
Instrumenti za zaščito pred sevanjem - Instrumenti za merjenje radona in njegovih razpadnih produktov - 4. del: Oprema za proizvodnjo referenčnih atmosfer, ki vsebujejo radonove izotope in njihove razpadne produkte (STAR)

Radiation protection instrumentation - Radon and radon decay product measuring instruments -- Part 4: Equipment for the production of reference atmospheres containing radon isotopes and their decay products (STAR)

Radiation protection instrumentation - Radon and radon decay product measuring instruments - Part 4: Equipment for the production of reference atmospheres containing radon isotopes and their decay products (STAR)

[SIST EN 61577-4:2015](https://standards.iteh.ai/catalog/standards/sist/2cd7991a-978c-4786-9f7e-c61028474111/sist-en-61577-4-2015)

Instrumentation pour la radioprotection Instruments de mesure du radon et des descendants du radon -- Partie 4: Dispositif pour la réalisation d'atmosphères de référence contenant des isotopes du radon et leurs descendants (STAR)

Ta slovenski standard je istoveten z: EN 61577-4:2014

ICS:

13.280	Varstvo pred sevanjem	Radiation protection
17.240	Merjenje sevanja	Radiation measurements

SIST EN 61577-4:2015

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 61577-4:2015

<https://standards.iteh.ai/catalog/standards/sist/2cd7991a-978c-4786-9f7e-1e33ddc2844f/sist-en-61577-4-2015>

EUROPEAN STANDARD

EN 61577-4

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2014

ICS 13.280

English Version

Radiation protection instrumentation - Radon and radon decay product measuring instruments - Part 4: Equipment for the production of reference atmospheres containing radon isotopes and their decay products (STAR)
(IEC 61577-4:2009 , modified)

Instrumentation pour la radioprotection - Instruments de mesure du radon et des descendants du radon - Partie 4: Dispositif pour la réalisation d'atmosphères de référence contenant des isotopes du radon et leurs descendants (STAR)
(CEI 61577-4:2009 , modifiée)

Strahlenschutz-Messgeräte - Geräte für die Messung von Radon und Radon-Folgeprodukten - Teil 4: Einrichtungen für die Herstellung von Referenzatmosphären mit Radonisotopen und ihren Folgeprodukten (STAR)
(IEC 61577-4:2009 , modifiziert)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

This European Standard was approved by CENELEC on 2014-11-17. CENELEC 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 CENELEC member. [SIST EN 61577-4:2015](https://standards.iteh.ai/catalog/standards/sist/2cd7991a-978c-4786-9f7e-)

<https://standards.iteh.ai/catalog/standards/sist/2cd7991a-978c-4786-9f7e->

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 CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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

Foreword

This document (EN 61577-4:2014) consists of the text of IEC 61577-4:2009 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
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2017-11-17

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

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 61577-4:2015](https://standards.iteh.ai/catalog/standards/sist/2cd7991a-978c-4786-9f7e-1e33ddc2844f/sist-en-61577-4-2015)

<https://standards.iteh.ai/catalog/standards/sist/2cd7991a-978c-4786-9f7e-1e33ddc2844f/sist-en-61577-4-2015>

Endorsement notice

The text of the International Standard IEC 61577-4:2009 was approved by CENELEC as a European Standard with agreed common modifications.

COMMON MODIFICATIONS

2 Normative references

Replace the title indicated for IEC 61577 (all parts) with “*Radiation protection instrumentation – Radon and radon decay product measuring instruments*”.

3 Terms, definitions and units

3.2 Specific terms and definitions

3.2.11 unattached fraction of PAEC

Delete the note.

Add a new note below the entry:

NOTE Z1 The particle size concerned is below 10 nm.

3.2.12 attached fraction

Replace in the note 0,3 µm with 0,5 µm.

<https://standards.iteh.ai/catalog/standards/sist/2cd7991a-978c-4786-9f7e-1e33ddc2844f/sist-en-61577-4-2015>

6 Requirements for the reference atmosphere provided by STAR

6.3 Influence quantities

6.3.1 General

Add to the paragraph “According to Clause 4, only those influence quantities relevant to the kind of STAR under test need to be considered.”

6.3.2 Temperature

In the second paragraph, replace “+18 °C to +22 °C” with “+18 °C to +24 °C”.

6.3.3 Relative humidity

In the second paragraph, replace “50 % RH” with “65 % RH” and “40 % RH to 60 % RH” with “40 % RH to 75 % RH”.

Table 1 – Reference and standard test conditions

Replace the line for temperature as follows:

Temperature	20 °C	18 °C to 24 °C
-------------	-------	----------------

Replace the line for relative humidity as follows:

Relative humidity	65 %	40 % to 75 %
-------------------	------	--------------

Replace the line for ambient gamma dose rate as follows:

Ambient γ dose rate	Negligible	$<0,25 \mu\text{Sv}\cdot\text{h}^{-1}$
----------------------------	------------	--

Replace the line for unattached fraction as follows:

Unattached fraction	Negligible	$<0,25$
---------------------	------------	---------

Replace the line for aerosol size (AMTD or AMAD) as follows:

Aerosol size (AMTD or AMAD)*	0,2 μm	0,1 μm to 0,5 μm
------------------------------	-------------------	--

Table A.1 – Atmosphere characteristic ranges (typical values)

Delete the line of the unattached fraction of RnDP_{222} .

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 61577-4:2015](https://standards.iteh.ai/catalog/standards/sist/2cd7991a-978c-4786-9f7e-1e33ddc2844f/sist-en-61577-4-2015)

<https://standards.iteh.ai/catalog/standards/sist/2cd7991a-978c-4786-9f7e-1e33ddc2844f/sist-en-61577-4-2015>

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-111	1996	International Electrotechnical Vocabulary - Chapter 111: Physics and chemistry	-	-
IEC 60050-393	2003	International Electrotechnical Vocabulary - Part 393: Nuclear instrumentation - Physical phenomena and basic concepts	-	-
IEC 60050-394	2007	International Electrotechnical Vocabulary - Part 394: Nuclear instrumentation - Instruments, systems, equipment and detectors	-	-
IEC 61577	series	Radiation protection instrumentation - Radon and radon decay product measuring instruments	EN 61577	series
ISO/IEC 17025	-	General requirements for the competence of testing and calibration laboratories	EN ISO/IEC 17025	-
ISO/IEC Guide 99	2007	International vocabulary of metrology - Basic and general concepts and associated terms (VIM)	-	-
ICRP 32	-	Annals of the ICRP, Publication N° 32, Limits for inhalation of Radon Daughters by Workers, Vol. 6, N°1, 1981, Pergamon Press	-	-
ICRP 38	-	Annals of the ICRP, Publication N° 38, Radionuclide transformations, Energy and Intensity of Emissions, Vol. 11 – 13, 1983, Pergamon Press	-	-
ICRP 65	-	Annals of the ICRP, Publication N° 65, ICRP Publication 65: Protection against Radon-222 at Home and at Work, Vol. 23/2, 1994, Pergamon Press	-	-

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 61577-4:2015

<https://standards.iteh.ai/catalog/standards/sist/2cd7991a-978c-4786-9f7e-1e33ddc2844f/sist-en-61577-4-2015>



IEC 61577-4

Edition 1.0 2009-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Radiation protection instrumentation – Radon and radon decay product measuring instruments – (standards.iteh.ai)
Part 4: Equipment for the production of reference atmospheres containing radon isotopes and their decay products (STAR)

<https://standards.iteh.ai/catalog/standards/sist/2cd7991a-978c-4786-9f7e-61577-42015>

Instrumentation pour la radioprotection – Instruments de mesure du radon et des descendants du radon –
Partie 4: Dispositif pour la réalisation d'atmosphères de référence contenant des isotopes du radon et leurs descendants (STAR)

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX

U

ICS 13.280

ISBN 978-2-88910-545-8

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope and object.....	7
2 Normative references.....	7
3 Terms, definitions and units.....	8
3.1 General terms and definitions.....	8
3.2 Specific terms and definitions.....	9
3.3 Units and conversion factors.....	12
4 General description of a System for Test Atmospheres with Radon (STAR).....	13
4.1 General.....	13
4.2 Mode of operation of a STAR.....	14
4.2.1 Static mode of operation.....	14
4.2.2 Dynamic mode of operation.....	14
5 Characteristics of a STAR.....	15
5.1 General.....	15
5.2 STAR for radon.....	16
5.2.1 General.....	16
5.2.2 Technical characteristics of STAR containers.....	16
5.2.3 Radon sources.....	16
5.2.4 ^{222}Rn and ^{220}Rn analysis and control.....	17
5.2.5 Analysis and control of climatic parameters.....	18
5.3 STAR for radon and RnDP.....	18
5.3.1 General.....	18
5.3.2 Technical characteristics of STAR containers.....	18
5.3.3 RnDP sources.....	18
5.3.4 RnDP analysis and control.....	19
5.3.5 Sampling flow rate of equipment under test.....	19
5.3.6 Analysis and control of climatic parameters.....	20
6 Requirements for the reference atmosphere provided by STAR.....	20
6.1 General.....	20
6.2 Reference conditions.....	20
6.3 Influence quantities.....	21
6.3.1 General.....	21
6.3.2 Temperature.....	22
6.3.3 Relative humidity.....	22
6.3.4 Atmospheric pressure.....	22
6.3.5 Ambient gamma field.....	23
6.3.6 Working range for exposure to RnDP.....	23
6.3.7 Working range for aerosols.....	23
6.3.8 Exposure time for the instrument under test.....	23
7 Calibration and traceability of measurement methods and instruments used in a STAR.....	23
7.1 Traceability chains.....	23
7.2 Quality assurance.....	24
Annex A (informative) Characteristics of atmospheres that can be simulated in a STAR.....	25

Bibliography.....	27
Figure 1 – Components of a STAR: general case.....	13
Figure 2 – Minimum requirements for a STAR.....	14
Figure 3 – Dynamic mode of operation of a STAR.....	15
Table 1 – Reference and standard test conditions.....	21
Table 2 – Tests with variation of the influence quantities	21
Table A.1 – Atmosphere characteristic ranges (typical values).....	26

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 61577-4:2015

<https://standards.iteh.ai/catalog/standards/sist/2cd7991a-978c-4786-9f7e-1e33ddc2844f/sist-en-61577-4-2015>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

**Part 4: Equipment for the production of reference atmospheres
containing radon isotopes and their decay products (STAR)**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61577-4 has been prepared by subcommittee 45B: Radiation protection instrumentation, of IEC technical committee 45: Nuclear instrumentation.

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

FDIS	Report on voting
45B/598/FDIS	45B/606/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.