



Standard Test Methods for Rubber O-Rings¹

This standard is issued under the fixed designation D 1414; 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 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

- D 297 Test Methods for Rubber Products—Chemical Analysis
 - D 395 Test Methods for Rubber Property—Compression Set
 - D 412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
 - D 471 Test Method for Rubber Property—Effect of Liquids
 - D 573 Test Method for Rubber—Deterioration in an Air Oven
 - D 865 Test Method for Rubber—Deterioration by Heating in Air (Test Tube Enclosure)
 - D 1329 Test Method for Evaluating Rubber Property—Retraction at Lower Temperatures (TR Test)
 - D 1415 Test Method for Rubber Property—International Hardness
 - D 2240 Test Method for Rubber Property—Durometer Hardness
 - D 4483 Practice for Determining Precision for Test Method Standards in the Rubber and Carbon Black Industries
- #### 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 D 412.

5.1.2 *Compression Set*—Test Methods D 395.

5.1.3 *Low Temperature*—Test Method D 1329.

5.1.4 *Density*—Test Methods D 297.

5.1.5 *Fluid Aging*—Test Method D 471.

5.1.6 *Heat Aging*—Test Methods D 865 and D 573.

5.1.7 *Hardness*—Test Methods D 2240 and D 1415.

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 room for a minimum of 30 min previous to the time of testing. For referee tests the minimum time for conditioning shall be 16 h. In cases where this temperature cannot be obtained, the actual temperature shall be reported.

7. Dimensional Measurements

7.1 Thickness:

¹ These test methods are under the jurisdiction of ASTM Committee D11 on Rubber and are the direct responsibility of Subcommittee D11.36 on 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.

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