SVENSK STANDARD SS-EN 61526

Fastställd	Utgåva	Sida	Ansvarig kommitté
2013-05-08	2	1 (1+60)	SEK TK 45

Kärnteknisk mätutrustning – Persondosimeter för direktavläsning av $H_p(10)$ och $H_p(0,07)$ för röntgen-, gamma- och betastrålning

Radiation protection instrumentation – Measurement of personal dose equivalents $H_p(10)$ and $H_p(0,07)$ for X, gamma, neutron and beta radiations – Direct reading personal dose equivalent meters

Som svensk standard gäller europastandarden EN 61526:2013. Den svenska standarden innehåller den officiella engelska språkversionen av EN 61526:2013.

Nationellt förord

Europastandarden EN 61526:2013

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 61526, Third edition, 2010 - Radiation protection instrumentation - Measurement of personal dose equivalents $H_p(10)$ and $H_p(0,07)$ for X, gamma, neutron and beta radiations - Direct reading personal dose equivalent meters**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 61526, utgåva 1, 2007, gäller ej fr o m 2015-12-24.

ICS 13.280.00

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61526

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ICS 13.280

Supersedes EN 61526:2007

English version

Radiation protection instrumentation - Measurement of personal dose equivalents Hp(10) and Hp(0,07) for X, gamma, neutron and beta radiations - Direct reading personal dose equivalent meters

(IEC 61526:2010, modified)

Instrumentation pour la radioprotection - Mesure des équivalents de dose individuels Hp(10) et Hp(0,07) pour les rayonnements X, gamma, neutron et bêta - Appareils de mesure à lecture directe de l'équivalent de dose individuel (CEI 61526:2010, modifiée)

Strahlenschutz-Messgeräte - Messung der Tiefen- und der Oberflächen-Personendosis Hp(10) und Hp(0,07) für Röntgen-, Gamma-, Neutronen- und Betastrahlung - Direkt ablesbare Personendosimeter (IEC 61526:2010, modifiziert)

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 61526:2013 E

SEK Svensk Elstandard

Foreword

This document (EN 61526:2013) consists of the text of IEC 61526:2010 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)	2013-12-24
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2015-12-24

This document supersedes EN 61526:2007.

EN 61526:2013 includes the following significant technical changes with regard to the previous edition:

– inclusion of terms and definitions of ISO/IEC Guide 99:2007 (VIM:2008);

– full consistency with IEC/TR 62461:2006 “*Radiation protection instrumentation – Determination of uncertainty in measurement*”;

– improved determination of constancy of the dose response and statistical fluctuations;

– abolition of classes of personal doses equivalent meters in relation to retention of stored information;

– inclusion of usage categories of personal dosemeters in Annex C.

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.

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 61526:2010 are prefixed “Z”.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61526:2010 was approved by CENELEC as a European Standard with agreed common modifications.

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

Publication	Year	Title	EN/HD	Year
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	2008	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	2009
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 61000-4-4 + corr. June	2004 2007	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test	EN 61000-4-4	2004

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.

IEC 61000-4-5 + corr. October	2005 2009	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5	2006
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	2009
IEC 61000-4-8	2009	Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test	EN 61000-4-8	2010
IEC 61000-4-11	2004	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests	EN 61000-4-11	2004
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 98-3 Suppl.1	2008 2008	Propagation of distributions using a Monte Carlo method and Corr.1 (2009)	-	-
ISO 4037-1	1996	X and gamma reference radiation for calibrating dosemeters 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 dosemeters 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 dosemeters and doserate meters and for determining their response as a function of photon energy - Part 3: Calibration of area and personal dosemeters 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 dosemeters and doserate meters and for determining their response as a function of photon energy - Part 4: Calibration of area and personal dosemeters 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 dosemeters and the determination of their response as a function of beta radiation energy and angle of incidence	-	-
ISO 8529-1	2001	Reference neutron radiations - Part 1: Characteristics and methods of production	-	-
ISO 8529-2	2000	Reference neutron radiations - Part 2: Calibration fundamentals of radiation protection devices related to the basic quantities characterizing the radiation field	-	-
ISO 8529-3	1998	Reference neutron radiations - Part 3: Calibration of area and personal dosimeters and determination of response as a function of energy and angle of incidence	-	-
ISO 12789-1	2008	Reference radiation fields - Simulated workplace neutron fields - Part 1: Characteristics and methods of production	-	-
ISO 12789-2	2008	Reference radiation fields - Simulated workplace neutron fields - Part 2: Calibration fundamentals related to the basic quantities	-	-
ICRU Report 51	1993	Quantities and units in radiation protection dosimetry	-	-

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INTRODUCTION

This International Standard applies to active, direct reading personal dose equivalent meters and monitors used for measuring the personal dose equivalents $H_p(10)$ and $H_p(0,07)$ for X, gamma, neutron and beta radiations.

For the personal dose equivalent $H_p(10)$ or the personal dose equivalent rate $\dot{H}_p(10)$ and for X and gamma radiations, two minimum rated ranges for the photon energy are given. The first from 20 keV to 150 keV is for workplaces where low energy X-rays are used, e.g., in medical diagnostic, the second from 80 keV to 1,5 MeV is for workplaces where high energy X-rays and/or gamma sources are used, e.g., in industry. For neutron radiation the minimum rated range of neutron energy is from 0,025 eV (thermal neutrons) to 5 MeV. The rated ranges can be extended to all energies covered by the respective standards for reference radiation fields.

For the personal dose equivalent $H_p(0,07)$ and for X and gamma radiations, a minimum rated range for the photon energy from 20 keV to 150 keV is given and for beta radiation, the minimal rated range is from 0,2 MeV to 0,8 MeV. The rated ranges can be extended to all energies covered by the respective standards for reference radiation fields.

Examples of extended rated ranges are given in Annex C.

In some applications, for example, at a nuclear reactor installation where 6 MeV photon radiation is present, measurement of personal dose equivalent (rate) $H_p(10)$ for photon energies up to 10 MeV should be required. In some other applications, measurement of $H_p(10)$ down to 10 keV should be required.

For personal dose equivalent meters, requirements for measuring the dose quantities $H_p(10)$ and $H_p(0,07)$ and for monitoring of the dose rate quantities $\dot{H}_p(10)$ and $\dot{H}_p(0,07)$ are given. The measurement of these dose rate quantities is an option for personal dose equivalent meters.

Establishments in some countries may wish to use this type of personal dose equivalent meter as the dosemeter to provide the dose of record by an approved dosimetry service.

RADIATION PROTECTION INSTRUMENTATION – MEASUREMENT OF PERSONAL DOSE EQUIVALENTS $H_p(10)$ AND $H_p(0,07)$ for X, GAMMA, NEUTRON AND BETA RADIATIONS – DIRECT READING PERSONAL DOSE EQUIVALENT METERS

1 Scope and object

This International Standard applies to personal dose equivalent meters with the following characteristics:

a) They are worn on the trunk or the extremities of the body.

b) They measure the personal dose equivalents $H_p(10)$ and $H_p(0,07)$ from external X and gamma, neutron and beta radiations, and may measure the personal dose equivalent rates $\dot{H}_p(10)$ and $\dot{H}_p(0,07)$.

c) They have a digital indication.

d) They may have alarm functions for the personal dose equivalents or personal dose equivalent rates.

This standard is therefore applicable to the measurement of the following combinations of dose quantities (including the respective dose rates) and radiation

1) $H_p(10)$ and $H_p(0,07)$ from X and gamma radiations;

2) $H_p(10)$ and $H_p(0,07)$ from X, gamma and beta radiations;

3) $H_p(10)$ from X and gamma radiations;

4) $H_p(10)$ from neutron radiations;

5) $H_p(10)$ from X, gamma and neutron radiations;

6) $H_p(0,07)$ from X, gamma and beta radiations.

NOTE 1 When reference is made in this standard to ”dose”, this is meant to indicate personal dose equivalent, unless otherwise stated.

NOTE 2 When reference is made in this standard to ”dosemeter”, this is meant to include all personal dose equivalent meters, unless otherwise stated.

This standard specifies requirements for the dosemeter and, if supplied, for its associated readout system.

This standard specifies, for the dosemeters described above, general characteristics, general test procedures, radiation characteristics as well as electrical, mechanical, safety and environmental characteristics. The only requirements specified for associated readout systems are those which affect its accuracy of readout of the personal dose equivalent and alarm settings and those which concern the influence of the reader on the dosemeter.

This standard also specifies in Annex C usage categories with respect to different measuring capabilities.

This standard does not cover special requirements for accident or emergency dosimetry although the dosemeters may be used for this purpose. The standard does not apply to dosemeters used for measurement of pulsed radiation, such as radiation emanating from most medical diagnostic X-ray facilities, linear accelerators or similar equipment.

2 Normative references

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.

IEC 60050-393:2003, *International Electrotechnical Vocabulary (IEV) – Part 393: Nuclear instrumentation – Physical phenomena and basic concepts*

IEC 60050-394:2007, *International Electrotechnical Vocabulary (IEV) – 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*

IEC 60086-1:2006, *Primary batteries – Part 1: General*

IEC 60086-2:2006, *Primary batteries – Part 2: Physical and electrical specifications*

IEC 60359:2001, *Electrical and electronic measurement equipment – Expression of performance*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*
Amendment 1 (1999) [1]

IEC 61000-4-2:2008, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3:2008, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4:2004, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5:2005, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-6:2008, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-8:2009, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test*

IEC 61000-4-11:2004, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*

IEC 61000-6-2:2005, *Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments*

IEC 61187:1993, *Electrical and electronic measuring equipment – Documentation*

IEC/TR 62461:2006, *Radiation protection instrumentation – Determination of uncertainty in measurement*

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1 There exists a consolidated edition (2.1) which includes IEC 60529 (1989) and its Amendment 1 (1999).

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

ISO/IEC Guide 98-3:2008/Suppl.1:2008, *Propagation of distributions using a Monte Carlo method and Corr.1 (2009)*

ISO 4037-1:1996, *X and gamma reference radiation for calibrating dosemeters 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 dosemeters 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 dosemeters and doserate meters and for determining their response as a function of photon energy – Part 3: Calibration of area and personal dosemeters 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 dosemeters and doserate meters and for determining their response as a function of photon energy – Part 4: Calibration of area and personal dosemeters in low energy X reference radiation fields*

ISO 6980-1:2006, *Nuclear energy – Reference beta-particle radiation – Part 1: Method 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 dosemeters and the determination of their response as a function of beta radiation energy and angle of incidence*

ISO 8529-1:2001, *Reference neutron radiations – Part 1: Characteristics and methods of production*

ISO 8529-2:2000, *Reference neutron radiations – Part 2: Calibration fundamentals of radiation protection devices related to the basic quantities characterizing the radiation field*

ISO 8529-3:1998, *Reference neutron radiations – Part 3: Calibration of area and personal dosemeters and determination of response as a function of energy and angle of incidence*

ISO 12789-1:2008, *Reference radiation fields – Simulated workplace neutron fields – Part 1: Characteristics and methods of production*

ISO 12789-2:2008, *Reference radiation fields – Simulated workplace neutron fields – Part 2: Calibration fundamentals related to the basic quantities*

ICRU report 51:1993, *Quantities and units in radiation protection dosimetry*