ICS 13.060.50 SLOVENSKÁ TECHNICKÁ NORMA Február 2020

STN	**Kvalita vody Stanovenie arzénu a antimónu Časť 2: Metóda atómovej absorpčnej spektrometrie s generovaním hydridov (HG-AAS)**	**STN ISO 17378-2** 75 7454

Water quality
Determination of arsenic and antimony
Part 2: Method using hydride generation atomic absorption spectrometry (HGAAS)

Qualité de l'eau
Dosage de l'arsenic et de l'antimoine
Partie 2: Méthode par spectrométrie d'absorption atomique à génération d'hydrures (HG-AAS)

Wasserqualität
Bestimmung von Arsen und Antimon
Teil 2: Verfahren unter Verwendung der Hydriderzeugungs-Atomabsorptionsspektrometrie (HGAAS)

Táto norma obsahuje anglickú verziu ISO 17378-2: 2014.

This standard includes the English version of ISO 17378-2: 2014.

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STN ISO 17378-2: 2020

Anotácia

Túto časť ISO 17378 by mali používať analytici so skúsenosťami s analýzou stopových prvkov pri veľmi nízkych koncentráciách.

Koncentrácie arzénu v prírodných vodách sú veľmi variabilné, od <10 µg/l do niekoľkých miligramov na liter v niektorých častiach Ázie, Južnej Ameriky a USA, významné sú v delte Gangy, kde otrava arzénom z kontaminovaných studní je vážnym problémom. Koncentrácie antimónu v prírodných vodách sú zvyčajne výrazne pod 10 µg/l. Arzén a antimón sa vyskytujú prirodzene v organických a anorganických zlúčeninách a môžu mať oxidačné stupne -III, 0, III a V.

Na úplné rozloženie všetkých zlúčenín arzénu alebo antimónu je potrebný rozklad vzorky. Rozklad sa môže vynechať, iba ak je isté, že arzén alebo antimón vo vzorke môže tvoriť kovalentný hydrid bez nutnosti predbežnej oxidácie.

Užívateľ by si mal byť vedomý, že konkrétne problémy môžu vyžadovať špecifikáciu ďalších podmienok.

Metóda stanovenia arzénu alebo antimónu je vo všetkých aspektoch rovnaká okrem prípravy štandardných roztokov, ktoré sa majú skúšať. Aby sa predišlo opakovaniu alebo duplicite, text sa vzťahuje na arzén aj antimón, ak je rovnako uplatniteľný v oboch prípadoch. Článok týkajúci sa prípravy štandardných roztokov je rozdelený na 5.11.1, ktorý sa zaoberá roztokmi arzénu, a 5.11.2, ktorý sa zaoberá roztokmi antimónu.

Vypracovanie normy

Spracovateľ: Úrad pre normalizáciu, metrológiu a skúšobníctvo SR, Bratislava

Technická komisia: TK 27 Kvalita a ochrana vody

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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 147, *Water quality*, Subcommittee SC 2, *Physical, chemical and biochemical methods*.

This first edition of ISO 17378-2 cancels and replaces ISO 11969:1996, which has been technically revised.

ISO 17378 consists of the following parts, under the general title *Water quality — Determination of arsenic and antimony*:

— *Part 1: Method using hydride generation atomic fluorescence spectrometry (HG–AFS)*

— *Part 2: Method using hydride generation atomic absorption spectrometry (HG–AAS)*

Introduction

This part of ISO 17378 should be used by analysts experienced in the handling of trace elements at very low concentrations.

Arsenic concentrations in natural waters are highly variable, from <10 µg/l to as high as several milligrams per litre in some parts of Asia, South America and the USA, notable in the Ganges delta where arsenic poisoning from contaminated tube wells is a serious problem. Antimony concentrations in natural waters are generally well below 10 µg/l. Arsenic and antimony occur naturally in organic and inorganic compounds and may have oxidation states –III, 0, III and V.

In order to fully decompose all of the arsenic or antimony compounds, a digestion procedure is necessary. Digestion can only be omitted if it is certain that the arsenic or antimony in the sample can form a covalent hydride without the necessity of a pre-oxidation step.

The user should be aware that particular problems could require the specification of additional marginal conditions.

The method for determining arsenic or antimony is identical in all aspects except for the preparation of standard solutions to be tested. To avoid repetition or duplication the text refers to both arsenic and antimony where the text is equally applicable to both instances. The subclause dealing with preparation of standard solutions is divided into 5.11.1, which deals with solutions of arsenic, and 5.11.2, which deals with solutions of antimony.

INTERNATIONAL STANDARD **ISO 17378-2:2014(E)**

Water quality — Determination of arsenic and antimony —

Part 2: Method using hydride generation atomic absorption spectrometry (HG-AAS)

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 and to ensure compliance with any national regulatory conditions.

IMPORTANT — It is absolutely essential that tests conducted according to this document be carried out by suitably trained and experienced staff.

1 Scope

This part of ISO 17378 specifies a method for the determination of arsenic and antimony. The method is applicable to drinking water, surface water, ground water, and rain water. The approximate linear application range of this part of ISO 17378 for both elements is from 0,5 µg/l to 20 µg/l. Samples containing higher concentrations than the application range can be analysed following appropriate dilution.

Generally sea water is outside the scope of this part of ISO 17378. Sea water samples can be analysed using a standard additions approach providing that this is validated for the samples under test. The method is unlikely to detect organo-arsenic and organo-antimony compounds.

The sensitivity of this method is dependent on the selected operating conditions.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 5667-5, *Water quality — Sampling — Part 5: Guidance on sampling of drinking water from treatment works and piped distribution systems*

ISO 5667-6, *Water quality — Sampling — Part 6: Guidance on sampling of rivers and streams*

ISO 5667-8, *Water quality — Sampling — Part 8: Guidance on the sampling of wet deposition*

ISO 5667-11, *Water quality — Sampling — Part 11: Guidance on sampling of groundwaters*

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*

ISO 8466-2, *Water quality — Calibration and evaluation of analytical methods and estimation of performance characteristics — Part 2: Calibration strategy for non-linear second-order calibration functions*

ISO 15587-1, *Water quality — Digestion for the determination of selected elements in water — Part 1: Aqua regia digestion*