



Designation: D8115 – 17 (Reapproved 2021)

Standard Test Method for Rubber Property—Abrasion Resistance (Multi-Directional Platform Abrader)¹

This standard is issued under the fixed designation D8115; 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 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 simultaneously moving 4 test pieces across the surface of abrasive sheets in a soft lissajous movement, and is expressed as volume loss in cubic millimeters where a smaller number indicates better abrasion resistance.

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

1.3 Results obtained by this test have shown to be similar to those obtained using Test Method D5963 and ISO 4649.

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

1.5 *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.*

1.6 *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

D297 Test Methods for Rubber Products—Chemical Analysis

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 D11.15 on Degradation Tests.

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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.

D2240 Test Method for Rubber Property—Durometer Hardness

D5963 Test Method for Rubber Property—Abrasion Resistance (Rotary Drum Abrader)

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

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

2.2 ISO Standards:³

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

ISO 2781 Rubber, Vulcanized—Determination of Density

ISO 4649 Rubber, vulcanized or thermoplastic—Determination of abrasion resistance using a rotating cylindrical drum device

ISO 7619 Rubber—Determination of Indentation Hardness by Means of Pocket Hardness Meters

3. Terminology

3.1 Definitions:

3.1.1 *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 mounted to an abrading table of specified dimensions.

4. Summary of Test Method

4.1 This test method provides procedures for preparing test pieces of specified dimensions from vulcanized thermoset rubbers or thermoplastic elastomers and for evaluating their abrasion resistance by sliding a test piece across the surface of an abrasive paper attached to an abrading table.

4.2 The test is performed under specified conditions of contact pressure, sliding distance, travel speed of the test piece, and the degree of abrasiveness of the abrasive sheet. These are outlined in 7.1.

4.3 The abrasion resistance is reported as abrasion loss (volume) in cubic millimeters and is calculated from the mass

³ Available from International Organization for Standardization (ISO), ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, <http://www.iso.org>.

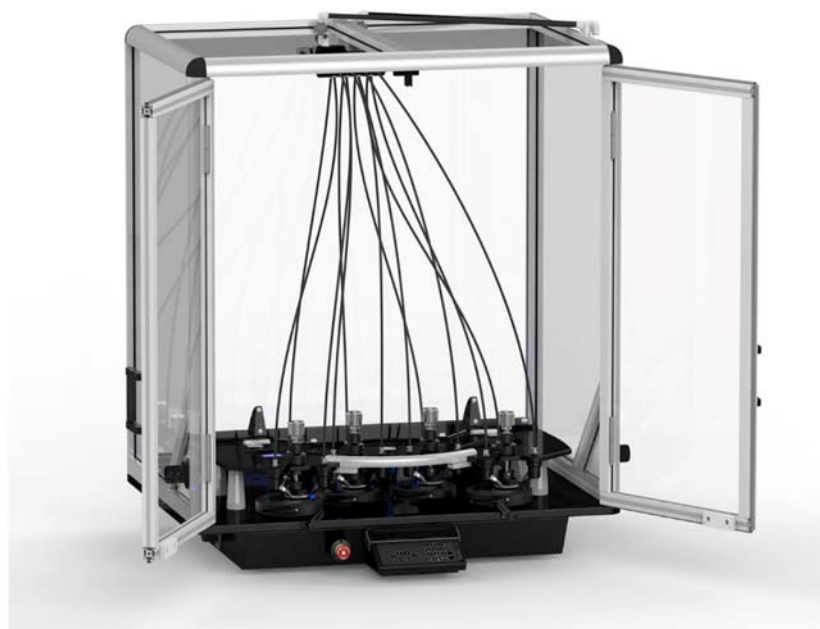


FIG. 1 Multi-Directional Platform Abrader

loss of the test piece and density of the test rubber. A smaller number indicates a higher resistance to abrasion.

5. Significance and Use

5.1 Abrasion resistance is a performance factor of paramount importance for many rubber products, such as tires, conveyor belts, power transmission belts, hoses, footwear, and floor covering. A test capable of measuring resistance to abrasion of rubber, including uniformity of wear behavior under abrasive/frictional service conditions is therefore highly desirable.

5.2 This test method may be used to estimate the relative abrasion resistance of different rubbers. Since conditions of abrasive wear in service are complex and vary widely, no direct correlation between this accelerated test and actual performance can be assumed.

5.3 This test method is suitable for comparative testing, quality control, specification compliance testing, referee purposes, and research and development work.

6. Limitations

6.1 Test pieces containing voids or porosity, or both, will yield unreliable test results.

6.2 Test pieces that bounce (chatter) over the surface of the abrasive sheet rather than running smoothly will produce inaccurate test results and are not candidates for this test method.

6.3 Test pieces that tend to extensively smear the surface of the abrasive sheet will provide meaningless test results.

6.4 Test results obtained under any of the above conditions shall not be used to reach conclusions regarding the relative abrasion resistance of rubbers.

7. Apparatus and Materials

7.1 Multi-Directional Platform Abrader:

7.1.1 The Multi-directional Platform abrader⁴ consists of a machine frame holding one or more test piece holders moving in a soft lissajous pattern, a corresponding number of abrasion tables to which an abrasive sheet can be fastened, and a drive system (example shown in Fig. 1).

7.1.2 The non-rotating test piece holders grip the specimens (example shown in Fig. 2). Sample protrusions of 2.0 ± 0.2 mm are set by shims. The combined weight of the test piece holder and spindle assembly apply a force of 6 ± 0.1 N on the specimen.

7.1.3 The soft lissajous pattern, measuring 60 mm by 60 mm ± 1 mm is shown in Fig. 3.

7.1.4 The abrasion tables, measuring 121 ± 1 mm diameter are shown in Fig. 4.

7.1.5 Air nozzles are provided for each abrasion table to blow away any debris and help to prevent clogging of the abrasive paper. Air pressure should be sufficient to remove debris from the abrasive paper, up to a maximum of 8 Bar. Care should be taken that the air pressure does not lift the specimen off of the abrasive paper.

7.1.6 The machine operates at 48 rpm.

7.1.7 The abrasive sheet shall be secured tightly to the abrading tables using clamp rings or an equivalent method. See Fig. 4.

⁴ The sole source of supply of the apparatus known to the committee at this time is James Heal, Lake View, Halifax, UK HX3 6EP. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,¹ which you may attend.