Designation: D 2868 – 96 (Reapproved 2001)

Standard Test Method for Nitrogen Content (Kjeldahl) and Hide Substance Content of Leather[1]

This standard is issued under the fixed designation D 2868; 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 nitrogen content of all types of leather. The nitrogen content is used to calculate the hide substance (protein fiber) content of leather.

NOTE 1—This test method is essentially a composite of Method 6441 of Federal Test Method Standard No. 311 and Method B 5 of the American Leather Chemists Association.

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 2813 Practice for Sampling Leather for Physical and Chemical Tests[2]

E 180 Practice for Determining the Precision of ASTM Methods for Analysis and Testing of Industrial Chemicals[3]

3. Summary of Test Method

3.1 The ground leather specimen prepared according to an accepted procedure[4] is digested with acid in the presence of a catalyst to convert the nitrogen to ammonium ion. The ammonium ion formed is nonvolatile under these highly acid conditions.

3.2 The acid mixture is then made alkaline and the ammonia liberated is distilled into a boric acid solution which absorbs the ammonia.

3.3 The amount of ammonia in the boric acid is then determined by back titration with standardized acid using a sharp color change indicator (green to purple) to determine the end point.

4. Significance and Use

4.1 The nitrogen content as determined by this test method is normally considered to be related to the amount of hide substance (protein fiber) present in the leather sample. A factor of 5.62 is normally used to calculate the hide substance from the nitrogen content.

4.1.1 The 5.62 factor represents the average result of many analyses of animal hides, but it cannot be considered to be accurate since it varies somewhat from hide to hide of the same type, from type of hide to type of hide, and also with the thickness of hide retained in the final leather (split thickness as compared to original hide thickness). As a result of these variations, the true factor for any given leather may be expected to vary from 5.44 to 5.80 or about ±3 %.[5]

4.2 A given leather sample may contain nitrogenous substances other than hide substance (protein fiber) which will be analyzed for by this test method, such as resins, dyestuffs, etc., that contain nitrogen. Therefore, although this test method is fairly accurate for determining the nitrogen content of leather, its use for determining hide substance may result in large errors.

4.3 The hide substance value derived from this determination has a large bearing on other chemical determinations of a given leather. Any errors, such as those described in 4.1.1 and 4.2, will be carried over into these other analytical calculations.

5. Apparatus

5.1 *Kjeldahl Apparatus* consisting of:

5.1.1 *Kjeldahl Flask*, of 500 or 800-mL capacity for digestion of the sample.

5.1.2 *Heater*, (gas or electric) for the Kjeldahl flask with fume hood or other exhaust system.

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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—General. This test method was developed in cooperation with the American Leather Chemists Assn. (Standard Method B 5 – 1954).

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

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

[4] Acceptable procedures are published in *Journal of the American Leather Chemists Association*, Vol 51, 1956 p. 497; or *Official Methods of Analysis*, Am. Leather Chemists Assn., available through the Office of the Secretary-Treasurer, Campus Station, Cincinnati, Ohio 45221; see Practice D 2813.

[5] Dahl, S., "Determination of Hide Substance in the Kjeldahl Method," in *Chemistry and Technology of Leather*, Vol 4, Reinhold Publishing Co., New York, NY, 1965.