SVENSK STANDARD SS-EN 61010-1

Fastställd	Utgåva	Sida	Ansvarig kommitté
2010-11-22	3	1 (1+159)	SEK TK 66

Elektrisk utrustning för mätning, styrning och för laboratorieändamål – Säkerhet – Del 1: Allmänna fordringar

Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements

Som svensk standard gäller europastandarden EN 61010-1:2010. Den svenska standarden innehåller den officiella engelska språkversionen av EN 61010-1:2010.

Nationellt förord

Europastandarden EN 61010-1:2010

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 61010-1, Third edition, 2010 - Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 61010-1, utgåva 2, 2001 och SS-EN 61010-1 C1, utgåva 1, 2002, gäller ej fr o m 2013-10-01.

ICS 19.080; 71.040.10

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Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61010-1

October 2010

ICS 19.080; 71.040.10

Supersedes EN 61010-1:2001 + corr. Jun.2002

English version

Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements

(IEC 61010-1:2010)

Règles de sécurité pour appareils électriques de mesurage, de régulation et de laboratoire - Partie 1: Exigences générales (CEI 61010-1:2010)

Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte - Teil 1: Allgemeine Anforderungen (IEC 61010-1:2010)

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 61010-1:2010 E

SEK Svensk Elstandard

Foreword

The text of document 66/414/FDIS, future edition 3 of IEC 61010-1, prepared by IEC TC 66, Safety of measuring, control and laboratory equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61010-1 on 2010-10-01.

This European Standard supersedes EN 61010-1:2001.

This edition includes the following significant changes from EN 61010-1:2001, as well as numerous other changes.

- The scope of the standard has been expanded to include all locations where these products may be used, so that both professional and non-professional versions of these products are within the scope.
- The requirements for testing and measuring circuits (in various subclauses and the entirety of Clause 16) have been removed and included in a particular standard EN 61010-2-030.
- Insulation requirements (6.7) have been completely rewritten.
- Specific requirements have been added for solid insulation and thin-film insulation.
- Subclause 6.7 now contains only the insulation requirements for MAINS CIRCUITS of OVERVOLTAGE CATEGORY II up to 300 V, and for secondary circuits.
- The insulation requirements for all other circuits have been moved to a new Annex K.
- Additional requirements for protection against mechanical HAZARDS (Clause 7) have been included.
- Surface temperature limits (Clause 10) have been modified to conform to the limits of EN 563.
- Radiation requirements (Clause 12) have been modified, and take into account a distinction between intended emission and unintended emission.
- Requirements for reasonably foreseeable misuse and ergonomic aspects have been added (Clause 16).
- A new clause (Clause 17) has been added to deal with HAZARDS and environments not covered by the standard, along with a new informative annex (Annex J) dealing with RISK assessment.
- A new informative annex (Annex E) addresses methods of reducing the POLLUTION DEGREE of a micro-environment.
- Requirements for the qualification of coatings for protection against POLLUTION have been added (Annex H).
- A new informative annex (Annex I) has been added to further explain how to determine the WORKING VOLTAGE of a MAINS CIRCUIT.

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

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)	2011-07-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2013-10-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61010-1:2010 was approved by CENELEC as a European Standard without any modification.

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

IEC 60079 series	NOTE	Harmonized in EN 60079 series (partially modified).
IEC 60085	NOTE	Harmonized as EN 60085.
IEC 60112:1979	NOTE	Harmonized as HD 214 S2:1980 (not modified).
IEC 60127 series	NOTE	Harmonized in EN 60127 series (not modified).
IEC 60204 series	NOTE	Harmonized in EN 60204 series (partially modified).
IEC 60332-1 series	NOTE	Harmonized in EN 60332-1 series (not modified).
IEC 60332-2 series	NOTE	Harmonized in EN 60332-2 series (not modified).
IEC 60335 series	NOTE	Harmonized in EN 60335 series (partially modified).
IEC 60364 series	NOTE	Harmonized in EN 60364 series (partially modified).
IEC 60439 series	NOTE	Harmonized in EN 60439 series (partially modified).
IEC 60439-1:1999	NOTE	Harmonized as EN 60439-1:1999 (not modified).
IEC 60445:1999	NOTE	Harmonized as EN 60445:2000 (not modified).
IEC 60447:1993	NOTE	Harmonized as EN 60447:1993 (not modified).
IEC 60601 series	NOTE	Harmonized in EN 60601 series (partially modified).
IEC 60664-1	NOTE	Harmonized as EN 60664-1.
IEC 60695-10-2	NOTE	Harmonized as EN 60695-10-2.
IEC 60950 series	NOTE	Harmonized in EN 60950 series (partially modified).
IEC 60950-1	NOTE	Harmonized as EN 60950-1.
IEC 60990	NOTE	Harmonized as EN 60990
IEC 61010-2-030	NOTE	Harmonized as EN 61010-2-030.
IEC 61032	NOTE	Harmonized as EN 61032
IEC 61243-3	NOTE	Harmonized as EN 61243-3
IEC 61326 series	NOTE	Harmonized in EN 61326 series (not modified).
IEC 61508 series	NOTE	Harmonized in EN 61508 series (not modified).
IEC 61558 series	NOTE	Harmonized in EN 61558 series (partially modified).
ISO 9241 series	NOTE	Harmonized in EN ISO 9241 series.
ISO 14121-1	NOTE	Harmonized as EN ISO 14121-1.
ISO 14738	NOTE	Harmonized as EN ISO 14738.
ISO 14971	NOTE	Harmonized as EN ISO 14971.

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.

Publication	Year	Title	EN/HD	Year
IEC 60027	Series	Letter symbols to be used in electrical technology	-	-
IEC 60065	Series	Audio, video and similar electronic apparatus - Safety requirements	EN 60065	Series
IEC 60068-2-14	-	Environmental testing - Part 2-14: Tests - Test N: Change of temperature	EN 60068-2-14	-
IEC 60068-2-75	-	Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests	EN 60068-2-75	-
IEC 60073	-	Basic and safety principles for man-machine interface, marking and identification - Coding principles for indicators and actuators	EN 60073	-
IEC 60227	Series	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V	-	-
IEC 60245	Series	Rubber insulated cables - Rated voltages up to and including 450/750 V	-	-
IEC 60309	Series	Plugs, socket-outlets and couplers for industrial purposes	EN 60309	Series
IEC 60320	Series	Appliance couplers for household and similar general purposes	EN 60320	Series
IEC 60332-1-2	-	Tests on electric and optical fibre cables under fire conditions - Part 1-2: Test for vertical flame propagation for a single insulated wire or cable - Procedure for 1 kW pre-mixed flame	EN 60332-1-2	-
IEC 60332-2-2	-	Tests on electric and optical fibre cables under fire conditions - Part 2-2: Test for vertical flame propagation for a single small insulated wire or cable - Procedure for diffusion flame	EN 60332-2-2	-
IEC 60335-2-24	-	Household and similar electrical appliances - Safety - Part 2-24: Particular requirements for refrigerating appliances, ice-cream appliances and ice makers	EN 60335-2-24	-

Publication	Year	Title	EN/HD	Year
IEC 60335-2-89	-	Household and similar electrical appliances - Safety - Part 2-89: Particular requirements for commercial refrigerating appliances with an incorporated or remote refrigerant condensing unit or compressor	EN 60335-2-89	-
IEC 60364-4-44	-	Low voltage electrical installations - Part 4-44: Protection for safety - Protection against voltage disturbances and electromagnetic disturbances	HD 60364-4-444	-
IEC 60405	-	Nuclear instrumentation - Constructional requirements and classification of radiometric gauges	EN 60405	-
IEC 60417	-	Graphical symbols for use on equipment	EN 60417	-
IEC 60529	-	Degrees of protection provided by enclosures (IP Code)	-	-
IEC 60664-3	-	Insulation coordination for equipment within low-voltage systems - Part 3: Use of coating, potting or moulding for protection against pollution	EN 60664-3	-
IEC 60695-11-10	-	Fire hazard testing - Part 11-10: Test flames - 50 W horizontal and vertical flame test methods	EN 60695-11-10	-
IEC 60799	-	Electrical accessories - Cord sets and interconnection cord sets	EN 60799	-
IEC 60825-1	-	Safety of laser products - Part 1: Equipment classification and requirements	EN 60825-1	-
IEC 60947-1	-	Low-voltage switchgear and controlgear - Part 1: General rules	EN 60947-1	-
IEC 60947-3	-	Low-voltage switchgear and controlgear - Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units	EN 60947-3	-
IEC 61010-031	-	Safety requirements for electrical equipment for measurement, control and laboratory use - Part 031: Safety requirements for hand-held probe assemblies for electrical measurement and test	EN 61010-031	-
IEC 61180	Series	High-voltage test techniques for low-voltage equipment	EN 61180	Series
IEC 61180-1	-	High-voltage test techniques for low-voltage equipment - Part 1: Definitions, test and procedure requirements	EN 61180-1	-
IEC 61180-2	-	High-voltage test techniques for low-voltage equipment - Part 2: Test equipment	EN 61180-2	-
IEC 61672-1	-	Electroacoustics - Sound level meters - Part 1: Specifications	EN 61672-1	-
IEC 61672-2	-	Electroacoustics - Sound level meters - Part 2: Pattern evaluation tests	EN 61672-2	-

Publication	Year	Title	EN/HD	Year
IEC 62262	-	Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)	EN 62262	-
IEC Guide 104	-	The preparation of safety publications and the use of basic safety publications and group safety publications	-	-
ISO/IEC Guide 51	-	Safety aspects - Guidelines for their inclusion in standards	-	-
ISO 306	1994	Plastics - Thermoplastic materials - Determination of Vicat softening temperature (VST)	EN ISO 306	1996 [1)]
ISO 361	-	Basic ionizing radiation symbol	-	-
ISO 3746	-	Acoustics - Determination of sound power levels of noise sources using sound pressure - Survey method using an enveloping measurement surface over a reflecting plane	EN ISO 3746	-
ISO 7000	-	Graphical symbols for use on equipment	-	-
ISO 9614-1	-	Acoustics - Determination of sound power levels of noise sources using sound intensity - Part 1: Measurement at discrete points	EN ISO 9614-1	-

[1)] Superseded by EN ISO 306:2004.

CONTENTS

INTRODUCTION

This Interational Standard specifies the safety requirements that are generally applicable to all equipment within its scope. For certain types of equipment, these requirements will be supplemented or modified by the special requirements of one, or more than one, particular part 2 of the standard which must be read in conjunction with the part 1 requirements.

SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE –

Part 1: General requirements

1 Scope and object

1.1 Scope

1.1.1 Equipment included in scope

This part of IEC 61010 specifies general safety requirements for the following types of electrical equipment and their accessories, wherever they are intended to be used.

a) Electrical test and measurement equipment

This is equipment which by electromagnetic means tests, measures, indicates or records one or more electrical or physical quantities, also non-measuring equipment such as signal generators, measurement standards, power supplies for laboratory use, transducers, transmitters, etc.

NOTE 1 This includes bench-top power supplies intended to aid a testing or measuring operation on another piece of equipment. Power supplies intended to power equipment are within the scope of IEC 61558 (see 1.1.2 h)).

This standard also applies to test equipment integrated into manufacturing processes and intended for testing manufactured devices.

NOTE 2 Manufacturing test equipment is likely to be installed adjacent to and interconnected with industrial machinery in this application.

b) Electrical industrial process-control equipment

This is equipment which controls one or more output quantities to specific values, with each value determined by manual setting, by local or remote programming, or by one or more input variables.

c) Electrical laboratory equipment

This is equipment which measures, indicates, monitors, inspects or analyses materials, or is used to prepare materials, and includes in vitro diagnostic (IVD) equipment.

This equipment may also be used in areas other than laboratories; examples include self-test IVD equipment to be used in the home and inspection equipment to be used to check people or material during transportation.

1.1.2 Equipment excluded from scope

This standard does not apply to equipment within the scope of:

a) IEC 60065 (Audio, video and similar electronic apparatus);
b) IEC 60204 (Safety of machinery – Electrical equipment of machines);
c) IEC 60335 (Household and similar electrical appliances);
d) IEC 60364 (Electrical installations of buildings);
e) IEC 60439 (Low-voltage switchgear and controlgear assemblies);
f) IEC 60601 (Medical electrical equipment);

g) IEC 60950 (Information technology equipment including electrical business equipment, except as specified in 1.1.3);

h) IEC 61558 (Power transformers, power supply units and similar);

i) IEC 61010-031 (Hand-held probe assemblies);

j) IEC 61243-3 (Live working – Voltage detectors – Part 3: Two-pole low-voltage type).

1.1.3 Computing equipment

This standard applies only to computers, processors, etc. which form part of equipment within the scope of this standard or are designed for use exclusively with the equipment.

NOTE Computing devices and similar equipment within the scope of IEC 60950 and conforming to its requirements are considered to be suitable for use with equipment within the scope of this standard. However, some of the requirements of IEC 60950 for resistance to moisture and liquids are less stringent than those in this standard (see 5.4.4 second paragraph)).

1.2 Object

1.2.1 Aspects included in scope

The purpose of the requirements of this standard is to ensure that HAZARDS to the OPERATOR and the surrounding area are reduced to a tolerable level.

Requirements for protection against particular types of HAZARD are given in Clauses 6 to 13, as follows:

a) electric shock or burn (see Clause 6);

b) mechanical HAZARDS (see Clauses 7 and 8);

c) spread of fire from the equipment (see Clause 9);

d) excessive temperature (see Clause 10);

e) effects of fluids and fluid pressure (see Clause 11);

f) effects of radiation, including lasers sources, and sonic and ultrasonic pressure (see Clause 12);

g) liberated gases, explosion and implosion (see Clause 13).

Requirements for protection against HAZARDS arising from REASONABLY FORESEEABLE MISUSE and ergonomic factors are specified in Clause 16.

RISK assessment for HAZARDS or environments not fully covered above is specified in Clause 17.

NOTE Attention is drawn to the existence of additional requirements regarding the health and safety of labour forces.

1.2.2 Aspects excluded from scope

This standard does not cover:

a) reliable function, performance, or other properties of the equipment not related to safety;

b) effectiveness of transport packaging;

c) EMC requirements (see the IEC 61326 series);

d) protective measures for explosive atmospheres (see the IEC 60079 series).

1.3 Verification

This standard also specifies methods of verifying that the equipment meets the requirements of this standard, through inspection, TYPE TESTS, ROUTINE TESTS, and RISK assessment.

1.4 Environmental conditions

1.4.1 Normal environmental conditions

This standard applies to equipment designed to be safe at least under the following conditions:

a) indoor use;

b) altitude up to 2 000 m;

c) temperature 5 °C to 40 °C;

d) maximum relative humidity 80 % for temperatures up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C;

e) MAINS supply voltage fluctuations up to ±10 % of the nominal voltage;

f) TRANSIENT OVERVOLTAGES up to the levels of OVERVOLTAGE CATEGORY II;

NOTE 1 These levels of transient overvoltage are typical for equipment supplied from the building wiring.

g) TEMPORARY OVERVOLTAGES occurring on the MAINS supply.

h) applicable POLLUTION DEGREE of the intended environment (POLLUTION DEGREE 2 in most cases).

NOTE 2 Manufacturers may specify more restricted environmental conditions for operation; nevertheless the equipment must be safe within these normal environmental conditions.

1.4.2 Extended environmental conditions

This standard applies to equipment designed to be safe not only in the environmental conditions specified in 1.4.1, but also in any of the following conditions as RATED by the manufacturer of the equipment:

a) outdoor use;

b) altitude above 2 000 m;

c) ambient temperatures below 5 °C or above 40 °C;

d) relative humidity above the levels specified in 1.4.1;

e) MAINS supply voltage fluctuations exceeding ±10 % of the nominal voltage;

f) WET LOCATION;

g) TRANSIENT OVERVOLTAGES up to the levels of OVERVOLTAGE CATEGORY III or IV (see Annex K).

2 Normative references

The following referenced documents, where applicable, 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 60027 (all parts), *Letter symbols to be used in electrical technology*

IEC 60065, *Audio, video and similar electronic apparatus – Safety requirements*

IEC 60068-2-14, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-2-75, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC 60073, *Basic and safety principles for man-machine interface, marking and identification – Coding principles for indicators and actuators*

IEC 60227 (all parts), *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V*

IEC 60245 (all parts), *Rubber insulated cables – Rated voltages up to and including 450/750 V*

IEC 60309 (all parts), *Plugs, socket-outlets and couplers for industrial purposes*

IEC 60320 (all parts), *Appliance couplers for household and similar general purposes*

IEC 60332-1-2, *Tests on electric and optical fibre cables under fire conditions – Part 1-2: Test for vertical flame propagation for a single insulated wire or cable – Procedure for 1 kW pre-mixed flame*

IEC 60332-2-2, *Tests on electric and optical fibre cables under fire conditions – Part 2-2: Test for vertical flame propagation for a single small insulated wire or cable – Procedure for diffustion flame*

IEC 60335-2-24, *Household and similar electrical appliances – Safety – Part 2-24: Particular requirements for refrigerating appliances, ice-cream appliances and ice-makers.*

IEC 60335-2-89, *Household and similar electrical appliances – Safety – Part 2-89: Particular requirements for commercial refrigerating appliances with an incorporated or remote refrigerant condensing unit or compressor*

IEC 60364-4-44, *Low-voltage electrical installations – Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances*

IEC 60405, *Nuclear instrumentation – Constructional requirements and classification of radiometric gauges*

IEC 60417, *Graphical symbols for use on equipment*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60664-3, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

IEC 60695-11-10, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*

IEC 60799, *Electrical accessories – Cord sets and interconnection cord sets*

IEC 60825-1, *Safety of laser products – Part 1: Equipment classification and requirements*

IEC 60947-1, *Low-voltage switchgear and controlgear – Part 1: General rules*

IEC 60947-3, *Low-voltage switchgear and controlgear – Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units*

IEC 61010-031, *Safety requirements for electrical equipment for measurement, control and laboratory use – Part 031: Safety requirements for hand-held probe assemblies for electrical measurement and test*

IEC 61180 (all parts), *High-voltage test techniques for low-voltage equipment*

IEC 61180-1, *High-voltage test techniques for low-voltage equipment – Part 1: Definitions, test and procedure requirements*

IEC 61180-2, *High-voltage test techniques for low-voltage equipment – Part 2: Test equipment*

IEC 61672-1, *Electroacoustics – Sound level meters – Part 1: Specifications*

IEC 61672-2, *Electroacoustics – Sound level meters – Part 2: Pattern evaluation tests*

IEC 62262, *Degrees of protection provided by enclosures for electrical equipment against external impacts (IK code)*

IEC Guide 104, *The preparation of safety publications and the use of basic safety publications and group safety publications*

ISO/IEC Guide 51, *Safety aspects – Guidelines for their inclusion in standards*

ISO 306:1994, *Plastics – Thermoplastic materials – Determination of Vicat softening temperature (VST)*

ISO 361, *Basic ionizing radiation symbol*

ISO 3746, *Acoustics – Determination of sound power levels of noise sources using sound pressure – Survey method using an enveloping measurement surface over a reflecting plane*

ISO 7000, *Graphical symbols for use on equipment*

ISO 9614-1, *Acoustics – Determination of sound power levels of noise sources using sound intensity – Part 1: Measurement at discrete points*