Designation: D 5356 – 93 (Reapproved 2003)

Standard Test Method for pH of Chrome Tanning Solutions[1]

This standard is issued under the fixed designation D 5356; 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 determination of the pH of chrome tanning solutions.

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 3898 Test Method for Chromic Oxide in Basic Chromium Tanning Liquors[2]

E 70 Test Method for pH of Aqueous Solutions with the Glass Electrode[3]

3. Terminology

3.1 *Definition of Terms Specific to This Standard:*

3.1.1 *pH, of a solution*—the negative logarithm of the hydrogen ion activity.

3.1.1.1 *Discussion*—A solution of pH 7 is neutral at 24°C. Lower numbers indicate increasing acidity, higher numbers indicate increasing alkalinity.

4. Summary of Test Method

4.1 The chrome tanning liquor is diluted to a concentration of 25.0 ± 0.5 g chromic oxide equivalent per litre, allowed to come to equilibrium and the pH is then measured with the appropriate meter. For general details of a procedure, Test Method E 70 should be consulted. The provisions of the standard shall be governing except where the text of this test method specifically deviates.

5. Significance and Use

5.1 This test method is designed to measure the pH of a chrome tanning solution which has been diluted to a specific concentration. This is considered to be a measure of the acidity or alkalinity of the solution.

5.2 This test method is suitable for quality control in the manufacture of leather.

6. Apparatus

6.1 *pH Meter*, either battery or line-operated equipped with appropriate electrodes. The meter shall have a maximum scale division of 0.1 pH unit and reproducibility of 0.05 pH unit.

NOTE 1—Sellers list reasonably priced models having more sensitivity and greater reproducibility.

7. Reagents

7.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.[4] Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

7.2 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean distilled water or water of equal purity.

7.3 *Buffer Solutions*—Commercially available buffer solutions of 2.00 ± 0.02 pH and 4.00 ± 0.02 pH shall be used for meter standardization, in accordance with the manufacturer's recommendations and the provisions set forth in Test Method E 70.

8. Standardization

8.1 Standardize the meter against the pH 4.00 standard, in accordance with the manufacturer's recommendations and the provisions set forth in Test Method E 70. The buffer standard shall be at room temperature and the temperature compensator shall be set at this temperature.

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[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] *Annual Book of ASTM Standards*, Vol 15.04.

[3] *Annual Book of ASTM Standards*, Vol 15.05.

[4] *Reagent Chemicals, American Chemical Society Specifications*, American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Analar Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmaceutical Convention, Inc. (USPC), Rockville, MD.

8.2 Read the pH of the 2.00 standard with no adjustment of the meter. The standard shall be at a temperature no more than 2°C different from that at which the meter was standardized against the pH 4.00 standard, and the temperature compensator set accordingly.

8.3 If the reading of the pH 2.00 buffer does not differ by more than 0.05 pH from the published value under the temperature conditions, the standardization is satisfactory and the meter ready for use. If the error exceeds 0.05 pH, the meter and electrodes must be checked and the necessary adjustments made to obtain conformity.

9. Procedure

9.1 The sample shall be representative of the chrome tanning liquor to be tested. It shall be adjusted to an equivalent chromic oxide concentration of 25.0 ± 0.5 g/L (Note 2) and allowed to stand at room temperature for at least 60 min before measuring pH in order to attain dilution equilibrium (Note 3).

NOTE 2—The concentration adjustment shall be based on the analysis of the liquor for chromium as based on Test Method D 3898. In most cases, the concentration of the sample will be above 25 g chromic oxide per litre and measurement of the appropriate quantity of liquor in a graduate or weighed quantity shall be transferred to a 100-mL volumetric flask. Diluting with water at room temperature, will give sufficiently accurate dilution.

NOTE 3—If the dilution described in Note 2 takes place essentially at room temperature, the change in pH is sufficiently slight that 60-min equilibration will suffice. If it is necessary to concentrate the solution by boiling, or the original solution was hot, then the diluted sample should be held at least 24 h before testing, or the pH test may be repeated until constant to 0.1 pH are obtained.

9.2 After standardization of the meter (Section 8), rinse the electrodes three times with water and remove surplus water with a soft, nonabrasive tissue. Do not let the electrodes dry. Immediately immerse the electrodes in the prepared sample to a depth recommended by the manufacturer, set the temperature compensator to the temperature of the solution (25 ± 5°C), allow the meter to equilibrate, and read the pH to the nearest pH unit of the meter.

10. Report

10.1 Report the following information:

10.1.1 pH of sample = A (25 g Cr_2O_3 per litre)

where:

A = pH reading obtained in Section 8.

11. Keywords

11.1 chrome tanning solutions; pH