



## Standard Test Method for Organic Nitrogen in Paper and Paperboard<sup>1</sup>

This standard is issued under the fixed designation D982; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This test method covers the determination of nitrogenous organic materials in paper and paperboard, which typically are used to reduce the thermal degradation of the cellulose in the paper and paperboard.

1.2 The nitrogen determination by this method does not include the nitrogen in nitro compounds, nitrates, nitrites, azo, hydrazine, cyanide, or pyridine ring-type compounds, none of which are normally found in paper and paperboard. There is no known modification of the method that is applicable to all nitrogenous compounds.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 *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:*<sup>2</sup>

**D585 Practice for Sampling and Accepting a Single Lot of Paper, Paperboard, Fiberboard, and Related Product (Withdrawn 2010)**<sup>3</sup>

**D644 Test Method for Moisture Content of Paper and Paperboard by Oven Drying (Withdrawn 2010)**<sup>3</sup>

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D09 on Electrical and Electronic Insulating Materials and is the direct responsibility of Subcommittee D09.01 on Electrical Insulating Products.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> The last approved version of this historical standard is referenced on [www.astm.org](http://www.astm.org).

### 3. Summary of Test Method

3.1 This test method is a modification of the well-known Kjeldahl procedure. In this test method, compounds that yield their nitrogen as ammonia are digested with concentrated sulfuric acid, using sodium sulfate to raise the boiling point, and mercuric oxide as a catalyst. The organic matter is destroyed and the nitrogen is fixed as ammonium sulfate in the excess acid.

### 4. Significance and Use

4.1 The purpose of this test method is to determine the amount of organic nitrogen present within a sample of electrical insulation paper or paperboard. Nitrogen content is used to determine if the paper or paperboard has been chemically treated to withstand higher than normal operating temperatures. Such a paper or paperboard is referred to in the industry as “thermally upgraded.” A paper or paperboard that is thermally upgraded can withstand higher operating temperatures and allow the electrical equipment to have a longer useful life span.

### 5. Apparatus

5.1 *Kjeldahl Apparatus*, with 500 mL or 800 mL flask and a digestion rack, an efficient bulb or scrubber type of trap to ensure that no nonvolatile alkali is carried over, the trap being connected to the flask with a rubber stopper and to the water-cooled condenser following, with rubber tubing. The condenser tube shall be made of alkali-resistant glass or block tin with the discharge end connected to a bent glass delivery tube, the lower end of which is drawn out to a bore of about 3 mm.

5.2 *Other Apparatus*—500 mL Erlenmeyer flask, 100 mL graduated cylinder, 50 mL buret, and mossy zinc or glass beads for the flask to prevent bumping.

### 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 the specifications of the Committee on Analytical Reagents of the American Chemical Society,