
**Oprema za varstvo pred sevanjem – Merilniki notranje kontaminacije –
Razvrstitev, splošne zahteve in postopki preskušanja za prenosno, premično
in inštalirano opremo**

Radiation protection instrumentation - In vivo counters - Classification, general
requirements and test procedures for portable, transportable and installed
equipment

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**Radiation protection instrumentation -
In vivo counters -
Classification, general requirements and test procedures
for portable, transportable and installed equipment
(IEC 61582:2004, modified)**

Instrumentation pour la radioprotection -
Systèmes de mesure in vivo -
Classification, exigences générales
et procédures d'essai pour les appareils
portables, mobiles ou à poste fixe
(CEI 61582:2004, modifiée)

Strahlenschutz-Messgeräte -
Einrichtungen für die
in-vivo-Überwachung -
Ganz- und Teilkörperzähler -
Klassifizierung, allgemeine Anforderungen
und Prüfverfahren für tragbare,
transportable und festinstallierte
Einrichtungen
(IEC 61582:2004, modifiziert)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC 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 CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of the International Standard IEC 61582:2004, prepared by SC 45B, Radiation protection instrumentation, of IEC TC 45, Nuclear instrumentation, together with common modifications prepared by the CENELEC BTTF 111-3, Nuclear instrumentation and radiation protection instrumentation, was submitted to the formal vote and was approved by CENELEC as EN 61582 on 2006-02-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2007-02-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2009-02-01

Annex ZA has been added by CENELEC.

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Endorsement notice

The text of the International Standard IEC 61582:2004 was approved by CENELEC as a European Standard with agreed common modifications as given below.

COMMON MODIFICATIONS

1 Scope and object

Delete in the 10th paragraph, second line: “of the whole body monitor”.

3 Terms and definitions

3.10 relative intrinsic error

Delete the last word of the last paragraph: “activity”.

3.13 energy resolution

Extend the term in order to read “relative energy resolution”.

Delete “full width at half maximum (FWHM)” below the indication of the term.

Shift the first paragraph behind the formula and **start** the shifted paragraph with “Where the full width is measured ...”.

Replace in the text in front of the formula “ R_e ” with “ ϵ_R ”

Replace in the formula “FWHM” with “ ϵ_R ”

Delete the “%” at the end of the formula.

4 Classification

4.1 General classification

In the first line, **replace** “type of elements” with “radionuclides”.

7 Characteristics of equipment for high-energy emitter measurements 100 keV to 3 MeV

7.3 Energy resolution

In the second paragraph, **replace** “9 %” with “10 %”.

7.4 Integral non-linearity

In the first and second paragraph, **replace** “conversion response (integral non-linearity)” with “integral non-linearity (conversion response)”.

8 Performance requirements and test procedures for low-energy emitter measurements

8.1 General test procedures

8.1.2 Tests performed under standard test conditions

Replace reference to “Tables 2, 3 and 4” with reference to “Tables 2 and 3”.

8.4 Radiation characteristics

8.4.2 Linearity (in relation to activity)

8.4.2.3 Expression of results

Correct the explanation of F_{SA} in order to read “is the relative uncertainty of the conventionally true activity of the test phantom in per cent (95 % confidence)”,

extend the explanation of F_{SR} in order to read “... of the test phantom relative to the other sources ...”

8.4.4 Determination of the integral non-linearity (INL) error

8.4.4.2 INL determination

Insert in the first paragraph behind “conversion characteristics”: “(channel number N versus energy E_γ)”,

replace the first explanation below the formula with “the channel number for energy ZERO”

and in the second explanation, **replace** “ k ” with “ K ”

8.4.8 Determination of the maximum count rate

8.4.8.2 Method of test

Replace in the formula “ C_2^{1} ” with “ C_1^{2} ”

8.4.9 Determination of stability

8.4.9.2 Method of test

Replace in the last formula and the paragraph in front of it “ F ” with “ F_{inst} ”.

8.4.10 Energy resolution measurement

8.4.10.1 Determination method

In the second paragraph and in the last paragraph, **replace** reference to 8.4.4 with reference to 8.4.9.

8.5 Environmental performance characteristics

8.5.2.4 Immunity to conducted disturbances

8.5.2.4.2 Method of test

Under a), **replace** “150 kHz to at” with “150 kHz to 80 MHz at”.

8.5.3 Ambient temperature

8.5.3.2 Method of test

In the second paragraph, **replace** the first reference to 8.4.4 with reference to 8.4.9.

9 Performance requirements and test procedures for high-energy emitter measurements

9.4 Radiation characteristics

9.4.2 Linearity

9.4.2.3 Expression of results

Correct the explanation of F_{SA} in order to read “is the relative uncertainty of the conventionally true activity of the test phantom in per cent (95 % confidence)”

extend the explanation of F_{SR} in order to read “... of the test phantom relative to the other sources ...”

9.4.5 Determination of the integral non-linearity (INL) error

9.4.5.2 INL determination

Insert in the first paragraph behind “conversion characteristics”: “(channel number N versus energy E_γ)”,

replace the first explanation below the formula with “the channel number for energy ZERO”

and in the second explanation, **replace** “ k ” with “ K ”

9.4.6 Determination of the efficiency to Caesium-137 661,7 keV gamma

9.4.6.1 Measurement procedure

Replace in the first paragraph “type 3 and 4” with “type 4”.

9.4.11 Determination of the maximum count rate

9.4.11.2 Method of test

Replace the formula with the corrected formula of Subclause 8.4.8.2.

9.4.12 Determination of stability

9.4.12.2 Method of test

In the last formula and the paragraph in front of it, **replace** “ F ” with “ F_{inst} ”.

9.4.13 Energy resolution measurement

9.4.13.1 Determination method

In the second and the last paragraph, **replace** the reference to 9.4.5 with reference to 9.4.12.2.

9.5 Environmental performance characteristics

9.5.2.4 Immunity to conducted disturbances

9.5.2.4.2 Method of test

Replace at the end of a) “(μV)” with “(mV)”.

Table 5 High-energy in vivo counting with Ge semi-conductor detectors

In the fourth line (“energy range”), **replace** “1 000 – 3 000” with “100 – 3 000”.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

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

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-393	- ¹⁾	International Electrotechnology Vocabulary - Part 393: Nuclear instrumentation - Physical phenomena and basic concepts	-	-
IEC 60050-394	- ¹⁾	International Electrotechnical Vocabulary - Chapter 394: Nuclear instrumentation: Instruments	-	-
IEC 60068-2-1	- ¹⁾	Environmental testing - Part 2: Tests - Tests A: Cold	EN 60068-2-1	1993 ²⁾
IEC 60068-2-2	- ¹⁾	Basic environmental testing procedures - Part 2: Tests - Tests B: Dry heat	EN 60068-2-2 ³⁾	1993 ²⁾
IEC 60068-2-6	- ¹⁾	Environmental testing - Part 2: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	1995 ²⁾
IEC 60068-2-14	- ¹⁾	Environmental testing - Part 2: Tests - Test N: Change of temperature	EN 60068-2-14 ⁴⁾	1999 ²⁾
IEC 60068-2-27	- ¹⁾	Basic environmental testing procedures - Part 2: Tests - Test Ea and guidance: Shock	EN 60068-2-27	1993 ²⁾
IEC 60068-2-78	- ¹⁾	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state	EN 60068-2-78	2001 ²⁾
IEC 60721-3-5	- ¹⁾	Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 5: Ground vehicle installations	EN 60721-3-5	1997 ²⁾

1) Undated reference.

2) Valid edition at date of issue.

3) EN 60068-2-2 includes supplement A to IEC 60068-2-2.

4) EN 60068-2-14 includes A1 to IEC 60068-2-14.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60721-3-7	- ¹⁾	Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 7: Portable and non-stationary use	EN 60721-3-7	1995 ²⁾
IEC 61000-4-2	- ¹⁾	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	1995 ²⁾
IEC 61000-4-3	- ¹⁾	Electromagnetic compatibility (EMC) - Part 4-3 : Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3	2006 ²⁾
IEC 61000-4-5	1995	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5	1995
IEC 61000-4-6	- ¹⁾	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields	-	-
IEC 61000-4-12	1995	Electromagnetic compatibility (EMC) - Part 4-12: Testing and measurement techniques - Oscillatory waves immunity test	EN 61000-4-12	1995
IEC 61187 (mod)	1993	Electrical and electronic measuring equipment - Documentation	EN 61187 + corr. March	1994 1995
IEC 61276	1994	Nuclear instrumentation - Guidelines for selection of metrologically supported nuclear radiation spectrometry systems	-	-
ISO 11929-1	2000	Determination of the detection limit and decision threshold for ionizing radiation measurements - Part 1: Fundamentals and application to counting measurements without the influence of sample treatment	-	-
ISO 11929-4	2001	Determination of the detection limit and decision threshold for ionizing radiation measurements - Part 4: Fundamentals and application to measurements by use of linear-scale analogue ratemeters, without the influence of sample treatment	-	-

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