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An American National Standard

Standard Guide for Detection of Fouling and Degradation of Particulate Ion Exchange Materials¹

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1. Scope

1.1 This guide presents a series of tests and evaluations intended to detect fouling and degradation of particulate ion exchange materials. Suggestions on reducing fouling and on cleaning resins are given.

1.2 This guide is to be used only as an aid in the evaluation of particulate ion exchange material performance and does not purport to address all possible causes of unsatisfactory performance. The evaluations of mechanical and operational problems are not addressed.

1.3 *This standard does not purport to address all of the safety problems, 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 1129 Terminology Relating to Water²
- D 1193 Specification for Reagent Water²
- D 1782 Test Methods for Operating Performance of Particulate Cation-Exchange Materials³
- D 2187 Test Methods for Physical and Chemical Properties of Particulate Ion Exchange Resins³
- D 2332 Practice for Analysis of Water-Formed Deposits by Wavelength-Dispersive X-Ray Fluorescence³
- D 2687 Practices for Sampling Particulate Ion-Exchange Materials³
- D 3087 Test Method for Operating Performance of Anion-Exchange Materials for Strong Acid Removal³
- D 3375 Test Method for Column Capacity of Particulate Mixed Bed Ion Exchange Materials³
- D 3682 Test Method for Major and Minor Elements in Coal and Coke Ash by the Atomic Absorption Method⁴
- D 3683 Test Method for Trace Elements in Coal and Coke Ash by the Atomic Absorption Method⁴

¹ This guide 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 Annual Book of ASTM Standards, Vol 11.01.

³ Annual Book of ASTM Standards, Vol 11.02.

⁴ Annual Book of ASTM Standards, Vol 05.05.

D 5042 Test Methods for Estimating the Organic Fouling of Particulate Anion Exchange Resins³

E 830 Test Method for Ash in the Analysis Sample of Refuse-Derived Fuel⁵

3. Terminology

3.1 *Definitions*—For definitions of terms used in this guide, refer to Terminology D 1129.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *organic fouling*—the buildup of organic material in or on anion exchange resins by sorption during the service cycle and incomplete removal during normal regeneration.

4. Significance and Use

4.1 Resins used in demineralization systems may deteriorate due to many factors including chemical attack, fouling by organic and inorganic materials, mishandling, or the effects of aging. Detection of degradation or fouling may be important in determining the cause of poor demineralizer performance.

5. Sampling

5.1 Follow the recommendations of Practices D 2687 for obtaining samples of particulate ion exchange materials. Core samples are important for obtaining representative samples; however, special problems may dictate other sampling requirements, such as surface, interface, or other samples.

6. Preliminary Examination

6.1 Examine the sample visually or with the aid of a magnifier for any abnormalities. Note any unusual color, precipitates, biological material (slime), particulate matter, or small pieces or fragments of resin. Note that the color of resin may vary from lot to lot or with normal use and would not be considered unusual.

6.2 Note any peculiar odor associated with the sample, such as from oil, solvents, or biological activity.

7. Moisture and Particulate Size Distribution

7.1 Follow procedures given in Test Methods D 2187, Methods A, B, and D for determining moisture (water retention capacity) and particle size distribution.

⁵ Annual Book of ASTM Standards, Vol 11.04.