Designation: D3060 – 94 (Reapproved 2013)

Standard Test Method for Pressure Drop Rate of Compressed Gas-Propelled Products[1]

This standard is issued under the fixed designation D3060; 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 This test method covers the determination of pressure drop rate of compressed gas-propelled 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 the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Significance and Use

2.1 This test method is applicable to all products packaged in prepressurized containers, and is rapid and reproducible.

2.2 Actual usage dispensing conditions are simulated in the test.

2.3 This test method is such that any slight variance in valves and actuators are overcome, and the final equilibrium pressure in the container is correlated to the amount of product dispensed.

3. Apparatus

3.1 *Gage* (Fig. 1)—Prepressurize the gage with compressed gas to a pressure 5 psi (34 kPa) higher than the expected pressure in the container, to determine if the assembly is gastight. If the gage pressure remains constant, the assembly is sufficiently gastight.

NOTE 1—Prepressurizing the gage 5 psi (34 kPa) higher than the expected container pressure also minimizes the possibility of gage contamination when measurements are taken through the valve. If the gage is at a significantly lower pressure than the container when the gage valve is opened, aerosol product will enter the gage and possibly affect its accuracy.

4. Sampling

4.1 Samples shall be selected representing the true product formula either from production or the laboratory.

5. Conditioning

5.1 Refrigerate products normally refrigerated at 40°F (4.4°C) for at least 24 h before testing.

5.2 Keep products normally stored at room temperature at 70°C (21°C) for a minimum of 24 h before testing.

6. Procedure

6.1 *Mass Determination*—Weigh a replicate of three filled containers, and record the mass in grams.

6.2 *Pressure Determination:*

6.2.1 Using the prepressurized gage, check the equilibrium pressure in the container to minimize product or pressure loss.

6.2.2 For products that require shaking, as indicated in the directions on the label, shake as follows:

6.2.2.1 Grasp the container in an upright position, and move the arm downward in an arc. As the arm moves downward, invert the container. Exert enough force in the motion to throw the product to the top end of the container. Then bring the container back to the starting position.

6.2.2.2 Repeat 6.2.2.1 for a total of ten times, pausing for a few seconds between the cycles.

6.2.3 Do not agitate products that are dispensed without shaking, before determining the equilibrium pressure.

6.3 *Dispensing:*

6.3.1 If required, shake the container in accordance with 6.2.2.1 and 6.2.2.2, and record the pressure before each dispensing.

6.3.2 Holding the container in the proper position, dispense a weighed amount at 5-min intervals.

6.3.3 Regulate the rate of dispensing so that the product is expelled in a given number of dispensings. (See Table 1 for the recommended number of dispensings.)

6.3.4 Record the mass in grams of the product dispensed after each dispensing.

6.3.5 Stop dispensing when the first gas discharge is observed. Weigh the container, and record the final equilibrium pressure.

6.4 *Maximum Delivery:*

6.4.1 Hold the container, without dispensing, in the dispensing position (inverted for invert style valves, and upright for dip tube valves) for a 2-min period.

[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.

Current edition approved April 1, 2013. Published April 2013. Originally approved in 1972. Last previous edition approved in 2005 as D3060 – 94 (2005). DOI: 10.1520/D3060-94R13.

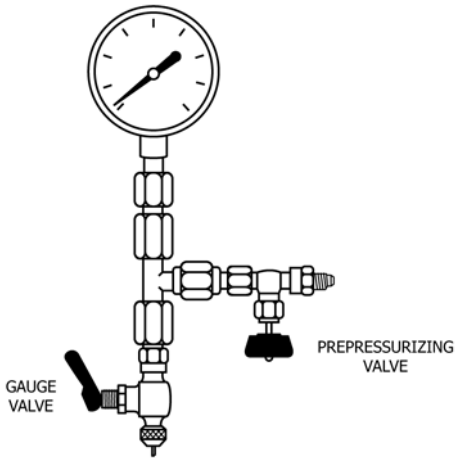

FIG. 1 Prepressurized Gage Assembly

TABLE 1 Recommended Number of Dispensings

Container Size, Sales Code Diameter and Height[A]	Total Capacity, oz.	Recommended Dispensings		
		Foam	Stream	Spray
202 by 214[B]	4.9	2	3	3
202 by 314	6.4	3	4	4
202 by 406	7.7	4	5	5
202 by 509	9.8	5	6	6
211 by 413	13.7	6	9	9
211 by 510	15.9	7	10	10
211 by 604	17.8	10	12	12

[A] The sales code diameter is the overall diameter of a tin-plate fabricated aerosol can, taken from the double seam at the bottom of the container.

The sales code height is the height of a tin-plate fabricated aerosol can taken from between the double seams at the top and bottom of the cylinder.

[B] The sales code diameter and height can be converted to inches as follows: 202 by 214 = $2\frac{2}{16}$ by $2\frac{14}{16}$ in.

NOTE 2—Do not shake the container after standing.

6.4.2 Dispense the product until the gas supply is exhausted; then weigh the container.

6.5 *Tare Mass:*

6.5.1 To obtain the tare mass, cut open the container, wash, and dry it. Weigh the container, and record the mass in grams, as the tare mass.

7. Calculation

7.1 Tabulate the mass of the product in grams versus the equilibrium pressure in the container.

7.2 Plot the mass of the product in grams on the abcissas and the equilibrium pressure on the axis of ordinates to obtain a pressure drop graph.

8. Precision and Bias

8.1 *Precision*—This test method is being reviewed for development of a precision statement based upon intralaboratory test data. Volunteers from various CSMA Aerosol Division, Test and Standard Methods subcommittee membership will provide the precision statement based upon their within-laboratory data.

8.2 The following criteria should be used for judging the acceptability of results (95 % confidence):

8.2.1 *Repeatability*—Duplicate results by the same operator should be considered suspect if they differ by more than 1 %.

8.2.2 *Reproducibility*—Results submitted by each of two laboratories should be considered suspect if the two results differ by more than 2 %.

9. Keywords

9.1 aerosol; package; pressure drop rate