ICS 25.180.10 SLOVENSKÁ TECHNICKÁ NORMA Október 2020

STN	**Bezpečnosť inštalácií pre elektrotepelné a elektromagnetické procesy Časť 1: Všeobecné požiadavky**	**STN EN IEC 60519-1** 33 5002

Safety in installations for electroheating and electromagnetic processing - Part 1: General requirements

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 09/20

Obsahuje: EN IEC 60519-1:2020, IEC 60519-1:2020

Oznámením tejto normy sa od 15.04.2023 ruší
STN EN 60519-1 (33 5002) z októbra 2015

131555

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 60519-1

May 2020

ICS 25.180.10

Supersedes EN 60519-1:2015 and all of its amendments and corrigenda (if any)

English Version

Safety in installations for electroheating and electromagnetic processing - Part 1: General requirements (IEC 60519-1:2020)

Sécurité dans les installations destinées au traitement électrothermique et électromagnétique - Partie 1: Exigences générales
(IEC 60519-1:2020)

Sicherheit in Elektroerwärmungsanlagen und Anlagen für elektromagnetische Bearbeitungsprozesse - Teil 1: Allgemeine Anforderungen
(IEC 60519-1:2020)

This European Standard was approved by CENELEC on 2020-04-15. 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.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, 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: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 27/1121/FDIS, future edition 6 of IEC 60519-1, prepared by IEC/TC 27 "Industrial electroheating and electromagnetic processing" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60519-1:2020.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2021-01-15
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-04-15

This document supersedes EN 60519-1:2015 and all of its amendments and corrigenda (if any).

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

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

Endorsement notice

The text of the International Standard IEC 60519-1:2020 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 as EN 60079 series
IEC 60335 series NOTE Harmonized as EN 60335 series
IEC 60519 series NOTE Harmonized as EN 60519 series
IEC 60601 series NOTE Harmonized as EN 60601 series
IEC 60974 series NOTE Harmonized as EN 60974 series
IEC 61010 series NOTE Harmonized as EN 61010 series
IEC 61140:2016 NOTE Harmonized as EN 61140:2016 (not modified)
IEC 62226 series NOTE Harmonized as EN 62226 series
IEC 62311 NOTE Harmonized as EN IEC 62311

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1 Where 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.

Publication	Year	Title	EN/HD	Year
IEC 60071-1	2006	Insulation co-ordination - Part 1: Definitions, principles and rules	EN 60071-1	2006
+A1	2010		+A1	2010
IEC 60204-1	2016	Safety of machinery - Electrical equipment of machines - Part 1: General requirements	EN 60204-1	2018
IEC 60204-11	2018	Safety of machinery - Electrical equipment of machines - Part 11: Requirements for equipment for voltages above 1 000 V AC or 1 500 V DC and not exceeding 36 kV	EN IEC 60204-11	2019
-	-		+corrigendum Feb.	2010
IEC 60228	2004	Conductors of insulated cables	EN 60228	2005
+ A1	2013		-	-
+ A2	2016		-	-
IEC 60335-1 (mod)	2010	Household and similar electrical appliances - Safety - Part 1: General requirements	EN 60335-1	2012
-	-		+A11	2014
			+A13	2017
			+A14	2019
+A1	2013		+A1	2019
+A2	2016		+A2	2019
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	2010
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	2010
-	-		+A1	2016
			+A2	2017
IEC 60364-1 (mod)	2005	Low-voltage electrical installations - Part 1: Fundamental principles, assessment of general characteristics, definitions	HD 60364-1	2008
-	-		+A11	2017
IEC 60364-4-41 (mod)	2005	Low-voltage electrical installations - Part 4-41: Protection for safety - Protection against electric shock	HD 60364-4-41	2017

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-	-		+A11	2017
			+A12	2019
+A1	2017			
IEC 60364-4-42	2010	Low-voltage electrical installations - Part 4-42: Protection for safety - Protection against thermal effects	HD 60364-4-42	2011
+A1	2014		+A1	2015
IEC 60364-4-44 (mod)	2007	Low-voltage electrical installations - Part 4-44: Protection for safety - Protection against voltage disturbances and electromagnetic disturbances	HD 60364-4-442	2012
+A1 (mod)	2015		HD 60364-4-443	2016
+A2	2018			
IEC 60364-5-53	2001	Electrical installations of buildings - Part 5-53: Selection and erection of electrical equipment - Isolation, switching and control		-
+ A1 (mod)	2002		HD 60364-5-534	2016
+ A2 (mod)	2015			
IEC 60364-5-54	2011	Low-voltage electrical installations - Part 5-54: Selection and erection of electrical equipment - Earthing arrangements and protective conductors	HD 60364-5-54	2011
-	-		+A11	2017
IEC 60398	2015	Installations for electroheating and electromagnetic processing - General performance test methods	IEC 60398	2015
IEC 60417	-	Graphical symbols for use on equipment	-	-
IEC 60445	2017	Basic and safety principles for man-machine interface, marking and identification - Identification of equipment terminals, conductor terminations and conductors	EN 60445	2017
IEC 60529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529	1991
+ A1	1999		+A1	2000
+A2	2013		+A2	2013
IEC 60664-1	2007	Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests	EN 60664-1	2007
IEC 60825-1	2014	Safety of laser products - Part 1: Equipment classification and requirements	EN 60825-1	2014
IEC 60865-1	2011	Short-circuit currents - Calculation of effects - Part 1: Definitions and calculation methods	EN 60865-1	2012
IEC 60909-0	2016	Short-circuit currents in three-phase a.c. systems - Part 0: Calculation of currents	EN 60909-0	2016
IEC 60990	2016	Methods of measurement of touch current and protective conductor current	EN 60990	2016
IEC 61000-6-2	2016	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments	EN IEC 61000-6-2	2019
IEC 61000-6-7	2014	Electromagnetic compatibility (EMC) - Part 6-7: Generic standards - Immunity requirements for equipment intended to perform functions in a safety-related system (functional safety) in industrial locations	EN 61000-6-7	2015

IEC 61010-1	2010	Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements	EN 61010-1	2010
+ A1	2016		+A1	2019
IEC 61082-1	2014	Preparation of documents used in electrotechnology - Part 1: Rules	EN 61082-1	2015
IEC 61310-1	2007	Safety of machinery - Indication, marking and actuation -- Part 1: Requirements for visual, acoustic and tactile signals	EN 61310-1	2008
IEC 61310-2	2007	Safety of machinery - Indication, marking and actuation -- Part 2: Requirements for marking	EN 61310-2	2008
IEC 61310-3	2007	Safety of machinery - Indication, marking and actuation -- Part 3: Requirements for the location and operation of actuators	EN 61310-3	2008
IEC 61439	series	Low-voltage switchgear and control gear assemblies	EN 61439	series
IEC 61508-1	2010	Functional safety of electrical/electronic/programmable electronic safety-related systems -- Part 1: General requirements	EN 61508-1	2010
IEC 61786-1	2013	Measurement of DC magnetic, AC magnetic and AC electric fields from 1 Hz to 100 kHz with regard to exposure of human beings - Part 1: Requirements for measuring instruments	EN 61786-1	2014
IEC 61786-2	2014[1)]	Measurement of low-frequency magnetic- and electric fields with regard to exposure of human beings - Part 2: Guidance for measurements		-
IEC 61936-1 (mod)	2010	Power installations exceeding 1 kV a.c. - Part 1: Common rules	EN 61936-1	2010
+ A1	2014		+ A1	2014
IEC 62061	2005	Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems	EN 62061	2005
+ A1	2012		+ A1	2013
+ A2	2015		+ A2	2015
IEC 62271	series	High-voltage switchgear and controlgear	EN 62271	series
IEC 62471 (mod)	2006	Photobiological safety of lamps and lamp systems	EN 62471	2008
IEC 82079-1	2012	Preparation of instructions for use - Structuring, content and presentation - Part 1: General principles and detailed requirements	EN 82079-1	2012
CISPR 11 (mod)	2015	Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement	EN 55011	2016
+ A1	2016		+ A1	2017
+ A2	2019			
IEEE C95.1	2005	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz		-

[1)] Dated as no equivalent European Standard exist.

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IEEE C95.6	2002	IEEE Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields, 0–3 kHz		-
ISO 3864-1	2011	Graphical symbols - Safety colours and safety signs - Part-1: Design principles for safety signs and safety markings		-
ISO 6385	2016	Ergonomics principles in the design of work systems (ISO 6385:2016)	EN ISO 6385	2016
ISO 7000	2019 [1)]	Graphical symbols for use on equipment -- Registered symbols		-
ISO 7010	-	Graphical symbols - Safety colours and safety signs - Registered safety signs	EN ISO 7010	2020
ISO 12100	2010	Safety of machinery - General principles for design - Risk assessment and risk reduction	EN ISO 12100	2010
ISO 13577-1	2016	Industrial furnaces and associated processing equipment - Safety - Part 1: General requirements		-
ISO 13577-2	2014	Industrial furnaces and associated processing equipment - Safety - Part 2: Combustion and fuel handling systems		-
ISO 13577-3	2016	Industrial furnaces and associated processing equipment - Safety - Part 3: Generation and use of protective and reactive atmosphere gases		
ISO 13732-1	2006	Ergonomics of the thermal environment - Methods for the assessment of human responses to contact with surfaces - Part 1: Hot surfaces	EN ISO 13732-1	2008
ISO 13849-1	2015	Safety of machinery - Safety-related parts of control systems	EN ISO 13849-1	2015
ISO 13850	2015	Safety of machinery - Emergency stop - Principles for design	EN ISO 13850	2015
ISO 13855	2010	Safety of machinery - Positioning of safeguards with respect to the approach speeds of parts of the human body	EN ISO 13855	2010
ISO 13857	2008	Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs	EN ISO 13857	2008
ISO 14119	2013	Safety of machinery - Interlocking devices associated with guards - Principles for design and selection	EN ISO 14119	2013
ISO 14120	2015	Safety of machinery – Guards - General requirements for the design and construction of fixed and movable guards	EN ISO 14120	2015
ISO 14159	2002	Safety of machinery - Hygiene requirements for the design of machinery	EN ISO 14159	2008
ISO 19353	2019	Safety of machinery - Fire prevention and fire protection	EN ISO 19353	2019

Annex ZZ
(informative)

Relationship between this European standard and the safety objectives of Directive 2014/35/EU [2014 OJ L96] aimed to be covered

This European Standard has been prepared under a Commission's standardization request relating to harmonized standards in the field of the Low Voltage Directive, M/511, to provide one voluntary means of conforming to safety objectives of Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits [2014 OJ L96].

Once this standard is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of this standard given in Table ZZ.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding safety objectives of that Directive, and associated EFTA regulations.

Table ZZ.1 – Correspondence between this European standard and Annex I of Directive 2014/35/EU [2014 OJ L96]

Safety objectives of Directive 2014/35/EU	Clause(s) / sub-clause(s) of this EN	Remarks / Notes
1 (a)	clauses 1, 4, 6, 7.3, 7.9, 8.5, 9.3, 13.3, 13.10, 14.5, 18.5 Annexes G and F	this standard addresses products for industrial use only
1 (b)	clauses 4 through 17, 18 and 19	
1 (c), intended use	clauses 1, 3, 4, 6, 13 Annexes B, C, D	refer to entries in 2(a) to 2(d) and 3(a) to 3(c) in this table.
1 (c), maintenance	clauses 7, 9, 10, 13, 14	refer to entries in 2(a) to 2(d) and 3(a) to 3(c) in this table.
2 (a)	clauses 4, 7, 13, 18 Annexes B, D, E, F	the general public and animals are outside the scope of this standard
2 (b)	clauses 4, 7, 8, 9, 10, 11, 13 and 18 Annexes C, D, E, F	
2 (c)	clauses 4, 9 through 17 and 18	the general public and animals are outside the scope of this standard
2 (d)	clauses 4, 7, 13 and 18	specific to electroheating is high temperature affecting insulations
3 (a)	clauses 4, 6, 10.4, 10.5, 12.3, 13.6, 13.9, 13.10, 13.13, 14, 15, 16.3 and 18	the general public and animals are outside the scope of this standard
3 (b)	clauses 4, 6, 9, 10, 11, 12, 13.7, 13.9, 13.13, 13.14, 14, 16.3 and 18	the general public and animals are outside the scope of this standard
3 (c)	clauses 6.5, 7, 10, 11, 12, 13, 14, 18	the general public and animals are outside the scope of this standard

WARNING 1**:** Presumption of conformity stays valid only as long as a reference to this European standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2: Other Union legislation may be applicable to the product(s) falling within the scope of this standard.

IEC 60519-1

Edition 6.0 2020-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Safety in installations for electroheating and electromagnetic processing – Part 1: General requirements

Sécurité dans les installations destinées au traitement électrothermique et électromagnétique – Partie 1: Exigences générales

IEC 60519-1:2020-03(en-fr)

IEC 60519-1

Edition 6.0 2020-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Safety in installations for electroheating and electromagnetic processing – Part 1: General requirements

Sécurité dans les installations destinées au traitement électrothermique et électromagnétique – Partie 1: Exigences générales

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

ICS 25.180.10 ISBN 978-2-8322-7898-7

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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SAFETY IN INSTALLATIONS FOR ELECTROHEATING AND ELECTROMAGNETIC PROCESSING –

Part 1: General requirements

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.
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International Standard IEC 60519-1 has been prepared by IEC technical committee 27: Industrial electroheating and electromagnetic processing.

This sixth edition cancels and replaces the fifth edition published in 2015. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) removal of noise from the scope;
b) clarification of EMC requirements;
c) risk classification of hazards based on emission for all processing frequencies;
d) clarification of boundaries between IEC 60519 (all parts) and ISO 13577 (all parts).

The text of this International Standard is based on the following documents:

FDIS	Report on voting
27/1121/FDIS	27/1123/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

In this document, the following print types are used:

– requirements and definitions: in roman type;
– NOTES: in smaller roman type;
– **terms** used throughout this standard which have been defined in Clause 3: **in bold type**.

A list of all parts in the IEC 605019 series, published under the general title *Safety in installations for electroheating and electromagnetic processing*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

These general requirements apply to all industrial **EH** and **EPM equipment**, unless an exception is given in the Particular requirements dealing with specific equipment in other parts of the IEC 60519 series. The provisions of other parts of the IEC 60519 series that directly apply to specific types of equipment take precedence over the provisions of this document.

Annex I and Annex J provide orientation with respect to the application of ISO 13577-1 in combination with this document.

This document presumes that the installation or equipment is operated and maintained only by personnel consisting of **skilled** or **instructed persons**.

This document is intended for verifying whether the **EH** or **EPM installation** or **equipment** meets the safety requirements of this document through design, site acceptance tests, routine tests or inspection.

Annex H provides a guide on the use of this document and a list of typical industrial **EH** and **EPM** processes.

SAFETY IN INSTALLATIONS FOR ELECTROHEATING AND ELECTROMAGNETIC PROCESSING –

Part 1: General requirements

1 Scope

This part of IEC 60519 specifies the general safety requirements for industrial installations or equipment intended for **electroheating** (**EH**) and **electroheating** based treatment technologies as well as for **electromagnetic processing of materials** (**EPM**). This document deals with the significant hazards, hazardous situations or hazardous events relevant to industrial **EH** and **EPM equipment**, as listed in Annex A, for **normal operation** and for **single fault condition** as well as under conditions of reasonably foreseeable misuse.

This document specifies the requirements intended to be met by the **manufacturer** to ensure the safety of persons and property during the complete life cycle of the equipment from design through commissioning, operation, maintenance, inspection, to decommissioning, as well as in the event of foreseeable **single fault condition** that can occur in the equipment.

The rated voltage of **EH** and **EPM equipment** can be in the range of low voltage; details are given in 4.2.

This document does not apply to equipment and appliances within the scope of

– IEC 60079 (all parts) – i.e. equipment intended for use in potentially explosive atmospheres;

– IEC 60335 (all parts) – i.e. household, commercial and similar electrical appliances, including room heating;

– IEC 60601 (all parts) – i.e. medical electrical equipment;

– IEC 60974 (all parts) – i.e. arc welding equipment;

– IEC 61010 (all parts) – i.e. equipment for laboratory use.

This document does not provide requirements for type testing.

NOTE Industrial equipment covered by this document is typically produced as a single unit or a very small number of units; such unit usually has a very high value and can cause severe harm at disintegration.

This document does not address data security and hazards arising from neglect of security.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60071-1:2006 [1], *Insulation co-ordination – Part 1: Definitions, principles and rules*
IEC 60071-1:2006/AMD1:2010

[1] A consolidated version of this publication exists, comprising IEC 60071-1:2006 and IEC 60071-1:2006/AMD1:2010.

IEC 60204-1:2016, *Safety of machinery – Electrical equipment of machines – Part 1: General requirements*

IEC 60204-11:2018, *Safety of machinery – Electrical equipment of machines – Part 11: Requirements for equipment for voltages above 1 000 V AC or 1 500 V DC and not exceeding 36 kV*

IEC 60228:2004, *Conductors of insulated cables*

IEC 60335-1:2010[2], *Household and similar electrical appliances – Safety – Part 1: General requirements*
IEC 60335-1:2010/AMD1:2013
IEC 60335-1:2010/AMD2:2016

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 unit or compressor*

IEC 60364-1:2005, *Low-voltage electrical installations – Part 1: Fundamental principles, assessment of general characteristics, definitions*

IEC 60364-4-41:2005[3], *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*
IEC 60364-4-41:2005/AMD1:2017

IEC 60364-4-42:2010[4], *Low-voltage electrical installations – Part 4-42: Protection for safety – Protection against thermal effects*
IEC 60364-4-42:2010/AMD1:2014

IEC 60364-4-44:2007[5], *Low-voltage electrical installations – Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances*
IEC 60364-4-44:2007/AMD1:2015
IEC 60364-4-44:2007/AMD2:2018

IEC 60364-5-53:2001[6], *Electrical installations of buildings – Part 5-53: Selection and erection of electrical equipment – Isolation, switching and control*
IEC 60364-5-53:2001/AMD1:2002
IEC 60364-5-53:2001/AMD2:2015

IEC 60364-5-54:2011, *Low-voltage electrical installations – Part 5-54: Selection and erection of electrical equipment – Earthing arrangements and protective conductors*

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2 A consolidated version of this publication exists, comprising IEC 60335-1:2010, IEC 60335-1:2010/AMD1:2013 and IEC 60335-1:2010/AMD2:2016.

3 A consolidated version of this publication exists, comprising IEC 60364-4-41:2005 and IEC 60364-4-41:2005/AMD1:2017.

4 A consolidated version of this publication exists, comprising IEC 60364-4-42:2010 and IEC 60364-4-42:2010/AMD1:2014.

5 A consolidated version of this publication exists, comprising IEC 60364-4-44:2007, IEC 60364-4-44:2007/AMD1:2015 and IEC 60364-4-44:2007/AMD2:2018.

6 A consolidated version of this publication exists, comprising IEC 60364-5-53:2001, IEC 60364-5-53:2001/AMD1:2002 and IEC 60364-5-53:2001/AMD2:2015.

IEC 60398:2015, *Installations for electroheating and electromagnetic processing – General performance test methods*

IEC 60417, *Graphical symbols for use on equipment* (available at http://www.graphical-symbols.info/equipment)

IEC 60445:2017, *Basic and safety principles for man-machine interface, marking and identification – Identification of equipment terminals, conductor terminations and conductors*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60825-1:2014, *Safety of laser products – Part 1: Equipment classification and requirements*

IEC 60865-1:2011, *Short-circuit currents – Calculation of effects – Part 1: Definitions and calculation methods*

IEC 60909-0:2016, *Short-circuit currents in three-phase a.c. systems – Part 0: Calculation of currents*

IEC 60990:2016, *Methods of measurement of touch current and protective conductor current*

IEC 61000-6-2:2016, *Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity standard for industrial environments*

IEC 61000-6-7:2014, *Electromagnetic compatibility (EMC) – Part 6-7: Generic standards – Immunity requirements for equipment intended to perform functions in a safety-related system (functional safety) in industrial locations*

IEC 61010-1:2010, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements*

IEC 61082-1:2014, *Preparation of documents used in electrotechnology – Part 1: Rules*

IEC 61310-1:2007, *Safety of machinery – Indication, marking and actuation – Part 1: Requirements for visual, acoustic and tactile signals*

IEC 61310-2:2007, *Safety of machinery – Indication, marking and actuation – Part 2: Requirements for marking*

IEC 61310-3:2007, *Safety of machinery – Indication, marking and actuation – Part 3: Requirements for the location and operation of actuators*

IEC 61439 (all parts), *Low-voltage switchgear and controlgear assemblies*

IEC 61508-1:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 1: General requirements*

IEC 61786-1:2013, *Measurement of DC magnetic, AC magnetic and AC electric fields from 1 Hz to 100 kHz with regard to exposure of human beings – Part 1: Requirements for measuring instruments*

IEC 61786-2:2014, *Measurement of DC magnetic, AC magnetic and AC electric fields from 1 Hz to 100 kHz with regard to exposure of human beings – Part 2: Basic standard for measurements*

IEC 61936-1:2010 [7], *Power installations exceeding 1 kV a.c. – Part 1: Common rules*
IEC 61936-1:2010/AMD1:2014

IEC 62061:2005 [8], *Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems*
IEC 62061:2005/AMD1:2012
IEC 62061:2005/AMD2:2015

IEC 62271 (all parts), *High-voltage switchgear and controlgear*

IEC 62471:2006, *Photobiological safety of lamps and lamp systems*

IEC 82079-1:2012, *Preparation of instructions for use – Structuring, content and presentation – Part 1: General principles and detailed requirements*

CISPR 11:2015[9], *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement*
CISPR 11:2015/AMD1:2016
CISPR 11:2015/AMD2:2019

IEEE C95.1:2005, *IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz*

IEEE C95.6:2002, *IEEE Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields, 0–3 kHz*

ISO 3864-1:2011, *Graphical symbols – Safety colours and safety signs – Part 1: Design principles for safety signs and safety markings*

ISO 6385:2016, *Ergonomics principles in the design of work systems*

ISO 7000, *Graphical symbols for use on equipment* (available at http://www.graphical-symbols.info/equipment)

ISO 7010, *Graphical symbols – Safety colours and safety signs – Safety signs used in workplaces and public areas*

ISO 12100:2010, *Safety of machinery – General principles for design – Risk assessment and risk reduction*

ISO 13577-1:2016, *Industrial furnaces and associated processing equipment – Safety – Part 1: General requirements*

ISO 13577-2:2014, *Industrial furnaces and associated processing equipment – Safety – Part 2: Combustion and fuel handling systems*

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[7] A consolidated version of this publication exists, comprising IEC 61936-1:2010 and IEC 61936-1:2010/AMD1:2014.

[8] A consolidated version of this publication exists, comprising IEC 62061:2005, IEC 62061:2005/AMD1:2012 and IEC 62061:2005/AMD2:2015.

[9] A consolidated version of this publication exists, comprising CISPR 11:2015, CISPR 11:2015/AMD1:2016 and CISPR 11:2015/AMD2:2019.

ISO 13577-3:2016, *Industrial furnaces and associated processing equipment – Safety – Part 3: Generation and use of protective and reactive atmosphere gases*

ISO 13732-1:2006, *Ergonomics of the thermal environment – Methods for the assessment of human responses to contact with surfaces – Part 1: Hot surfaces*

ISO 13849-1:2015, *Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design*

ISO 13850:2015, *Safety of machinery – Emergency stop function – Principles for design*

ISO 13855:2010, *Safety of machinery – Positioning of safeguards with respect to the approach speeds of parts of the human body*

ISO 13857:2008, *Safety of machinery – Safety distances to prevent hazard zones being reached by upper and lower limbs*

ISO 14119:2013, *Safety of machinery – Interlocking devices associated with guards – Principles for design and selection*

ISO 14120:2015, *Safety of machinery – Guards – General requirements for the design and construction of fixed and movable guards*

ISO 14159:2002, *Safety of machinery – Hygiene requirements for the design of machinery*

ISO 19353:2019, *Safety of machinery – Fire prevention and fire protection*