Microplastics Standards - Status and Future Needs

The Science of Microplastics in the World Ocean - WHOI

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A standard is:

• a recognized unit of comparison by which the correctness of others can be determined.
• a set of characteristics or qualities that describes features of a product, process, or service.
Why Are Standards Important

- Fire sprinkler systems – NFPA 13
- Internet communications – HTTP/3
- Lights – UL 8750 (LEDs)
- Electricity – NEC
- Baseball – Official Baseball Rules
XKCD on Standards

How standards proliferate:

Situation: There are 14 competing standards.

14?! Ridiculous! We need to develop one universal standard that covers everyone's use cases. Yeah!

Soon:

Situation: There are 15 competing standards.

See: A/C chargers, character encodings, instant messaging, etc.

https://xkcd.com/927/
Background

“The lack of standard methods for sampling and analyzing microplastics in the environment means that comparisons across studies are difficult”

-WHO Report on MPs in Drinking Water

“Professional standards, certifications, and product labelling can motivate action”

-A Scientific Perspective on MPs in Nature and Society - SAPEA
• The average microplastics content was 118 ± 88 particles/L

• The large MP surface concentrations were between 10,000 and 250,000 pieces/km². Small microplastic concentrations ranged from 500,000 to 7,000,000 pieces/km². These concentrations are similar to the existing data (13–501 plastic debris per m³)


Sampling Microplastics

- Marine Environments
- Biological samples
- Atmospheric samples
Micro particles based on polystyrene

size: 10 µm

Synonym: Latex beads from PS

MDL number MFD00243243

SKU-Pack Size | Availability | Pack Size | Price (USD) | Quantity
---|---|---|---|---
72586-5ML-F | Available to ship on 10/15/19 - FROM | 5 ML | 275.00 | 0
72586-10ML-F | Only 3 left in stock (more on the way) - FROM | 10 ML | 426.00 | 0

Product Recommendations

- 79653 Micro particles based on polystyrene size: 5 µm
- 74491 Micro particles based on polystyrene size: 20 µm
- 89904 Micro particles based on polystyrene size: 1 µm
- 94135 Micro particles based on polystyrene size: 30 µm
- 74994 Micro particles based on polystyrene size: 15 µm
At the heart of the U.S. standards system are voluntary standards that arise from a formal, coordinated, consensus-based and open process. Developed by subject matter experts from both the public and private sectors, the voluntary process is open to all affected parties and relies upon cooperation and compromise among a diverse range of stakeholders.
Standards Bodies

ASTM International

American National Standards Institute

NSF International

International Organization for Standardization
# ASTM Activities

## Active Committees

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<th>Name</th>
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<tr>
<td>ASTM D19.06</td>
<td>Methods for Analysis for Organic Substances in Water</td>
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<td>ASTM D20.96</td>
<td>Environmentally Degradable Plastics and Biobased Products</td>
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<td>ASTM D13.40</td>
<td>Sustainability of Textiles</td>
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### ISO Activities

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Additional MP TCs in soil, air, textiles, sewage treatment
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<tr>
<td>ASTM WK67565</td>
<td>Standard Test Method for the Spectroscopic Identification and Quantification of Microplastic Particles in Water Using Raman and IR Spectroscopy</td>
<td>Draft</td>
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<tr>
<td>ASTM WK67563</td>
<td>Collection of Wastewater Samples for the Identification and Quantification of Microplastic Particle</td>
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<tr>
<td>ASTM WK67564</td>
<td>Preparation of Wastewater Samples Allowing the Identification and Quantification of Microplastic Particles using Raman and FTIR Microscopy</td>
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<tr>
<td>ASTM WK67788</td>
<td>Identification of Microplastic Particles and fibers in Municipal Wastewater using Pyrolysis-GC/MS</td>
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<td>ASTM WK62604</td>
<td>New Test Method for Qualitative and Quantitative Fiber Release of Fabrics - Dry Method</td>
<td>Proposed</td>
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<td>ASTM D7841 - 13</td>
<td>Standard Practice for Sustainable Laundry Best Management Practices</td>
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D833 – 19b – Standard terminology relating to plastics

Plastic(s), $n$ – a material that contains as an essential ingredient one or more organic polymer substances of large molecular weight, is solid in its finished state, and, at some stage in its manufacture or processing into finished articles, can be shaped by flow.
• Identification and quantitation of microplastic particles in municipal raw wastewater influent and treated effluent

• Designed to distinguish plastic materials in municipal wastewater ranging in size from 20µm—5mm and index particle types via spectroscopic analysis. Confirms microplastic particle size, shape and surface features with appropriate instruments such as a scanning electron microscope

• Applies to all microplastic particles that exhibit absorption and reflection of light applicable for Raman and FTIR spectroscopy.
• **WK 67563 – Wastewater Sample Collection**
  Provides for the collection of municipal sewage and treated wastewater effluent for determining the presence of microplastic particles. Wastewater samples are sieved through sieves of increasingly smaller mesh size to allow for the collection of desired particle size fractions.

• **WK 67788 – Pyrolysis-GC/MS**
  This test method is designed to distinguish plastic particles and fibers in municipal wastewater ranging in size from 1um to 5mm and index particle and fiber types via pyrolysis-GC/MS. Prior to the pyro-gc/ms analysis, it is also desired to confirm microplastic particle size, shape and surface features with appropriate instruments such as a scanning electron microscope (SEM)
• Standard Practice for Sustainable Laundry Best Management Practices

The purpose of this practice is to identify and define sustainable laundry Best Management Practices (BMPs) that are used in commercial laundry facilities to reduce their impact on the environment.
## ISO Standards

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<td>In committee</td>
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<td>ISO/DIS 22766</td>
<td>Plastics -- Determination of the degree of disintegration of plastic materials in marine habitats under real field conditions</td>
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