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.

Designation: D932 – 20

Standard Practice for Filamentous Iron Bacteria in Water and Water-Formed Deposits[1]

This standard is issued under the fixed designation D932; 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 covers the determination of filamentous iron bacteria (FIB) by microscopic examination. This practice provides for the identification of the following genera of bacteria found in water and water-formed deposits: *Siderocapsa*, *Gallionella (Dioymohelix)*, *Sphaerotilus*, *Crenothrix*, *Leptothrix*, and *Clonothrix*.

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, health, and environmental 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]

D887 Practices for Sampling Water-Formed Deposits
D1129 Terminology Relating to Water
D1193 Specification for Reagent Water
D3370 Practices for Sampling Water from Flowing Process Streams
D5465 Practices for Determining Microbial Colony Counts from Waters Analyzed by Plating Methods

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 The iron bacteria are generally filamentous, typically found in fresh water, and frequently surrounded by a sheath which is usually encrusted with iron or manganese, or both (**1**, **2**).[3] However, Starkey (**3**) reports another type which is classified among the true bacteria. Detection and identification is accomplished by microscopic examination of sediment from the sample.

4.2 This practice provides a qualitative indication of the density of the filamentous iron bacteria and the severity of the clogging problem in pipes caused by these bacteria.

5. Significance and Use

5.1 Filamentous iron bacteria is a general classification for microorganisms that utilize ferrous iron as a source of energy and are characterized by the deposition of ferric hydroxide in their mucilaginous sheaths. The process is continuous with these growths, and over a period of time large accumulations of slimy brown deposits can occur. Iron bacteria may clog water lines, reduce heat transfer, and cause staining; objectionable odors may arise following death of the bacteria. The organic matter in the water is consequently increased, and this in turn favors the multiplication of other bacteria.

6. Apparatus

6.1 *Centrifuge,* complete with 250 mL conical bottles.

6.2 *Cover Glasses,* round or square type, 19 mm (¾ in.) in diameter.

6.3 *Filter Paper or Blotter.*

6.3.1 For 8.3.2.1 – Grade 5 (nominal 2.5 µm particle-size retention).

6.3.2 For 9.3 – any absorbent paper medium will suffice.

6.4 *Containers,* sterile 1 L glass or plastic (can be autoclavable).

[1] This practice is under the jurisdiction of ASTM Committee D19 on Water and is the direct responsibility of Subcommittee D19.24 on Water Microbiology.

Current edition approved May 1, 2020. Published May 2020. Originally approved in 1947. Last previous edition approved in 2015 as D932 – 15. DOI: 10.1520/D0932-20.

[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 boldface numbers in parentheses refer to a list of references at the end of this standard.

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