Designation: D2208 – 16

Standard Test Method for Breaking Strength of Leather by the Grab Method[1]

This standard is issued under the fixed designation D2208; 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 U.S. Department of Defense.

1. Scope

1.1 This test method covers the determination of the breaking strength of leather by the grab method. It is intended for use on light, soft leathers; boarded, sueded, or embossed leathers tested on a specimen in the form of a rectangle piece; narrow strap, welt, lace, and round belt leathers; or other leathers that cannot be accurately tested by Test Method D2209. This test method does not apply to wet blue.

1.2 The test method is not recommended for breaking loads over 500 lbf (2200 N) because of slippage of the specimen in the jaws.

1.3 The values stated in inch-pound units are to be regarded as the standard. The values given 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:*[2]

D1517 Terminology Relating to Leather

D1610 Practice for Conditioning Leather and Leather Products for Testing

D1813 Test Method for Measuring Thickness of Leather Test Specimens

D2209 Test Method for Tensile Strength of Leather

D2211 Test Method for Elongation of Leather

3. Terminology

3.1 For definitions of leather terms used in this standard, refer to Terminology D1517.

4. Summary of Test Method

4.1 The leather specimen is clamped in the test machine as described in Test Method D2209. The force required to rupture the leather at a jaw separation of 10 ± 2 in./min is measured, along with the percent elongation at rupture.

5. Significance and Use

5.1 The measurement of the strength of leather is often necessary in order to determine its suitability for its intended application. This test method is recommended for use on light, soft leathers, narrow strap, welt, lace and round belt leathers as well as others that cannot be accurately tested by Test Method D2209.

6. Apparatus

6.1 *Testing Machine,* as described in Test Method D2209.

NOTE 1—The face of one jaw of each clamp shall measure 1 by 1 in. (25.4 by 25.4 mm) and that of the other shall measure 1 by 1½ (25.4 by 38 mm) or more for testing specimens wider than the jaws only.

6.2 *Thickness Gage*—A dead-mass type of thickness gage as described in Test Method D1813.

6.3 *Steel Scale,* graduated to read in 0.02 in. (0.5 mm).

7. Sampling, Test Specimens, and Test Units

7.1 For testing specimens wider than the jaws, the specimen for wide, flat leathers shall be a small piece of leather 6 in. (152 mm) long and 3 in. (76 mm) wide. The direction of the long dimension relative to the backbone shall be noted.

7.2 For testing specimens cut from narrow strip, the specimen for narrow strap, welting, lace, and round belt leathers shall be a piece of leather 6 in. (152 mm) long.

8. Conditioning

8.1 Conditions as described in Practice D1610.

9. Procedure

9.1 *For Testing Specimens Wider than the Jaws:*

[1] This test method is under the jurisdiction of ASTM Committee D31 on Leather and is the direct responsibility of D31.05 on Upholstery. This test method was developed in cooperation with the American Leather Chemists Assn. (Standards Method E16–1965).

Current edition approved Sept. 1, 2016. Published October 2016. Originally approved in 1963. Last previous edition approved in 2010 as D2208–00 (2016). DOI: 10.1520/D2208-16.

[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.

9.1.1 Measure the thickness of the specimen to the nearest 0.001 in. (0.025 mm) in three places: at the center and on the long axis 1 in. (25.4 mm) each side of the center.

9.1.2 The distance between the grips at the start of the test shall be 3 ± ⅛ in. (76 ± 3.2 mm).

9.1.3 The face of one jaw of each clamp shall measure 1 by 1 in. (25.4 by 25.4 mm).

9.1.4 Place the specimen in the testing machine with its long axis parallel to the direction of the applied force, and clamp lightly. Distribute the material of the specimen uniformly and hang flat between the jaws before tightly clamping the specimen.

9.1.5 Determine the elongation of the specimen in accordance with Test Method D2211.

9.1.6 Operate the machine so that the movable clamp travels at a uniform speed of 10 ± 2 in./min (254 ± 50 mm/min) when running free.

9.1.7 Record the load required to rupture the specimen as the breaking strength.

NOTE 2—In a test of this type, many of the specimens will rupture at the jaws of the testing machines. The load should be recorded regardless of the place of rupture.

9.2 *For Testing Specimens Cut from Narrow Strips:*

9.2.1 Measure the thickness of a flat specimen or the diameter of a round specimen to the nearest 0.001 in. (0.025 mm) in three places: at the center and 1 in. (25.4 mm) each side of the center.

9.2.2 Place the specimen in the testing machine with its long axis parallel to the direction of the applied force.

9.2.3 The distance between the grips at the start of the test shall be 3 ± ⅛ in. (76 ± 3.2 mm).

9.2.4 Determine the elongation of the specimen in accordance with Test Method D2211.

9.2.5 Operate the machine so that the movable clamp travels at a uniform speed of 10 ± 2 in./mm (254 ± 50 mm/min) when running free.

9.2.6 Record the load required to rupture the specimen as the breaking strength.

10. Report

10.1 The report shall include the following:

10.1.1 Thickness to the nearest 0.001 in. (0.025 mm), reported for each specimen or averaged and reported as the thickness of the sample, and

10.1.2 Breaking strength to the nearest 1 lbf (or 1 N), reported for each specimen or averaged and reported as the breaking strength of the sample.

11. Precision and Bias

11.1 The following criteria may be used to judge the acceptability of the results if at least 15 units have been tested:

11.1.1 *One Operator, Duplicate Specimens, Same Skin*—Results by the same operator on duplicate adjacent specimens in a skin taken from the official sampling position should not be considered suspect unless the coefficient of variation exceeds:

Specimens Wider than Jaws	
Upholstery	16 %
Garment	11 %
Specimens Narrower than Jaws	
Laces (Note 3)	27 %
Welting (Note 4)	24 %

NOTE 3—Lace samples are taken at random from the bundles of finished laces. The location of die and direction of testing is unknown, so the comparisons should be between and within bundles.

NOTE 4—Welting samples are taken at random from the hanks of the finished welting. The location of side and direction of testing is unknown, so the comparison should be between and within hanks.

11.1.2 *Two Laboratories, Duplicate Specimens, Same Skin*—Results submitted on leathers of the type mentioned in 11.1.1 by each of two laboratories on duplicate adjacent specimens from the same skin taken from the official sampling position should not be considered suspect unless the average of the two results differs by more than 5 %.

NOTE 5—The reproducibility reported in 11.1.2 is based on data obtained at two laboratories, each with a different type of testing machine and a different operator. One machine is a load-cell type and the other a pendulum type. The results show very close correlation between laboratories.

NOTE 6—The results in Section 11 are based on tests on 30 sides of leather and do not apply to findings and cut parts.

NOTE 7—The precision data for between skins are not given because the results were based on different skins of several production lots. The variables in leather for between skins will give higher variation of the results, but this factor should not affect the precision of the test method.

12. Keywords

12.1 breaking strength; leather; strength