investigation of repeatability and reproducibility is not practicable.

10.2 *Bias*—Test Method D 3070 has no bias because an accepted reference or referee value is not available.

11. Keywords

11.1 aerosol can pressure; aerosol packaging; pressurized products

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