

Radiation protection instrumentation - Ambient and/or directional dose equivalent (rate) meters and/or monitors for beta, X and gamma radiation - Part 1: Portable workplace and environmental meters and monitors

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 60846-1:2014 sisaldab Euroopa standardi EN 60846-1:2014 inglisekeelset teksti.	This Estonian standard EVS-EN 60846-1:2014 consists of the English text of the European standard EN 60846-1:2014.
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English Version

**Radiation protection instrumentation - Ambient and/or directional dose equivalent (rate) meters and/or monitors for beta, X and gamma radiation - Part 1: Portable workplace and environmental meters and monitors
(IEC 60846-1:2009 , modified)**

Instrumentation pour la radioprotection - Instruments pour la mesure et/ou la surveillance de l'équivalent de dose (ou du débit d'équivalent de dose) ambiant et/ou directionnel pour les rayonnements bêta, X et gamma - Partie 1: Instruments de mesure et de surveillance portables pour les postes de travail et l'environnement
(CEI 60846-1:2009 , modifiée)

Strahlenschutz-Messgeräte - Umgebungs- und/oder Richtungs-Äquivalentdosis(leistungs)-Messgeräte und/oder Monitore für Beta-, Röntgen- und Gammastrahlung - Teil 1: Tragbare Messgeräte und Monitore für den Arbeitsplatz und die Umgebung
(IEC 60846-1:2009 , modifiziert)

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

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Foreword

This document (EN 60846-1:2014) consists of the text of IEC 60846-1:2009 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 (dop) 2015-07-28
at national level by publication of an identical
national standard or by endorsement
- latest date by which the national standards conflicting (dow) 2017-07-28
with this document have to be withdrawn

This document supersedes EN 60846:2004.

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 60846-1:2009 are prefixed "Z".

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.

Endorsement notice

The text of the International Standard IEC 60846-1:2009 was approved by CENELEC as a European Standard with agreed common modifications.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60325:2002 NOTE Harmonized as EN 60325:2004 (modified).

IEC 61005:2003 NOTE Harmonized as EN 61005:2004 (modified).

COMMON MODIFICATIONS

All over the document

Replace “1,5 MeV” with “1,33 MeV”.

3 Terms and definitions

In the note of 3.19, **replace** “Tables 5 to 8” with “Tables 5 to 9”.

4 Units and list of symbols

In Table 2, **delete** the row starting with $t_{\min}$.

5 General characteristics of ambient and directional dose equivalent (rate) meters

In 5.7, **replace** “Tables 4 to 8” with “Tables 5 to 9”.

8 Radiation performance requirements and tests

In 8.9.2.2, **replace** the second paragraph by the following:

The initial and final dose equivalent rates shall differ by a factor of 10 or more up to the factor for the change from background dose rate to the maximum dose rate of the rated range. The measurements shall be carried out for both an increase and a decrease in the dose equivalent rate by this factor. The initial or the final dose equivalent rate shall be the background dose rate.

10 Mechanical characteristics of directional and ambient dose equivalent (rate) meters

Add the following new subclause.

10.Z1 Drop test during operation

10.Z1.1 Requirements

Portable dose equivalent (rate) meters shall be able to withstand without damage, a drop from a height of 0,3 m onto a hard steel or concrete surface.

10.Z1.2 Test method

The dose equivalent (rate) meter shall withstand at least one single drop from 0,3 m to each surface of dose equivalent (rate) meter so that the unit is still operable after the drop. The test may be performed either with one or more test units in such a way that one drop onto each surface of the dose equivalent (rate) meter is tested. The instrument passes the test if the instrument response does not deviate after the 6 drop tests from the original response by more than - 17 % to + 25 %. The drop can make the instrument switch off but the user shall be able to switch the unit back on. The physical condition of the instrument shall not be affected by these drops (for example solder joints shall hold, nuts and bolts shall not come loose).

11 Environmental characteristics, performance requirements and tests

In 11.4.2, **replace** the last sentence by “The differences shall be within - 9 % to + 11 %”.

Table 9 – Mechanical performance under test conditions

Add the following at the end of Table 9.

Drop during operation	0,3 m	6 drops from a given height onto steel or concrete surface	10.Z1
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Annexes

Add the following new annex.

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 60050-151	2001	International Electrotechnical Vocabulary (IEV) Part 151: Electrical and magnetic devices	-	-
IEC 60050-393	2003	International Electrotechnology 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 60068-2-31	2008	Environmental testing Part 2-31: Tests - Test Ec: Rough handling shocks, primarily for equipment-type specimens	EN 60068-2-31	2008
IEC 60086-1	2006	Primary batteries Part 1: General	EN 60086-1 ¹⁾	2007
IEC 60086-2 + corr. April	2006 2007	Primary batteries Part 2: Physical and electrical specifications	EN 60086-2 ²⁾	2007
IEC 60359	2001	Electrical and electronic measurement equipment - Expression of performance	EN 60359	2002
IEC 60529 + A1	1989 1999	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May + A1	1991 1993 2000
IEC 61000-4-2 + A1 + A2	1995 1998 2000	Electromagnetic compatibility (EMC) Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2 + A1 + A2 ³⁾	1995 1998 2001
IEC 61000-4-3 + A1	2006 2007	Electromagnetic compatibility (EMC) Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3 + A1	2006 2008
IEC 61000-4-6	2008	Electromagnetic compatibility (EMC) Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields	EN 61000-4-6 ⁴⁾	2009
IEC 61000-4-8 + A1	1993 2000	Electromagnetic compatibility (EMC) Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test	EN 61000-4-8 + A1 ⁵⁾	1993 2001

1) EN 60086-1 is superseded by EN 60086-1:2011, which is based on IEC 60086-1:2011.

2) EN 60086-2 is superseded by EN 60086-2:2011, which is based on IEC 60086-2:2011.

3) EN 61000-4-2 is superseded by EN 61000-4-2:2009, which is based on IEC 61000-4-2:2008.

4) EN 61000-4-6 is superseded by EN 61000-4-6:2014, which is based on IEC 61000-4-6:2013.

5) EN 61000-4-8 is superseded by EN 61000-4-8:2010, which is based on IEC 61000-4-8:2009.

IEC 61000-6-2	2005	Electromagnetic compatibility (EMC) Part 6-2: Generic standards - Immunity for industrial environments	EN 61000-6-2 + corr. September	2005 2005
IEC 61187 (mod)	1993	Electrical and electronic measuring equipment - Documentation	EN 61187 + corr. March	1994 1995
IEC/TR 62461	2006	Radiation protection instrumentation - Determination of uncertainty in measurement	-	-
ISO/IEC Guide 98-3	2008	Uncertainty of measurement Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)	-	-
ISO/IEC Guide 99	2007	International vocabulary of metrology - Basic and general concepts and associated terms (VIM)	-	-
ISO 4037-1	1996	X and gamma reference radiation for calibrating dosimeters and doserate meters and for determining their response as a function of photon energy Part 1: Radiation characteristics and production methods	-	-
ISO 4037-2	1997	X and gamma reference radiation for calibrating dosimeters and doserate meters and for determining their response as a function of photon energy Part 2: Dosimetry for radiation protection over the energy ranges from 8 keV to 1,3 MeV and 4 MeV to 9 MeV	-	-
ISO 4037-3	1999	X and gamma reference radiation for calibrating dosimeters and doserate meters and for determining their response as a function of photon energy Part 3: Calibration of area and personal dosimeters and the measurement of their response as a function of energy and angle of incidence	-	-
ISO 4037-4	2004	X and gamma reference radiation for calibrating dosimeters and doserate meters and for determining their response as a function of photon energy Part 4: Calibration of area and personal dosimeters in low energy X reference radiation fields	-	-
ISO 6980-1	2006	Nuclear energy - Reference beta-particle radiation Part 1: Methods of production	-	-
ISO 6980-2	2004	Nuclear energy - Reference beta-particle radiation Part 2: Calibration fundamentals related to basic quantities characterizing the radiation field	-	-
ISO 6980-3	2006	Nuclear energy - Reference beta-particle radiation Part 3: Calibration of area and personal dosimeters and the determination of their response as a function of beta radiation energy and angle of incidence	-	-

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