RADIOAKTIIVSUSE MÕÕTMINE KESKKONNAS. ÕHK: RADOON-222. OSA 5: AKTIIVSUSKONTSENTRATSIOONI PIDEVMÕÕTMISE MEETOD

Measurement of radioactivity in the environment - Air: radon-222 - Part 5: Continuous measurement method of the activity concentration (ISO 11665-5:2012)

EESTI STANDARDIKESKUS
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NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 11665-5:2015 sisaldab Euroopa standardi EN ISO 11665-5:2015 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 11665-5:2015 consists of the English text of the European standard EN ISO 11665-5:2015.
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 16.09.2015.	Date of Availability of the European standard is 16.09.2015.
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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English Version

Measurement of radioactivity in the environment -Air: radon-222 - Part 5: Continuous measurement method of the activity concentration (ISO 11665-5:2012)

Mesurage de la radioactivité dans l'environnement - Air: radon 222 - Partie 5: Méthode de mesure en continu de l'activité volumique (ISO 11665-5:2012)

Ermittlung der Radioaktivität in der Umwelt - Luft: Radon-222 - Teil 5: Kontinuierliches Messverfahren für die Aktivitätskonzentration (ISO 11665-5:2012)

This European Standard was approved by CEN on 12 June 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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European foreword

The text of ISO 11665-5:2012 has been prepared by Technical Committee ISO/TC 85 “Nuclear energy, nuclear technologies, and radiological protection” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 11665-5:2015 by Technical Committee CEN/TC 430 “Nuclear energy, nuclear technologies, and radiological protection” the secretariat of which is held by AFNOR.

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 March 2016, and conflicting national standards shall be withdrawn at the latest by March 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 11665-5:2012 has been approved by CEN as EN ISO 11665-5:2015 without any modification.

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Introduction

Radon isotopes 222, 220 and 219 are radioactive gases produced by the disintegration of radium isotopes 226, 224 and 223, which are decay products of uranium-238, thorium-232 and uranium-235 respectively, and are all found in the earth's crust. Solid elements, also radioactive, followed by stable lead are produced by radon disintegration[1].

When disintegrating, radon emits alpha particles and generates solid decay products, which are also radioactive (polonium, bismuth, lead, etc.). The potential effects on human health of radon lie in its solid decay products rather than the gas itself. Whether or not they are attached to atmospheric aerosols, radon decay products can be inhaled and deposited in the bronchopulmonary tree to varying depths according to their size.

Radon is today considered to be the main source of human exposure to natural radiation. The UNSCEAR (2006) report[2] suggests that, at the worldwide level, radon accounts for around 52 % of global average exposure to natural radiation. The radiological impact of isotope 222 (48 %) is far more significant than isotope 220 (4 %), while isotope 219 is considered negligible. For this reason, references to radon in this part of of ISO 11665 refer only to radon-222.

Radon activity concentration can vary by one to multiple orders of magnitude over time and space. Exposure to radon and its decay products varies tremendously from one area to another, as it depends firstly on the amount of radon emitted by the soil and the building materials in each area and, secondly, on the degree of containment and weather conditions in the area where individuals are exposed.

The values commonly found in the continental environment are usually between a few becquerels per cubic metre and several thousand becquerels per cubic metre. Activity concentrations of one becquerel per cubic metre or less can be observed in the oceanic environment. Radon activity concentrations inside houses can vary from several tens of becquerels per cubic metre to several hundreds of becquerels per cubic metre[3]. Activity concentrations can reach several thousands of becquerels per cubic metre in very confined spaces.

The activity concentration of radon-222 in the atmosphere can be measured by spot, continuous and integrated measurement methods with active or passive air sampling (see ISO 11665-1). This part of ISO 11665 deals with continuous measurement methods for radon-222.

NOTE The origin of radon-222 and its short-lived decay products in the atmospheric environment and other measurement methods are described generally in ISO 11665-1.

Measurement of radioactivity in the environment — Air: radon-222 —

Part 5: Continuous measurement method of the activity concentration

1 Scope

This part of ISO 11665 describes continuous measurement methods for radon-222. It gives indications for continuous measuring of the temporal variations of radon activity concentration in open or confined atmospheres.

This part of ISO 11665 is intended for assessing temporal changes in radon activity concentration in the environment, in public buildings, in homes and in work places, as a function of influence quantities such as ventilation and/or meteorological conditions.

The measurement method described is applicable to air samples with radon activity concentration greater than 5 Bq/m^3.

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 11665-1, *Measurement of radioactivity in the environment — Air: radon-222 — Part 1: Origins of radon and its short-lived decay products and associated measurement methods*

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

IEC 61577-1, *Radiation protection instrumentation — Radon and radon decay product measuring instruments — Part 1: General principles*

IEC 61577-2, *Radiation protection instrumentation — Radon and radon decay product measuring instruments — Part 2: Specific requirements for radon measuring instruments*

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11665-1 apply.

3.2 Symbols

For the purposes of this document, the symbols given in ISO 11665-1 and the following apply.

C activity concentration, in becquerels per cubic metre

C^* decision threshold of the activity concentration, in becquerels per cubic metre