



Designation: D3094 – 18

Standard Practice for Seepage Rate of Aerosol Products¹

This standard is issued under the fixed designation D3094; 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 practice covers the determination of approximate mass loss due to valve seepage rate² of aerosol products by the collection and measurement of gases seeping through the valve and into a special eudiometer tube, over a relatively short time period.

1.2 It can be shown that the average refrigeration-filled aerosol product seeps to the extent of approximately 3.0 mL when the corresponding mass loss is 0.10 oz (2.9 cm³)/year. This figure is partially based on air content and is subject to variations according to filling conditions. This practice is not considered dependable when applied to pressure-filled, unpurged aerosol products.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.4 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Significance and Use

2.1 This practice affords a more rapid answer to the ever-present problem of mass loss during storage. It is of particular value in determining the effectiveness of valve stake and clinch

seal elastomers in contact with new formulations. This practice may also be used to evaluate new valves with standard mixtures.

3. Apparatus

3.1 *Bath*, constant-temperature, equipped with a thermostat sufficient to maintain water at $80 \pm 2^\circ\text{F}$ ($26 \pm 1^\circ\text{C}$). The tank should be of sufficient proportions to accommodate the necessary number of test specimens in an upright position, so that each specimen is surrounded by approximately 1 in. (25 mm) of water.

3.2 *Eudiometer Tubes* (Fig. 1 and Fig. 2), custom-ordered or hand-made, with an internal volume of 5.0 mL net (allowing for any part of the valve that might protrude into the tube). It is convenient to calibrate in 1, 2, and 3-mL divisions.

NOTE 1—For tests involving many dispensers, small test tubes and vials have been successfully substituted for the tubes in Fig. 1 and Fig. 2.

4. Test Specimens

4.1 Test specimens shall be prepared in accordance with production methods wherever possible, making certain that the clinch diameter and the depth of clinch below the curl of the mounting cup are in agreement with the specifications. New dispensers shall be pretested for leakage by heating the contents to 130°F (54°C).

5. Procedure

5.1 Fill the bath with water that has been allowed to deaerate for 24 h at room temperature. Bring the bath to 80°F (26°C) and immerse the dispensers.

5.2 Scrub the bath walls, bottom, and dispenser surfaces to remove adhering air. Give the dispensers a hard knock to release any air bubbles clinging to the valve parts.

5.3 Submerge the eudiometer tubes and fill them. Remove the air bubbles. Invert the tubes over the dispenser valves and allow them to remain for 48 h.

5.4 Give each dispenser a hard knock to free the clinging gas into the inverted eudiometer tube. Determine and record the amount of gas in each tube.

5.5 The mass loss due to seepage through the valve and O-ring seal represents only a part of the total mass loss. Leakage will also occur at the seams and seam junctures.

¹ This practice is under the jurisdiction of ASTM Committee D10 on Packaging and is the direct responsibility of Subcommittee D10.33 on Aerosol Products. This practice was originally developed by the Chemical Specialties Manufacturers Assn. Current edition approved May 1, 2018. Published June 2018. Originally approved in 1972. Last previous edition approved in 2010 as D3094 – 00(2010). DOI: 10.1520/D3094-18.

² Data on the theoretical development of seepage concepts has been filed at ASTM Headquarters as RR:D10-1000. Contact ASTM Customer Service at service@astm.org.