



Designation: **D4704 – 00 (Reapproved 2010) D4704 – 12**

Standard Test Method for Tearing Strength, Tongue Tear of Leather¹

This standard is issued under the fixed designation D4704; 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 is intended for determining the tearing strength of leather by measuring the force required to tear a specimen cut perpendicular to the surface. This test method does not apply to wet blue.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

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:*²

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

D2813 Practice for Sampling Leather for Physical and Chemical Tests

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *tongue tear strength*—the load required to tear the leather between two tongues formed by splitting the leather perpendicular to its surface.

4. Significance and Use

4.1 Knowledge of the strength of the sample can be a determining factor for the end use of the product.

5. Apparatus

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

5.2 *Thickness Gage*, a dead weight type of thickness gage as described in Test Method **D1813**.

5.3 *Steel Die*, to cut test specimens.

6. Sampling and Test Specimens

6.1 Unless otherwise specified, sample the leather according to Practice **D2813**.

6.2 The specimen shall be a rectangular piece of leather, 1 × 4 in. (25.4 × 101.6 mm) by the full thickness of the unit. It shall have a $\frac{3}{16}$ in. (4.76 mm) hole located on the long axis 1 in. (25.4 mm) from one end and shall be split along its axis from the hole to the other end to form two tongues. The direction of the long axis of the specimen relative to the backbone shall be noted. See Fig. 1.

¹ This test method is under the jurisdiction of ASTM Committee **D31** on Leather and is the direct responsibility of Subcommittee **D31.07** Physical Properties. Current edition approved Oct. 1, 2010; Sept. 1, 2012. Published November 2010. Originally approved in 1987. Last previous edition approved in 2005 as **D4704 – 00 (2005) (2010)**. DOI: 10.1520/D4704-00R10.10.1520/D4704-12.

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.

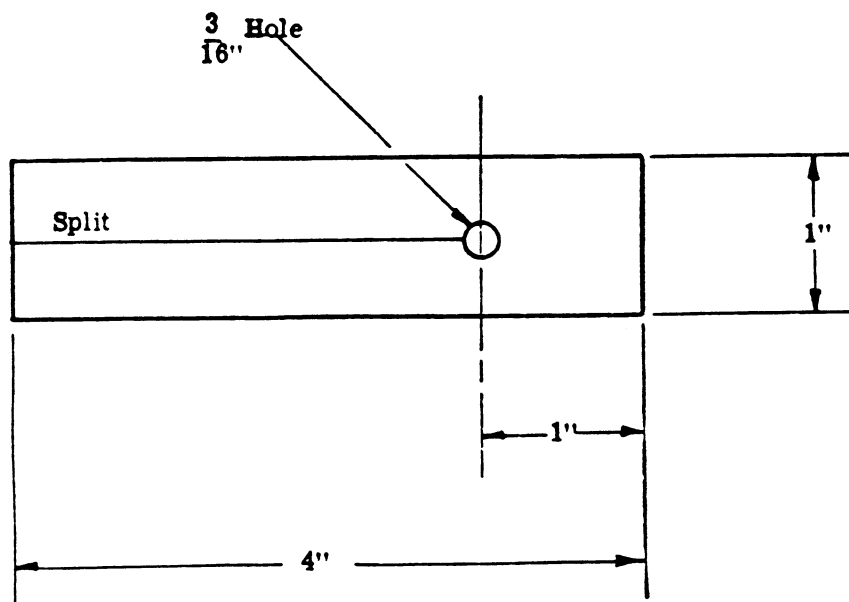


FIG. 1 Test Specimen

7. Conditioning

7.1 All specimens shall be conditioned for 48 h in an atmosphere maintained at $73.4 \pm 3.6^\circ\text{F}$ ($23 \pm 2^\circ\text{C}$) and $50 \pm 4\%$ relative humidity and tested under the conditions as described in Practice D1610.

8. Procedure

8.1 Determine the thickness of the specimen to the nearest 0.5 oz (0.20001 in. (0.01 mm)) on the long axis between the hole and the unsplit end of the specimen. The gage foot shall be adjacent to, but shall not overlap, the hole.

8.2 Clamp one of the tongues on the specimen in each of the testing grips so that the long axis of the tongue is in the direction of the motion of the movable grip. The faces of the grips shall be approximately 2 in. (50.8 mm) from the common base of the tongues (from the hole).

8.3 Operate the machine at $10 \pm 2 \text{ in.}$ ($254 \pm 50.8 \text{ mm}$) per minute until the specimen starts to tear. At the instant of the initial tear, note and record the load registered by the machine.

9. Report

9.1 The thickness measurement of all specimens tested shall be averaged to the nearest 0.5 oz (0.20001 in. (0.01 mm)) and reported as the thickness of the sample.

9.2 The load required to tear the specimens shall be averaged to the nearest pound and reported as the tongue tear strength of the sample.

9.3 The direction of the long axis of the specimen relative to the backbone shall be reported.

10. Precision and Bias (or Reproducibility)

10.1 This test method is adopted from the procedures of the American Leather Chemists Association where it has long been in use and where it was approved for publication before the inclusion of precision and bias statements was mandated. The original inter-laboratory test data is no longer available. The user is cautioned to verify by the use of reference materials, if available, that the precision and bias (or reproducibility) of this test method is adequate for the contemplated use.