Designation: D4654 – 87 (Reapproved 2020)

Standard Test Method for Sulfate Basicity in Leather[1]

This standard is issued under the fixed designation D4654; 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 is intended for use in calculating the sulfate basicity of mineral tanned leather.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.3 *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]

D2807 Test Method for Chromic Oxide in Leather (Perchloric Acid Oxidation)

D4655 Test Methods for Sulfates in Leather (Total, Neutral, and Combined Acid)

3. Significance and Use

3.1 This test method is used to determine the percent of total chromic oxide that is combined with hydroxyl and may serve as a measure of chrome fixation.

4. Apparatus and Reagents

4.1 The apparatus and reagents shall be as described in Test Methods D2807 and D4655.

5. Sampling, Test Specimens and Test Units

5.1 The test specimen shall be as described in Test Methods D2807 and D4655.

5.2 Unless otherwise specified in the detail specifications, two specimens from the composite sample shall be tested.

5.3 The percent basicity of the sample for test shall be the average of the test results obtained from the specimens tested.

6. Procedure

6.1 The chromic oxide shall be determined as described in Test Method D2807. The combined sulfate shall be determined as described in Method D4655.

7. Calculation of Results

7.1 Express the percent basicity of the specimen according to Schorlemmer's system. In this system, the percent basicity is the percent of the total chromic oxide that is combined with hydroxyl. Conversely, the percent acidity is the percent of the total chromic acid that is combined with sulfate or other acid anions. Percent basicity is therefore 100 % acidity.

$$\text{sulfate basicity, \%} = 100 - \%\ \text{combined sulfate} \times 52.8/\%\ \text{total chromic oxide} \quad (1)$$

7.2 When other metals that form hydrolysable sulfates are present, add their equivalent percent of chromic oxide to the chromic oxide present before calculating percent basicity. Use the following conversion factors: % $Al_2O_3 \times 1.49$, % $ZrO_2 \times 0.82$, and % $Fe_2O_3 \times 0.95$.

7.3 Report the results to the nearest 0.1 %.

8. Precision and Bias

8.1 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 were mandated. The original inter-laboratory test data is no longer available. The user is cautioned to verify by the use of reference material if available that the precision and bias of this test method is adequate for the contemplated use.

9. Keywords

9.1 chrome fixation; Schorlemmer's system; sulfate basicity

[1] This test method is under the jurisdiction of ASTM Committee D31 on Leather and is the direct responsibility of Subcommittee D31.06 on Chemical Analysis.

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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.