



Standard Test Method for Rubber Property—Abrasion Resistance (Rotary Drum Abrader)¹

This standard is issued under the fixed designation D 5963; 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.

ε¹ NOTE—Footnotes 7, 8, 9, and 10 were editorially updated in October 2002.

1. Scope

1.1 This test method covers the measurement of abrasion resistance of rubbers (vulcanized thermoset rubbers and thermoplastic elastomers) that are subject to abrasive/frictional wear in actual service. The abrasion resistance is measured by moving a test piece across the surface of an abrasive sheet mounted to a revolving drum, and is expressed as volume loss in mm³ or abrasion resistance index in percent. For volume loss, a smaller number indicates better abrasion resistance, while for the abrasion resistance index, a smaller number denotes poorer abrasion resistance.

1.2 Test results obtained by this test method shall not be assumed to represent the wear behavior of rubber products experienced in actual service.

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

1.4 *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:

- D 297 Test Methods for Rubber Products—Chemical Analysis²
- D 1765 Classification System for Carbon Blacks Used in Rubber Products²
- D 2240 Test Method for Rubber Property—Durometer Hardness²
- D 3182 Practice for Rubber—Materials, Equipment, and Procedures for Mixing Standard Compounds and Prepar-

ing Standard Vulcanized Sheets²

D 4483 Practice for Determining Precision for Test Method Standards in the Rubber and Carbon Black Industries³

2.2 Other Standards:

DIN 53516 Determination of Abrasion Resistance⁴

ISO 868 Plastics and Ebonite—Determination of Indentation Hardness by Means of a Durometer (Shore Hardness)⁵

ISO 2393 Rubber Test Mixes—Preparation, Mixing and Vulcanization—Equipment and Procedures⁵

ISO 2781 Rubber, Vulcanized—Determination of Density⁵

ISO 4649 Rubber—Determination of Abrasion Resistance Using a Rotating Cylindrical Drum Device⁵

ISO 5725 Precision of Test Methods—Determination of Repeatability and Reproducibility for a Standard Test Method by Interlaboratory Tests⁵

ISO 9298 Rubber Compounding Ingredients—Zone Oxide Test Methods⁵

3. Terminology

3.1 *abrasion loss*, A , (mm³), n —the volume loss of a defined rubber test piece determined by sliding the test piece under specified conditions over the surface of an abrasive sheet of “nominal abrasiveness,” S_O , mounted to a rotating drum of specified dimensions.⁶

3.1.1 *Discussion*—The designation A_A is used to indicate that the test was run in accordance with Method A.

3.2 *abrasion resistance index ARI (%)*, n —the ratio of the volume loss of a Standard Rubber to that of a test rubber expressed in percent, with the volume loss determined by

³ *Annual Book of ASTM Standards*, Vol 09.02.

⁴ Available from DIN (Deutsches Institut fuer Normung), Burggrafenstrasse 6, 10787, Berlin, Germany.

⁵ Available from American National Standards Institute, 25 W. 43rd St., 4th Floor, New York, NY 10036.

⁶ This corresponds to the test method of DIN 53516 and to Method A (Relative volume loss) of ISO 4649:1985. The same calculation could be made for the other test methods if the proper value for the “nominal abrasiveness,” S_O , for the test method were known or assumed. (150 mg has been indicated as a possible value for Method D but its accuracy has not been established to the degree of the Method A value.)

¹ This test method is under the jurisdiction of ASTM Committee D11 on Rubber and is the direct responsibility of Subcommittee D11.15 on Degradation Tests. Current edition approved Nov. 10, 1997. Published May 1998.

This test method is an adaptation of ISO Standard 4649 (1985 revision), Rubber—Determination of Abrasion Resistance Using a Rotating Cylindrical Drum Device, and is being coordinated with a current draft revision of that standard (see Appendix X1).

² *Annual Book of ASTM Standards*, Vol 09.01.