



Standard Test Methods for Rubber O-Rings¹

This standard is issued under the fixed designation D1414; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 These test methods describe the procedures for determining the physical properties of O-rings and changes in these properties due to aging.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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.*

2. Referenced Documents

2.1 ASTM Standards:²

- D297 Test Methods for Rubber Products—Chemical Analysis
- D395 Test Methods for Rubber Property—Compression Set
- D412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
- D471 Test Method for Rubber Property—Effect of Liquids
- D573 Test Method for Rubber—Deterioration in an Air Oven
- D865 Test Method for Rubber—Deterioration by Heating in Air (Test Tube Enclosure)
- D1329 Test Method for Evaluating Rubber Property—Retraction at Lower Temperatures (TR Test)
- D1415 Test Method for Rubber Property—International Hardness
- D2240 Test Method for Rubber Property—Durometer Hardness
- D3767 Practice for Rubber—Measurement of Dimensions

¹ These test methods are under the jurisdiction of ASTM Committee D11 on Rubber and are the direct responsibility of Subcommittee D11.37 on Coated Fabrics, Rubber Threads and Seals.

Current edition approved July 1, 2015. Published September 2015. Originally approved in 1956. Last previous edition approved in 2013 as D1414 – 94 (2013). DOI: 10.1520/D1414-15.

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.

D4483 Practice for Evaluating Precision for Test Method Standards in the Rubber and Carbon Black Manufacturing Industries

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

2.2 Aerospace Standard:

AS568A O-ring Sizes³

3. Terminology

3.1 Definitions:

3.1.1 *O-ring*—a rubber seal of homogeneous composition molded in one piece to the configuration of a torus with circular cross section. The O-ring is used as a dynamic or static seal usually installed in a machined groove.

4. Significance and Use

4.1 These test methods provide acceptable procedures for quality control purposes and for the determination of engineering characteristics.

5. General Methods

5.1 Except as otherwise specified in these test methods for rubber O-rings, the following ASTM test methods applicable in general to vulcanized rubber, shall be complied with as required and are hereby made a part of these test methods:

- 5.1.1 *Tension Test*—Test Methods D412.
- 5.1.2 *Compression Set*—Test Methods D395.
- 5.1.3 *Low Temperature*—Test Method D1329.
- 5.1.4 *Density*—Test Methods D297.
- 5.1.5 *Fluid Aging*—Test Method D471.
- 5.1.6 *Heat Aging*—Test Methods D865 and D573.
- 5.1.7 *Hardness*—Test Methods D2240 and D1415.

5.2 In case of conflict between the provisions of these test methods and those of detailed procedures herein, the latter shall take precedence.

6. Test Conditions

6.1 The temperature of the testing room shall be $23 \pm 2^{\circ}\text{C}$ ($73.4 \pm 3.6^{\circ}\text{F}$). The specimens to be tested shall be kept in this

³ Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.