



Standard Test Method for Measuring Area of Leather Test Specimens¹

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1. Scope

1.1 This test method covers the measurement of the surface area of leather test specimens. Unless otherwise specified, the surface to be measured shall be the grain surface or the surface most closely adjacent to the grain surface. This test method does not apply to wet blue.

1.2 *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:

D 1610 Practice for Conditioning Leather and Leather Products for Testing²

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *area of a circular specimen*—the average diameter squared and multiplied by $\pi/4$ and reported to the nearest 1 mm².

3.1.2 *area of a rectangular specimen*—the product of the average distance across the width of the grain surface multiplied by the average distance across the length of the grain surface of the leather specimen to the nearest 1 mm².

4. Significance and Use

4.1 This test method is designed to measure the area of specimens before and after they are subjected to various tests that may effect surface area. Two test procedures wherein such measurements could be used are for the apparent density of leather and the resistance of leather to synthetic perspiration solution.

5. Apparatus

5.1 *Die*, of appropriate size for round or rectangular leather specimens, having uniform dimensions in the 50 to 80 mm range. When rigid and thick leathers, such as sole leathers, are being measured, a knife may be used to produce the test

specimen provided straight edges are obtained.

5.2 *Mallet or Clicking Machine*.

5.3 *Rule or Steel Tape*, graduated to 1.0 mm.

5.4 *Caliper*, graduated to 1.0 mm (recommended for sole leather).

6. Test Specimen

6.1 The specimen shall be a circular or rectangular piece of leather cut from leather sides or skins that have been conditioned in accordance with Practice D 1610 for 48 h in an atmosphere maintained at $73.4 \pm 1.8^\circ\text{F}$ ($23 \pm 1^\circ\text{C}$) and $50 \pm 4\%$ relative humidity.

6.2 The specimens used in this test method generally range in area from 1500 to 10 000 mm².

6.3 Do not die out or cut specimens from areas that show surface defects such as indentations, creases, or cuts.

7. Procedure

7.1 Place the specimen with the grain side up on a flat surface and spread it out without pulling or stretching. Using a rule or steel tape for flexible leathers and a caliper for sole leathers, make three measurements equally spaced along the width and three measurements along the length of the specimen to the nearest 1.0 mm.

7.2 Measure the diameter of the specimen by placing a rule or steel tape across its widest girth and note the length on the rule or tape extending over the specimen. Repeat this measurement four times at radii approximately 45° to each other and average the results to obtain the diameter.

8. Calculation and Report

8.1 Multiply the average value obtained for the length by the average value obtained for the width to determine the area of the specimen.

8.2 Calculate the area of circular test specimens as follows:

$$A = 1/4 \pi D^2 \quad (1)$$

where:

A = area (mm²), and

D = average diameter, mm.

8.3 Report area to the nearest 1 mm².

9. Precision and Bias

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

9.1.1 Results by the same operator on duplicate specimen,

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² *Annual Book of ASTM Standards*, Vol 15.04.

same skin, should not be considered suspect unless the coefficient of variation exceeds 2 %.

9.1.2 Results of two laboratories on duplicate specimens, same skin, should not be considered suspect unless the coefficient of variation exceeds 2 %.

9.2 *Bias*—No justifiable statement on bias can be made

since the true value of area of leather test specimens cannot be established by an accepted reference method.

10. Keywords

10.1 area change; leather; measuring area

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