

INTERNATIONAL STANDARD

**ISO
5666**

First edition
1999-05-01

Water quality — Determination of mercury

Qualité de l'eau — Dosage du mercure



Reference number
ISO 5666:1999(E)

Contents

1 Scope	1
2 Normative references	1
3 General interferences	1
4 Determination of mercury after tin(II) chloride reduction without enrichment.....	2
5 Determination of mercury after sodium tetrahydroborate reduction without enrichment.....	9
6 Precision data	11
Annex A (informative) Ultrasonic digestion method.....	13
Annex B (informative) Autoclave digestion method	14
Annex C (informative) Microwave digestion method.....	15

© ISO 1999

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet iso@iso.ch

Printed in Switzerland

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 5666 was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 2, *Physical, chemical and biochemical methods*.

This first edition cancels and replaces the first editions of ISO 5666-1:1983 and ISO 5666-2:1983, which have been technically revised.

Annexes A, B and C of this International Standard are for information only.

Introduction

In natural water sources, mercury compounds generally occur only in very low concentrations (less than 0,1 µg/l). Higher concentrations may be found, for example, in waste water. Mercury can accumulate in sediment and sludge. Both inorganic and organic compounds of mercury may be present.

In order to fully decompose all of the mercury compounds, a digestion procedure is necessary. Digestion can be omitted only if it is certain that the mercury concentration can be measured without this pretreatment.

For measurements in the low concentration range, highest purity reagents, clean reaction vessels, mercury-free air in the laboratory and a very stable measurement system are essential. It should be investigated whether, and to what extent, particular problems will require the specification of additional marginal conditions.

It is absolutely essential that tests conducted according to this International Standard are carried out by suitably qualified staff.

This document is a preview generated by EVS

Water quality — Determination of mercury

1 Scope

This International Standard specifies two methods for the determination of mercury in water, for example in ground, surface and waste waters.

In the method described in clause 4, tin(II) chloride is used as reducing agent. In the method given in clause 5, sodium tetrahydroborate is used as reducing agent. The choice of the method depends on the equipment available and the matrix (see clause 3). Both methods are suitable for the determination of mercury in the concentration range from 0,1 µg/l to 10 µg/l. Higher concentrations can be determined if the water sample is diluted.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 5667-1:1980, *Water quality — Sampling — Part 1: Guidance on the design of sampling programmes*.

ISO 5667-2:1991, *Water quality — Sampling — Part 2: Guidance on sampling techniques*.

ISO 5667-3:1994, *Water quality — Sampling — Part 3: Guidance on the preservation and handling of samples*.

3 General interferences

With mercury there is a risk that exchange reactions, i.e. adsorption and desorption, will occur on the walls of the reaction vessel (see 4.4).

Mercury vapour can diffuse through various plastics; this phenomenon needs to be taken into consideration in the choice of tubing material. Glass or special plastics tubing, e.g. perfluoro(ethylene-propylene) (FEP) tubes, may be used. Silicone tubing is unsuitable.

Volatile organic substances can absorb in the UV range and be mistaken for mercury. These are for the most part removed by adding potassium permanganate until the solution is permanently coloured red and aerating for 10 min with an inert gas, before reduction of the mercury compounds. Often, such interference by non-specific absorption can also be eliminated using a background compensation system.

All solutions have to be brought to the same temperature (< 25 °C) before reduction and stripping of the mercury vapour. Water condensation on the cuvette windows can be prevented by heating the cuvette with, for example, an infrared lamp.

The interferences which occur due to the presence of other elements in the matrix are dependent on the choice of reducing agent. Element concentrations in excess of those listed in Table 1 can cause results which are too low.