Designation: D6076 – 08

StandardTest Method for Shrinkage Temperature of Leather[1]

This standard is issued under the fixed designation D6076; 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 covers the determination of the shrinkage temperature of all types of leather. The heating medium is water when the shrinkage temperature is at or below 98°C. The heating medium is a glycerine-water solution when the shrinkage temperature is above 98°C.

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]
D1517 Terminology Relating to Leather

3. Terminology

3.1 *Definitions*—For definitions of general leather terms used in this test method, refer to Terminology D1517.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *shrink*—to contract or become smaller.

3.2.2 *shrinkage*—the temperature at which noticeable shrinkage occurs when a leather specimen is gradually heated in an aqueous medium.

4. Summary of Test Method

4.1 A leather specimen is thoroughly soaked in the aqueous medium that will be used to heat the specimen for this test method. This specimen is then fastened between two clamps (one fixed and one movable) and immersed in the aqueous medium. The aqueous medium is gradually heated until the specified temperature is reached without shrinkage or until shrinkage is indicated by a deflection of the dial needle which is attached to the movable clamp.

5. Significance and Use

5.1 This test method is designed to determine the temperature at which a thoroughly wetted leather specimen experiences shrinkage. In this test method, shrinkage occurs as a result of hydrothermal denaturation of the collagen protein molecules which make up the fiber structure of the leather. The shrinkage temperature of leather is influenced by many different factors, most of which appear to affect the number and nature of crosslinking interactions between adjacent polypeptide chains of the collagen protein molecules. The value of the shrinkage temperature of leather is commonly used as an indicator of the type of tannage or the degree of tannage, or both, of that particular leather (especially for the more hydrothermally stable tannages such as chrome tannage).

6. Apparatus

6.1 *Stand,* for supporting the testing equipment.

6.2 *Indicating Device,* either of the two devices listed as follows:

6.2.1 *Theis Shrinkage Meter Dial*—a dial indicator having a face divided into 360 to 380°, with one revolution of the dial hand corresponding to 12.7 mm (0.5 in.) of specimen movement, and with leeway for four revolutions of the dial hand.[3]

6.2.2 *AGD (American Gage Design) Dial Indicator*—A mechanical device capable of registering on a scale a reading

[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. This test method was developed from Federal Test Method Standard No. 311, Method 7011.1, in cooperation with the U.S. Defense Personnel Support Center, Directorate of Clothing and Textiles, Philadelphia, PA and the U.S. Army Natick Research, Development and Engineering Center, Natick, MA.

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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.

[3] A shrinkage meter apparatus setup meeting these specific requirements was formerly available from the Arthur H. Thomas Co., Philadelphia, PA. The minimum number of apparatus setups required for an order makes the cost of new apparatus of this type prohibitive. Used apparatus of this type may still be available from tanneries or laboratories that have gone out of business or from used equipment dealers.