



Designation: D4786 – 00 (Reapproved 2020)

Standard Test Method for Stitch Tear Strength, Single Hole¹

This standard is issued under the fixed designation D4786; 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 is intended for determining the stitch-tearing strength of leather with a tear originating from one hole. It is particularly applicable to heavy leather. This test method does not apply to wet blue.

1.2 The values stated in inch-pound units are to be regarded as standard. No other units of measurement are included in this 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *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
- D1813 Test Method for Measuring Thickness of Leather Test Specimens
 - D2209 Test Method for Tensile Strength of Leather

3. Significance and Use

3.1 This test method is intended to be used to rate leathers as to their stitch tear strengths.

4. Apparatus

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

¹ This test method is under the jurisdiction of ASTM Committee D31 on Leather and is the direct responsibility of Subcommittee D31.01 on Vegetable Leather.

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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.

4.2 *Steel Punch*, beveled on the outside, which will make a $\frac{1}{8}$ in. diameter hole.

4.3 *Metal Yoke*, made to the dimension shown in Fig. 1.

4.4 *Steel Rod*, 0.095 ± 0.005 in. in diameter and at least 1 in. long.

4.5 *Testing Machine*, power-driven, as described in Test Method D2209.

5. Test Specimen

5.1 The test specimen shall be a rectangular piece of leather 1 in. by 2 in. die cut from the sample unit of leather. The end of the specimen in which the hole is to be punched shall be at least 1 in. away from any uncut edge on the unit. The direction of the long axis relative to the backbone shall be noted.

6. Procedure

6.1 Place the specimen on the anvil of the thickness gage and lower the presser foot gently (do not drop) until it rests on the specimen. Take the reading 5 s after the full load is reached. Read the thickness to the nearest 0.001 in. The thickness of the specimen should be taken on the long axis near the end in which the hole is to be punched.

6.2 Punch a $\frac{1}{8}$ in. diameter hole on the long axis of the specimen. The center of the hole should be $\frac{5}{32}$ in. from the end on which the thickness was measured.

6.3 Grip the yoke in one of the testing machine jaws. Place the end of the specimen containing the hole between the arms of the yoke and pass the steel rod through the holes in the yoke and the specimen. Clamp the free end of the specimen in the other testing machine grip. Operate the machine at 10 ± 2 in. per minute until the specimen starts to tear. At the instant that tearing begins, note and record the load registered by the machine.

7. Calculation

7.1 Calculate the pounds per in. thickness as follows:

$$\begin{aligned} F &= \text{lb at initial tear} & \text{Stitch tear strength} &= F/T \\ T &= \text{thickness of sample} & \text{Avg stitch tear strength} &= \frac{F/T}{S} \\ S &= \text{Number of individual specimens per unit test of leathers} \end{aligned}$$

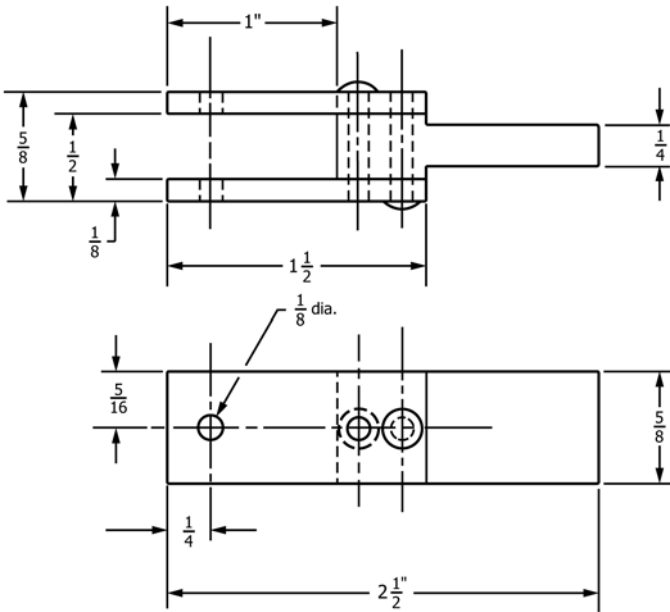


FIG. 1 Metal Yoke

8. Report

8.1 Report should include the following:

8.1.1 Stitch tear strength of each test specimen and average stitch tear strength per unit of leather.

8.1.2 The thickness measurements of all the specimens tested shall be averaged to the nearest 0.001 in. and reported as the thickness of the sample unit of leather.

8.1.3 The direction of the long axis of the specimen relative to the back-bone shall be reported.

9. Precision and Bias

9.1 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 interlaboratory test data are no longer available. The user is cautioned to verify by the use of reference materials, if available, that the precision and bias of this test method is adequate for the contemplated use.

10. Keywords

10.1 leather; stitch tear strength; tear strength

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