



Standard Test Methods for Phosphorus in Water¹

This standard is issued under the fixed designation D 515; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope*

1.1 These test methods cover the determination of phosphorus in water and wastewater. The following two methods are included:

Sections

Method A—Colorimetric Ascorbic Acid Reduction	8 to 16
Method B—Semiautomated Digestion/Colorimetric Ascorbic Acid Reduction	17 to 25

1.2 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems 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.* For a specific caution statement, see 19.1.

1.3 Former Test Methods B (Colorimetric Amino Reduction) and C (Colorimetric Molybdovanadophosphate) have been discontinued. Refer to Appendix X1 for historical information.

2. Referenced Documents

2.1 ASTM Standards:

- D 1066 Practice for Sampling Steam²
- D 1129 Terminology Relating to Water²
- D 1192 Specification for Equipment for Sampling Water and Steam in Closed Conduits²
- D 1193 Specification for Reagent Water²
- D 2777 Practice for Determination of Precision and Bias of Methods of Committee D-19 on Water²
- D 3370 Practices for Sampling Water from Closed Conduits²

¹ These test methods are under the jurisdiction of ASTM Committee D-19 on Water and are the direct responsibility of Subcommittee D 19.05 on Inorganic Constituents in Water.

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² Annual Book of ASTM Standards, Vol 11.01.

E 60 Practice for Photometric and Spectrophotometric Methods for Chemical Analysis of Metals³

E 275 Practice for Describing and Measuring Performance of Ultraviolet, Visible, and Near Infrared Spectrophotometers⁴

3. Terminology

3.1 *Definitions*— For definitions of terms used in these test methods, refer to Terminology D 1129D 1129.

4. Summary of Test Methods

4.1 Both test methods are based on reactions that are specific for the orthophosphate ion. With Test Method A the analytical scheme shown in Fig. 1 is used to measure various forms of phosphorus in the water sample. The separations into various forms are largely analytically defined, but the differentiations have been selected for interpretive purposes.

4.1.1 Separation into dissolved and total recoverable forms depends on filtration of the water sample through a 0.45-μm membrane filter. A reproducible, gross separation of dissolved from particulate forms of phosphorus is made with the uniform pore size membrane filter, but no claim can be made that separation is complete. The sample should be filtered as soon as possible after it is drawn if dissolved forms are to be measured, since the ratio of dissolved to particulate phosphorus may change when analysis is delayed. Total recoverable phosphorus includes all phosphorus forms when the unfiltered, shaken sample is heated in the presence of sulfuric acid and ammonium persulfate.

4.1.2 *Orthophosphate (A)*—Only orthophosphate and a negligible amount of hydrolyzable phosphorus is measured when the test is run on the undigested sample. An insignificant fraction of the hydrolyzable phosphorus may be converted to orthophosphate on addition of the acidic reagent during the test, particularly if completion of the test is delayed after the addition of acid.

³ Annual Book of ASTM Standards, Vol 03.05.

⁴ Annual Book of ASTM Standards, Vol 03.06.

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