SLOVENSKI STANDARD
SIST EN ISO 10704:2019

01-maj-2019

Nadomešča:
SIST EN ISO 10704:2015
SIST ISO 10704:2013

Kakovost vode - Skupna alfa in skupna beta aktivnost - Preskusna metoda z odlaganjem v tankem sloju (ISO 10704:2019)

Water quality - Gross alpha and gross beta activity - Test method using thin source deposit (ISO 10704:2019)

Wasserbeschaffenheit - Bestimmung der Gesamt-Alpha- und der Gesamt-Beta-Aktivität in nicht-salzhaltigem Wasser - Dünnschichtverfahren (ISO 10704:2019)

Qualité de l'eau - Activités alpha globale et bêta globale - Méthode d'essai par dépôt d'une source fine (ISO 10704:2019)

Ta slovenski standard je istoveten z: **EN ISO 10704:2019**

ICS:

13.060.60	Preiskava fizikalnih lastnosti vode	Examination of physical properties of water
13.280	Varstvo pred sevanjem	Radiation protection

SIST EN ISO 10704:2019 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 10704

March 2019

ICS 13.060.60; 13.280

Supersedes EN ISO 10704:2015

English Version

Water quality - Gross alpha and gross beta activity - Test method using thin source deposit (ISO 10704:2019)

Qualité de l'eau - Activités alpha globale et bêta globale - Méthode d'essai par dépôt d'une source fine (ISO 10704:2019)

Wasserbeschaffenheit - Bestimmung der Gesamt-Alpha- und der Gesamt-Beta-Aktivität in nicht-salzhaltigem Wasser - Dünnschichtverfahren (ISO 10704:2019)

This European Standard was approved by CEN on 16 February 2019.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN ISO 10704:2019) 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of an identical text or by endorsement, at the latest by September 2019, and conflicting national standards shall be withdrawn at the latest by September 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 10704:2015.

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Endorsement notice

The text of ISO 10704:2019 has been approved by CEN as EN ISO 10704:2019 without any modification.

INTERNATIONAL STANDARD

ISO 10704

Second edition
2019-02

Water quality — Gross alpha and gross beta activity — Test method using thin source deposit

Qualité de l'eau — Activités alpha globale et bêta globale — Méthode d'essai par dépôt d'une source fine

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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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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 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 3, *Radioactivity measurements*.

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.

This second edition cancels and replaces the first edition (ISO 10704:2009), which has been technically revised. The main changes compared to the previous edition are as follows:

— Introduction: an introduction has been added;

— Clause 1: the scope has been modified to specify applicability to emergency situations and applicability of waste water as a test sample; information about the exclusion of low energy beta emitters has also been added;

— Clause 4: the filtration has been specified to be carried out at 0,45 µ;

— 5.1.2.2: ^{137}Cs has been introduced as a standard that can be used;

— 5.2.4: the recommended thickness has been increased to up to 400 µg/cm^2;

— 7.6.3.1: in order to evaluate self-absorption phenomena, spiking method has been recommended to mimic the nature of the salt;

— Clause 8:

  — a new Formula (9) has been introduced to obtain the beta activity concentration when systematic correction is not required;

  — the subsequent Formulae have been renumbered;

— Clause 9: several limitations and interferences have been given;

— 9.1: the natural radionuclides contributions have been given.

Introduction

Radioactivity from several naturally-occurring and anthropogenic sources is present throughout the environment. Thus, water bodies (e.g. surface waters, ground waters, sea waters) can contain radionuclides of natural, human-made, or both origins:

— natural radionuclides, including ^{40}K, ^{3}H, ^{14}C, and those originating from the thorium and uranium decay series, in particular ^{226}Ra, ^{228}Ra, ^{234}U, ^{238}U, ^{210}Po and ^{210}Pb can be found in water for natural reasons (e.g. desorption from the soil and washoff by rain water) or can be released from technological processes involving naturally occurring radioactive materials (e.g. the mining and processing of mineral sands or phosphate fertilizers production and use);

— human-made radionuclides such as transuranium elements (americium, plutonium, neptunium, curium), ^{3}H, ^{14}C, ^{90}Sr, and gamma emitting radionuclides can also be found in natural waters. Small quantities of these radionuclides are discharged from nuclear fuel cycle facilities into the environment as a result of authorized routine releases. Some of these radionuclides used for medical and industrial applications are also released into the environment after use. Anthropogenic radionuclides are also found in waters as a result of past fallout contaminations resulting from the explosion in the atmosphere of nuclear devices and accidents such as those that occurred in Chernobyl and Fukushima.

Radionuclide activity concentration in water bodies can vary according to local geological characteristics and climatic conditions and can be locally and temporally enhanced by releases from nuclear installation during planned, existing, and emergency exposure situations[1]. Drinking-water can thus contain radionuclides at activity concentrations which could present a risk to human health.

The radionuclides present in liquid effluents are usually controlled before being discharged into the environment[2] and water bodies. Drinking waters are monitored for their radioactivity as recommended by the World Health Organization (WHO)[3] so that proper actions can be taken to ensure that there is no adverse health effect to the public. Following these international recommendations, national regulations usually specify radionuclide authorized concentration limits for liquid effluent discharged to the environment and radionuclide guidance levels for waterbodies and drinking waters for planned, existing, and emergency exposure situations. Compliance with these limits can be assessed using measurement results with their associated uncertainties as specified by ISO/IEC Guide 98-3 and ISO 5667-20[4].

Depending on the exposure situation, there are different limits and guidance levels that would result in an action to reduce health risk. As an example, during a planned or existing situation, the WHO guidelines for guidance level in drinking water is 0,5 Bq/l for gross alpha activity and 1 Bq/l for gross beta activity.

NOTE The guidance level is the activity concentration with an intake of 2 l/d of drinking water for one year that results in an effective dose of 0,1 mSv/a for members of the public. This is an effective dose that represents a very low level of risk and which is not expected to give rise to any detectable adverse health effects[3].

Thus, the test method can be adapted so that the characteristic limits, decision threshold, detection limit and uncertainties ensure that the radionuclide activity concentrations test results can be verified to be below the guidance levels required by a national authority for either planned/existing situations or for an emergency situation[5][6][7].

Usually, the test methods can be adjusted to measure the activity concentration of the radionuclide(s) in either wastewaters before storage or in liquid effluents before being discharged to the environment. The test results will enable the plant/installation operator to verify that, before their discharge, wastewaters/liquid effluent radioactive activity concentrations do not exceed authorized limits.

The test method(s) described in this document can be used during planned, existing and emergency exposure situations as well as for wastewaters and liquid effluents with specific modifications that could increase the overall uncertainty, detection limit, and threshold.

