SLOVENSKI STANDARD
SIST EN ISO 17353:2005

01-december-2005

Kakovost vode – Določevanje izbranih organokositrnih spojin - Metoda plinske kromatografije (ISO 17353:2004)

Water quality - Determination of selected organotin compounds - Gas chromatographic method (ISO 17353:2004)

Wasserbeschaffenheit - Bestimmung von ausgewählten Organozinnverbindungen - Verfahren mittels Gaschromatographie (ISO 17353:2004)

Qualité de l'eau - Dosage de composés organostanniques sélectionnés - Méthode par chromatographie en phase gazeuse (ISO 17353:2004)

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13.060.50	Preiskava vode na kemične snovi	Examination of water for chemical substances

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Water quality - Determination of selected organotin compounds - Gas chromatographic method (ISO 17353:2004)

Qualité de l'eau - Dosage de composés organostanniques sélectionnés - Méthode par chromatographie en phase gazeuse (ISO 17353:2004)

Wasserbeschaffenheit - Bestimmung von ausgewählten Organozinnverbindungen - Verfahren mittels Gaschromatographie (ISO 17353:2004)

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Foreword

The text of ISO 17353:2004 has been prepared by Technical Committee ISO/TC 147 "Water quality" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 17353:2005 by Technical Committee CEN/TC 230 “Water analysis”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2006, and conflicting national standards shall be withdrawn at the latest by February 2006.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Endorsement notice

The text of ISO 17353:2004 has been approved by CEN as EN ISO 17353:2005 without any modifications.

INTERNATIONAL STANDARD

ISO 17353

First edition
2004-09-15

Water quality — Determination of selected organotin compounds — Gas chromatographic method

Qualité de l'eau — Dosage de composés organostanniques sélectionnés — Méthode par chromatographie en phase gazeuse

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Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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.

ISO 17353 was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 2, *Physical, chemical and biochemical methods*.

Introduction

It should be noted whether and to what extent particular problems will require the specification of additional boundary conditions.

This International Standard describes a gas-chromatographic/organotin specific determination of organotin compounds after derivatization with sodium tetraethyl borate and liquid/liquid extraction.

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

Water quality — Determination of selected organotin compounds — Gas chromatographic method

WARNING — Persons using this International Standard should be familiar with normal laboratory practice. This International Standard 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 International Standard be carried out by suitably trained staff.

1 Scope

This International Standard specifies a method for the identification and quantification of organotin compounds and/ or cations as mentioned in Table 1 in drinking water, surface water and wastewater containing not more than 2 g/l of suspended material. The working range is 10 ng/l to 1 000 ng/l. The respective anions are not determined.

This method can also be applicable to other compounds such as R = methyl, n = 1 to 2 and R = phenyl, n = 1 to 2. This International Standard is also applicable to marine water.

Table 1 — Organotin compounds and cations determined using this International Standard

$R_nSn^{(4-n)+}$	R	n	Name	Acronym
$BuSn^{3+}$	Butyl	1	Monobutyltin cation	MBT
Bu_2Sn^{2+}	Butyl	2	Dibutyltin cation	DBT
Bu_3Sn^{+}	Butyl	3	Tributyltin cation	TBT
Bu_4Sn	Butyl	4	Tetrabutyltin	TTBT
$OcSn^{3+}$	Octyl	1	Monooctyltin cation	MOT
Oc_2Sn^{2+}	Octyl	2	Dioctyltin cation	DOT
Ph_3Sn^{+}	Phenyl	3	Triphenyltin cation	TPhT
Cy_3Sn^{+}	Cyclohexyl	3	Tricyclohexyltin cation	TCyT

2 Normative references

The following referenced documents are indispensable for the application 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 3696:1987, *Water for analytical laboratory use — Specification and test methods*

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

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

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

3 Terms and definitions

For the purposes of this International Standard, the following terms and definitions apply.

3.1
organotin compound
OTC
substance with at least one Sn-C bond

NOTE The number of Sn-C bonds is a measure of the degree of substitution.

3.2
organotin cation
OC
part of the organotin compound that contains all Sn-C bonds (and which is formally loaded)

NOTE In this International Standard, the abbreviation OC is also used for the non-dissociated tetrasubstituted organotin. OC therefore comprises the cations MBT, DBT, TBT, TTBT, MOT, DOT, TCyT, and TPhT.

4 Principle

Organotin compounds in water are alkylated with sodium tetraethylborate and extracted with hexane. The extract can be cleaned with silica. After concentration, the tetrasubstituted OTC are separated by capillary gas chromatography and detected with a suitable system such as MS (mass spectrometry), FPD (flame photometric detection), AED (atomic emission detection). The concentration is determined by calibration for the total procedure using an internal standard mixture.

5 Interferences

The reagents sometimes contain impurities of organotin compounds. It is absolutely essential to verify the blanks (see A.4.6).

6 Reagents

Use reagents of highest purity.

6.1 Water, free of substances causing interference with this method and complying with ISO 3696:1987, Grade 1.

6.2 Nitric acid, $\rho(HNO_3) = 1{,}4$ g/ml.

6.3 Acetic acid, CH_3COOH, glacial.

6.4 Sodium hydroxide solution, $c(NaOH) = 1$ mol/l.

6.5 Sodium acetate, CH_3COONa, anhydrous.

6.6 Sodium sulfate, Na_2SO_4, anhydrous.

6.7 Silica, grain size 0,2 mm to 0,063 mm (200 mesh to 63 mesh).

6.8 Tetrahydrofurane, C_4H_8O, free of peroxides and water.

6.9 Acetone, (propanone) $(CH_3)_2CO$.

6.10 Methanol, CH_3OH.

6.11 Hexane, C_6H_{14}.

6.12 Sodium tetraethylborate, $NaB(C_2H_5)_4$.

6.13 Monobutyltin trichloride, MBTCl, $C_4H_9SnCl_3$.

6.14 Dibutyltin dichloride, DBTCl, $(C_4H_9)_2SnCl_2$.

6.15 Tributyltin chloride, TBTCl, $(C_4H_9)_3SnCl$.

6.16 Tetrabutyltin, TTBT, $(C_4H_9)_4Sn$.

6.17 Monooctyltin trichloride, MOTCl, $C_8H_{17}SnCl_3$.

6.18 Dioctyltin dichloride, DOTCl, $(C_8H_{17})_2SnCl_2$.

6.19 Triphenyltin chloride, TPhTCl, $(C_6H_5)_3SnCl$.

6.20 Tricyclohexyltin chloride, TCyTCl, $(C_6H_{11})_3SnCl$.

6.21 Monoheptyltin trichloride, MHTCl, $C_7H_{15}SnCl_3$; (internal standard).

6.22 Diheptyltin dichloride, DHTCl, $(C_7H_{15})_2SnCl_2$; (internal standard).

6.23 Tripropyltin chloride, TPTCl, $(C_3H_7)_3SnCl$; (internal standard).

6.24 Tetrapropyltin, TTPT, $(C_3H_7)_4Sn$; (internal standard).

6.25 Multicomponent solutions and prepared reagents.

Since stability of multicomponent standard solutions is a matter of concern, it is recommended to prepare several solutions containing solely organotin compounds with the same degree of alkylation/arylation (e.g. four solutions respectively for mono-, di-, tri-, and tetrasubstituted compounds). Stability can be assessed by the absence of degradation products.

6.25.1 Multicomponent-standard solution in methanol, Stock solution A.

For the preparation of 1 mg/ml of organotin cation stock solution, weigh, to the nearest 0,1 mg, the amounts of organotin compounds specified in Table 2 into a 100 ml volumetric flask. Dissolve these compounds in a small amount of methanol (6.10). Then make up to volume with methanol and mix well.

If stored at 4 °C in the dark, the solution is stable for up to one year.