
**Water quality — Determination of
alkylmercury compounds in water —
Method using gas chromatography-
mass spectrometry (GC-MS) after
phenylation and solvent extraction**

*Qualité de l'eau — Détermination des composés alkyl mercure dans
l'eau — Méthode par chromatographie gazeuse et spectrométrie de
masse (CG-SM) après phénylation et extraction par solvant*



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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).

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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*.

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.

Introduction

This document specifies a method for the determination of alkylmercury compounds in water by gas chromatography-mass spectrometry (GC-MS) after phenylation and solvent extraction.

Alkylmercury has high toxicity that causes Minamata disease in the heavy exposure as discovered at Minamata City in Japan in 1956. Methylmercury in wastewater from an acetaldehyde acetic acid manufacturing plant was identified as a causative substance. Subsequent investigation revealed that ethylmercury poisoning has a similar toxic effect as methylmercury. Japanese government set an effluent standard and an environment standard for alkylmercury.

Minamata Convention on Mercury was adopted by over 140 countries in 2013 for prevention of global environmental pollution and health damage caused by mercury, and entered into force in 2017. The convention states that each party shall identify the relevant point source categories and take measures including the set of release limit values and the use of best available techniques and best environmental practices. It should be noted that the released inorganic mercury is partially converted to alkylmercury by biochemical processes of microorganism in water and sediment. Alkylmercury is concentrated in biota through food chain, and consequently the risk to higher organism increases.

This document will be beneficial to evaluate the risk of alkylmercury from water and to control the anthropogenic releases of alkylmercury from the relevant point sources.

Water quality — Determination of alkylmercury compounds in water — Method using gas chromatography-mass spectrometry (GC-MS) after phenylation and solvent extraction

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 specifies a method for the determination of alkylmercury compounds in filtered water samples by gas chromatography-mass spectrometry after phenylation and solvent extraction.

This method is applicable to determination of individual methylmercury (MeHg) and ethylmercury (EtHg) compounds in surface water and waste water.

The method can be applied to samples containing 0,2 µg/l to 10 µg/l of each compound as mercury mass. Depending on the matrix, the method may also be applicable to higher concentrations after suitable dilution of the sample or reduction in sample size.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

ISO 5667-1, *Water quality — Sampling — Part 1: Guidance on the design of sampling programmes and sampling techniques*

ISO 5667-3, *Water quality — Sampling — Part 3: Preservation and handling of water samples*

ISO 8466-1, *Water quality — Calibration and evaluation of analytical methods and estimation of performance characteristics — Part 1: Statistical evaluation of the linear calibration function*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>