



Designation: D3590 – 17

## Standard Test Methods for Total Kjeldahl Nitrogen in Water<sup>1</sup>

This standard is issued under the fixed designation D3590; 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 These test methods cover the determination of total Kjeldahl nitrogen. Section 24 on Quality Control pertains to these test methods. The following test methods are included:

|                                                   |                    |
|---------------------------------------------------|--------------------|
| Test Method A—Manual Digestion/Distillation       | Sections<br>8 – 14 |
| Test Method B—Semiautomated Colorimetric Bertholt | 15 – 23            |

1.2 The analyst should be aware that precision and bias statements included may not necessarily apply to the water being tested.

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 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.*

1.5 *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>

D1129 Terminology Relating to Water

D1193 Specification for Reagent Water

D1426 Test Methods for Ammonia Nitrogen in Water

D2777 Practice for Determination of Precision and Bias of Applicable Test Methods of Committee D19 on Water

D3370 Practices for Sampling Water from Closed Conduits

D5810 Guide for Spiking into Aqueous Samples

<sup>1</sup> These test methods are under the jurisdiction of ASTM Committee D19 on Water and are the direct responsibility of Subcommittee D19.05 on Inorganic Constituents in Water.

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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.

D5847 Practice for Writing Quality Control Specifications for Standard Test Methods for Water Analysis

### 3. Terminology

#### 3.1 Definitions:

3.1.1 For definitions of terms used in this standard, refer to Terminology D1129.

#### 3.2 Definitions of Terms Specific to This Standard:

3.2.1 *continuing calibration blank, n*—a solution containing no analytes (of interest) which is used to verify blank response and freedom from carryover.

3.2.2 *continuing calibration verification, n*—a solution (or set of solutions) of known concentration used to verify freedom from excessive instrumental drift; the concentration is to cover the range of calibration curve.

3.2.3 *total Kjeldahl nitrogen, n*—the sum of the nitrogen contained in the free ammonia and other nitrogen compounds, which are converted to ammonium sulfate  $[(\text{NH}_4)_2\text{SO}_4]$  under the specified digestion conditions.

### 4. Significance and Use

4.1 These test methods are useful for measuring organic nitrogen and ammoniacal nitrogen, which are essential growth nutrients.

4.2 Nitrogen compounds are widely distributed in the environment. Sources of nitrogen include surface-applied fertilizers, cleaning products, and drinking water treatment aids. Because nitrogen is a nutrient for photosynthetic organisms, it may be important to monitor and control discharge into the environment.

### 5. Interferences

5.1 Nitrate is known to cause a serious negative interference in the test. Reportedly, a concentration of 250 mg/L  $\text{NO}_3$  results in zero recovery of some level of mg/L N added as some nitrogen compound.

5.2 The analyst is cautioned that ammonia in the laboratory may easily become an interference in these test methods from contamination of reagents, caps, or from the laboratory atmosphere. Care should be taken that ammonium hydroxide, either as a reagent or as a cleaning substance, is not used in the same room.

\*A Summary of Changes section appears at the end of this standard