



Designation: D6302 – 98 (Reapproved 2017)

Standard Practice for Evaluating the Kinetic Behavior of Ion Exchange Resins¹

This standard is issued under the fixed designation D6302; 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.

1. Scope

1.1 This practice is intended to evaluate changes in kinetic performance of ion exchange resins used in mixed beds to produce high purity water. Within strict limitations, it also may be used for comparing resin of different types. This standard does not seek to mimic actual operating conditions. Specific challenge solutions and conditions are specified. At the option of the user, other conditions may be tested.

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 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.*

1.4 *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:*²

D1129 Terminology Relating to Water

D1193 Specification for Reagent Water

D2187 Test Methods for Physical and Chemical Properties of Particulate Ion-Exchange Resins

D2687 Practices for Sampling Particulate Ion-Exchange Materials

D5391 Test Method for Electrical Conductivity and Resistivity of a Flowing High Purity Water Sample

¹ This practice is under the jurisdiction of ASTM Committee D19 on Water and is the direct responsibility of Subcommittee D19.08 on Membranes and Ion Exchange Materials.

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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. Terminology

3.1 Definitions:

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

4. Summary of Practice

4.1 An apparatus is described in which a specified volume of regenerated resin sample is mixed with a corresponding new resin. The mixed bed then is operated at a controlled high flow rate on an influent of known composition, and the quality of the effluent is measured by conductivity, and if agreed upon, other appropriate analytical procedures.

5. Significance and Use

5.1 This practice is intended to evaluate changes in the performance of ion exchange resins used in mixed beds operating as polishing systems for solutions of low ionic strength, typically, <10 mg/L dissolved solids, that are intended to produce very high purity effluents. It is recommended that when new resins are installed in a plant it be used to provide a base line against which the future performance of that resin can be judged.

5.2 The conditions of this test must be limiting kinetically, such that kinetic leakage, and not equilibrium leakage, is tested. This leakage is influenced by a combination of influent flow velocity and concentration, as well as bed depth.

5.3 It is recommended that the practice be followed with the resin ratio, flow rate, and influent quality as indicated. The design of the apparatus permits other variations to be used that may be more appropriate to the chemicals used in a specific plant and the nature of its cooling water, but the cautions and limitations noted in the practice must be accommodated.

5.4 It is possible that the cation resin could experience kinetics problems. In many cases, however, the anion resins are more likely to experience the types of degradation or fouling that could lead to impaired kinetics. Testing of field anion and cation resins together is an option, especially when historic data on the mixed bed will be compiled. Recognize, however, that many variables can be introduced, making it difficult to interpret results or to compare to historical or new resin data on separate components.