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)

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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.