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STN	**Prístroje na ochranu pred žiarením. Prístroje na meranie radónu a produktov rozpadu radónu. Časť 3: Špecifické požiadavky na prístroje na meranie produktov rozpadu radónu.**	**STN EN 61577-3** 35 6607

Radiation protection instrumentation - Radon and radon decay product measuring instruments - Part 3: Specific requirements for radon decay product measuring instruments

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 08/15

Obsahuje: EN 61577-3:2014, IEC 61577-3:2011

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61577-3

December 2014

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English Version

Radiation protection instrumentation - Radon and radon decay product measuring instruments - Part 3: Specific requirements for radon decay product measuring instruments (IEC 61577-3:2011 , modified)

Instrumentation pour la radioprotection - Instruments de mesure du radon et des descendants du radon - Partie 3: Exigences spécifiques concernant les instruments de mesure des descendants du radon (CEI 61577-3:2011 , modifiée)

Strahlenschutz-Messgeräte - Geräte für die Messung von Radon und Radon-Folgeprodukten - Teil 3: Besondere Anforderungen an Messgeräte für Radonfolgeprodukte (IEC 61577-3:2011 , modifiziert)

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 61577-3:2014 E

Foreword

This document (EN 61577-3:2014) consists of the text of IEC 61577-3:2011 prepared by IEC/SC 45B "Radiation protection instrumentation" of IEC/TC 45 "Nuclear instrumentation", together with the common modifications prepared by CLC/TC 45B "Radiation protection instrumentation".

The following dates are fixed:

• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2015-11-17
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The text of the International Standard IEC 61577-3:2011 was approved by CENELEC as a European Standard with agreed common modifications.

COMMON MODIFICATIONS

2 Normative references

Add IEC 61577-1 and IEC 61577-4.

6 Test conditions

IEC 61577-3

Edition 2.0 2011-12

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Radiation protection instrumentation – Radon and radon decay product measuring instruments –
Part 3: Specific requirements for radon decay product measuring instruments

Instrumentation pour la radioprotection – Instruments de mesure du radon et des descendants du radon –
Partie 3: Exigences spécifiques concernant les instruments de mesure des descendants du radon

IEC 61577-3:2011

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Radiation protection instrumentation – Radon and radon decay product measuring instruments – Part 3: Specific requirements for radon decay product measuring instruments

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RADIATION PROTECTION INSTRUMENTATION – RADON AND RADON DECAY PRODUCT MEASURING INSTRUMENTS –

Part 3: Specific requirements for radon decay product measuring instruments

FOREWORD

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International Standard IEC 61577-3 has been prepared by sub-committee 45B: Radiation protection instrumentation, of IEC technical committee 45: Nuclear instrumentation.

This second edition of IEC 61577-3 cancels and replaces IEC 61577-3:2002 and IEC 61263:1994. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

– Implementation of new requirements and tests concerning radiation detection performance.
– Implementation of new requirements and tests concerning environmental performance.

– Harmonization of the requirements and tests concerning electrical and mechanical performance with other standards in the area of radiation protection instrumentation.

The text of this standard is based on the following documents:

FDIS	Report on voting
45B/700/FDIS	45B/716/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 61577 series, under the general title *Radiation protection instrumentation – Radon and radon decay product measuring instruments*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

Radon is a radioactive trace gas produced by the decay of ^{226}Ra, ^{223}Ra and ^{224}Ra, respectively decay products of ^{238}U, ^{235}U and ^{232}Th which are present in the earth's crust. By decay, radon isotopes (i.e., ^{222}Rn, ^{219}Rn, ^{220}Rn) produce three decay chains, each ending in a stable lead isotope. The radon isotope ^{220}Rn generally is called thoron[1].

NOTE In normal conditions, due to the very short half-life of ^{219}Rn, its activity and the activity of its RnDP[2] are considered negligible compared to the activity of the two other series. Its health effects are therefore not important. Thus in this standard ^{219}Rn and its decay products are not considered.

Radon isotopes and their corresponding short-lived Radon Decay Products (RnDP) (i.e., ^{218}Po, ^{214}Pb, ^{214}Bi, ^{214}Po for ^{222}Rn, and ^{216}Po, ^{212}Pb, ^{212}Bi, ^{212}Po, ^{208}Tl for ^{220}Rn) are of considerable importance, as they constitute the major part of the radiological exposure to natural radioactivity for the general public and workers. In some workplaces such as underground mines, spas and waterworks, the workers are exposed to very significant levels of RnDP. Various quantities of these radionuclides are airborne in a gaseous form for the radon isotopes and as particulates for the radon decay products. It is worthwhile for health physicists to be able to measure with a great accuracy the level of this kind of natural radioactivity in the atmosphere. Because of the unique behaviour of these radioactive elements in the atmosphere and in the corresponding measuring instruments, it is necessary to formalize the way such instruments could be tested.

The standard series IEC 61577 covers specific requirements concerning test and calibration of radon and radon decay product measuring instruments. In order to facilitate its use, the IEC 61577 series is divided into the following different parts:

IEC 61577-1 (Normative): This part deals with the terminology and units used in the specific area of radon and radon decay products (RnDP) measurements and describes briefly the System for Test Atmospheres with Radon (STAR) used for test and calibration of radon and RnDP measuring devices.

IEC 61577-2 (Normative): This part is dedicated to the test of ^{222}Rn and ^{220}Rn measuring instruments.

IEC 61577-3 (Normative): This part is dedicated to the test of $RnDP_{222}$ and $RnDP_{220}$ measuring instruments.

IEC 61577-4 (Normative): This part describes the construction of a STAR and its use for testing.

IEC 61577-5 (Informative): This is a technical guide concerning special features of radon and radon decay products as well as their measurement.

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1 The term *thoron* is not used in this standard. Instead, the term *radon* is used to denote the radionuclides ^{220}Rn and ^{222}Rn. In the case of only one radionuclide being explicitely specified, the atomic mass number and the chemical symbol will be given.

2 RnDP is the acronym of Radon Decay Products which are sometimes denoted as radon progeny. The term *Radon Decay Product* or its abbreviation (RnDP) denotes the whole set of short-lived decay products that are the focus of this standard. A particular isotope is indicated by its chemical symbol preceded by its mass number. The subscripts $_{222}$, $_{220}$ added to the symbol RnDP refer to the whole set of short-lived decay products of the corresponding radon isotope ($RnDP_{222}$: ^{218}Po, ^{214}Pb, ^{214}Bi, ^{214}Po, and $RnDP_{220}$: ^{216}Po, ^{212}Pb, ^{212}Bi, ^{212}Po, ^{208}Tl).

RADIATION PROTECTION INSTRUMENTATION – RADON AND RADON DECAY PRODUCT MEASURING INSTRUMENTS –

Part 3: Specific requirements for radon decay product measuring instruments

1 Scope

This part of IEC 61577 describes the specific requirements for instruments measuring the volumetric activity of airborne short-lived radon decay products and/or their ambient potential alpha-energy concentration outdoors, in dwellings, and in workplaces including underground mines.

This standard applies practically to all types of electronic instruments that are based on grab sampling, continuous sampling technique and electronic integrating measurement methods. The measurement of activity retained by a sampling device, for example a filtering device, can be performed both during sampling or after the completion of a collection cycle.

The different types of instrumentation used for measurements are stated in IEC 61577-1.

2 Normative references

The following references are indispensable in applying this document. For dated references, only the cited edition applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-394, *International Electrotechnical Vocabulary (IEV) – Part 394: Nuclear instrumentation – Instruments, systems, equipment and detectors*

IEC 60068-2-27, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

IEC 61000-6-4, *Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments*

IEC 61140, *Protection against electric shock – Common aspects for installation and equipment*

IEC 61187, *Electrical and electronic measuring equipment – Documentation*

ISO/IEC Guide 98-3:2008, *Uncertainty of measurement – Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*