



Designation: D8489 – 23^{ε1}

Standard Test Method for Determination of Microplastics Particle and Fiber Size, Distribution, Shape, and Concentration in Waters with High to Low Suspended Solids Using a Dynamic Image Particle Size and Shape Analyzer¹

This standard is issued under the fixed designation D8489; 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.

^{ε1} NOTE—Research report information was added to Section 14 editorially in May 2023.

1. Scope

1.1 This test method covers the determination of microplastic particle size distribution, shape characterization, and number concentration (particle counts) in sample extracts containing particles between 5 μm and 100 μm. Light is transmitted through a flow cell containing particles in liquid medium. The particles create shadows as they pass through the field of vision of a camera, producing a multitude of images. The images are then used to measure size, shape, and concentration.

1.2 This test method is used as a complementary technique for microplastic particle and fiber polymer identification methods infrared microscopy and gas chromatography/mass spectroscopy pyrolysis.

1.3 This test method requires that samples are collected according to Practice D8332 and prepared according to Practice D8333 prior to use.

1.4 *Units*—The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.5 *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.*

1.6 *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

- D883 Terminology Relating to Plastics
- D1129 Terminology Relating to Water
- D1193 Specification for Reagent Water
- D5847 Practice for Writing Quality Control Specifications for Standard Test Methods for Water Analysis
- D8332 Practice for Collection of Water Samples with High, Medium, or Low Suspended Solids for Identification and Quantification of Microplastic Particles and Fibers
- D8333 Practice for Preparation of Water Samples with High, Medium, or Low Suspended Solids for Identification and Quantification of Microplastic Particles and Fibers Using Raman Spectroscopy, IR Spectroscopy, or Pyrolysis-GC/MS
- E131 Terminology Relating to Molecular Spectroscopy
- E1617 Practice for Reporting Particle Size Characterization Data
- E2651 Guide for Powder Particle Size Analysis

3. Terminology

3.1 *Definitions*—For definitions of terms relating to this test method, refer to Terminologies D1129 and D883, and for definitions of terms relating to molecular spectroscopy, refer to Terminology E131.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *microplastic, n*—plastic particle less than 5 millimeters (mm) in size.

3.2.1.1 *Discussion*—The lower size of a plastic particle determined as a microplastic is usually classified as 1 micron (μm); however, the smaller size is limited by sample collection, sample preparation, and analysis.

¹ This test method is under the jurisdiction of ASTM Committee D19 on Water and is the direct responsibility of Subcommittee D19.06 on Methods for Analysis for Organic Substances in Water.

Current edition approved March 1, 2023. Published March 2023. DOI: 10.1520/D8489-23E01.

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.