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Water quality — Sampling

Part 27: Guidance on sampling for microplastics in water



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A requirement is any statement in the Standard which uses the word "shall".

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(a) "should" means that something is recommended.

(b) "may" means that something is permitted.

(c) "can" means that something is possible.

Structure of Standards

A Standard always has the following parts:

(i) The Preface states who developed the Standard, what the Standard is aiming to do, and how it relates to other documents.

(ii) The Scope states what the Standard is about, what it covers and what it does not cover.

(iii) The Normative references clause lists other documents that are referenced in the Standard as part of requirements.

(iv) The Terms and definitions clause defines important terms to help with understanding the Standard.

A Standard may also include other parts, such as the following:

(1) A normative appendix sets additional requirements that need to be conformed to.

(2) An informative appendix provides additional information or guidance. They usually do not contain requirements. If an informative appendix does contain requirements, the Standard will explain when those requirements apply.

(3) A Bibliography lists documents referenced in the Standard but not as part of requirements.

Many Standards include notes. Notes provide recommendations and/or guidance only. They never contain requirements.

Preface

This Standard was prepared by the Standards Australia Committee ME-009, Microplastics.

The objective of this document is to specify the basic methods for sampling suspended microplastics in water (domestic water, freshwater, seawater, treated wastewater and untreated wastewater), for their subsequent characterization. Suspended particles can also include synthetic or semi-synthetic polymeric materials (such as rubber).

This document does not cover chemical analysis, biological (ecotoxicological) methods or physical methods, nor the pre-treatment or digestion methods intrinsic to such analyses.

This document covers general methodologies —

(a) for grab sampling, sampling using a set of successive filters of different pore sizes (cascade filtration), for water samples with low, medium and high content of suspended solids; and

(b) for net sampling using, for example, manta, plankton or neuston nets.

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Contents

Page

Preface ..... **v**
Foreword ..... **vii**
Introduction ..... **viii**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Principles and general considerations **3**
4.1 Methodologies 3
4.1.1 General 3
4.1.2 Grab sampling 3
4.1.3 Volume-reduced sampling 3
4.2 Selecting the most appropriate sampling method 4
4.3 Sampling volume 6
4.4 Quality control 6
4.4.1 General 6
4.4.2 Sources of sampling errors 7
4.4.3 Blanks 8
4.5 Sampling plan 9
4.5.1 General 9
4.5.2 Sampling points 9
4.5.3 Sampling frequency, duration and timing 9
5 Reagents **10**
6 Apparatus **10**
6.1 Grab sampling method 10
6.2 Cascade filtration methods 11
6.3 Net sampling 12
7 Sample handling **16**
7.1 General 16
7.2 Grab sampling method 16
7.3 Cascade filtration methods 16
7.4 Net sampling 16
8 Procedures **17**
8.1 Grab sampling method 17
8.2 Cascade filtration method 1: Sampling of domestic water, treated wastewater and water samples with low suspended solid content 17
8.3 Cascade filtration method 2: Sampling of untreated wastewater or water samples with medium or high suspended solid content 18
8.4 Net sampling 19
9 Sampling report **21**
Bibliography **26**

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 147 *Water quality*, Subcommittee SC 6, *Sampling (general methods)*.

A list of all parts in the ISO 5667 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

Microplastic occurrence in the environment is a prominent concern both to the public and to the scientific community. Determining the amount and distribution of microplastics in water bodies and domestic water is therefore a critical task.[1]-[6] However, the methodology for sampling microplastics in water samples is still lacking in precision. Consistent methodology is only starting to emerge, but still no universal protocol exists for the sampling of these contaminants in water.

The presence of small plastic fragments in the ocean was first reported in 1972,[7] but it was in 2004 that the term “microplastics” was proposed for the first time to describe plastic particles of a few micrometres in diameter.[8] Since then, a wealth of information became available on the abundance and type of microplastics in the marine environment, freshwater and estuarine systems. However, the different studies have used diverse techniques to sample, extract, treat and detect microplastic present in water.

There are many reasons why different studies investigating microplastic occurrence in water and wastewater show different results. The disparity between some of the findings (for microplastic type and abundance) can be partially explained by the fact that differing sampling techniques have been used. Variables pertaining to both time of year and time of day, flow rate and volume of water sampled, grab sampling or sieving the water over an extended period, the use of plastic containers or tubing, selection of a few parts of the sample for analysis, or dissimilar devices to capture the microplastic fragments, can be the causes of variation in study results.

While several standards for water sampling and water quality already exist (e.g. ISO 5667 series and, in particular, ISO 5667-17), microplastics as particular determinands pose a specific challenge which requires a more specific approach. For example, microplastics sampling requires the use of very specific materials for collecting, handling and storing to avoid cross-contamination. Also, microplastic buoyancy can vary depending on their composition, size, shape or colonization by microorganisms, and microplastics are not homogeneously distributed in the water column. Therefore, a more targeted and detailed set of sampling protocols is required to account for these differences. To better understand the fate and impact of microplastics in the environment, a more specific standardized sampling approach should be adopted and applied.

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