SIST

SLOVENSKI STANDARD
SIST EN ISO 16641:2016

01-junij-2016

Merjenje radioaktivnosti v okolju - Zrak - Radon 220: Integrirane merilne metode za ugotavljanje povprečne koncentracije aktivnosti s pasivnimi polprevodniškimi detektorji nuklearnih sledi (ISO 16641:2014)

Measurement of radioactivity in the environment - Air - Radon 220: Integrated measurement methods for the determination of the average activity concentration using passive solid-state nuclear track detectors (ISO 16641:2014)

Ermittlung der Radioaktivität in der Umwelt - Luft - Radon-220: Integrierende Messmethoden für die Bestimmung der mittleren Aktivitätskonzentration mit passiven Festkörperspurdetektoren (ISO 16641:2014)

Mesurage de la radioactivité dans l'environnement - Air - Radon 220: Méthode de mesure intégrée pour la détermination de l'activité volumique moyenne avec des détecteurs passifs solides de traces nucléaires (ISO 16641:2014)

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17.240	Merjenje sevanja	Radiation measurements

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EUROPEAN STANDARD

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English Version

Measurement of radioactivity in the environment - Air - Radon 220: Integrated measurement methods for the determination of the average activity concentration using passive solid-state nuclear track detectors (ISO 16641:2014)

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Ermittlung der Radioaktivität in der Umwelt - Luft - Radon-220: Integrierende Messmethoden für die Bestimmung der mittleren Aktivitätskonzentration mit passiven Festkörperspurdetektoren (ISO 16641:2014)

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European foreword

The text of ISO 16641:2014 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 16641:2016 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of an identical text or by endorsement, at the latest by October 2016, and conflicting national standards shall be withdrawn at the latest by October 2016.

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Endorsement notice

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INTERNATIONAL STANDARD

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Measurement of radioactivity in the environment — Air — Radon 220: Integrated measurement methods for the determination of the average activity concentration using passive solid-state nuclear track detectors

Mesurage de la radioactivité dans l'environnement — Air — Radon 220: Méthode de mesure intégrée pour la détermination de l'activité volumique moyenne avec des détecteurs passifs solides de traces nucléaires

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Foreword

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The committee responsible for this document is ISO/TC 85, *Nuclear energy, nuclear technologies, and radiological protection*, Subcommittee SC 2, *Radiological protection*.

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, are all found in the earth's crust. Solid elements, also radioactive, followed by stable lead are produced by radon disintegration.[1]

Radon is considered to be the main source of human exposure to natural radiation. The UNSCEAR (2006) report[2] suggests that, at the international level, radon accounts for around 52 % of the global average exposure to natural radiation. Isotope 222 (48 %) is far more significant than isotope 220 (4 %), while isotope 219 is considered negligible.

Recent studies on indoor radon-222 and lung cancer in Europe, North America, and Asia provide strong evidence that radon-222 causes a substantial number of lung cancers in the general population. Current estimates of the proportion of lung cancers attributable to radon-222 range from 3 % to 14 %, depending on the average radon-222 concentration in the country concerned and the calculation methods.[3]

Indoor radon-222 concentration is mainly measured by passive detectors that can measure both radon-222 and radon-220 signals.[4] If the readings are overestimated, the lung cancer risk is given as a biased estimate when epidemiological studies are carried out. Radon-222 and radon-220 parallel measurements have been carried out in several countries[4]-[11] (See Table A.1). Experiences from field work indicate that there is no correlation among radon-222 and radon-220 and its decay products' concentrations. This implies that one parameter cannot be estimated from the other. Unless radon-220 activity concentration is measured, a correct radon-222 concentration cannot be given with a single use of radon-222 measuring device. Therefore, a specific measurement of radon-220 is justified.

Due to its short half-life, radon-220 disappears very rapidly in the atmosphere. An activity concentration gradient is observed from the walls or grounds to the inner space of the room. Depending on the objective of the measurement (building characteristics, construction material characterization, etc.), the sampling location is to be chosen after taking into account this gradient.

Due to a highest level of radon-222 in air, radon-220 is very difficult to measure alone. This International Standard proposes a measuring method of radon-220 activity concentration using a dual system considering radon-222 and radon-220.

There are many ways of measuring the activity concentration of radon-220 and its decay products. The measuring technique proposed is an integrated measurement method for radon-220 only.