



Standard Test Methods for Physical and Chemical Properties of Particulate Ion- Exchange Resins¹

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1. Scope

1.1 These test methods cover the determination of the physical and chemical properties of ion-exchange resins when used for the treatment of water. They are intended for use in testing both new and used materials. The following thirteen test methods are included:

	Sections
Test Method A—Pretreatment	6-10
Test Method B—Water Retention Capacity	11-17
Test Method C—Backwashed and Settled Density	18-24
Test Method D—Particle Size Distribution	25-32
Test Method E—Salt-Splitting Capacity of Cation-Exchange Resins	33-41
Test Method F—Total Capacity of Cation-Exchange Resins	42-50
Test Method G—Percent Regeneration of Hydrogen-Form Cation-Exchange Resins	51-58
Test Method H—Total and Salt-Splitting Capacity of Anion-Exchange Resins	59-66
Test Method I—Percent Regeneration of Anion-Exchange Resins	67-75
Test Method J—Ionic Chloride Content of Anion-Exchange Resins	76-83
Test Method K—Carbonate Content of Anion-Exchange Resins	84-91
Test Method L—Sulfate Content of Anion-Exchange Resins	92-99
Test Method M—Total Anion Capacity of Anion-Exchange Resins	100-108

1.2 The values stated in SI units are to be regarded as the standard. The inch-pound units given in parentheses are for information only.

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 precautionary statements are given in Note 1.

¹ These test methods are under the jurisdiction of ASTM Committee D19 on Water and are the direct responsibility of Subcommittee D19.08 on Membranes and Ion Exchange Materials.

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2. Referenced Documents

2.1 ASTM Standards:²

- D 1129 Terminology Relating to Water
- D 1193 Specification for Reagent Water
- D 1293 Test Methods for pH of Water
- D 2687 Practices for Sampling Particulate Ion-Exchange Materials
- D 2777 Practice for Determination of Precision and Bias of Applicable Methods of Committee D19 on Water
- E 11 Specification for Wire Cloth and Sieves for Testing Purposes

3. Terminology

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

3.2 Definitions of Terms Specific to This Standard:

- 3.2.1 *anion-exchange material*—an ion-exchange material capable of the reversible exchange of negatively charged ions.
- 3.2.2 *cation-exchange material*—an ion-exchange material capable of the reversible exchange of positively charged ions.
- 3.2.3 *ion-exchange resin*—a synthetic organic ion-exchange material.
- 3.2.4 *mixed bed*—a physical mixture of anion-exchange material and cation-exchange material.

4. Reagents

4.1 *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, where such specifications are available.³ Other grades may be

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 *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. Pharmaceutical Convention, Inc. (USPC), Rockville, MD.