



Standard Test Methods for Precoat Capacity of Powdered Ion-Exchange Resins¹

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1. Scope

1.1 These test methods cover the determination of the operating ion-exchange capacity of both powdered cation-exchange resins (hydrogen form) and powdered anion-exchange resins (hydroxide form). These test methods are intended for use in testing new powdered ion-exchange resins when used for the treatment of water. The following two test methods are included:

	Sections
Test Method A—Operating Capacity, Anion-Exchange Resin, Hydroxide Form.....	7 to 15
Test Method B—Operating Capacity, Cation-Exchange Resin, Hydrogen Form.....	16 to 24

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.*

2. Referenced Documents

2.1 ASTM Standards:

- D 1125 Test Methods for Electrical Conductivity and Resistivity of Water²
- D 1129 Terminology Relating to Water²
- D 1193 Specification for Reagent Water²
- D 2687 Practices for Sampling Particulate Ion-Exchange Materials³
- D 4456 Test Methods for Physical and Chemical Properties of Powdered Ion-Exchange Resins³
- E 200 Practice for Preparation, Standardization, and Storage of Standard and Reagent Solutions for Chemical Analysis⁴

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

¹ These test methods are under the jurisdiction of ASTM Committee D-19 on Water and are the direct responsibility of Subcommittee D19.08 on Membranes and Ion-Exchange Materials.

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² Annual Book of ASTM Standards, Vol 11.01.

³ Annual Book of ASTM Standards, Vol 11.02.

⁴ Annual Book of ASTM Standards, Vol 15.05.

3.1.1 *powdered ion-exchange material*, *n*—an ion-exchange resin that has undergone post-manufacturing size reduction to less than 300 μm.

3.1.2 *resin dosage*, *n*—the weight of mixed resin applied per unit area of precoatable filter surface. This is expressed as dry pounds per square foot.

3.1.3 *resin floc*, *n*—that voluminous aggregate formed when powdered anion-exchange resin and powdered cation-exchange resin are slurried together in an aqueous suspension.

3.1.4 *resin ratio*, *n*—the ratio of the weights of powdered cation-exchange resin to powdered anion-exchange resin used to prepare a resin slurry. If not otherwise indicated, it is understood to be the ratio of the dry resin weights.

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

4. Significance and Use

4.1 The salt removal capacity of a powdered resin precoat is limited by the capacity of either the anion-exchange resin or the cation-exchange resin contained in it. Applications include condensate polishing in fossil-fueled electric generating plants, as well as condensate polishing, spent fuel pool water treatment, reactor water treatment, and low-level radioactive liquid waste treatment in nuclear-powered electric generating plants.

4.2 By determining the ion-exchange capacity profile of either a cation exchange resin or an anion-exchange resin (capacity expended per unit of time under specific conditions), it is possible to estimate runlength and remaining capacity when treating a liquid of the same makeup. Although they cannot accurately predict performance during condenser leaks, these test methods are useful for determining operating capacities as measured under the test conditions used.

4.3 These test methods may be used to monitor the performance of either powdered anion-exchange resin or powdered cation-exchange resin. The total capacity of either resin depends primarily upon the number density of ion-exchange sites within the resin. The operating capacity is a function of the total capacity, degree of conversion to the desired ionic form when received, and properties of the resin and the system that affect ion exchange kinetics.

5. Purity of Reagents

5.1 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