



Standard Test Method for Total Peroxides in Acrylonitrile¹

This standard is issued under the fixed designation E1784; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope*

1.1 This test method describes a procedure for determining the total peroxide content of acrylonitrile in the range of 0.1 to 0.6 mg H₂O₂/kg acrylonitrile (ppm). Peroxides are an undesirable impurity in acrylonitrile.

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

1.3 *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.* Specific hazard statements are given in Section 7.

1.4 Review the current Material Safety Data Sheets (MSDS) for detailed information concerning toxicity, first aid procedures, and safety precautions.

2. Referenced Documents

2.1 *ASTM Standards:*²

D1193 Specification for Reagent Water

E60 Practice for Analysis of Metals, Ores, and Related Materials by Spectrophotometry

E180 Practice for Determining the Precision of ASTM Methods for Analysis and Testing of Industrial and Specialty Chemicals (Withdrawn 2009)³

E200 Practice for Preparation, Standardization, and Storage of Standard and Reagent Solutions for Chemical Analysis

3. Summary of Test Method

3.1 Peroxides in the sample react with potassium iodide to form the yellow I₃ ion. The intensity of the color, which is

proportional to the concentration of the I₃ ion, is measured at 365 nm. Results are expressed as total peroxides as H₂O₂.

4. Significance and Use

4.1 This test method provides for the determination of total peroxide in acrylonitrile in the range of 0.1 to 0.6 ppm. Only peroxides or other oxidants that react under the conditions of this test method are measured.

5. Apparatus

5.1 *Spectrophotometer*, capable of measuring at 365 nm,

5.2 *Absorption Cells*, 1-cm, borosilicate, matched, and

5.3 *Buret*, 25-mL capacity.

NOTE 1—Photometers and photometric practice described in this test method shall conform to Practice E60.

6. Reagents

6.1 *Purity of Reagents*—Unless otherwise indicated, all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society where such specifications are available.⁴ 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.

6.2 *Purity of Water*—Unless otherwise indicated, references to water mean Type II or Type III reagent water conforming to Specification D1193.

6.3 *Potassium Iodide*.

6.4 *Acetic Anhydride*.

6.5 *Hydrogen Peroxide, 30 %*.

6.6 *Acrylonitrile, Peroxide Free*—Prepare by passing acrylonitrile through a 2 cm × 40 cm glass column packed with 50 mL of activated alumina or acid form ion exchange resin.⁵

¹ This test method is under the jurisdiction of ASTM Committee E15 on Industrial and Specialty Chemicals and is the direct responsibility of Subcommittee E15.02 on Product Standards.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ *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. Pharmacopeial Convention, Inc. (USPC), Rockville, MD.

⁵ Rohm and Haas Amberlyst 15 has been found to be suitable or an equivalent resin may be used.

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