



Designation: D5193/D5193M – 93 (Reapproved 2017)

Standard Test Method for Coated Fabrics—Air Retention¹

This standard is issued under the fixed designation D5193/D5193M; 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 describes the determination of the retention of air by fabrics coated on one or both sides with rubber.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the 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, health and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *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. Referenced Documents

2.1 *ASTM Standards:*²

D751 Test Methods for Coated Fabrics

3. Summary of Test Method

3.1 A membrane specimen of the material to be tested is placed across a circular orifice in the measuring apparatus. The bottom surface of the membrane is exposed to a source of air at a specified pressure. The top surface of the specimen is covered with water or soap solution. Absence of the appearance of air bubbles on the top surface of the material during a

specified exposure period indicates the lack of pin-holes, leaks, or other similar defects. The coated fabric is then acceptable for use in the intended application. This procedure is limited to membranes or coated fabrics having a thickness of less than 3 mm [0.125 in.].

4. Significance and Use

4.1 This test method describes a procedure for evaluating rubberized fabrics that are used to manufacture pneumatic articles (that is, those that must retain air in order to perform satisfactorily in an intended application). Examples of such articles are emergency rafts, life preservers, marine recreational equipment, floats, pontoons, and warning or detection devices, such as buoys or weather balloons.

5. Apparatus

5.1 The test apparatus shall consist of the assembly shown in **Fig. 1**.

5.2 If preferred, wing nuts or toggle clamps may be substituted to facilitate assembly and disassembly of the apparatus, as long as an air-tight seal is maintained during testing.

6. Test Conditions

6.1 Unless otherwise specified, the standard conditions for testing coated fabrics as cited in Test Methods **D751** shall be used. All specimens and equipment shall be preconditioned for 1 h prior to conducting the test.

7. Time Lapse Between Vulcanization and Testing

7.1 For all purposes, the minimum time between vulcanization and testing shall be 16 h.

7.2 For nonproduct tests, the maximum time between vulcanization and testing shall be four weeks, and for evaluations intended to be comparable, the tests, as far as possible, should be carried out after the same time interval.

7.3 For product tests, whenever possible, the time between vulcanization and testing should not exceed three months.

8. Test Specimens

8.1 Three circular test specimens, 330 ± 3 mm [13 ± 0.1 in.] in diameter, shall be accurately cut from the coated fabric.

¹ This test method is under the jurisdiction of ASTM Committee **D11** on Rubber and Rubber-like Materials and is the direct responsibility of Subcommittee **D11.37** on Coated Fabrics, Rubber Threads and Seals.

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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.

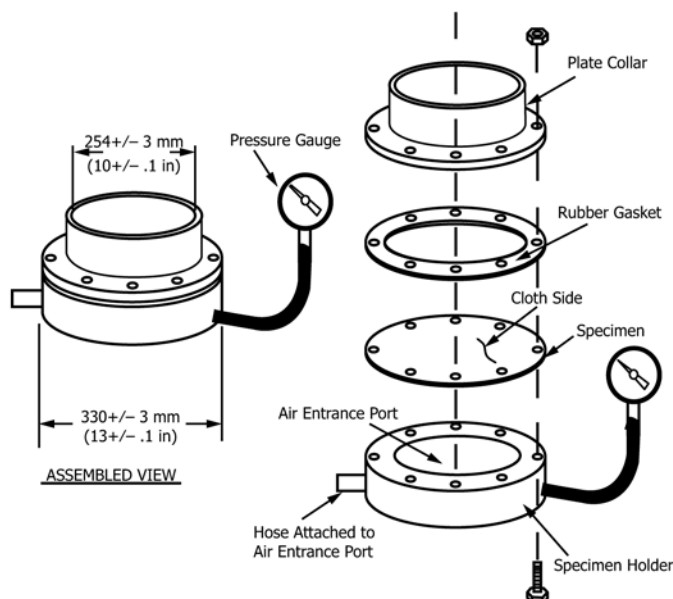


FIG. 1 Air Retention Test Apparatus

Holes conforming to the size and location of the bolts, as shown in Fig. 1, shall be punched around the perimeter of each piece.

NOTE 1—Specimen size is not critical. An apparatus which can accommodate specimens having a diameter as small as 254 ± 3 mm [10 ± 0.1 in.] is acceptable. Report the specimen size used in 10.1.4.

9. Procedure

9.1 Position the specimen in the test apparatus by aligning the punched holes with the projecting bolts and carefully pressing it into position in contact with the rubber gasket. If the fabric is coated on one side only, that side shall face down. In cases where the fabric is coated on both sides, the side

normally exposed to the inflating air pressure shall be face down. Place the upper section of the test assembly over the specimen and tighten the bolts securely. Pour 1 to 2 mm [0.040 to 0.080 in.] of water, or preferably soap solution, onto the exposed surface of the specimen to ensure complete coverage throughout the duration of the test. Gradually increase the air pressure until a level of 70 kPa [10 psi] has been reached. Air bubbles initially appearing on the specimen surface, produced by air pressure during closure of the space between the cloth and coating, shall be removed. Maintain the test pressure for at least five, but preferably ten minutes and observe for the appearance of air bubbles. Failure is defined as the continued appearance of surface air bubbles in any of the three specimens tested as taken from the sample of coated fabric being evaluated.

10. Report

10.1 Report the following information:

10.1.1 That the test was performed in accordance with Test Method D5193/D5193M,

10.1.2 Description of the material tested, including the thickness and type of coating,

10.1.3 Temperature of the test,

10.1.4 Diameter of the test specimen, and

10.1.5 Whether the material passed or failed the air retention test.

11. Precision and Bias

11.1 No statement is made about either the precision or the bias of this test method. Results are reported on an individual pass/fail basis, thus no comparison with a standard reference material can be made.

12. Keywords

12.1 air retention; coated fabrics; pneumatic end items.

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