Designation: D7246 – 06 (Reapproved 2015)

Standard Test Method for Detection of Holes in Polyethylene Food Service Gloves[1]

This standard is issued under the fixed designation D7246; 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 detection of holes in polyethylene food service gloves. This test method shall not be used on any medical glove.

1.2 This test method is limited to the detection of holes that allow water leakage under the conditions of the test.

1.3 The smallest hole size that will allow water leakage has not been determined and is beyond the scope of this method.

1.4 The safe use of polyethylene food service gloves is beyond the scope of this standard.

1.5 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.6 *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. Referenced Documents

2.1 *ASTM Standards:*[2]

D5151 Test Method for Detection of Holes in Medical Gloves

2.2 *Other Standards:*[3]

ISO 2859-1 Sampling Procedures and Tables for Inspection by Attributes

3. Terminology

3.1 *Definitions:*

3.1.1 *food service gloves, n*—gloves used in the preparation and distribution of foods for human consumption.

4. Significance and Use

4.1 This test method is designed to detect holes in food service gloves made of polyethylene that may compromise the barrier quality of the glove.

4.2 This method is suitable and designed as a reference method to evaluate samples of polyethylene food service gloves for holes. The presence of holes is defined as a compromise in barrier quality.

4.3 This test method is designed for use as a quality referee for holes in polyethylene food service gloves and for manufacturers to evaluate the ongoing control of holes in food service gloves made of polyethylene.

4.4 Test Method D5151 is the test method that shall be used for the detection of holes in a food service glove made of the same material type as that of a medical glove, as specified or described, or both, in each applicable ASTM medical glove standard.

4.5 For food service gloves made of a material type not described or specified in an existing ASTM glove standard, and if the material is non-elastic, this test method shall be used for the detection of holes.

5. Apparatus

5.1 *Filling Apparatus*—A test glove filling apparatus with a suitably smooth finished fixture whose design permits the glove under test to hang unsupported should be used. Care should be taken to not allow the glove samples under test to come into contact with the surface below, but rather they should hang unsupported for the entire test period. If the food service glove is not removed from the filling apparatus for inspection, the mandrel should also seal the cuff of the glove against water overflow without the introduction of an air headspace as the glove is positioned horizontally for examination. The filling apparatus is to have fill set points of 600 cm^3, 700 cm^3, and 800 cm^3 depending on the size of the glove to be tested. See Table 1.

5.2 *Graduated Cylinder or Beaker*—At a minimum, the graduated cylinder or beaker used to measure the volume of water for this test shall be marked in increments of 50 cm^3 to a capacity of 1000 cm^3. The markings shall be accurate to within ±10 cm^3 at volumes greater than 500 cm^3.

5.3 *Stopwatch or suitable timing device.*

[1] This test method is under the jurisdiction of ASTM Committee D11 on Rubber and is the direct responsibility of Subcommittee D11.40 on Consumer Rubber Products.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

TABLE 1 Filling Apparatus Set Points

Glove Size	Volume of Water	Material	Application
Extra Small	600 cm^3	Polyethylene	Food Service
Small	600 cm^3	Polyethylene	Food Service
Medium	700 cm^3	Polyethylene	Food Service
Large	800 cm^3	Polyethylene	Food Service

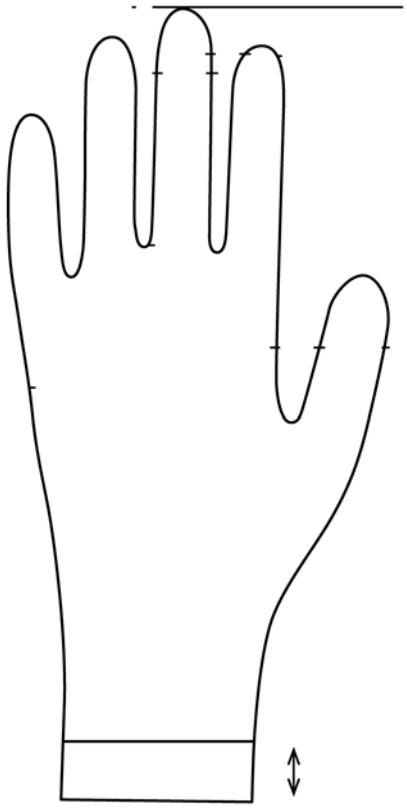


FIG. 1 Area of Test Sample to be Used for Mounting (2.5 mm from Cuff)

5.4 *Various Clamps and Hangers*—Springs, clamps, or rubber bands can be used between the cuff and a point measured 2.5 cm from the cuff for the purpose of attaching and holding the food service polyethylene glove securely on the mandrel while allowing it to hang freely during the hang portion of the test.

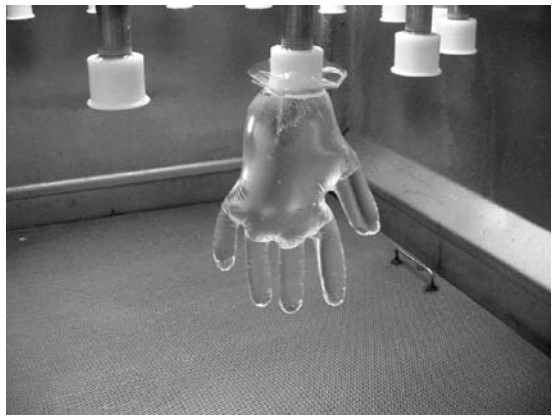
6. Reagents and Materials

6.1 *Tap Water*—The water used in this test method shall be clean and free from any visible contaminants or particulates, or both. Water temperature shall be between 15 and 30°C.

7. Sampling

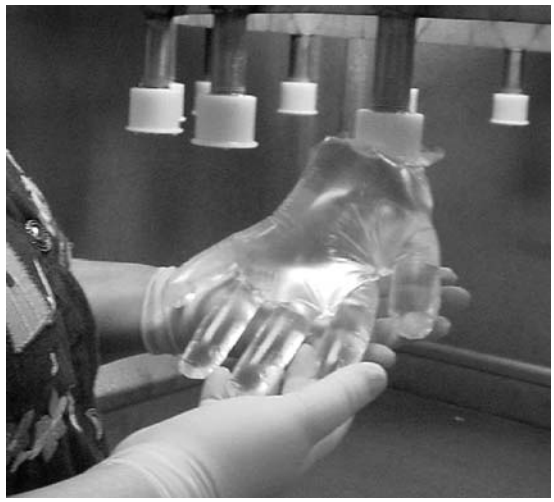
7.1 As applicable, food service glove samples shall be pulled randomly from the lot being tested. The sampling plan should be based on ISO 2859-1 or on another suitably verifiable statistical basis.

7.2 To avoid inadvertent damage to the food service glove, samples operators are to wear gloves or finger cots. In addition, hands and wrists should be free of jewelry.



NOTE 1—Mount the test sample onto a suitable mandrel and secure with strings, clamps, or rubber bands. Fill with water as determined by size (see Table 1). Allow the food service glove test sample to hang for 2 min (hang period).

FIG. 2 Mounted Test Sample



NOTE 1—At the end of the hang period (2 min), carefully elevate and examine all of the exterior surfaces of the test sample for defects.

FIG. 3 Lifting Test Sample to Examine for Defects

8. Procedure

8.1 Sort the food service glove test samples into groups by size. Verify that each group of test samples is made up of only one size of food service gloves.

8.2 Ensure that the exterior of the test sample remains dry during the steps described in 8.4 and 8.5.

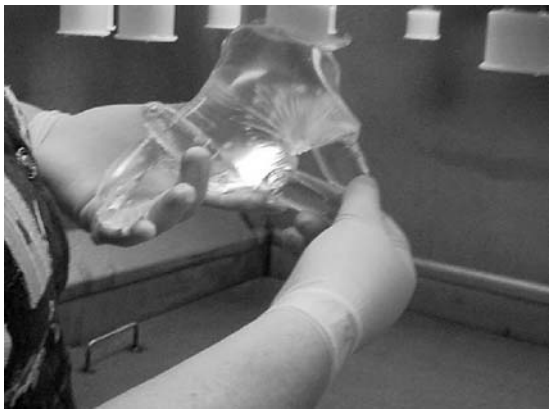
8.3 Carefully examine the apparatus to be sure it is free of burrs or nips prior to testing and record the results in 10.1.5.

8.4 All areas of the food service glove are to be tested. For mounting purposes, the area 2.5 cm from the cuff shall be used. Holes in this area shall not be counted. See Fig. 1.

8.5 Mount each test sample onto a suitable mandrel using appropriate springs, clamps, or rubber bands. See Fig. 2.

8.6 Meter the required volume of water into each test sample allowing it to hang freely. See Table 1.

8.7 Allow each test sample to hang for 2 min. See Fig. 2.



NOTE 1—Carefully examine the thumb, the finger tips, and between the fingers for holes and other defects.

FIG. 4 Examining Test Sample for Defects

NOTE 1—Remove from mandrel, record results, and discard. Retain defects for verification.

FIG. 5 Removing Test Sample from Mandrel

8.8 Examine each test sample between the fingers and along the seams to ensure that there is no water leakage. See Fig. 3.

8.9 Elevate each test sample by providing support from underneath with one hand and lifting as depicted in Fig. 3.

8.10 Continue to carefully examine all surfaces of the test sample for holes or other defects, or both, that allow water to pass. See Fig. 4.

8.11 Remove each test sample from the mandrel to which it is attached and record the test results. See Fig. 5.

8.12 Repeat the steps described in 8.2 – 8.10 for each test sample.

9. Calculation or Interpretation of Results

9.1 Any food service glove test sample that shows a droplet, stream, or any other type of water leakage shall be deemed a failure.

9.2 If seams leak or the test sample breaks during the hang portion, this shall be considered a failure.

10. Report

10.1 The report shall include the following information:

10.1.1 Lot size and identification.

10.1.2 Number of food service glove samples tested.

10.1.3 Size of the food service glove tested.

10.1.4 Number of failures detected.

10.1.5 Status of test apparatus, ensure and document that it is free of nips and burrs.

10.1.6 Location of the defects that were observed.

10.1.7 Name of the operator performing the test.

11. Precision and Bias

11.1 No statement is made about either the precision or bias of this test method. This is a "pass-fail" test procedure not subject to the usual analysis for quantitative variable precision.

12. Keywords

12.1 detection; food service; food service gloves; gloves; holes; polyethylene