



Designation: D 2807 – 93 (Reapproved 1998)

Standard Test Method for Chromic Oxide in Leather (Perchloric Acid Oxidation)¹

This standard is issued under the fixed designation D 2807; 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 chromic oxide in leathers that have been partly or completely tanned with chromium compounds. In general the samples will contain between 1 and 5 % chromium, calculated as chromic oxide.

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. See Section 7 for specific safety hazards.*

2. Referenced Documents

2.1 ASTM Standards:

D 2617 Test Method for Total Ash in Leather²

D 2813 Practice for Sampling Leather for Physical and Chemical Tests²

E 180 Practice for Determining the Precision of ASTM Methods for Analysis and Testing of Industrial Chemicals³

3. Summary of Test Method

3.1 The perchloric acid method is applied to the ash obtained in Test Method D 2617. In the acid digestion, any remaining organic matter is destroyed and the chromium oxidized to the hexavalent state. On dilution, the chromium is titrated volumetrically with thiosulfate or ferrous salt. The perchloric acid method requires less manipulation than procedures based on fusion of the ash, but care must be taken because of potential hazards in the use of this reagent. The perchloric acid method also tends to give low results.

4. Significance and Use

4.1 The procedure described is specific for chromium in leather. Vanadium is the only common interfering element and

this is rarely present in quantity. The precision and accuracy of the methods are usually at least as good as the sampling of the leather itself.

4.2 The chromium content of leather relates to the degree of tannage obtained, and hence may be a matter for specification in the purchase of leather. The procedure described provides adequate accuracy for this purpose.

5. Apparatus

5.1 *Potentiometric Titration Equipment*—This is required in an alternative method for titrating chromium (Cr^{6+}) with ferrous ammonium sulfate solution. The equipment consists of:

5.1.1 *Stirrer.*

5.1.2 *Calomel and Platinum Electrodes.*

5.1.3 *Potentiometer*—A variety of instruments is satisfactory.⁴ The most convenient common feature of these instruments is a null-point device (either a cathode-ray electron tube or galvanometer) that will signal the abrupt change occurring in the potential when the end point is reached.

5.2 In carrying out the titration, the electrodes are immersed in the sample, the solution agitated by the stirrer, and the potential balanced with the galvanometer or cathode-ray tube. Titrant is added dropwise until a sharp permanent change in potential occurs.

6. Reagents

6.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.⁵ 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.

¹ This test method is under the jurisdiction of ASTM Committee D-31 on Leather, and is the direct responsibility of Subcommittee D31.06 on Chemical Analysis—General Methods. This test method was developed in cooperation with the American Leather Chemists Assn.

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

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

⁴ Satisfactory equipment include, among others the following: the Kelley, Serfass, and Fisher tritrimeters, Leeds & Northrup potentiometers, and Beckman pH meters.

⁵ *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.