Water quality - Measurement of polonium 210 activity concentration in water by alpha spectrometry (ISO 13161:2011)

EESTI STANDARDIKESKUS
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NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 13161:2015 sisaldab Euroopa standardi EN ISO 13161:2015 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 13161:2015 consists of the English text of the European standard EN ISO 13161:2015.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 14.10.2015.	Date of Availability of the European standard is 14.10.2015.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 13161

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English Version

Water quality - Measurement of polonium 210 activity concentration in water by alpha spectrometry (ISO 13161:2011)

Qualité de l'eau - Mesurage de l'activité du polonium 210 dans l'eau par spectrométrie alpha (ISO 13161:2011)

Wasserbeschaffenheit - Bestimmung der Aktivitätskonzentration von Polonium-210 in Wasser mittels Alphaspektrometrie (ISO 13161:2011)

This European Standard was approved by CEN on 27 September 2015.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

The text of ISO 13161:2011 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 13161:2015 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 April 2016, and conflicting national standards shall be withdrawn at the latest by April 2016.

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

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Endorsement notice

The text of ISO 13161:2011 has been approved by CEN as EN ISO 13161:2015 without any modification.

Contents

Page

Introduction

There are different techniques to measure ^{210}Po activity concentration in water: alpha spectrometry, liquid scintillation counting, alpha proportional counting.

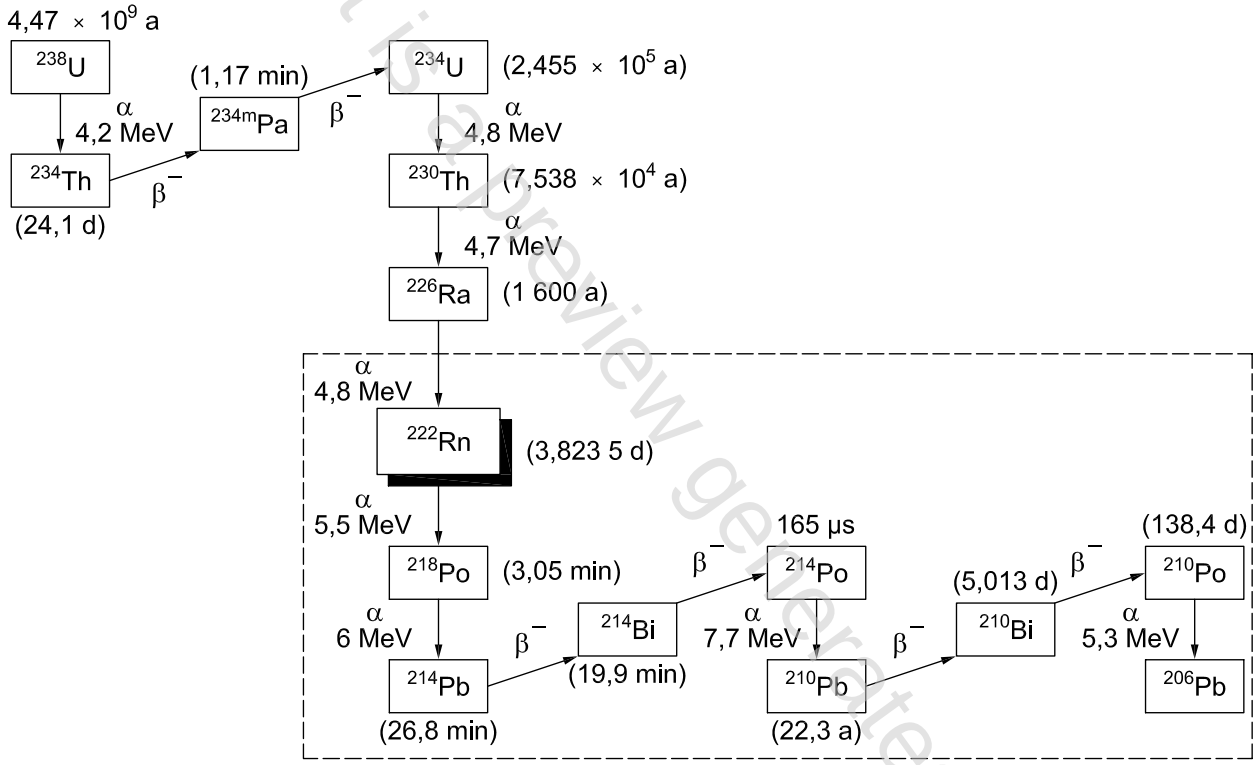
This International Standard describes a method for measuring ^{210}Po activity concentration in natural waters by alpha spectrometry.

Polonium 210 (^{210}Po) is a natural alpha-emitting radionuclide with a half-life of 138 d. It appears in the natural chain of uranium 238 (^{238}U) (see Figure 1). It is a long-life decay product of radon 222 (^{222}Rn) through lead 210 (^{210}Pb) (see References [5] to [9]).

Precautions are required when manipulating radioactive materials such as polonium isotopes.

The activity concentration ranges of ^{210}Po, in drinking waters for example, are generally very low, usually ranging from 1 mBq l^{-1} to 30 mBq l^{-1}.

This International Standard is applicable to all types of water, including sea water, and usually allows the measurement of ^{210}Po activity concentrations greater or equal to 5 mBq l^{-1}.



NOTE ^{206}Pb is stable.

Figure 1 — Uranium 238 and its decay products

Water quality — Measurement of polonium 210 activity concentration in water by alpha spectrometry

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 the measurement of ^{210}Po activity concentration by alpha spectrometry in all kinds of natural waters.

The detection limit of this method depends on the volume of the sample, the counting time, the background count rate and the detection efficiency. In the case of drinking water, the analysis is usually carried out on the raw sample, without filtration or other pretreatment.

If suspended material has to be removed or analysed, filtration at 0,45 µm is recommended. The analysis of the insoluble fraction requires a mineralization step that is not covered by this International Standard (see NF M 60-790-4[4]). In this case, the measurement is made on the different phases obtained. The final activity is the sum of all the measured activity concentrations.

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 and sampling techniques*

ISO 5667-3, *Water quality — Sampling — Part 3: Preservation and handling of water samples*

ISO 11929, *Determination of the characteristic limits (decision threshold, detection limit and limits of the confidence interval) for measurements of ionizing radiation — Fundamentals and application*

ISO 80000-10, *Quantities and units — Part 10: Atomic and nuclear physics*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

ISO/IEC Guide 98-3, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

3 Terms, definitions, symbols and units

For the purposes of this document, the terms, definitions, symbols and abbreviations given in ISO 80000-10 and the following apply.