



Standard Test Method for Rubber Hose for Gas Diffusion of Liquefied Petroleum Gas¹

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1. Scope

1.1 This test method covers the determination of the volume of liquefied petroleum gas diffusing through the wall of a hose during a specified period of time.

1.2 The values stated in SI units are to be regarded as standard.

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.* A specific precautionary statement is given in the note in Section 5.

2. Significance and Use

2.1 Rubber hose has an inherent characteristic of permitting diffusion of a gas through the hose structure. This test method quantitatively measures the loss of liquefied petroleum gas.

3. Apparatus

3.1 *Water Bath*, long enough to accommodate the gas-collecting apparatus and hose.

3.2 *Gas Supply*, provided with a suitable pressure gage and emergency excess flow shutoff valve in case of hose failure.

3.3 *Set of Gas-Collecting Apparatus*, consisting of a glass tube at least 10 % longer than the hose being tested and with an inside diameter at least 10 % larger than the outside diameter of the hose being tested, a conical funnel 25 mm in diameter, and a 500-cm³ measuring cylinder graduated at 5.0-cm³ intervals.

3.4 *Barometer*, to record the barometric pressure during the test.

3.5 *Thermometers*, two, to record water and air temperature at the gas-collection point. (For a schematic diagram of the test arrangement, see Fig. 1.)

3.6 *LP-Gas*,² having a minimum purity of 99 mol % propane, and a sulfur content less than 0.005 mass %.

¹ This test method is under the jurisdiction of ASTM Committee D11 on Rubber and is the direct responsibility of Subcommittee D11.31 on Rubber Hose and Belting.

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² CP Grade, available from Matheson Gas Products, has been found satisfactory for this purpose.

4. Test Hose

4.1 The test hose shall have a 0.50-m (19.7-in.) free length between couplings and shall be coupled with suitable couplings, that is, band-it-type couplings. If the test hose is rubber covered, then the cover should be thoroughly perforated with a pricker roll.

5. Test Pressure

5.1 Unless otherwise specified, conduct the test with the LP-gas in the liquid phase at a pressure of 1000 \pm 20 kPa (145 \pm 3 psi). Regulate this pressure by keeping the LP-gas tank in the water bath and adjusting the temperature of the water to obtain the desired pressure, approximately 28°C. (**Warning**—Take special precautions to ensure that the water bath temperature cannot rise accidentally, as this will increase the gas pressure significantly, creating a danger of explosion. Do the testing in a well-ventilated area. The system shall be equipped with a safety relief valve set at a gage pressure of 1200 \pm 35 kPa (175 \pm 5 psi).)

6. Procedure

6.1 Cap or plug the hose coupling on one end of the test hose and connect the hose coupling on the other end to the LP-gas supply. (Invert the tank when testing in the liquid phase or use a tank equipped with full-length dip tube.)

6.2 Flush the inside surface of the test hose with LP-gas to remove air and seal the end.

6.3 Locate the test hose in the center of the glass tube and mount in the water bath at an incline angle of approximately 20°.

6.4 Adjust the water bath to the specified temperature. Apply the specified gas pressure to the test hose and maintain this pressure and the water bath temperature for 14 days. At the end of the 14-day conditioning period, inspect the test apparatus for leaks and, in particular, the area around the hose couplings. Leaks will be evident by the formation of gas bubbles in the water bath. If none are found, insert the funnel into the measuring cylinder, fill the cylinder with water, and mount the funnel over the end of the glass tube.

6.5 Collect the gas for a 6-h period or collect 450 to 500 cm³ of gas, whichever occurs first, and record the time and the volume of gas collected. Repeat this procedure every 24 h until