Designation: D 1630 – 94 (Reapproved 2000)

Standard Test Method for Rubber Property—Abrasion Resistance (Footwear Abrader)[1]

This standard is issued under the fixed designation D 1630; 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 This test method covers the determination of the resistance to abrasion of vulcanized rubber or other compounds, or both, used for the soles and heels of footwear. It is not recommended for materials less than 2.5 mm (0.1 in.) in thickness.

1.2 Values stated in SI units are to be regarded as the standard. Values 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:*

D 2240 Test Method for Rubber Property—Durometer Hardness[2]

D 4483 Practice for Determining Precision for Test Method Standards in the Rubber and Carbon Black Industries[2]

3. Significance and Use

3.1 It is recognized that when comparing different types of rubber, the ranking in service may not follow the ranking from the test results.

3.2 This test method should not be used as a measure of abrasion resistance for compositions that differ markedly from the standard reference compound. For example, misleading results are obtained in polyurethane compositions compared with the standard reference compound.

3.3 Some samples will bounce (chatter) over the paper instead of running smoothly. The results obtained on these samples are very inaccurate and should be interpreted with care. If samples give data that is inconsistent, they should be cut after the test is run to check for voids. If any voids are present the results should be discarded and the test repeated using samples free from voids.

4. Test Conditions

4.1 Unless otherwise specified, the standard temperature for testing shall be 23 + 2°C (73.4 + 3.6°F). Since humidity affects the sandpaper, the relative humidity should be controlled at 50 + 5 %. The samples should be conditioned at this temperature and humidity for at least 24 h prior to running.

5. Apparatus

5.1 *Abrasion Machine*— The footwear abrader referred to as the National Bureau of Standards model is shown in Fig. 1 and consists of the following components:

5.1.1 *Metal Drum*, rubber-coated or metal-surfaced, 150 mm (6 in.) in diameter. The drum is rotated at a rotation rate of 5.7 ± 0.6 rad/s (45 ± 5 r/min) by means of an electric motor with a reducing mechanism. The number of revolutions of the drum is indicated by a counter attached to one end of the shaft.

5.1.2 *Arms*, three, each pivoted at one end and having a mass suspended from the other end. The mass is attached so that a downward force of 22 N (5 lbf) is exerted directly on the specimen in contact with the abrasive.

5.1.3 *Dial Thickness Gages*, three, graduated to read 0.02 mm (nonmetric gages to measure 0.001 in.) and attached to a bridge so that one gage contacts one arm at a point directly over the specimen. The bridge is hinged at one end to allow the arms to swing back for mounting the specimen.

5.1.4 *Compressed Air*, free from moisture and grease, for cleaning the surface of the abrasive. The air is delivered to a manifold or nozzle where the pressure shall be maintained at 210 ± 35 kPa (30 ± 5 psi). A suitable suction may be used to remove abraded particles.

5.1.5 *Arm Stop*, one for each arm.

5.1.6 *Rubber Bands or Metal Clamps*, for holding a strip of abrasive paper in position around the rotating drum. The ends of the abrasive paper are cut at an angle of about 80° to the length of the paper and when in place, permit a clearance of about 1.5 mm (0.063 in.) but no overlap.

[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.

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

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