Designation: D6077 – 16

Standard Test Method for Trapezoid Tearing Strength of Leather[1]

This standard is issued under the fixed designation D6077; 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.

1. Scope

1.1 This test method covers the measurement of the tearing load of nonwoven fabrics by the trapezoid method for leather. This test method does not apply to wet blue.

1.2 The values stated in SI units are to be regarded as the standard. The values given 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:*[2]

D1610 Practice for Conditioning Leather and Leather Products for Testing

D2813 Practice for Sampling Leather for Physical and Chemical Tests

3. Summary of Test Method

3.1 An outline of a trapezoid (see Fig. 1) is marked on a specimen cut for the determination of breaking load, and the nonparallel sides of the specimen are clamped in the jaws of a tensile testing machine. A continuously increasing load is applied to the specimen in such a way that the tear propagates across the specimen width. The value of the breaking load of the specimen is obtained from the load-elongation (stress-strain) curve recorded autographically.

4. Significance and Use

4.1 The trapezoid tearing load is a tension test in which the test strength is determined primarily by the interlocking structure of the fibers. It is useful for estimating relative ease of tearing of leather.

4.2 The procedure can also be used to determine if there is any appreciable difference in the relative strength of the leather in the parallel and the perpendicular directions to the backbone.

5. Apparatus

5.1 *Tensile Testing Machine,* constant-rate-of-traverse type, equipped with an autographic recorder to register the applied load.

5.2 *Clamps,* with faces measuring 25 by 75 mm (1 by 3 in.) with the longer dimension perpendicular to the direction of application of the load.

5.3 *Template,* optional, having the dimensions shown in Fig. 1.

5.4 *Pawls,* bolt on a machine to allow motion in only one direction.

6. Sampling

6.1 Unless otherwise specified, sample as directed, parallel and perpendicular to backbone or parallel and perpendicular to the cut part. Sampling per Practice D2813.

7. Test Specimens

7.1 Unless otherwise specified, test ten specimens.

7.2 Cut the test specimens parallel and perpendicular to backbone or parallel and perpendicular to the cut part.

8. Conditioning

8.1 Condition in accordance with Practice D1610. (The customer may specify.)

9. Procedure

9.1 Test properly conditioned test specimens in the standard atmosphere for testing.

9.2 Set the clamps at the start of the test 25 ± 1 mm (1 ± 0.05 in.) apart and operate the machine at 300 ± 10 mm (12 ± 0.40 in.)/min. Select the load range of the testing machine such that the break occurs between 10 and 90 % of the full-scale load.

9.3 Secure the test specimen in the machine, clamping along the nonparallel sides of the trapezoid with the cut halfway between the clamps. Hold the short edge taut and let the long edge lie in folds.

[1] This test method is under the jurisdiction of ASTM Committee D31 on Leather and is the direct responsibility of Subcommittee D31.05 on Upholstery.

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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.

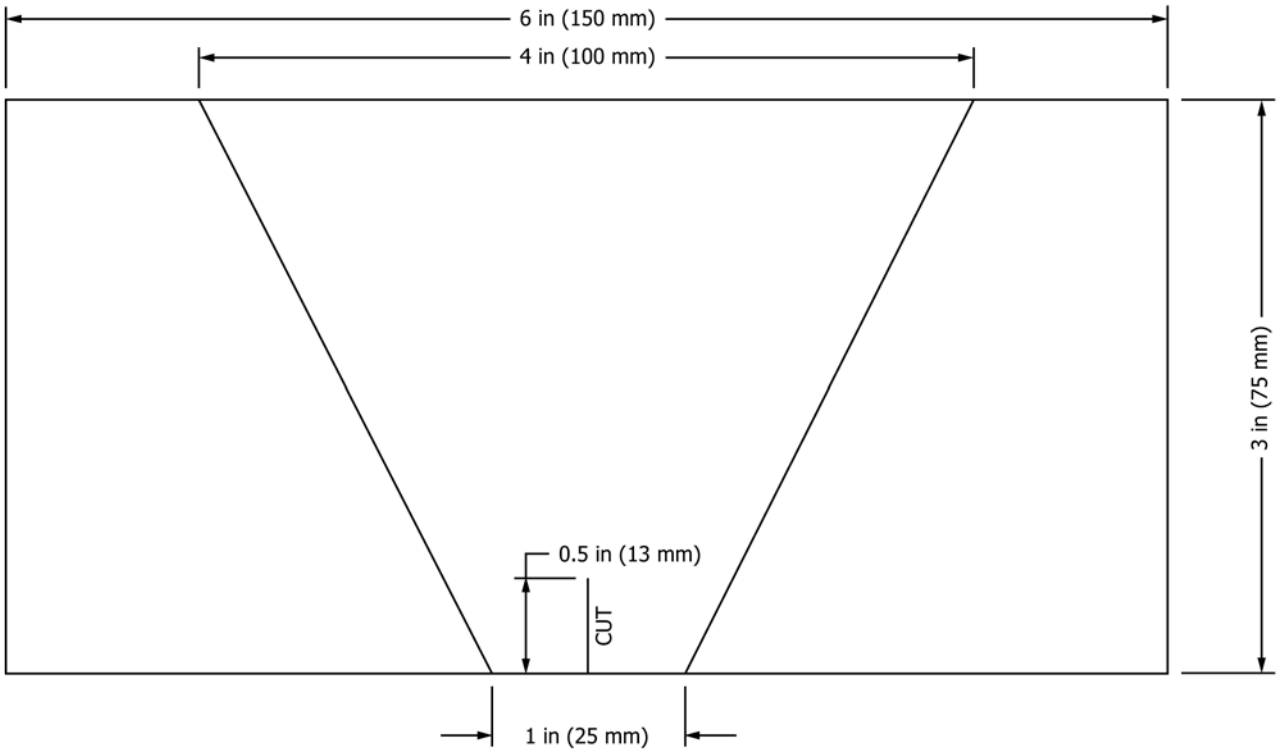

FIG. 1 Template for Trapezoid Tearing Load Test

9.4 Start the machine with pawls disengaged, and record the tearing load on the autographic recorder. The tearing load will not be a single value, but will appear as a series of maxima and minima.

10. Calculation

10.1 Visually fit a straight line parallel to the elongation axis through the maxima, and use this as the maximum load. Repeat this for the minima. Take the average of these two values as the tearing load for that specimen.

10.2 Separately calculate the average of the tearing load of the five parallel direction test specimens and the average of the five perpendicular direction test specimens.

11. Report

11.1 Report the following information:

11.1.1 Describe the material or product samples,

11.1.2 Describe the method of sampling used,

11.1.3 Report thickness, and

11.1.4 tearing load.

12. Precision and Bias

12.1 *Precision*—A coefficient of variation of about 5 % can be anticipated.

12.2 *Bias*—The true value of the trapezoid tearing strength can be defined only in terms of a specific test method. Within this limitation, the procedure for testing trapezoid tearing strength has no known bias.

13. Keywords

13.1 tear strength; tearing load; template; tension test; trapezoid