SLOVENSKI STANDARD

SIST EN ISO 22478:2006

01-julij-2006

Kakovost vode ï Določ evanje določ enih eksplozivov in sorodnih spojin ï Metoda tekoč inske kromatografije visoke loč ljivosti (HPLC) z UV-detekcijo (ISO 22478:2006)

Water quality - Determination of certain explosives and related compounds - Method using high-performance liquid chromatography (HPLC) with UV detection (ISO 22478:2006)

Wasserbeschaffenheit - Bestimmung ausgewählter Explosivstoffe und verwandter Verbindungen - Verfahren mittels Hochleistungs-Flüssigkeitschromatographie (HPLC) mit UV-Detektion (ISO 22478:2006)

Qualité de l'eau - Dosage de certains explosifs et de composés apparentés - Méthode utilisant la chromatographie en phase liquide à haute performance (CLHP) avec détection UV (ISO 22478:2006)

Ta slovenski standard je istoveten z: **EN ISO 22478:2006**

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13.060.50

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 22478

February 2006

ICS 13.060.50

English Version

Water quality - Determination of certain explosives and related compounds - Method using high-performance liquid chromatography (HPLC) with UV detection (ISO 22478:2006)

Qualité de l'eau - Dosage de certains explosifs et de composés apparentés - Méthode utilisant la chromatographie en phase liquide à haute performance (CLHP) avec détection UV (ISO 22478:2006)

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This European Standard was approved by CEN on 6 February 2006.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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

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Foreword

This document (EN ISO 22478:2006) has been prepared by Technical Committee ISO/TC 147 "Water quality" in collaboration with 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 August 2006, and conflicting national standards shall be withdrawn at the latest by August 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Endorsement notice

The text of ISO 22478:2006 has been approved by CEN as EN ISO 22478:2006 without any modifications.

INTERNATIONAL STANDARD

ISO 22478

First edition
2006-02-15

Water quality — Determination of certain explosives and related compounds — Method using high-performance liquid chromatography (HPLC) with UV detection

Qualité de l'eau — Dosage de certains explosifs et de composés apparentés — Méthode utilisant la chromatographie en phase liquide à haute performance (CLHP) avec détection UV

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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 22478 was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 2, *Physical, chemical and biochemical methods*.

Introduction

Explosives and related compounds are frequently encountered in groundwater areas near to soil sites contaminated by armaments waste and may also be found in drinking water taken from nearby catchment areas. The range of pollutants will depend on the waste concerned, but will not, as a rule, include all the compounds listed in Table 1. Instead, samples of groundwater containing such pollutants may contain numerous other substances, such as nitro- and dinitrobenzoic acid, nitrophenols and aromatic amines. The compounds listed in Table 1 are frequently used for exploratory examinations of armaments waste.

When using this International Standard, it may be necessary in some cases to determine whether and to what extent particular problems will require the specification of additional conditions.

Water quality — Determination of certain explosives and related compounds — Method using high-performance liquid chromatography (HPLC) with UV detection

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

1 Scope

This International Standard specifies a method for determination of certain explosives, in particular nitrotoluenes, nitroamines and nitrate esters, and related compounds (by-products and degradation products), such as those listed in Table 1, in drinking water, groundwater and surface water.

Depending on the type of sample and the compound to be analysed, the lower limit of the working range for nitroaromatics and nitramines can be assumed to be between 0,1 µg/l and 0,5 µg/l (in some cases, the lower limit may be extended down to 0,05 µg/l). The lower limit of the working range for nitrate esters may be assumed to be higher (0,5 µg/l or more).

Similar compounds, in particular other nitroaromatics, may also be determined by this method, but its applicability will have to be checked in each individual case.

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

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

The substances in the water sample are concentrated by solid-phase extraction using a polystyrene/divinylbenzene-based adsorbent. After elution with a solvent mixture, the eluate is concentrated and the substances are separated by high-performance liquid chromatography (HPLC) and analysed using a UV photodiode array (UV-PDA) detector.

Table 1 — Explosives and related compounds determined by this method (the compounds listed here are particularly likely to be encountered in water samples containing armaments waste)

Name	Abbreviation [a]	Other name	CAS [b] No.	Molar mass	Reference No./ letter in example chromatograms in Clause			
				g/mol	A.1	A.2	A.3	B.1
2,4,6-Trinitrophenol	PA	Picric acid	88-89-1	229,1	1	2	1	a
1,3,5,7-Tetranitro-octahydro-1,3,5,7-tetrazocine	HMX	Octogen	2691-41-0	296,2	2	1	2	b
1,3,5-Trinitro-hexahydro-1,3,5-triazine	RDX	Hexogen	121-82-4	222,1	3	3	4	d
2,2',4,4',6,6'-Hexanitrodiphenylamine	—	Hexyl	131-73-7	439,2	4	19	3	c
Ethylene glycol dinitrate	EGDN	—	628-96-6	152,1	5	4	5	e
Diethylene glycol dinitrate	DEGN	—	693-21-0	196,1	6	5	6	f
1,3,5-Trinitrobenzene	1,3,5-TNB	—	99-35-4	213,1	7	6	7	g
1,3-Dinitrobenzene	1,3-DNB	—	99-65-0	168,1	8	7	9	i
N-Methyl-*N*-2,4,6-tetranitroaniline	CE	Tetryl	479-45-8	287,2	9	8	8	h
Glycerol trinitrate	NG	Nitroglycerine	55-63-0	227,1	10	9	10	j
2,4,6-Trinitrotoluene	2,4,6-TNT	TNT	118-96-7	227,1	11	10	11	k
4-Amino-2,6-dinitrotoluene	4-A-2,6-DNT	—	19406-51-6	197,1	12	11	12	l
2-Amino-4,6-dinitrotoluene	2-A-4,6-DNT	—	35572-78-2	197,1	13	12	13	m
2,6-Dinitrotoluene	2,6-DNT	—	606-20-2	182,1	14	13	14	n
2,4-Dinitrotoluene	2,4-DNT	—	121-14-2	182,1	15	14	15	o
2-Nitrotoluene	2-NT	—	88-72-2	137,1	16	15	17	q
Pentaerythritol tetranitrate	PETN	Nitropenta	78-11-5	316,2	17	18	16	p
4-Nitrotoluene	4-NT	—	99-99-0	137,1	18	16	18	r
3-Nitrotoluene	3-NT	—	99-08-1	137,1	19	17	19	s
Diphenylamine	DPA	—	122-39-4	169,24	20	—	—	—

[a] Standard abbreviations, some of Anglo-Saxon origin.

[b] Chemical Abstracts Service.

The structural formulae of selected compounds are given in Figure 1.