ISO/FDIS 16094-2~~:2025(E)~~

ISO/TC 147/SC 2

Secretariat: DIN

Date: 2025-06-04

Water quality — Analysis of ~~microplastics~~microplastic in water —

Part 2: Vibrational spectroscopy methods for waters with low content of suspended solids including drinking water

Qualité de l'eau — Analyse des microplastiques dans l'eau — ~~Partie 2: Méthodes utilisant la spectroscopie vibrationnelle pour les eaux à faible teneur en matières en suspension incluant les eaux potables~~

~~First edition~~

~~Date: 2025-03-12~~

Partie 2: Méthodes de spectroscopie vibrationnelle pour les eaux à faible teneur en matières en suspension, y compris l'eau potable

FDIS stage

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: + 41 22 749 01 11
~~Email~~E-mail: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

© ISO 2025 – All rights reserved

© ISO 2025 – All rights reserved

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 documents 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 2, *Physical, chemical and biochemical methods,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 230, *Water analysis,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

A list of all parts in the ISO 16094 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.

© ISO 2025 – All rights reserved

Introduction

Pollution linked to microplastics is recognized as a global phenomenon. The standardization of the sampling, quantification and identification protocols is required to ensure reliability and comparability of the data produced for health and environmental risk assessments.

Microplastics in water can be identified and quantified using various methodological approaches. Depending on the measurement objectives, several complementary approaches shall be used to cover the full spectrum of microplastics (size and chemical nature). Table 1Table 1 resumes the characteristics and the information obtained with spectroscopic techniques.

Table 1 — Characteristics of the various analytical techniques and information obtained.

Characteristics and information obtained	Raman micro spectroscopy	Infrared micro spectroscopy
Type of sample	Water filtrate residues	
Chemical nature of the polymer	Yes	
Information provided by analytical technique	Functional groups	
Results expression	Polymer type, number of particles, size of particles	
Minimum measurable size range of particles	1 µm to 5 µm	20 µm
Minimum mass subject to measurement after preparation	Undefined	
Consequences for the test sample after measurement	Non-destructive	
Main interferences	Mineralmineral particles, coloured particles, pigments, fluorescence, fatty acids, fatty amides, proteins, surface alterations by biofilms or weathering, carbohydrates, generated by microbes	Mineralmineral particles, proteins, surface alterations by biofilms or weathering, particles loaded with carbon black, presence of water, carbohydrates generated by microbes

© ISO 2025 – All rights reserved

Water quality — Analysis of microplasticsmicroplastic in water— —

Part 2:
Vibrational spectroscopy methods for waters with low content of natural suspended solids including drinking water

WARNING — Persons using this document should be familiar with normal laboratory practice. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices.

IMPORTANT — It is absolutely essential that tests conducted in accordance with this document be carried out by suitably qualified staff.

1 Scope

This document sets outestablishes key principles for the investigation of microplastics in drinking water and water with low content of natural suspended solids using a microscopy technique coupled with vibrational spectroscopy.

This method is applicable to:

— ——determine the size of microplastics [which range from 1 µm to 5 000 µm], count them and classify them by size range;

— ——identify the chemical composition of microplastics, the main ones (most used in industry and most abundant in the environment) being: polyethylene (PE), polypropylene (PP), polyethylene terephthalate (PET), polycarbonate (PC), polystyrene (PS), polytetrafluoroethylene (PTFE), polyvinyl chloride (PVC), polyamide (PA), polymethyl methacrylate (PMMA) and polyurethane (PU);

TheThis method is applicable to water with a low content of organic matter and other suspended matter as defined in ISO 6107 [(1] definition (1mg mg/l to 100 mg/l or lower when interfering with the determination), i.e.,

— ——ultrapure water;

— ——water intended for human consumption;

— ——raw groundwaters.

Given the very low concentrations of microplastics usually present in these waters, special attention shallneeds to be paid to potential sources of contamination during sample preparation.