



Standard Test Method for Abrasion Resistance of Leather (Rotary Platform, Double-Head Method)¹

This standard is issued under the fixed designation D 7255; 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.

^{e1} NOTE—In Note 2, the reference to H-19 was editorially corrected to H-18 in September 2006.

1. Scope

1.1 This test method covers the determination of the abrasion resistance of leather using the rotary platform, double-head tester (RPDH).

1.2 *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 to determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

D 1517 Terminology Relating to Leather

D 1610 Practice for Conditioning Leather and Leather Products for Testing

D 2240 Test Method for Rubber Property—Durometer Hardness

D 2813 Practice for Sampling Leather for Physical and Chemical Tests

3. Terminology

3.1 *Definitions:*

3.1.1 *abraser*—a wear testing instrument, also referred to as a rotary platform, double head (RPDH) tester or abrader.

3.1.2 *abrasion*—the wearing away of any part of a material by rubbing against another surface.

3.1.3 *abrasion cycle*—in *abrasion testing*, one or more movements of the abradant across a material surface, or the material surface across the abradant, that permits a return to its starting position. In the case of the rotary platform test method, it consists of one complete rotation of the specimen.

3.1.4 *resurface*—the preparation of an abrasive wheel on a resurfacing disk or diamond tool wheel refacer, prior to use in testing.

3.2 For definitions of other leather terms used in this test method, refer to Terminology D 1517.

4. Summary of Test Method

4.1 A specimen is abraded using rotary rubbing action under controlled conditions of pressure and abrasive action. The test specimen, mounted on a turntable platform, turns on a vertical axis, against the sliding rotation of two abrading wheels. One abrading wheel rubs the specimen outward toward the periphery and the other, inward toward the center. The resulting abrasion marks form a pattern of crossed arcs over an area of approximately 30 cm². Resistance to abrasion is evaluated by visual inspection of the specimen or change in weight, as described in Section 14.

5. Significance and Use

5.1 The resistance of leather to abrasion, as measured on a testing machine in the laboratory, is generally only one of several factors contributing to wear performance or durability as experienced in the actual use of the material. While “abrasion resistance” (often stated in terms of the number of abrasion cycles) and “durability” (defined as the ability to withstand deterioration or wear out in use, including the effects of abrasion) are frequently related, the relationship varies with different end uses and different factors may be necessary in any calculation of predicted durability from specific abrasion data. This test method provides a comparative ranking of material performance, which can be used as an indication of relative end-use performance.

5.2 The resistance of leather to abrasion may be affected by factors including test conditions, type of abradant, pressure between the specimen and abradant, mounting or tension of the specimen, and type, kind, or amount of finishing materials.

5.3 Abrasion tests utilizing the rotary platform, double-head tester may be subject to variation due to changes in the abradant during specific tests. Depending on abradant type and test specimen, the wheel surface may change (that is, become clogged) due to the pick up of finishing or other materials from test specimens and must be cleaned at regularly defined intervals.

¹ This test method is under the jurisdiction of ASTM Committee D31 on Leather and is the direct responsibility of Subcommittee D31.07 on Physical Properties. Current edition approved April 1, 2006. Published April 2006.

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.

5.4 The measurement of the relative amount of abrasion may also be affected by the method of evaluation and may be influenced by the judgment of the operator.

6. Apparatus

6.1 *Rotary Platform, Double-Head (RPDH) Tester*,³ consisting of the elements described in 6.1.1-6.1.5 (see Fig. 1).

6.1.1 A turntable platform, which is removable, parts provided with the turntable include the S19 rubber pad, clamp plate and nut, and clamping ring to secure the specimen to the turntable. The turntable is motor driven and mounted so as to produce a circular surface travel of an essentially flat specimen in the plane of its surface,

6.1.2 A motor capable of rotating the turntable platform at a speed of either 72 ± 2 r/min for 110 V/60 Hz or 60 ± 2 r/min for 230 V/50 Hz,

6.1.3 A pair of pivoted arms to which the abrasive wheels and accessory weights or counterweights are attached,

NOTE 1—Without auxiliary weights or counter weights applied, each arm will apply a load against the specimen of 250 ± 1 g (exclusive of the mass of the wheel itself).

6.1.4 A vacuum suction system and vacuum pickup nozzle to remove debris and abrasive particles from the specimen surface during testing. The height of the vacuum pickup nozzle shall be adjustable, and will have two openings – with one opening positioned between the two wheels and over the wear path and the other placed diametrically opposite. The distance between the axes of the two openings shall be 76.0 ± 1.0 mm, and

6.1.5 A counter to record the number of cycles (revolutions) made by the turntable platform.

6.2 *Abrasive Wheels*,⁴ which are attached to the free end of the pivoted arms, and are able to rotate freely about horizontal spindles.

6.2.1 Their internal faces shall be 52.4 ± 1.0 mm apart and the hypothetical line through the two spindles shall be 19.05 ± 0.3 mm away from the central axis of the turntable (see Fig. 2). When resting on the specimen, the wheels will have a peripheral engagement with the surface of the specimen, the direction of travel of the periphery of the wheels and of the specimen at the contacting portions being at acute angles, and the angles of travel of one wheel periphery being opposite to that of the other. Motion of the abrasive wheels, in opposite directions, is provided by rotation of the specimen and the associated friction there from.

6.2.2 The wheels shall be 12.7 ± 0.3 mm thick and have an external diameter of 51.9 ± 0.5 mm when new, and in no case less than 44.4 mm. The abrasive wheels are either resilient or vitrified based, with both types of wheels consisting of hard particles embedded in a binder material and manufactured in different grades of abrasive quality.

NOTE 2—The H-18 wheels typically produce a harsher abrasion than the CS-17 wheels, which produce a harsher abrasion than the CS-10 wheels.

⁴ The sole source of supply of the apparatus known to the committee at this time is Taber Industries, 455 Bryant Street, North Tonawanda, NY 14120. 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.

³ Available from Taber® Industries, 455 Bryant Street, North Tonawanda, NY 14120.

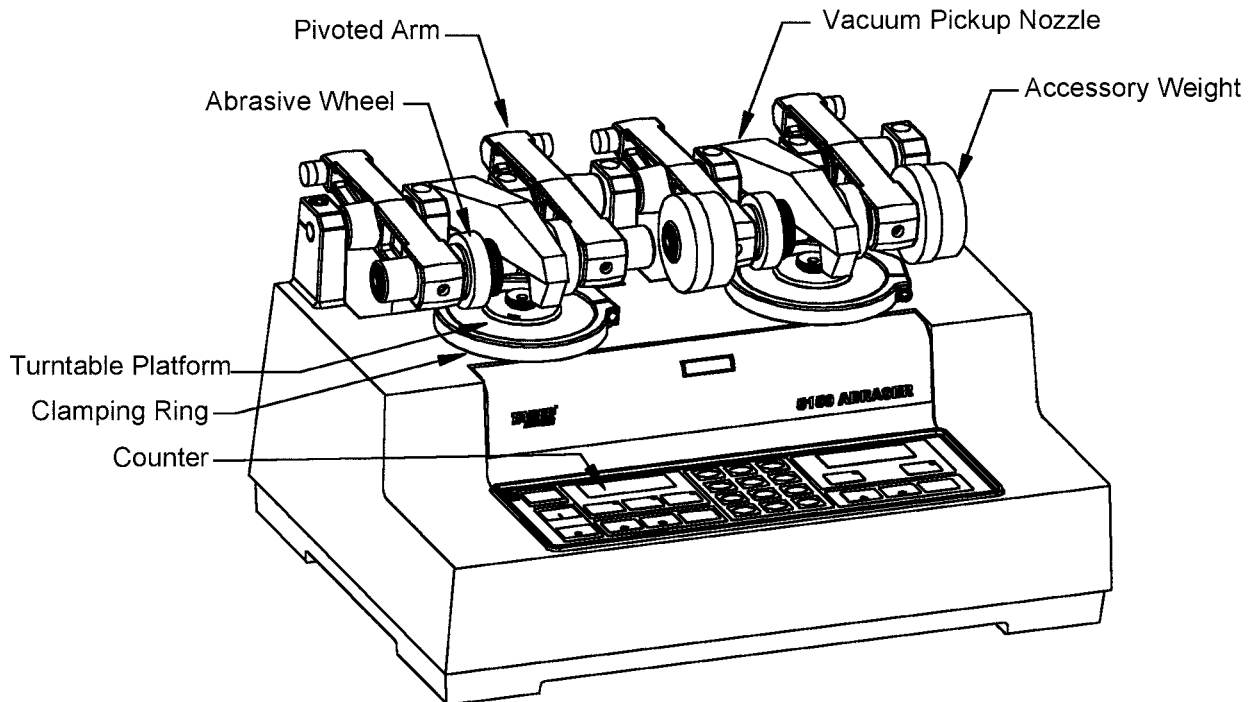


FIG. 1 Rotary Platform, Double-Head Tester